

# Aviation Human Factors Industry News

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From the sands of Kitty Hawk, the tradition lives on.

Hello all,

To subscribe send an email to: [rhughes@humanfactorsedu.com](mailto:rhughes@humanfactorsedu.com)

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

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## NTSB Opens Asiana Crash Hearing

The National Transportation Safety Board held its first public hearing last week about the July 16, 2013, crash of Asiana Flight 214 at San Francisco International Airport, with board experts explaining their findings and [releasing an animation](#) of the accident sequence. The animation ends with a few seconds of video showing the impact, fire, and the aircraft crashing onto the runway.



Board experts are being questioned by NTSB board members about the flight crew's actions during the approach and also about Asiana's standard operating procedures. Acting NTSB Chairman Christopher Hart opened the hearing by offering condolences to families of three passengers who died in the crash and to passengers who were injured and their families. "The report also answers the basic question about the accident itself: [Why did this airplane crash while executing a visual approach on a clear day?](#)" Hart said. "It is one of the most sophisticated and automated aircraft in service. Automation has unquestionably made aviation safer and more efficient, but the more complex it becomes, the more challenging it is to be sure that pilots [adequately understand it](#). In this instance, they over-relied on systems they did not understand and flew the aircraft too low and slow, colliding with a seawall at the end of the runway. More than 15 years ago, [Professor James Reason](#) wrote that in their efforts to compensate for the unreliability of human performance, designers of these control systems have created opportunities for new error types that can be more serious than those they were seeking to avoid. Today, we will discuss many recommendations in the report that address how humans interact with automation to prevent similar accidents in the future."

NTSB staffers have prepared [30 findings](#) based on their investigation. One is that while the airport's instrument landing system glide slope was out of service during this incident, that should not have resulted in a crash. Another cites automation reliance and fatigue as factors affecting the flight crew's performance.

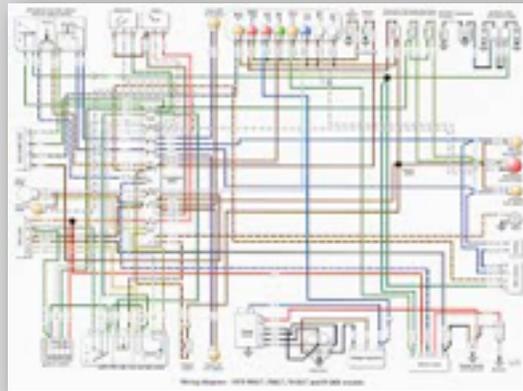
This was **the first time** the flying pilot had flown a visual approach without a glide slope, and he had an inadequate understanding of the auto throttle engagement feature on this B777 aircraft, according to the staff's presentation.

<http://www.youtube.com/watch?v=8MFPSfGoT1U&feature=youtu.be>

<http://www.nts.gov/news/events/2014/asiana214/abstract.html>

## **787 ELT Fire Caused by Improper Battery Wiring**

The UK Air Accidents Investigation Branch (AAIB) investigation into the fire on board a Boeing 787 operated by Ethiopian Airlines at London Heathrow Airport on July 12, 2013, discovered improper wiring of the lithium metal battery that powered the aircraft's Honeywell 406AFN fixed emergency locator transmitter (ELT). According to an AAIB special bulletin published last week, the investigation concluded **that the battery had been incorrectly wired to the ELT** during the manufacturing process. To date, the AAIB said, 28 of the same model ELTs have been found with the **same faulty wiring**, prompting the agency to develop five safety recommendations for the FAA. The AAIB wants the U.S. regulator to develop enhanced certification requirements for the use of lithium metal batteries in aviation. It also advocates a new requirement that electrical performance and design-abuse certification tests for lithium metal batteries are conducted while these units are installed in parent equipment (such as an ELT) to view the battery's thermal performance more safely.



Additional recommendations include testing to create the worst possible thermal-runaway cases before the units are installed anywhere and that the agency also require equipment manufacturers using lithium metal batteries to demonstrate **they can mitigate** all the hazardous effects of a thermal runaway or explosion.

The AAIB asked the FAA to investigate whether the technical standard order is the most effective means to certify batteries when their unknown characteristics can be duplicated only once they are installed inside another device.

