Flightfax

ARMY AVIATION RISK-MANAGEMENT INFORMATION

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Never Underestimate those "Simple" Missions

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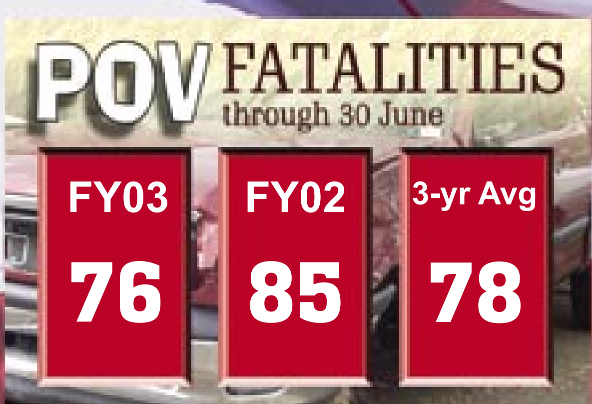

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Joseph A. Smith
BG, USA
Commanding

Keep Your "Leader Lights" On...

We're an Army of 228 years of standards-based experience. Today's leaders understand how to manage risks to protect their soldiers, enforce standards, and demand soldier discipline. These are the foundations of our Army Safety Program.

Although our leaders have made great progress in their safety programs, there is much work to be done. When we look at the accident statistics over the last 10 years, we see that the Army's rate of accidents and fatalities during recent years mirror those of a decade ago. The hazards are clear and generally remain the same: 40.6 percent of accidents involve POVs, with military vehicle accidents accounting for just under an additional 20 percent. Sports and off-duty recreational activities caused 17 percent of recent Army fatalities. Tragically, in our current combat theater of operations, we have lost 11 soldiers simply to the negligent discharge of weapons. The statistics tell us that we continue to be our own worst enemy.

Our goal over the next two years and the Secretary of Defense's mandate is that we reduce accidents and fatalities by 50 percent—a tall order, but one within the ability of the world's greatest Army. Success will require more than standard risk assessments and casual weekend safety briefs. It will require innovative tools to help commanders in the field refine control measures for known hazards. It will require an effective link between the Safety Center's databases and the Army's first-line supervisors, giving them information in lieu of experience to properly risk-mitigate. Most importantly, it will require Army leaders to take an open-eyed, proactive approach toward their safety programs. Simply stated, it means that we must all turn our leader lights "on."

Currently we have large numbers of soldiers preparing to come home and unite with family and friends after months of successful and stressful operations. Let's be mindful that these soldiers have not been behind the wheels of their POVs for some time. Take a proactive approach to ensuring they're not fatigued when they take that first road trip. Visit our Post-Deployment POV Special Update and an updated "Leader's Guide to POV Accident Prevention" posted on our Web site at **http://safety.army.mil**. These are excellent tools to use when talking to your soldiers regarding the common, and not so common, hazards associated with POVs and redeployment.

Clearly, this is a challenging time for our Army. The Army Safety Center, your team member, is working hard to develop additional tools and initiatives to assist in protecting your soldiers' lives and your unit's readiness. In the meantime, I ask you to keep your leader lights "on" and be the leader who prevents the next accident.

Joe Smith

BG Joseph A. Smith

Never Underestimate those "Simple" Missions

CW5 John H. Strickland
FORSCOM Safety, Aviation Division

The mission was simple. An OH-58C had made a precautionary landing out on the range and needed a part flown out. It would take about 30 minutes to replace the part. The aircraft could then be signed off and flown back home. CW3 J was tasked to perform the support mission single-pilot. He was told to take along a technical inspector (TI) and a crew chief who could perform the work and return to base in the other aircraft.

CW3 J did the normal things—preflight, weather check, and mission planning. The mission brief was simple; after all, it was a simple mission. He knew the range by heart—every landing zone (LZ), road, and checkpoint. Navigating was a cinch; he wouldn't have to rely on a map. Of course he'd take it, along with all the other required publications. He believed in doing things the right way and by the book.

The only thing that bugged CW3 J was the weather. He didn't like flying single-pilot at night. Since he had gotten used to night vision goggles (NVGs),

night unaided had lost its luster. Besides, quite honestly, he hadn't flown unaided in a good while. This was the Cav—where night flights meant goggle flights. He looked at the weather information closely: Clear, the moon would be up, and visibility unrestricted. As he prepared a local flight plan, he thought about the fact that this was the fall of the year—hot in the day and cool at night. Ground fog came up fast on the range.

"Oh well," he thought, "I know that range like the back of my hand—every creek, every lake where the fog likes to hide." Besides, he would be returning early, before the fog began to settle in over the low areas.

The flight out to the downed aircraft was uneventful. After shutting down, the TI and crew chief went to work. CW3 J talked with the two aviators from the downed aircraft. CW3 J kidded the pilot-in-command (PC) about causing him to miss getting home early and having supper with his family.

"Should have let you stay out here—good survival training," he joked.

The work took longer than expected; but about an hour later, it was time to head for the barn. The pilots of the now-repaired -58 at first suggested that CW3 J follow them back. However, as they discussed it, they all realized that they had not been briefed for formation flying. So that was not a good idea.

CW3 J told the other crew to take off first. He would wait a few minutes and then follow. After all, they were going in the same direction. As long as they were not in formation, it should not be a problem. Everyone agreed.

On the return flight home, the two aircraft kept their distance but maintained internal FM radio communication. CW3 J maintained visual sight of the lead aircraft's position lights as they followed the route to exit the range.

Except for the fact that it was about 90 minutes later than he had initially expected, everything was going smoothly. It was simple to follow the route back—mostly range roads—but patches of ground fog were beginning to show in low areas.

