# Aviation Human Factors Industry News

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**Hello all,**

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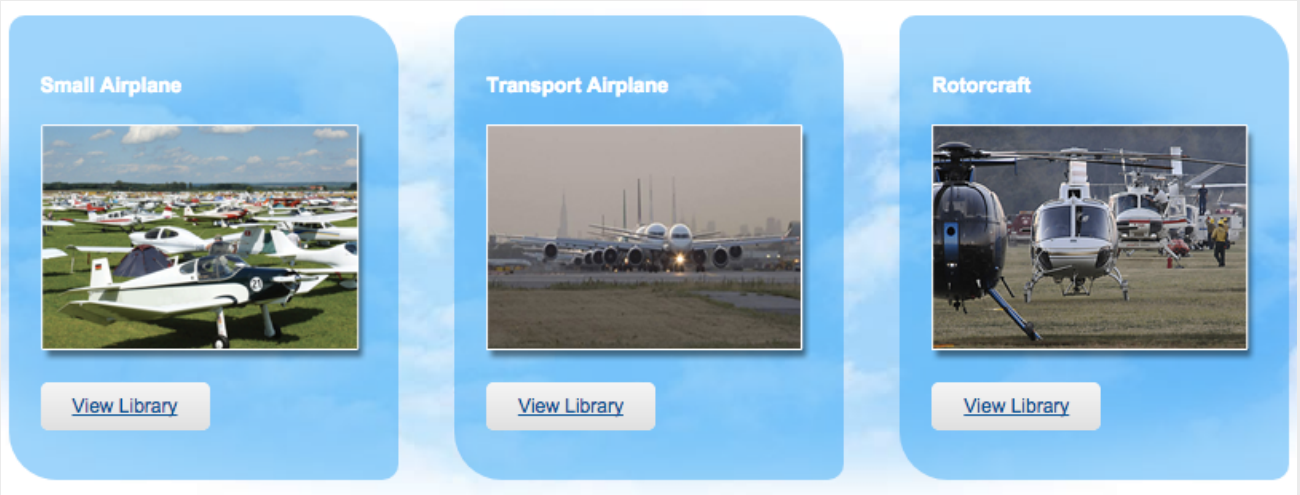
**In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:**

# New part of FAA Accident library

Lessons Learned (LL) from Aviation Accidents library subscribers- We would like to bring to your attention certain recent changes we've made to the LL from accidents material. These changes involve three general areas: (1) New material; (2) Addition of Small Airplane and Rotorcraft into the LL Library format; and (3) Revisions to certain existing LL content.




Summary of additions/changes:

New material:

1. 1967; Lake Central Airlines flt 527; Convair 580; Propeller failure; Out-of-sequence production 2. 2002; DHL flt 611 and Bashkirian Airlines flt 2937; Boeing 757 and Tupolev TU154M; Midair collision; Flight crew TCAS training consistency 3. 2010; UPS flt 6; Boeing 747; In-flight cargo fire; Li-on battery shipment 4. 2010; Qantas flt 32; Airbus A380; Uncontained engine failure; Engine manufacturing process

Library format:
Addition of Small Airplane and Rotorcraft content into library structure

Revision to existing module content:

1. 1975; Eastern Airlines flt 66; Boeing 727; Loss of control due to windshear Added video of microburst from Tuscon, Az into Overview Section 2. 1985; Delta Airlines flt 191; Lockheed L-1011; Loss of control due to windshear.

Added video of microburst from Tuscon, Az into Overview Section 2. 1994; Simmons Airlines American Eagle flt 4184; ATR-72; Loss of control due to icing
Added Supercooled Large Droplet (SLD) regulatory linkage into Resulting Safety Initiatives section

As discussed in the home pages of this new material, the Small Airplane and Rotorcraft libraries are in their early development stages, and only contain one accident module within each library. Our plans are to continue developing content into these libraries in order to capture key safety knowledge. Releases of new content will follow as soon as it becomes available.

Please do not hesitate to contact us if you have any questions or comments.

