Aviation Safety Special Edition 2012

WINGMAN

Airmen Taking Care Of Airmen

The United States Air Force Journal of Aviation, Ground, Space and Weapons Safety

Aviation Special Edition

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Features

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Message From the Air Force Chief of Safety

U.S. Air Force photo

Proactive Safety

MAJ. GEN. GREG FEEST
Air Force Chief of Safety and
Commander, Air Force Safety Center
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2011 was the second safest year in Air Force aviation history and followed our best year on record. The airframe statistics on the following pages of this special edition tell the story.

The Class A aviation flight mishap rate, which currently excludes RPAs, was 0.76 mishaps per 100,000 flight hours. This helped lower our 10-year average rate, which now stands at 1.16 mishaps per 100,000 flight hours. Last year, we experienced two fatalities, eight destroyed manned aircraft and 12 destroyed RPAs. Over the last 10 years, we've averaged 9.5 fatalities, 12.3 destroyed manned aircraft and 7.3 Class A RPAs per year. Our current way of conducting business in aviation safety has consistently delivered a low mishap rate, but even one mishap is too many. Improving the already low mishap rate is indeed a formidable challenge.

We're all aware of the current budget constraints and are bracing to see how they will impact mission readiness and execution. As we reduce our aircraft and manpower numbers, the mission value of each remaining asset increases. This greater appreciation makes any future loss of combat capability that much more damaging.

In order to prepare for our future, our allies and sister services have joined us in adopting *proactive safety* as a means to further reduce the mishap rate and overall losses. We define proactive safety as the detection, measurement and mitigation of unknown or insufficiently assessed safety threats and errors that are potential mishap precursors. We will strengthen our Air Force by identifying and eliminating preventable conditions that lead to mishaps.

We endorse four proactive safety programs as best practices: Military Flight Operations Quality Assurance, Aviation Safety Action Program, Line Oriented Safety Audit and Air Force Culture Assessment Safety Tool. Every leader, safety professional and aircrew member must know these programs. If you don't have at least a fundamental understanding of them, your safety program will remain behind the power curve. Read more about these proactive safety programs on the back page.

Aviation safety will continue to transform along with our evolving Air Force. Our success in preventing future mishaps will increasingly depend on innovation and adaptation. We all must embrace proactive safety as the transformational evolution of our capability to preserve and ensure our increasingly valuable combat capability. ★★

2011 BASH REVIEW/ 2012 WAY AHEAD

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U.S. Air Force photos by Ted Wilkens
Photo Illustration by Dan Harman

Since October, the Bird/Wildlife Aircraft Strike Hazard Team at the Air Force Safety Center has provided updates to the new Air Force Instruction 91-202, *The U.S. Air Force Mishap Prevention Program*, continued pursuing an initiative with the U.S. Department of Agriculture and continued to gain approval for multiple ammunition options.

The most prominent changes in the new AFI 91-202 deal with vegetation height and the presence of large animals on airfields. The BASH Team views airfields as an artificial environment, maintained for the safety of aircraft and aircrews. This approach has been successful in mitigating wildlife risks over time, and 2011 wildlife strike costs are at a three-year low. The centralized USDA funding initiative has been modified due to the current fiscal environment.

Instead of pursuing central funding at this time, the Air Force chief of safety is seeking approval to pursue a centralized agreement with the USDA to standardize hazardous wildlife management at all Air Force installations. This centralized agreement is expected to lower the cost per biologist, eliminate costs associated with contracting and bring the Air Force into compliance with the Sikes Act, which states that "priority shall be given to Federal and State agencies having responsibility for the conservation or management of fish or wildlife."

While depredation isn't the first option in airfield wildlife control, it's a valuable tool. It's important to be prepared with the proper ammunition. Ammunition procurement has undergone a few changes. Commercial off-the-shelf ammunition includes steel shot and lead shot. For steel shot, Winchester Super-X DryLok 2, 4, 6 and 2.75 BBs are pre-approved through the global ammunition control point for the 12-gauge shotgun. For lead shot, the Winchester Super-X Slug is awaiting pre-approval from GACP. Centrally managed ammunition and munitions in Air Force Catalog 21-209, Volume 1, *Ground Munitions*, include 7.5 lead shot, 12-gauge Bird Scare, and a 15 mm Banger and Screamer. Note that all ammunition is for the Remington 870 12-gauge shotgun.

The new AFI 91-202 was released in July 2011 and requires Air Force airfield vegetation cover to be

Fiscal 2010 – 2011 Bird Strike Data

Fiscal 2010 Strikes by Class				
Class	Count	Percent of Total	Cost	Percent of Total
A	1	0.02	$10,011,204	44.81
B	2	0.04	$2,082,753	9.32
C	43	0.91	$7,006,128	31.36
E	4676	99.03	$3,241,579	14.51
Total	4722	100.00	$22,341,664	100.00

Fiscal 2011 Strikes by Class				
Class	Count	Percent of Total	Cost	Percent of Total
A	0	0.00	$0	0.00
B	5	0.13	$4,419,861	35.19
C	38	0.86	$5,376,233	42.80
E	4383	99.11	$2,764,777	22.01
Total	4426	100.00	$12,560,871	100.00

maintained at 7 – 14 inches and 500 feet from the aircraft movement areas when possible unless a waiver is secured from the Air Force Safety Center's BASH Team. As a rule, this height range usually discourages flocking birds, such as blackbirds, and large birds, such as geese, from congregating on the airfield. The BASH Team offers waivers to reduce risk to aircraft operations when local conditions (climate, habitat or species) prohibit compliance, targeted threats aren't dissuaded by the directed height requirements or alternative solutions aren't available. The BASH Team doesn't offer waivers to encourage the presence of wildlife on the airfield, as this fundamentally conflicts with our goals of reducing wildlife risks and promoting flight safety. If you wish to request a vegetation height waiver, please visit the BASH portal webpage to see examples of previously approved waivers.

Some Department of Defense installations have successfully used growth inhibitors on the airfield and have significantly reduced their mowing efforts. It reduces the frequency of mowing operations, which attracts birds to the airfield to feed, helps prevent rutting caused by mowing wet areas and can decrease ground maintenance costs. The following need to be considered prior to the application of any herbicide:

1) DOD pesticide regulations
2) Federal, state, county and local laws
3) Endangered, threatened species and species of special concern found on the airfield
4) Water contamination

Recognize DOD and Air Force major command reduction proposals in pesticide use and that they aren't mandates. Proper application can pay large dividends in flight safety and contract cost savings.

The new AFI 91-202 also requires airfields to maintain a zero tolerance toward large free-roaming animals on or adjacent to the aircraft movement area. Free-roaming animals include deer, canines and geese.This move is firmly backed by scientific research on the relative hazard level of various species. USDA researchers from the National Wildlife Research Center in Sandusky, Ohio, found that when struck by aircraft, large animals cause damage at least 51-96 percent of the time and substantial damage 16-38 percent of the time.

The most hazardous species are mule deer, white-tailed deer and domestic dogs.

While large mammals cause the most damage when struck, they are involved in less than 3 percent of wildlife strikes. More than 97 percent of wildlife strikes are attributed to birds with geese causing nearly 61 percent as much damage per strike as mule deer. A good fence can exclude all three mammal species from the airfield. An 8-foot chain-link fence secured at the ground with three-strand barbed outriggers angled outward at the top will keep most mammals off the airfield. A 4-foot chain-link fence material skirt, attached to the bottom of the fence and buried at a 45-degree angle on the outside of the fence, will prevent animals from digging underneath, while reducing washouts. Patrol the fence at least weekly to prevent and correct any breaches. When large mammals are found on the airfield, attempt to herd them through gates, hire an experienced trapper or depredate if herding/trapping efforts are unsuccessful.

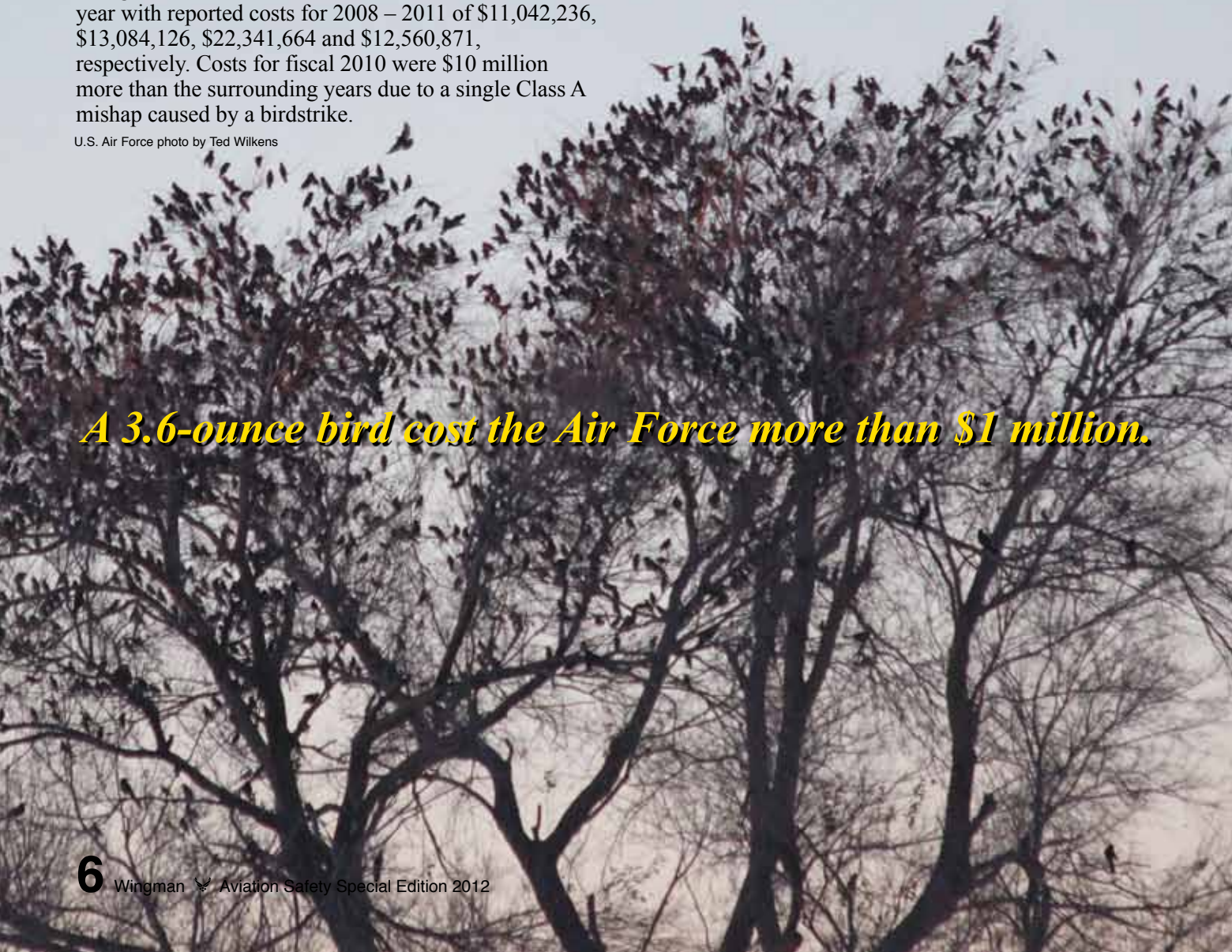
Available fiscal 2011 BASH data indicates no significant change in BASH statistics for the fourth consecutive year with reported costs for 2008 – 2011 of $11,042,236, $13,084,126, $22,341,664 and $12,560,871, respectively. Costs for fiscal 2010 were $10 million more than the surrounding years due to a single Class A mishap caused by a birdstrike.

