2017, Vol. 1 No. 2

360° Approach

The Navy and Marine Corps Aviation Safety Magazine

Is It Time to Rethink Human Error?

Hearing Loss: You Have the Power to Prevent It

New Radar Prevents Bird Strikes

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Mishaps cost time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This magazine's goal is to help make sure that personnel can devote their time and energy to the mission. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous; the time to learn to do a job right is before combat starts.*Approach* (ISSN 1094-0405) is published bimonthly by Commander, Naval Safety Center, 375 A Street Norfolk, VA 23511-4399, and is an authorized publication for members of the Department of Defense. Contents are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the U.S. Navy. Photos and artwork are representative and do not necessarily show the people or equipment discussed. We reserve the right to edit all manuscripts. Reference to commercial products does not imply Navy endorsement. Unless otherwise stated, material in this magazine may be reprinted without permission; please credit the magazine and author.
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Pages

On the cover:
A pilot climbs into the cockpit of an F/A-18F Super Hornet assigned to the Fighting Swordsmen of Strike Fighter Squadron (VFA) 32 on the flight deck of the aircraft carrier USS Dwight D. Eisenhower (CVN 69) (Ike). (Photo by Airman Courtney Leavitt)

CONNECT WITH US

Bravo Zulu

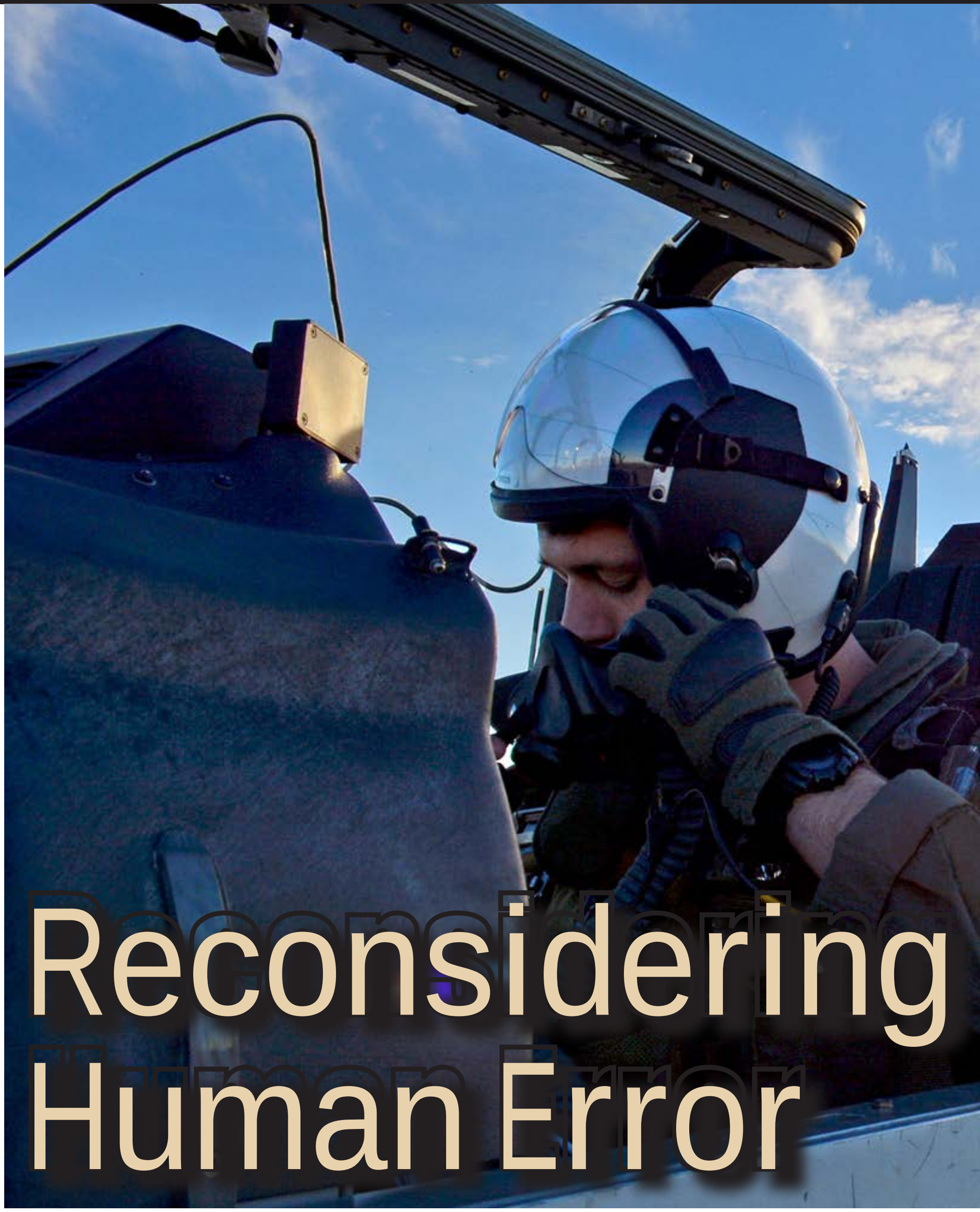
Sailors and Marines Preventing Mishaps

LCDR CHRISTOPHER GLENN

LCDR Christopher L. Glenn, USN, a flight instructor with VT-10 at NAS Pensacola, demonstrated exceptional initiative, knowledge, and technical acumen while researching a critical safety aspect of the T-6A Texan II emergency oxygen system. An aircrew member on a T-6A training flight noted an illumination of the on-board oxygen generation system fail warning light. The crew executed their emergency procedures and activated emergency oxygen systems in accordance with the T-6A NATOPS. After this action, the instructor pilot's emergency oxygen supply lasted only one minute and the student's three minutes instead of the expected 10 minutes. After learning of the issue, LCDR Glenn took it upon himself research the dilemma. He found that there was no check valve to prevent emergency oxygen from flowing back into the main oxygen supply line after actuation. Though not a critical action item in the T-6A NATOPS, he discovered it was time-critical to disconnect the main oxygen supply hose after activating the emergency system to maximize the available duration. He immediately communicated his findings with the chain of command. Through LCDR Glenn's initiative, the command identified a significant procedural blindspot in the T-6A NATOPS resulting in submission of a detailed hazard report and an urgent NATOPS change to address the deficiency.

