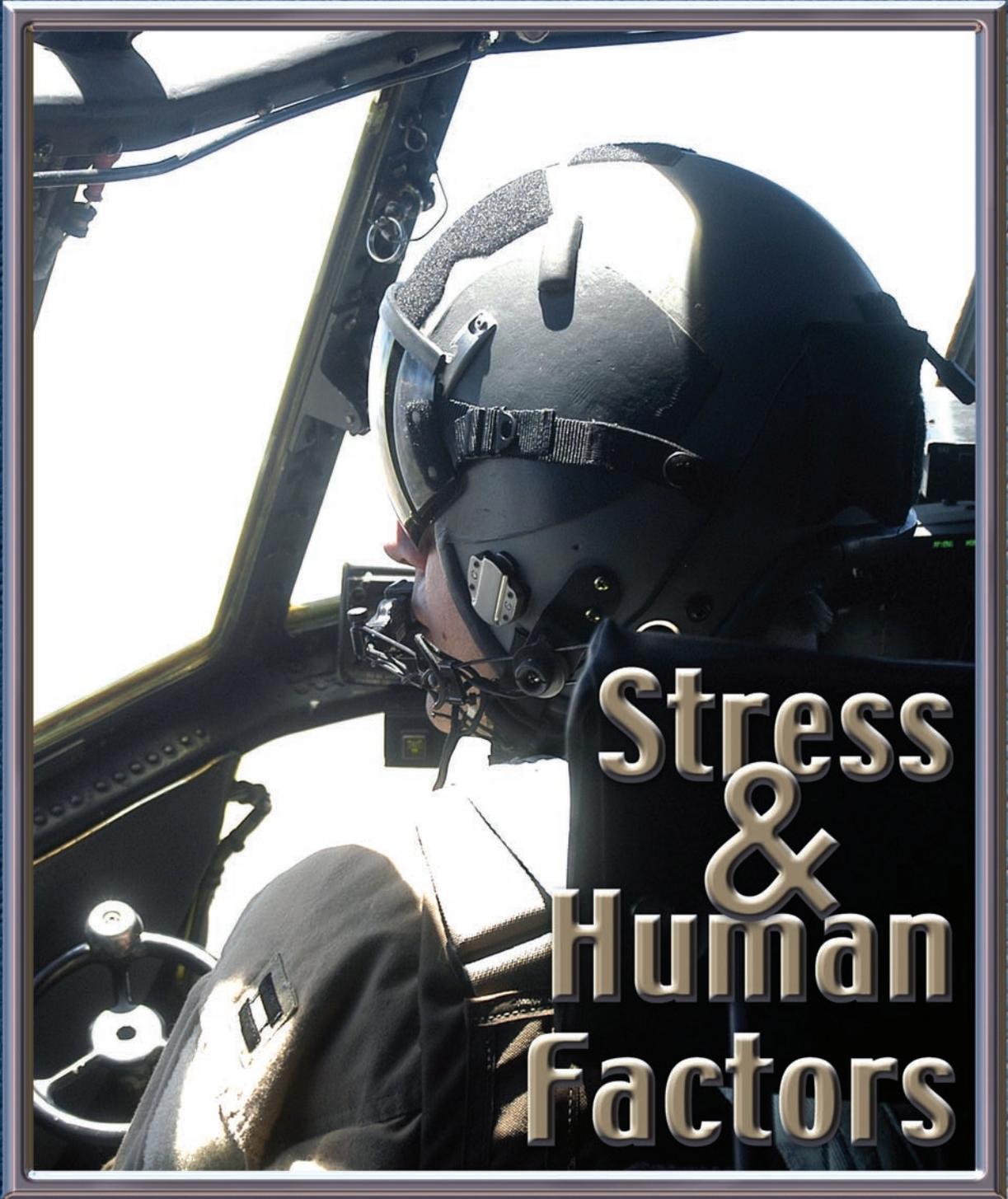


UNITED STATES AIR FORCE  
**FSM**  
AUG 2006  
FLYING SAFETY MAGAZINE





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Rear Cover: USAF Photo by TSgt Catherine Perretta





## STRESS

One of our stories this month says, "They are called 'human factors' for a reason. They aren't called 'heavy-pilot-only factors' or 'over-50-years-old-male factors' or 'applies-only-to-sub-standard-pilots factors.'"

We're looking at human factors in some stressful situations, not all of them life threatening, but all likely to cause a certain level of "pucker factor." A sampling:

"Tower called us back within three minutes and told us they had the entire bird. It had been killed and roasted by our No. 2 engine's 900-degree-C exhaust."

"I have always looked at pilot training as one big, stressful, sweaty game. Some lucky days you win, some days you lose."

"I'm a fighter pilot, after all, and fighter pilots don't wimp out and whine about not being able to fly because they don't feel 100 percent."

"[I]t was sheer luck that I had enough blood left in the grey matter to command some form of anti-G straining maneuver."

"The radios were going non-stop, and my student was unable to find a break in the radios to make his final turn call. Halfway through the final turn I noted the airspeed was higher than it should be for the power setting. I was analyzing this in the turn, but not rolled out on final, when the RSU called, 'Final go around, no gear.'"

"Here we were, on three engines, low on fuel due to the leak, and approaching the end of a 26-hour day..."

"For pilots—who have been identified as having one of the most stressful occupations—on-the-job stress may occur when operational demands exceed the pilot's physical capacity and/or mental capacity. In these situations, researchers have assumed that pilots with 'an overload of information' have an increased risk of stress-related performance errors."

We hope you'll find some remedies to combat these errors.

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**PURPOSE** — *Flying Safety* is published monthly to promote aircraft mishap prevention. Facts, testimony, and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. The contents of this magazine are not directive and should not be construed as instructions, technical orders, or directives unless so stated. **SUBSCRIPTIONS** — For sale by the Superintendent of Documents, PO Box 371954, Pittsburgh PA 15250-7954. **REPRINTS** — Air Force organizations may reprint articles from *Flying Safety* without further authorization. Non-Air Force organizations must advise the Managing Editor of the intended use of the material prior to reprinting. Such action will ensure complete accuracy of material amended in light of most recent developments.

**DISTRIBUTION** — One copy for each three aircrew members and one copy for each six maintainers and aircrew support personnel.

**POSTAL INFORMATION** — *Flying Safety* (ISSN 00279-9308) is published monthly except combined Jan/Feb issue by HQ AFSC/SEMM, 9700 G Avenue, SE, Kirtland AFB NM 87117-5670. Periodicals postage paid at Albuquerque NM and additional mailing offices. **POSTMASTER:** Send address changes to *Flying Safety*, 9700 G Avenue, SE, Kirtland AFB NM 87117-5670.

**CONTRIBUTIONS** — Contributions are welcome as are comments and criticism. The editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

**Commercial Prefix (505) 846-XXXX**

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**24-hour fax:** DSN 246-0931

**HQ Air Force Safety Center web page:**  
<http://afsafety.af.mil/>  
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# Stress

## and Aircrew Performance

Courtesy, Flight Safety Foundation *Human Factors & Aviation Medicine*

*Although small amounts of stress can yield benefits such as increased alertness and an improved ability to concentrate, an accumulation of stress caused by daily frustration and major life events has been associated with numerous health problems. In studies of flight crewmembers, stress has been associated with pilot error.*

**S**tress is the body's response to demands, pressures or changes. Causes of stress (stressors) can be major life events, such as a death in the family or a new job; ongoing aggravations, such as a chronic illness or an inflexible work schedule; or the annoyances of daily life, such as traffic jams or—

crewmembers—exposure to aircraft engine noise and vibration during flight.

Each encounter with a stressor causes a complex reaction that begins with a signal from the brain to the autonomic nervous system, which controls involuntary body functions such as breathing, heart rate and blood pressure. The signal from the brain also triggers the release of hormones—primarily adrenaline and noradrenaline (also known as epinephrine and norepinephrine) from the adrenal glands—into the bloodstream to prepare the body to cope with a perceived danger.<sup>1</sup>

In response to the brain's signal, the breathing rate increases to allow the body to take in more oxygen, and the heart rate increases, blood pressure rises, and some blood vessels narrow, directing blood to the muscles and brain and away from the skin and other organs not involved in the response to the perceived danger. Some blood cells (platelets)



become “stickier” (more adhesive) to prevent excessive bleeding in the event of injury. Fats and glucose (sugar) are released from storage sites to provide energy, and muscles become tense.

Long ago, the stress response was vital in fighting off enemies and running from predatory beasts (the “fight-or-flight” response). However, the stress response typically occurs today in situations that are considerably less than life-threatening; repeated activation of the stress response, rather than providing the impetus to fight or to flee danger, may contribute to serious health problems.

The body “does a poor job of distinguishing between life-threatening events and day-to-day stressful situations,” says a Harvard Medical School report on stress.<sup>2</sup> “Anger or anxiety triggered by less momentous sources of stress, such as financial fears or traffic jams, doesn’t find a quick physical release and tends to build up as the day rolls on. Anticipation of potential problems, such as anxiety or more personal worry stemming from awaiting medical [test] results, adds to the turmoil. The physical and psychological symptoms of stress—a clenched jaw, shakiness, anxious feelings—compound this, creating a negative, self-perpetuating cycle” (see Symptoms of Stress”).

## Stress Can Have Benefits

Stress cannot be avoided, and the right amount of stress is considered beneficial; it helps people stay alert, focused on the task at hand and interested in the world around them.

Individual stress responses differ; some people become stressed in response to minor daily occurrences while others cope with virtually everything with no outward indication of stress. Genetics may be partly responsible for the differences.

“The genes that control the stress response keep most people on a fairly even keel, only occasionally priming the body for ‘fight or flight,’” the Mayo Clinic said.<sup>3</sup> “Overactive or underactive stress responses may stem from slight differences in these genes.