For the five Class B mishaps in 2011, Bird Avoidance Model/Avian Hazard Advisory System accurately predicted severe/moderate for two and was unknown for the other three. There were three engine ingestions: a Black Vulture on a B-1B on low-level near Dyess AFB, Texas; a Common Buzzard on a C-5B take off from Ramstein AB, Germany, and an Eastern Meadowlark on a T-38C take off from Chennault International Airport, La.

The damage on the other two Class B mishaps was caused by an Alpine Swift hitting the Electronic Countermeasures Pod of an MC-130H near Hurlburt Field, Fla., and a C-5A impacting at least one unidentified bird on takeoff from Rota Naval Air Station, Spain. The MC-130H Alpine Swift strike is a good example of a small bird causing a large amount of damage. In this case, a 3.6-ounce bird cost the Air Force more than $1 million.

The BASH Team will continue to promote flight safety through USDA standardization, make ammunition procurement possible and update and rewrite applicable regulations. Let's continue our positive trend and lower BASH costs even more in 2012!

U.S. Air Force photo by Ted Wilkens



A 3.6-ounce bird cost the Air Force more than $1 million.

U.S. Air Force photo by Staff Sgt. Andy M. Kin

Bombers

By MAJ. JEREMY PROVENZANO
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Congratulations. Fiscal 2011 was a good year for bomber aviation safety. Over the past three years, we've experienced only two Class A mishaps, a feat worth celebrating and surpassing. With combatant commands depending on bomber firepower to complete the mission, preserving combat power for the future and safeguarding our resources is now more important than ever. It's essential that we strive for improvement each year.

The Class A mishap that occurred this year involved a catastrophic failure of a B-52 engine in flight. There were no fatalities and neither B-1s nor B-2s experienced any Class A mishaps. The mighty "Buff" fleet experienced one Class B mishap this year, up from zero last year, while the "Bone" fleet experienced seven Class B mishaps, up slightly from six last year. Finally, the "Spirit" fleet had two Class B mishaps, up from zero last year. This may be the time for wings to take a good look at all classes of mishaps for a "back to basics" emphasis.

Any activity involving humans inherently involves human factors. An analysis of bomber mishaps shows a trend toward complacency and channelized attention. It's essential for our Airmen to maintain situational awareness on the flightline as much as in the air. Diligence in operations and proper risk management can save fingers, lives and parts.

Of our 317 Class E events, 179 (more than 56 percent) were wildlife-related. That's a lot of birds. Most involved little to no damage, but one bird at the wrong time and the wrong location can make a good day turn bad. Keep your eyes peeled, especially in the low-altitude regime. Bird conditions can give you a heads-up for what you are likely to encounter, but they are no guarantee of safety. Close coordination between supervisors of flying and tower officials, along with preemptive firing of bird cannons prior to takeoff, can mitigate the bird threat.

Eight of our 10 Class A/B mishaps involved engines and were caused by factors that included wildlife, other foreign objects and internal problems. Class C mishaps showed 11 of 54 (20 percent) involved foreign object damage to engines. Kudos to the professionals who've been identifying potential sources of FOD and reducing our risk to critical components! Last year, about 23 percent of Class C mishaps involved people injuring themselves with airplanes. This figure dropped to under 16 percent for 2011, so keep up that safety effort! As in previous years, our sharp bomber teams maintain a strong safety reputation while sustaining our venerable fleet.

Risk management begins with risk assessment. With many of the hazards in bomber aviation having been identified over the years, remaining alert for indications of potential problems is essential to safe operations. Take a step back, assess the situation and take the appropriate action, both in the air and on the ground.

Heavy Lifters

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C-5

In the Galaxy community, fiscal 2011 saw the re-emergence of a trend we hope to see continue – no Class A mishaps. In comparison, there was one Class A mishap in fiscal 2010, which was a brake fire after a rejected heavyweight takeoff. There were no Class A mishaps in fiscal 2008 or 2009.

There were four Class B mishaps in fiscal 2011. In comparison, there was only one Class B mishap in fiscal 2010. The lifetime average of Class B mishaps for the C-5 is about 3.6 per year. Of the four Class B mishaps, two involved engines and two involved birds.

Class C mishaps accounted for the majority of C-5 mishaps. There were more than 30 reported, including both flight and aircraft ground operations mishaps. The vast majority of the Class C's involved injuries caused while working on and around the C-5.

There were almost 200 Class E events last year. The most interesting involved a stray cat that boarded a C-5 at an overseas location. During a routine scan of the cargo compartment approximately one hour into the flight from Kuwait International Airport to Ramstein AB, Germany, the crew spotted a cat in the cargo compartment. Two crewmembers (one flight engineer and one flying crew chief) attempted to isolate and capture the animal. During their effort to capture the cat, both crewmembers were bitten, requiring bandaging. The crew then called off the search and vacated the cargo compartment.

The flight continued without further incident to Ramstein AB. Upon landing, the crewmembers received medical care and were placed on duty not including flight status.

Airmen at Ramstein AB attempted to capture the cat after landing. Those attempts failed, and the cat escaped from the aircraft. An inspection of the cargo compartment found two kittens in a stack of bags located in a rack on the back of a satellite trailer. While the cargo was awaiting transport from Kuwait International Airport, the pregnant cat had hidden in the cargo and had given birth to the two kittens.

This mishap could have been prevented. Anytime there is a wild animal on the aircraft, aircrew members should isolate the area and have trained personnel capture the animal after landing.

C-17

After a tragic Class A mishap and an engine-related Class A mishap in fiscal 2010, the C-17 community saw only an engine-related Class A mishap in fiscal 2011. In comparison, the 10-year average for Class A's for the C-17 is almost two per year.

There were four Class B mishaps for fiscal 2011. In comparison, there were no Class B mishaps in fiscal 2010. The 10-year average for Class B's for the C-17 is around four per year. Of the four Class B mishaps, three involved engines, and one involved a blown tire/wheel well fire.

Class C mishaps accounted for the majority of C-17 mishaps. There were more than 40 reported, including flight and aircraft ground operations mishaps. The vast majority of the Class C's involved injuries caused while working on and around the C-17.

There were 570 Class E wildlife strikes in fiscal 2011. However, active mitigation efforts on the part of crews, base personnel and planners kept those from becoming damaging. In addition, bird radar is being used in the AOR to help reduce the number of incidents.

ASAP (Aviation Safety Action Program)

Traditionally, the Air Force aviation safety community has tracked our success by an ever-decreasing number of Class A mishaps. The good news is that we've seen record-setting low mishap rates in the past three years, confirming that we're trending in the right direction. As we continue to strive toward an even lower mishap rate, the Air Force safety community has embraced a new proactive safety approach, which includes the Aviation Safety Action Program (ASAP).

Created by the commercial aviation industry in cooperation with the Federal Aviation Administration, ASAP is designed to capture the precursor events that could potentially lead to a mishap without having to have an actual mishap to analyze. Using a web-based reporting tool, aircrews now have the ability to anonymously report incidents that could have potentially led to a mishap, providing timely, actionable information to the safety community. Now, instead of the information being passed only within a squadron during a local debrief, the information is handled at the Air Force major command level and can be disseminated to aircrew members worldwide via MAJCOM safety channels.

The program was launched in 2009 within Air Mobility Command, and it wasn't long before the value of the program was acknowledged at the MAJCOM level. A C-5 crew during a normal landing was unable to maintain directional control on the ground and almost departed the runway. It was discovered that the cockpit temporary armor had come loose and jammed the co-pilot's rudder pedals. Though there was no mishap, the information obtained via ASAP allowed the MAJCOM to take immediate corrective action throughout the entire C-5 community, resulting in what we refer to as "another mishap averted"!

The Air Force Safety Center manages ASAP. It's currently being expanded to include other disciplines, such as maintenance. To learn more about ASAP, contact Kevin Tibbs at the Air Force Safety Center (Kevin.Tibbs@kirtland.af.mil).

U.S. Air Force photo by Staff Sgt. Ryan Crane

Human Factors
Channelized Attention and Instrument Cross-Check

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For decades, aviation communities have recognized human factors threats are closely associated with mishaps. In fact, from 2001 through 2011, the Air Force average for Class A aviation mishaps attributed to human factors was 73 percent. Interestingly, channelized attention (or channelization) was causal or contributory in 28 percent of those mishaps. Human factors professionals throughout the industry have discussed, taught, trained and briefed the deadly effects of channelized attention. Most aviation professionals can easily define channelized attention or even describe a mishap where it was present; however, is there anything we can do about it?

The Department of Defense developed a human factors taxonomy that describes 146 different human factors definitions as they apply to mishaps. The DOD Human Factors Analysis and Classification System, defines channelized attention as: *a factor when the individual is focusing all conscious attention on a limited number of environmental cues to the exclusion of others of a subjectively equal or higher or more immediate priority, leading to an unsafe situation. It may be described as a tight focus of attention that leads to the exclusion of comprehensive situational information.*

Overall, cognitive factors, judgment and decision and skill-based errors were the top aviation human factors in 2011. If we look even closer, we find channelized attention and inattention were involved in cognitive-factor types of mishaps 53 percent of the time. They were the most frequent human factors finding in 2011. However, there's a mitigation strategy that could possibly reduce a pilot's susceptibility to channelization.