FAA Lessons Learned from Accidents team

http://lessonslearned.faa.gov/

## UPRT Skills Transferability: Effectively Addressing the #1 Killer in Aviation Today


Why would I train in an aerobatic airplane when I normally fly a corporate jet? Or a twin turboprop? These are common questions to which Upset Prevention and Recovery Training (UPRT) instructors must respond. The answers are simple. Although the ideal training environment would be in the aircraft each pilot flies on a daily basis, the safety margins are too low to test the edge of the envelope with stalls and spins in corporate jets, twin turbos or any other flying machine where the POH prohibits spins and/or exceeding critical angle of attack with unusual attitudes.

The good news is that the laws of aerodynamics are shared across every aviation platform. “Exceed the critical angle of attack and the surface will stall and lift will decrease instead of increase. This is true regardless of airplane speed or attitude or wing shape. A solid understanding of the physics of flight can be applied from one flying machine to another.

## Applying UPRT Knowledge Across All Aviation Platforms

If a pilot can gain a better understanding of the aerodynamics and physics of flight with on-aircraft UPRT, this knowledge can be applied across all aviation platforms. “The situation is analogous to initial instrument training. We routinely teach pilot candidates initial instrument proficiency in lower performance aircraft and simulators with the understanding that those instrument skills will largely transfer to other aircraft on which their specific handling and performance characteristics will be learned. The same concept applies to the transfer of skills in UPRT.

UPRT emphasizes the fundamentals of aerodynamics, energy management, mitigation of the effects of surprise and startle, and then the application of that knowledge to daily flight operations in any given platform. “A pilot who is aware of the energy and flight path is less likely to be startled and therefore, more likely to deal with the situation with controlled inputs versus reactive responses.

## Simulator Upset Training Critical for Skills Development

Most UPRT providers recommend recurrent simulator and academic training, in conjunction with on-aircraft training. Generally, on-aircraft UPRT occurs first in the sequence of training events. Once UPRT is completed in a safe, stable platform with a large operating envelope, pilots can then test their knowledge in their primary aircraft simulator. The simulator portion of upset training is critical to obtain a better feel for the required control inputs and practice required to develop muscle memory and necessary skills to recover in that cockpit.

Regardless of what aircraft you fly, a better understanding of aerodynamics, stalls and spins is paramount. Many of the worst aviation accidents over the last several decades could have been prevented with a better understanding of these concepts. The NTSB notes, “Sadly, the circumstances of each new accident are often remarkably similar to those of previous accidents.

This suggests that some pilots are not taking advantage of the lessons learned from such tragedies that could help them avoid making the same mistakes.

## Pilots Must Have a Fundamental Understanding of Flight Dynamics

Identifying a stall is easy in 1G flight at the prescribed stall speed, but with each introduced variable, the assessment grows more challenging. ICAO, Airbus, ATR, Boeing, Bombardier and Embraer came together again with Revision 3 of the Airplane Upset Prevention & Recovery Training Aid to emphasize, “Control inputs appropriate at one point in the flight envelope might not be appropriate in another part of the flight envelope. Pilots must have a fundamental understanding of flight dynamics in order to correctly determine the control input(s) necessary.

### Pilots need to:

1) fully understand the aerodynamics of unusual attitudes,
2) feel the physical attributes associated with recovery in a safe, stable training aircraft, and
3) take the time to apply their on-aircraft UPRT skills to their simulator environment to effectively transfer skills from one flying machine to another.

This added component of on-aircraft UPRT, and the ability to transfer skills from one aircraft to another, is the only way that the aviation industry will effectively address the #1 killer in aviation today.