“Life experiences may increase your sensitivity to stress as well. Strong stress reactions sometimes

can be traced to early environmental factors. People who were exposed to extreme stress as children tend to be vulnerable to stress as adults.”

For pilots and other crewmembers, even under ordinary conditions, the flight environment includes stressors such as noise, vibration, decreased barometric pressure, and accelerative forces. Fatigue and altered sleep-wake cycles also may be factors, especially for crewmembers on flights that span several time zones.<sup>4</sup>

## The “Wrong Stuff”

Moreover, a 2000 study found that the captain’s personality type also influences the amount of stress on the flight deck.<sup>5</sup>

During the study, 24 three-member flight crews performed line operations, including emergency operations, in a Boeing 737 simulator; afterward, they were tested for perceived stress. The crews that committed the fewest errors reported experiencing less stress than crews that committed more errors. The crews with the fewest errors typically were led by captains who were categorized in the report on the study as possessing the “right stuff” (for example, they were described as “active, warm, confident, competitive and preferring excellence and challenges”).

Other captains were categorized as possessing either the “wrong stuff” (for example, they were described as arrogant, authoritarian, emotionally invulnerable, impatient, irritable, preferring excellence and challenging tasks, and having limited interpersonal warmth/sensitivity) or “no stuff” (for example, they were described as “unassertive [and] self-subordinating, [with] average interpersonal [skills], low self-confidence, low desire for challenging tasks and low desire for excellence”).

## “General Adaptation Syndrome”

Researchers have studied stress for many decades, but it was not until the 1940s that Hans Selye, an endocrinologist at McGill University in Montreal, Quebec, Canada, developed the “general adaptation syndrome” (stress syndrome) theory. According to this theory, an encounter with stress develops in three stages:<sup>6,7</sup>

- The *alarm reaction* includes an initial shock, in which an individual’s resistance is lowered, followed by a countershock, in which the individual’s defense mechanisms are activated;
- *Resistance* is the stage of maximum adaptation; if the adaptation succeeds, the individual’s body functions return to normal; and,

continued on next page

## Symptoms of Stress

Symptoms of stress are numerous and differ from one person to another. Common symptoms include the following:<sup>1,2,3</sup>

### Physical symptoms

- Tense muscles, especially in the neck and shoulders;
- Headache or backache;
- Stomachache, nausea, vomiting, diarrhea or constipation;
- Tiredness or difficulty sleeping;
- Unusually rapid heartbeat;
- Shakiness or excessive sweating;
- Weight loss or weight gain;
- Clenched jaw or clenched teeth;
- Fingernail-biting;
- Sighing or changes in breathing patterns; and,
- Decreased interest in sex.

### Emotional symptoms

- Frustration, irritability or anger;
- Depression or anxiety;
- Nervousness; and,
- Boredom or apathy.

### Behavioral symptoms

- Abuse of alcohol, drugs or other substances;
- Marital problems;
- Binge eating; and,
- Self-destructive behavior.

### Cognitive symptoms

- Forgetfulness, preoccupation and difficulty concentrating;
- Indecisiveness;
- Work mistakes and loss of productivity;
- Excessive worry;
- Decrease in creativity; and,
- Loss of sense of humor.

### Notes

1. Harvard Medical School. *Stress Control: Techniques for Preventing and Easing Stress*. Boston, Massachusetts, U.S.: Harvard Health Publications, 2002.
2. Mount Sinai Medical Center. Stress. "<http://www.mssm.edu>"
3. The Cleveland Clinic. *Keys for Managing Daily Stress*. "<http://www.clevelandclinic.org>"

- If the stressor persists or if the defense mechanisms fail, the result is *exhaustion*, in which the defense mechanisms collapse.

Later research found that one or more sources of stress—either at home or at work—in combination with personality traits such as competitiveness and impatience (typically described as elements of a “type A” personality), may lead to a variety of “stress manifestations” such as physical illness or mental illness or dissatisfaction with a job or a marriage.<sup>8</sup>

For pilots—who have been identified as having one of the most stressful occupations—on-the-job stress may occur when operational demands exceed the pilot’s physical capacity and/or mental capacity. In these situations, researchers have assumed that pilots with “an overload of information” have an increased risk of stress-related performance errors.<sup>9,10</sup>

## Stress Links Stress, Pilot Error

A 1985 study of more than 700 U.S. Naval aviators who were involved in major aircraft mishaps found that the 381 aviators who were “causally involved” were more likely to have had problems with interpersonal relationships—one of the symptoms often displayed by someone who is not coping well with stress—than were the 356 aviators who “had no culpability in their mishaps.”<sup>11</sup>

A report on the study said that the data showed that aviators in the causally involved group also “are more likely to be poor leaders, to be less mature and stable, to lack an adequate sense of their own limitations, and to lack professionalism and the ability to assess troublesome situations. In addition, they are more likely to have financial problems, to have trouble with interpersonal relationships, to have trouble with superiors and peers, and to drink to excess or to have recently changed their alcohol intake. They are more likely to have recently become engaged to be married, be making a major career decision and to have undergone a recent personality change...”

“It also appears that there are certain personality factors that render some aviators more susceptible to the adverse effects of stress, as evidenced by their higher human-error-mishap potential. Such factors as a lack of maturity, no sense of their own limitations and an inability to assess potentially troublesome situations are more prevalent among those who are subsequently assigned fault in an aircraft mishap.

## Home Stress Adds to Job Stress

Researchers have studied the effects on pilot

performance of both job-related stress and stress at home.

A study based on a questionnaire administered to 19 U.S. Coast Guard helicopter pilots in 2000 found that, as stress at home increased, stress on the job also increased.<sup>12</sup>

“Pilots under stress at home felt tired and worried...at work,” said the U.S. Federal Aviation Administration (FAA) report on the study.<sup>13</sup> “Pilots indicated that as the home stress experienced at work increased, self-perceptions of flying performance decreased, especially the sense of ‘not feeling ahead of the game.’”

Authors of the FAA report said that their findings were that the pilots surveyed identified their primary coping strategies as a stable spousal relationship, a stable home life and the ability to talk with an understanding partner.

“The first warning signs of home-based psychological distress may be more evident in the daily work activities rather than in cockpit error,” the report said. “If support services and management recognized the early warning signs at work that were symptomatic of home-based stress, they could provide timely intervention before the occurrence of more serious flying performance decrements.”

## Results of Stress

Researchers estimate that more than 40 percent of adults experience adverse health effects associated with stress and that more than 75 percent of visits to physicians’ offices are for stress-related problems.<sup>14</sup>

These problems can be relatively minor, such as clenched teeth or tiredness, but they also can be life-threatening. For example, stress is associated with heart disease and diseases involving the immune system, as well as accidents and suicides. Stress also can exacerbate a number of medical conditions, including gastrointestinal disorders and asthma; some medical specialists believe that stress can be a factor in the development of cancer.

The Harvard Medical School report said that the widespread implications of stress include direct effects, “such as...long-term suppression of the immune system, causing stickier-than-normal platelets, slowing wound-healing, or constricting major blood vessels, and indirect effects on behavior. Overeating, smoking, drinking too much, not exercising enough and engaging in other risk behavior can certainly take a toll.”<sup>15</sup>

More specifically, stress influences heart disease in several ways:<sup>16</sup>

- The stress-related release of adrenaline and other hormones into the blood increases the amount of cholesterol manufactured by the

body. (For example, one study found that the blood cholesterol levels of medical students increased by about 25 percent during their final exam period.) Elevated blood cholesterol levels contribute to atherosclerosis, the narrowing of blood vessels, which can lead to chest pain, heart attack or stroke;

- Stress-related increases in blood pressure can contribute to hypertension (high blood pressure), which—by placing extra pressure on the blood vessels—can result in injury to the vessels and can force more cholesterol into the artery walls, increasing the risk of atherosclerosis; and,

- Chronic stress reduces the effectiveness of the body’s immune system. The immune system typically responds to an infection by releasing substances to fight the infection; after the infection subsides, the adrenal glands release the hormone cortisol to stop the body’s infection-fighting response. During periods of stress, cortisol is among the hormones that remain elevated; at the elevated level, cortisol can suppress the immune system, preventing a response to infection.<sup>17</sup>

However, in some cases, stress causes the immune system to overreact. The result is an increased risk of autoimmune diseases, such as lupus, in which the immune system attacks healthy cells. Stress also can exacerbate the symptoms of existing autoimmune diseases.

Some medical specialists believe that chronic stress—because of its effects on the immune system—may influence the development of cancer by restricting the body’s ability to stop the spread of cancer cells. Their theory is that cancerous changes in the body’s cells occur often and for many reasons but that the immune system destroys these altered cells; when the immune system cannot do its job, the cancer cells spread.<sup>18</sup>

Stress is one of several factors that can contribute to gastrointestinal ailments. For example, stress can cause an increase in the secretion of gastric acid, which can lead to heartburn. Studies have found that a combination of stress and other psychological factors and physical factors can cause gastrointestinal pain and abnormal contractions of the intestines that often are symptoms of irritable bowel syndrome. Another study found that people who considered their lives stressful were about twice as likely to have ulcers as people who did not believe that they were experiencing stress. Earlier findings identified a bacterium as the primary cause of ulcers, but some medical specialists now believe that stress could delay healing of ulcers.<sup>19</sup>

Stress is one of dozens of factors that can trigger an asthma attack. The stress response causes



# Relax...

Progressive muscle relaxation and deep breathing, also known as relaxed breathing or abdominal breathing, are techniques designed to help manage stress.