The cross-check is initially taught in the contact phase of undergraduate pilot training and helps the pilot maintain situational awareness, reduces the risk

U.S. Air Force photo by Master Sgt. Adrian Cadiz

of "falling behind the aircraft" and draws the pilot's attention to the altimeter, heading indicator and attitude indicator. A vigilant cross-check may prevent the most channelized or distracted pilot from flying into the ground or other aircraft. In fact, several mishap reports have cited that the failure of the pilot(s) to maintain a cross-check contributed to the mishap. In 2009, two F-16s collided in midair resulting in a fatality.

Indeed, rejoining within proximity of another aircraft at night is a demanding task and requires a constant cross-check of range, closure, altitude and line-of-sight; becoming channelized on radios, radar or other non-critical tasks can easily lead to a loss of SA.

The most infamous example of an entire cockpit crew becoming channelized is the storied Eastern Airlines mishap. Ninety-nine passengers and crewmembers lost their lives when the pilot and crew became fixated on an apparent landing gear problem. Ironically, there was no problem with the gear, only a burned-out landing gear light bulb in the gear handle. In the midst of troubleshooting their apparent problem, the pilot, co-pilot and first officer failed to cross-check their altitude. The airliner plunged into the Florida Everglades.

As previously mentioned, cross-check is taught in the early stages of pilot training. However, if a proper technique isn't appropriately developed in flight training, the poor habit will remain throughout one's flying career and will inevitably compound itself. According to the Federal Aviation Administration:

"A beginner might cross-check rapidly, looking at the instruments without knowing exactly what to look for. With increasing experience in basic instrument maneuvers and familiarity with the instrument indications associated with them, a pilot learns what to look for, when to look for it, and what response to make. As proficiency increases, a pilot cross-checks primarily from habit, suiting scanning rate and sequence to the demands of the flight situation."

Failure to maintain basic instrument proficiency through practice can result in many common scanning errors, both during training and at any subsequent time. Fixation, omission of an instrument from a cross-check or emphasis on a single instrument instead of a combination of instruments, is a typical mistake when scanning.[1]

A proper, timely and frequent cross-check of the altimeter, heading indicator and attitude indicator provides the aviator with the tools and resources to navigate out of the most precarious human factors jams. This is the lifeline of flight, the ultimate SA. Proper scanning habits must be taught early in flight training as an effective way to avoid channelization. This simple but life-saving technique must be nourished, resurrected and foot-stomped across every flying squadron while poor scanning habits must be identified and corrected.

Recognizing that channelized attention is a human factors danger is an important first step. However, without a proper mitigation strategy, aviators will continue to fall victim to this threat. Learning to cross-check is a basic technique that fliers learn early in their careers and is the best defense against this leading human factors hazard. A well-timed and properly utilized cross-check can prevent aircrews from flying into the ground or colliding with other aircraft.

[1]FAA Instrument Flying Handbook (n.d.). Airplane Attitude Instrument Flying. Retrieved Oct 20, 2011 from http://www.faa.gov/library/manuals/aviation/instrument_flying_handbook/media/FAA-H-8083-15A%20-%20Chapter%2004%20Section%20I.pd

Fighters

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Fiscal 2011 was a good year for the Air Force, totaling 15 Class A mishaps for a mishap rate of .76 mishaps per 100,000 flight hours. This compares to 14 Class A's in fiscal 2010 and 17 in fiscal 2009. Fighter aircraft, unfortunately, doubled last year's Class A numbers and made up more than three quarters of the total Air Force numbers. For fiscal 2011, we suffered 12 Class A mishaps for a rate of 2.16 and had two fatalities. The details for each airframe are below for your awareness of the highlighted areas of concern (minus the QF-4E – sorry, rhino drivers!)

A-10 – Hawgs
A-10s finished fiscal 2011 with three Class A mishaps. One was a sunshade falling on jets. Another was a scary narrative – spatial disorientation leading to an ejection. I doubt there are many of us who haven't either gone lost wingman or been very close. Yanking on the stick may not be the best idea when you're "in the soup" – the lost wingman procedures exist for a reason. Remember that old adage that slower is faster? In this case, it's absolutely true. Spatial disorientation isn't good – especially in the weather, and it gets really scary when you add in proximity to the ground. Try your best to fly smooth inputs in the weather and apply the correct procedures. It just may save your life.

The last Class A was a dual-engine failure. The biggest lesson to learn from this mishap is that it's difficult to know too much about your jet. Even experienced pilots benefit from time spent in the books, and though knowledge of engine numbers and systems isn't as sexy as learning combat tactics, you use it more often. You need your jet to get to combat! Spend the time required in the books, know your jet and its limits, and you'll be a better and more effective fighter pilot for it.

A-10s rounded out the mishap year with 17 Class B's and 47 Class C's. The trends from the B's were foreign object damage and compressor stalls. The Class C's showed bird strikes and gun problems as the repeat offenders. Stay vigilant – from preflight (FOD prevention) to engine start (compressor stalls), through enroute operations (bird strikes) and the range/AOR (gun problems). Of course, just because the trends don't go further than that, it's a good idea to stay on your game until engine shutdown. Attention to detail, systems knowledge and mission planning can really help mitigate the problems surfacing in these mishap categories.

F-15C/E – Eagles
Eagles finished off the year with only one Class A mishap, an out-of-control F-15E or "dark grey" that most likely resulted from asymmetric loading. Just because flying with an asymmetric load is normal, try not to let complacency lessen your spidey senses. The off-balance loadout you started with isn't the same after burning down fuel and dropping stores off one side only.

The eight Class B mishaps point to landing issues with tire and barrier failures resulting in aircraft damage. I don't have to remind you that the sortie isn't over 'til you're in the chocks and the engines are winding down. Keep up the vigilance until you're back in the building

U.S. Air Force photo by Ted Wilkens

and we can try to continue keeping these landing problems from becoming Class A's.

Forty-nine Class C mishaps reveal the following trends: gun malfunctions (nine), weather/lightning strikes (six) and bird strikes (four). Dark greys, keep paying attention to gun malfunctions and treat them as serious problems. In one case, a minor hung gun malfunctioned later in the sortie and became a much bigger problem. Pay attention to weather, and continue trying to avoid it – primarily in mission planning! Finally, use the tools available to mitigate the bird strike potential (Avian Hazard Avoidance System, bird watch condition, supervisor of flying, etc.). Hitting birds at more than 500 mph doesn't make for a fun day!

F-16 – Vipers

Vipers racked up seven Class A mishaps last fiscal year, one of which was fatal. This fatality occurred during a high aspect basic fighter maneuver sortie – yes, another G-induced loss of consciousness. Although high G's are a part of everyday life, don't ever let yourself become complacent. If you aren't feeling up to the G's on the fourth set (or the first for that matter), speak up! I used to dread incompletion of an upgrade ride, but I don't anymore. At the worst, it's another ride with an experienced instructor pilot to learn something new! There's just no reason to push something like G's in training – and very few in combat. The bad guy *might* kill you, but the ground almost definitely will.

Three of the remaining six Class A's were F-16s departing the runway. Two of these also experienced brake failures but misapplied the checklist. Be sure to analyze the situation fully before committing to a landing, and brush up on your brake failure procedures. They're not critical action procedures, but treat them like they are! Everyone's landed long before, but do you have a plan for when that happens and your brakes also fail? Or it's wet with a runway condition reading less than reported? You might want to think about that before it happens!

In addition to the Class A's, the F-16 community also experienced eight Class B and 40 Class C mishaps. Trend items from these mishaps include FOD (most of which couldn't be caught by the preflight), hot brakes on landing and bird strikes. We've talked about landing already. FOD and bird strikes are often emergencies that aren't preventable, but they're usually manageable. Know the procedures, read the checklist and use the help that's available (wingman, IP, SOF, etc.). There is very little substitute for preparation.

F-22 – Raptors

The Raptor community finished fiscal 2011 with one Class A mishap which resulted in a fatality. One Class B resulted from FOD, and a single Class C was attributed to hypoxic symptoms. I don't have to tell you this, but I will anyway – keep up with your physiological condition! If you even think you might feel hypoxic, slightly loopy or just not right, act NOW! The entire Air Force is looking for a solution, but even when we find one, pay attention to your body – it might be telling you something much more critically important than the integrated caution, advisory and warning system.