About 5 minutes from home, things began to go wrong. The fog was getting worse, and CW3 J lost sight of the aircraft ahead. One call assured him they were okay and that they had the airfield in sight.

Suddenly the fog thickened. CW3 J told the TI, who was in the left seat, to let him know if he began to lose sight of the ground to his left. CW3 J slowed the aircraft a little but decided to maintain altitude.

Should he turn around? He could still see the ground, and the PC of the lead aircraft had just flown through this and stated he had no problems. CW3 J knew the other crew had followed the same route, and they were no more than a kilometer ahead of him.

When he was almost to the exit point where he would change frequency from range control to the airfield tower, he looked to his right. It was mostly open fields; at night, it appeared to be a black hole.

Suddenly, they were engulfed in fog and rapidly lost all visual contact with the ground. How deep was this fog? How high was it? Was it a simple scud layer? Single-pilot at night on instruments? Should he climb? Descend?

Do a 180? That didn't sound smart. Neither did the idea of flying in this soup.

"Your left, sir." The TI had seen a sucker hole.

CW3 J immediately turned left, descended through the hole, leveled off, and looked for an open field. He knew there was a field somewhere to his left off the range road. It was getting difficult to maintain visual reference. Below were trees and more trees. Then, straight ahead, there was the field he had been searching for. Before landing, CW3 J made a quick call to unit ops that he was landing and shutting down. They could come get him—he had no intentions of flying this aircraft back tonight.

As the two crewmembers sat by the fire they'd built in the field they'd landed in, the fog continued to roll in. CW3 J looked over at the TI and realized that he could have killed this young soldier. Of course, the fact that he could have died along with the TI didn't make that realization any easier to take.

What had seemed a simple mission had turned into a close call—brief seconds of fear and decisions involving high risk.

This is a true story. It happened many years ago. I was the pilot.

Much can be said of the safety programs and improved technology in aviation that have reduced risk and resulted in significant reductions in our overall accident rates. However, regardless of that progress, we aviators are still the same human beings who flew the first biplane.

Same song, second verse

Years later, I was an accident investigator for the Army. One day I found myself walking around the wreckage of an AH-64 that had entered a fog bank. The pilot had initiated a right turn and, within seconds, both crewmembers experienced spatial disorientation and loss of situational awareness. Now one was dead and the other was seriously injured.

Theirs also had been a simple mission—to fly an aircraft back to the airfield. They were both experienced, high-time pilots. What went wrong? The same thing that went wrong many years before at another time and another place to another much luckier guy.

Much can be said of the safety programs and improved technology in aviation that have reduced risk and resulted in significant reductions in our overall accident rates. However, regardless of that progress, we aviators are still the same human beings who flew the first biplane. Though more knowledgeable, we are still capable of making the same errors we've always made.

We have been successful at standardizing our equipment; technology allows us to improve machinery across the board. Human beings, however, have to improve one at a time. That is the reason standardization is critical. It allows us to train each aviator to a particular level and standard.

What went wrong on both those nights I talked about earlier was that the humans involved were not adhering strictly to standards. I had not flown unaided in quite a long time, and flying unaided is not the same as flying NVGs. I knew that, but I wasn't going to turn down a mission because of it. I didn't consider it to be a serious factor. I had completed the risk assessment sheet with all the right numbers, and it had come out "low risk"—nice if everything goes perfect, but which it seldom does.

In addition, we fudged on the formation flight. Sure, we were legal, but we weren't very smart. My intentions were to keep the other aircraft in sight—we would "unofficially" flight follow each other. What I did not know was that the other crew was flying NVGs, and that's why they had fewer problems than I did. Of course, since we were not "flying formation" there had been no need to brief, so critical information never was shared.

Last, but hardly least, was the weather. The risk level changed when the timeline changed—

the weather was changing even as we were discussing our takeoff. And my decision-making process left out still another critical fact as we droned along that night: the other aircraft was a kilometer ahead, and that made a difference.

The only weather you should trust absolutely is what you are seeing outside your cockpit window. The weather that night was saying "*Land Now!*" I hesitated almost 30 seconds too long, and that could have cost me my life and the life of the TI. I realized years later as I surveyed the crash site that this crew had made the same mistake. They anticipated better weather, they saw a low risk, and they were confident they could handle any situation that might occur. After all, it was a simple mission, they knew the area, and it was a short flight back home.

The ability to learn from your own mistakes is a blessing, not a given. I was allowed to learn from my experience. As I walked through the wreckage of the Apache, I knew that the pilot in the front seat of this aircraft would not have the same opportunity.

It's not our equipment or the environment that causes most of our accidents. Machines and environment are fairly predictable. We can plan on these with acceptable accuracy. Human beings are not quite as predictable; they make decisions that lead to accidents. It's not too difficult to determine what they did wrong, but determining why is more challenging.

Lessons learned

From these two separate events, I learned what I call my top five "WHY" lessons.

1. Aircrew coordination must involve effective communication and teamwork. One thing I remember most is the silence between the TI and me during our flight. I never communicated my concerns to him or he to me about continuing to fly that night as visibility grew worse. He was ready to land and get out several minutes before we ultimately did. The crew of the other aircraft never communicated to me that they were giving weather observations under NVGs. Same thing happened with the crew of the accident aircraft years later—they never effectively communicated to each other during the last critical 2 minutes of the flight. Two highly skilled pilots do not automatically equal good aircrew coordination.

2. Risk management during every phase of mission planning reduces unpredictable "human" actions. We reduce risk by reducing unpredictable actions. Accident-causing errors usually result from individuals' unplanned actions, and unplanned actions are usually due to unidentified risk.

3. We must seek to anticipate and eliminate every possible risk. Every aviator will be faced at least once in his or her life with making a decision whose outcome can mean the difference between an accident, a close call, or a good no-go choice. Each one must be prepared to identify risk and work the process through to completion. Don't accept unnecessary risk, no matter what phase of the mission you're in.

