# Aviation Human Factors Industry News

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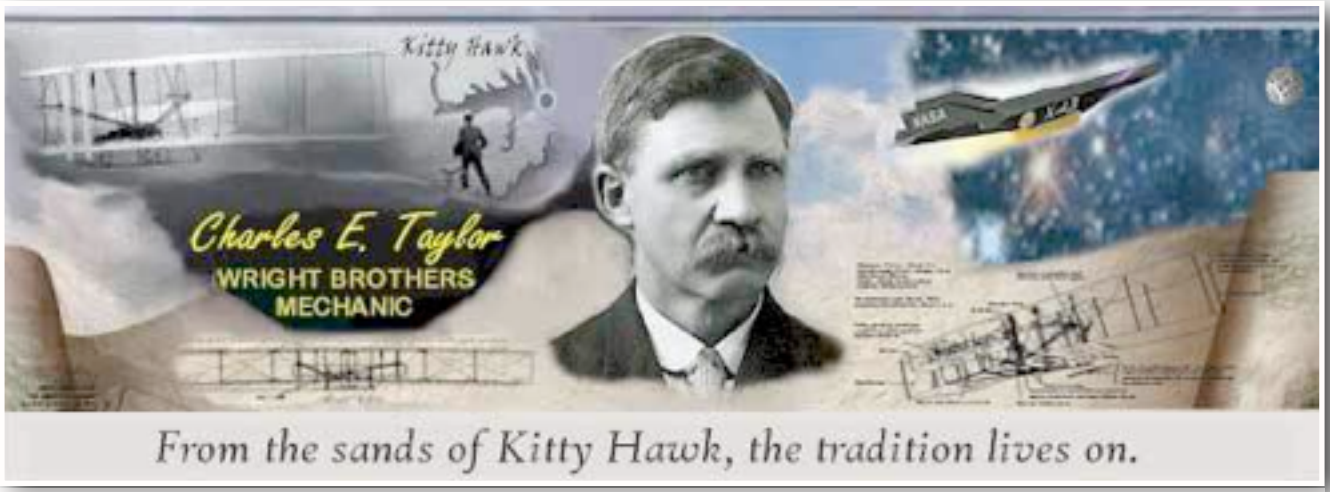


**Hello all,**

***To subscribe send an email to: rhughes@humanfactorsedu.com***

**In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:**

# AIN's Human Factor Podcast

## Episode 01: Flying into a Thunderstorm, Part 1


In the inaugural episode of AIN's The Human Factor, we explore the circumstances that led to Tim Valentine flying his Cirrus SR22 into a thunderstorm. On May 16th, 2013 Tim departed from Addison, Texas, en route to Austin, confident that most storms in the area had passed to the east after his departure was delayed by more than an hour. But when Tim took off under overcast conditions, at 1,000 feet his IFR routing took him directly into the back end of the thunderstorms that he was trying to avoid.

This episode explores the decisions leading up to this incident. We will hear from:

Tim Valentine—pilot of the SR22
John Dorsey—former executive director of SAFE (The Society of Aviation and Flight Educators)
John Kosak—program manager, Weather at NBAA (National Business Aviation Association)
Topics in this episode will cover:

Preflight weather planning
PIREPs (pilot reports)
En-route weather versus ATC-viewable weather
Precipitation static or P-static
Instrument failures
*Stay tuned for Part II of this episode to be released on August 14th.*

Listen here

http://www.ainonline.com/podcast/general-aviation/2017-08-02/episode-01-flying-thunderstorm-part-1?eid=346020113&bid=1828402

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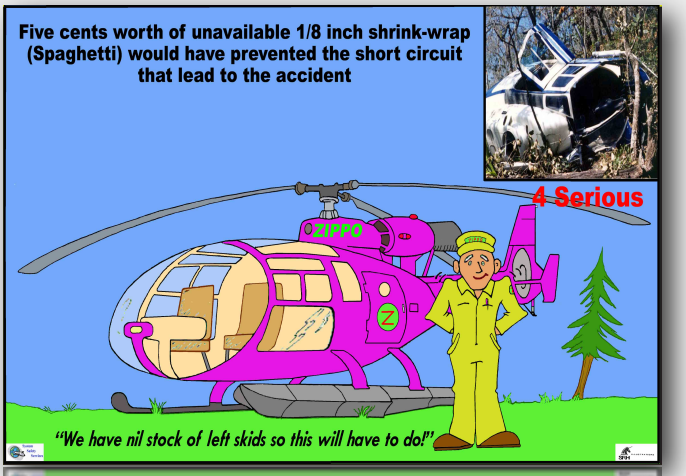
## Lack of Resources

Submitted by Gordon Dupont

With permission from D.O.M. Director of Maintenance Magazine




We AMT/AMEs are proud of being able to keep aircraft flying and we should rightfully be so. There is the old adage that: *An AMT/AME is a person who can do more and more with less and less until he is fully qualified to do everything with absolutely nothing."* And he's damn proud of it as well. While this may sound commendable, **Lack of Resources** has led to all to many accidents.