Honeywell told the AAIB investigators that it is not aware of any previous in-service thermal events involving the ELT battery. Following a February 2013 incident in which a faulty ELT had been returned to the manufacturer with a discharged battery, Honeywell discovered wires [trapped under the cover-plate, cuts](#) in the gasket and insulation damage exposing the positive conductor. This prompted it to revise the assembly process for new ELTs but no inspections or modifications were recommended to operators of existing equipment or to the manufacturers of aircraft using the ELT.

[http://www.aaib.gov.uk/publications/special\\_bulletins/s4\\_2014\\_b787\\_8\\_et\\_aop.cfm](http://www.aaib.gov.uk/publications/special_bulletins/s4_2014_b787_8_et_aop.cfm)

[http://www.aaib.gov.uk/cms\\_resources.cfm?file=/S4-2014%20ET-AOP.pdf](http://www.aaib.gov.uk/cms_resources.cfm?file=/S4-2014%20ET-AOP.pdf)

## **Update on the crash of a Gulfstream IV jet near Boston on 31 May 2014**

Loss: Marcella Dalsey executive director of the Drew A Katz foundation.

The aircraft was equipped with both a cockpit voice recorder and a flight data recorder, both of which were recovered and are currently being analyzed by the NTSB.

**31 May 2014; Gulfstream IV; N121JM, Hanscom Field, near Boston, MA:** The aircraft was on an unscheduled flight from Hanscom Field in Bedford, MA to Atlantic City, NJ and crashed during takeoff. According to preliminary reports from the NTSB, a witness saw the aircraft attempt a takeoff, but did not see it become airborne. After departing the runway, the aircraft struck a localizer antenna (used for instrument landing approaches) and a fence before proceeding down an embankment and coming to rest about 1,850 feet beyond the end of the runway, in a gully formed by a small river.



Multiple witnesses reported hearing an explosion and seeing a fireball.

All seven occupants, including two flight crew members, a cabin crew member, and four passengers were killed. Although the authorities have not determined a cause of death, given the location of the crash site and the condition of the aircraft, it is likely that the fatal injuries were due to the effects of a combination of impact forces, smoke or fume inhalation, and burns.

Among the four passengers was Lewis Katz, a prominent entrepreneur and philanthropist who was a former owner of the New Jersey Nets and New Jersey Devils, and a current part owner of the Philadelphia Inquirer newspaper.

An AirSafe.com review of the online incident and accident databases of the NTSB and FAA show no prior accidents or serious incidents involving the accident aircraft. The aircraft was owned by SK Travel, LLC, of Raleigh, NC (a company co-owned by one of the passengers), and there were no indication of those same databases of any previous accident or serious incident involving this company.

According to Gulfstream Aerospace, 536 Gulfstream IV aircraft were produced from 1985 until 2002. The aircraft involved in the Hanscom Field accident was manufactured in 2000.

According to Aviation-Safety.net, a site run by the Flight Safety Foundation, there have been four fatal events involving the Gulfstream IV, including the recent crash at Hanscom Field, that resulted in the death of one or more people either inside or outside of the aircraft.

#### [NTSB preliminary report - 13 June 2014](#)

The NTSB preliminary report included the following key findings:

- Tire marks consistent with braking were observed to begin about 1,300 feet from the end of runway 11. The tire marks continued for about another 1,000 feet through the paved runway safety area.
- The airplane's ground roll began about 49 seconds before the end of the CVR recording.
- FDR data indicated the airplane reached a maximum speed of 165 knots during the takeoff roll, and did not lift off the runway.
- The FDR data ended about seven seconds after thrust reverser deployment, with the airplane at about 100 knots.
- [The airplane was equipped with a mechanical gust lock system](#), which can lock the ailerons and rudder in the neutral position and the elevator in the down position, to protect the control surfaces from wind gusts while parked.
- The FDR data revealed the elevator control surface position during the taxi and takeoff [was consistent with its position if the gust lock was engaged](#).

The gust lock handle was found in the forward (OFF) position, and the elevator gust lock latch was found not engaged.

- Review of FDR data parameters associated with the flight control surface positions did not reveal any movement consistent with a flight control check prior to the commencement of the takeoff roll.

