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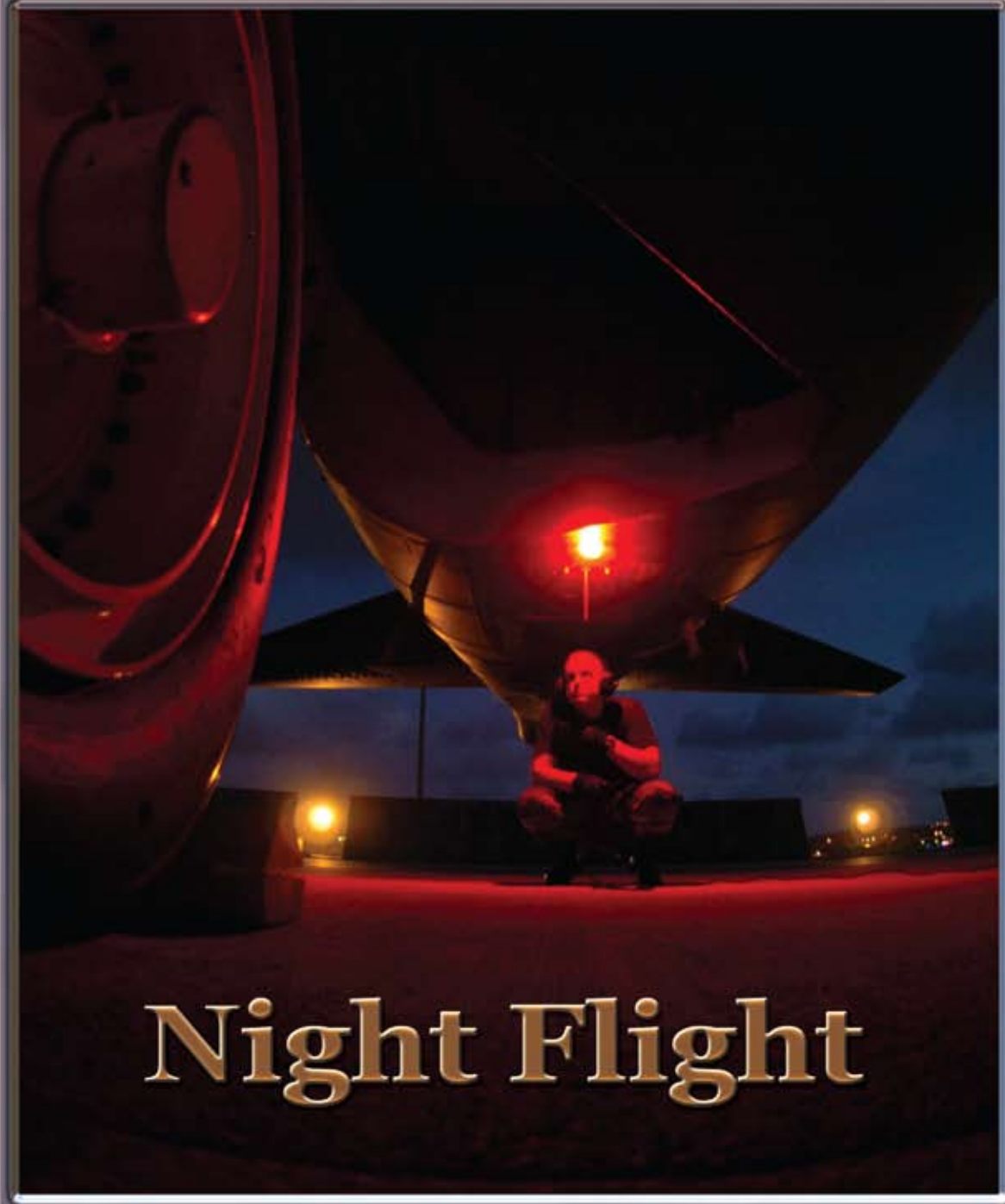

Night Flight

FSM
FLYING SAFETY MAGAZINE

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contents

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U.S. AIR FORCE

Front Cover: U.S. Air Force photo by Master Sgt. Val Gempis
Back Cover: U.S. Air Force photo

The view from Blue 2

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I love flying at night. Particularly in combat. Not that I really liked combat, but given the choice, I preferred night Weasel missions any day … or night.

A totally dark night, the green glow of cockpit CRTs dialed down to just barely visible and the occasional meteor streak … it's just unreal. Aside from the basic surreality of it all, the best part is that I can see everything the enemy fires at me. And if I can see it, I can avoid it. Man, you've never really seen fireworks until you've seen those big bad blood-red Roman candles fired AT YOU from a 57mm or 100mm. And SAMs or HARMs at night? Smokin'!

How nice it would be to see every single threat we face in aviation. But the real threats we face on a daily basis don't typically come from Russian-built gun muzzles and missile rails. It's the unseen risks we do our best to ID and defeat through our ORM processes. We do our best to cover each others' 6, watching out for the tired wingmen, paying attention to each others' fuel state and weather cats. We do a good job of it, but we don't always gain a tally on the day's flight risks.

Enter the night. The hazards double, but are easily twice as hard to see coming. Vestibular and temporal disorientation, fatigue, impaired judgment, visual illusions, terrain, loss of visual acuity, loss of situational awareness … I could go on, but you get the drift. Our best and brightest try to help us with hardware solutions, but sometimes NVGs aren't much more effective than beer goggles. Still, they're all we have, so we do our best and get the job done.

Folks, we're two-dimensional day creatures attempting three-dimensional aerospace acts, miles above the ground, at times of night best suited for Cartoon Network's ADULT SWIM. So far in Fiscal Year 2008, our wingmen endured six Class A aviation mishaps during night operations. Of them, four were directly attributed to human factors associated with, or compounded by, flight operations at night. We humans really aren't inventing new ways to prang aircraft at night. Technology is helping, but training, experience, and solid ORM and CRM become our next lines of defense from the night ops mishap threat.

In this month's ***Flying Safety Magazine***, nine wingmen will debrief us on their personal night flying hazard experiences, making them among the most meaningful stories we can post in this hog log. Give a listen and see how you can apply the lessons to your flight briefings and instructional bag of tricks.

Read the stories tonight, and then read them again. Why? Well, as they say at Holloman, ***"Once a Knight is never enough."***

— Blue 2's in!

DEPARTMENT OF THE AIR FORCE — THE CHIEF OF SAFETY, USAF

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U.S. Air Force photo by Dennis Spotts

A Night Just Like Any Other

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It was just like a million other local training missions in the Herc. We were scheduled to fly about three hours of night low-level, including NVG work, and follow up with a few passes over the local drop zone. There was a bit of weather to contend with, but nothing out of the ordinary.

The weather brief indicated a scattered cloud layer at 1,500 feet and a broken layer at 3,000. During the summer months it's usually pretty easy to predict what the weather will be because it's always the same. So, being the good ORM-oriented crew that we were, we discussed it in the briefing. I think the entire weather briefing went something like, "Yep, we've got standard summer weather tonight." But our briefing didn't gloss over everything in the same way. We spent a long time discussing exactly what route we'd take on the low-level, where we would deviate from the "black line," and what areas of the route would be most challenging. We thoroughly studied our current noise complaint areas, which we conveniently labeled "threats." Finally, we analyzed the drop zone, computed release points and designated a conservative safety box to ensure a good drop.

After what seemed like an eternity of briefings, we stepped to the plane. Nothing seemed out of the ordinary, except maybe for the fact that it was a Friday night. Since everything on this night was shaping up to be "standard operations," why stop now? We ended up taking off about a half an hour late due to some minor maintenance problem and had to make it up by flying extra fast on the low-level route. The entire crew was involved, and the result was a very productive portion of the mission. We climbed up to mid-level altitude to make up some of our lost 30 minutes on the way back to the DZ. We managed to find a hole in the weather and dropped down to low-level before the drops.

Now, since this is a safety article, something bad has to happen, right? Wrong! A little more than three hours into the flight, we made three passes over the drop zone, which all went off without a hitch. Since all the "tough stuff" was over, the crew let out a collective sigh and got set up for an ILS into home field for a full stop to the main runway. As I mentioned before, it was Friday night and everyone had just got done with three and a half hours of intense vibration. We all just wanted to call it quits for the night. This should have been the easiest part of the profile, and we elected not to do a tactical approach or to go to the assault zone because of the cloud deck below us and the human factors involved in it being the weekend.