**References:**


1 Airplane Upset Prevention and Recovery Training Aid (Rev 3, 2017). Retrieved from ICAO website on June 1, 2017: https://www.icao.int/safety/LOCI/AUPRTA/index.html

2 Brooks, R., Loss of Control in Flight – Training Foundations and Solutions, European Airline Training Symposium, 2010. Retrieved on June 1, 2017: http://understandingaf447.com/extras/Brooks-Loss_Of_Control_In_Flight_Training_Foundations_And_Solutions.pdf

3 NTSB Safety Alert (2013, revised 2015). Prevent Aerodynamic Stalls at Low Altitude. Retrieved from the National Transportation Safety Board website on June 1, 2017: https://www.ntsb.gov/safety/safety-alerts/Documents/SA_019.pdf

## FlySafe – Startle Response


Fatal general aviation accidents often result from inappropriate responses to unexpected events. Don't get caught by surprise on your next flight — check out this month's #FlySafe fact sheet on how to manage the "startle response".

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

## New: Human Factors Training for Pilots

### "Human Factors" Training for Pilots

You've probably seen the stat: Nearly 80% of GA accidents are caused by pilot error.

Most pilots know that "pilot error" is the leading cause of airplane accidents, yet few pilots do anything concrete to reduce the risk that they bring to the cockpit on every flight.

Professional pilots receive regular training on human factors and CRM, but it is sorely lacking in general aviation.

That's why we are introducing **Human Factors** training from Convergent Performance. Adapted from their highly successful and certified program for the NBAA, this online program will make you reflect on your own flying and give you ways to improve your mental "game".

Fly safely,

Mark Robidoux
PilotWorkshops

**Get The Details**

## Feith Urges Flight Attendants To Stress Safety Mission

Flight attendants must demand respect from the flight crew and get them to understand that the cabin crew are chief safety players, retired NTSB accident investigator and aviation consultant Gregory Feith told attendees at the 22nd annual NBAA Flight Attendants and Flight Technicians Conference in Long Beach, California, recently. A keynote speaker during the first day of general sessions at the conference, Feith focused his presentation on the human factors involved in flight and cabin crew coordination. He implored flight attendants to stress they are “customer safety representatives.”

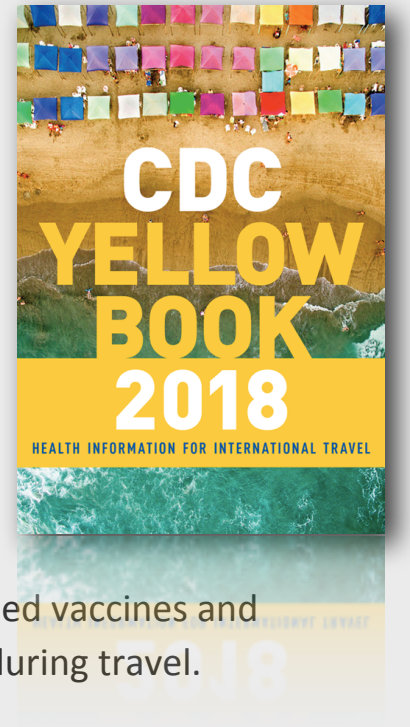
He encouraged attendees to “Run a 30-second ‘what if—then’ scenario drill in the 30 seconds before any takeoff and pick a passenger that you believe could assist you to get everyone out of the airplane. There is almost always someone who can help.”

Following Feith was Linda Talley, an expert in non-verbal communication, who reviewed the three primary non-verbal methods by which humans communicate worldwide.

“There’s eye contact, the smile and the handshake in the western world,” she explained. How long one maintains eye contact, the sincerity of one’s smile and the firmness of a handshake make lasting first impressions on passengers, clients, and in job interviews.

## Updated CDC Travel Health Book Now Available

*CDC's 2018 Yellow Book is now available for free via download or for order in hard copy.*




The Centers for Disease Control and Prevention's **2018 Yellow Book** is now available for free online and for order in hard copy. The book is a guide for healthy international travel, and the 2018 edition features revisions including important health recommendations, new sections, and improved designed.

The book is completely revised every two years. It provides information such as when to get recommended vaccines and medicines before departure and symptoms to watch during travel.