To perform progressive muscle relaxation, assume a comfortable position, with support for your head and neck. Close your eyes and tense the muscles in the hand and arms to 25 percent to 50 percent of maximum tension; maintain the tension for a few seconds as you continue to breathe, then release the tension and focus your attention on the contrast between tense muscles and relaxed muscles. Repeat the muscle-tensing and tension-releasing process once for each of six other muscle groups: muscles in the face; in the neck and shoulders; in the stomach and

abdomen; in the buttocks and thighs; in the calves of the legs; and in the toes. Sit quietly for several minutes and focus your attention on the feeling of relaxation. Slowly open your eyes.<sup>1</sup>

To perform deep breathing, inhale through your nose while mentally counting to 10. As you inhale, your upper abdomen—not your chest—should rise. Exhale slowly and completely, again mentally counting to 10. Repeat between five times and 10 times.<sup>2</sup>

### Notes

1. Mount Sinai School of Medicine. Stress. "<http://www.mssm.edu>" The technique is one suggested by the American Heart Association.
2. Mayo Clinic. Stress: Why You Have It and How It Hurts Your Health. "<http://www.mayoclinic.com>"

small airways in the lungs to contract (tighten), interfering with the flow of air into and out of the lungs. Some specialists also believe that a person's exposure to intense stress when very young can contribute to the development of asthma.<sup>20</sup>

## How to Cope

People cope with stress in many ways. Specialists say that the first step in coping is to identify stressors and the symptoms that occur after exposure to these stressors.

Other recommendations involve development or maintenance of a healthy lifestyle, with adequate rest and exercise, a healthy diet, limited consumption of alcoholic drinks and avoidance of tobacco products.

More specific recommendations include the following:<sup>21,22</sup>

- Remove the stressor, or change your way of thinking about the stressor;
- Seek training in common stress-reduction techniques such as meditation, yoga, tai chi; and biofeedback-assisted relaxation. Some people also find relief in prayer;
- Perform progressive muscle-relaxation or deep-breathing exercises (see "Relax...");
- Talk to someone else about the situation. Psychiatrists, psychologists and licensed clinical social workers all have training to help people cope with situations that trigger a stress response;
- Visit a massage therapist, use a hot tub, or take a bath or shower;
- Exercise or play sports;
- Go outdoors; or,
- Listen to music, read a book, write in a journal or write a list, engage in a hobby or other enjoyable activity.

Major life events and the frustrations of daily living result in an accumulation of stress that has been associated with numerous health problems, as well as with pilot error. With a healthy lifestyle, an understanding of what causes stress and selection of appropriate coping mechanisms, people can learn to alleviate their stress. ✈️

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1. Harvard Medical School. *Stress Control: Techniques for Preventing and Easing Stress*. Boston, Massachusetts, U.S.: Harvard Health Publications, 2002.

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13. Ibid.

14. American Psychological Association. *How Does Stress Affect Us?* "<http://www.apahelpcenter.org>"

15. Harvard Medical School.

16. Ibid.

17. Mayo Clinic.

18. Harvard Medical School.

19. Ibid.

20. Ibid.

21. Mayo Clinic

22. Mount Sinai School of Medicine. *Stress*. "<http://www.mssm.edu>"

# It's A Dry Heat

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Tinker AFB OK

**I**t was warm that day, but then again it was Del Rio, so what else would it be? I remember it was my second solo ride in the T-37. So, there I was, burning holes in the pattern like my life depended on it. It was a clear VFR day and I was diligently scanning all around my aircraft to ensure adequate pattern spacing from the get-go. To say the airspace around a pilot training base is busy would be an understatement. The day in question has stuck with me because I believe it is the closest I have ever been to riding one in.

I have always looked at pilot training as one big, stressful, sweaty game. Some lucky days you win, some days you lose. For me, that day's game was the pattern game. A huge carousel of fighter-crazed Tweet pilots going round and round. The way it works is, you make your way around the pattern to get as much practice working the radios, sharpening your reflexes, and basically doing as many

touch-and-goes as possible to better your airmanship. If it looks like someone returning from the military operating areas (MOA) is going to occupy the same space as you at the same time, it would behoove you to break out of the pattern and head to the VFR entry point to once again play the spacing game.

I remember the VFR entry point like it was yesterday. I'm sure at one point in time this landmark was a beautiful sprawling lake with rivers leading to and fro, but during my stay at Laughlin it was something more akin to a mud puddle when seen (if seen) from altitude. The first time the instructor says to you, "Do you see it?" you naturally say no because it's not an easy find. However, once the barrage of ridicule and sarcasm about being blind and incompetent abates, you naturally say yes, whether you see it or not. So round and round I went, excited and feeling a numbness that can only be brought on by the task saturation of being a new Tweet pilot trying to grasp the finer points of piloting a military aircraft.

As luck would have it, I got the opportunity to practice my skill at breaking out of the pattern due



USAF Photo by TSgt Bill Thompson

to traffic conflict, so off I went to the VFR entry point. Knowing the point was sometimes difficult to see, I did my best to pick a heading perpendicular to the airfield and began scanning the ground for my puddle. I know what you might be thinking: So you find a spot, you turn around, and it's no big deal. Well, this is true. But I was new, so the more I frantically searched for this elusive point, the more fear and doubt crept into me that I might screw up.

You always hear the embarrassing tale where the new solo pilot is doing his thing, having a great time in the pattern by himself but ultimately makes an erroneous decision, after which two lines are heard. The first is where the controller asks him what he is doing, and the second is where the controller asks him to make his next landing a full stop. I certainly did not want that to happen.

Well, I did manage to find the point right as I flew almost directly over it, and here is where I put myself in harm's way. Had I been a little calmer and more rational, I would have offset myself nicely for a gradual turn and descent into the entry point. What happened was me channeling all my attention to positioning my aircraft exactly where I wanted it at exactly that moment (i.e., instantaneous turn around a point). So, from a breakout altitude of 2,600 feet to a pattern altitude of 2,100 feet, I rolled somewhere in the neighborhood of 120 degrees, give or take, and pulled.

Suddenly I thought to myself, "Why does everything look so bleak?" and just as suddenly I realized I wasn't seeing much of anything anymore. I can only say that it was sheer luck that I had

enough blood left in the grey matter to command some form of anti-G straining maneuver. My vision returned, I rolled out of some bank, and let the turn play out as I tried to collect my thoughts. With terror in my heart, I practiced a couple more landings and brought the mighty Tweet to a full stop.

The reason that this experience has really stuck with me is simply because I realized that from 2,000 feet, if you are seeing much more brown than blue, and you start to G-LOC, it may be the last time you see anything ever again. It is a dreadful recollection when you think to yourself that only a few seconds were all that stood between you and the ground.

What did I learn from a safety standpoint, you may ask yourself? Number one, it's better to give your best effort and learn from it, than to die trying to be perfect. Sometimes we forget that our business entails something that humans don't naturally do. Our jobs are inherently dangerous, and while there are a myriad of factors beyond our control, we always have the chance to make the right decisions that will keep us out of harm's way.

Number two, it's important to have a firm grasp of your own limitations so you are cognizant of what kind of situation you may put yourself in and what it's going to take to get back out of it. The smart ones learn to anticipate, recognize, and plan accordingly for a potentially dangerous situation. For me, it was important to internalize the potential ramifications of flying an aircraft with the fastest G-onset in the Air Force inventory.

Finally, no one wants to die flying a 5,000-pound dog whistle into the ground. 

# If Only I'd Believed That

**CAPT TRISHA D. HARMS**  
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**W**e've all thought this at one time or another, right? *If only I'd believed my coach when he told me that stretching would prevent a pulled hamstring. If only I'd believed my dad when he told me to change my oil every 3,000 miles...even on my old Toyota. If only I'd believed that investor who told me to start saving in my twenties.* You get the hint.

My job entails providing instruction to people about things they often don't believe. They may understand, but they don't actually believe it applies to them. However, this, like so many other things, seems to be something that changes with age. I've found it's usually the lieutenant colonels and above who share their stories and offer examples and edification on the topics I brief. It seems the younger crowd is the most challenging audience...the crowd that still holds a few "it'll never happen to me" attitudes.