4. There are no simple missions. The more we identify and eliminate risk, the greater our opportunity for success.

5. Every flight should start and end with standardization. Human beings are the most complicated of the man-machine-environment mix. There is no substitute for training to standards and enforcing those standards. Ignore standards and accidents will occur.

Summary

My top five "WHY" lessons are not all-inclusive. When it comes to safety, nothing is. Accidents do not just happen—they are caused. The goal of every individual in the unit should be to ensure that nothing he or she does will cause an accident. And, because you may not get the chance to learn from your own mistakes, take every opportunity to learn from someone else's.

—CW5 Strickland currently works in FORSCOM Safety, Aviation Division, G-3, and can be reached at DSN 367-7508 (404-464-7508), e-mail: john.strickland@forscom.army.mil.

Easy Approach to

Butch Grafton
Lear Siegler Services Incorporated

The following story is one that has made instrument flying the easiest thing in the world to do. Having taught instrument flight training at Fort Rucker, AL, for 23 years, I have learned the technique that really makes a difference in pilots' attitudes regarding instrument flying. Here is how I present it to my Rotary Wing Instrument Flight Examiner Course (RWIFEC) students:

Question: If someone gives you a heading to fly, does that make your job easier?

The answer is a resounding "YES."

Question: So, if I am in the left seat and you are in the right seat and I say, "Fly heading zero-six-five, it will hold you on course." Does my giving you that heading make your job easier?

Again, the answer is always "yes."

How did I come up with the correct heading to fly? It's really very simple. What I did is exactly what has been in Field Manual (FM) 1-240, *Instrument Flying and Navigation for Army Aviators*, for all these years but, unfortunately, few of us know how to use. It's called "bracketing," and it works beautifully. Not only does bracketing work, but the moment you fully understand it, instrument flying becomes truly easy.

I know this because it has happened to me, and it happens to every student from initial entry rotary wing (IERW) to RWIFEC that I teach. It is amazing that something so simple can make such a big difference in instrument flight rules (IFR) flight, but it does. In every class I hear this same statement, "Why didn't someone teach me this 10 years ago?"

Prior to continuing I must ask another question: Is being off course a good thing or a bad thing? Everyone, without fail, says it is a bad thing. So, the first problem with track following is the inherent fear that being off course is a "bad" thing. This fear creates the majority of track following problems simply because pilots tend to stare at the course deviation bar and quit cross-checking the flight instruments. It's tough to control the aircraft looking at navigation instruments! I can tell you that being off course is not a bad thing; indeed, it is a good thing and an inherent part of good track following.

A simple chess game

My best analogy of bracketing is nothing more than a simple chess game, with one difference: I allow my students to make only six moves. In other words, if done properly, the student will establish and maintain a course with six heading changes or less. I have had IERW students do instrument landing system (ILS) approaches on check rides with as few as two heading changes.

Here's how it works. Just as in chess, there is you and one live opponent. In the track following game, there is you and your opponent, the needle. Keep in mind that if you know what heading to fly, this business is MUCH easier. With bracketing, you always know what heading to fly.

To start any bracket, the first heading to fly is the course itself. You can't go wrong turning onto a course and rolling out on the course heading. How simple is that? Now, just as in a chess game, it is your opponent's move. Once he (the needle) moves, it then becomes your move, and so on until he is checkmated and has no more moves. Here is an example of the simplicity of this:

Our course is 120 degrees, so we turn on the course and roll out on 120 and relax. Now, using the standard 20-degree bracket method, I already know my next heading will be either 100 degrees or 140 degrees. (We all agree that knowing the next heading sure makes our job easier!) For example, I am flying 120 and the needle is centered. If the needle's first move is to the right, I already know I am moving to 140; conversely, if the needle's first move is to the left, I know my move will be to 100. So, the needle starts to move to the right, and I allow that because it is a natural part of the bracketing process—hence, being off course really is a good thing because it must happen in order for you to work a good bracket.

Now that the needle is moving right of 120, I will now turn to heading 140, which I already knew was the heading I needed to fly if the needle moved that direction. Now I wait. It is the needle's turn to make a move. While waiting I am contemplating my next move, and I know it will be a 10-degree one. If the needle moves to the right again, I will go to 150. If it moves back to centerline, I will go to 130. I will continue this process until I have worked my bracket down to a 5-degree bracket for precision work or a 10-degree bracket for non-precision work.

Bracketing is without a doubt the technique that removed all my fear of instrument flying. It released me from chasing needles constantly and allows me to sit back and fly simple basic instruments.

In the end it should take six heading changes or less to find what you are looking for, a heading that holds you on course. If you work a good bracket you will know what heading corrects you right, what heading corrects you left, and what heading holds you. If you inadvertently turn and find yourself off the course line, you simply turn to the heading that corrects the direction you wish to go. Brackets seldom take all six heading changes.

I suggest reading FM 1-240 regarding track following using the bracketing method, then try applying it first on a long, en route leg. Once you have that working, attempt bracketing on a few non-precision approaches and finally on the ILS. Use 20 degrees for your first correction on an ILS unless you are very close to the outer marker. It works like a charm. You also can start with an initial heading change of 10, 20, or 30 degrees, depending on where you are and what you think the winds might be doing.

Lastly, bracketing is without a doubt the technique that removed all my fear of instrument flying. It released me from chasing needles constantly and allows me to sit back and fly simple basic instruments, which most of us could do in the first few days of our instrument flight training with little trouble. The one drawback to this is your natural tendency to quit bracketing and start chasing the needle. The moment you do this is the moment instrument flying becomes work again.