With the cost of aircraft parts what they are today, the **Lack of Resources** cause of maintenance error is always in the background and sometimes, unfortunately, in the foreground. But **Lack of Resources** is not just the lack of spare parts you would like to see in your stores. It is also the lack of: that manual for a propeller you work on;

that special tool for torqueing the wing attach bolts; proper lighting in the work area; (a flashlight stuck between tubing is not proper lighting);
shelter when the wind is blowing 40 kts. in a sleet-like rain; a hanger with heat when the outside and inside temperature is 40 below either scale,
personnel for the work on hand and technical support when its needed. If you don't have the answers, there should be someone you can turn to, be it the chief engineer, a wise engineer you know or a tech rep.

Let's look at a case study that will illustrate the point.

The Piper Navajo was one of the more high time aircraft in the fleet but was generally well maintained. The crew had been complaining about a door "not closed" light coming on in flight but it always appeared to function OK when maintenance tried it on the ground. As the latches were worn it was decided to order new parts for the next 100 hourly and even though they were AOGed, (Aircraft on Ground) Piper was in Chapter 11 (a polite name for bankruptcy protection) and they had not arrived when the 100 hour rolled around. The aircraft was signed out as airworthy but the door light was coming on more regularly and now could be made to come on, on the ground if you pushed on the door. Still no parts, the AME decided to remove the latches and file the securing screw holes so that the latches could be moved inward more. This "fix" appeared to work as pushing on the door would not cause the warning light to come on. The aircraft departed with a full load of passengers and had just reached cruise altitude over the mountains when the warning light flickered a few times and stayed on. The Captain told the copilot to go back and check the handle to ensure that the door was fully closed.

Fortunately, just before he got there the upper latching door flew open and the heavier lower door with the stairs and a leather covered steel cable to pull it up to close tore off at the hinge and was swinging at the end of the steel cable in the slipstream. It was striking the empennage as it swung around making a sound that amplified up into the cabin. A lady sitting near the door became hysterical as the banging sound plus a 200 mph wind in her face lead her to believe that the end was near. The Captain swung the aircraft around as he declared an emergency and pushed both throttles as far forward as they would go. The increased speed increased the slipstream and thus the thundering noise of the door striking the metal skin. From the ever increasing dent in the empennage began cracks that slowly started to circle the battered airframe.

By the time a Safe landing was made with the aircraft still dragging the very much worse for wear door down the runway, the cracks had progressed almost 20% of the empennage circumference. Had the incident occurred say 15 minutes later or perhaps even less, there would have been a fatal accident somewhere in the mountains with a burning wreckage minus its empennage.

There were no physical injuries but plenty of adrenaline was flowing in the persons in that aircraft that day and one can be sure that multiple lawsuits would follow..

A pilot who was flying single pilot cargo in the same type of aircraft on autopilot wasn't as lucky when he went back to check the door and disappeared never to be found. Perhaps one day a hunter will notice a skeleton up in a tree and wonder just how on earth it got there. The aircraft crashed an unknown time later out of fuel.

So what can we do about it? In this case, the latch was giving lots of warning that it needed replacement and should have been replaced even if it took calls around to locate new latches or even grounding the aircraft until a set was located and obtained.

As for the AME who did what he thought best at the time to keep the aircraft flying, was fired by the company and received a 90 day license suspension by the regulatory body. Had the aircraft not made it back he could have been looking at a criminal negligence causing death charge.

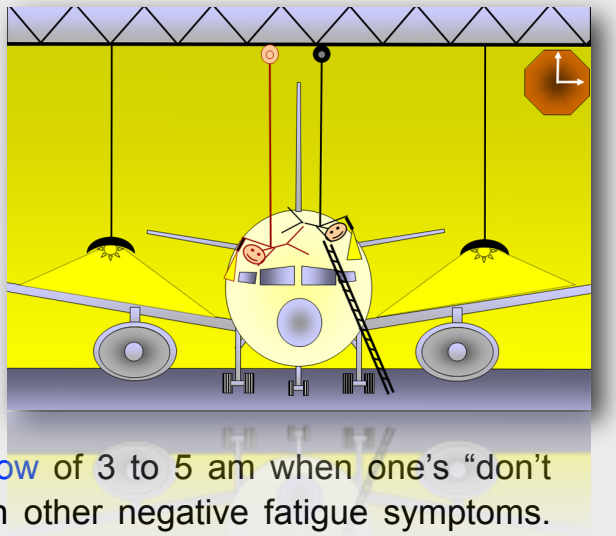
When placed in a position of having to decide whether it is Safe to fly until a new part arrives; stop and think: "how many people will thank you if your decision is wrong."