No, I'm not an insurance salesman. I am an aero-

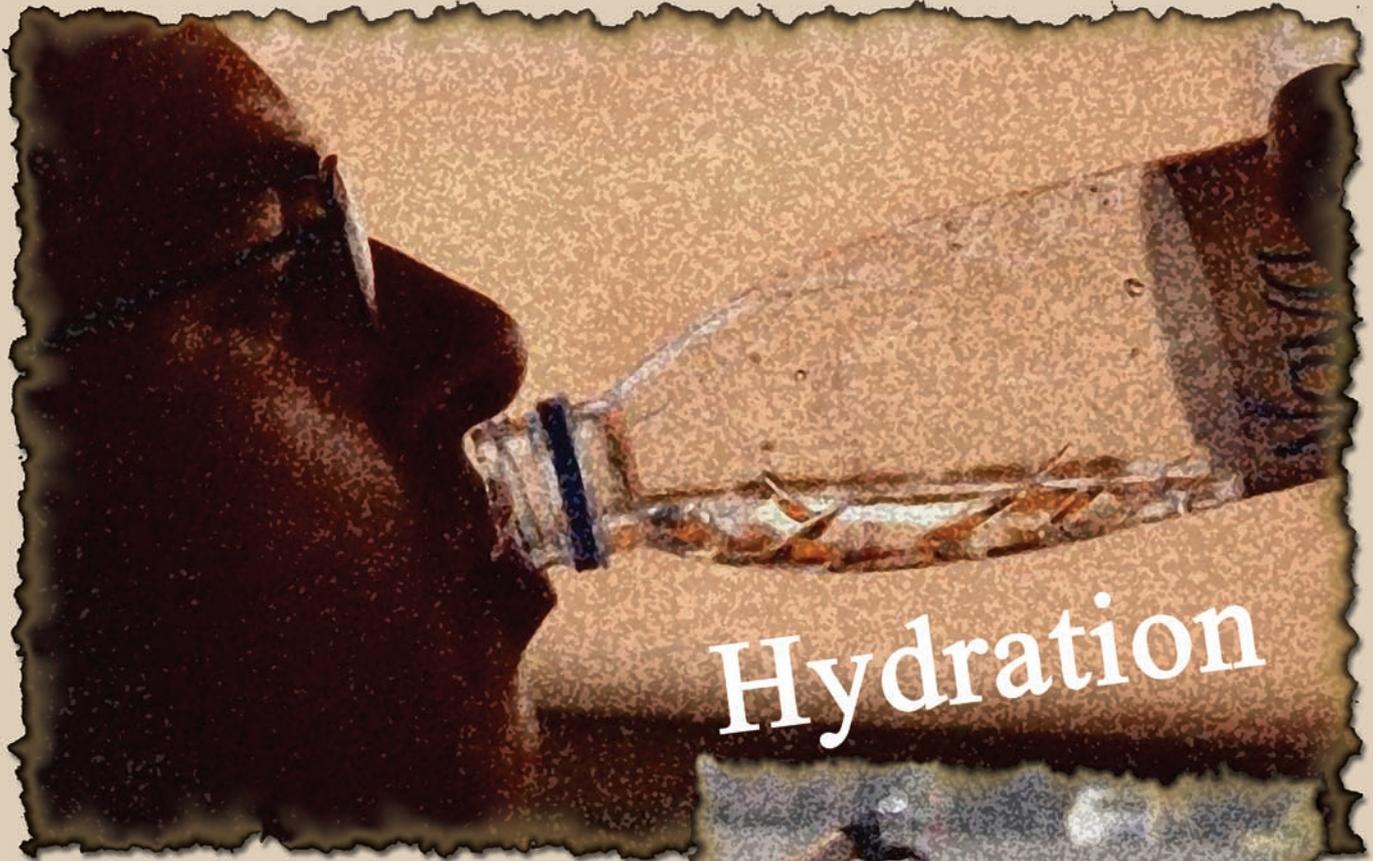
space physiologist, and one of my jobs is to educate people about human factors. Before you close the magazine and say, "I've heard this all before," just give me five minutes (10 for the slower readers) and consider that they are called "human factors" for a reason. They aren't called "heavy-pilot-only factors" or "over-50-years-old-male factors" or "applies-only-to-sub-standard-pilots factors". Keep an open mind as you read this, and remember all the times you've said, "If only I'd believed that."

## Catchin' Some Z's

**Fact:** Getting less than enough sleep negatively affects your performance. Your SA will be decreased, reaction time increased, and higher-level functioning (decision-making) impaired. Most adults require 7-9 hours of sleep per night. Let's put this in terms a lot of people will understand. According to Dr. John Caldwell, AFRL/HEPF, a sleep loss of only 2-3 hours results in the same mental functioning as drinking 3-4 beers. I doubt there are many pilots who would even consider stepping to their jet intoxicated, yet many regularly step impaired to the same degree by fatigue. Does it matter why you're



USAF Photo by SSgt Janice Cannon



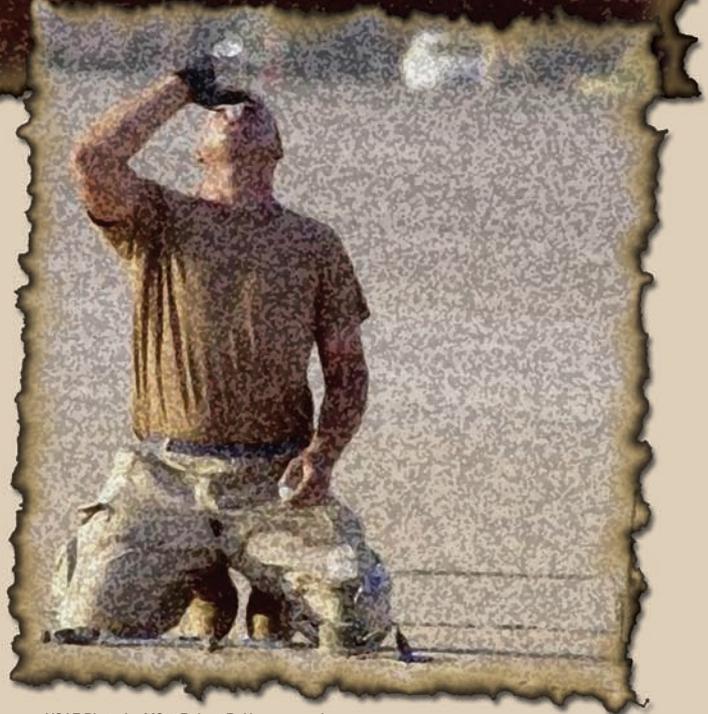
# Hydration

impaired? Or is it that you don't really believe that being a little tired could really affect you that much? What will it take for you to believe? A near mid-air on a night flight after you got a little behind the jet or spatially disoriented? Seeing a buddy (who you know has been putting in some long hours lately) have to punch out following a loss of SA and altitude awareness? Even if this happens, would you connect the dots that fatigue played a significant role in their degraded state?

A more extreme study shows that being awake for 20-25 hours puts us at the functional equivalent of a person with a blood alcohol content of .10 percent. Legally drunk in most states is .08 percent.

## Have You Checked the Oil Lately?

One of the simplest and most important things you can do for your body is to maintain a good hydration level. I'm not going to lie to you; being hydrated doesn't add to your performance capabilities. But being dehydrated definitely detracts from them. Therefore, maintaining a proper level of hydration eliminates potential negative effects. Your body's thirst mechanism is activated when you are approximately 2 percent dehydrated (2 percent of your body weight). Dehydration of only 3 percent (reached when you've felt thirsty for around 20-30 minutes) leaves you with a 20 percent decrease in your aerobic capacity and a 35 percent decrease in your anaerobic capacity. Depending on what you

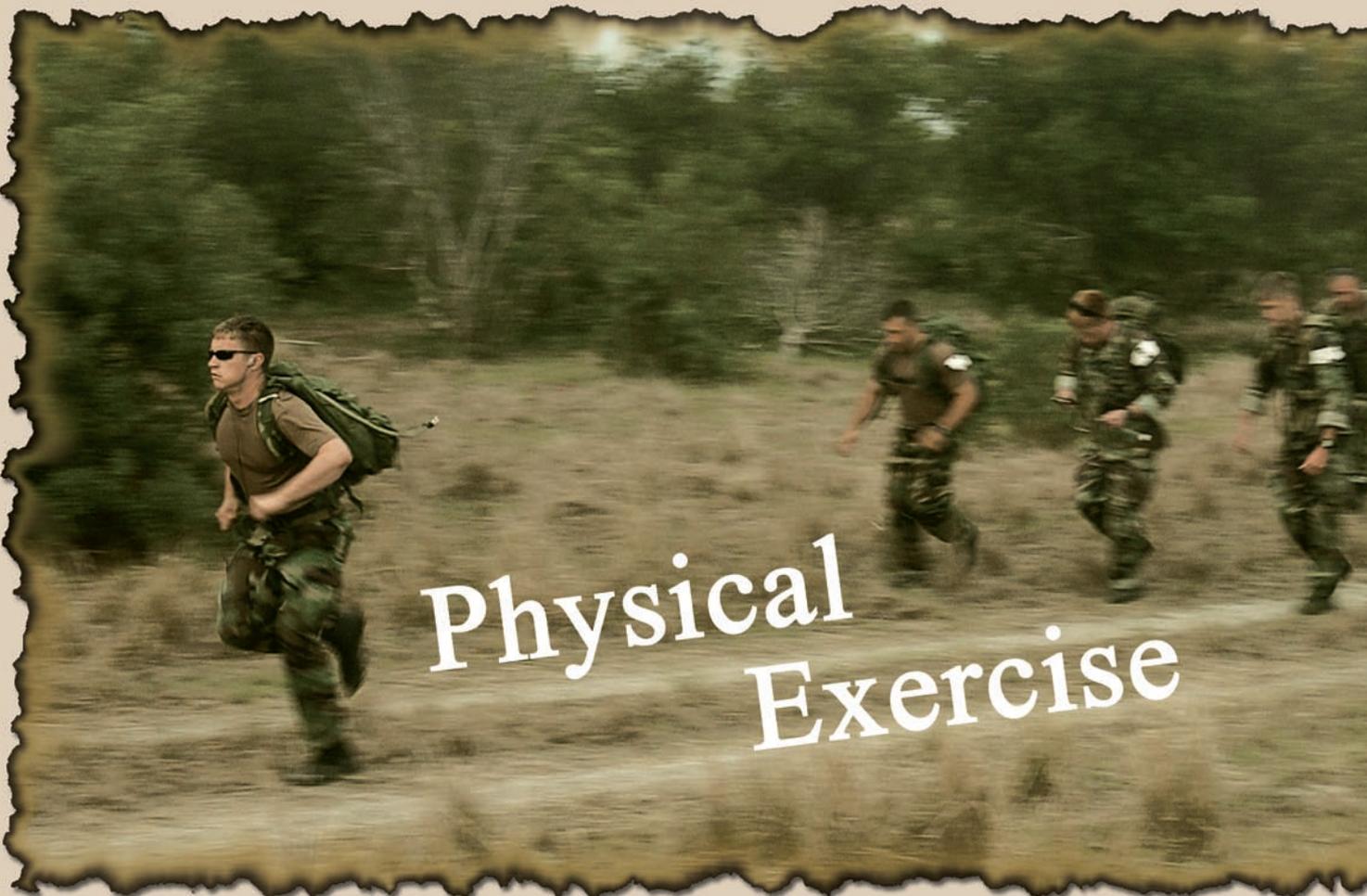


USAF Photo by MSgt Robert R. Hargreaves Jr.

fly and what your mission is for the day, you will require different amounts of effort from these systems. If you fly fighters and will be pulling significant G's on a given sortie, being 3 percent dehydrated lessens your G-tolerance by up to 50 percent.