The new edition includes information about infectious diseases such as Ebola and Zika, new cholera vaccine recommendations, travel recommendations for Cuba and Myanmar, and more.

https://www.cdc.gov/media/releases/2017/p0612.html

## The New Part 147: Where Are We Now?

Lots of behind-the-scenes activity is taking place in preparation for the new part 147. The expectation is that a new rule will be issued this summer, so it's a good time to sit back, take a breath, and assess where we're at, and opportunities coming down the pike.

First, a quick recap: Title 14 Code of Federal Regulations (CFR) part 147 governs aviation maintenance technician schools that hold a Federal Aviation Administration (FAA) certificate. The regulation was originally established under the Civil Aviation Administration and re-codified into 14 CFR in 1962. Since that time, neither the regulation, nor the subject areas it dictates be taught, have significantly changed. During the same time, the design regulations mandating the standards to which a civil aviation article must be certificated and maintained have changed innumerable times. These changes have enhanced safety significantly; they also mandate more sophistication and knowledge in maintenance personnel.

Everyone agrees the rule needs revising. A 2003 Government Accountability Report (GAO) report called for updates to curriculum requirements, recognizing that certificated programs do "not fully prepare A&P mechanics to work on commonly flown, technologically advanced commercial aircraft," and that "today's modern aircraft require A&P mechanics to have a different set of skills than those being taught at aviation maintenance technician schools." An Aviation Rulemaking Advisory Committee, made up of industry and FAA representatives, issued a December 2008 report with specific recommendations to update static minimum curriculum requirements dictated in part 147.

Since then, ATEC has been at the forefront of the demand for change. In November 2015, the FAA issued a part 147 notice of proposed rulemaking. ATEC submitted extensive comments, calling for a less-prescriptive rule that would allow for competency-based programs and the freedom to cater training to industry needs. ATEC's position was supported by 14 aviation organizations, discouraging the NPRM's continued reliance on class time at the expense of technical capability. To continue the momentum, ATEC representatives held face-to-face meetings, submitted supplemental comments and garnered legislative support for a rule that would provide better trained personnel to meet industry workforce needs.

During roughly the same period of time, an FAA-industry working group undertook a massive effort to improve airframe & powerplant (A&P) mechanic certification testing. The Aviation Maintenance Technician (AMT) Airman Certification Standards (ACS) will replace current practical test standards (PTS), and clearly define minimum knowledge and skill requirements for A&P mechanics. Once completed, the ACS will provide the framework for the written, oral and practical mechanic tests; and subsequently, a guide for revising handbooks, oral questions, practical projects and the knowledge test bank. That means outdated questions and projects will be replaced with relevant assessment material, and incorrect, incomplete or inadequate questions and projects will be updated or removed.

Promulgation of the new part 147 and AMT ACS development couldn't be more perfectly timed. The new rule will utilize operations specifications in lieu of static curriculum requirements; industry's hope is that those operations specifications will simply reference the ACS, ensuring that training and testing are directly correlated. What's more, the joint FAA-industry committee will periodically review and update ACS standards to ensure it is in line with mechanic knowledge and skill requirements as technology evolves. And, under a new rule allowing for competency-based programs, AMTS can focus on ensuring a student can demonstrate required knowledge, skills and attitudes (as defined in the ACS!), instead of required training hours.

ATEC Treasurer and Embry-Riddle Aeronautical University Associate Professor and Department Chairman Chuck Horning has volunteered hundreds of hours to help usher through the new generation of regulations and standards, "We have an incredible opportunity right now that probably won't happen again. We started this initiative hoping for a rule change and never dreamed we would have the opportunity to improve the testing process. Now we have the chance to do both and have all the pieces of the puzzle fit like they should."

ATEC will continue to engage with the agency and congressional leaders to support timely promulgation and smooth implementation. The council will also ensure its member schools have the tools and resources required for a successful transition; webinars, curriculum guides, tools and resources are in development. Take advantage of all ATEC has to offer, and support the council's workforce development efforts, by ensuring your membership is current.

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# Long term exposure to aircraft noise linked to high blood pressure

- Night-time noise may be particularly influential, findings suggest

Long term exposure to aircraft noise, particularly during the night, is linked to an increased risk of developing high blood pressure and possibly heart flutter and stroke as well, suggests research.