SGT RENE RAMOS

While performing the aircraft acceptance screening of a newly received MV-22B, Sgt Ramos noticed a critical tracking error within the optimized organizational maintenance activity program that tracks aircraft component life cycles. In this case the nose landing gear drag strut actuator installed was only being tracked in one of the two metrics required. Noting the discrepancy, Sgt Ramos immediately took action to correct the error. Upon further investigation into the component's history, it was determined that the part required removal from the aircraft. Due to Sgt Ramos' attention to detail, and knowledge of the tracking requirements, the squadron was able to rectify an unsafe condition which could have led to landing gear failure, injury, or catastrophic damage to the aircraft.



Reconsidering Human Error

BY LT ANDREW MIRANDA, NAVSAFECEN

This year marks the 70th anniversary of one of the most influential publications in human factors. In 1947, psychologist Paul Fitts, along with Air Force Capt. Richard Jones and support from Lt. Col. A. P. Gagge and Col. Edward Kendricks of the Aeromedical Laboratory at Wright-Patterson Air Force Base, researched results of hundreds of non-combat aviation accidents. The causes of the accidents were originally categorized as pilot error, but the authors were unsatisfied with these conclusions. The title of their report was "Analysis of 270 'Pilot-Error' Experiences in Reading and Interpreting Aircraft Instruments." The quotations around pilot-error were intentionally ironic, suggesting the authors would not use this term to classify the failures. They concluded that the actual source of failure was poorly designed instruments.

What makes The Fitts and Jones report so influential goes beyond design error being a substitute for human error. It was the scientific approach they applied to understanding performance. They gathered pilot performance data by studying various types of errors, interviewed pilots about their experiences and considered human strengths and weaknesses of how we process information. They analyzed errors as the result of interactions between multiple components in the cockpit and determined errors can result not from a single component working in isolation (i.e. the human), but by the interaction of multiple components. For example, the incongruent motion between the turn needle used in one instrument and the bank indicator appearing in a separate instrument was a source of confusion not previously discovered.

As a result of this lack of uniformity, the pilot must change his mental set each time he shifts his eyes from one instrument to another. He can undoubtedly learn to do this in time, as is shown by the skill attained by experienced instrument pilots. In fact, the shift in reference may become so automatic that experienced pilots are unaware that it is happening.

But the necessity of constantly changing mental attitude certainly makes for more difficulty to learning instrument flying and may lead to occasional reversal during emergency conditions. It cannot be overemphasized that the pilot who must use his full set of instruments in critical maneuvers should have a panel in which he can shift from one instrument to another without conflict.

Paul Fitts went on to become a human factors pioneer. The influence of his work is still around today, whether in cockpit design or size and location of buttons on a smartphone. Wright-Patterson AFB still hosts research efforts advancing human factors in aviation, including the Navy Medical Research Unit-Dayton. Other areas of efforts include numerous divisions of naval aviation and the Department of Defense Human Factors Engineering Technical Advisory Group. Mishap investigators also use the Human Factors Analysis and Classification System, which intends to identify the latent conditions that put human operators in positions of failure. Each of these entities emphasize what Fitts initiated, which is understanding that performance of aviators, and all human users of technology for that matter, is the result of the relationship between the human and the work. Despite his legacy, and the ongoing efforts of many human factors researchers, human error is still a prominent causal factor discussed within safety communities.

The statistic often cited when discussing safety and human performance is that an estimated 80 percent of accidents are attributable to human error. If only it were that simple. The statistic implies that most accidents can be traced to the solitary

2nd Lt. Seth Montgomery, a student pilot assigned to Training Squadron 28 (VT-28) straps himself into a T-6 II turbo prop plane. (Photo by Mass Communication Specialist 2rd Class Victor R. Navarrete)

human component within a complex system and that the remaining accidents are attributable to mechanical failure. Separating outcomes into distinct categories deprives us of a deeper understanding of the interaction between these components. Seventy years after Fitts and Jones, it is time once again to challenge the notion of human error as being a useful concept.

If Fitts and Jones had been satisfied with pilot error as the decisive factor in the accidents they analyzed, they may have recommended more training as an intervention to improve performance, or encouraged pilots to maintain adequate situation awareness and to avoid complacency. These solutions, however, focus on the human component alone and oversimplify the interactions occurring within complex systems. They often do not take into consideration strengths and weakness of human being as performers in such systems. Humans have natural tendencies and limitations, especially in demanding situations. But we are amazingly creative, adaptable, and resilient. The Bravo Zulu section of this magazine commemorates these very strengths when aviators overcome such difficulties.