C-130

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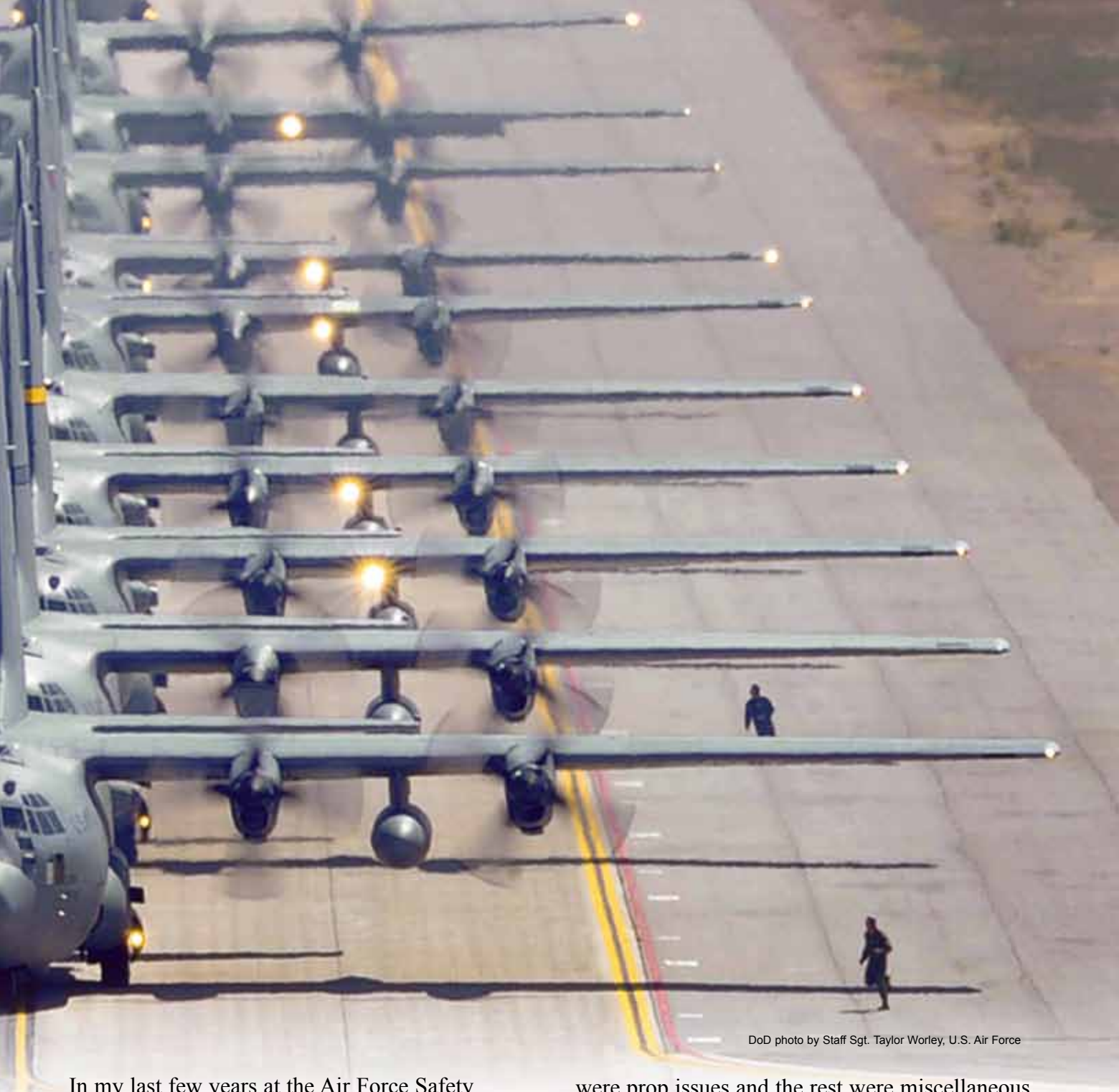
Herks. We're not just known for our good looks, but also for our great safety record.

As a community, we should be thankful that once again this year, we enjoyed zero fatalities or loss of aircraft; however, we did suffer one Class A mishap. This was an unprecedented mishap where a C-130 collided with an Army RPA during arrival into a forward operating base in Afghanistan. The aircraft sustained major damage to the leading edge and engines. The crew shut down the No. 1 engine and landed without injury.

Our community sustained six Class B mishaps during this past fiscal year, double the number of fiscal 2010. Last year's Class B's involved birds versus pricey aircraft sensors. This year, two of the Class B's can be attributed to the same. However, two were due to failure to follow guidance. Of those two, one was attributed to improper jack screw installation which resulted in serious damage to the wing flap. As for the other, a crew chief demonstrated poor risk management when he inserted his finger inside a hole in the ramp made for an aerial delivery system arm. The ramp settled, and the crew chief unfortunately suffered a loss of his finger. The fifth Class B involved a failure of the third stage turbine blade during post-airdrop operations. Lastly, a gear box failed which resulted in an engine fire.



DoD photo by Staff Sgt. Taylor Worley, U.S. Air Force

In my last few years at the Air Force Safety Center, bird strikes, injuries and other factors had represented a third each of Class C mishaps. But in fiscal 2011, injuries in Class C mishaps were 52 percent. Bird strikes fell to 10 percent and 38 percent for other. Do the math and you can see that doing more, and doing it faster and more "efficiently" has resulted in less caution. Let's use good RM. It's not just the mission on the line, but also your personal well-being.

Class E reports totaled 2,021 in fiscal 2011. Fifty-seven percent of these were bird strikes, 27 percent were prop issues and the rest were miscellaneous. Birds continue to be our biggest and most inevitable threat, so RM with good mission planning is imperative.

If you would like to review some of these mishaps, please contact your unit flight safety representative. They can help educate you, and you will leave with tremendous mishap prevention lessons learned – at other's expense.

It's been a pleasure for me to serve in the Herk community. I'm hanging up the bag, but I trust you'll continue to fly safe without my nagging.

Maintenance

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Historically, maintenance has caused an average of 14 percent of all Class A, B and C aviation mishaps. Maintenance-related mishaps have been on a downward trend over the past two years. That's great work, but we still have a long way to go. In fiscal 2011, maintenance was responsible for two Class A, 11 Class B and more than 50 Class C mishaps. Finding the root causes of these mishaps is the key to preventing the same thing from happening again in future years.

Class A and B mishaps … $44.1 million

An aircraft experienced an in-flight engine shutdown and crashed. During a recent MX overhaul, the engine gearbox had been torn down and rebuilt. During the assembly procedure, leftover beadblast material and a piece of teflon remained in the gearbox. The foreign object debris blocked an oil passageway and eventually caused the power takeoff shaft thrust bearing to fail.

An aircraft departed the runway on landing. MX failed to properly torque the brake metering valve cannon plug, and it became disconnected during the sortie.

An aircraft experienced an engine low lube light on takeoff and had to jettison all its external stores. MX failed to identify excessive engine oil consumption documented on previous sorties.

On two separate occasions, MX left an inspection mirror in the intake, which caused extensive damage on the next engine start. On one of these occasions, the pilot of the mishap aircraft flew the entire sortie

U.S. Air Force photo

uneventfully before the missing mirror and damage was discovered during shift turnover and post-flight.

A lower wrap cowling departed the aircraft in-flight and was ingested by an engine. MX failed to properly secure the panel.

Compressor stall during flight. MX failed to install a Tridair fastener retaining ring and also failed to check for proper running torque during panel installation. The Tridair departed the aircraft and was ingested by an engine.

Compressor stall during flight. MX improperly installed the sixth stage stator vane, misaligning the vane by approximately 17.5 degrees.

Compressor stall during post-phase MX run. MX left a wing root fillet panel fastener lying on a wing prior to engine run.

Dropped proprotor hub during phase. MX failed to disconnect the pitch links from the left hand pitch horn as directed by the technical order.

Catastrophic failure of the No. 2 engine in-flight. MX incorrectly installed the No. 13 fuel injector.

MX removed the main landing gear safety pins prior to engine start in violation of T.O. procedures. A shorted wire caused the right MLG to retract during start.

MX disabled the undercool warning system using a practice not referenced in T.O. As a result, 24 port transducer units exceeded the temperature limit for ground operation.

In fiscal 2011, we caused more than 50 Class C mishaps that cost the Air Force almost $8 million. What went wrong to cause these events? Twenty-two percent, or $1.5 million in damage, was because we either ran a

U.S. Air Force photo

piece of aerospace ground equipment into a parked aircraft or incorrectly positioned a piece of AGE while performing operational checks. On eight occasions, we pushed, raised or lowered a piece of AGE right into a parked aircraft. Three other times, we decided to position a piece of AGE under the flight control surface that we were planning on moving around.

I'm at a loss to explain how stuff like this could happen because every T.O. I've ever read that directs moving flight control surfaces also directs us to move stands away from the aircraft. In addition to these events, we also had the inevitable maintainer who lowers the canopy onto a crew ladder and the jammer operator who backs his loader right into an aircraft. Overall, 46 percent, or $2.7 million worth of all our fiscal 2011 mishaps, occurred because of complacency, rushing, distraction or just plain lack of attention. In the end, it looks like we could've cut our Class C mishap rate almost in half and saved the Air Force almost $3 million if we would've just paid a little more attention to what we were doing at the time.

In addition to the above Class C mishaps, you could probably take quite a few of the Class A's and B's that I listed and drill those down to the same human factors. Every year, the number one overall reason why maintainers cause mishaps is because of a failure to follow the T.O. This year, it accounts for 44 percent of all our mishaps and it's very easy to just say, "Well, there you go, the guy just didn't follow the T.O.", but we can't just stop there. We have to ask, "Why did he fail to follow the T.O.?" If you keep drilling down and keep asking why, you will probably discover accepted practices, complacency, distraction, rushing or even overconfidence.

How do you fix these?

Take overconfidence for example. How do you stop maintainers from becoming overconfident in their abilities? How do you convince maintainers who have done a particular job dozens of times and think they already know how to do it by the book that they need to slow down, take their time and re-read the T.O. again. You already know who they are. They're your super troops, the ones you go to when you need the job done right, right now! They're probably the most experienced maintainers you have, and they're also probably one of the few in the unit who've done this particular job before. They're the ones who the expediters and production supervisors love because they can count on them to get the job done quickly, efficiently and safely.

Unfortunately, they're also the ones who are most susceptible to the next mishap. In my time as an aircraft maintenance unit and squadron superintendent, I can't tell you how many times a flight chief explained to me how we just dinged an aircraft, failed an inspection or had a safety-related incident. Inevitably, I'd hear the comment, "You know chief, it's really weird this happened to them because they are one of our best maintainers." OK, so how did this happen to one of our "best maintainers"? How do we fix it? How do we teach our maintainers to not become overconfident, complacent, distracted, rushed or inattentive?

In recent years, the Air Force has required maintenance resource management training for all maintainers. The class teaches folks how to prepare for a task; how to ensure that they have all the right people, equipment and personal protective equipment; how to ensure they maintain the proper situational awareness during the task and, most importantly, how to listen and effectively communicate their concerns when they feel that "something isn't right" or "we shouldn't be doing it this way." The class is a great tool, but like all one-time or yearly recurring classes, the lessons learned are all too often quickly forgotten after the maintainer returns to the line. To combat this, all MX supervisors – from the individual workers on the line, through the expediters, flight chiefs and pro supers and all the way up to squadron, group and wing supervision – have to actively support and reinforce the lessons taught in this class.

In the past year, I've been asked, "How can supervision be causal to a mishap?" Well, in the past, we've caused Class A mishaps because we failed to perform a simple task, such as putting on the aircraft covers at the end of the day. On the surface, it would look like the mishap was caused by just another failure to follow the T.O., but, as I stated before, we have to keep asking why. Would the maintainer's inaction be causal? There was a requirement he did not accomplish that led directly to a mishap. Then again, the supervisor who allowed the entire unit to think it was OK to skip that particular step in the T.O. also contributed to the cause.