There was a little confusion on which checklist to run, since we were switching from tactical to normal procedures. The co-pilot was doing an outstanding job of staying ahead of the aircraft by configuring to 50 percent flaps and gear down, as well as starting down on the glideslope. Meanwhile, the aircraft commander was turned around slightly in his seat in order to talk with the engineer and navigator about exactly what our plan was. Since he was chatting away, the co-pilot didn't have the opportunity to talk about what was happening to him. The cloud deck was about 200 feet below our

U.S. Air Force photo

glideslope intercept height. Although we had already descended through the weather twice to get into the low-level route and drop zone, this time it was a little different. Since we were configured, the landing lights were shining brightly on those clouds, which made them look like a hard surface. The "big hand" was preventing the co-pilot from continuing the descent and we got slow — painfully slow. Approach speed should have been 140 knots. The AC took control of the aircraft as we were slowing through 110. We recovered without incident and landed the aircraft as planned. But it definitely got us all thinking, as it should whenever you are about to do "the same thing we always do, for the thousandth time."

The first aspect we should have been worried about was the fact that it was a Friday night. I'm sure that's blatantly obvious to everyone, and it was to us as well. We talked about it in the briefing, but I don't think we realized how it would affect our attitudes. Thankfully, the aircraft commander saw the crew was having concentration difficulties at the end of the mission and elected to finish tactical training at that time. Sometimes, however, that's not an option.

The second item of concern was the weather. We knew our flight profile had us climbing and descending multiple times through or around the weather. As we descended through a hole in the clouds to make our drops, we should have made a better mental note of the tops of the clouds. That way we could have assessed the visual illusions they would create on the ILS. We missed that particular opportunity, and it created a potentially risky situation that could have ended up a lot worse.

The final debrief item was our mental let down once the difficult portions of the flight were over. After completing the NVG low-level and airdrops, everything else was just easy. But the landing phase of flight is inherently risky, and we should have treated it as such. This is very similar to the letdown of flying local training missions after flying adrenaline-pumping combat missions.

Looking at these three items in a broader sense, I now have a greater appreciation for ORM. The Friday night concept means that I have to take into account what everyone on the crew is thinking about. It doesn't just have to be Friday, either. It can be the navigator who is going through an ugly divorce, or the loadmaster who is worried somebody's going to draw on him while he's asleep in the back. I think about present and forecasted weather conditions — anything outside the aircraft that could impact the success of the mission. In combat it could be enemy fire or traffic deconfliction. On training missions it could be ATC or the person controlling the drop zone. In other words, the letdown phase of any flight can be the most dangerous yet. The letdown can come from completing the hardest part of the mission, even though there are aspects remaining which can pose just as big of a threat. Or, it can happen on the next flight after a check ride, since the pressure of not screwing up isn't as obvious.

Either way, I've learned to look at these areas for every flight I'm on. If I take into account what my crew might be thinking about other than flying, what can happen outside the aircraft that affects us, and continually update the mental state of everyone on the crew throughout the flight, my personal ORM concept can only add to the probability of success for the mission.

These three categories may not work for you, and you may already have your own personal checks as you get ready to fly. The important point to note, however, is that everyone assesses the ability to safely complete the mission, regardless of how typical the mission may be.

U.S. Air Force photo by Airman 1st Class Liliana Moreno

The Role of Communication in CRM

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In the B-52, crew resource management is easy to appreciate. It shows up in every sortie and very often is in direct correlation to mission success.

On paper it's simple enough: the five-person crew works together under the leadership of the aircraft commander to navigate to the combat zone and put bombs on target while evading threats. A junior crew might see good CRM as a navigator telling the pilots that they are so many knots off airspeed while flying in the pattern. Strong CRM might also be the EW and the radar navigator learning how to coordinate their calls so they aren't talking over each other during a bomb run. These lessons are learned early on as crews hone their combat skills on regular training missions. I was no different.

I was concerned with putting the bombs on target and getting home. Then, under special circumstances, I learned to expand my CRM concept beyond the cockpit. I learned new CRM tricks, like using ATC's radar to tell just how dense that cloud formation is up ahead — nice to know before you take a jet limited to 2 Gs through a cloud bank without weather radar. These are great uses of CRM and they all have something important in common — they all rely on strong communication skills. In my everlasting quest to become a better pilot, I've learned that communication skills are integral to strong CRM.

Just when I thought I had a pretty good grasp on the subject, I made a crucial CRM mistake. It was while air refueling on a combat mission during Op-

U.S. Air Force photo

eration Enduring Freedom. We were in pre-contact over the Indian Ocean late on a pitch black night. As co-pilot, all I really had to do was monitor the boom through the hatch window and call out the relative distance from the receptacle as it went over my head. When we started into the contact position, I noticed that this particular boom operator was using the technique of pointing the boom at the co-pilot's windshield until the last possible second and then swinging it around for the plug in, which I'm not a big fan of. This particular boom operator lost that game of chicken that night when he didn't move the boom at the optimal time, and he scraped the boom along the top side of the aircraft in what appeared to be an attempt to pry my ejection hatch off the plane. This caught my attention. The shower of sparks that you can only get as you grind metal against metal caused me to express my displeasure with a number of expletives, but I offered no explanation of what I was seeing until my crew asked me. CRM lesson learned. With three crew dogs along for the ride who don't have windows to see how your AR is progressing, it's best not to say anything that gives them the impression that they're seconds away from burning up in a fiery mess, unless that's actually the case. They expressed their discontent with me, and rightly so. More than a simple communications issue, I denied the crew my perspective. My comments were reactionary, but I've found that a lot of flying is training yourself to react in the best way possible. Case in point:

Several months later in the early days of OIF, I found myself in another learning situation. My crew and I were attacking targets in the vicinity of Baghdad. It was another night sortie and I was in a formation with other bombers. I had seen the occasional pot shot taken at me before, but this night, I would see some intense resistance. As one SAM after another launched up from the ground (this time I was on the NVGs), I calmly called out each missile and the appropriate direction to evade. I sensed some frustration from my EW who commented that he wasn't picking up any signals. Once again, the crew found themselves along for the ride with little to do. We maneuvered aggressively on our way to the target and put the bombs on target as planned. Later, my crew told me they appreciated the calm manner in which I called out the enemy fire. It allowed them to remain calm and keep up their situational awareness, making us a more effective crew. While it's always nice to get praise, there was an important lesson that wasn't lost on me. Up until then, I didn't appreciate how uncomfortable and distracting it must be to know there are missiles in the air intended for you. Not only can't you do anything about it, but you must rely on someone else to tell you where they are. It goes to show that sometimes CRM isn't just using all of the assets at your disposal, but also being an asset for someone else.

My time as a buff co-pilot is over. Now I'm a T-38 IP trying to teach CRM to SUPT students. Some people see CRM at odds with the single-seat pilot mentality, but I think it's just the opposite. Without a crew to back you up, it's very important that you be aware of and take advantage of all your potential resources to effect a successful mission. I'm still learning great CRM lessons. Wingmen, ATC, cockpit instruments and prior preparation all play important roles in crew resource management, but a good set of communication skills work wonders. These days I challenge myself to use the most effective communication I can. If brevity really is the soul of wit, then sometimes silence must be genius. I find that almost as often as not, it's better for all involved to just take the jet and demonstrate what I'm talking about than talking my students through my CRM analysis process. I still can't say that I've mastered the concept of CRM, but I do know that I can make continual progress by working to improve my communication skills.

100% CERTAIN?

MAJ. TROY CAMPBELL
DCMA Southern Europe

As operators of fighter, attack or bomber aircraft, we need to be 100% certain of the target area and desired mean point of impact. We need to be as skilled as a surgeon, with precise and accurate aiming, thus preventing the possibility of fratricide or collateral damage. This not only applies in wartime, but also in peacetime range operations.

Recently, several instances of target mis-identification or procedural errors have occurred resulting in fratricide or near misses. Two highly publicized examples of target mis-identification or procedural errors are as follows. First, the Udairi range incident occurred, in which a Navy F/A-18 mistakenly dropped ordnance too close to ground controllers, resulting in the deaths of six friendlies. Another example is a B-52 dropping MK 117s on a friendly radar beacon signal impacting near the ground forward air controller's observation position, killing one, injuring 10 and destroying two CH-53 helicopters. Both of these incidents involved some form of target mis-identification or aiming system error.