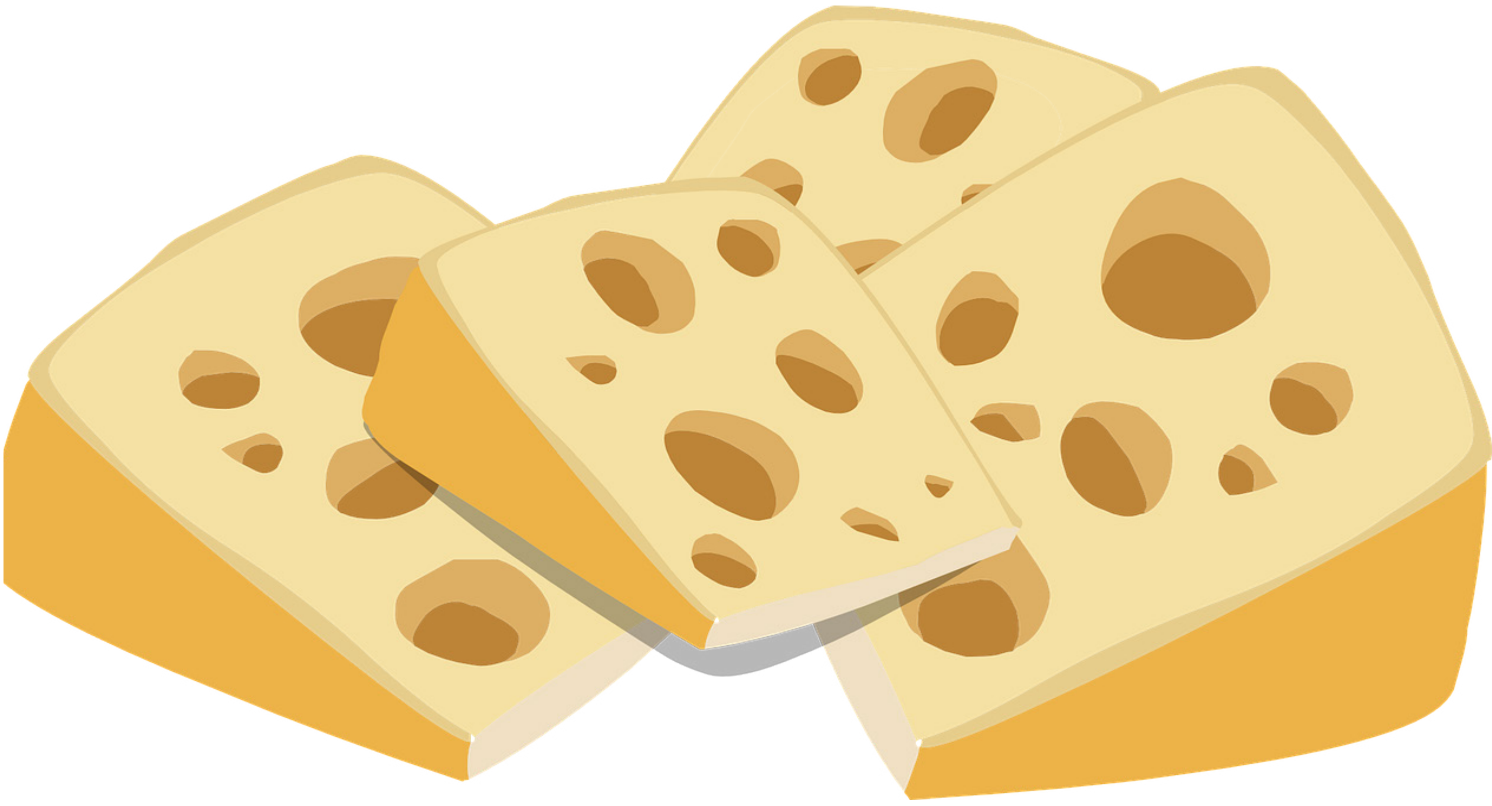
The next 70 years will continue to present new challenges in aviation and human factors. If the progress made during the last seven decades is any indication, we will continue to embrace and conquer these challenges.

These are solvable problems. But we owe it to ourselves, and certainly to the future generations of aviators, to first and foremost correctly identify the problems.

LT Andrew Miranda is an aerospace experimental psychologist at the Naval Safety Center. He earned a doctorate in human factors psychology from Wichita State University.

2,200-Pound Block of Swiss Cheese

BY AD1 (AW) PATRICK WARD, VFA-37



What started out as a normal workday for the powerplants work center, actually turned out to be a hectic night. Fortunately, the results were not near as dire as they could have been. Unfortunately, the event could have been completely avoided had we just followed proper procedures. We did, however, answer a very important question.

What do you get when you combine a routine maintenance action with miscommunication and maintenance not done by the book? A 2,200-pound block of Swiss cheese crashing to the deck!

In preparation for a functional check flight (FCF) for the following morning, the night check desk chief tasked our work center with dropping the inboard wing drop tank from aircraft 401 at the evening maintenance meeting.

Our work center was sidetracked with a higher priority job and after four hours, we were asked by the desk if we had completed the drop tank removal. Just to be sure about the maintenance evolution the shift supervisor and I, the leading petty officer (both collateral duty inspectors [CDIs]), went to maintenance control to confirm which aircraft needed its station seven-drop tank removed. After asking the maintenance controller to confirm the aircraft and station to be dropped, we found him working another jet issue and responded, "Yeah, 402, since it needs an FCF tomorrow." There were many missed opportunities that should have been avoided.

Missed opportunity No. 1: Wrong aircraft— 401 or 402.

We immediately headed back to the work center and told the shop to start checking out the appropriate tools for a drop tank removal and meet us on the flight line.

Missed opportunity No. 2: Neither the LPO, nor the other CDI qualified mechanic, checked the in-work status of the maintenance action in NALCOMIS.