A very common Lack of Resource is lighting which played a role along with a number of its teammates to cause the unthinkable, Aloha "convertible" accident to occur.

As I hope you will recall, (June 2016 issue) we said that complacency played a major role in the maintenance error that enabled the accident to occur. However, complacency had a number of accomplices under Lack of Resources. Starting with the lighting in the World War 2 built hangar.

It was hung perfectly for the DC3 and like aircraft of the day but was too low to completely light up the much larger Boeing 337. The lights were never raised and wasn't a major problem as most routine work occurs on the engines and landing gear.

As "Murphy" would have it, the low light required that they use flashlights to look for cracks. The problem with flashlights is they provide a very focused beam of light over a small area and thus you lose the advantage of peripheral vision.
Have you ever looked at something and seen nothing but as you turn away you see something that was there "out of the corner of your eye. Without getting into the rods and cones in your eyes just remember that the peripheral is more powerful and if you are using a flashlight to see, the weaker direct vision will follow that light. The cracks were forming along the S-10 longeron above the windows on each side. The proper stand to go over the wing would have enabled them to look almost directly at the crack location. But that stand was in another hangar and would have involved pushing aircraft out to obtain and position the stand. Being ingenious AMTs they connected themselves in a harness attached to the rafters. Thus should they slip off it would stop them before hitting the hangar floor. See drawing.



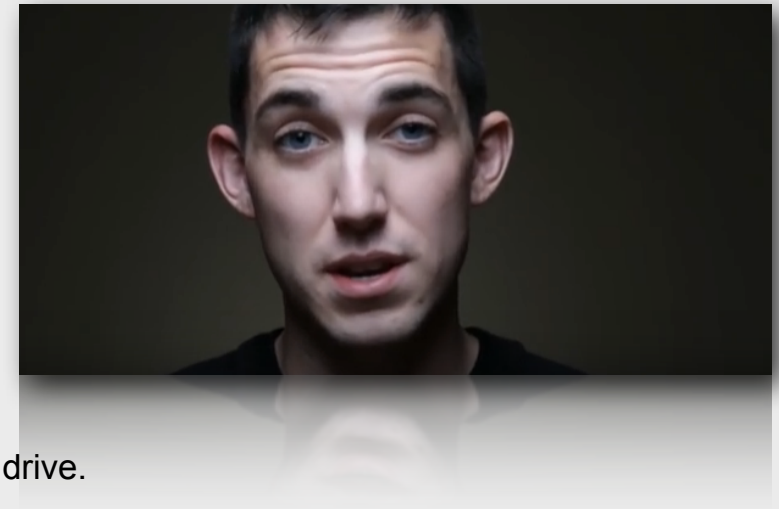
I suspect they did a great job inspecting the rivets on the top of the aircraft but as their head got below their butt, the odds are very high they speeded up the inspection of that area as the prospect of sliding down head first loomed. All this was occurring in the circadian rhythm low of 3 to 5 am when one's "don't care attitude would be at its highest along with other negative fatigue symptoms. The links in the chain of events towards an accident were forming and they didn't have a clue.

Special tools make the job easier and in some cases, possible but who hasn't made a tool to do a particular job? The question has to be: Am I 100% sure this tool will do the job? If not, don't use it.

A LAME (Australia) was servicing a Beechcraft model with electric gear and a spring that provided the tension to keep the gear over center lock locked. The inspection called for a special tool with a gauge to be used to push against the over center lock until a 020" feeler gauge could just be inserted into the unlocking gear. The gauge showed the acceptable range for this to occur. Not having this tool, he took a fish scale and attached a piece of angle metal to it and pulled on the scale until the feeler gauge fit it.

Now any fisherman will attest to the accuracy of these gauges that enable them to have bigger bragging rights re fish weight than they are entitled to. Not too long after, the left gear collapsed on a rough gravel strip.
Fortunately there was no fire from the leaking fuel but you can be sure you could have bought an awful lot of the "special tool" with the cost of the repair. The Safety net is the same as the materials one.

## "I Killed a Man"



While scrolling through various news stories on my USA Today app, one story immediately caught my attention; *Drunken driver confesses on YouTube: 'I killed a man'.* The 22 year old Ohio man says he was drunk and will take 'full responsibility" for wrong-way collision in June. Homicide charges are possible which carries a maximum of eight years in prison upon conviction.Could this 3-minute video influence others who drink and drive.

I share this story with the hope you view it and pass it along to others.

https://www.youtube.com/watch?v=MmpK_EshSL4

## Did brain phenomenon contribute to Air Canada pilot's close-call at SFO?

Edie Fischer, a retired research psychologist, holds a copy of a research paper, which shows her performing an experiment, at her home in Gilroy recently. Fisher's experiment in 1980 for NASA had pilots land on a simulator. During one landing she secretly placed an airplane in the middle of the runway. During one phase of experiment 2 of 8 pilots didn't see the plane.

