

# Aviation Human Factors Industry News

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

Hello all,

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

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## WHY THE UPS CRASH IS SUCH A SHOCK

For a widebody twinjet operated by a US carrier into a US airport to crash on final approach in good weather is a statistical shock. It wouldn't have been such a surprise ten or 20 years ago, but these things 'just don't happen now', so they are disproportionately shocking when they do.



WHY?

Let's look at why it's such a surprise.

- \* North America's commercial air transport is consistently at the top of the world's safety league;
- \* UPS has high safety standards, runs a disciplined safety management system, and involves its crews in the SMS;
- \* The aircraft, an Airbus A300-600F, was only ten years old - youthful for an airplane - with relatively low flight hours and cycles for its age;
- \* The visibility was good and the cloudbase high.
- \* There was no emergency call.
- \* It was a routine scheduled flight for UPS.

On the other hand, did the crew face any disadvantages?

- \* It was just after 05:00 local time when the accident happened, which is a [natural human circadian low](#) point affecting performance (but on the other hand night flying is mostly what UPS pilots do);
- \* Runway 18 is not the main runway at Birmingham, it has no glideslope guidance on approach apart from the precision approach path indicators, and the runway has simple edge lighting.

That's about it.

If the crew had a problem they didn't tell anyone about it. Of course that could be because they were too busy dealing with it to make a call. Then the airplane got so low on the approach it hit the ground well before the runway threshold.

A few parts of the world, including the USA, are within reach of the [holy grail of zero fatal accidents in commercial aviation](#). But what does it take to get there?

When so few accidents happen, [lessons from them are important](#). Although the aviation world is gradually getting better at gathering and assembling data pointing to where operational and technical risks lie, the difference between an incident and an accident is what tipped it over the edge. We want to know what that was at Birmingham, Alabama.

## **EasyJet A320 Loses Fan Cowl After Departure**

### **Blowing out the same candle over and over!**

An EasyJet Airbus A320 that lost part of the composite fan cowl on Aug. 12 shortly after takeoff [had received routine overnight maintenance the night before](#), says the airline. An airline spokeswoman says a fan cowl over the left-hand CFM International CFM56 engine detached from the four-year-old aircraft [during takeoff](#) from Milan Malpensa Airport but the aircraft returned to the airport and landed with power from both engines.



This incident follows a more serious one on May 24 when the inboard and outboard cowl doors detached from a British Airways Airbus A319 after departing London Heathrow Airport for Oslo. That aircraft [suffered damage to fuel and hydraulic systems, the fuselage and landing gear door](#). A scheduled overnight check on this aircraft required opening the fan cowl doors on both engines to check the integrated drive generator oil levels.

EasyJet immediately launched an investigation of the incident and is working with the safety authorities.

The airline operates 214 A319 and A320 aircraft that have an average age of four years. "This is the first incident of its type EasyJet has experienced," says the airline.

All of the passengers safely disembarked the damaged aircraft and continued their journey to Lisbon on a different aircraft, later the same day.

## Possible flaw in aircraft autopilot systems could be flight risk

Flight safety experts studying recent high-profile plane crashes found [sudden autopilot disconnection](#) to be a design flaw that creates unnecessary emergencies by surprising pilots during critical, high-workload episodes.

"The sudden disengagement of autopilot is analogous to a pilot suddenly throwing up his or her hands and blurting to the copilot, '[Your Plane!](#)'" says Eric E. Geiselman, lead author of a recently published two-article *Ergonomics in Design* series, "Flight Deck Automation: Invaluable Collaborator or Insidious Enabler" (July issue) and "A Call for Context-Aware Logic to Improve" (October issue).



Eric E. Geiselman, along with coauthors Christopher M. Johnson, David R. Buck, and Timothy Patrick, have combined expertise as pilots, crew resource management instructors, and [human factors researchers](#). They studied the 2009 Colgan Air crash in Buffalo, New York, and the 2009 Air France crash off the coast of Brazil with a focus on how humans and machines can best [communicate](#) on the flight deck.

The authors recommend that autopilot systems transfer controls following the same protocols crew members use -- with acknowledgment by the receiving pilot that he or she has assumed control. FAA regulations require a visual and auditory warning to occur following autopilot shutoff, but Geiselman et al. emphasize that such warning [should occur before](#) -- not after -- autopilot is disengaged.