Missed opportunity No. 3: Neither of us brought a checklist for drop tank removal to the flight line.

Missed opportunity No. 4: We never established who would lead the evolution and who would inspect as CDI.

By the time we made it to the jet, our young Sailors had completely prepared the job site. The aft mount and I-cable were already removed and wooden pallets were placed under the tank (we did not have a drop tank cart available at the time). With a jet turning both engines directly adjacent to aircraft 402, the noise level was pretty high.

When the shift supervisor went up to the tank, he incorrectly verified the fuel quantity by knocking on the outside to see if it sounded empty. The supervisor was unable to hear any sound coming from the tank since the adjacent aircraft was turning, but deemed it empty and carried on. I asked him if the tank was empty and the shift supervisor confirmed that it was in fact empty. That was missed opportunity No. 5.

With a mistakenly empty fuel tank ready to be dropped, the supervisor positioned himself at the front of the drop tank and locked arms with his partner on the other side, and the other two personnel positioned themselves in the back and locked arms. Due to a previous hand injury, I took my spot at the weapons rack to unlock the release mechanism. I yelled the requisite, "Ready front? Ready back?" My crew replied accordingly, signifying they heard me and were ready to receive the weight. At this point, I unlocked the suspension rack and the external tank fell through their arms and landed squarely on the pallets positioned underneath.

As soon as the tank fell, I immediately checked to ensure no one was injured. After determining that no one had been hurt, I opened the fuel tank lid and discovered the tank was completely full of jet fuel.

> "As soon as the tank fell, I immediately checked to ensure no one was injured. After determining that no one had been hurt, I opened the fuel tank lid and discovered the tank was completely full of jet fuel."

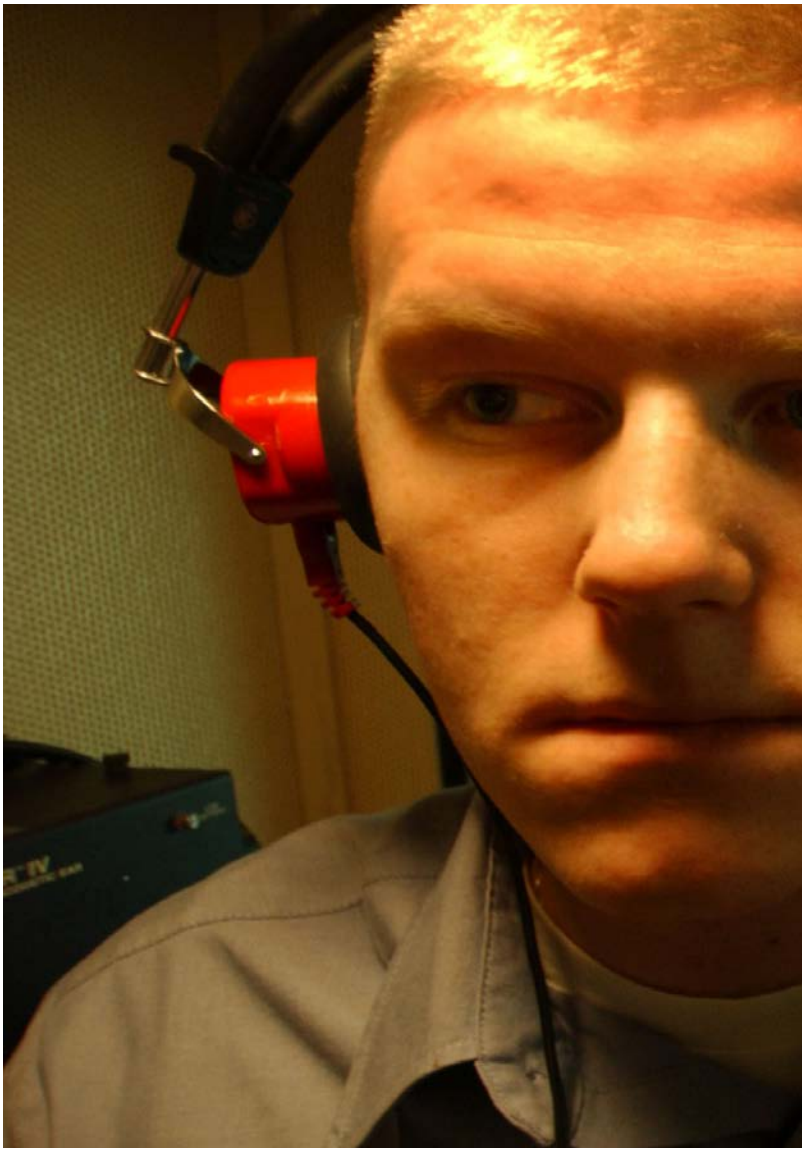
We learned many extremely important lessons from this unfortunate event that we should have never had to learn. First and foremost, work center leadership failed from the beginning by not putting the maintenance action into an in-work status. If the proper time had been spent ensuring proper documentation, maintenance would not have been performed on the wrong aircraft (401 vs. 402) and the miscommunication between the work center and maintenance control desk would have been easily identified.

Second, the publications checklist (LWS-460) was not with us at the time of the evolution. Had it been, maintenance would have been done by the book. The fuel level would have been correctly checked by removing the fuel cap and visually verifying that the tank was empty instead of simply slapping it on the side to hear if it was empty.

Third, even with these multiple mistakes made, we completely circumnavigated the quality assurance process of preventing maintenance mistakes by not establishing the leader of the evolution and CDI to verify proper maintenance was achieved.