In addition, almost all MX-related mishaps have contributing factors, such as experience, shift, hours into shift and deployed versus home location. MX supervisors should understand that all of these factors are likely to contribute to a mishap and should be engaged reinforcing the lessons taught in MRM to mitigate them. Despite this, I still read reports that determine that the mishap occurred in the ninth hour of midshift and the mishap unit only had one senior noncommissioned officer – the pro super who was supervising the entire shift. Conversely, the day shift was fully supplied with an officer-in-charge, an MX superintendent, an assistant OIC, two senior master sergeants and at least one SNCO flight chief in each section. To make the matter worse, it turned out that the mishap maintainer wasn't qualified or signed off on the task and was filling a position on the mishap crew that required a different Air Force specialty code.

The crew supervisor decided to continue with an unqualified crew and filled the position with a different AFSC because the midshift didn't have enough of the required AFSC assigned and he wanted to get the job done. The mishap crewmembers didn't report for duty that night expecting to have a mishap, but they ended up with one because they made a bad decision to press with the task even though their MX supervision hadn't manned the shift with the required number of personnel. Would the outcome have been different if a flight chief would've been present during the task? Maybe … maybe not, but I'd like to think that if there was a little more MX supervision actively engaged in what the guys were doing that night that someone would've been called in early or the task would've been left for the next shift. Oh, and you might be asking, "Where was the pro super during all of this?" Well, he was on the other side of the flightline trying to get all 14 exceptional releases signed off for the next day's fliers.

Don't forget, the factors I just mentioned still don't drill down to the root cause. Inexperience, shift, hours on duty and deployed locations are all contributing factors but they didn't cause the mishap. Remember, you still have to keep asking why, and, if you do, you will almost inevitably find a human factor involved. To mitigate the human factors that affect us all, we have to have MX supervision who is actively engaged on a daily basis out on the flightline and in the back shops making sure folks know what the rules are and that they're being followed. Also, the production section should understand that it's more important to get the job done right rather than quickly, but all too often accuracy is sacrificed for speed when operations is on the radio and the pro super needs that spare ready right now.

Our MX supervisors also have to understand how important it is to watch the new guys more closely, to have all the shifts sufficiently covered with experience and to spread out the supervision so that each shift is covered with SNCOs who devote some portion of the shift to getting out from behind the desk and seeing what their guys are actually doing out there. When deployed, they should be even more on guard because I can tell you for a fact that many people "assume" that the same rules don't exist because "this is combat." With the current Air Force budget constraints, the MX manning situation versus operations tempo is tightly stretched, and I can tell you from experience that it's not an easy job. I'm certain that active MX supervision (or lack thereof) plays a huge role in mishap prevention.

In the end, most mishaps still come down to the individual maintainer. Many of the mishaps discussed in this review could've been avoided by remembering what you were taught in MRM and following the T.O. no matter how good you think you are or how well you think you know the procedure. With very few exceptions, the tasks we perform as maintainers are written down for us. Torque values have been established. Launch procedures tell us to remove protective covers. Towing checklists include what wing walkers are supposed to do. Following the T.O. is imperative when working on aircraft, and it's up to each and every maintainer to follow established procedures. Remember to look out for each other, and let's make fiscal 2012 the safest year ever for maintainers.

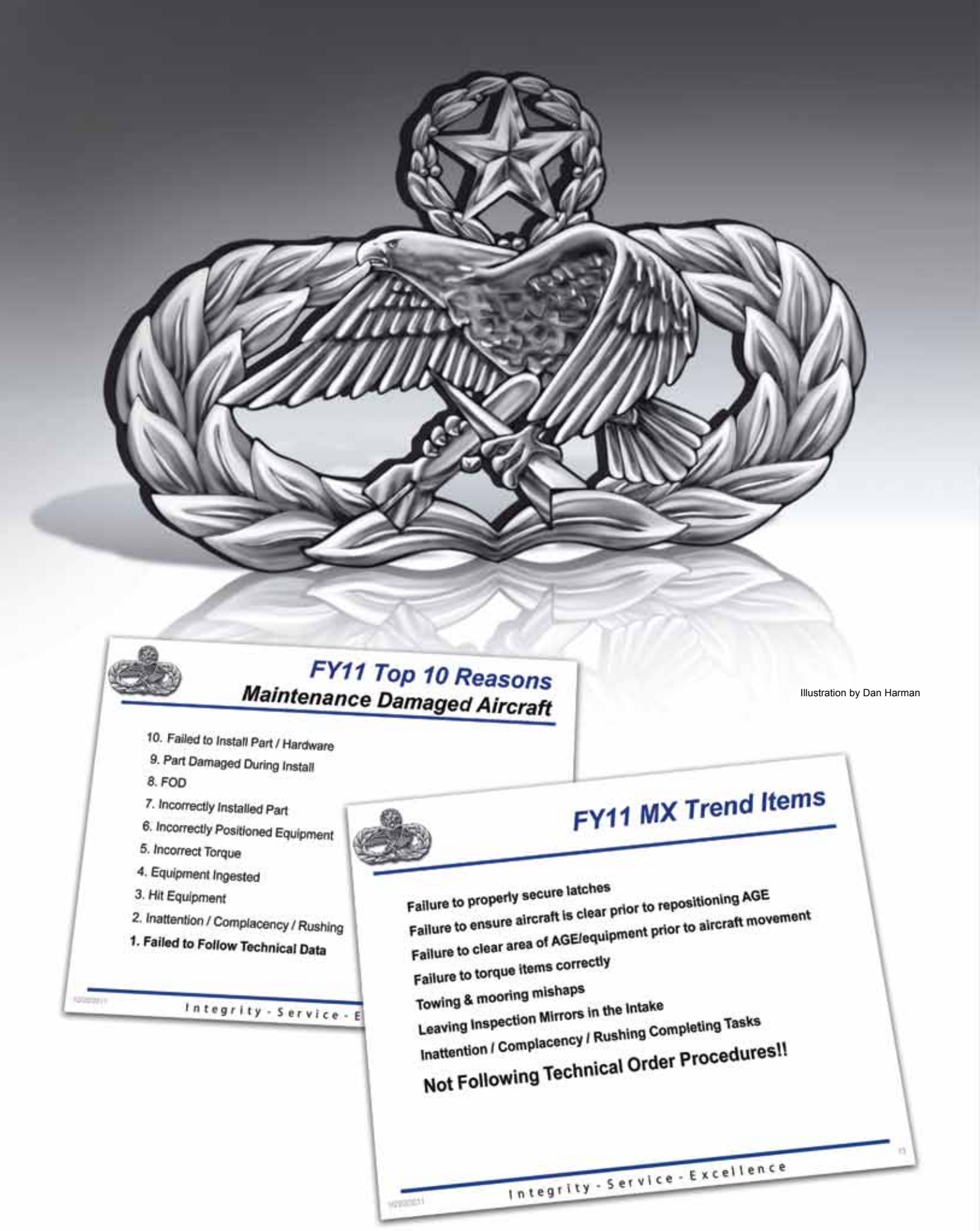

Illustration by Dan Harman

Reconnaissance and Surveillance

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U.S. Air Force Photo by Staff Sgt. Joshua Garcia

Fiscal 2011 was another outstanding year for reconnaissance and surveillance aircraft (TC-135, WC-135, OC-135 and RC-135) with no Class A or B mishaps. Additionally, there were no Class A mishaps in the past five years (fiscal 2007 through 2011) and there was only one Class B logistics/maintenance-related mishap that occurred in January 2009. The mishap involved an engine bearing failure.

There were six Class C mishaps during fiscal 2011. Three of those mishaps were operations-related: flight through ice, engine pod scrape and a hard landing. The other three were logistics/maintenance-related. Two involved people striking their heads on the aircraft, and the other involved a person burning or being burned during liquid oxygen servicing.

There were 33 Class C mishaps over the past five years. Nineteen of those mishaps were classified as logistics/maintenance, nine operations and five miscellaneous. Eight of the logistics/maintenance mishaps involved personal injuries while working on the aircraft. Five of the operations mishaps involved engine pod scrapes.

Three of the miscellaneous mishaps involved bird strikes with aircraft damage cost exceeding the Class C mishap threshold. The other two miscellaneous mishaps involved personal injuries.

Fiscal 2011 saw 100 reported Class E events. As normal, wildlife strikes led the way with 85 reported events. The next leading event was hazardous air traffic reports with nine events. Next was the miscellaneous category with three events. Finally, the high accident potential, propulsion and physiological categories had one event each.

In the past five years, there have been 575 reported Class E events. Of those reported events, 423 involved wildlife strikes. This problem is not unique to the 135 fleet, most Air Force mission design series have similar statistics. Other Class E reportable events categories were as follows: miscellaneous – 60, HATR – 38, propulsion – 30, flight controls – 10, physiological – seven, instruments – four and HAP – three.

Congratulations for all your outstanding work! Fliers though, keep focused on executing the mission safely and don't let your guard down until you're back in the chocks. If something on landing doesn't seem right, go around.

Maintainers, watch yourself when working around these valuable assets. In a collision between you and the plane, the plane will almost always win. Take your time to do your job right. It can potentially save you some personal pain and prevent a mishap.

U.S. Air Force photo by Master Sgt. Scott T. Sturkol

Remotely Piloted Aircraft

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The Air Force had 13 RPA Class A flight mishaps in fiscal 2011 producing a rate of 3.83 per 100,000 flight hours. This was a 62 percent increase from the fiscal 2010 total of eight Class A flight mishaps. Even though there were five more mishaps than last year, the mishap rate increased only 38 percent from the fiscal 2010 rate of 2.78 per 100,000 flight hours, due to an increase of approximately 75,000 flight hours.

Of the 13 fiscal 2011 Class A mishaps, 11 were MQ-1 Predators, one was an MQ-9 Reaper and one was a RQ-4 Global Hawk. These 13 mishaps fell into the following categories: five were identified as system failure or malfunction (non-power plant); four were power plant failure or malfunction; two were environment/weather; one was pilot loss of control in-flight and one was categorized as other. Ten of the 13 Class A mishap investigations are complete, and human factors-related issues continue to affect the community. Of those 10 mishap investigations, the safety investigation boards determined that nine had contributing human factors and eight of those were causal. The results from these SIBs show these top human factors: acquisition policies, procedural guidance/publications, organizational training issues, procedural error and channelized attention.