Could the same brain phenomenon identified as contributing to today's polarizing political climate have played a role in an Air Canada flight crew coming within seconds of landing on a row of jets awaiting takeoff at SFO? Absolutely, experts say. The condition, known as confirmation bias, occurs when people accept or seek out evidence that confirms their expectations and ignore or avoid facts that don't align with their expectations.

The same mental blind spot likely impacted the Air Canada flight crew on July 7 when it nearly triggered the worst aviation disaster in history by landing on four fully-loaded planes on the San Francisco International Airport taxiway, says Dr. Andrew Gilbey, a senior lecturer in aviation at Massey University in New Zealand. Gilbey and colleagues have published a number of studies in psychology periodicals on aviation confirmation bias.

Federal officials are continuing to investigate the close-call by the Air Canada jet, which came within 50 feet of ground aircraft, according to flight data analyzed by this news agency and FlightAware.

The pilot, who was heading directly to the taxiway rather than the runway, thought he was in the right place. When he asked about lights he saw on the ground, according to air traffic audio, the tower assured him the runway was clear for him to land, and the pilot continued on his misguided course. As we all know by now, the pilot was not where he thought he was, but why didn't he make his own assessment and correction?

"Unfortunately, people often ignore … (contrary) evidence which could show their prior belief is wrong, and favor confirmatory evidence, which generally cannot show definitively that they are correct," Gilbey said.

Here's how confirmation bias likely played a role during Air Canada flight 759's final approach to the San Francisco airport, according to Gilbey, who has reviewed the audio and flight data analysis for this news organization:

In general, during high-stress situations, like a night landing at a busy airport, people are more likely to commit errors of judgment. In this case, the pilot assumed he was lined up on approved Runway 28-Right, when he was really aimed at Taxiway C. And when he told the tower he saw lights on the "runway," the air traffic controller told him the runway was clear, so the pilot assumed his current flight path had been approved.

"When they were told by a controller that Runway 28-Right was clear, this would have probably provided them with … confirmatory evidence that everything was going as planned," Gilbey said. "However, there must have been at least three major pieces of disconfirmatory evidence confronting the aircrew, and had they utilized this evidence, they should have realized much earlier that they were lined up on a taxiway as it would have definitely indicated their prior belief … was dangerously wrong."

As contrary evidence, the pilot should have noticed the different color lights that mark the taxiway. He should have noticed that the very distinct lighting that marks a runway was missing. And given how clear the night was, he should have seen the lights of the aircraft queued on the taxiway — lights that wouldn't have been there if he were headed for the runway, Gilbey said.

But it took a pilot on the ground to warn of the pending collision and the air traffic controller to order a go-around before the Air Canada plane aborted the landing.

In 1980, Edie Fischer was a graduate student at San Jose State University in the psychology department and led a study for NASA Ames Research Center and the American Pilot Association to determine if a new cockpit display would work in commercial airplanes. As part of the experiment conducted in a flight simulator, experienced commercial airline pilots were cleared to land, even though a wide-body aircraft had been placed on the runway. In the study, two of eight pilots in the experiment never saw the runway aircraft, apparently because they already had convinced themselves nothing was in their path.

Fischer said that study provided insight into the Air Canada event, confirmation bias and how little we know about the human mind.

“If you want to use my study results at all, you have to raise the possibility that after all the physical reasons, such as fatigue, vision problems, drugs, etc. are eliminated, the pilot’s actions may have resulted from a cognitive malfunction beyond his conscious control,” said Fischer, a retired research psychologist. “The only remedy I can think of is training pilots intensively to expect the unexpected.”

One pilot interviewed in Fischer’s study who did not see the airplane on the simulated runway told researchers at the time: “If I didn’t see it (the tape), I wouldn’t believe it. I honestly didn’t see anything on that runway.”

Fischer said pilots need rest and training — “There need to be some serious studies on the cognitive processes of the human being.”

The FAA has been aware of this human factor in aviation errors for years, and the agency’s safety team issued a reminder in 2014: “A mental bias can lead to unconscious behavior, and it is difficult to prevent what you don’t intend to do. So, work as a team. Two heads are better than one, and many better than two. Try to disprove the decision.”

Capt. Shem Malmquist, a 777 pilot and air safety and accident investigator, has written about aviation confirmation bias. Based on what he knows about the Air Canada incident from media reports only, Malmquist said confirmation bias “might have come into play.”

The “cognitive short-cut” becomes worse at night, and fatigue can exacerbate the situation, he said. The Air Canada flight was a red-eye.