Geiselman et al. report on many other design-level safety issues in these articles and offer prototypes featuring solutions that can be affordably implemented with available technology. They believe better design of automation technology on planes can prevent future accidents and that more pilot training [shouldn't be the only solution](#) pursued by the industry.

## **Boeing blames 787 extinguisher defect on supplier**

Boeing said Friday that a defect in engine fire extinguishers for its new 787 jets occurred [during manufacturing](#) of the bottles at a supplier's facility and the issue was being fixed.

Boeing has told airlines to inspect the extinguishers and given them directions for fixing improperly configured fire-suppression systems. The company identified the supplier as Kidde, a division of United Technologies.



United Technologies spokesman Daniel Coulom said that an assembly error affected "a limited number" of fire-extinguisher bottles.

"The error has been corrected, and we are working with Boeing and the airlines to complete the necessary inspections, which we expect will be completed over the next few days," he said.

With the defect, the system [would engage the wrong extinguisher](#) if a fire started in one of the jet's two engines. An All Nippon Airways 787 returned to the gate Wednesday in Tokyo after a problem was noticed in the system. The airline said the plane took off after a part was replaced.

Boeing spokeswoman Kate Bergman said in a statement Friday that the 787s have redundant systems for extinguishing engine fires and that the problem "does not present an immediate safety of flight issue." She said that incorrectly configured parts weren't acceptable, and the problem "is being addressed promptly."



## NTSB cites mechanical problems for plane crash that killed Goshen educator

The National Transportation Safety Board has determined that the owner flying a plane with **known problems** and a mechanic's **failure to reattach a cable** caused the crash that killed Goshen educator Jane Unhjem a year ago.

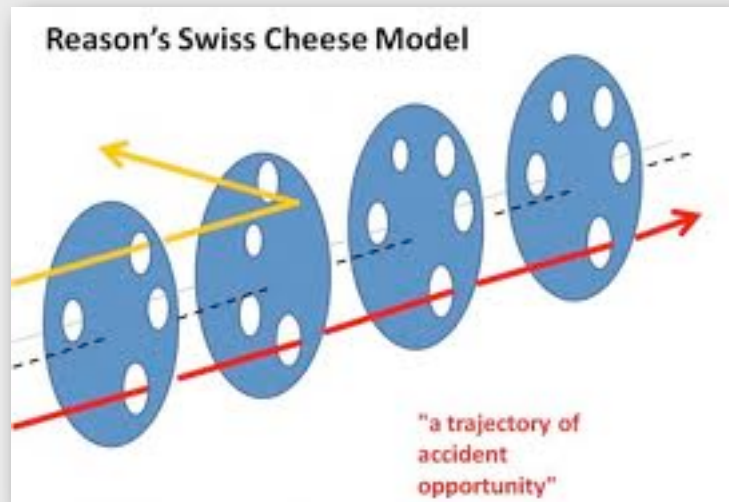
The NTSB's report says David McElroy flew the plane for potential buyers Erick and Jane Unhjem even though he knew the tachometer didn't work. The plane also had problems gaining altitude in a test flight just three days before the crash, the report said.

**Despite the problems**, McElroy told the couple that the plane had its annual inspection and was ready for sale. The report also says the mixture control cable on the single-engine Daher Socata plane was disconnected from the carburetor mixture control arm and appeared to have been detached before the flight. The mechanic, John DiLavore, had disassembled and cleaned the carburetor while working on the plane before the crash, according to a handwritten list of discrepancies of work he did that he provided to investigators.

The Unhjens came down to Brookhaven Calabro Airport on Long Island to fly the plane on Aug. 19, 2012. Witnesses said the plane seemed slow on takeoff. It climbed to tree-top height then stalled out and went down, striking a tree and a construction dumpster and bursting into flames.

McElroy and Jane Unhjem, who was an assistant Goshen school superintendent, were killed in the crash while Erik Unhjem was badly injured.

After the crash, Erik Unhjem told investigators he had wanted to see and photograph the maintenance records before taking off, but McElroy **insisted they fly first**. Unhjem said he left his camera tripod on the table next to the logbooks and they got in the plane.



Erik Unhjem, who is also certified as a pilot, performed the takeoff roll, but the acceleration seemed slow, and when the plane had trouble lifting off. he gave McElroy the controls.