Addressing the other mishap categories, there were eight Class B mishaps, 15 Class C mishaps, and 75 Class E events during fiscal 2011. Due to the number of airframes in operation, coupled with non-standard system development, it wasn't a surprise that the MQ-1 was involved in 68 percent of these mishaps, and the MQ-9 was involved in 26 percent. Airfield operations accounted for nearly half of the Class B and C mishaps (12 of 23). This resulted from problems during the landing phase of the mission. Pilot-induced oscillations have been an area in which training and early aircrew recognition and communication could effectively decrease the mishap rate.

One difference seen in fiscal 2011 was the senior-level attention RPAs attracted. Senior Air Force leadership directed an all-out surge of MQ-1/9s by nearly 20 percent and acceleration of the fielding of nine combat air patrols.

The defense secretary noted in a June 2011 memo that the increase to 65 orbits by the end of fiscal 2013 "represents a temporary plateau in progress toward an even greater enduring requirement. Clear distinctions between wartime and peacetime operations do not exist for UAS platforms – the demand for UAS will grow and persist well past the conclusion of the conflicts in Afghanistan and Iraq."

Even though there was a 160 percent flight hour increase in the past five years, the last MQ-1 Predator has been built. With decreasing funding available for system improvements, mishap prevention awareness is a critical, fundamental approach to prolonging this asset's life in order to keep it in the fight. The MQ-9 has a scheduled annual production of 48 aircraft between 2013 and 2017 and is scheduled to replace the MQ-1 around 2013. The RQ-4 has an ever increasing role in the intelligence, surveillance and reconnaissance community, and its mission and capabilities continue to evolve. RPAs are here to stay, and it only takes one person to interrupt the mishap chain. The No. 1 reason for a SIB is for mishap prevention. The lessons learned from this past year's SIBs need to be applied this year forward as every Class A mishap decreases our warfighting capability.

Tankers

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U.S. Air Force photo by Master Sgt. William Greer

Our tankers crews, maintainers and a host of other great warriors have conspired to complete another stellar year. With so many demands for contingency and training operations, it's an awesome feat to meet mission requirements with such a superior safety record. The last Class A tanker mishap occurred in May 2008. In essence, it's been four years with only a single Class A mishap! Incredible! Keep looking for those developing dangers and address problems early.

Through fiscal 2011, there were eight Class B tanker mishaps, which is one (or 11 percent) less than last year. With diligence, this reduction will continue into fiscal 2012. Of the eight Class B's, five were engine mishaps, not including an auxiliary power unit fire. The other two were weather-related. Is it time to refresh our preflight weather assessments and in-flight decisions? Going back to the basics once in a while is always a good idea. Yesterday's Class B could turn into tomorrow's Class A.

Over the fiscal year, we had 78 Class C's with a mix of flight and aircraft ground mishaps. A couple of notable mishaps were related to people "overexerting" themselves or "channelizing attention". Maintenance risk management is just as important as operational risk management. Are we so focused on today's mission that we take risks that affect tomorrow's mission? We'll each have to answer that question for ourselves. Our maintainers need as much wingman support as our fliers to address our Class C numbers ... even more so if we want to reduce the Class D mishaps. There were numerous eye, cranium and hand/digit injuries. Maybe it's time to readdress when we wear eye protection.

As you expected, the majority of Class E events were bird strikes. A bird strike is like a Vegas slot machine in reverse – it could be OK or it could be bad. It only takes one big bird hitting the wrong spot on the aircraft to cause a Class A. Watch the bird status and sunrise/sunset hours. And keep an eye out for those raptors and flocks, especially when near the ground.

Overall, it was a good year for our tanker compadres, and we want to make next year the best ever! Take a look at the bird status during mission planning and at step; you'll likely reduce your chances of a bird strike. If your tasks include working overhead, wear eye protection; it takes such a small effort to put it in the tool kit and don the goggles before starting work. Watch yourself when working around the aircraft; in a collision between you and the plane, the plane will win. And lastly, remember to watch your buddy. It can be a dangerous world out there, and we've got to look out for each other. Keep up the great work!

Trainers

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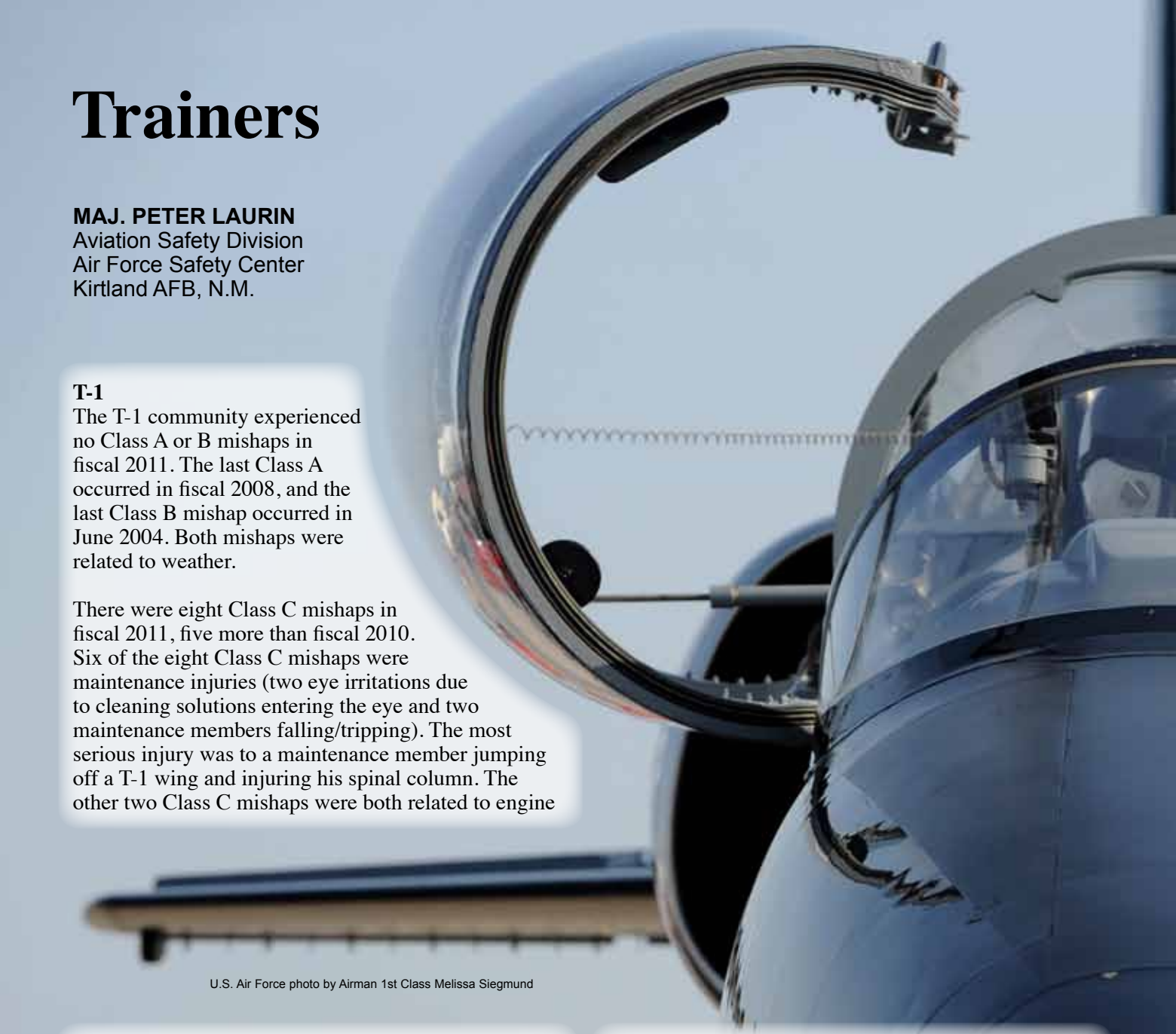

U.S. Air Force photo by Airman 1st Class Melissa Siegmund

T-1
The T-1 community experienced no Class A or B mishaps in fiscal 2011. The last Class A occurred in fiscal 2008, and the last Class B mishap occurred in June 2004. Both mishaps were related to weather.

There were eight Class C mishaps in fiscal 2011, five more than fiscal 2010. Six of the eight Class C mishaps were maintenance injuries (two eye irritations due to cleaning solutions entering the eye and two maintenance members falling/tripping). The most serious injury was to a maintenance member jumping off a T-1 wing and injuring his spinal column. The other two Class C mishaps were both related to engine damage, one due to a bird strike and the other due to a Hi-Lok fastener not being secured properly. In comparison, last year's two Class C's were caused by a left main tire fail, followed by a wheel well fire on one T-1 and the other being a T-1 departing the runway.

Fiscal 2011 Class E events were as follows: 130 related to bird/wildlife aircraft strike hazards; 17 related to hazardous air traffic reports and six related to high accident potential. Fifteen of the HATRs had the T-1 crews complying with the traffic collision avoidance system resolution advisory. The remaining HATRs had air traffic control providing separation between the T-1 crew and other aircraft. The six HAPs comprised three landing gear malfunctions, two smoke and fumes in the cockpit and one hydraulic fluid loss resulting in the use of emergency brakes. Fortunately, no significant damage occurred in any of the T-1 HAPs.

T-6
The T-6 community had no Class A mishaps in fiscal 2011. The last Class A (fiscal 2010) was an engine flameout with no re-light, and both pilots successfully ejected albeit at a lower-than-recommended altitude above ground level.

One Class B mishap occurred in fiscal 2011 during a pre-takeoff overspeed governor check when a power turbine blade failed due to low cyclic fatigue. A more robust turbine blade has been fielded and is being installed during engine overhauls.

Seven Class C mishaps occurred in fiscal 2011, compared to eight in fiscal 2010. The T-6 propulsion system continues to be an area of high interest, as it accounted for three Class C mishaps (compared to seven last year). The remaining Class C's in fiscal 2011

T-38
The T-38 community had one Class A mishap in fiscal 2011 compared to zero Class A mishaps in fiscal 2010. The mishap occurred after an aircraft suffered extensive damage due to a hard landing at night. The pilot lost directional control due to failure of the right main landing gear, departed the runway and contacted a partially buried cement block before coming to a stop on the infield. The pilot, who was flying solo, egressed uninjured. In any mishap, human factors can play a substantial role. Remember duty day limits exist to ensure crews are at their best in challenging flight regimens.