Since the incident, intensive training was conducted about the mishap and steps to be taken to prevent a reoccurrence. Work center leadership created a maintenance evolution brief, highlighting assignment of team lead, team members, and CDI for each event. The most crucial aspect of the brief is that it translates to all maintenance actions. This ensures clear communication between personnel and promotes safety by eliminating and mitigating risks. Overall, the squadron is lucky this had not happened before and steps have been put in place to ensure it does not happen again.

Only You Can Prevent Hearing Loss



BY LT NICHOLAS MYERS, VAW-121

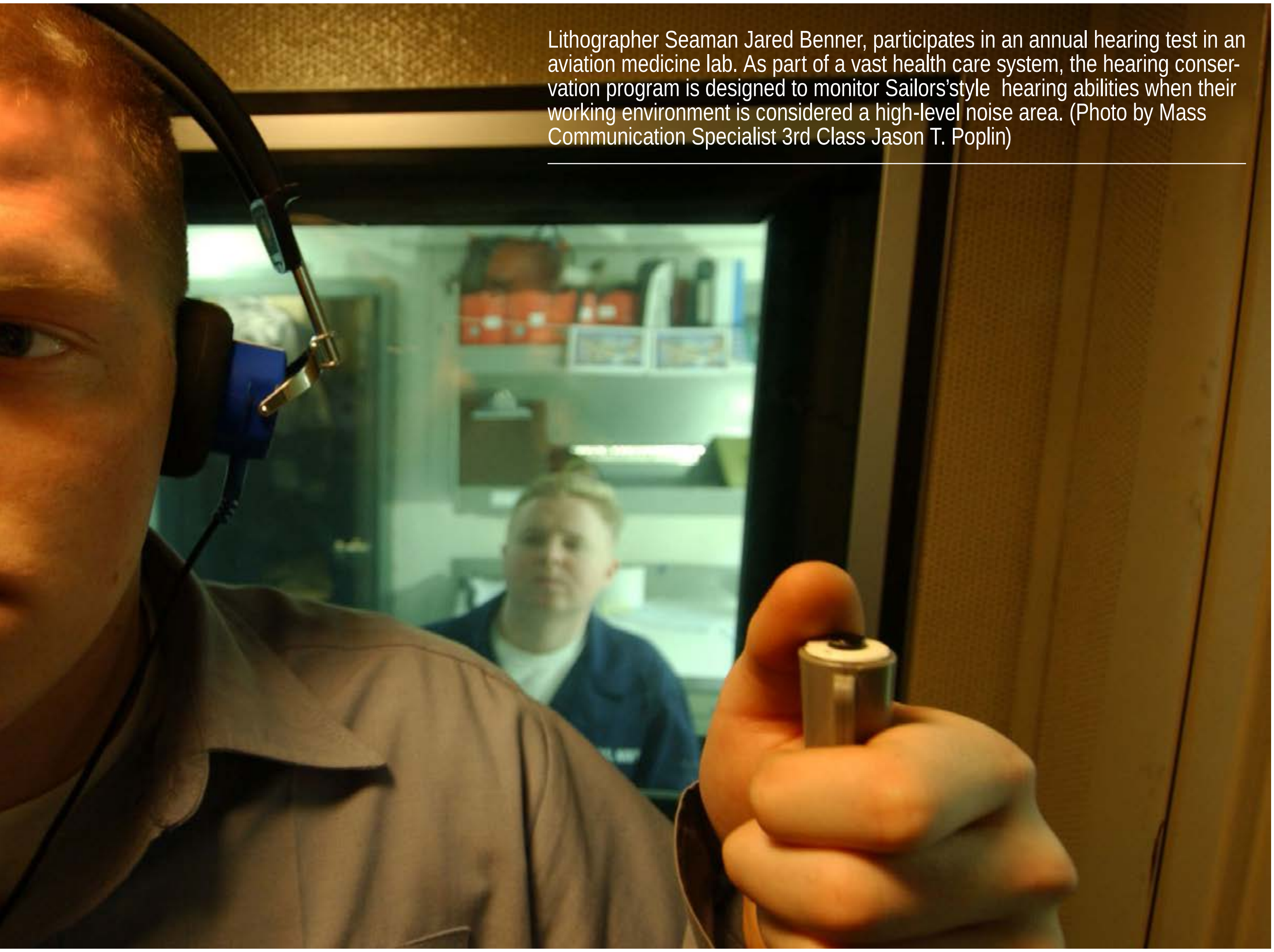
Naval Aviation is a noisy business, and as aviators it's a hazard we have come to accept and mitigate through the use of hearing protection. With the introduction of new platforms and technologies there comes a time when we have to re-evaluate traditional hearing protection methods and adapt accordingly to prevent permanent disability.

Since the initial flights of the E-2D Advanced Hawkeye, aircrew recognized noticeably higher noise levels and increased crew fatigue throughout different regimes of flight. Many of these flights have led to hazard reports being generated and post-flight audiograms being performed to evaluate hearing change for that duration. The VAW-121 Bluetails conducted a noise study to collect additional data to help support the HAZREPs and give fleet feedback to assist the PMAs in allocating resources to address these issues. While collaborating with industrial hygiene specialists at Naval Medical Center Portsmouth, Va., the squadron was able to both collect this data and learn additional lessons about noise exposure that are applicable to all platforms fleetwide.