[http://www.nts.gov/aviationquery/brief.aspx?ev\\_id=20140531X32035&key=1](http://www.nts.gov/aviationquery/brief.aspx?ev_id=20140531X32035&key=1)

<http://aviation-safety.net/database/types/Gulfstream-Aerospace-G-1159-Gulfstream/database>

<http://gulfstreamnews.com/news/gulfstream-celebrates-25th-anniversary-of-first-giv-flight>

[In an interview conducted shortly after the preliminary report was released, former NTSB Board Member John Goglia](#) suggested that this lack of flight control movement prior to takeoff indicated that the crew did not complete a standard preflight checklist.

## **'USA Today' GA Safety Investigation Ignites Controversy**



A USA Today story titled [“Unfit For Flight”](#) on the safety record of general aviation aircraft has painted a picture of government and industry inaction and coverup on what its author Thomas Frank calls "a massive and growing death toll from small aircraft crashes." The extensive article, which appears in the June 18 paper and online, alleges that there are ["hidden defects"](#) in general aviation aircraft and that only 15 percent of small aircraft crashes are "investigated thoroughly." Frank writes that "Wide-ranging defects have persisted for years as manufacturers covered up problems, lied to federal regulators and failed to remedy known malfunctions."

The General Aviation Manufacturers' Association was the first to react ([PDF](#)) and it did so strongly.

In a news release, GAMA President Pete Bunce called the story "[sensationalistic](#)" and said it ignores the myriad advances in GA safety that have been implemented, the declining fatal accident rate and the exhaustive certification process for aircraft. Bunce also points to the Small Airplane Revitalization Act that will streamline the addition of modern equipment and features to legacy aircraft on the recommendations of the Part 23 Aviation Rulemaking Committee.

<http://www.usatoday.com/longform/news/nation/2014/06/12/lies-coverups-mask-roots-small-aircraft-carnage-unfit-for-flight-part-1/10405323/>

[http://www.avweb.com/avwebflash/news/GAMA\\_USAToday\\_response.php](http://www.avweb.com/avwebflash/news/GAMA_USAToday_response.php)

## **Chinese airlines get tough with pilots during World Cup**

Pilots of Chinese airlines [have been warned](#) not to stay up late to watch football games during the World Cup, the Oriental Morning Post reported.

Budget carrier Spring Airlines said it had introduced special measures to avoid safety risks. Staff will [be monitored for fatigue](#) by having their blood pressure checked, an employee said, and pilots will keep tabs on one another. China Southern Airlines has taken a harder line, forbidding employees to even discuss football matches during work.



Several pilots said that the majority of Chinese airlines had released similar warnings.

With matches scheduled from midnight to 6:00am, Chinese football fans face a tough work schedule in the days ahead.

Brazilian aviation authorities threatened international and domestic carriers last month with fines of up to \$40,000 for late flights.

## The Safety Squeeze



### The AMT Perspective

A group of aviation maintenance technicians (AMT's) have been complaining about old and inadequate workstands. These complaints have been submitted for a long period of time; in fact for a few years. These complaints have been submitted both verbally to supervisors and in writing ([via the maintenance facility's SMS hazard reporting system](#)). They are valid complaints. In fact, all one needs to do is go into the maintenance hangar and look at the workstands and how they are being used. For instance, six of the 15 stands are visibly starting to fall part. A few other stands are not of sufficient height. AMT's are standing on the handrails in order to get to the required height to perform their tasks.

### The Management Perspective

Management has known about these workstand issues for almost as long as the complaints have been submitted. Yet, no action has been taken. You see, according to management, the workstands seem to be "good enough to get the job done" and an investment in new workstands will cost a substantial amount of money. Management's rationale is that, although the company has the financial resources to purchase the new workstands, there are other, more important areas to allocate company money, such as the acquisition of a new corporate office building.

### Welcome to the Safety Squeeze

This dichotomy creates what I call "[the safety squeeze](#)." I am sure many of you can relate to a situation similar to this one; an obvious and valid need for some type of new or replacement safety equipment but at the same time there is much pushback from management. One of the reasons for this dichotomy is that line personnel and management have different objectives. Line personnel are the "doers," the people that get the job done.