“Once the brain has decided on a solution, it takes an awful lot of evidence to shake it. Our perception is actually influenced greatly by what we believe, where some cognitive scientists take it so far as to state that reality is a shared hallucination,” Malmquist said. “Confirmation bias is one of those factors that is very challenging to see or predict prospectively, but extremely obvious in hindsight.”

http://onlinelibrary.wiley.com/doi/10.1002/acp.2860/abstract

http://onlinelibrary.wiley.com/doi/10.1002/acp.3225/abstract

https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19810005125.pdf

https://www.faasafety.gov/spans/noticeView.aspx?nid=5112

https://airlinesafety.wordpress.com/2014/04/21/the-role-of-cognitive-bias-in-aircraft-accidents/

## Do It Right or Don’t Do It At All

Someone once told me, “Doing it wrong is as good as not doing it at all.” Right off the bat that message is what you should get out of this story, as it is a very important lesson we must all learn from, regardless of rating or rank. On a rainy Tuesday morning, my fellow ordnance men and I were on the flight line preparing the aircraft for daily flight operations.

I was the collateral duty inspector (CDI) in charge of overseeing the installation and torqueing of 16 ALE-47 magazine dispenser buckets on four F/A-18E Super Hornets. I had all the required tools, but I did not have the actual checklist in my hands.

Over time, I got so relaxed with the repetitiveness of this specific job that I missed a very important step. I should have read the checklist step-by-step, without rushing. Even though I thought I had verified the torque on all the buckets in an x-pattern, in accordance with A1-F18EA-LWS-000, I obviously missed something. The aircraft returned from its flight and during the turnaround of the aircraft another ordnance man found one of the four ALE-47 magazine dispenser buckets missing from the aircraft. The bucket had fallen off in flight! The aircraft had flown over residential areas where kids were at school and where people were in their homes.

It could have been catastrophic if it had hit and destroyed someone's property or, even worse, if it had hit someone as this surely would have resulted in a fatality. Luckily, this did not result in any property damage or personal injury; however, this incident was entirely avoidable had I done by-the-book maintenance. All of this was a result of my negligence to do the job by the book.

Proper procedures and instructions are established by experts for all of us to follow. Mishaps have happened in the past because maintainers have not followed simple instructions, and it has resulted in the damage of personal property and/or injury; and even worse, death. They are easy to read and simple to use, so there should be no reason to not follow the specific steps as written in the publications and checklists.

CDIs are the people in the work center that the command trusts to oversee that the job gets done properly, but, more importantly, we are the people that the junior Sailors look up to. They seek guidance and knowledge from us, and are relying on us to do it right ourselves and to train them if they are not doing the job correctly. They are our replacements and the future of our Navy. What kind of future are we providing if we don't teach them to do the right things now? Equally as important, how can we as CDIs and supervisors keep our Sailors safe and the jets flying safely if we are not following the book at all times, on and off the flightline? The term "by-the book maintenance" is something we've all heard hundreds of times that can sometimes go in one ear and out the other.

Please use this incident as a reminder of what can happen if we choose to not take that to heart by letting that phrase fully sink in.

## Plane nearly ran out of fuel after pilots forgot to bring up landing gear

Two pilots have been suspended from duty after their aircraft, carrying 99 passengers, nearly ran out of fuel because they forgot to retract the landing gear after take-off.

Air India Flight AI676 was en route to Mumbai from Kolkata on July 22 but was forced to divert to Nagpur when the crew became alarmed by the speed at which the aircraft was losing fuel thanks to the additional drag created by the extended wheels.

An unidentified source told the Times of India that the "brand new Airbus A320", one of the most fuel efficient aircraft in existence, had struggled to climb after take-off, prompting the pilots to settle on an altitude of 24,000 feet as opposed to a usual cruising height of 35,000 feet. The source, who made a point of saying that both pilots were women, said it flew like this at 230 knots - as opposed to around 500 knots - for about an hour-and-a-half, while the extended landing gear dragged heavily on the aircraft.

At this point, 90 minutes into a two-and-a-half-hour flight, the crew requested permission to divert to Nagpur as their fuel would have run out before reaching Mumbai.

"When preparing to land, they decided to lower the landing gear. At this point they realized that the wheels had been out all the while from Kolkata," said the source.

A playback of the flight from FlightRadar24.com shows it failing to reach an altitude higher than 24,000 feet but put the aircraft's speed at just over 300 knots.

A spokesperson for Air India told the Times of India the pilots have been "de-rostered" and the airline is investigating.

The problem is more often experienced in reverse when pilots have difficulty lowering the landing gear during an approach. Such landings are called "belly landings" as aircraft attempt to negotiate a touchdown without wheels. This has been known to occur because crew simply forget to lower the gear. One such incident happened to a light aircraft in 2015 when a pilot, distracted by a moose on the runway in Alaska, forgot to lower the landing gear, meaning his twin-engine Piper PA 31-350 landed on its belly, skidding across the tarmac.