The scope of this study was to evaluate the magnitude of E-2D noise exposure to aircrew through multiple regimes of flight and determine if current hearing protection methods are sufficient across all frequencies in the aircraft. The Bluetails answered these questions throughout three flights, during which personal noise dosimeters were utilized and noise levels throughout the aircraft were evaluated with various handheld noise measuring devices provided by the industrial hygiene specialists. The flights were two to three hours long and conducted in various operating areas on the east coast. Some of the flight profiles evaluated were: max power in a climb, straight and level flight, left and right flat turns, and max power descent. Samples were taken during these profiles at various locations in the cockpit, forward equipment compartment (FEC), and the Combat Information Center.

The U.S. Department of Health and Human Services states that noise levels at or above 85 decibels can cause noise induced hearing loss (NIHL). To put this in perspective, a typical running vacuum cleaner produces 88 decibels. NIHL is the only type of hearing loss that is completely preventable with the proper use of personal protective equipment (PPE) and exposure time mitigation. The study concluded E-2D aircrews are being exposed to a time weighted average of 100 dBA, which requires an attenuation of 16 dBA to reduce personnel exposure below DoD criteria. While these average levels are acceptable with the proper wear of current hearing protection, there are circumstances where aircrew are subjected to peak noise levels exceeding the exposure threshold for permanent hearing loss while utilizing the recommended PPE. For instance, with a high power setting, straight and level at 200 KIAS, measurements taken at the pilot and co-pilot stations were 113 dBA and 108 dBA respectively. During this noise exposure it is common for aircrew to remove hearing protection to adjust fitment or switch from helmets to their alternate David Clark headsets. Additionally, within the same flight regime at 210 KIAS, noise levels at the FEC avionics rack reached 118 dBA. This area of the aircraft is often occupied during trouble shooting of avionics and radar pressurization systems or while utilizing the relief tube. To put these exposures in perspective, with no hearing protection it will take 56 seconds at 112 dBA to cause permanent hearing loss.

The study concluded that the noise exposure levels can be mitigated through the proper wear of double hearing protection; however, given the thin margin of protection afforded by current PPE, correct wear cannot be emphasized enough. The question regarding the cause of increased crew fatigue has yet



Lithographer Seaman Jared Benner, participates in an annual hearing test in an aviation medicine lab. As part of a vast health care system, the hearing conservation program is designed to monitor Sailors'style hearing abilities when their working environment is considered a high-level noise area. (Photo by Mass Communication Specialist 3rd Class Jason T. Poplin)

to be answered and has led Naval Air Systems Command to investigate the possibility of the HGU-68 and HGU-84 helmets amplifying at-ear sound at low frequencies due to vibration.

The biggest takeaways for aircrew are to ensure you are following the manufacturers' recommendations when installing earplugs to maximize effectiveness. Also, it is imperative to maintain the integrity of your hearing protection through proper fitment of flight equipment. Finally, aircrew must manage noise exposure by limiting the time PPE is removed and prioritize quieter regimes of flight if removal is necessary.

Noise induced hearing loss is completely preventable. Wear the correct hearing protection, wear it right, and wear it when needed. Only you can prevent your hearing loss.

Kurt Yankaskas, the Office of Naval Research Noise-Induced Hearing Loss program officer, watches as Jacob Thompson, of United Sciences, demonstrates an in-ear scanning solution. The company has developed a technique for scanning and 3D-printing custom-molded hearing protection for noisy environments. (U.S. Navy photo by John F. Williams)

From left to right: Recovery teamlead Cpl Sean Gutzmer (HMLA-167), aircraft commander Capt Gil McMilliann (HMLA-467), and airframes collateral duty inspector LCpl Brian Jennings (HMLA-167 stand next to the UH-1Y that made a precautionary emergency landing near Prescott, Arizona on Sept. 18, 2015. (Photo by Co-pilot ,Capt Ferrell/USMC).

The Safety Win

BY LTCOL JESSE JANAY

On Sept. 17, 2015, Capt Gil "Pebble" McMillian and his UH-1Y Huey crew had a transmission chip light and they made a precautionary emergency landing (PEL). Not a big news story in itself, but there is a bigger win here: a possible mishap did not occur because the safety management system worked.

It was day four of four on a cross-country from North Carolina to Arizona to deliver the aircraft for the next weapons and tactics instructor (WTI) course in Yuma. This particular leg was through the canyons of Sedona on the way to the last fuel stop at Lake Havasu. When the transmission chip caution light illuminated, there were no suitable landing zones; nothing but canyons on the left, and a mountain range blocking the nearest divert to Prescott.

The gauges showed no secondary indications and the crew's initial instinct was to press over the mountains to the divert, but right at that specific moment, right during the make risk decisions part of the risk-management process, the crew remembered a ready room brief from their squadron aviation safety officer two weeks prior of a safety investigation report (SIR). It was the HMLA-169 Class A mishap on Jan. 23, 2015 at Twentynine Palms that killed both pilots. The un-privileged summary from The Marine Corps Times article is that "About 34 minutes into the 49-minute flight, the pilots noticed that their oil pressure gauge fluctuated and then plummeted to zero.

While the warning lights typically indicate an emergency, the pilots likely assumed the problem was due to a faulty gauge, not actual fluid loss, because of recent maintenance issues. With Twentynine Palms Calif., more than 15 minutes away, the pilots decided to continue flying. They passed two airports where they could have landed safely before the transmission froze, the investigators found." The actual SIR goes into great detail and I'd highly recommend all aircrew read it. Back to Pebbles PEL and his transmission chip.

Within minutes, the crew spotted a power line slash and found a small field next to it to execute a PEL. Safe-on-deck. No crash. Phone calls were made, a maintenance recovery team was launched, and the local sheriff was on scene shortly thereafter. A confirmed transmission chip and two nights later in that same field, the aircraft and crew made it to Yuma safely. Throughout this process, squadron, group, and wing

leadership supported and applauded the aircrew's risk management application and decision-making ability.