They are on the frontline and are intimately familiar with the tools and equipment they need and use. They are the best judges of safety.

On the other hand, you have management. Unlike line personnel, management objectives are more aligned with profitability and shareholder interests. Managers are decision makers who, among other things, enable line personnel to get the job done, through the allocation (or not) of human and financial resources. Management, however, are not on the frontline and may not be familiar with the tools, equipment, and procedures required to get the job done. In fact, management may be so distal from line operations that it would be nearly impossible for them to determine whether or not something is safe. Because of this, it can become very difficult to explain to management why an investment in safety needs to be made. Management's role, among others, is to save money and/or increase revenues. Why would management buy new workstands if the ones that have been used for years are still getting the job done?

### Epilogue

A few months ago, an AMT fell off one of those workstands while working outside on a windy day. He was standing on the handrails because he needed to attain more height in order to access the upper part of the fuselage. He suffered a broken neck and will be out of work indefinitely.

The next day, management ordered new workstands for the entire maintenance facility.

## **EASA Boss Warns Against Complacency After Fatality-Free 2013**

Despite the fact that there were no fatal accidents last year involving commercial air transport fixed-wing aircraft flown by operators based in the member states of the European Aviation Safety Agency (EASA), the authority's executive director, Patrick Ky, has warned against complacency.



“We should never overlook that maintaining safety requires vigilance as one single accident can stop or even reverse this positive trend,” he said in the foreword to the recently published 2013 EASA Annual Safety Report. “There has been only one fatal accident in the past two years, representing an improvement on the 10-year average of 2.3 fatal accidents per year between 2002-2011,” Ky pointed out.

“The 18 accidents that did occur in member states during 2013 represented a decrease of 46 percent when compared to the 33 accidents in 2012. This was also 27 percent lower than the 10-year average over the period 2002-2011 of 24.6 accidents per year.”

According to the EASA’s report, the most common type of nonfatal fixed-wing air transport accident in its jurisdiction last year was once again [loss of control](#).

Last year commercial air transport helicopters flown by EASA-based operators experienced seven accidents, three of which were fatal. The most common type of helicopter accident, as well as the most common type of helicopter fatal accident, was also caused by [loss of control](#).

<http://easa.europa.eu/newsroom-and-events/general-publications/annual-safety-review-2013>



Experimental Amateur-Built aircraft (aircraft limited to recreational, non-commercial purposes and which must have at least 51 percent of their assembly completed by an amateur builder) represent about 10 percent of the U.S. General Aviation fleet. However, according to a 2012 study by the NTSB, Experimental Amateur-Built (EAB) aircraft accounted for approximately 15% of the total and 21% of the fatal U.S. general aviation (GA) accidents.

The NTSB also noted that EAB aircraft accidents usually happen very early in the airplane’s life, [often on the first flight](#) and frequently involve engine failure or loss of power.

## Crossed Fuel Lines

The Pilot of another EAB aircraft was also performing initial flight testing when fuel starvation resulted in an off-field landing. Rather than a misjudgment of the fuel available, the culprit in this case was a fuel plumbing issue. There was no mention of selecting the other tank after the engine stopped or of correlating fuel usage with tank selection prior to the loss of power.

■ I departed on a local flight to do some air work checking engine cooling, magnetic heading calibration, autopilot operation, and VOR operation. We proceeded on course to a nearby airport at 2,500 feet MSL and then maneuvered over the airport at 3,000 feet performing standard rate turns.... We then exercised the autopilot operation for altitude hold, vertical speed control, and bank command. After several circuits over the airport, we started to return to my departure airport after approximately 45 minutes of flight time.

After listening to automated weather, I contacted Approach and proceeded inbound for landing. About 15 NM from the airport, I noted that the **fuel pressure indication was flashing** and the value read approximately 3.0 PSI (6-7 PSI is normal). The electric fuel pump was ON, but I cycled the switch in an attempt to restore fuel pressure, to no avail. The Fuel Tank Selector switch (Electric) had been set on the right tank since takeoff. The right tank contained approximately nine gallons and the left tank had five gallons.