Two Class B mishaps occurred in fiscal 2011 compared to zero Class B's in fiscal 2010. The first was a bird strike to the left engine of a T-38 during takeoff. The aircrew performed a textbook runway abort procedure and prevented further damage to the aircraft. The second Class B was a compressor stall while applying power on a missed approach. The engine failed and wouldn't re-light; however, the crew did an excellent job handling the emergency and landed safely off of a straight in approach.

The number of Class C's remained at 24 in fiscal 2011 equal to fiscal 2010. Half of Class C mishaps were caused by bird strikes or engine-related events. This year, there were two mishaps involving a canopy not being properly secured and departing the aircraft on takeoff with one of the canopies striking the tail section of the aircraft. A cause for the departing canopies was undetermined, but the most likely was the result of a canopy latch handle not being fully seated. Last year, one T-38 canopy departed the aircraft on takeoff and struck the aircraft tail.

The majority of all T-38 mishaps (261 in fiscal 2011 vice 221 in fiscal 2010) were Class E events (total mishaps for all categories were 288 in fiscal 2011 vice 250 in fiscal 2010). BASH was the number one cause, followed by propulsion, then HATRs.

were due to: two maintenance injuries, one landing gear door failing to open resulting in a gear up landing and a T-6 departing the runway on takeoff as the nose wheel steering button was selected to correct for drift due to crosswinds.

Class E mishaps increased this year to 324 from last year's total of 193. The top three causes of Class E's were BASH events, followed by miscellaneous events – the vast majority being on-board oxygen generating system failures and physiological OBOGS. As a reminder, any Class E mishaps caused by OBOGS should be categorized as Class E Physiological**.** Log into AFSAS at https://afsas.kirtland.af.mil/Login.do and review *Safety Flash 12-01, Aircraft Oxygen Generating System Event Reporting* for specific reporting instructions.

Trainer Aircraft Wrap Up
Fiscal 2011 was a very good year for the training community with one Class A and three Class B mishaps, (fiscal 2010: one Class A and one Class B). Well done to all in the training world. Your vigilance – whether flying or maintaining aircraft – has resulted in two excellent years of below normal mishap rates.

Vertical Lift

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H-60

Congratulations on making fiscal 2011 an overall successful flying year from a Pavehawk flight safety perspective. There were no Class A mishaps. Taking a five-year (fiscal 2007 through 2011) look back, there were three Class A mishaps with the last occurring in January 2009. All three of those mishaps were classified as operations-related. Two involved landing mishaps and one involved a controlled flight into terrain. Best of all, none of them involved fatalities.

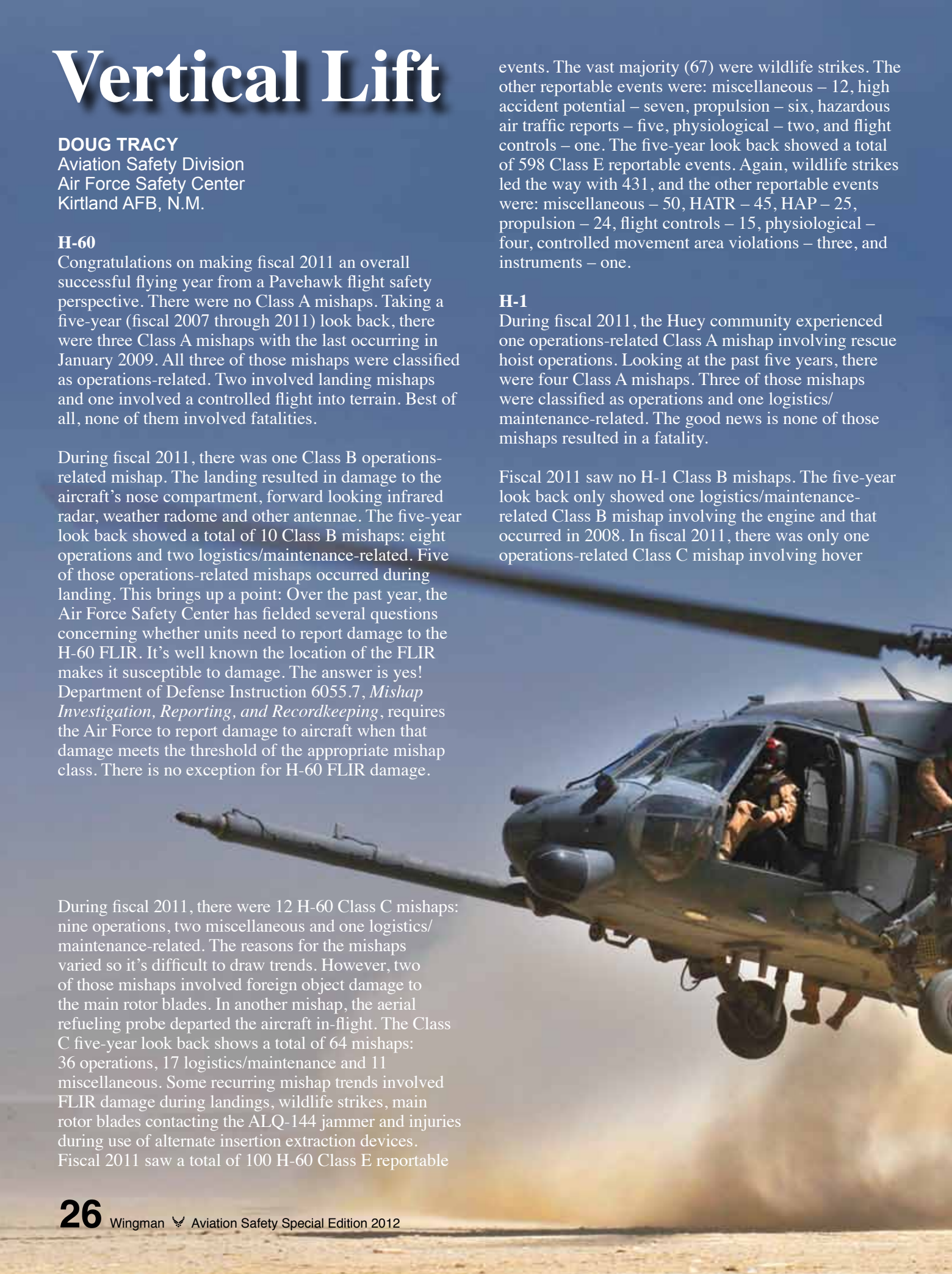
During fiscal 2011, there was one Class B operations-related mishap. The landing resulted in damage to the aircraft's nose compartment, forward looking infrared radar, weather radome and other antennae. The five-year look back showed a total of 10 Class B mishaps: eight operations and two logistics/maintenance-related. Five of those operations-related mishaps occurred during landing. This brings up a point: Over the past year, the Air Force Safety Center has fielded several questions concerning whether units need to report damage to the H-60 FLIR. It's well known the location of the FLIR makes it susceptible to damage. The answer is yes! Department of Defense Instruction 6055.7, *Mishap Investigation, Reporting, and Recordkeeping*, requires the Air Force to report damage to aircraft when that damage meets the threshold of the appropriate mishap class. There is no exception for H-60 FLIR damage.

During fiscal 2011, there were 12 H-60 Class C mishaps: nine operations, two miscellaneous and one logistics/maintenance-related. The reasons for the mishaps varied so it's difficult to draw trends. However, two of those mishaps involved foreign object damage to the main rotor blades. In another mishap, the aerial refueling probe departed the aircraft in-flight. The Class C five-year look back shows a total of 64 mishaps: 36 operations, 17 logistics/maintenance and 11 miscellaneous. Some recurring mishap trends involved FLIR damage during landings, wildlife strikes, main rotor blades contacting the ALQ-144 jammer and injuries during use of alternate insertion extraction devices. Fiscal 2011 saw a total of 100 H-60 Class E reportable events. The vast majority (67) were wildlife strikes. The other reportable events were: miscellaneous – 12, high accident potential – seven, propulsion – six, hazardous air traffic reports – five, physiological – two, and flight controls – one. The five-year look back showed a total of 598 Class E reportable events. Again, wildlife strikes led the way with 431, and the other reportable events were: miscellaneous – 50, HATR – 45, HAP – 25, propulsion – 24, flight controls – 15, physiological – four, controlled movement area violations – three, and instruments – one.

H-1

During fiscal 2011, the Huey community experienced one operations-related Class A mishap involving rescue hoist operations. Looking at the past five years, there were four Class A mishaps. Three of those mishaps were classified as operations and one logistics/maintenance-related. The good news is none of those mishaps resulted in a fatality.

Fiscal 2011 saw no H-1 Class B mishaps. The five-year look back only showed one logistics/maintenance-related Class B mishap involving the engine and that occurred in 2008. In fiscal 2011, there was only one operations-related Class C mishap involving hover



operations. The five-year look back showed 22 Class C mishaps: 11 operations, nine logistics/maintenance and two miscellaneous. No real mishap trends jumped out, although four of those mishaps involved hard landings.

There were 47 H-1 Class E reportable events. Forty one were wildlife strikes and the other six HATRs. The five-year look back showed a total of 177 Class E reportable events. Not surprising, wildlife strikes led the way with 132, and the other reportable events were: HATR – 16, miscellaneous – eight, HAP – eight, propulsion – six, flight controls – four, physiological – two, and instruments – one.

CV-22

Congratulations to the CV-22 community as there were no CV-22 Class A mishaps during fiscal 2011. The five-year look back showed two Class A mishaps with the last occurring in April 2010, which unfortunately involved four fatalities and 16 injured Airmen. One of those mishaps was logistics/maintenance-related and involved FOD damage. The other was an operations-related landing mishap.

Fiscal 2011 did have three Class B mishaps. Two of those mishaps were operations-related and involved an in-flight over-torque and the other a landing mishap. The third mishap occurred when the proprotor hub was dropped during phase inspection, and it was classified as logistics/maintenance-related. Between fiscal 2007 and 2011, there were six Class B mishaps. Five of those were logistics/maintenance-related and one operations-related.

All seven CV-22 Class C mishaps were logistics/maintenance-related. Some of the trends included aircraft damage during landing gear extension and dropped objects. The five-year look back showed a total of 20 Class C mishaps, comprising 14 logistics/maintenance, three operations and three miscellaneous.