Normally, this kind of story would never have seen the light of day because it was just a PEL. It only did because several weeks later, as the wing director of safety and standardization (DSS), I just happened to go flying with the same pilot and he told me that the SIR saved him and his crew's lives.

Because of a safety program that worked, we are able to hear about this and not read another mishap report. This pilot was briefed on a previous mishap with similar circumstances, learned from the causal factors, and it entered his decision loop at a critical moment. We rarely, if ever, hear about these safety wins. We only hear about the bad ones.

It is hard to know when your safety management system works, but it is definitely easy to see when it does not; hence our almost religious tracking of our mishap statistics. Both civilian and military aviation professionals track them, but the problem is that they are a lagging metric. In safety, we need better leading metrics. One proposal: The safety win.

We seldom know when our safety program has prevented a mishap. How can one capture a non-eventful; safety wins? We always focus on the bad and how this pilot did this or that wrong. There is great merit in this approach... learning from others mistakes, but we can do better.

Our reporting systems are geared to report mishaps and we rarely hear about the near-mishaps. There needs to be a culture shift that the safety department is not here just to talk about what pilots did wrong, but also to talk about what pilots did right— for making the right call, executing the correct procedures, and not pushing it—the safety win.

Here's an idea put into action: Higher headquarters buy-in and support are essential to the success of the safety win. The 2nd Marine Aircraft Wing DSS team has done this by briefing a weekly safety win to the commanding general (CG) and his staff, posting them on the digital billboards across the base weekly, and staffing a quarterly CG's safety award (borrowed that idea from a Navy counterpart from the aviation safety manager's course) that really incentivizes the safety win by giving time off to the winning squadron. The safety culture shift in the wing is certainly noticeable because everyone likes a win.

Bird Detecting Radar Reduces Strike Damage

BY ROD HAFEMEISTER, NAS KINGSVILLE PAO

A student pilot is on final approach when he sees a flash of something feathered pass in front of him and then feels an explosion.

Bird strike! The single engine on his T-45 Goshawk jet trainer has failed, turning the aircraft into a 5-ton glider.

At Naval Air Station Kingsville, that scenario is more than a training exercise – it happened in 2005 and again in 2007, forcing the student and instructor to eject and destroying two $29 million aircraft.

Today, the air station and the flying training wing are using technology to better understand the threat of bird strikes and adjust flying hours to minimize it.

Based in South Texas near the Gulf Coast, NAS Kingsville is home to half of the Navy and Marine Corps strike pilot training. It's ideally situated for such training, with large, uncongested training areas and more than 220 days of sunshine annually.

But the Coastal Bend area has another attribute: It's the southern United States end of the Central Flyway, the largest migratory flyway in North America.

Every spring and fall, millions of birds pass through the area.

"In the fall, it's the raptors – hawks and falcons," said Eddie Earwood, a Department of Agriculture (USDA) biologist. "In the spring, the problem is especially birds that migrate in the evening, after the sun goes down."

Earwood is stationed at NAS Kingsville as coordinator of the base's Bird Aircraft Strike Hazard (BASH) program under an agreement between USDA and the Department of Navy.

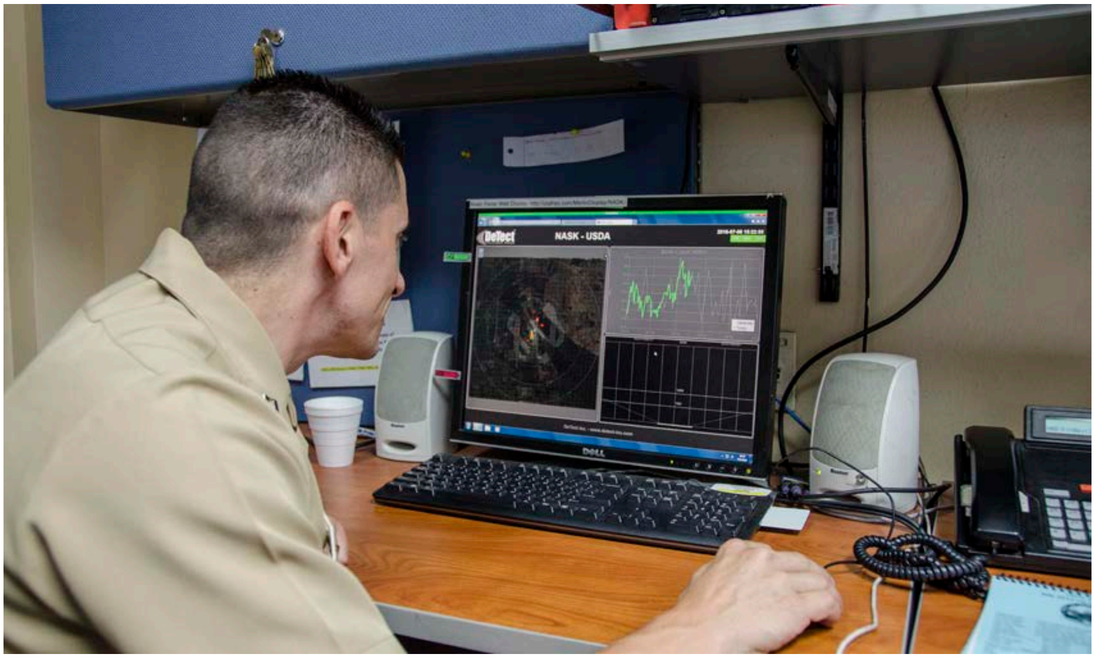
Photo courtesy of NAS Kingsville

U.S. Navy personnel inspect the site of a T-45 Goshawk crash after it struck a bird.