The engine eventually stopped. I declared an emergency and looked for a field to set the airplane down. I set the mixture full rich and attempted a start but, as I recall, I did not get the prop to even turn over. At one point in the descent, the aircraft got a little slow on airspeed (~75 knots) and started to roll right (heavy wing) while a left turn was being commanded. I kept the left turn in, increased airspeed, and eventually the aircraft rolled left for the desired field. I set up to land into the wind.

I now recommend checking fuel pressure values between engine driven pump and electric fuel pump. Monitor fuel quantities to match expected consumption. Consider some sensing means and indication to determine that fuel is being withdrawn from the selected tank. The fuel tank selector valve had been replaced due to what appeared to be a leak from the original valve.

The primary concern would be that fuel lines are correctly installed on the proper ports of the selector valve. [Testing five days later confirmed that:](#) 1) The fuel valve was powered. 2) When the fuel pump was powered and the right tank (containing approx. 9 gal.) was selected, no fuel was pumped through the line to the carburetor. 3) When the fuel pump was powered and the left tank (empty) was selected, fuel was pumped through the line to the carburetor. [The fuel lines had been reversed when the new valve was installed.](#)

## **Airbus evaluating cockpit windshield films that counter laser beams**

Thin films that can be attached to aircraft cockpit windows to deflect laser beam flashes are being tested by Airbus. Innovative thin films that can be attached to cockpit windshields to protect against laser beams and other light sources [are being evaluated](#) by Airbus.

The films, a fraction of the width of human hair, are from Canada's Lamda Guard and are made of nano-structured metamaterials that interact with laser beams, deflecting beams from any angle. "At Airbus, we are always [on the lookout for new ideas](#) coming from such innovative small- and medium-enterprises as Lamda Guard," said Yann Barboux, Airbus' chief innovation officer. "We are very pleased to explore the potential application of this solution to our aircraft for the benefit of our customers."

Airbus noted a recently study by the U.S. Federal Bureau of Investigation indicated there were nearly 4,000 laser-strike incidents involving aircraft in the United States in 2014 -- a more than [1,200 percent increase](#) from 2005 levels. Directing laser beams toward aircraft during takeoff and landing may cause pilot disorientation.



## Navy: Human error led to submarine collision

The primary reason a submarine and a guided-missile cruiser collided off the coast of Florida during a 2012 training exercise was **human error and poor teamwork** by the submarine's watch team, according to a Navy investigation released on Tuesday.

The investigation details the events leading up to the collision between the Norfolk-based USS San Jacinto and the Los Angeles-class attack submarine USS Montpelier, which were participating in an anti-submarine warfare exercise in the Jacksonville, Florida, operating area as part of an aircraft carrier's pre-deployment training.

The San Jacinto was one of two ships that was supposed to protect the USS Harry S. Truman as part of the exercise, while the Montpelier was playing the role of aggressor. However, the report also noted that the San Jacinto **wasn't fully focused** on the anti-submarine warfare exercise because it was **distracted** with higher-priority carrier flight operations, among other things.

The Navy released the redacted report in response to a Freedom of Information Act request filed by news outlets more than a year ago.

The investigation also faulted the Montpelier's commanding officer, Cmdr. Thomas Winter, for failing to follow basic established periscope depth operating procedures. The depth the submarine was operating at was redacted, but the report noted that Winter ordered that it go to "emergency deep" after watch standers realized how close it was to the San Jacinto. Winter **was relieved of his duties** following the collision due to a loss of confidence in his ability to command.

The report also faulted the Navy's chain of command for **failing to properly plan the exercise**.

"The number one priority of any exercise is safety. This must be ingrained in our naval force. Regrettably, it is not," wrote Adm. Bill Gortney, commander of U.S. Fleet Forces Command, in endorsing the investigation's findings. "We must ensure the **lessons learned from this accident** are implanted into our officers and sailors. We will not repeat this failure."



No injuries occurred as a result of the collision, but ship repairs were necessary. The report said both ships suffered extensive damage. The Montpelier's rudder was dislodged as a result of the collision, but its propulsion plant was unaffected. The San Jacinto's sonar dome had extensive metal deformation, tears and flapping metal with exposed wiring.

The report estimated that repairs for both ships [could exceed \\$43 million](#).