Through his lawyer, DiLavore, who was at the hangar that day, told investigators that he warned McElroy not to fly the plane. He also said he didn't complete the annual inspection or try to troubleshoot the engine power issue because the tachometer didn't work.

After the crash, inspectors recovered Unhjem's camera tripod from the bed of McElroy's truck — not on the table. [The maintenance logbooks were never recovered.](#) DiLavore said he had given them to McElroy to make copies.

## **Woman stepped into rotating plane propeller at Popham Airfield**

A woman had a lucky escape from serious injury after she stepped into the path of a rotating plane propeller.

The accident took place at 11am on Saturday, May 5 this year, while the microlight airplane [was sat running idle](#) at Popham Airfield. The details appear in a report by the Air Accident Investigation Branch for the Department for Transport.



The 54-year-old pilot had refueled the Ikarus C42 FB80 microlight airplane before starting the engine and was running it at idle to allow it to warm up.

The report read: “His passenger was strapped in and the doors were closed but the passenger complained that she could not find her mobile telephone and suddenly, [against the advice of the pilot](#), opened the door, stepped out of the aircraft and into the path of the rotating

The passenger suffered a suspected dislocated shoulder, and two of the three propeller blades were damaged.

## Online Training Helps Helicopter Operators To Close The Safety Gaps

Training Port delivers a wide range of courses covering largely safety-related topics developed with business aircraft flight and ground crew in mind. These are all [available purely online](#) and can be accessed on mobile devices such as tablets.

New risk management requirements for safety management systems (SMS) and the responses to these encapsulated in the International Standards for Business Aircraft Operations (IS-BAO) have been big drivers of demand for a wide array of training for flight and ground crews. But what corporate pilot and flight department manager Scott Macpherson found when he tried to provide this for his team was that he just could not get all this training conveniently in one place. This prompted him to start [Training Port](#) to consolidate available educational resources and deliver entirely online training for operational safety and maintenance topics. The Canadian company is forever refreshing the presentation and the content of its many courses. It has just expanded the curriculum by introducing initial and recurrent courses on airborne weather radar training led by experts Erik Eliel of Radar Training International and Archie Trammel of AJT Inc.



According to Macpherson, who holds type ratings for the Dassault Falcon family of aircraft, simulator-based companies like Flight Safety International are doing a fine job providing equipment-specific aircraft training. Training Port's approach is to focus on more [human factors-based training](#) that is of value to any operator and its staff.

Macpherson sits on the board of the International Business Aviation Council (IBAC) and specifically on its committee overseeing IS-BAO. He told AIN that operators are facing multiple new challenges in ensuring that their operations are entirely attuned to the commitments made in their safety management systems and that this process has revealed gaps in business aviation's approach to training. Training Net can provide clients with a full initial assessment to identify precise training needs.



“The industry has recognized that it needs to move past inflexible training and that operators need to make a full assessment of their needs based on what their [operations] manual has committed them to,” said Macpherson. “When SMS was first discussed 15 or so years ago there really was no specific training along these lines.”

From the start, Training Port decided to deliver its training entirely via the Internet so as to be readily accessible to trainees, even when they are on the road. Lessons, which can be viewed on tablet-devices and even smart phones, are broken down into short, [15-minute sessions so as to be easily absorbed by busy staff](#). On average, trainees take about one lesson each week and each lesson ends with three to five questions so that by the end of a year they have done about 150 to 180 exam questions overall.

The company makes a lot of use of sophisticated graphics and professional voice-over instruction in its Web presentations. About 40 percent of each session involves trainees responding interactively.

The lessons are refreshed in format and content every year or so to avoid getting stale. “This approach is especially important for providing effective recurrent training,” said Macpherson.

Training Port (Stand 4012) is now placing a strong emphasis on international expansion. In May, it signed up Germany’s Aeroex as its representative in Europe and it is now exploring options to have a presence in India and China.

<http://www.trainingport.net/Home>

## **Technical Report: Aviation Maintenance Human Factors:**

Researchers at the Civil Aerospace Medical Institute (CAMI) have published a technical report titled [An Evaluation of Aviation Maintenance Fatigue Countermeasures Training](#). A major airline volunteered to help CAMI test fatigue countermeasures training adapted for maintenance employees by providing employee participants and a training facility. A three-hour classroom training program was developed, delivered, and evaluated by the research team.