The report from the National Transportation Safety Board read: "While on final approach, an airplane that landed in front of him reported a moose in the vicinity of the runway. An airport maintenance person announced on the common traffic advisory frequency that he was attempting to chase the moose off of the runway. The pilot became distracted trying to avoid wake turbulence from the preceding airplane and monitor the location of the vehicle and moose and failed to extend the landing gear prior to landing."

## Aviation experts identify industry's biggest safety challenges

**ALPA aviation safety chair Steve Jangelis, TSB Canada chair Kathy Fox, NTSB chairman Robert Sumwalt.**

National Transportation Safety Board (NTSB) acting chairman Robert Sumwalt said complacency is the biggest threat to safety the aviation industry. Speaking on a panel at the Air Line Pilots Association International Air Safety Forum July 20, Sumwalt said the issue is on the minds of NTSB investigators while conducting crash probes.

"Unanimously, we are well aware of that … we had several hull losses at my airline [US Airways] over a period of time and the management over the next few years were very aware of all of those things," Sumwalt said. "But as time evolved, the people that were running the company weren't the same people that were there during those bad times. We've had an excellent run of good, safe flights over the last number of years [but] the people leading the airlines … weren't around back in those dark days. I worry about complacency in the industry overall."

Sumwalt's Canadian counterpart, Transportation Safety Board (TSB) of Canada chair Kathy Fox, said the biggest risk facing the industry is "trying to identify what your next biggest risk is."

"There are still a lot of issues out there that we think are well known to the industry—unstable approaches that are contingent on landing, runway overruns, runway incursions—a lot more can be done to resolve those issues," Fox said. "It will be a challenge … your next accident is in your data. The question is how we mine that data and find those risks."

In a separate panel on threats to aircraft, ALPA unmanned aircraft systems (UAS) expert Jim Pala, described "the unbelievable growth in hobbyists of UAS" as the major safety threat to the industry.

"The internet is just littered with video of people who do not understand the risk that they're subjecting airliners to, and where they'll fly [their UAS]," Pala said. To mitigate the risk, Pala referred to FAA's registration regulation, "and unfortunately that was just overturned in court, so that will have to be corrected at the next [FAA] reauthorization bill."

Pala said FAA data on airliner sightings of UAS has tripled this year from 2016.

"There's a UAS near-midair collision form on the FAA [Near Mid Air Collision System] website, so when you are flying out there and you do see a UAS please report it because we need the data," Pala urged the audience of pilots.

**http://www.asias.faa.gov/pls/apex/f?p=100:33:0:::::**

## Lack of safety management systems found in "numerous" marine, aviation accident investigations: TSB


Fifteen years after four passengers drowned in an accident aboard an amphibious sightseeing vehicle across the Ottawa River from the nation's capital, the Transportation Safety Board of Canada warned Thursday that there has "been only limited progress" on expanding the application of safety management systems "to a broader range of companies."

In its annual report to Parliament, TSB said safety management systems have been on its watchlist since 2010. The watchlist "identifies the key safety issues that need to be addressed to make Canada's transportation system even safer," said TSB, a separate organization from Transport Canada that investigations incidents in rail, marine, pipelines and aviation.

"Numerous recent investigations have found companies that have not managed their safety risks, either because they were not required to have an SMS or because their SMS was not implemented effectively," TSB said in its annual report, released July 20.

In that report, TSB also expressed concern about runway overruns.

This past May, TSB warned in an investigation report that not all Code 4 runways in Canada have a 300-metre runway end safe area “or a means of stopping aircraft that provides an equivalent level of safety.”

That investigation was into an June 5, 2015 runway overrun in Montreal, which resulted in no injuries.

TSB recommended in 2007 that Transport Canada “require all Code 4 runways” to have a 300-metre runway end safety area “or a means of stopping aircraft that provides an equivalent level of safety.” That recommendation was made in an investigation report into the August, 2005 Air France accident at Toronto International Airport. An Airbus A340 landed about 3,800 feet beyond the threshold of a 9,000 foot runway, continued at 80 knots past the end of the runway, and came to a stop on the east side of Etobicoke Creek. The upper portion of the fuselage was consumed by fire and 12 occupants of the Air France plane were seriously injured.

“Pilots must receive timely information about runway surface conditions,” TSB said July 20, 2017 in its annual report to Parliament. “TC must require appropriate runway end safety areas (RESAs); and, Canadian airports must invest in RESAs or other engineered systems and structures to safely stop aircraft that overrun. The TSB remains concerned that without these actions, risks to the public remain.”

TSB said this past June that the *Leviathan II* whale watching vessel, which capsized Oct. 25, 2015 near Tofino, British Columbia, did not operate under a certified safety management system and was not required by law to do so.