I recently completed an assignment as an air liaison officer. The joint terminal attack controllers at my unit experienced two reportable near-miss incidents during my two and a half years as an ALO. Fortunately, neither incident resulted in casualties or fatalities. As ground controllers, we're putting our lives in the hands of the aircraft operators, whether that aircraft is an A-10, F-16, F/A-18, AH-64 or even a B-52 or B-2. With today's evolving definition of close air support and the platforms being used to perform the CAS mission, every weapon-carrying platform needs to be aware of the inherent dangers for the "guys on the ground" giving that "cleared hot" call.

The most recent event occurred at night on Cannon Range, Mo. Cannon Range is a manned range near Ft. Leonard Wood Army Installation. The JTAC working this mission was highly experienced and combat tested. He had been in Afghanistan working with Special Forces during the initial stages of Operation Enduring Freedom and was highly skilled and respected throughout the tactical air command and control specialist career field. The tactical air control party was positioned in the flank tower with a contract range controller. Other JTACs and contract range controllers were manning the main tower complex, monitoring the range frequency for safety and learning points.

The TACP, one JTAC and one TACCS were set up and ready when the first mission of the night checked in. The TACP was using night vision goggles (model PVS-7D) and infrared ground command pointers. The range towers were marked with IR ground beacons. This is standard practice for night range operations with all units using

U.S. Air Force photo by Senior Airman Julianne Showalter

NVGs and other night targeting/marking devices.

The mission began as any CAS mission would. The two-ship of F-16s (call sign Viper) equipped with LITENING II targeting pods checked in "as fragged" and proceeded to the mission orbit point. The JTAC gave his CAS check-in briefing, along with the ground commander's intent, and also informed Viper Flight that all controls would be Type 1. Upon receipt and acknowledgement by the flight lead, the JTAC continued with his CAS briefing (more commonly referred to as the "9-line"). The 9-line was read to Viper Flight and lead acknowledged a good copy and read back the required items — Lines 4, 6 and the restrictions (Line 4: target elevation, Line 6: target location). The restrictions included the location of the "real world" friendlies and run-in restrictions (HDG 160 + 15 degrees). Everyone understood all restrictions, to include where the friendlies and target were located.

Note: There are three types of terminal attack control. Each type follows a set of procedures with associated risk.

Type 1 Control: When the risk assessment requires the JTAC to visually acquire the attacking aircraft and the target under attack.

Type 2 Control: When the JTAC desires control of individual attacks, but assesses that either visual acquisition of the attacking aircraft or target at weapons release is not possible or when attacking aircraft are not in a position to acquire the mark/target prior to weapons release/launch.

Type 3 Control: May be used when the tactical risk assessment indicates that CAS attacks impose low risk of fratricide. (pp V-14&15, JP 3-09.3, Sept. 3, 2003)

Viper Flight proceeded to the initial point to set up and begin its target attacks. Viper Lead reached the IP and called "In." Lead proceeded in-bound to the target, waiting for clearance from the JTAC to release his weapons. The JTAC didn't visually acquire lead or No. 2 on the first pass, so neither aircraft released any ordnance on the "first run attack." Release clearance was withheld by the JTAC due to poor lighting conditions and inability to maintain "visual/tally" on the attackers and the target.

The second pass, however, was a little more interesting. During the reset, both members of the TACP were able to reacquire the "visual/tally" and cleared Viper Flight for immediate re-attack with the same run-in restrictions as previously briefed. Both flight members acknowledged.

Viper Lead called "In" and waited for clearance to drop. Again, Viper Lead was unable to release ordnance due to late visual and clearance from the JTAC.

Viper Two called "In." The JTAC had visual on Viper Two and requested a "tally target" call. Two responded appropriately with his attack heading. The JTAC immediately gave Two the mandatory "Cleared Hot" call.

After a 15-second pause, Viper Two called on the radio, "I think I hit just south of that strobe light." Another qualified and tested JTAC sang out on the radio that famous three-word phrase, **"KNOCK IT OFF, KNOCK IT OFF, KNOCK IT OFF."**

All players immediately acknowledged the "knock-it-off." Viper Flight immediately "safed" their switches and orbited the range high-and-dry. The JTAC then began investigating what was wrong. The Main Range Control complex had just been attacked by a BDU-33. The JTAC observing the mission from the main complex indicated the practice ordnance had impacted approximately 50 feet from the employee break area, located just outside the main building. The rest of the night's activities for Viper Flight were cancelled, as well as the remaining night range schedule.

Fortunately, this was a training mission with training munitions; otherwise, this could have been a disastrous mission/night for all those involved.

Even though no one was injured and no property was damaged, the inhabitants of Cannon Range on that spring night were very lucky. Everyone needs to be constantly vigilant and cognizant of the mission and surrounding area. The aircraft operators need to stay alert and focused not only on the target, but on their aircraft instruments and targeting systems. The JTAC needs to remain aware of the surroundings, the location and nose position of attacking aircraft at all times.

This is just one example of recent incidents in which loss of life, limb or property could have occurred. With proper mission planning and adherence to procedures, these types of incidents can be prevented. This was a close brush with disaster. Stay alert and aware at all times during your activities or this could happen to you.

U.S. Air Force photo by Staff Sgt. Bennie J. Davis III

Balancing Risks

ANONYMOUS

The following article deals with the challenge of balancing risk within a high threat environment. How much risk are we willing to accept to achieve the desired outcome, and what are the consequences of accepting the additional risk?

The following scenario is a good example of accepting too much risk to avoid one threat, while simultaneously exposing the aircraft to an additional threat.

I was a new aircraft commander on one of my first rides in theater. The weather was clear and free from clouds and this was our first stop of the night. En route to our stop, we discussed look out doctrine and who was going to scan for threats and where, as well as how we were going to run the required briefings and checklists. We also talked about how we were going to set up our aircraft lighting. We had a brief from squadron tactics on the midair threat and how some crews were having close calls with other aircraft, particularly helicopters, as well as our normal enemy threat briefings. I chose to focus more on the enemy threat since I assumed most aircraft in the terminal area would be under radar or tower control, so our midair threat should be reduced. After the long flight en route, we were finally ready to start our descent from altitude.

We were on a visual approach into an airfield in theater with normal NVG lighting. After commencing the approach, I heard a formation of helicopters asking for permission to depart to the east. Nothing seemed out of the ordinary, and I expected the departure course to be well clear of my approach. We received permission to land, so I assumed tower would be providing adequate approach separation. On an approximate two-mile final, I observed the formation of two helicopters, also blacked out, fly in front of my aircraft over the threshold lights. Although both of our aircraft were blacked out, I visually acquired them with my NVGs. Since they were directly in front of me, it was fairly easy to acquire them; however, we were at a 90-degree angle to them, so unless they were looking, they probably didn't see our aircraft. At this point, we were busy running checklists and preparing for landing, scanning outside the aircraft, and ensuring we completed required checklists. Inside the one-mile point, I noticed another pair of blacked-out helicopters transition across my flight path over the threshold lights right in front of my aircraft. I immediately initiated a climb due to the proximity of the helicopters to my flight path. After they passed by and were no longer a threat to the aircraft, I continued

Digital illustration by Felicia M. Hall

the approach and landed safely. If I hadn't seen the additional two helicopters and continued on the descent profile, we would've been dangerously close to a midair collision.

Flying in theater requires balancing risk mitigation between the two most significant threats: enemy fire and midair collision with coalition aircraft. One of the first briefings we get when we arrive in theater is balancing the two threats. On one extreme, we can deny the enemy acquiring our aircraft at night by blacking out the aircraft to such an extent that we will be virtually unseen. This decreases the enemy acquisition threat, but conversely exposes the aircraft to a midair threat. On the other extreme, we can fly with our normal aircraft lighting to enable see-and-avoid with other aircraft flying in the area. This would minimize the likelihood of a midair collision, but would expose aircrew unnecessarily to visual acquisition by the enemy and, subsequently, enemy ground fire.