Written tests and self-reports were used in the evaluation of the training to measure changes in employee knowledge, attitude, and behavior regarding fatigue and how to manage the associated risk. Questionnaires were administered up to one week before training, at the end of training, and six weeks following training. Results indicate that the training was effective in increasing employees' general fatigue knowledge. The training program also **had an immediate positive affect** on employees' awareness of the importance of and commitment to managing fatigue. **However**, employee commitment, motivation, and self-efficacy toward fatigue management declined significantly six weeks following training. At follow-up, there were increases in consistent use of a few good sleep routine habits and avoidance of the majority of sleep routine and health and fitness bad habits, **but there was no real impact on good work-life habits**. Additionally, the occurrence of good work-life habits declined. Follow-up results suggest the maintenance organization **needs to provide better support** to fatigue management in the work environment in order to realize long-term organizational benefits of fatigue countermeasures training. A computer-based version of the fatigue countermeasures training is available online (MXfatigue.com) at no cost.



This research is associated with requirement HF-12-02 – A Multi-Disciplinary Approach to Fatigue Risk Management in Maintenance. For a copy of the technical report, please visit:

[http://www.faa.gov/data\\_research/research/med\\_humanfacs/oamtechreports/2010s/media/201309.pdf](http://www.faa.gov/data_research/research/med_humanfacs/oamtechreports/2010s/media/201309.pdf)

<https://hfskyway.faa.gov/hfskyway/fatiguehome.aspx>

## **787 Repair A "Challenge"**

The 787 that was damaged in a fire at Heathrow recently can be repaired, but the exact procedure for fixing the damage **is unclear and may prove costly**, according to The Seattle Times. Although the fire blackened and damaged the composite structure, it didn't burn all the way through the skin, the Times said, but the skin will nevertheless need to be replaced, and "repairing the damaged Ethiopian

Airlines jet will clearly be a [major challenge](#) for Boeing's engineers." Depending on how big the damaged area is, it may be cheaper and easier for Boeing to replace the entire aft fuselage section, rather than install a large patch that would require extensive testing to prove its soundness to the FAA. Composites World called the effort "possibly, [one of the largest composite repair projects in aerospace history.](#)"



Repairing the damage "is not as simple as cutting away the damaged skin section and fashioning a patch," according to Composites World. "Stringers and other sub-skin structures must be assessed, replaced and tested — [all a first for Boeing.](#)" Boeing told The New York Times it was discussing the repair options with Ethiopian Airlines, the owner of the damaged aircraft, and would not discuss them publicly. "We feel comfortable that we know how to address this issue and most other structural issues as they arise," Boeing CEO W. James McNerney Jr. said.

## **Faulty Fire Extinguisher: Crossed Wires - ASRS Report**



In this ERJ-170 Maintenance Technician's report, crossed wires didn't actually cause the problem, [but they certainly contributed to it.](#) The ability to cross two electrical connections in order to attach them to the corresponding engine fire bottle cartridges disguised the fact that the cartridges were actually installed backwards.

■ While performing the Fire Bottle Job Card, referencing the Aircraft Maintenance Manual, it was discovered that the fire bottle cartridges were installed in the incorrect locations allowing the left engine fire extinguishing agent to be discharged to the right engine and the right engine fire extinguishing agent to be discharged to the left engine in the event of an engine fire. This bottle had been installed on the aircraft [in this configuration] for several years. To compound the issue, the wiring on the aircraft has [sufficient slack to allow](#) the [electrical] connectors to also be installed incorrectly [to their matching cartridges] and the Maintenance Manual Task to replace the bottles and cartridges [is not clear enough](#) to prevent incorrect assembly.

The aircraft is assembled in a manner in which cross-connection of the electrical connectors for both the “A” and “B” engine fire bottles is possible. In a worst case scenario, if both bottles are affected, neither engine would have fire protection....