Water is the preferred fluid for hydration. Full-strength sodas and fruit juices or drinks require some level of dilution in order for your body to process them. If you don't drink some water after drinking juice or soda, your body will re-route water from other places in order to dilute and pro-

continued on next page



# Physical Exercise

cess these fluids. In survival courses, the instructors teach you not to eat if you don't have any water. This is the same concept. Food and concentrated or sugary drinks require you to drink additional water. If you don't, you end up more dehydrated than you were before you drank the juice or soda.

Chronic dehydration is hard on your body. You're asking it to operate in less than optimal conditions, and eventually it will catch up with you. Think of it as using only three or four quarts of oil in a car that needs five quarts. It will run, but after years of running on less than the optimal amount of oil, you'll see some problems. Likewise, chronically operating with less than optimal hydration will increase your risk of certain diseases and conditions over time.

Caffeine is not the proverbial oil leak, as originally thought. A recent study has shown that the diuretic effects of caffeine do not kick in until you surpass the 300-400mg mark (about 2 regular size cups of coffee).

### Have You Heard About the \_\_\_\_\_ Diet?

Nutrition can have a significant effect on your performance, both short-term and long-term, and you control this as well. There are plenty of fad diets and "miracle pills" at your disposal. Just use some common sense here. If you're trying to lose weight, keep in mind that you didn't gain the 15 pounds in one week and you won't be able to lose them in

one week either. There is a reason why some things aren't fads...it's because they make sense and they work. Exercise and a sensible diet are the sure-fire ingredients to getting/maintaining a healthy weight. A donut and cup of coffee for breakfast, a candy bar and a soda for lunch, and jalapeno popcorn and a beer for supper do not fit into the "sensible diet" category. You all know the basics. Fruit, vegetables, lean meat, milk, whole grains = good for your body and good for your mind.

If you go for more than 3-4 hours without eating, or your breakfast was the coffee and donut mentioned above, you are likely to be a bit hypoglycemic (low blood sugar). Hypoglycemia usually causes feelings of fatigue, difficulty concentrating, lack of energy, and possibly even dizziness. In order to prevent this, eat something (not necessarily a full meal) every 3-4 hours...a piece of fruit, a granola bar, a container of yogurt, or a small sandwich. Foods high in sugar or low in fiber (read: donut, candy bar, chips, soda, etc.) will cause your blood sugar to rise quickly and remain high for approximately 30 minutes, then drop to a level even lower than it was before. So, unless you'll be able to eat a donut every 30 minutes (this is not a valid reason to do so), you may want to try a bowl of cereal (that doesn't have sugar listed as one of the first three ingredients) or a bagel for breakfast. They will prevent the blood-sugar roller coaster.



Don't think you have enough time to eat a healthy diet every day? It's not always convenient, but a little planning can go a long way. Put the leftovers from supper in a plastic container for lunch the next day. Set an apple, banana, and granola bar on the counter in the evening so you don't forget to grab them in the morning. However, even those who are already "healthy eaters" can't be perfect; therefore, it's also a good idea to take a daily multi-vitamin. Be sure to ask your doctor first. He/she may even be able to get you some from the pharmacy or recommend a good brand.

### **I Am Going to "Pump You Up!"**

Exercise goes hand-in-hand with nutrition and hydration if you are trying to lose some weight, but exercise has far more benefits than often realized. Regular exercise is a great way to relieve stress. When you exercise, your body releases hormones that actually improve your mood. Exercise also helps you feel less fatigued during the day and improves the quality of your sleep at night. Furthermore, the better shape your body is in, the more effectively you will be able to handle different stresses (fatigue, G's, high-pressure situations, etc.). Do you see a performance trend here?

The 2005 Dietary Guidelines for Americans, published by the US Department of Health and Human Services, states in order to manage body weight and

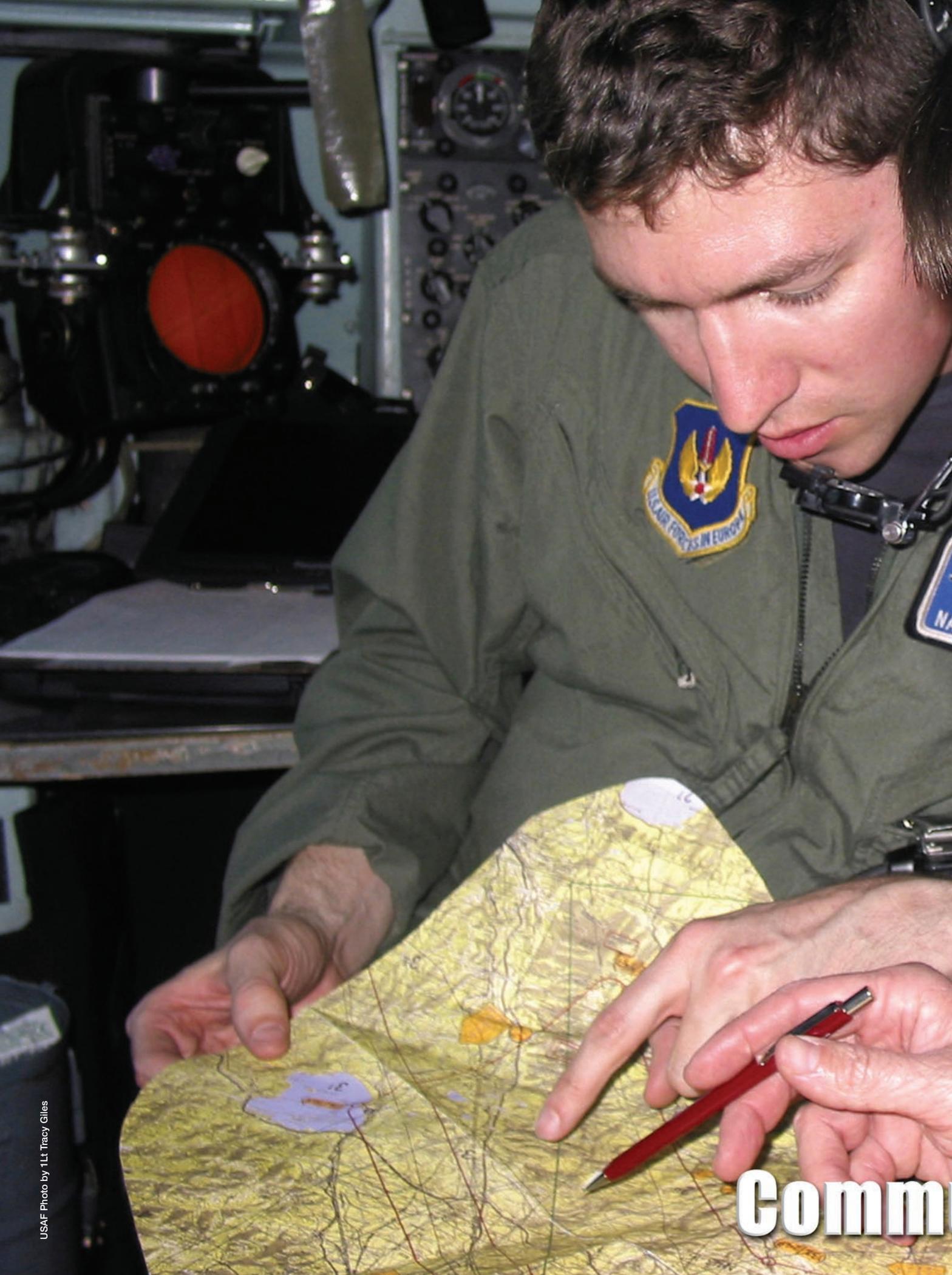
prevent gradual, unhealthy body weight gain in adulthood, one should engage in approximately 60 minutes of moderate to vigorous intensity activity on most days of the week while not exceeding caloric intake requirements. Additionally, the guidelines state that in order to sustain weight loss in adulthood one should participate in at least 60 to 90 minutes of daily moderate intensity physical activity while not exceeding caloric intake requirements. If you find an activity you enjoy, you are more likely to exercise regularly. Don't get stuck in an exercise rut; mix things up occasionally. Try a new class at the gym. Do interval work on the treadmill instead of keeping the same pace. Use some new weight machines or try a new technique for calisthenics (push-ups, sit-ups, lunges, etc.). Your body adapts to "routine" exercise eventually and you don't get as much out of a workout you've been doing for a long time. See your HAWC, aerospace or exercise physiologist, or flight doc for more ideas or information.

### **I am Freakin' Out Here**

Stress is a part of everybody's life in some way or another, and it's not all bad. In fact, the presence of some stress is needed for optimal performance. If stress is kept at a manageable level, it is hardly noticed. But as soon as it exceeds the optimal level, performance goes downhill quickly. There will always be some stress in your life, even after you retire. Therefore, knowing how to manage that stress is key. Many of you do this already, even if you don't consciously say to yourself, "I'm in need of some stress relief today." One of the most beneficial ways to relieve some stress was mentioned above...exercise. Some people may find escaping with a good book or playing with their kids to be a stress relief. Others get a massage, watch a favorite movie, or go fishing. Almost any hobby can be a good stress reliever. But those that are dangerous or involve copious amounts of food or alcohol can be counterproductive (contrary to popular belief, the bar is not a hobby).

High stress levels cause the body to release a hormone called cortisol. Cortisol slows down your metabolism (causing you to gain weight). Too much stress also interferes with your sleep and your mood.

Do you see the connection, yet? If you are in decent shape and take care of your body, you will sleep better at night, more effectively manage stress, and feel more alert and effective during the day. If, however, you decide that you don't have time to exercise or eat right, you will likely gain weight, feel fatigued from not sleeping well, maintain a higher stress level, and overall be a bit depressed. Individually, it may seem that these things have an insignificant effect on your performance. But they all interrelate and, together, have a large impact on your condition. Bottom line: You have the ability to improve your condition and performance level with only a few minor changes. 