Another way to look at the problem is to use a sliding scale. On one side, for example, you have the enemy threat. On the other side you have the midair threat. Theoretically, we should fly somewhat in the middle, balancing both threats, accepting some risk from one threat while negating risk from the other threat. If you move too much to one extreme, you may mitigate most of a threat, but now you have overly exposed yourself to the other threat that could be equally as deadly.

For me, I perceived the most significant threat to be enemy fire. Due to the perceived threat, I elected to fly the approach as blacked out as possible. As we can see from the above scenario, I was closer to the enemy risk avoidance on the risk scale, while not paying enough attention to the midair threat, and by flying to mitigate that threat, overly exposed myself to a possible air traffic conflict with friendly helicopters. In subsequent flights, I elected to fly the approach blacked out and then turn on some overt lighting closer into the airfield to aid in visual acquisition for other aircraft. This approach seemed to be the best balance for the level of risk at the terminal phase of flight in preparation of landing. I also understated the role that the airfield tower played in the above situation. Although not as tactically sound, I could've given the tower my relative position to the airfield to enable other aircraft to have a greater situational awareness as to my aircraft's position relative to their position. Given this, the helicopters might have held their position and waited for us to land before dragging their formation in front of us, or tower could have directed them to hold, thus eliminating the possible midair.

What are the final lessons learned? In a chaotic environment of numerous aircraft transiting the terminal environment, as well as an enemy trying to shoot down coalition aircraft, we need to decide which is the appropriate risk mitigation technique we're going to use and when on the descent profile we're going to use them. Also, don't underestimate the power of basic communication between aircraft and the controlling services. If tower has more information, they can easily break a chain in a potential mishap situation. Everyone has a role in the ORM process, outside and inside of the aircraft.

U.S. Air Force photo by Tech. Sgt. Manuel Trejo

U.S. Air Force photo by Master Sgt. Val Gempis

Pushing Just to Check a Box Can Kill You

U.S. Air Force photo

Anonymous

It was a dark and gloomy night in Alaska, barely VFR. Our MC-130H "Combat Talon II" rumbled through the night on a low-level TF training sortie. As part of our training profile, we terminated our regular radar TF procedures and started to perform NVG low-level. The difference is that when using radar TF procedures, the radar is looking out approximately 20 NM to generate a flying profile from 250 to 1,000 feet, regardless of the visibility. Using NVG low-level procedures, we dim down our displays or turn off the radar TF generated profile and fly a visual modified contour profile, with only the radar altimeter to give us any low altitude warning protection down to 300 feet. After 30 +/- minutes from Elmendorf at the end of a 4.5 sortie, flying NVG low-level, the low-alt warning went off; bells and whistles pierced the cockpit. I pulled hard on the yoke and applied full power; the RADALT maintained 115 to 150 feet as the Talon II clawed its way up the mountainside. The crew breathed a collective sigh of relief as we crested the ridge. We activated the TF system and followed the valley home. The flight deck was silent as the crew contemplated how close to death we really were, and for what?

A highly trained, seasoned and irreplaceable crew was almost killed that night because we were pushing the weather to check a box! In the marginal VFR, almost zero illumination night, we failed to see a ridge jutting off the side of the valley we were in. We train to fly not down the middle of valleys, but on one side or the other — illumination, winds and threat dependant. Due to the low illumination,

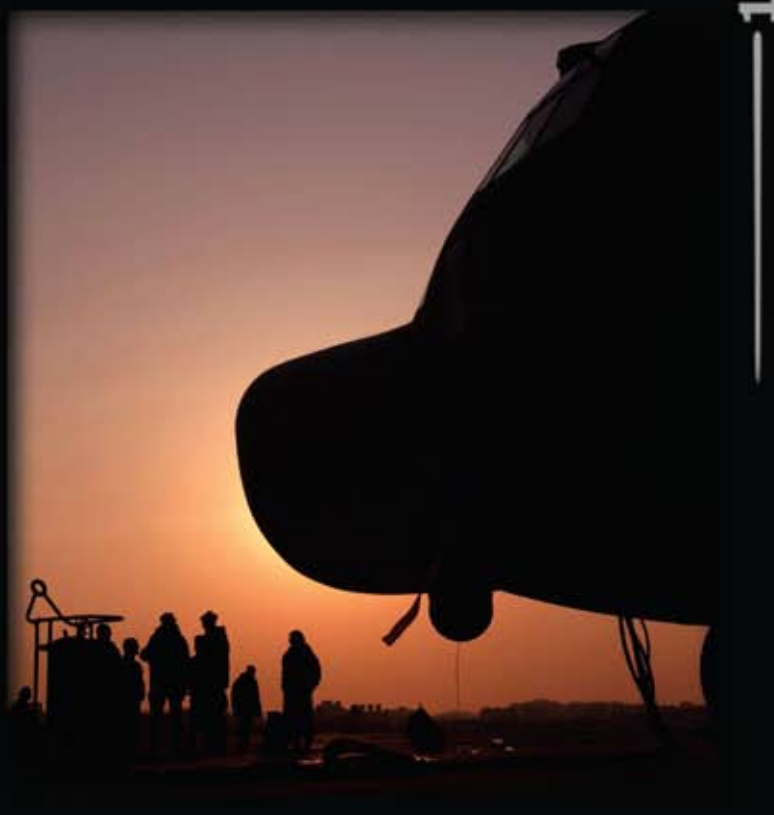
U.S. Air Force photo

the ridge was basically invisible. Luckily the day before, on a severe clear VFR TF training line, the IP I was flying with stressed the necessity to respond aggressively to all low altitude warnings and not grow complacent to the systems designed to protect you. Sometimes, when not utilizing the radar TF mode, a small finger ridge or a very tall tree will give you a brief low altitude warning, but often you're past the object by the time you react. It's important to verbalize an impending low altitude warning to let the rest of the crew know you've identified the object which is driving the warning. You can lull yourself into thinking that when the warning goes off, it must be for something you've identified. That's where you can lead yourself into a false sense of security because you're second-guessing a protective system. The conditions were ripe that night for a CFIT event, but luckily, we reacted correctly and can now tell the tale.

Although the Talon II is an advanced aircraft with unrivaled all-weather TF capability, all that technology can make you think you're invincible due to the comprehensive safeguard systems that are in place. Many other aircraft perform low-level ops utilizing far less sophisticated equipment, but the same ideas apply to all aviators that fly within hundreds of feet off the ground, often in poor weather, and now more often in hostile territory. The bottom line is that we have to be on top of our game all the time, regardless if we're flying an F-22, MC-130H or a Cessna 182. We have to thoroughly understand our equipment and, more importantly, our equipment's limitations.

Usually we work hard to keep our semiannual requirements under control, but the next time you're pushing to fill a square, think twice. The worst that can happen is that you have to fly with an instructor for the first ride of the next semiannual. Big deal, better than being a smoking hole! I have heard good commanders and DOs stress the importance of safety, and stress that if you're asked to do something unsafe, there'll be a good reason for it, usually coming from the highest AF and DoD levels. Usually the stress we feel to check a box doesn't come from the head office, but from ourselves or our peers. Aviation in general is a culture of competition, striving for success with a work hard/play hard attitude. All these traits are good for a powerful and victorious Air Force, but like Clint Eastwood says, "Every man has to know his limitations." I support the idea of max-performing the aircraft, getting the most out of each training line, as long as we temper this with a culture that will accept aviators "knocking it off" to live and train/fight another day.

The more we razz each other about making conservative decisions or talk about how someone is a wimp because they didn't push it to get requirements done, the more likely we'll set someone up to push themselves and their crews past their limits and into death's door. The mishap report annals are full of good crews that pushed themselves too hard and died on vanilla training lines … and for what? Like anything in life, a common ground is important. Our jobs as aviators are inherently dangerous. We should savor our abilities to get a mission accomplished, train ourselves to the edge to ensure we're the most lethal Air Force in the world, but be aware of our personal and equipment limits.



U.S. Air Force photo by Staff Sgt. Efren Lopez

Close Call After Sunset

CAPT. BRAD "MUTE" ERTMER
95th Fighter Squadron
Tyndall AFB, Fla.