## [Safety Culture Spreads in UK Military](#)

The success of the United Kingdom's Military Aviation Authority (MAA) is being regarded as a model for wider application of its principles across all arms of the military with the planned creation of a Defense Safety Authority. "We publish without approval – we don't let other people mark our homework," said the director general of the UK's



MAA, Air Marshal Dick Garwood. Speaking at a briefing to the Air Power Association, at the RAF Club in London, Garwood was reporting on how the MAA had developed since it was established in April 2011 in response to the Haddon-Cave Nimrod XV230 review. This review was triggered when a Royal Air Force (RAF) [Nimrod MR2 exploded](#) while on a mission over Afghanistan on Sept. 2, 2006, killing all 14 personnel on board. Among the findings of the subsequent investigation led by a senior British judge, Sir Charles Haddon-Cave, were that [aircraft safety concerns had been overlooked to cut costs](#), which had resulted in a "systemic breach of the military covenant."

Now Garwood reports directly to the Secretary of State, not the Chief of the Defense Staff or any military superior. Garwood stated that he did not believe that the MAA's work had developed an insidious safety culture and, if anything, "the pendulum has swung slightly back [after stringent safety application](#) since 2011." Now, he added, "[we enforce the rules](#), which has come as a slight shock to some." But he revealed that time between fatalities had significantly improved, averaging one fatality every five months to one every nine months although the last fatality had been nearly two years ago. Garwood said there was now [a wider culture of understanding operating risk against operational risk](#).



- Workers should avoid operating heavy machinery, driving, or handling hazardous materials if they become drowsy and notify a supervisor if they feel they aren't sufficiently alert to perform a task safely.
- Those who supervise shift workers should try to assign a variety of tasks to help workers remain alert and attentive.

Make sure the workplace is well-lit, heated or cooled to a comfortable temperature, and properly ventilated.

- Make sure the workplace is well-lit, heated or cooled to a comfortable temperature, and properly ventilated.
- Caffeine can increase alertness temporarily, but it's not a substitute for sleep. Make sure workers understand this and aren't relying solely on coffee to keep going.
- Encourage employees to eat a nutritious, balanced diet and exercise regularly. To make this easier for workers whose schedules can make healthy living difficult, employers might try providing healthy snacks and a space for employees to exercise during breaks.
- Outside of work, employees should set a sleeping schedule and adhere to it to minimize disruptions to their circadian rhythms.

## **Human Fatigue: Definition and Causes**



Everyone these days is talking about employee fatigue, driver fatigue and fatigue risk management systems. But what exactly is the [definition of "fatigue"](#)?

While engineers use the term to describe the irreversible failure of materials as a result of stresses over an extended period of time, the term is also used to describe human impairment in the workplace or on the highway.

In [The Definition of Human Fatigue](#), Dr. Martin Moore-Ede, one of the world's leading experts on human fatigue, explains the meaning of fatigue and its causes, including extended wakefulness, heavy work, excessive stimulation, illness or stress. Knowing what exactly is meant by human fatigue is critical to reversing it.

**Download the White Paper:**

## ***"The Definition of Human Fatigue"***

CIRCADIAN offers its white papers for free to shift work managers and others interested in improving the health, safety and productivity of the 24/7 workforce.

Throughout our 30 years of working with shiftwork and extended hours operations, CIRCADIAN has written many white papers in response to our clients questions and interests. If you have a question for us, please contact us.

<http://circadian.send24web.com/track/click/NTcx:29841:5876AD0A-329E-421D-8575-829ECDF64409/10190>

[For a complete list of our white papers, please click here](#)

## **Safety Sampler Workshop**

I wanted to let you know that I have scheduled a 2-day Safety Sampler Workshop in Fort Lauderdale on November 13-14, 2014.

We have a special three-tier fee structure with fees starting at only \$250.00 per person! We are currently in the "prospective (planning) mode" and looking for expressions of interest. Please visit the workshop webpage and then let me know if you would be interested in attending!



<http://www.tacgworldwide.com/safetysampler.htm>

Thanks!