USAF Photo by 1Lt Tracy Gilles

Comm



**Communication—the key to CRM**



USAF Photo by Terry Wasson

## Final Has No Gear

ANONYMOUS

**F**ew words will silence a T-37 runway supervisory unit (RSU) more than the four words "Final has no gear." I have been in the RSU several times when it happened, and like most pilots I said to myself, "It would not happen to me."

Ask any supervisor of flying at a UPT base where most of the action is and they will tell you the action is in the "Tweet" pattern. There is a limit of 12 aircraft in the T-37 pattern. It is not uncommon to have aircraft waiting for takeoff, as they wait for someone to land. The instructors are working hard in the saturated pattern with hopes of trying to get one last student pattern. At the heart of it all is the RSU.

In the RSU, the controllers often joke that the best they can do in their shift is break even. They know that someone will be upset that they never received the required straight-in or the requested closed. They know this causes student training to suffer and may even cause an incomplete sortie. The work they do is extremely important. An experienced controller excels at keeping the pattern flowing and the observer by his side provides a watchful eye overhead and on the departure end of the runway.

The student recorder tracks takeoffs, how many are in the pattern, where the solos are, when someone is overdue and the eventual landing times. The last critical position in the RSU is the spotter. The spotter's role is so important that, unlike the recorder, students are not allowed to fill the position until they are post-solo. What is the student looking for through those binoculars? A blinking passing light on the nose of the mighty Tweet, the position of the flaps and the speed brake. Ninety-nine percent of the time, the words out of the student's mouth will be, "Final is gear down normal," "Final is gear down single-engine," or "Final is gear down no-flap." All of these statements begin with the most important four words, "Final is gear down." There could be multiple emergencies happening in the T-37 pattern at the same time and the spotter must interrupt the emergency conversation to get the controller's attention focused on the aircraft on final without its gear down. The RSU is a time-tested resource where roles and duties are clearly defined. This clear division of duties has prevented many gear-up T-37 landings.

In fact, the majority of gear-up T-37 landings have happened at tower-controlled, non-RSU runways.

Tower personnel do not usually look at aircraft through binoculars because they expect pilots to confirm the gear position before calling their gear down. The majority of tower controllers also don't know the significance of the T-37 passing light. Every T-37 pilot training base has had close calls saved by the RSU.

Why does it happen so often? The gear warning system is very rudimentary. There is a light in the gear handle and an audible beeping sound when either throttle is between idle and 70 percent. You get the warning when you are adjusting your energy level in the area, setting up a spin, on descent for radar entry, and even at initial when you, as the instructor pilot (IP), pull back a throttle for the simulated single-engine overhead. Because the horn sounds at so many different points in a normal T-37 profile, the instinctive reaction by the IP and even the student is to punch off the horn. So, all that is left is the red light in the gear handle.

Can we engineer the problem away? Sure we could, but like anything it takes money. With the tremendous cost of our newer aircraft, a ground incident can easily cause a \$1,000,000 Class A mishap. If a T-37 lands gear-up on the flaps and the speed brake, we can lift the aircraft, repair the metal, and have the Tweet back in service in very little time. With a repair cost of less than \$20,000, the mishap will fall into the lowest category of flight mishaps, a Class C. If that argument is not enough, realize the T-6 has already started to replace the aging Tweet. So, if you were king for the day, where would you spend your prevention money?

At the time of my close call, I had over a year's worth of T-37 instructor line-dog time. I had seen almost everything a student could throw my way, and I had every profile we flew memorized. It was my second and last sortie of the day. No, I can't even use trip turning as an excuse. My student was in the advanced contact phase, and a couple of flights prior to his final contact checkride. We completed all of his pattern work at the auxiliary field except for one pattern he reserved for the home field. All of the area work was nice and, in fact, he kept us cleanly inside the lateral and vertical boundaries. On our letdown for traffic entry, I thought to myself how his performance was going to merit a shorter than normal student debrief. The traffic saturation, pattern entry, and radio calls were normal.

Then I saw a conflict developing while we were on short initial. There was an aircraft on touch-and-go off the inside runway and a formation on a low-approach over the center runway. Both were likely to request a closed pattern. Seeing an opportunity to instruct, I started trying to describe what the controller was likely to do. In hindsight, my student had probably already run through the scenario before while chair-flying, or had seen it when he was in the RSU. As any good student



USAF Photo by TSgt Lance Cheung

does, he did his best to listen to both the intercom and the radio. As expected, the controller gave the instruction "Stand by" to the inside runway closed request, "Overhead, cleared immediate break" to us, followed by "Closed approved" to the aircraft on departure leg of the inside runway. The formation was instructed, "Negative closed, break out." Because my student had to break earlier than he expected, he was now working faster to complete his aircraft configuration. I felt good about being able to predict the solution to the controller's problem, and I hoped my student would remember the event. He would soon have a reason to remember the flight but, for a different reason.

I saw the gear handle go down prior to the perch and I mentally checked it off my list. However, I didn't ensure the light went out or that we had three green gear-down indications, because I was checking his spacing from the runway. Coming off the perch, I watched the flaps track down. The radios were going non-stop, and my student was unable to find a break in the radios to make his final turn call. Halfway through the final turn I noted the airspeed was higher than it should be for the power setting. I was analyzing this in the turn, but not rolled out on final, when the RSU called, "Final go around, no gear."

After landing, I called and thanked the controller in the RSU and then confessed my sin to the DO. I am sure it wasn't the first time he had heard it because he summed up the solution very succinctly. He said, "You were being the IP when you should have been the aircraft commander." Those words stuck with me. I would have been better off saving my instruction for the debriefing.

As a UPT instructor, you don't have the time to instruct everything. Develop your habit patterns so you run the checklist the same way every time. This will give you the uneasy feeling when you skip a step. If you get interrupted while running a checklist, go back to the beginning of the checklist to ensure you didn't miss anything. Lastly, share your lessons learned with your fellow pilots. ✖



## “It Could Have Been Worse”

### ANONYMOUS

This was my first overseas sortie in the C-5 Galaxy after the standard schoolhouse checkout. As the First Pilot, I was not new to the strategic airlift world, having spent almost five years in the C-141. However, this trip did remind our crew of a few basic lessons we apparently needed to review.

We were scheduled for an “easy” Pacific channel run. This included an air refueling over Hawaii, an overnight in Japan, and two en route stops back to the home field. The crew was augmented with three pilots, three engineers, and four loadmasters. The engineers and loadmasters were to accomplish some student training on this trip as well. Standard operating crew and procedures for a four-day channel run.

Departure and the overwater cruise were all going according to the planned schedule. I was

in the right seat for the AR rendezvous, with the IP in the left and copilot in the jumpseat. The tanker over Hickam AFB was on time and on track. Things were going smoothly until the first attempt at a contact. We were showing an intermittent Ready Light. Since it was cycling between green and off, we went to the pre-contact position and discussed the problem with our flight engineers, the instructor FE, and the instructor loadmaster. At least I was getting a little more stick time. After finding no clear guidance from the books, as well as no corporate knowledge in this type of malfunction, the crew diverted to Hickam. It turned out to be a broken clamp in the AR system, and the maintenance technicians were doubtful that we could have unhooked “normally” from the tanker had we actually latched.



USAF Photo by SSgt Reynaldo Ramon

A brute force disconnect would have been worse.

After a day of delay, we were alerted at 0200L (with mild sunburns) to continue our travels. The IP and I had now switched seats so I could run through start, taxi, and takeoff from Hickam. Ground ops were normal and we were ready to start engines when the AMCC Command Post called. Apparently, our destination had MOG problems, so we were to come back in and refile to another base. No sweat, just a repeat of the process with a different ICAO, flight plan, NOTAMs, and fuel calculations. Attempt Number Two was almost successful, with our crew getting as far as requesting and getting clearance for taxi. I did clear the chocks and make one turn before Tower told us to return to parking. Of course I was thinking, "How much could I have screwed up just taxiing 200 feet?" After all

shutdown checklists were complete, we found out why we were not allowed to depart that day. It was 0615L Hawaii Time on September 11, 2001.

We now know that the attacks on our country that morning could have been exponentially worse.

With all the 9/11 consequences weighing on us, we finally departed Hickam a few days later, now headed to the Korean peninsula. We had already assumed our original itinerary would change depending on AMC issues at Pacific bases. Our flight was uneventful and quiet all the way to engine shutdown and departing the aircraft. The plan was to clear customs and immigration, then head to billeting for an RON.

That plan went south as we stepped off the jet. It seems that the ramp personnel wanted the crew to download the cargo. All of the crew was less than enthusiastic about this impending two-plus-hour

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ordeal, with the exception of the IP. After our concerns were voiced, we were overruled by the boss.

I completed our immigration requirements with the locals and obtained a crew bus during the download. The entire base was still in reaction mode to the horrible news from the States, so it was more difficult to get our normal RON procedures completed.

Arriving at billeting revealed that all of the off-base personnel had been moved back on the base and that our crew would have to be put in an off-base hotel. Not very convenient or prudent for us, considering the perceived terrorist threats from the base OSI. But even aircrew can be flexible on occasion. Another trip back to the crew bus, load our baggage, ride out the gate, and check-in at the local hotel.

We all agreed to meet in the lobby to search for food. Standard idea with non-standard results. Transportation was not going to drive us around base anymore plus most on-base facilities were already closed. Our extra two or three hours out at the jet ended up biting us, just as our loadmasters had predicted. We did manage to walk to the back gate and get a few slices of pizza just prior to that establishment shutting down for the night. Note for next crew brief: Bring more helmet bag food on Pacific trips.

Still, ground support, lodging, and meals could have been worse.