U.S. Air Force photo by Staff Sgt. Ken Bergman

At the time, I was a 150-hour invincible wingman ready to take on the world. What I saw not only changed my attitude, but also changed how I brief, execute and debrief every night sortie I fly. Hopefully, this will give you a different perspective and a newfound respect for the machines we have the privilege of flying.

It was the third week of a one-month deployment flying Dissimilar Air Combat Training in F-15Cs as red air against F-16s gaining blue training. This was the first week of night sorties after two weeks of day flying. My flight of six arrived to what by now was a fairly standard brief with the only addition being night and night vision goggle specifics. Following the coordination brief, my flight lead briefed up our red air (simulating MiG 29 Fulcrums) game plan and night deconfliction plan. About half an hour after sunset, I suited up and stepped to my jet for what I thought would be an uneventful sortie, followed by late evening cocktails downtown. This evening was anything but uneventful.

As the blue air flight lead called "Fight's on," I pressed out of my CAP in my block (a sanctuary altitude that cannot be transited unless a very specific set of criteria exist – especially at night). After five minutes, the blue air F-16s and my flight of F-15s met at the merge. Feeling good about being undetected by the blue air, I saw a two-ship of F-16s in the beam off my nose above me at about 22,000 feet MSL (the F-16 blocks were the 0-4s – i.e., 10,000-14,000 feet; 20,000-24,000 feet, etc.) with my NVGs. Regardless of range or aspect angle, other jets on NVGs appear as a spot of light, so other means such as radar or GCI must be used to determine actual slant range distance to what the eyeball is seeing. At first, the two-ship had distinct line of sight across my canopy bow (they weren't pointed at me). Suddenly, the line of sight froze on my canopy bow, meaning that the F-16s had either turned directly away from me or had turned nose on to get a radar lock and shoot. It turns out to be the latter.

A second later, I received a radar spike on my radar warning receiver. In debrief, I learned the range the two-ship turned into me was approximately four miles. At mach vs. mach speeds, this equates to about 12 seconds until we're in the same exact piece of sky, if neither of us flinch. I wasn't worried yet as I was in my block at 18,000 feet and expecting the F-16s to stay in their block at >20,000 feet MSL. I should have been worried as the lead F-16 determined he had fulfilled all requirements to come out of his block and into mine with his nose pointed straight at me. After seeing his flight lead turn hard to the left and descend, the trail F-16 followed his flight lead without ever seeing the threat (me) that was four NM away and closing. From here on, time dilation began to kick in as I watched the pinpoint of light that was a jet blossom into the fully recognizable form of the lead F-16 as he passed 500 feet off my left wing. If everything is done correctly IAW 11-214 training rules, there's no way I should have seen anything more than a spot of light, and the F-16 shouldn't have been closer than 1,000 feet away. This was enough for me to know that I had enough, but the best was yet to come.

The trail F-16 was one NM back from his flight lead and still didn't see me. One NM of range equates to three seconds of time. This three seconds lasted forever in my mind as again I saw an F-16 erupt from a pinpoint of light to an F-16 which I not only could VID, but could identify the other pilot's helmet – at night, at 1,200+ knots of closure, and, as it turns out, 199 feet away from me. My brain took several seconds to register what had just happened as I started a shallow turn to the left to get away as soon as possible. Following a plethora of choice four-letter words, I removed my tactical flying mindset and shifted immediately to self-preservation and got as far from

the other jets as possible (>50 NM) and waited until the end of the fight to RTB. Needless to say, the debrief was slightly tense as a midair collision had nearly occurred. Only the lead F-16 had seen me – the trail F-16 (the 199 feet pass F-16) had not seen me nor knew I was there even after the close pass.

Two major lessons can be gleaned from what was nearly a tragic incident with loss of two lives and millions of dollars of Air Force combat assets. The first regarded the NVG crosscheck negative transfer from day to night, and the second more important lesson was adherence to training rules, which are written in blood and were very nearly re-written in blood.

Negative transfer is defined as taking a habit pattern that works during one set of circumstances and transposing it to a similar, though not identical, set of circumstances, resulting in an adverse effect. As it relates to this situation, the transfer occurred due to a visual cue that during the day would dictate one set of actions. When a pilot sees an enemy jet in the daylight, his first instinct is to employ ordnance by ripping his nose directly to the bandit while "bore sighting" with the radar – putting what you see right on the nose to get a radar lock. Under these conditions, a pilot has two essential pieces of data directly from his eye – depth perception and shape of the jet. Instantly, the subconscious processes the data to the invaluable pieces of required information – range as deduced from depth perception and aspect angle as deduced by the shape of the jet and line-of-sight direction. If the other jet is too close, the pilot simply stops pulling his nose on before pointing directly at the bandit so as not to cause a collision.

Now take that set of circumstances and change the illumination to night and add NVGs. As described earlier, a jet on NVGs looks like a spot of light until well inside of 1,000 feet. A spot of light gives no data about depth perception or aspect angle – the two essential data needed to make an instantaneous determination about collision avoidance. A pilot inexperienced with NVGs (or extremely task-loaded) will revert to trusting his primary sensory input – his eyeball. The pilot must recognize that his eyeball is not giving him all the information it gives during the day and fight the tendency to point at the bandit. In my case, the pilot did exactly what he would do during the day, and the results speak for themselves.

The second lesson learned from this case is a reiteration of the necessity to obey training rules. It's precisely at the merge that training rules are most important. In this case, the lead F-16 pilot had a spot of light that he used as justification to exit his block and enter mine. In order to exit the block on a visual commit at night, one must have range awareness, a visible line of sight and a visible horizon. The spot of light that was my jet led the pilot to believe he had range awareness. Also, the required line of sight wasn't present. The only criterion fulfilled on this event was a visible horizon. The trail fighter had even less reason to leave his block as he didn't have situational awareness on my jet even being there. At night, your assigned block is where you MUST be, unless, beyond a shadow of a doubt, you have spatial awareness of every jet involved – a near impossible feat. This training rule point MUST be emphasized in the brief. The other point that I now emphasize during my briefs, while not necessarily a training rule violation, is that bore sight radar modes are the last choice of modes to use at night – off axis, slewable modes are primary visual auto acquisition modes at night.

Looking back on what happened that night, I'm not sorry it occurred, and I don't blame the other pilot. Before this event, given the same set of circumstances, with the roles reversed, I may have done exactly as the F-16 pilot had done with the exact same results. Each of these "pucker factor" sorties helps to teach us an invaluable set of lessons for the future. My hope is that those of you reading this can painlessly learn a lesson from me without such a close call.

U.S. Air Force photo by Tech. Sgt. David McLeod


USAF
We Own

U.S. Air Force photo by Master Sgt. Bill Thornton
Digital illustration by Felicia M. Hall

Wake Turbulence
The Invisible Killer

CAPT. DAVID KEGERREIS
43rd Airlift Wing
Pope AFB, N.C.

It had been three long months in the desert; 18-hour crew duty days; often staying awake for 24 hours at a time. I often found myself flying the final approach with fatigue equivalent to a blood alcohol content of between .05 and point one. But, that was not the case this day. This day was supposed to be easy. It was the final leg of the 6,500-mile journey from the desert back to Pope AFB, N.C. We woke up around 10 a.m. after an excellent night's sleep. Takeoff was at 2 p.m. with a four-ship formation from Providence, R.I. to Pope. It was a simple high-level formation with 4,000 feet between our C-130Es.

About 20 miles from Pope, we dropped down to 500 feet AGL and closed up to visual formation position (1,000 to 2,000 feet in trail). We were No. 3, got long, and had to accelerate to 270 indicated to gain position. We were to do a 500-foot overhead, breaking with a sixty-and-two over Pope's Green Ramp where families, friends and media were eagerly awaiting our return from Operation Iraqi Freedom. It would be spectacular. I vividly remember the flags waving, large welcome home banners, the news trucks with cameras rolling, and all the husbands, wives and children waiting for their loved ones to come home.

Lead broke at the appointed spot that would bring his aircraft directly over the cheering crowd. No. 2 broke and followed lead. One potato, two potato, and I smoothly began to roll into 60 degrees of coordinated bank, brought the power to flight idle, and added back pressure to maintain altitude. But the plane didn't stop at 60 degrees; it continued to roll past 60 — *"bank angle,"* — to 70, 80 — *"bank angle,"* — 90 degrees, and then some. I slammed the yoke to the left and held on with all I had. I kept the throttles at flight idle since we were already doing 250 knots. The nose dropped, and this was where I got the best aerial view of green ramp I'd ever seen. I actually had time to pick out the place we were going to impact.