[There is no labeling on fire bottles](#) “A” or “B” identifying the left or right engine squib cartridge positions. The bottles are identical, interchangeable, have the [same part numbers](#), and come new from the manufacturer or overhaul vendor with the squib cartridges and discharge nozzles already installed. Two discharge nozzle outlets are screwed into each fire bottle, they use a common thread, are interchangeable, and they can be installed on either fire bottle. There are two different part numbers. Two nozzles have coarse-threads and the other two nozzles have fine-threads that will only accept a specific squib with similar threads. There are also two different part numbers for the four squibs; two with coarse threads and two with fine threads. The electrical connectors are also keyed to a similar squib.

The wiring harnesses should be shortened, or zip-tied to prevent an electrical connector meant for bottle “A” from reaching bottle “B.” The wire harnesses are routed to the fire bottles from different directions. [The maintenance procedure should also be rewritten to emphasize the correct installation of the connectors.](#)

The aircraft involved had gone through at least one C-Check [without](#) the discrepancies being noticed.

## **FAA Team Safety Tip**

It is sad to say there have been fatalities [attributed to tools left in aircraft](#). Can you imagine the immense emotional impact - and the legal consequences - if your tool caused a loss of life? With a little common sense, attention to detail and time, you can avoid the dire consequences of leaving your tools where they might cause harm to innocent people.



This is one type of accident you can absolutely prevent —the cure is simple, and may keep you from becoming the cause of an accident. After every maintenance action, [account for every tool](#). As a matter of fact, do so before signing off the work. Put a big sign on your toolbox or add a note to the [inspection checklist](#). Included below are some simple tips that may prevent "Fly-Away Tools":

- Organize your toolbox or tool crib so you can readily identify when a tool is missing.
- Place stickers on your toolbox to remind you to inventory your tools after performing maintenance.
- Place posters throughout your hangar to remind everyone to inventory their tools after performing maintenance.
- Insert steps into your checklist to require a tool inventory prior to signing the aircraft maintenance log and returning the aircraft to service.
- Do not let the aircraft operate or depart until you do the tool check!

[Adopting some, or all](#), of these simple steps will not only prevent the loss of expensive tools, but most importantly, it could save a life.



## Transport safety videos go online

The Australian Transport Safety Bureau (ATSB) has released the first in a series of short YouTube videos highlighting areas [where more can be done](#) to improve transport safety in Australia.

The first video focuses on the recurring dangers facing general aviation pilots, particularly around low-level flying, striking power lines, fuel management and flying into bad weather. Chief Commissioner at the ATSB, Martin Dolan said the videos were part of efforts to [increase awareness of the recurrent risks](#) that needed to be managed in the aviation, maritime and rail communities.



The release follows an announcement that the Transportation Safety Board of Canada (TSB) is to conduct an independent external review of the ATSB's investigation processes and publish the results. The review, to begin with an initial visit by the TSB team this month, aims to provide an independent and objective assessment of the ATSB's investigation methodology and processes. The review team will benchmark TSB investigation methodologies with the ATSB's and compare them with international standards. It will also examine how ATSB methodologies and processes have been applied to ATSB investigations and compare them with TSB approaches.

Mr Dolan said the review was a new step in the ATSB's continuing close cooperation with other international investigation agencies and it would provide both organizations with a significant learning opportunity. "The review will identify [best practices](#) from both organizations that we can adopt to improve how we investigate accidents and occurrences and improve transport safety," Mr Dolan said.

He said it was anticipated that the TSB would produce a final report early in the northern spring of 2014.

The videos are available at this [PS News link](#).

<http://www.youtube.com/watch?v=tqd7qGToNDE>

## **What if There Was a Maintenance Fatigue Rule?**

by [Dr. Bill Johnson](#)

Knowledge of fatigue hazards can become clouded by the necessity of meeting deadlines, fulfilling delivery promises, or pocketing some extra overtime wages. While the author does not see a U.S. maintenance fatigue rule anytime soon he is always answering the question, [what would the rule look like?](#)



My first answer to the question of a maintenance fatigue rule is that “it is not on the immediate horizon.” In June 2009, the FAA chartered the Flight and Duty Time Limitations and Rest Requirements Aviation Rulemaking Committee (ARC). On Sept. 9, 2009, the ARC delivered its final report to the FAA in the form of a draft Notice of Proposed Rulemaking (NPRM). Associated with a heightened sensitivity to the effects of fatigue on pilots, on Aug. 1, 2010, the President signed Public Law (PL) 111-216, Airline Safety and Federal Aviation Administration Extension Act of 2010, which focused on improving aviation safety.