—Mr. Grafton is currently working for Lear Siegler Services Incorporated (LSSI), Fort Rucker, AL. He entered Army flight school in 1969 and has been an instrument instructor pilot at Fort Rucker for 23 years and taught instrument MOI, RWQC, RWIC, IERW, and RWIFEC. He can be reached at 334-790-4417, e-mail: butchgr@snowhill.com, http://www.autorotate.org.

FDR System Overview

Historically, human performance has been a factor in 80 percent of all aviation accidents, both military and civilian. The human factor in accidents is one thing flight data recorders (FDRs) have the potential to reduce. The FDR is an asset that provides valuable assistance in accident investigation. But more importantly, it provides commanders a training resource to ensure "command presence" on all flights and a maintenance tool to reduce maintenance costs.

All too often when an aircraft accident or mishap is reported, it may not be understood immediately why the U.S. Army Safety Center (USASC) asks the unit flight safety technician if there was a recording device(s) installed on the aircraft. We are referring to cockpit voice recorders, FDRs, video data recordings, and any other data-producing device that might aid in the accident data collection and discovery process.

USASC is the sole authority for analyzing the safety portion of the data involving Army accidents, as well as the disposition of data extracted from installed onboard recording devices. Therefore, recording devices must be secured, protected, and turned over to the accident investigation board in accordance with Army Regulation (AR) 385-40. In turn, USASC will take this data, conduct analysis, and might actually animate flight data to recreate the flight to relate the mishap profile in support of the accident investigation.

This article is primarily written to assist the commander, flight safety technician, operations, and maintenance personnel by familiarizing them with the equipment and helping them develop procedures for handling transfer and security of data recorders.

Army aircraft today may be equipped with a variety of data recording devices that range from solid-state to older tape-type flight data or cockpit voice tape-style recorders, to include video recorders. They are the:

- Maintenance data recorder (MDR).
- Voice and Data Recorder (VADR®).
- Cockpit voice recorder (CVR) (from various manufacturers).
- FDR (from various manufacturers).
- Programmable digital transfer module (DTM) or data transfer cartridge (DTC).
- Video subsystems of various formats.
- Smart Onboard Data Interface Module (SMODIM®), which normally is installed in support of Combat Training Center rotations.

Many Army aircraft might have engine-trend monitoring systems like the electronic control unit (ECU) or the digital electronic control unit (DECU). Some could even be instrumented with non-standard recording devices and equipment in support of special programs. These systems can provide valuable data for accident investigations, as well as maintenance and operational trends in support of Flight Operations and Quality Assurance (FOQA) programs. The following is a brief overview by platform:

AH-64

The AH-64A aircraft normally are equipped with video subsystems. The problem is that the system might or might not be turned on and operating at the time of the mishap. Generally unit tactics, techniques and procedures, and SOPs govern operation. The aircraft might have also been modified with a SMODIM. If your aircraft are so equipped, USASC is prepared to assist you in retrieving the data.

The AH-64D Longbow has a video subsystem, MDR, and, in some cases, a SMODIM. The MDR is a crashworthy system that might also have cockpit voice capability, so treat the MDR just like an FDR or CVR. Data from the MDR can be downloaded using the Longbow Integrated Maintenance Support System (LIMSS) via a 1553 Interface cable to a personal computer (PC) host system. When the unit requests assistance from USASC to process safety data from the MDR, the maintainer must execute a full "safety download" to capture the voice file. MDR data and voice files can be sent over a secure DoD e-mail system to USASC when needed.

The bottom line: If the Longbow has been involved in a mishap, USASC will direct that the MDR be secured.

OH-58D

The Kiowa Warrior has two basic digital source collector (DSC) devices along with an airborne video tape recorder, the programmable DTC for the "I" model, and the programmable DTM for the "R" model. In addition, the ECU on the 250-C30R/3 engine for the "R" model aircraft can be downloaded at the request of the commander by a Rolls-Royce field representative. This download can provide limited engine parameters such as turbine gas temperature (TGT), N_G, N_P, torque, etc. The DTC has a limitation in that it relies on battery power to hold memory. If the batteries in the DTC are weak or aircraft battery power was cycled, maintenance data recorded on the DTC can be lost. The DTM has a non-volatile memory system that effectively holds data.

Unfortunately, units do not have the ability to download the flight data from a DTC or DTM; they can only program mission data via the Aviation Mission Planning System (AMPS). Presently, to download the DTC or DTM, the cartridge must be sent or escorted to USASC. The project manager for AMPS is working to make download capability available to units. When that has been accomplished, units will be able to e-mail cartridge binary data over a secure DoD e-mail system when needed to analyze a flight data set. New upgrades in the aircraft software will provide the unit additional flexibility in ways to handle flight data from the aircraft.

UH-60 and CH-47

Currently, there is nothing installed on these aircraft to provide a standardized source for digital data collection except for specialized aircraft that use VADR®. However, some aircraft have been outfitted with the Health Usage Monitoring System (HUMS) that is currently involved in field demonstrations and special projects. USASC coordinates data download from the Army aircraft system project manager when needed. The aircraft might have also been configured with a SMODIM. If you have questions regarding the UH-60 or CH-47 aircraft, contact USASC for assistance.

Fixed-wing

The fixed-wing fleet has a varied list of data collection recording devices and capability because most are a military version of a commercial variant and are similarly configured. As a result, many of our fixed-wing aircraft have the older, tape-style CVR or FDR systems. Recently the Army has started modifying fixed-wing aircraft with digital CVRs or FDRs. Units requesting download and analysis of data should contact USASC for assistance.

Other collection sources

USASC uses other data collection sources to capture the full impact of maintenance, training, and human performance problems. Sometimes eyewitnesses, video recordings from other aircraft, radar summary, and Air Traffic Control tapes are the only sources of data. In any case, think outside the box in search of other data collection sources.