That report was released 13 years after TSB recommended Transport Canada “take steps to ensure that small passenger vessel enterprises have a safety management system.” In 2004, TSB released a report into the sinking of the *Lady Duck*, a vehicle built using a converted Ford F-350 truck chassis. On June 23, 2002, the driver of the *Lady Duck* noticed the vessel was floating lower than normal in the Hull, Quebec marine.  Occupants were ordered to abandon ship but four passengers drowned after becoming trapped under the fabric awning.

“The picture that emerged from this investigation was one of an organization pursuing minimal compliance with regulations rather than one seeking to minimize risk through all available means,” TSB said of the *Lady Duck*.

In its report on the capsizing in 2015 of the *Leviathan II*, TSB noted that under Canadian law, passenger vessels carrying more than 12 passengers on an international voyage subject to the International Convention for the Safety of Life at Sea (SOLAS) “are required to develop a formal” safety management system.

That ruled does not apply to the *Leviathan II* which was conducting whale watching tours Oct. 25, 2015 out of Tofino and Ucluelet. After a breaking wave hit, 24 passengers and three crew members were thrown into the cold seawater without floatation aids. Six passengers died.

“If companies that operate passenger vessels do not implement risk management processes to identify and address environmental hazards in their area of operation, such as the potential formation of breaking waves, then there is a risk of a similar capsizing and loss of life,” TSB said in the report.

In a report on an aviation accident, released Aug. 17, 2016, TSB said it has “been calling” on Transport Canada “to implement regulations requiring all operators in the aviation industry to have formal safety management processes, and for TC to oversee these companies’ safety management processes.” That report arose from an accident June 10, 2013 when a King Air ran out of fuel and was forced to conduct an emergency landing in a field short of St-Mathieu-de-Beloeil, Quebec airport.

“The aircraft was extensively damaged, and the four occupants sustained minor injuries,” TSB said in 2016.

The King Air pilot determined that 500 pounds of fuel were needed to carry the flight and to land with a 30-minute reserve and although the weight-and-balance form “showed that there were 580 pounds of fuel at the time of departure” TSB estimated that in fact there were about 220 pounds of fuel.

“When risks are managed by means of a single layer of defense, such as relying on a single person to ensure flight safety, deviations from regulations or from standard practice can occur, thereby increasing the risk of incident or accident,” TSB said in the report.

The issue of SMS will remain on TSB's watch list until the federal government "implements regulations requiring all commercial operators in the air and marine industries to have formal safety management processes and effectively oversees these processes," TSB says on its watchlist page.

http://www.tsb.gc.ca/

## FAA Safety Team | Safer Skies Through Education

**Are You Mixing Meds and Flying?**
Notice Number: NOTC7278

Mixing meds with flying is a potentially deadly combination! Impairment, particularly from over-the-counter drugs, is a common factor in a number of general aviation accidents. Learn more about how medications can compromise a pilot's ability to control an aircraft in this month's fact sheet.

http://1.usa.gov/2u71VqX

## A Virtual Deicing Experience

Between wasted deicing fluid, fuel spent operating trucks and the risk of damage to both aircraft and GSE, the costs associated with deicing operations training can be extensive.

So in order to give ground service providers the experience required to safely deice airplanes without unneeded expenses, Global Ground Support has introduced a simulator designed specifically for use with virtual reality.

The commercial version of the Gen2 VR Deicing Simulator was released in December of 2016 – nine years after the company's original version was released.

The Gen2 model, which offers access to 18 different aircraft and multi-user functionality, has an updated graphic engine that allows for full virtual reality.

"Up to eight users can deice the same aircraft either as the basket operator or driver," explains Jeff Walsh, Executive Vice President for Worldwide Sales, Service and Marketing at Global. "A ninth person can supervise and evaluate everyone's performance."

The Gen2 simulator offers training for the Global Ultimate 2200 AirPlus with Enclosed Cab; Global Ultimate 2200 Open Basket; and Global ER2875 AirPlus with Enclosed Cab.

In order to make simulations as realistic as possible, several variables are provided, including FAA holdover times built in and changed based on precipitation and temperature; full fluid dynamics; and multiple wind scenarios that affect the fluid as it comes out of the nozzle.

The simulator then scores users based on their performance.

"It allows operators to train in simulated winter weather conditions, variable wind speeds/direction, time of day, etc.," Walsh says. "Most vehicle training occurs at the end of summer or early fall, which does not come close to representing the actual conditions they will deice in.

"Most operators never train on actual aircraft," he adds. "And for some, the first time they spray on an airplane, it is a live departure with passengers."

Global's simulator can be set up in less than an hour, and the company provides eight hours of training with each new simulator.

The simulator, which requires less than 3 sq. meters of floor space, includes the actual armrests and joysticks from the deicer, along with an Oculus Rift VR device, computer, 50" monitor, software and other required components.

According to Walsh, the Gen1 simulator is utilized by 77 customers while four customers currently operate the Gen 2. Customers include airlines, ground handlers, service providers and the United States Air Force.