U.S. Air Force photo by Airman 1st Class Christine A. Clark

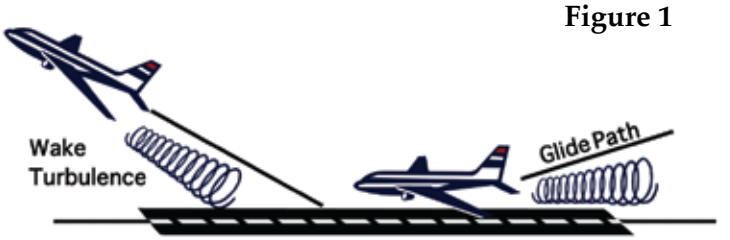
It seemed like an eternity, but it was only a second or two before the ailerons become effective again and the plane began to waffle out of its extreme bank angle. We had lost 200 feet of altitude before we fully recovered.

We rolled out to 30 degrees of bank and then back to 60 as we climbed up and attempted to regain formation position. We configured on the downwind and landed uneventfully. More than one crew member was still shaking as we taxied to park. The question on everybody's lips was, "What the heck was that all about?" Two words — wake turbulence. Some witnesses on the ground thought we were showing off, as did my squadron commander. "No, sir, that was wake turbulence trying to flip us over and crash us into a crowd of unsuspecting onlookers. Nice to see you again."

Despite its dangers, wake turbulence accounts for a surprisingly low number of aircraft mishaps. However, we want our low numbers even lower. Reducing that number to zero is the goal. Here is a quick review of the standard rules for avoiding wake turbulence. **See Figure 1.**

- Wait three minutes to land after a "heavy" aircraft departs or lands
- Wait one minute behind like aircraft
- Rotate before the previous plane's rotate point and stay above its path
- On final, fly "one dot" above the preceding aircraft's glide slope
- Land beyond the previous plane's touchdown point
- Pass above and well behind crossing traffic, one mile or more if able
- Wake turbulence dissipates quicker with strong crosswinds and lingers with light winds

Figure 1



Digital illustration by Felicia M. Hall

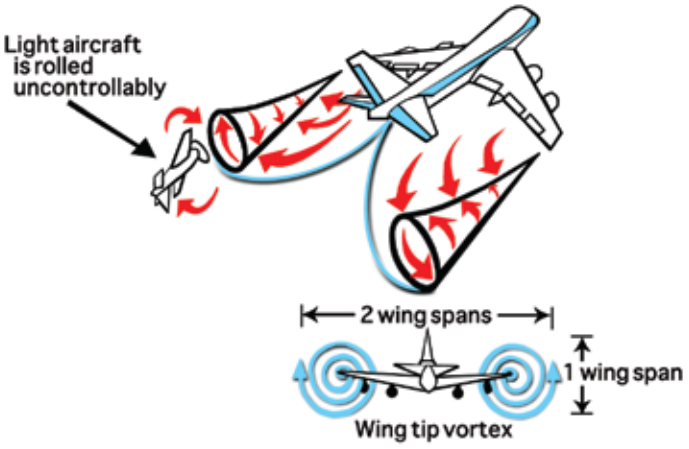
Those rules tend to work for taking off, landing or flying around by yourself. What about taking off and flying in formation? Aside from Large Package Week at Pope AFB, it's perhaps the most dangerous thing we do in the mighty Herc. For example, as a young co-pilot during one formation pass over Sicily drop zone, I found my plane loaded with 55 airborne troopers caught up in lead's wake turbulence. In retrospect, I'm pretty glad that I wasn't flying. Even with the pilot applying max power, full aileron and full rudder, our plane continued to slip and rock violently, but he somehow managed to keep the plane pretty much upright. The loadmaster reported a jumper exiting the aircraft and actually coming back in before bouncing out again. It was ugly. During a formation takeoff earlier, I witnessed No. 2 get pushed directly to the

U.S. Air Force photo by Chief Master Sgt. Gary Emery

right, obviously struggling to regain aircraft control and spraying fuel from the right wing tip. I remember thinking those guys must have soiled their pants during that maneuver. Yet we continue to fly in formation. So what can we do to mitigate the risks associated with this invisible killer we call wake turbulence? We may already be doing all we can, but revisiting this potentially deadly phenomenon just might give you the tools needed to recognize, avoid or get out of it.

Starting with a quick review of wake vortices' characteristics may help. Wake turbulence is caused by the lift, creating high pressure under the wing rapidly moving over the wing tip to the low pressure area on top. This causes tornado-like vortices to flow from the wing tips. The characteristics are more pronounced when the aircraft is heavy, slow and clean, thus generating the most lift, i.e., after cleaning up during takeoff. The vortices move clockwise off the left wing tip and counterclockwise from the right when viewed from behind. They typically fall down and away from the aircraft. **See Figure 2.**

Figure 2



Digital illustration by Felicia M. Hall

Let's go over what else we know and why this is such a serious problem for C-130 aircraft. We know that below 125 knots indicated, the C-130 may not have the aileron authority to overcome the effects of wake turbulence generated by a preceding C-130. We also know that drop airspeed for personnel is 130 knots. Most C-130 pilots typically brief they'll maintain plus or minus five knots on airspeed, so that doesn't leave much of a buffer for a potential wake turbulence encounter during a drop.

Moreover, we take off with a 15-second interval, not the two minutes or more that is recommended by the FAA, and our rotate airspeeds are typically not much higher than 100 knots. This is when we're most vulnerable. Here is an account from my buddy on his first formation takeoff without an instructor and only his third flight as an aircraft commander.

"We departed as the second aircraft of a two-ship formation. Takeoff speed was 109 kts. Passing 200 feet, we flew into lead's wake turbulence. The aircraft began roll off to the left. I applied max power and full right aileron, but we were now rolling through 30 degrees of left bank at 110 kts. At that point, there wasn't much more I could do but stay coordinated and ride it out. We were too slow to pull the nose up and climb through the vortices, too low to let it drop and build up some speed. Eventually, we got spit out of the turbulence, regained full control and continued the departure for an uneventful afternoon of dropping 18 ABN paratroopers."

So what really happened? The C-130E(H)-1 states, "The forces from C-130 wing tip vortices can easily exceed the aileron authority of a following C-130 at 125 kts" (page 6-5). This was a formation departure, so they were 15 seconds behind the lead aircraft. It's right there in black and white. If you find yourself in wake turbulence below 125 kts, you can expect little or no aileron authority. We do that every day. The situation described above was aggravated because the wake turbulence caused the aircraft to roll into a 30-degree bank. At that particular takeoff gross weight, power-off stall speed at 30 degrees was 101 kts. If they had continued to roll to 45 degrees of bank, the stall speed would have been 113 kts — three knots below their current speed. Thankfully, they exited the vortices before rolling any further.

Up to this point, I haven't offered many solutions in the way of correcting the dangers inherent in the C-130 mission. I'm not here to change the way we've done things for decades; however, here are a few things that should be considered and thoroughly briefed before "stepping to the jet" for a seemingly routine trip around yellow route for a personnel drop at Luzon DZ.

Let's start with the takeoff. We've already discussed the 15-second takeoff interval. Imperative to our mission is getting into formation position, so extending the takeoff interval is impractical. However, we can use our favorite wake turbulence techniques to keep ourselves out of trouble. A good technique would be for lead to momentarily delay his rotation, perhaps to 125 knots, and shallow out his climb. This will allow his wingmen to rotate before and climb above lead's flight path. In a crosswind situation, a good idea is to maneuver upwind of the preceding aircraft's flight path to decrease the likelihood of passing through his wake vortices. In calm winds, maneuver slightly left or right as appropriate to avoid the turbulence. Worry about getting in position once you've gotten away from the ground.