Long term exposure to aircraft noise, particularly during the night, is linked to an increased risk of developing high blood pressure and possibly heart flutter and stroke as well, suggests research published online in Occupational & Environmental Medicine.


The research team drew on data from 420 people living near Athens International Airport in Greece, where up to 600 planes take off and land every day.

They formed one of six groups of people living near six large European airports who had taken part in the HYENA study, which assessed the potential health impacts of aircraft noise in 2004-6.

The aircraft and road traffic noise exposure levels estimated for their postal codes at that time -- less than 50 decibels to more than 60 dB -- were used for the current study in 2013.

Daytime aircraft noise was defined as that occurring between 0700 and 2300 hours, and that occurring between 2300 and 0700 hours was defined as night-time aircraft noise.

Around half of the participants (just under 49%) were exposed to more than 55 dB of daytime aircraft noise, while around one in four (just over 27%) were exposed to more than 45 dB of night-time aircraft noise. Only around one in 10 (11%) were exposed to significant road traffic noise of more than 55 dB.

Between 2004-6 and 2013, 71 people were newly diagnosed with high blood pressure and 44 were diagnosed with heart flutter (cardiac arrhythmia). A further 18 had a heart attack.

Exposure to aircraft noise, particularly at night, was associated with all cases of high blood pressure, and with new cases.

When all cases of high blood pressure were included, every additional 10 dB of night-time aircraft noise was associated with a 69% heightened risk of the condition. When only new cases were included, every additional 10 dB was associated with a more than doubling in risk.

Exposure to night-time aircraft noise was also associated with a doubling in risk of heart flutter diagnosed by a doctor, but this only reached statistical significance when all cases, not just new ones, were included in the calculations.

A heightened risk of stroke was similarly linked to increasing aircraft noise exposure, but this was not statistically significant, possibly because of the small number of cases involved, suggest the researchers.

The associations between road traffic noise and ill health were much weaker and less consistent, the findings showed.

This is one of the first long term follow-up studies of aircraft noise so it's not possible to draw conclusions about cause and effect at this stage until more evidence/studies become available, say the researchers.

They point out that they were unable to look at specific causes of death among the 78 people who died between 2004-6 and 2013. The numbers studied were also relatively small, and it wasn't possible to account for the potential effects of air pollution.

Nevertheless, a growing body of evidence links noise exposure to ill health, they emphasize.

## What's Behind the Increase in Lithium-Ion Battery Fires on Planes?

The FAA reports that, on average, one of these fires occurs every 10 days. Here's what passengers need to know.

An alarming increase in the number of smoke and fire incidents on airlines from passengers' malfunctioning lithium-ion batteries is causing concern among safety and aviation experts as summer travel season approaches."It's one of the few rising risks in aviation," says John Cox, a veteran pilot and an airline safety consultant with special expertise on lithium-ion batteries in aviation.

So far this year the Federal Aviation Administration has reported at least 18 incidents involving lithium-ion batteries on airplanes and in airports, and there were 31 incidents in 2016. That compares with 16 incidents in 2015, nine in 2014, and eight in 2013.

Cox says that any given flight might contain hundreds of Li-ion cells in phones and laptops and that many rechargeable devices involved in these fires—such as wireless headphones and especially e-cigarettes—weren't even on the market a few years ago.

Just last week a JetBlue flight from New York to San Francisco was diverted to Grand Rapids, Mich., for an emergency landing after an e-cigarette charger caught fire. Initial FAA reports said the culprit was a laptop computer, but the airline has told Consumer Reports that what actually caught fire was an Efest Soda charger for e-cigarettes.

The battery in that device is about the size of a AA battery that you might find in a remote control.

Last year, Li-ion battery safety was in the news after the Samsung Galaxy Note7 smartphone was recalled over fire hazard concerns. The FAA subsequently banned the phones from commercial aircraft.