While customers have not been charged for updates to the Gen 1 Simulator, the Gen2 Simulator requires different hardware and cannot be run on the older systems, the company says. However, Walsh believes current and future updates to the Gen2 will make investing in the new model worthwhile.

"Since we own the software, we will always be adding additional features, aircraft and, hopefully, other GSE equipment," Walsh says.

## Is This the Flight Data Recorder of the Future?


A new all-in-one style flight data recorder (FDR) is currently in development that could take on roles typically reserved for systems that exist outside of what mainstream media refers to as the bright orange "black box." *Avionics* caught up with Curtiss-Wright Defense Solutions to learn about the capabilities featured on the latest version of Fortress.When Curtiss-Wright introduced its first FDR in 1957, it used magnetic tape and was primarily used for storage of information from flight instruments and cockpit voice recording. Today, the aerospace and defense manufacturer's next generation recorder is far more advanced.

“What we’ve tried to define is something that is more than just a flight recorder and can record more data than is necessary — and then can be used for analysis of that data or lead to the analysis of that data,” Steve Leaper, FDR product manager for Curtiss-Wright told *Avionics*.

FDRs are required (by the FAA) to track 88 different parameters including information such as pilot flight control inputs, engine settings, airspeed and more. Most of the data captured by FDRs though is usually only accessed or reviewed when something extreme happens, such as an accident.

On most modern aircraft, other data acquisition technology, such as health usage monitoring systems (HUMS) and central maintenance computers are tasked with monitoring the health, performance and faults of airframe components and systems.

But Curtiss-Wright’s latest version of the Fortress, its FDR product line, is a combination of the traditional roles of the FDR and HUMS or data-acquisition technology featured on modern commercial aircraft. According to Leaper, the new Fortress, currently in development by Curtiss-Wright, can function as a traditional FDR, cockpit voice recorder, datalink recorder or airborne image recorder, or a combination of the four. It also includes capabilities that allow operators to use the data captured for predictive maintenance, similar to the way some operators use other technologies to replace airplane parts before they fail.

During a presentation of the new FDR to Avionics, Leaper noted that some of the predictive maintenance capabilities of Fortress for both fixed and rotary wing aircraft include flight exceedance monitoring, bearing monitoring and rotor faults among other detection and sensing support.

A key feature on the latest version of the Fortress is the expansion slot, and the first application Curtiss Wright has evaluated in that slot is a HUMS card, said Leaper. There’s also an internal data collection card and the capability for interfacing with cloud-based analysis tools. Curtiss-Wright is also including a remote USB interface so data from the Fortress can be directly downloaded to a laptop.

Memory has also greatly increased on the Fortress, as Leaper said the first generation solid state recorder he designed in 1994 had a memory capacity ranging between 44 to 64 megabytes, whereas the new Fortress has 64 gigabytes of solid state memory and a gigabit download port with a host web server integrated into the recorder.

In the future, FDRs will also need to meet the International Civil Aviation Organization (ICAO) amendments to Annex 6 of the Chicago Convention. Among those amendments, there is a requirement for the timely recovery of flight data, which Leaper believes could be supported through the use of satellite-based data transmission and cloud computing.

“We estimate installation is no more than 7 days, and the total weight of all the sensors we can support on the node on the bus is 13 pounds,” said Leaper.

Leaper said the Fortress will be featured on the MC-21, which is scheduled to enter service by 2019. He expects FAA and EASA certification of the new Fortress by the end of 2017. Curtiss-Wright also sees the new box as a retrofit for its existing in-service multi-purpose FDRs.

http://interactive.aviationtoday.com/avionicsmagazine/december-2016-january-2017/an-insider-look-at-how-fedex-is-digitally-managing-airplane-health/

## NASA's newly released video archives contain a skyfull of goodies

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NASA is forever linked to space, a plucky government agency bravely hurtling people and robots into the great beyond. Yet the agency has always had as much of an earth-bound mission as an outer space one. The “Aeronautics” at NASA may get short shrift, but with 300 videos of archival aviation tests released online this week, there’s plenty of airborne excitement waiting for viewers.

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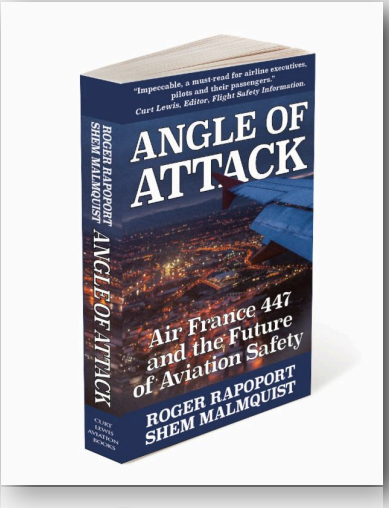


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