U.S. Air Force photo by Staff Sgt. Suzanne Jenkins

Now that we've successfully avoided our preceding aircraft's wing tip tornados on takeoff, let's discuss the drop. Intuitively, stacking each plane 50 feet sounds like a good idea, but it's not practical for large formations. It's slightly effective when we stack multiple element formations (three-ships), but isn't much help to the guys behind their element leader. During high-drift situations, we automatically set ourselves up to avoid wake turbulence with our angled track into the drop zone, but during light winds, we're 2,000 feet directly behind lead. Since we're dropping visually, it seems reasonable to move slightly upwind and accept a deviation in our drop score. At some point, though, we're going to run out of drop zone and be stuck behind lead. Now what? Tragically, we sit back and hope we don't get caught in wake turbulence. If we do get caught, we've hopefully armed ourselves with the tools to get out. Section six of our dash one describes the recovery procedure. At the first indication of encountering wake turbulence, "[Warning] Immediate application of maximum power and maximum coordinated deflection of flight controls may be required to exit the wake turbulence. Elevator back pressure may be necessary to minimize altitude loss." You may want to brief your engineer to close the bleed air valves upon encountering wake turbulence. Every bit of power will aid in a successful recovery.

Having a good plan is essential. We haven't fundamentally changed the way we fly formation since before I was born, and it isn't likely that it'll change any time soon. Bring it up to any "old hat" and he or she will tell you, "That's the way we've always done it." This attitude, my friends in flight, is an entirely different safety issue all together. For now, realize that the nature of formation operations — especially C-130 formations — puts us in the wake turbulence envelope from takeoff through landing. Admittedly, it's a manageable risk. Your experiences and skills as pilots will also be called into play. You should always do everything you can to avoid wake turbulence, but if you can't avoid it, at least apply max power and stay coordinated. Abrupt rudder inputs or high rudder deflections at high power/low airspeed can cause a fin stall to develop, and now your day just got a whole lot worse. Keep the ball centered and no matter what — keep flying.

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Interview with Capt. Mark Oberson, October 5, 2004

NVG Limitations

ANONYMOUS

The mission seemed easy enough. The plan was to transport several passengers to a nearby National Guard base to participate in an exercise. Due to the early morning start of the exercise, the crew arrived at the squadron and quickly began mission planning. Since the flight would commence in the dark, we checked out and preflighted NVGs from life support. The weather forecast looked good and spoke well for the coming flight — good visibility and high ceilings. I noted that the temperature/dew point spread was only one degree, but I assumed that the spread would increase as the morning progressed.

The preflight brief was quick and to the point. There seemed little need to go into excessive detail on how we would handle various contingencies since the flight seemed relatively benign. Since we flew the majority of the flights routing to the exercise site daily and planned to stay above 500 feet AGL, little time was spent discussing the route or various low-level obstacles along the route.

We were a young and inexperienced crew. I had just recently returned from my aircraft commander upgrade while the co-pilot and flight engineer had been in the Huey for less than a year. Our NVG flight time was low, and our NVG experience was limited to mostly fair weather flights. As I completed a quick walkaround, it seemed to me that the ceilings were lower than forecast, but nothing that made me or anyone in the crew overly concerned. After an uneventful start and takeoff, we began the 40-minute flight to the exercise location. As the flight progressed, it was becoming obvious that the actual weather was much less ideal than the picture presented by the forecast. Since we were wearing NVGs and the illumination was very low, it was very difficult to determine the exact ceiling and visibility. After discussion with the crew, we decided that we would continue pressing on with the flight and would turn around and return to base if the conditions continued to deteriorate.

Looking forward through our goggles, the visibility appeared to be three to four miles, but there were hints that things weren't exactly what they seemed. Scintillation in the NVGs was starting to become more prevalent the further we progressed, an indication that the weather was probably worse than what we were seeing. I knew from my various NVG classes that it was relatively easy to get suckered into an inadvertent IMC situation on NVGs, since goggle users often could see farther though less dense clouds than

U.S. Air Force photo by Carlos Cintron

unaided vision. Looking under our goggles and using the landing light as a measuring tool, we confirmed that the visibility was actually closer to one mile and getting worse by the minute. Looking behind us, the FE gave us the unwelcomed news that the visibility behind us was worse than that ahead of us.

It was now obvious to the crew that our original mission was over, and our new priority was to get the helicopter and our passengers safely on the ground before we went completely IMC. The nearest helicopter pad was about two miles ahead. We used this pad frequently and knew it well, so I decided that we would press forward and land at the pad. We started to descend in anticipation of the approach and in search of better visibility. As we were just starting to make out the outline of the helipad and brief up the approach, the last of our luck ran out and visibility went to zero. I had practiced inadvertent IMC in the simulator many times, but I was truly unprepared for the reality of it. It was as if someone had thrown a switch and instantly we were in the dark. Two undeniable facts came quickly to my mind. First, we were about 80 feet above the ground and descending, and secondly, I really didn't know exactly where the numerous towers were that I knew were in close proximity of the nearby helipad.

As the words "climb" came out of both my and the FE lips, the CP was already applying power and transitioning to instruments. I quickly flipped up my goggles and began turning on our cockpit lights. We were climbing slowly but surely away from the ground. When we climbed past the highest altitude of the nearby towers, I dialed up approach and let them know that we had gone inadvertent and requested vectors for the ILS. After turning to our assigned heading and after what seemed like hours, we broke out of the clouds into one of the most beautiful skies I had ever seen. We were completely in clear blue sky, a solid deck of white clouds beneath us, and the sun was just starting to peak out above the horizon. As the sun climbed higher in the sky and we flew on our downwind vector to the ILS, the clouds began to slowly break up. The ILS approach went smoothly and we broke out with enough ceiling to make it back to our helipad.

After we returned to base and confessed our sins to our squadron leadership and fellow aircrew members, we finally had time to think about what had just happened to us. I had made numerous mistakes, and things could have turned out much worse than they did. First, I had blindly put my faith in our weather forecast and ignored the many signs that things weren't as predicted. The fact that temperature/dew point spread was a mere one degree should have set off some cautionary sirens in our heads. A forecast can sometimes be completely wrong, and there's no replacement for carefully monitoring local conditions before flight, coupled with a healthy dose of skepticism. Secondly, there's no such thing as a "benign" flight, and preflight briefs should reflect this way of thinking. The time to wonder about where towers are is during the safety of pre-mission planning and the brief, not during a frantic climb out. Lastly, never forget the golden rule of helicopters — you can land them almost anywhere. If it's safe to do so, land and think about what you're going to do next — from the safety of the ground.

U.S. Air Force photo by Staff Sgt. Joshua T. Jasper

One Challenging Night in Boston

CAPT. CHRIS KIERSTEAD
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It could happen on any leg. When you train people or are short on experience or proficiency yourself, be aware that on the very first leg after finishing the training, it could happen to them. It never happened to me when I was fresh out of training, and I hoped that it never would, but the clock ran out one night in Boston.

I had just returned from two years of Air Force Reserve duty in the desert. Fifteen years in the Air Force Reserve and more than one war had left me anxious to return to civilian life. I was back in civilian clothes, wearing a tie at work again and looking forward to flying the Regional Jet that I had left nearly two years ago. Only a month had passed since I started retraining on an airplane which I had nearly a thousand hours in, and at my peak, knew like the back of my hand. I was no longer at my peak. In the Reserves, I serve as a navigator. I didn't log a single hour of pilot time during my time on activation; rusty doesn't begin to describe my skills on that first simulator session. Several sims later and it all started coming back. Some nice comments by the examiner on my checkride in the sim added to my confidence. The four legs I flew with an instructor went smoothly, and I was once again certified in charge of a crew carrying 50 passengers around the United States.

After processing the paperwork, I was placed on reserve with my airline. I didn't have long to wait. I was quickly assigned to a four-day trip, mostly running up and down the East Coast. It looked like a good way to get back into the swing of things, but I knew that I still needed a little seasoning.

I met my crew at the airplane. The briefing and preflight went well, and we were off. The first two legs went uneventfully with good weather and smooth operations the rule. For the last two legs, we were scheduled to go to Boston with a scheduled landing at 8 p.m., then on to Reagan National in Washington for the overnight, arriving at about 10 p.m. I was more apprehensive about my first approach at DCA in two years than going into Boston. Boston had long runways and a good ground crew; what could go wrong?

We had been swapping legs and for this leg, I was the flying pilot. Weather at Boston was marginal VFR and slowly deteriorating with a fall storm approaching that was going to make the next day's weather bad for the entire Northeast.