The official release of the NPRM in the Federal Registry was made on Sept. 14, 2010. Following the resolution of more than 8,000 public and industry comments, the 14 CFR Parts 117, 119, and 121 Flight crew member duty and rest requirements were published on Jan. 4, 2012 with an effective date of Jan. 4, 2014. That is pretty fast by rule making standards. That speed was triggered mostly from a very public accident that publicized the lack of adequate rest by both flight crew members (Colgan, Flight 3407 in February 2009). While the NTSB (AAR-10-01) did not attribute fatigue as a primary or contributory cause of the accident, the topic of fatigue-related hazards among flight crews was addressed in the NTSB final report.

Read the entire article:

[http://www.aviationpros.com/article/11046004/knowledge-of-fatigue-hazards-can-become-clouded-by-the-necessity-of-meeting-deadlines-fulfilling-delivery-promises-or-pocketing-some-extra-overtime-wages?utm\\_source=AMT+Weekly+Newsletter&utm\\_medium=email&utm\\_campaign=AVVDB130816003](http://www.aviationpros.com/article/11046004/knowledge-of-fatigue-hazards-can-become-clouded-by-the-necessity-of-meeting-deadlines-fulfilling-delivery-promises-or-pocketing-some-extra-overtime-wages?utm_source=AMT+Weekly+Newsletter&utm_medium=email&utm_campaign=AVVDB130816003)

## **Drive Safely Work Week 2013 Toolkits Available**

The free kits were developed by the Network of Employers for Traffic Safety.

The Network of Employers for Traffic Safety is offering a [free online toolkit](#) to help employers improve driving performance and safety awareness of employees, employees' family members, and their communities.



The 2013 Drive Safely Work Week toolkit was developed by NETS, which is a partnership of private-sector companies and the federal government. The campaign theme this year is "Gear up for safe driving: Mind, Body, Vehicle." Campaign materials illustrate [how maintenance of mind, body, and vehicle](#) are all connected and essential components to being a safe driver. The campaign was developed using the expertise of NETS member companies, representing a fleet of more than 500,000 vehicles driven more than 10 billion miles each year. "Driving is a physical task that requires mental focus," said Sandra Lee, director of Worldwide Fleet Safety for Johnson & Johnson and chairperson of NETS. "A driver's mind and body, in combination with the vehicle, work together as a system. This year's campaign outlines simple steps that anyone can take to ensure every component of that system is well cared for and that drivers are at their best behind the wheel."

In recent years, an average of 3,500 organizations have participated annually, representing 16.5 million employees per year, according to NETS.

The DSWW 2013 toolkit can be downloaded free at [www.trafficsafety.org](http://www.trafficsafety.org).

## OSTRICH PILLOW

[Power napping](#) just got easier. Pull and Ostrich Pillow over your head and you instantly find yourself in a dark, quiet personal space where it won't matter what people nearby are saying about you. An opening for your mouth and nose allows easy breathing, and the padding softens any surface you lean on. "as a bonus," hand holes have been built in too, adding extra comfort when you want to put your head down on your desk and take a [20 minutes to recharge your battery](#).



## 9 Ways to Instantly Strengthen Your Brain

New challenges and activities can strengthen your brain.

[Here are some easy tips to help you get a little smarter every day.](#) Even though the brain is an organ, rather than a muscle, you can still give your brain a workout. Just as with a muscle, repetitive tasks can dull or even damage your mental acuity, while new challenges and activities can strengthen your brain and even make you measurably smarter. [Get ready for your workout!](#)



[Exploit your weakness.](#) This first challenge will seem counterintuitive, but there's good science to support it. If you're a morning person who's most productive and alert early in the day, try tackling a creative task late at night, and vice versa for you night owls. You'll discover that this stress on your brain—asking it to work hard at a time when you usually don't—can yield surprisingly good results. It works best for creative tasks, rather than analytic tasks, and you'll be surprised at what you can accomplish when you work at what isn't your typically optimum time.

**Play memory games.** Whether it's a low-tech matching game or a high-tech solution like Lumosity, actively working to improve your memory produces measurable results. Memory really is key to not just appearing, but also being smart. Imagine if you could recall everything you've ever learned. That may never happen, but if you can train your brain to be able to recall even a small portion of the things you're currently forgetting, you'll be smarter and more efficient.