Though the chance of any one device igniting is slim, such fires are now occurring once every 10 or 11 days on a flight somewhere in the U.S. The unique characteristics of battery fires pose serious challenges for cabin crews.

“Battery fires are particularly dangerous because they burn very hot, they can emit toxic byproducts, and they tend to flare up even after it seems like they’ve been extinguished,” says Consumer Reports chief scientific officer James H. Dickerson, a physicist and former administrator at the Department of Energy’s Center for Functional Nanomaterials at Brookhaven National Laboratory.

## What Passengers Can Do

Passengers have a large role to play in preventing these fires. The first step is to follow the FAA guidelines regarding the transport of spare batteries on flights. Spare Li-ion batteries should not be stored loose in checked luggage but instead packed in a carry-on bag. The electrical terminals should be taped or otherwise protected to keep the battery from coming into contact with any stray metal devices, which could cause a short circuit.

Though the FAA doesn’t require it, Cox recommends carrying any devices containing lithium-ion batteries in your carry-on luggage, as well. If a battery catches fire, the problem will be noticed and handled quickly.

What should you do if your battery-powered device begins heating up or even smoking while you are on board? Cox says you should notify the flight crew immediately. Then, if possible, calmly move away from the burning device and let the flight crew do its job.

The crew of the JetBlue plane put the backpack containing the burning battery in a metal bin and stored it in the plane’s lavatory until the plane could land. A statement from the airline says, “Crewmembers took actions consistent with their training to make sure the situation was contained.”

## Difficult Choices for Airlines

Though airline crews are trained to handle onboard emergencies, battery fires can be complicated, difficult, and dangerous to cope with.

A Li-ion battery contains volatile chemicals separated by a permeable membrane, explains K.M. Abraham, a professor at Northeastern University and a pioneer in Li-ion battery design. If that membrane is compromised—whether because of a defect or damage to the battery—the energy can be released in an uncontrolled manner, a condition called thermal runaway.

“The volatile gases increase the pressure in the cell,” Abraham says. “This can lead to the rupture of the battery and release of volatile organic compounds, which can catch fire when they come into contact with the oxygen in the air.”

Published FAA guidelines instruct flight crews to handle a Li-ion battery fire in stages. The first step is to use a Halon fire extinguisher to dampen the flames. Next, it’s critical to cool the battery, which can reach temperatures of 1,000° F—more than twice as hot as the highest setting on a home oven. Otherwise, the battery is likely to reignite.

The FAA says the best way to cool a runaway battery is, believe it or not, with plain old water. “After extinguishing the fire, douse the device with water or other nonalcoholic liquids to cool the device and prevent additional battery cells from reaching thermal runaway,” the FAA says in a written advisory.

But that procedure can create its own risks. “Pouring water over a device indiscriminately could pose a variety of unintended hazards, from electric shock to further spread of the toxic materials from the battery,” Dickerson says. Further, “You'd need an awful lot of water to cool down a large laptop battery this way.”

When dealing with a large device like a laptop, immersing it in a vessel full of water could be a better tactic, safety experts say. The problem, however, is that moving a burning battery can be dangerous. In addition to giving off intense heat, the battery could explode, spewing sticky red-hot chemicals that cling to the skin. “It’s a lot like napalm,” Cox says.

These dangers have prompted the FAA to recommend against using the fire-resistant pouches that some airlines—but not JetBlue—have employed to handle battery fires.

“Do not use fire resistant burn bags to isolate burning lithium-type batteries,” the FAA document says. “Transferring a burning appliance into a burn bag may be extremely hazardous. Do not move the device until you are certain the fire is extinguished and the device is cool.”

“It's a paradox,” Dickerson says. “The device is so hot that you don't want to move it, but moving it is the best way to get the danger under control.”