Digital illustration by Felicia M. Hall

There were no delays in the terminal area, and Approach vectored us over the ocean for a left downwind to runway 22 left. To move things along, I kept the airspeed high and the airplane clean until we turned a seven-mile final and cleared for the ILS runway 22 left. At that point, we were above a broken scud layer that ATIS said would have bottoms at 1,200 feet with 10-15 knot winds from the Southeast, which was basically right down the runway. I called for flaps eight and that's when the fun began. I heard the click of the flap lever as the first officer moved the lever into the flaps eight detent, and almost immediately heard the single chime and saw the master caution begin to flash. I looked down at the EICAS and instead of the usual nuisance warning, I saw something that I had never seen in the actual airplane — FLAPS FAIL. The flaps were at zero and I knew from reading the procedures in the past that the checklist would probably lead us into a flaps-up landing.

First things first, we were now at about five miles to go and approaching glideslope intercept. I knew we would not be landing out of this attempt, so I told the F/O to dig out the checklist and start that procedure. I confirmed that I had the airplane, and I also took over the radio duties. I called Boston tower and told them about our issue and asked to go back to Approach for vectors or holding. Approach started vectoring us in a large box pattern to give us time.

"I looked down at the EICAS and instead of the usual nuisance warning, I saw something that I had never seen in the actual airplane — FLAPS FAIL."

We ran the checklist and our fears were confirmed — this would be a no-flap landing. I had just done this procedure in the simulator a week ago. I had hoped that the next time I would see this would be in the simulator again, next year, but I guess this was my night.

Right off the bat I thought of the United flight in Portland, Ore. in the 70's which ran out of gas while running troubleshooting. So both the F/O and I checked fuel and set a bingo to start the approach. With that, we got to work.

The clean-up items on this emergency checklist were rather lengthy, so the F/O started that, while I became a communications specialist while flying the airplane. I called the flight attendant and briefed her in on what was going on and what was going to happen. My airline uses the BETTS system of performing this briefing (Brace signal, Evacuation yes or no and signal, Type of emergency, Time remaining, Special instructions). It's a really good way of getting the flight attendant briefed quickly, without wasting time giving extraneous information or shortchanging them on the information they need. I then called our dispatcher who functions as our single point of contact once we're in the airplane. Together, the two of us went through everything. Maintenance was brought in, but really had nothing to add since we had already run the checklist. The dispatcher pulled our performance numbers just to verify that all was well. I also had him call crew scheduling because this airplane was not going to DCA, at least not tonight. The whole time I was talking on the radio, I was talking to ATC, coordinating our movements, and keeping him in the loop so he could sequence us into the flow of traffic. I realize that this violates the principles learned in the Eastern crash in the Everglades (one pilot does nothing but fly the aircraft), but with only two of us, many tasks to perform and time short, I evaluated this the lesser of two evils. I always made sure that I looked away from the flight instruments for only brief periods of time when I was talking on the radios, and I kept reminding myself that flying came first. The last people that I spoke to were the passengers. I told them what to expect (faster than normal approach speed, firm touchdown and fire trucks chasing us), and that this was really no big deal, just precautionary and that we would have them at the gate very soon.

By the time I had finished talking, the F/O had finished his procedures, and we were ready for the approach. After all the anticipation and buildup, it was an uneventful landing. The passengers cheered, and we taxied to the gate with two fire trucks in tow.

We ended up staying the night in Boston and ferrying the airplane back to our base the next day with the flaps locked in the takeoff position. That was also an adventure in coordinating, but that's a story for another day.

Be ready any time for anything to happen. This turned into a pretty benign story for these reasons:

1) Training — We perform worst-case scenarios in the simulators so that if they happen in the real world, they will seem uneventful.

2) CRM — It works. All the hours spent learning to communicate and work as a team pay off.

3) Luck — In reality, this was a simulator scenario played out in real life. If the situation had been complicated by other events, it could have been much worse.

Safety Center Courses Now Accredited

ROBERT BURNS
Chief, Training Development Branch
Air Force Safety Center
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The American Council on Education recently completed a review of the courses taught at the Air Force Safety Center, Kirtland AFB, N.M. and on August 20, 2008 recommended students receive college credits for completing three of the center's courses.

U.S. Air Force photo by Dennis Spotts

For the Flight Safety Officer Course, ACE recommended that students in the upper-division baccalaureate category receive three semester hours in aircraft accident investigation and one semester hour in aircraft accident investigation laboratory. For students in the graduate degree category, ACE recommended three semester hours in aviation safety and human factors.

Students who complete the Aircraft Mishap Investigation Course can get three semester hours in mishap investigation analysis, and one semester hour in mishap investigation analysis laboratory.

For those students completing the center's Mishap Investigation Non-Aviation course, three semester hours in mishap investigation analysis and one semester hour in mishap investigation analysis laboratory are available in the upper-division baccalaureate category.

The credits available through the FSO and AMIC courses are retroactive to October 2007. Students who completed the MINA course from January 2008 forward can receive the credits.

Course graduates may receive the hours by taking their course completion certificate along with a copy of the ACE guide, located at ***www.militaryguides.acenet.edu***, to a college where they are enrolled and apply for the credit.

Class A Flight Mishaps

FY08 (Through Sept. 18)

	Class A Mishaps		
	FY08	Same Date in FY07	Total FY07
ACC	8	8	8
AETC	6	5	5
AFMC	1	1	1
AFRC	3	1	1
AFSOC	0	1	1
AFSPC	0	0	0
AMC	4	3	3
ANG	3	5	5
PACAF	1	1	1
USAFE	0	1	1
AF at Large	0	1	1
Total	26 / 1.36	27 / 1.35	27 / 1.32

Flight Rate Producing

Nov 01	F-22A		No. 2 engine FOD discovered during post-flight walkaround
Nov 02	F-15C	✈	Crashed on training mission; pilot suffered minor injuries
Nov 12	KC-10A		No. 2 engine compressor stalled; rotor/stator damage; no injuries
Nov 20	E-8C		Hard landing; wing/pylon/gear/radar damaged
Nov 28	T-6	✈	Dual T-6 midair collision
Nov 29	HH-60G		Hard landing during brownout; damaged FLIR, WX radome
Jan 15	F-16C	✈	Aircraft crashed in ocean during training mission
Feb 01	F-15D	✈	Aircraft crashed in ocean during training mission
Feb 20	F-15C	✈	Dual F-15C midair; 1 pilot fatality
Feb 23	B-2A	✈	Aircraft crashed on takeoff
Mar 14	F-16C	✈	Aircraft crashed during student training; 1 fatality
Apr 02	F-16D		Aircraft landed gear up
Apr 04	B-1B	✈	Landed; taxied clear of runway; fire/explosion
Apr 23	T-38C	✈	Crashed on takeoff; 2 fatalities
May 01	T-38C	✈	Crashed on touch-and-go; 2 fatalities
May 01	E-9		Gear up landing
May 03	B-1B		No. 2 engine damaged
May 21	T-1A	✈	Landed short of runway
Jul 21	B-52H	✈	Aircraft crashed in ocean; 6 fatalities
Jul 30	F-15D	✈	Crashed during Red Flag exercise; 1 fatality

UAS

Nov 29	MQ-1B	✈	Aircraft crashed
Dec 17	MQ-1B	✈	Contact lost; aircraft crashed
Apr 09	MQ-1B	✈	Aircraft crashed
May 02	MQ-1B	✈	Aircraft crashed
May 12	MQ-9A	✈	Aircraft crashed
Jun 02	MQ-1B	✈	Aircraft crashed
Jun 12	MQ-1B	✈	Aircraft crashed
Jul 21	MQ-1B	✈	Contact lost; aircraft crashed
Aug 01	MQ-1B	✈	Aircraft crashed
Aug 12	MQ-1B	✈	Contact lost; aircraft crashed

- A Class "A" aircraft mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of a USAF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crew members successfully ejected/egressed from their aircraft.
- Reflects all fatalities associated with USAF aviation category mishaps.
- "✈" Denotes a destroyed aircraft.
- USAF safety statistics are online at http://afsafety.af.mil/stats/f_stats.asp
- **If a mishap is not a destroyed aircraft or fatality, it is only listed after the investigation has been finalized. (As of Sept. 18, 2008).**

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