**Use mnemonics.** Mnemonics work, and they also help to stretch your brain to create and use new associations. Working on remembering the names of people you've just met, for example, can include associating their name with their profession or their interests. Andrew the architect or Louise the lawyer forces your brain to work just a bit harder and results in you not fumbling for that name when you need to make an introduction—win-win!

**Raise your eyebrows.** Trust me. While you may want to practice this tip privately rather than on the subway, you'll be pleased. You may feel silly, but as soon as you try this tip, you'll understand exactly what I mean. Raising your eyebrows opens your eyes wider, resulting in a slight adrenaline boost. You'll instantly feel brighter and more alert.

**Read books that push your boundaries.** It's okay to take small steps on this one, but reading is one of the best things you can do for your brain. Maybe you just commit to turn off the TV (which is much more passive than reading) and pick up a book—any book—once in a while. Perhaps you branch out from your usual style of book. The point is to read something that's different from your usual fare because if you broaden your reading horizons, you're getting smarter. Swap your usual sci-fi for history occasionally, or trade your fluff for a classic from time to time. The point is to get out of your reading rut.

**Try new hobbies.** Experiment with new enterprises that direct your focus and attention in a way that's new to you. Mastering a new mechanical task—anything from knitting to tennis—develops new territory in your brain. Any new challenge you undertake will create new associations and force your brain to accommodate new information and new routines.

**Eat better.** Organs require nourishment—ideally you should strive for a balanced diet, because a brain that's starving isn't growing. Even healthy, well-nourished folks can benefit from additional help from time to time, and supplements like ginkgo biloba can help improve your concentration, improve your memory and increase your attention span.

**Exercise.** Exercise improves absolutely everything. Not only will you feel better if you get regular exercise, but exercise improves circulation throughout your body, moving protein and nutrients to your brain. Strong body, strong mind!



**Get enough sleep.** Like exercise, adequate sleep improves every facet of your life. Operating with a sleep deficit can actually be dangerous, and in fact, studies have demonstrated that sleep deprivation can result in symptoms that mimic intoxication. One technique that can specifically increase your brain activity while you sleep is to eat a small snack before going to sleep—something with a little natural sugar, like a piece of fruit. That snack will keep your brain more active while your body rests up, and that active brain will be growing stronger.

Thinking of your brain as a muscle is actually a great analogy, even if it's not technically accurate. If you don't exercise a muscle, it weakens; it atrophies. If you exercise that muscle in exactly the same way over and over, day in and day out, the muscle won't atrophy, but it won't grow or develop. If you consistently use that muscle in new ways, though—if you stretch it, push it and challenge it, you'll grow that muscle and make it stronger. That's exactly the way the brain works. **Challenge your brain in new ways as often as possible**, and you'll be stronger and smarter than you were the day before.

## **Da Vinci Codex On Flight At Smithsonian**

A notebook dating back to roughly 1505, filled by Leonardo da Vinci, with his ideas and sketches regarding bird and **mechanical flight**, will be on display at the Smithsonian's National Air and Space Museum next month. The book is called the "Codex on the Flight of Birds" and it will be digitized, allowing visitors to flip its pages on monitors at the museum for the duration of its Sept. 13 to Oct. 22 stay. The

showing will mark the (more than) 500-year-old book's second appearance in America. It is recognized as one of the only books that da Vinci focused on a single subject. The book will be placed in the same exhibition space as the **Wright brothers' 1903 Flyer**, which is regarded as the first successful aircraft to incorporate principles and systems that followed through to modern planes. Air and Space Museum curator Peter Jakab told the Washington Post that da Vinci items rarely travel -- even within Europe -- making public display of the Codex in the U.S. "extraordinary." The book covers da Vinci's explorations into aerodynamics, structures and even where a pilot would need to be positioned to fly an aircraft. According to Jakab, "When you look at what the Wright brothers did, you see these concepts that da Vinci had identified in rudimentary form" more than 300 years before Orville and Wilbur were born.



## Inspiration

I have always dreamed of a special place, far from the madding crowd, surrounded by beauty beyond measure. I thought it more a symbol of an inner attitude rather than a physical reality. Then, [one day, nature showed me it could be both.](#) -

<http://www.celebratewhatsright.com/film>



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