The crew was more than happy to leave the next day. After a pre-packaged breakfast from the shoppette, we all proceeded to the plane to begin our departure rituals. Flight planning procedures were completed in a somewhat disjointed fashion, as we had to “find” the weather folks and some essential base operations personnel for computer, fax, and filing assistance. NOTAMs for the departure airfield, en route divers, and destination were checked. Departure and destination weather was fine, with only the emergency divert fields forecasting true IFR conditions. The copilot called in our final fuel to the Command Post, and we returned to the jet.

All checklists and procedures went smoothly and taxi-out was normal. It seemed we were finally getting a break from non-standard problems. The IP was flying from the left and the copilot performed the TRT rolling takeoff. Everything looked great—until just past “Go” speed, of course. A rather large Egret-size bird glided gracefully across the runway from right to left and flew directly under the left wing. We felt nothing but made an immediate call to Tower after rotation and asked if they saw the bird. They confirmed a pile of feathers on the runway and dispatched the Airfield Manager to have a look. Fortunately the weather was VFR, we had no climbout issues, all the engines continued operating within parameters, and we even had allowable extra fuel so we could climb out with the gear down for a few minutes. Tower called us

back within three minutes and told us they had the entire bird. It had been killed and roasted by our No. 2 engine’s 900-degree-C exhaust. It did not go into the engine or strike the gear. With that good news, we continued on our way back to the States.

A bird strike with a heavy C-5 can definitely be worse.

After approximately four hours, I jumped into the right seat to relieve the copilot. Fuel, coast-out, and NOPAC navigation was all normal. I was talking to Tokyo Radio approaching the FIR Boundary and within 15 minutes of our calculated ETP when they called us. Much to my surprise they asked us to descend from FL280 to FL180. This got the IP and the FE interested in my radio conversation. After a few questions from us to Tokyo, we found out we had *not* checked the “Center NOTAMs.” A scheduled missile test was restricting some of the altitudes along sections of Northern Pacific tracks. All aircraft had to be above FL320 by the FIR boundary or at FL180 or below. None of our fuel data reflected this glaring mistake made by the pilots. The mighty C-5 was not going to be able to climb to FL320 for another four hours, so we slowly descended and started working on our self-inflicted wound.

We had managed to drive ourselves into a corner with two options. The first was to divert back to a U.S. airbase in Japan for fuel. The second was to recalculate fuel based on driving around at FL180 for two solid hours, then climbing up to normal cruising flight levels to our destination. It seems dumb luck was with us, since we had not completely burned down our small excess of fuel after takeoff. The computations with the fuel remaining onboard allowed us to continue to our destination well within AMC flight planning criteria. We flew at the requested FL180 until we cleared the restricted airspace and climbed back to an economical cruise altitude. Arrival was normal and the copilot made an excellent approach into our original destination.

Our entire crew knows that this could have been a much, much worse scenario.

How did we get ourselves in that situation? This one is fairly easy. By not following USAF directives for complete flight planning, the pilots put the crew and a multi-million dollar aircraft into a totally *avoidable* situation. None of the events leading up to our base operations requirements can excuse that fact.

What lessons learned did we need to review as a crew? There will always be situations that “could have been worse.” How much worse are you or your crew willing to accept? The risks we face in the military cannot be completely eliminated—our force effectiveness would be zero. This is the nature of our work today. We can, however, mitigate or even avoid most of these risks by the simple and professional execution of our established directives and procedures. ➔

## [Tower] confirmed a pile of feathers on the runway...

# How Far Do You Let Them Go?

## Training The Single-Seat Fighter Pilot For Emergencies



**CAPT BRYAN E. BEIGH**  
479 FTG  
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**E**mergency procedures (EPs) are hammered into every Undergraduate Pilot Training (UPT) student who is someday hoping to walk out the door with a pair of wings on his/her chest. Arguably, the first formal training for handling emergencies as a single-seat fighter pilot is not experienced until the Introduction to Fighter Fundamentals (IFF) course. At IFF, instructors have the balancing act of training this soon-to-be fighter pilot to handle EPs and the responsibility of recovering the T-38C when something goes wrong. As a new IFF instructor, I have heard two main techniques

for handling EPs during a student syllabus sortie. One approach is to take the jet from the student, accomplish the applicable boldface and/or checklist items, and then recover the aircraft on your own. The other approach is to allow the students to handle the EP themselves and give them opportunity to build their airmanship during these situations while in a trainer aircraft. Both techniques are reasonable and appropriate within Air Force regulations, but they bring up an issue of maximizing training for our future single-seat pilots without sacrificing flight safety.

IFF briefs usually start out with the students talking about an emergency situation and explaining how they would recover the aircraft during the mission that day. This review is not like the stand-up EPs in UPT where the students stand in front of the class of peers and other wing wearers as they discuss their hypothetical actions. However, the IFF EP of the day is nonetheless nerve wrecking for the student since their performance in the EP alone can buy them a "no step"—in short, failing the ride before stepping out to the jet for takeoff. I think the students' preparation is mostly driven by the fear of being one ride closer to washing out of IFF and crushing their dreams of becoming a fighter pilot. Therefore, most students in IFF are prepared to talk about the EPs during the brief.

One can argue that the ability to spout out

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USAF Photo by SSgt Jeffrey Allen

the boldface or read the checklist sitting at 1G during the brief doesn't prove a student has the ability to lead the formation, coordinate with air traffic control agencies, and accomplish the checklist items, all while maintaining control of an aircraft in an emergency. This situation can be dangerous, not to mention aggravating, if the instructor does not take control of the aircraft when the students are unable to handle the situation due to limited experience. For this reason, some instructors will take the conservative approach and handle the EP themselves. In some cases with a student's limited flight leadership experience and other extenuating circumstances like bad weather, consideration should be given to being conservative. The instructor can always debrief the student, after the sortie, on key learning points they can take away from the situation without putting the flight in a square corner.

Another technique is to allow the student to build confidence and experience by letting

them handle the EP like they learned in the simulators and academics. When a student is making decisions and experiencing the stresses of real world EPs, the impact on the student is greater. The lessons that students take away from getting the aircraft back safely themselves can be more beneficial than if they were just passengers on an emergency flight.

Of course, some EPs are time-critical, and if the student does not handle them in a relatively timely manner it can lead to a more complicated scenario. Instructors still have the option of giving quick inputs to the students based on their performance or taking control of the jet if the EP is not taken care of appropriately. Obviously, this technique varies with the ability of the student and takes more situational awareness on the part of the instructor, but in the long run it will create a more capable pilot for EPs.

The real difficulty in allowing the student to handle the entire EP is that you want to maxi-

mize the student's learning without sacrificing anyone's safety. This is a large gray area, since it depends on the severity of the emergency. For example, if a student is slow to formulate a plan after shutting down an engine for a fire, the instructor should have very little tolerance for the student to handle the EP. However, if a student takes the appropriate actions for a generator failure and shows the ability to recover the aircraft with some hesitation, an instructor may be inclined to give the student more freedom to recover the aircraft without interjection.

No blanket statement encompassing all emergency procedures can be given. In the training environment, when the situation allows, I believe it is beneficial to let the students prove their ability to successfully carry out a real in-flight emergency. Pilots are given extensive emergency procedure simulator training in the single-seat communities, but in the IFF training environment we should take

advantage of all our resources to maximize a student's learning.

After students graduate from the IFF program, they can be only a few rides away from taking off solo in a multi-million dollar fighter. The question we want to ask ourselves is: How much better can our pilots be at handling an EP if a little tolerance is given in a controlled training environment? These techniques of letting a student learn first-hand in the air or after the flight in the debrief will inherently vary on the instructor's comfort level, experience, and teaching technique. What all instructors should think about is what technique they believe in, where they draw the line under different emergency scenarios, and how far are they willing to let the student go.

Obviously, this question can be expanded outside the realm of IFF, but nevertheless it can still be applied in the same manner. Should we strive to be sufficient at EPs or should we strive for training the best single-seat pilots? 





**CAPT PHILLIP M. BROWN**  
65 AS  
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Everyone has stories about how they “leaned forward” to move the mission, especially in the wake of 9/11. In the world of strategic airlift, this has been a constant ever since the beginning of Operation Enduring Freedom and continues through Operation Iraqi Freedom. Those of us in the C-5 community are constantly battling the many maintenance issues of the Galaxy, and we’ve been leaning forward for almost three years to get the cargo to those who need it most—the troops on the ground. This is my story of leaning forward...and almost falling over.

We launched out of Dover AFB, DE, for Cherry Point MCAB, NC. The plan was to upload the cargo and quick turn-back to Dover, where another crew would take the aircraft over the pond to Germany. However, today was not our day. Approximately 30

minutes after takeoff, the Flight Engineer (FE) notified the pilots that a #X engine was losing oil pressure. It didn’t take long for the pressure to drop out of limits, so we shut the engine down and made a safe recovery back to Dover. CRM saves the day!

Twelve hours later, after min crew rest, we got the opportunity to dead-head to Fort Campbell, KY, pick-up another broken C-5, and fly it to Rhein Main AB, Germany. Of course, we arrived in Kentucky and the aircraft was still broken; so back into crew rest we went. Another 12 hours later—in the middle of the night, no less—the C-5 was A-1 (so we were told) and away we went. Approximately 15 minutes into the flight, the FE announced that a #X engine was over temping, and once again we shut it down. CRM again saved the day as we discussed our options and decided to dump fuel, coordinate a divert to Dover, give the airplane back to maintenance, and go to bed once again.

The stage manager and TACC had a different plan, though. Upon arrival at Dover, they decided that since we were only four hours into our 26-hour day we should transload the cargo onto another C-5 and continue the mission without burning another crew out of the stage. We, being the crew

dogs that we were, happily agreed and decided to “lean forward” and get the mission done. Not really. But after battling with the powers-that-be, we did transload the cargo and departed for Frankfurt about five hours later.