Because Army aircraft are equipped with a variety of recording devices, the flight safety technician needs to understand what they have on the aircraft and how to use it. If your unit experiences a mishap or an event that requires analysis in support of maintenance diagnostics or safety download, contact USASC's 24-hour hotline in the Operations Division at DSN 558-2660/3410 or (334) 255-2660/3410 to assist you in the disposition of and instructions for recording devices. ♦

Editor's note: An example of a policy letter that can be incorporated into your unit's pre-accident plan and unit reading file is located at ***http://safety.army.mil/pages/tools/fdr.doc****.*

—FDR Analysis Section, USASC, DSN 558-2884 or 2259 (334-255-2884 or 2259)

High Temperatures and High Stress

Dr. (MAJ) Dave Romine, U.S. Army Aeromedical Center,
and Dr. (CPT) Kris Kratz, U.S. Army School of Aviation Medicine

Summertime and the livin' is easy. Right? Hardly. For most of us, summer schedules tend to be the manic extreme of cramming as much as possible into the period between Memorial and Labor Days. All kinds of activities—from family reunions to the phenomenon I call "youth league soccer and baseball slavery"; overdue visits to family members who, after a day or two, remind us why we live at least a 2-days' drive from them; and sunburn and animal bites—help to keep us from any true summer rest and relaxation. Throw into the mix a PCS move (this period being most likely for military family relocation) and two or three large wads of cash dropped on a vacation to some miserably hot and crowded theme park with rodent-costumed people dancing around in what was formerly uninhabitable swampland, and what you have is "summertime and the livin' is crazy."

For the aviator and aircrew member, increased stress can impair their ability to perform in the aircraft with varying consequences. We always are emphasizing the need for physical preparedness (crew rest, overall fitness, etc.) and only are beginning to take a preventive approach to good emotional health. Though we often talk about stress and its effect on us, we often fail to recognize that the presence of most stressors in our life is frequently voluntary. In other words, if we are stressed out, then it's most likely the result of our not saying "no" to something that wasn't necessary. Remember, a certain amount of stress always is impacting us; some of it is related to good events (a new spouse, baby, promotion, etc.) and some bad events (a death in the family, injury, non-select for promotion, etc.). And, each person has a certain threshold that, once reached, will manifest itself by adversely impacting our day-to-day ability to function.

Signs that we have too much stress in our lives:

- Problems with relationships: family, work, or socially.
- Missing routine items, such as meetings or items on checklists.
- Feeling resentful of your responsibilities or other people.
- Not enjoying things that used to be fun.
- Changes in motivation.
- Problems with attention, memory, or reaction time.
- Anxiety, depression, or unexplained fatigue.
- Laughing or crying for no reason.
- Back pain, headaches, or other body aches.
- Other physical changes such as high blood pressure, shortness of breath, weight changes, upset stomach, or constipation and/or diarrhea.

Tips on avoiding undue stress:

- Develop a sense of humor—seriously! Learn to laugh at yourself. Keeping standards high doesn't mean you have to be hard on yourself or those close to you.
- Learn to recognize when you're feeling stressed.
- Make choices to change the things you can control, and choose to stop worrying about things you can't control.
- Exercise regularly, drink less caffeine, and stay properly hydrated.
- Use alcohol only in moderation to enhance the good times, not to mask the tough ones.
- Cultivate healthy, peaceful relationships.
- Learn to relax, particularly diaphragmatic breathing and progressive muscle relaxation.
- Pray, meditate, and take time for faith and stillness.

Drug and alcohol abuse are NOT ways to deal with stress. Drugs and alcohol only add new problems, including addiction and relationship issues. Also, don't ignore stress. It won't go away on its own!

If you're feeling a little overwhelmed, talk to someone—your spouse, chaplain, or even a close friend—about it. Talk to your flight surgeon early, let him know what's going on, and ask for his help. Go directly to an aeromedical psychologist. They are doctoral-level aviation crewmembers specially trained to help the aviator keep his or her emotional health in top form. And don't wait for stress to build to the point of distraction, causing you to miss a mission-critical detail that could hurt you or others. Instead, take a "performance enhancing" perspective. Early intervention ensures that your abilities (attention, memory, reaction time, and crew coordination) in the cockpit do not begin to degrade.

And, about that summer (or anytime) schedule: Think about the choices we make for filling up our days and nights. The cumulative social and peer pressures that push and pull at us should be viewed judiciously. Guard yourself from unnecessary obligations and learn to focus on what's truly needful. Avoid the distractions of the day, and always make safety your goal. ♦

Drug and alcohol abuse are NOT ways to deal with stress. Drugs and alcohol only add new problems, including addiction and relationship issues. Also, don't ignore stress. It won't go away on its own!

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Murphy's Law— Lightning Strikes Two Ways

LTC John D. Murphy
HQDA, DCS, G-2

How likely is your aircraft to be damaged by lightning? Consider the odds... Since 1 October 1999, we've had 13 lightning strikes to Army aircraft. Eleven of those were Class C accidents and two were Class D accidents. Are there any precautions or techniques we can use to increase the miss distance? The answer is yes...and no.

"A bright flash of light and a loud boom similar to a cannon going off" is how an aircrew described a discharge they encountered while descending to land. Flying at 10,000 feet, the aircraft entered instrument meteorological conditions (IMC) and encountered very light, steady turbulence seconds before the strike. Immediately after the discharge, the crew noted light rain and Saint Elmo's fire (luminous, low-intensity electrical discharge). The crew described the Saint Elmo's fire as "green waves dancing on the windscreen," which continued for 2 to 3 minutes. After landing, maintenance discovered over $50,000 in damage including a small hole in the radome, aircraft skin delamination, and over 100 spot welds along the underside of the fuselage. Weather analysis revealed the outside air temperature (OAT) at 10,000 feet was about 1°C.

Did this crew do something wrong?