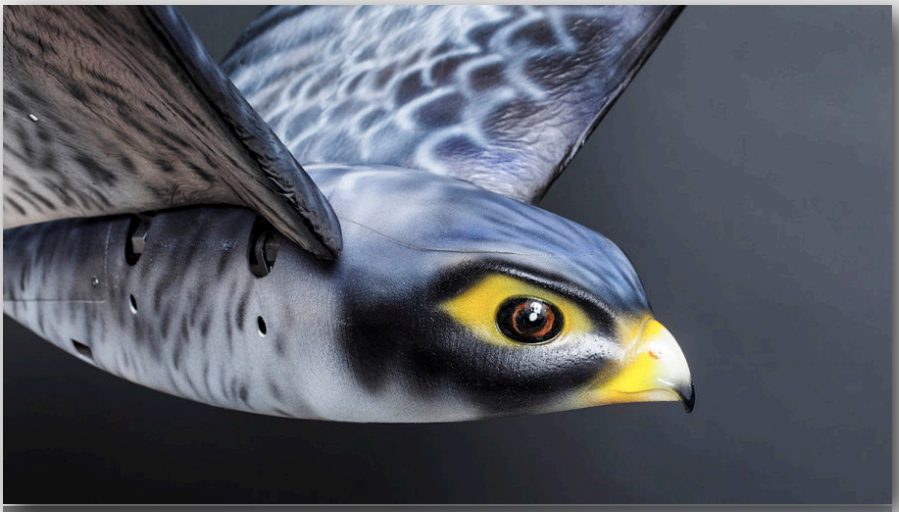
Some business jets and a few commercial ones have purchased a device called a PlaneGard to handle laptop battery fires. The device, which includes gloves and goggles, acts as a shield to protect the crew member. The laptop or other device can be scooped up and enclosed in a metal shell. That shell is then sealed inside a heavy-duty aluminum case that contains the vapor emitted by the burning battery and guards against subsequent explosions. Finally, the PlaneGard can be filled with water to cool the battery.

The issue of laptops on planes has additional currency this year because of laptop policies formulated by the Department of Homeland Security. The agency banned laptops from the cabins of airliners on U.S.-bound flights originating in some airports in the Middle East and North Africa, and has considered extending the ban to other countries.

These moves are designed to counter a potential terrorism risk, but some experts have expressed concern over a potential fire hazard if the devices are transported in plane cargo holds instead. The FAA instituted regulations controlling the transport of Li-ion batteries as commercial cargo after an onboard fire caused the fatal crash of UPS Airlines Flight 6 in 2010.

## A First for Airports: Flapping Robo-falcon to Scare Away Birds

The Robird weighs about 1.5 pounds, including the battery, and has a flying time of around 15 minutes.



Beginning this month, a flapping-winged drone will become the first UAV in the world tasked with the job of scaring off birds from runways at an international airport. The Robird, which mimics the flight of a real falcon, will patrol Canada's Edmonton International Airport daily, chasing away seagulls, Canada geese and starlings that gather in flocks and pose a hazard to planes landing and taking off."The last thing airports and airlines want are for birds to down a plane and put people in harm's way," says Jordan Cicoria, co-founder and managing director of Aerium Analytics, the Calgary-based company that will operate the Robird, as well as other drones designed to survey and map the airport landscape.

According to the Federal Aviation Administration (FAA), wildlife strikes have destroyed more than 247 aircraft and killed more than 262 people globally between 1988 and 2015. In 2015, 13,795 wildlife strikes to aircraft were reported to the FAA, with 96 percent of them caused by birds. The cost to the industry is enormous. Airlines lost $229 million in revenue and repairs in 2015 because of shattered cockpit windows, gashes in aircraft fuselages, damaged wings and disabled engines.

The most famous of these incidents occurred on Jan. 15, 2009, when US Airways Flight 1549 struck a flock of Canada geese three minutes after takeoff from New York City's LaGuardia Airport. Pilots Chesley Sullenberger and Jeffrey Skiles glided the plane into the Hudson River and all 155 passengers were rescued. The 2016 movie "Sully" starring Tom Hanks dramatized the event and brought the reality of bird strikes into the public eye.