Our little jaunt across the North Atlantic was uneventful, except that almost every crewmember was completely exhausted. Soon, though, the lights of London were below us and we were heading across the English Channel. Then, once again the FE made an announcement: “Pilot, we’re losing fuel from #4 main tank.” The scanner verified the fuel leak when he observed a stream of fuel coming from the pylon, forming a nice thick contrail through the early morning sky. So, for the third time in as many days, we shut down the engine and discussed our options. Press on to Frankfurt was the call (we were about equidistant between Frankfurt and Mildenhall).

Now, anybody who has flown into Rhein Main AB, aka Frankfurt International, knows that it is a busy, no-nonsense place. Here we were, on three engines, low on fuel due to the leak, and approaching the end of a 26-hour day. Not the ideal conditions by any means. About the only thing going right was the weather. Frankfurt Control was very accommodating. They gave us priority and upset a few Lufthansa aircraft by breaking them out of the landing pattern, and we made an uneventful land-

ing. CRM once again pulled us through.

So, how did we almost fall over by leaning too far forward? The elements for a greater mishap were all present in the skies over Europe: fatigue, malfunctioning aircraft, low fuel, and busy airspace. Thankfully, proper use of CRM principles kept us from making any compounding mistakes and allowed us to safely complete the mission. However, a few lessons were learned.

One, always be prepared for the next contingency. The maintainers do a terrific job of keeping our aircraft flying, but the aircraft are being flown harder and longer than ever before.

Two, never let the stage manager or TACC talk you into something you feel uneasy about. We as a crew decided not to invoke “safety of flight” in order to avoid the mission. Why? We didn’t want to look like wimps, or another whining aircrew. We also thought, “What are the chances of another engine shutdown today?” If only we had known. We allowed TACC to call the shots, even though we were already tired due to the time of night and we had already handled one emergency that day.

Three, CRM is critical. I sort of joke about it in this article, but good CRM is what kept us safe and allowed us to handle each situation as it developed. It’s extremely important that we continue incorporating good CRM, not only in the cockpit, but in all aspects of the mission. ✈





# *How Sick Is Too Sick? How Tired Is Too Tired?*

**ANONYMOUS**

**E**very day when we step to fly, whether a deliberate process or not, we make assessments regarding the risk associated with flying that day. When we brief, we are sure to discuss things like the weather, the bird hazard, the complexity of the mission, and currency in planned events, among other things. However, something we as a flying community frequently fail to pay due regard to is our own individual readiness to fly.

How many times have you stepped to fly when you had a cold, were stressed out about family issues, or maybe just didn't get quite as much sleep as you needed the night prior? I would venture to guess that all of us at some point in our career have experienced at least one, if not all of these things. Some days we get lucky and skate by with no problems—but not always, as is confirmed by aircraft mishaps in which such issues, while not causal, certainly did not help the mishap pilot.

A while back I came down with a nasty cold. I decided I would keep flying as long as I could still clear my ears. My initial qualification checkride was scheduled that week, and I didn't want to postpone it until after the upcoming four-day weekend. I was able to complete most of the checkride that Wednesday, but due to a minor aircraft malfunction, I had to land prior to completing the mandatory visual pattern work. Now it was down to the wire. I had one day prior to the long weekend to complete the checkride, and I wasn't feeling any better. I had sucked it up and successfully completed the first portion with no problems, so I was sure to be fine the next day too, right?

When I showed up in the squadron the next day, I am sure it was readily apparent that I had no business flying that day. My cold was no better, and in fact had grown worse overnight. I wasn't too excited about flying that day, but I really did want to finish my checkride. I'm a fighter pilot, after all, and fighter pilots don't wimp out and

whine about not being able to fly because they don't feel 100 percent. And, I could still clear my ears...barely. My squadron leadership queried me as to whether or not I was feeling up to flying. Of course I was! I wanted to finish my checkride and enjoy the long weekend!

So, in all of my brilliance, I briefed, stepped, and took off with no problems. The plan was simple. We were flying to a nearby airfield to do a few overheads, after which we would return to base for a visual straight-in. All went well until I came off of the perch on the first overhead. I began to experience a sharp pain in my sinuses that only worsened as I descended. When I realized it wasn't going to go away, I went around and advised the SEFE that I was done for the day. We declared an emergency for a physiological incident and returned to our home field for a visual straight-in. I experienced some more pain on the final descent, but it went away shortly after landing.

I made the right choice to call knock-it-off after I experienced the first pain; there are plenty of stories around of guys who have continued in similar cases and blown out their sinuses. But unfortunately, I made the wrong decision when it really counted, before I stepped to the jet. After that incident I realized that I needed to be much wiser about my evaluation of my personal readiness to fly.

Fortunately, plenty of tools already exist to aid in this decision-making process, not the least of which is Operational Risk Management, or ORM. Some units have gone so far as to have each flight lead fill out an ORM worksheet prior to flying. In completing these worksheets, the total risk level of the flight is determined by adding up values assigned to a variety of variables, to include such things as recent flying experience, weather, and human factors, among other things. Depending on the total risk assigned to the flight, approval for the flight may need to be gained from the squadron commander, or perhaps even the operations group commander.

These worksheets are one way, and perhaps a relatively effective way, of forcing aircrews to look at the hazards they face that day, including their own readiness to fly. While this method

continued on next page



# Knock It Off?

have been waiting months for, and know that if you back out you probably won't get another opportunity to complete it for quite some time. Similarly, maybe you're feeling a little concerned about a family member, but it's your first time scheduled to drop live CBU and you don't want to miss out. Rarely is the decision simple or easy.

Personal readiness to fly is, and always will be, a very subjective issue of individual assessment. My own personal rule, which I've adopted since my physiological incident, is that if I have to give my own readiness to fly more than a minute or two of thought, it is most likely time to call knock-it-off. This has cost me sorties that I really wanted to fly, but has also kept me out of trouble. Other tools such as ORM are available, and force us to pay attention to the matter, but ultimately it is up to the pilot to make the smart choice. 



does force crews to briefly focus on their own mental and physical health, it continues to fall short. Even though crews are asked to assign a score to their personal readiness that is included in the sum total risk for the flight, it still remains a very subjective evaluation. For instance, while evaluating the bird hazard for a particular flight, a bird low condition may be assigned a "1," while a bird severe condition may be assigned a "5." But, what risk level do you assign to feeling a little more tired than usual, or to the stress you feel over a recent family crisis? When do you call knock-it-off?

Unfortunately, the evaluation is only made more difficult by external stressors. Perhaps there's no backup pilot that day, so if you call in DNIF the line will have to be canceled. Or, maybe the day that you're feeling a little more tired than usual you're finally getting an upgrade sortie that you



**FY06 Aviation Mishaps  
(Oct 05-Aug 06)**

**FY05 Aviation Mishaps  
(Oct 04-Aug 05)**

**24 Class A Mishaps (15 rate producing)  
0 Fatalities  
7 Aircraft Destroyed**

**41 Class A Mishaps (30 rate producing)  
12 Fatalities  
11 Aircraft Destroyed**

- 09 Oct** An F-16C departed the runway on landing rollout; pilot egressed safely.
- 20 Oct** \* An F-22A ingested an NLG safing pin into the #2 engine; no intent for flight.
- 21 Oct** \* An MQ-9L landed short of runway; gear collapsed.
- 28 Oct** An F-16C departed the runway on landing rollout; pilot egressed safely.
- 02 Nov** A C-5A had a #2 MLG bogie fire after landing.
- 17 Nov** A C-17A had a #4 engine compressor stall and fire.
- 28 Nov** An F-16C departed the runway on landing rollout; pilot egressed safely.
- 30 Nov** \* A B-1B practice munition ignited a 26,000-acre range fire.
- 06 Dec** \* An A-10A had a landing gear collapse prior to takeoff.
- 13 Dec** ➔ A T-38 had a bird strike; aircraft crashed, pilots ejected safely.
- 17 Jan** ➔ An F-15C crashed into the ocean; pilot ejected OK.
- 01 Feb** \* An MQ-1 crashed during landing.
- 14 Mar** ➔ An F-16C experienced buffeting and uncommanded pitch/roll; pilot ejected safely.
- 21 Mar** \* An MQ-1 crashed during flight; pilot experienced loss of control.
- 30 Mar** A T-38C landed short of runway.
- 30 Mar** ➔ An F-16C crashed; pilot ejected safely.
- 03 Apr** ➔ After an emergency RTB, a C-5B landed short of runway, aircraft destroyed.
- 05 Apr** ➔ An F-16C crashed into the ocean; pilot rescued with multiple injuries.
- 11 Apr** ➔ An F-16C crashed after takeoff; pilot ejected with minor injuries.
- 21 Apr** An F-16C sustained engine damage from bird strike on takeoff; RTB OK.
- 25 Apr** \* A QF-1 was command-detonated inflight due to control failure.
- 27 Apr** \* An F-15C ingested an NLG safing pin during ground operations.
- 08 May** A B-1B landed gear-up.
- 26 May** \* An F-16D incentive ride passenger suffocated inflight; died at hospital.
- 22 Jun** \* An MQ-1 crashed during flight; engine failure due to oil loss.

*Editor's Note: The Air Force has experienced four fatalities that are not considered rate-producing. One fatality was post-flight (26 May), and the other three were attributable to other services.*

- A Class A mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding \$1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.
- Reflects only USAF military fatalities.
- "➔" Denotes a destroyed aircraft.
- "\*" Denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Aviation Ground" mishaps that are shown here for information purposes.
- Flight and ground safety statistics are updated frequently and may be viewed at the following web address: <http://afsafety.af.mil/stats/stats.asp>
- **Data includes only mishaps that have been finalized as of 31 Aug 06.**

*"How much could I have screwed up just  
taxiing 200 feet?"*

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