The answer is no, since the crew was well over 20 miles from thunderstorms as confirmed by airborne and ground-based radars. Radar showed only light precipitation in the area where they encountered the strike, not the type of weather normally requiring avoidance. This example is typical of mishaps reported as lightning strikes. Most don't occur while flying near a thunderstorm, but instead are associated with flight in precipitation near the freezing level.

Two types of lightning strikes

An article by D.W. Clifford of McDonnell Aircraft Company entitled "Another Look at Aircraft-Triggered Lightning" describes the experiences of many military and commercial pilots. Clifford states the strikes usually fit into one of two types. The most common occurs near the freezing level in precipitation not associated with thunderstorms, and can be preceded by static noise on aircraft radios and Saint Elmo's fire around the aircraft's extremities. When the discharge occurs, it's accompanied by a loud bang and usually does little or no apparent damage. Typically, a small $5,000 hole is burned through the radome and minor delamination occurs.

The other type of discharge occurs abruptly in or near a thunderstorm and usually causes more severe damage. This type is what most of us picture as a true lightning strike, where the aviator was simply in the way of a bolt of lightning. Fortunately, we experience very few of these in the Army because we routinely give thunderstorms a wide berth.

But what about the more common type of electrical discharge, often referred to as static discharge ("triboelectric charging," for you electrical engineers). It is the one occurring in areas we normally think of as safe. Clifford explains aircraft static charge accumulates through a process that is similar to the static electricity build-up when you scuff your feet on the carpet. For aircraft, the amount of charge transferred is related to the type and amount of water particles present, aircraft frontal area, and aircraft speed. A large aircraft flying at cruise speed through heavy precipitation will usually build up a charge quicker than a small, slower aircraft flying at approach speeds through light rain. Flying near the freezing level adds to the static charge build-up. The most intense electrical charging mechanisms exist in this region due to its mixture of ice crystals and supercooled water droplets. Furthermore, as supercooled droplets become more highly charged at the freezing level, they could break into even more numerous smaller droplets, thus increasing the electric charge buildup.

If all this electrical potential is at the freezing level in innocent-looking rain clouds, why is there no natural lightning? Good question! Here's where we must deal with some theory. First, for lightning to occur, charged areas need to separate. In rain showers, large charged regions don't form until your aircraft comes flying through. Not only is your aircraft accumulating a large negative charge from impacting cloud droplets and precipitation, the turbulence created in your wake might intensify the charge separation process. Although Clifford's explanation is complex, it essentially says the aircraft triggers the discharge. Whether you want to call this a lightning strike or a static discharge really doesn't matter—results are often the same.

So where does Saint Elmo's fire fit into the process? Saint Elmo's fire also is called corona and occurs when charge builds up enough to exceed the breakdown strength of the air around the sharpest points of your aircraft. Air breakdown strength is its resistance to electrical arcing and decreases with altitude. The corona will typically form around the aircraft nose and, besides being visible to the crew, could cause radio static.

Does the presence of Saint Elmo's fire mean you'd better get ready for a strike? Well, not necessarily. Although you might be on the verge of a rapid discharge, electrical exchange to the air by the corona reduces the charge on the aircraft. As long as the corona releases charge from the aircraft at least as fast as it builds up, you're okay. However, static charge build-up can exceed the corona's ability to "vent" the charge. The aircraft then becomes a region of charge build-up, and a discharge similar to lightning occurs.

This discussion isn't meant to imply we're only susceptible to aircraft-triggered static discharges. Natural lightning strikes can and do occur. The USAF, NASA, and FAA have conducted considerable aircraft lightning strike research by intentionally flying highly instrumented CV-580 and F-106B aircraft in the vicinity of thunderstorms. Their results show conditions likely to cause lightning strikes differ from those we generally encounter during a static discharge. These tests demonstrated the probability of lightning strikes in thunderstorms increased with altitude, usually well above the altitudes of most Army aviators. At 36,000 to 40,000 feet and at temperatures below –40°C, they averaged two strikes per minute inside thunderstorms. At 18,000 feet, the frequency was one strike every 20 minutes. Most of the strikes at the lower altitudes actually were triggered by the aircraft themselves. Test results, though, were probably influenced by how the data was collected. NASA obtained data by intentionally penetrating thunderstorms—a maneuver most aviators shy away from. Lightning strikes in the vicinity of thunderstorms don't pose as great a hazard to Army aircraft. This isn't because thunderstorms aren't potentially dangerous, but because they're usually easy to avoid by giving them a wide berth using flight planning, radar, and good old common sense. ♦

Editor's note: Remember, lightning is not the only reason to avoid thunderstorms: heavy precipitation, low visibility and ceilings, hail, turbulence, icing, violent wind speed, and direction shifts, to mention a few, also can cause major problems. Though the risk of lightning strikes to Army aviators might be low, other risks associated with thunderstorms make flying near the storms inherently dangerous. The wise aviator is the aviator who steers clear of thunderstorms and gives them a wide berth.

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WAR Stories

Risk management lessons learned

You Don't Know as Much as You Think

"I made it just by the skin of my teeth!" How many times have you heard an Army aviator say that? In a land far, far away and a time long, long ago, I was a CW2 and pilot-in-command (PC) of a UH-1. I thought I knew everything there was to know about flying Army helicopters, and I even had nearly 500 hours of flight time. I could tell war stories with the best of them and had a really strong knowledge of emergency procedures, range operations, and airfield operations. I was proficient in night, instrument, and formation flying, or so I thought.

Late one afternoon, five crews and my copilot (a brand-new WO1) and I reported to flight operations for a day-out, night-return training mission with formation flying incorporated as part of the training. We took off in good weather, with reports calling for some late-evening clouds and visibility of no less than 3 miles outside the clouds. We did formation changes, lead changes, and approaches to confined areas. Some time later, it was well past dark so we elected to put our best lead pilot up front in case we encountered low visibility.