To address the problem, airports have enlisted a range of tactics to reduce collisions. Many aircraft have lighting systems to detect birds. Airports have adopted scare tactics, such as firing off propane cannons or other noisemakers, training dogs to chase the birds away, straining fish out of local waterways or filling nearby ponds with floating balls to discourage waterfowl from lingering.

Some alter the local habitat to make the area less appealing. For example, they might crop field grass to very short lengths or use a grass seed mixed with a fungus that birds and insects find unappetizing.

Some solutions work better than others. But birds are smart, says Cicoria, and they adapt to changes and also become habituated to scare tactics that don't threaten their lives. The wildlife management team at Edmonton International Airport has tried some of these strategies, including using noisemakers, trapping and relocating birds, and enlisting a falconer to come on weekends with peregrine falcons and Harris's hawks trained to chase away birds. But with a golf course, landfill and several bodies of water nearby, gulls remain a problem. Migrating birds, like geese, also present an issue, especially during March and November when enormous flocks are moving south or north.

Enter Robird. It was conceived of 14 years ago by Nico Nijenhuis, while he was a studying applied physics and fluid dynamics at the Technical University of Twente in the Netherlands. Eventually he started up the company Clear Flight Solutions and is now its CEO. The avian UAV has been used to chase away birds from blueberry fields and landfills and to prevent them from nesting on offshore oil and gas platforms as well as on cargo containers near shipping ports, but this is the first time it will be used at an airport.

"To now officially start integrating our operations at a major Canadian airport is absolutely fantastic," Nijenhuis said in a press statement.

The Robird weighs just 700 grams (about 1.5 pounds), including the battery, and has a flying time of around 15 minutes. Like a real falcon, the Robird flaps its wings to stay aloft.

"In order to be effective, it had to look as close to a bird's natural predator as possible," said Cicoria. "Birds respond to the silhouette of whatever is flying in the air, and they respond to the flapping. By mimicking that, you make it much more effective."

According to Canadian law, two pilots must work as a team to fly the Robird — one operates the UAV using a handheld controller and the other observes the airspace and listens to the air traffic control broadcast. The drone's operational range is 2 kilometers (1.2 miles), but because of airport regulations, the Robird has to remain visible to both pilots at all times.

Each morning, the pilots will meet with the airport's wildlife management team to establish a strategy for the day. A computer program tied to the Robird by a wireless signal allows the operators to establish a boundary with a specific width and height. The so-called geofence is essentially an invisible cube meant to contain the drone in a specific area. If it flies beyond the boundary for some reason, the program automatically shuts off the controller, puts the drone on autopilot and returns it to the approved airspace.

For now, one Robird will patrol the 7,000 acres (2,833 hectares) of land that comprise Edmonton International Airport. As it does, it will chase off birds, and in doing so, begin to establish a kind of predatory range, like a real falcon, which will discourage new birds from getting too comfortable. That could reduce damage to aircraft, to people and ultimately, save birds from themselves.

See for yourself in the video:

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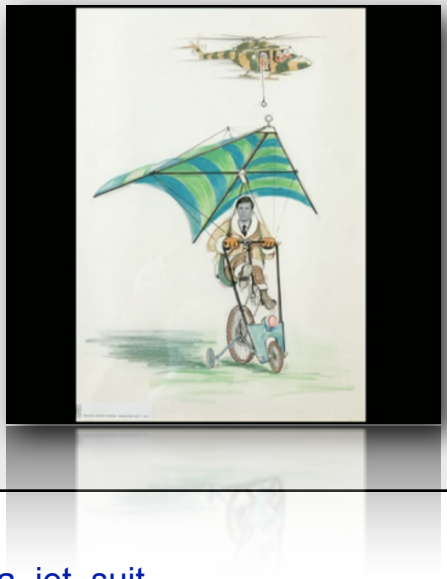
We've all dreamed of flying — but for Richard Browning, flight is an obsession. He's built an Iron Man-like suit that leans on an elegant collaboration of mind, body and technology, bringing science fiction dreams a little closer to reality. Learn more about the trial and error process behind his invention and take flight with Browning in an unforgettable demo.



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