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## University of Southern California Announces Maintenance Safety Courses Dates

The University of Southern California announces new and upcoming dates in 2014 and 2015 for its maintenance related [Human Factors and Safety Management](#) courses within the [Aviation Safety and Security Program](#). These specific

maintenance related courses can be used for obtaining the program's Aviation Safety and Security Certificate. These course are taught by highly experienced industry experts, with both knowledge and hand-on experience in aircraft maintenance operations.

[Human Factors in Aviation Maintenance \(HFMX\)](#) is designed to provide knowledge and understanding of human factors in the realm of aviation maintenance and hangar operations. This course deals with individual performance factors, leadership traits and performance relating to human factors, individual and leadership situational awareness, how leadership affects human performance, workplace risk identification and management, fatigue issues, deviation from normal operations, Data collection systems, and human factors and business culture, and current industry problems.



This course is 4.5 days in length and will be offered October 27-31, 2014; April 27 to May 1, 2015; and October 26-30, 2015. The course is designed for all maintenance personnel and aviation personnel, including potential supervisors.

**Safety Management for Aviation Management (MAINT)** provides supervisors and management personnel with aviation safety principles and practices needed to manage the problems associated with aircraft maintenance operations. This course discusses the problems associated with individual maintenance, line maintenance operations, business and corporate maintenance operations, repair station operations aviation, and industrial operations. Safety Management, data reporting, business cultures, flight line safety and ramp operations are discussed. The objective of the course is to familiarize managers with concepts to improve safety and efficiency.

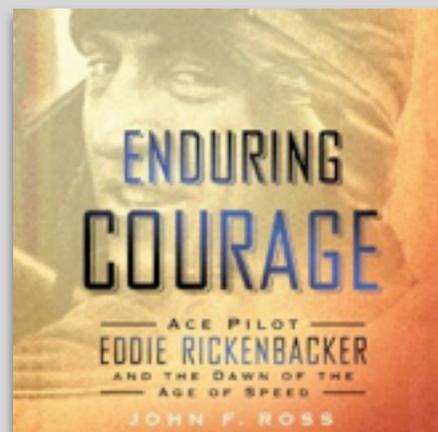
This course is 4.5 days in length and will be offered August 11-15, 2014; January 26-30, 2015; and August 10-14, 2015. The course is designed for all maintenance personnel and aviation personnel, including potential supervisors.

For further information, or to enroll, in these courses contact the University of Southern California by calling 310-342-1345, or email to: [aviation@usc.edu](mailto:aviation@usc.edu), or visit the USC website at <http://viterbi.usc.edu/aviation>

## **Enduring Courage - Book**

The sensational true story of Eddie Rickenbacker, America's greatest flying ace.

At the turn of the 20th century two new technologies - [the car and airplane](#) - took the nation's imagination by storm as they burst, like comets, into American life. The brave souls that leaped into these dangerous contraptions and pushed them to unexplored extremes became new American heroes: The race car driver and the flying ace.



No individual did more to create and intensify these raw new roles than the tall, gangly Eddie Rickenbacker, who defied death over and over with such courage and pluck that a generation of Americans came to know his face better than the president's.

The son of poor, German-speaking Swiss immigrants in Columbus, Ohio, Rickenbacker overcame the specter of his father's violent death, a debilitating handicap, and, later, accusations of being a German spy, to become the American military ace of aces in World War I and a Medal of Honor recipient. He and his high-spirited, all-too-short-lived pilot comrades, created a new kind of aviation warfare, as they pushed their machines to the edge of destruction - and often over it - without parachutes, radios, or radar.

Enduring Courage is the [electrifying story](#) of the beginning of America's love affair with speed - and how one man above all the rest showed a nation the way forward. No simple daredevil, he was an innovator on the racetrack, a skilled aerial dualist and squadron commander, and founder of Eastern Air Lines. Decades after his heroics against the Red Baron's Flying Circus, he again showed a war-weary nation what it took to survive against nearly insurmountable odds when he and seven others endured a harrowing three-week ordeal adrift without food or water in the Pacific during World War II. For the first time, Enduring Courage peels back the layers of hero to reveal the man himself. With impeccable research and a gripping narrative, John F. Ross tells the unforgettable story of a man who pushed the limits of speed, endurance, and courage and emerged as an American legend.

## Inspiration!