After we had climbed to 3,000 feet we decided that everyone had had enough training for one day, so we turned for home. Well, the things that are supposed to stay the same didn't. The weather came in and the next thing I knew, we had just initiated instrument flight rules (IFR) break-up, with all five crews IFR!

The lead called approach control and informed them of our situation. Approach control, in turn, called each of us, gave us squawk codes, and began sequencing us for an approach. Sometime between getting my code and the time approach control came back to me with my clearance, I had not been performing a proper cross-check and zeroed the airspeed. The aircraft just stopped flying, and by the time I realized what I had done we were in some very unusual attitudes with a bunch of warning lights going off!

I remember attempting to make a mayday call, which was totally unintelligible because my voice had gone up so many octaves that it sounded like a 1955 Chevy squealing tires. By the grace of God, I managed to regain control of the aircraft and my voice. I called approach control and asked for the nondirectional radio beacon (NDB) approach back to the airfield. They asked me if I had attempted a mayday call because they couldn't understand who called or what had been said. I told them I had called, but that it was a mistake. I was too embarrassed to tell the truth.

Approach control approved the NDB request and vectored me to a course that kept me from doing the entire approach. I asked my copilot to tune and identify the NDB and do a before-landing check. “Tuned and identified and land check completed,” he said.

As we crossed the beacon, approach control turned us over to the tower for final approach. I continued to fly the heading that was depicted on the approach plate, but the #1 needle was pointing in the wrong direction. Now at this point and after everything else that had occurred, you can imagine my concern.

Just as I was about to call for a missed approach, we broke out of the overcast and I saw the airfield off to my left front. You can probably guess what happened. My copilot dialed in the wrong frequency, and I didn’t check after he confirmed tuned and identified.

Remember that if you fly Army aircraft, you don’t know as much as you think. Always reconfirm anything you or your copilot do, and never stop flying the aircraft until you are sitting in the club with your beverage of choice and an audience for your war stories. I’m not going to sign my name to this—I’m very old, still on active duty, and there are probably some guys left out there that flew with me back then. I just can’t handle all the obscene phone calls! ♦

Be safe!

New Aviation Life Support Equipment Course

Dan Reed
Directorate of Training, Doctrine, and Simulation

Beginning in October 2003, the U.S. Army Aviation Center will enhance the aviation life support equipment (ALSE) course by adding a 6-week resident course to the existing 1-week distributed learning (DL) course.

The ALSE course is designed in two phases. The first phase is the online DL phase of 38.5 hours of instruction. The second phase includes 6 weeks of in-residence training at the ALSE School, Fort Rucker, AL. The course has been designed to include the new Air Warrior equipment.

Registration for access to the online DL phase began 23 June 2003. Soldiers must pass the two online Phase One DL examinations and have confirmation of test scores 2 weeks prior to arriving at Fort Rucker for the Phase Two resident portion in October 2003. Unit training divisions must start registering their soldiers *now* for the Phase One DL course and follow on with the Phase Two resident course in the Army Training Requirement Reporting System (ATRRS).

“This is another first for us in the distance learning arena in aviation enlisted training at Fort Rucker,” said CPT Ken Girardi, Chief of Enlisted Training. “We are giving our soldiers a Web-based course of instruction followed by a resident course. In meeting the directive set by the Commanding General of TRADOC for FY04, we are importing a DL concept into our training strategy that ultimately provides our soldiers more time at home station and less time in the schoolhouse. It’s a win-win situation for both the soldiers and commanders in the field.” ♦

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Above the Best

CW5 William Barker
Aviation Warrant Officer Proponency

Simply mentioning the fact that you are a military pilot often makes you the center of attention, even in the company of other soldiers or professional people. It is a heady feeling that strokes the ego, leaving you rightly proud of your accomplishments and proud of knowing you have joined an elite group—the long line of Army aviators. You are one who can proudly wear the Silver Wings, one who can truly identify with the timeworn phrase "Above the Best."

You could be doing a thousand other things with your life. Instead you have been chosen to do something extraordinary, something that demands intelligence, meticulous planning, and continuous, career-long, thoughtful effort in order to count yourself alive and successful at the end of the day. It is the stuff of legend, something highly desired and greatly treasured, and it is naturally fun and exciting! No honest aviator would deny that. We probably wouldn't tolerate many of the hardships if it were otherwise.

That exhilaration comes at a price. Sadly, not all of us are willing to make that sacrifice for this great privilege. We have had some frightful incidents and accidents in the past because of that unwillingness. It is time to look at our individual attitudes, professionalism, and the integrity of our actions.

Perception

You've heard it your entire career...you are a soldier first and always. What you do as an aviator is subordinate to that singular, distinguishable fact. It's that simple and it's that profound. This can't be overemphasized! If this is not your perception, then you need to seriously consider leaving the Army. There must be an unwavering commitment to this principle. Anything less is unacceptable and is grounds for dismissal!

Attitude

The great standardization instructor pilots (SPs) I have known and worked with placed attitude preeminent on their scale of required aviator "skills." Among the many attributes and skills needed to be a proficient aviator, most can be strengthened or enhanced through study, practice, and guidance—with one notable exception, attitude. It is the age-old story; I can teach you to fly an instrument landing system (ILS) or to execute a visual meteorological conditions (VMC) approach, but I can't fix your attitude. Only you can do that! It's a matter of the heart, and only you can effect authentic and lasting change. If you have chosen to be a rogue aviator, the type who holds rules and guidelines in disdain, there is little hope of forcing you into a different mindset. Worse still, you simply can't be trusted with millions of dollars worth of equipment, the dependency of others on your mission performance, and most importantly, the priceless lives of your fellow soldiers.