He was brought in as a result of a Class A mishap that destroyed a T-45 in 2005. In 2007, a second bird strike led to ejections and the loss of a T-45. "The 2005 crash was a collision with a single turkey vulture," he said. "In October 2007, it was a large group of migrating broad-winged hawks.

"We decided to see if radar could be used to identify birds before the planes find them. We wanted to identify large groups of birds, such as the migrating hawks, before they entered our critical or most used airspace."

The focus was on the tower pattern, where dozens of sorties a day practice approaches and landings.



ABOVE: LCDR Danny Cook, Training Air Wing Two safety officer, and Eddie Earwood, USDA bird aircraft strike hazard coordinator, examine the Merlin radar at NAS Kingsville. The radar is changing the way the Wing plans training, adjusting schedules to avoid flying during the periods of greatest bird strike hazards. (U.S. Navy Photo by Rod Hafemeister)

LEFT: Training Air Wing Two duty officer checks the Merlin radar to determine the current bird hazard condition: low, moderate or severe. At Severe, flights are curtailed until the hazard condition goes down. (U.S. Navy Photo by Rod Hafemeister)

A T-45 Goshawk struck a bird resulting in a Class A mishap. (Photo courtesy of NAS Kingsville)

The answer was Merlin, a special bird-detection radar.

"As a direct result of those two bird strikes in the pattern, we got the Merlin radar," said LCDR Danny Cook, safety officer for Training Air Wing Two.

The radar was put through tests in 2008 and 2009 and was leased for the first time in 2013.

It sits between the air stations runways, taking images in three axes.

"Our initial thought was that it would let us see large birds at a distance," Earwood said.

Merlin can pick up large groups of large birds out to about four miles. But it turned out it also does a good job of picking up large groups of small birds at shorter distances – which has resulted in changes in how the system is used.

Before the radar, tower personnel would set a bird hazard condition and restrict flight operations based on what wildlife they could see from the tower. But adding bird radar was problematic because of manning and logistics.

"It was determined that the wing duty officers would be better suited to make the bird hazard decision, if they had good situational awareness to do so," Earwood said.

"The radar became their eyes on the airfield. Combined with communications with the tower and wildlife detection and dispersal team observations, it gives them the information necessary to make that decision."

Having pilots in the flying wing determine the bird hazard condition was a first, Earwood said.

The radar was set up to display in the wing duty office – and now can be streamed live to computer screens.

"Over the years, we've gotten a better program," Cook said. "The wing duty officer can directly monitor bird activity. He's able to set a BASH condition based on what he's seeing in real time."

Merlin Aircraft Birdstrike Avoidance Radar positioned between the runways at Naval Air Station Kingsville, Texas. The air station sits in the middle of the busiest migratory bird flyway in North America, with millions of birds ranging from tiny hummingbirds to large raptors passing through every fall and spring. (Photo by Rod Hafemeister)

The wing has established three levels of bird hazard condition: low, moderate and severe.

Severe means "no fly" – aircraft on the ground stay there and aircraft needing to land come in with a high-angle approach that minimizes the chance of a bird strike and maximizes the odds of landing safely if a bird strike happens.

"Since we've integrated the Merlin radar, we haven't lost an aircraft to a bird strike," Cook said. "We've had some damages, but no lost aircraft."

Earwood and the wing also are using the Merlin radar to develop historical data of the patterns of BASH threats, including times of year, times of day and weather conditions.

"We have daily reports of the number of tracks, the amount of bird activity at different times," Earwood said.

"The wing sees that real-time data in a scrolling graph that measures bird activity. A red line was implemented at 70 percent of the historic peaks to help standardize setting of bird hazard condition.

"Approaching the red line, the condition is moderately elevated, at or above is severely elevated.

"As of September 2015, anything above that red line is a full stop – which resulted in a more than 45 percent reduction in overall bird strikes for September, which historically has been the peak month for bird strikes at NAS Kingsville.

"The wing is participating in the BASH program in a real way – it's a cultural change."

While the fall raptor migrations are generally a daytime threat, the spring migrations include many small birds that take flight just after dark, avoiding predators and feasting on spring flying insects.

Spring 2016 marked the first time the BASH condition settings were fully used at night.

"This spring, we've hit 'severe' and ordered full stop on landings," Cook said.

"Our plan is to study and adjust the condition thresholds annually; spring typically hits 'severe' almost every night for nearly a month.

"So now we're looking at adjusting our training schedules to minimize evening operations here at NAS Kingsville during that period. We can be smart about it to continue our production of new pilots."

The radar also has revealed the hot spots where birds are likely. That is helping greatly with habitat management to reduce the threat, Earwood said.

A T-45 Goshawk struck a bird resulting in a Class A mishap. (Photo courtesy of NAS Kingsville)

"This allows us to make recommendations on ways to mitigate the threat from wildlife without adversely affecting mission accomplishment," Earwood said.

"At the end of the day, we've got to work together to train Navy and Marine Corps pilots safely."

Cook said the radar is a great tool, but it's not going to prevent every bird strike.

"Even with the radar, there's going to be birds out there that don't meet the 'severe' threshold," he said.

"We've managed the threat – that's all we can do.

"The only way to eliminate it is to not fly."


A helicopter removes a a T-45 Goshawk from a crash site after it struck a bird. (Photo courtesy of NAS Kingsville)