There were 42 Class E reportable events.Wildlife strikes led the way with 24 events. The other reportable events were: miscellaneous - eight, HAP - three, propulsion – three, physiological – two, CMAV – one, and instruments – one. The five-year look back shows 126 Class E reportable events: wildlife strikes – 79, miscellaneous – 14, HAP – 12, propulsion – eight, HATR – seven, physiological – two, CMAV – one and instruments – one.

More on Wildlife Strikes

As you're well aware, helicopters and CV-22s and their aircrews have to share airspace with our feathered friends. Helicopters, CV-22s and birds spend the

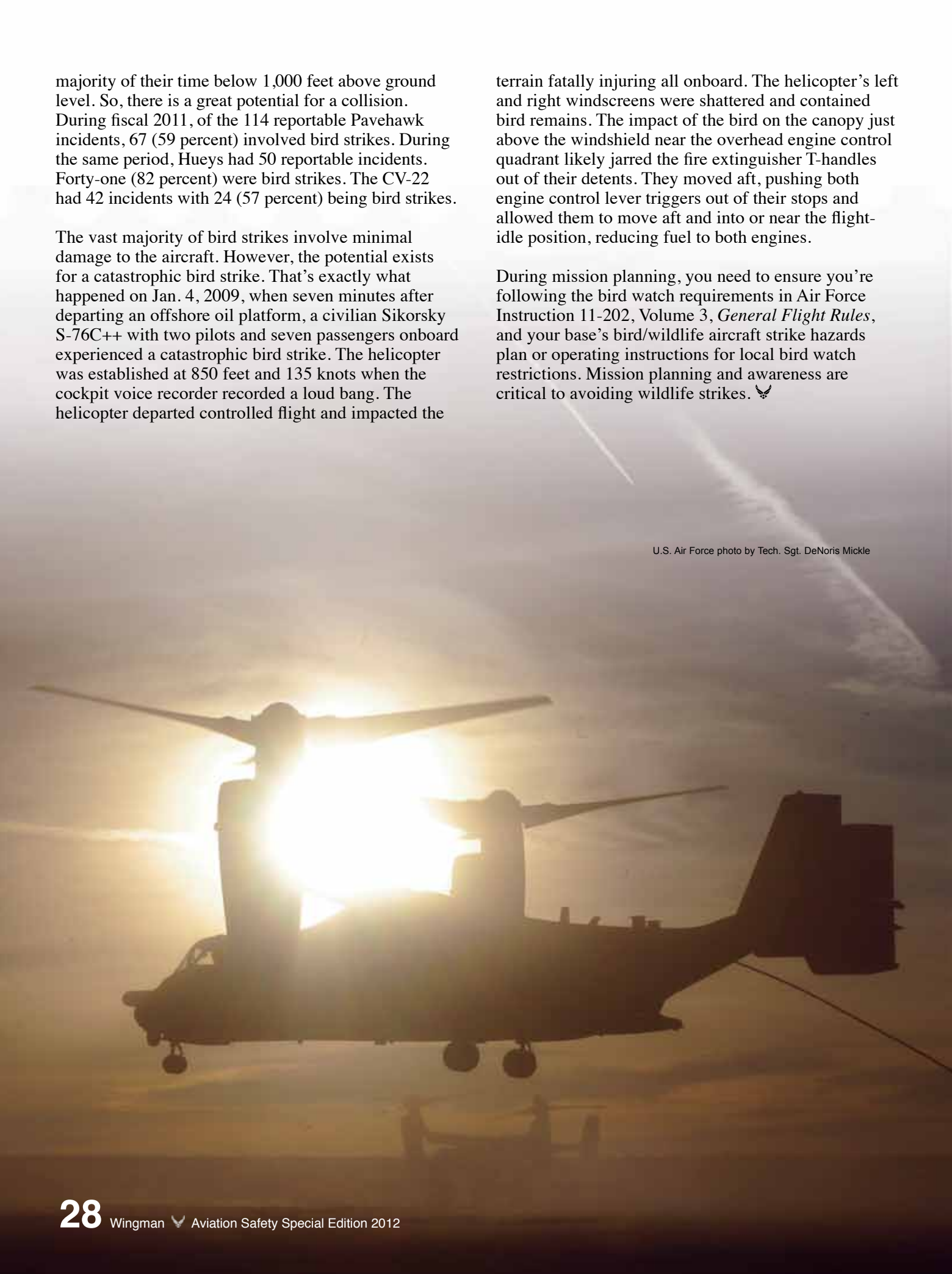
U.S. Air Force photo by Staff Sgt. Christopher Boitz

majority of their time below 1,000 feet above ground level. So, there is a great potential for a collision. During fiscal 2011, of the 114 reportable Pavehawk incidents, 67 (59 percent) involved bird strikes. During the same period, Hueys had 50 reportable incidents. Forty-one (82 percent) were bird strikes. The CV-22 had 42 incidents with 24 (57 percent) being bird strikes.

The vast majority of bird strikes involve minimal damage to the aircraft. However, the potential exists for a catastrophic bird strike. That's exactly what happened on Jan. 4, 2009, when seven minutes after departing an offshore oil platform, a civilian Sikorsky S-76C++ with two pilots and seven passengers onboard experienced a catastrophic bird strike. The helicopter was established at 850 feet and 135 knots when the cockpit voice recorder recorded a loud bang. The helicopter departed controlled flight and impacted the terrain fatally injuring all onboard. The helicopter's left and right windscreens were shattered and contained bird remains. The impact of the bird on the canopy just above the windshield near the overhead engine control quadrant likely jarred the fire extinguisher T-handles out of their detents. They moved aft, pushing both engine control lever triggers out of their stops and allowed them to move aft and into or near the flight-idle position, reducing fuel to both engines.

During mission planning, you need to ensure you're following the bird watch requirements in Air Force Instruction 11-202, Volume 3, *General Flight Rules*, and your base's bird/wildlife aircraft strike hazards plan or operating instructions for local bird watch restrictions. Mission planning and awareness are critical to avoiding wildlife strikes.

U.S. Air Force photo by Tech. Sgt. DeNoris Mickle



U-2

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U.S. Air Force photo by Airman 1st Class David Tracy
Background U.S. Air Force photo by Staff Sgt. J.G. Buzanowski

Fiscal 2011 was another successful flight safety year for the U-2 community. There were no Class A mishaps. The last Class A mishap occurred in 2007 and was a non-fatal logistics/maintenance-related mishap that involved an equipment bay hatch separating. The last U-2 Class B occurred in 2004.

During fiscal 2011, there were five Class C mishaps. Four of those mishaps were logistics/maintenance-related. Two involved foreign object damage. In another, a maintainer strained his back while working on the aircraft. A fourth involved an inertial navigation system failure. The fifth mishap is still under investigation. A five-year (fiscal 2007 through fiscal 2011) look back produced 31 Class C mishaps, consisting of 19 logistics/maintenance, 11 operations and one still under investigation.

There were 19 U-2 Class E reportable events in fiscal 2011. These events were classified as: miscellaneous – six, wildlife strikes – five, flight controls – four, physiological – two, instruments – one, and high accident potential – one. A five-year look back showed 87 Class E reportable events: physiological – 27; wildlife strike – 25; miscellaneous – 15; HAP – eight; flight controls – six, instruments – four and propulsion – two.

The U-2 community has produced great safety results over the past five years, but it's important to keep your guard up. In other weapons systems across the Air Force, we continue to see individuals becoming complacent and failing to follow published guidance. Keep focused on doing the mission safely so we can continue to preserve these valuable assets and the men and women who not only fly them but maintain them as well.

Air Force Safety Center Proactive Safety Programs

Military Flight Operations Quality Assurance

The MFOQA program records flight data for aggregate analysis to determine hidden or unquantified hazards. It's a military version of the civilian Flight Operational Quality Assurance and Flight Data Management programs. The idea is to routinely download flight data in order to detect mishap precursors. The great challenge of mishap prevention is that we often try to manage safety by measuring the rates of mishaps. Managing safety by using mishap metrics is like driving a car solely by looking in the rearview mirror. MFOQA allows us to actually measure the leading indicators of safety by examining close calls, which we know occur in far greater numbers than actual mishaps, and thus furnish our analyses with far more data than what our infrequent mishaps provide. With the data from the "almost mishaps," we can measure our drift toward failure instead of just the actual failures.

To put aircrew members at ease, an Office of the Secretary of Defense policy memo, dated Oct. 11, 2005, stated that data generated from the MFOQA process shall not be used for monitoring aircrew performance to initiate punitive or adverse action, except for cases of suspected willful disregard of regulations and procedures. This is stated in Air Force Policy Directive 90-13, *Military Flight Operations Quality Assurance*. We accumulate data from many flights and de-identify the data before we try to detect instances where aircraft operated outside of preset parameters. We're especially interested in finding unsafe latent conditions, such as routinely failing to follow procedures because they are poorly designed.

Aviation Safety Action Program

ASAP empowers crewmembers with a quick web-based means for voluntarily submitting reports of safety threats and crew errors. It allows individuals to document their "there I was …" story and provides near-instant high level visibility of hazards. ASAP reports are critical to identifying environmental threats and aircrew errors that may otherwise remain unknown. It's designed to provide a non-punitive environment for the open reporting of information, both critical for resolving mishap precursors and valuable for sharing across aviation communities. To file an ASAP report or get updates on report resolution, go to www.safety-masap.com.

U.S. Air Force photo by Ted Wilkens

Line Oriented Safety Audit

LOSA uses highly trained observers to collect data on situational factors and flight crew behavior on "normal" flights. It represents "fly on the wall" data. During flights that are being audited, observers record and code potential threats to safety, how the threats are addressed, the errors such threats generate, how flight crews manage these errors and specific behaviors that have been known to be associated with mishaps and incidents. It, like MFOQA and ASAP, is also non-punitive and features aircrew identity protection.

Air Force Culture Assessment Safety Tool/Air Force Combined Mishap Reduction System

AFCAST/AFCMRS is a web-based mishap prevention tool aimed at squadron commanders across the Air Force. Survey results are accompanied by a personalized telephone debrief that provides commanders at all levels with immediate feedback, trend analysis and recommendations to improve unit safety culture, reduce mishaps and enhance nuclear surety and operational safety. AFCAST/AFCMRS is one tool that provides proactive safety intelligence to commanders on organizational safety and behavioral hazards prior to a mishap. A data base of nearly 300,000 completed surveys allows commanders to compare their organizations with similar organizations across the Air Force. AFCAST facilitates directed mitigation efforts before mishaps occur.