Integrity

Can you be counted on—counted on to be realistic about your own or the crew's shortcomings, to maintain the knowledge necessary to be a professional aviator, and to be dedicated to the Army mission, whatever that might be on a particular day? Will you do the right thing when no one is watching? Regardless of the strength or weakness of the "command climate," a professional soldier and aviator will not violate the implied trust of those he serves. Vigilance must come from within; it should not need to be forced from without.

Duty and Honor

Some have snickered at the statement of the seven Army Values, yet they form the glue that bonds soldiers together in peace and, most especially, war. These values are intangible elements, but they manifest themselves in very tangible consequences, good and bad, gratifying and tragic.

It is imperative the Army Aviation community solve its own problems without outside meddling from those who won't likely understand our unique requirements. Past issues of *Flightfax* have made us aware of the consequences of disobedience and undisciplined flight. I'm encouraging you to aspire to greatness, to live on the other side of the fence from the rogue aviator, the one who wreaks havoc and destroys lives. Perform your flight and your mission with honor and distinction.

Flying is fun and garners much personal attention, but it must be embraced as a sacred trust and when that trust is violated, disciplinary action must be swift and unwavering. The sheer joy of flight properly executed carries no guilt and is exhilaration undefiled. In the daily performance of this privileged assignment, we must remain duty-bound and committed to integrity of action. ♦

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ACCIDENT BRIEFS

Information based on preliminary reports of aircraft accidents

AH-64

A Model

■ **Class A:** While in cruise flight at approximately 400 feet above ground level (AGL) and performing a route recon, the pilot-in-command (PC) executed a right turn at an altitude between 300 to 400 feet AGL and 20 knots. The aircraft entered a down-wind condition, and the rotor RPM began to decay. The PC attempted to regain rotor RPM by reducing power, but the rotor RPM had not recovered by 200 feet AGL. The PC executed a power-on autorotation to sloping terrain and the aircraft rolled right upon touchdown. The PC compensated with left cyclic, causing the main rotor blades to strike the upslope terrain. The aircraft rolled inverted, spun 180 degrees, and came to rest on the rotor hub. The crew egressed without injury, but the aircraft was totally destroyed.

■ **Class A:** While conducting a night recon and surveillance mission using night vision systems (NVS), a flight of two aircraft departed a named area of interest (NAI) en route to another NAI in a loose, staggered right formation. As the flight maneuvered between two hilltops, Chalk 1 struck a series of four mining cables. Both pilots were killed by the impacts and the aircraft was completely destroyed by a post-crash fire.

■ **Class D:** During preflight phase with engines running prior to taxi, the aircraft turned 290 degrees to the left while on the ramp in parking. This movement caused the aircraft to contact a Tri-Max fire extinguisher with the right underside of the stabilator. The aircraft stopped turning when it contacted the fire extinguisher. The pilot was late with the appropriate corrective flight control inputs to stop the turn.

CH-47

F Model

■ **Class E:** During shutdown, the #1 hydraulic pump failed and subsequently was replaced. The problem was determined to be due to fair wear and tear (FWT).

MH-60

L Model

■ **Class E:** During run-up, the #1 engine flamed out while in cross-feed. Maintenance personnel attempted to run the #2 engine indirect, and it subsequently flamed out. Maintenance personnel determined the packing between the #2 main fuel hose and the #2 main fuel tank breakaway valve had deteriorated and allowed a significant enough air leak to flame out whichever engine was drawing fuel from the #2 main fuel tank.

OH-58

C Model

■ **Class C:** Aircraft suffered a reported turbine outlet temperature (TOT) spike to 990ºC during engine start-up. No other details were provided.

DR Model

■ **Class C:** During termination with power phase of an autorotation, the aircraft experienced engine (141 percent/2 seconds) and transmission (119 percent/3 seconds) overtorque conditions. No other details were provided.

■ **Class E:** While conducting an over-water formation, the aircrew noticed a slight binding and resistance in the flight controls or hydraulic system. The crew made a precautionary landing, and the aircraft was inspected in accordance with the appropriate maintenance technical manual (TM). No mechanical damage was found, and the aircraft was released for flight.

UH-60

A Model

■ **Class C:** The aircraft's tail de-ice cable bracket fractured during flight, striking the tail rotor and stabilator on the right leading edge. No other details were provided.

■ **Class E:** During daytime cruise flight the #1 ENG CHIP and MASTER CAUTION lights illuminated. Engine oil temperature and pressure remained within normal limits, and the flight was terminated without further incident. Maintenance inspection revealed the #1 engine chip detector was within tolerance, and the aircraft was released for flight.

O-2A

Cessna Skymaster

■ **Class E:** During takeoff roll at night the pilot observed fuel flow drop to zero, and the #1 engine lost power. The pilot aborted takeoff and secured the engine by moving the mixture lever to CUTOFF and closing the front engine fuel valve. The aircraft was taxied to parking and secured. Maintenance personnel discovered a fractured fuel line fitting at the fuel injector and installed a replacement part. The aircraft was functional flight-checked and returned to service.

Editor's note: **Information published in this section is based on preliminary mishap reports submitted by units and is subject to change. For more information on selected accident briefs, call DSN 558-9552 (334-255-9552) or DSN 558-3410 (334-255-3410). There have been numerous accidents in Kuwait and Iraq since the beginning of Operation Iraqi Freedom. We will publish those details in future *Flightfax* articles.**

Routine Mission? I Don't Think So!

A crewmember in Afghanistan was working on his aircraft when he felt something touch the top of his boot. He looked down and froze when he saw this snake on his foot—turns out it was a 6-foot cobra. That'll get your attention! The snake was seeking refuge in the fuel vent area above the right forward landing gear.

LESSON LEARNED:

Never get too comfortable on a "routine mission." Something could be waiting out there to bite you!