

Aviation Human Factors Industry News

Volume XII. Issue 20, October 16, 2016



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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FAA Aviation MX Human Factors Quarterly Newsletter



William B. Johnson

About the Author: Dr. William Johnson is the FAA Chief Scientific and Technical Advisor for Human Factors in Aircraft Maintenance Systems. His comments are based on nearly 50 years of combined experience as a pilot, mechanic, airline engineering and MRO consultant, professor, and FAA scientific executive.



A Workshop on Training the Human Factors Trainer

Dr. Bill Johnson

There is a high demand for good Human Factors (HF) trainers. Every Inspection Authorization Seminar, professional meeting, and formal gathering of aviation maintenance personnel dedicates some portion of the program to the topic of human factors. The FAA has a number of Safety Team Program Managers (FPMs) who provide excellent presentations on a multitude of safety and technical topics. This article describes a recent Chief Scientist Workshop created to sharpen maintenance human factors presentation skills of FFAAST members. It also shared material and resources for those who teach or speak about maintenance human factors. At the conclusion of the article you will find out how to gain access to all of the information presented at the workshop so that you, too, can utilize these resources.

Planning to Train the Trainer Workshop

We commenced the HF Train-the Trainer (TTT) workshop with a design team that included the Chief Scientist and Technical Advisor (CSTA) program, Dr. Bill Johnson, the Human Factors Branch of the Civil Aerospace Medical Institute (CAMI), Dr. Michelle Bryant, the Department of Transportation Safety Institute (TSI), Mr. D Smith and the National FAA Safety Team (FAAST) Manager – Airworthiness, Mr. Jim Hein. Among the 4, the team had more education-related degrees, military training certificates,

Human Factors in Aviation Maintenance



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https://www.faa.gov/about/initiatives/maintenance_hf/fatigue/publications/

Fatal consequences of miscommunication between pilots and air traffic controllers

Communication failures have been blamed for more than a [thousand deaths](#) in plane crashes, warns an Australian academic who has reviewed the language pilots and air traffic controllers use.

Dominique Estival, a Western Sydney University linguist, pilot and flight instructor has urged native English speakers to adjust their communication in the aviation industry [to reduce the risk](#) of misunderstanding by non-English speaking pilots. Dr Estival said she has heard pilots in Australia saying "cleared for the big smoke" when cleared for takeoff, which was potentially dangerous in a situation where they were communicating with a non-English speaker.

So-called aviation English was adopted as the international language of pilots and air traffic controllers in 2011.

But in her new book [Aviation English](#), Dr Estival warns that some terms commonly used have been misunderstood, with fatal consequences.

Miscommunication had contributed to the deaths of more than 2000 people who have been killed in plane crashes since the mid-1970s.

Given that radio communication is the main means of communication between air traffic controllers and pilots, effective communication ["is crucial for aviation safety"](#).

"The study of aviation communication sheds light on our understanding of English, and differences between native English speakers and speakers of English as a second language in high risk situations," Dr Estival said.



"Effective communication is paramount in ensuring the success of the global aviation industry."

In her book, Dr Estival said an investigation of a runway collision between two Boeing 747s in the Canary Islands in 1977 revealed the Dutch-speaking pilot's lack of English proficiency may have contributed to the accident.

The accident, involving a Pan Am jumbo and a KLM plane, claimed the lives of 583 people — making it the deadliest accident in aviation history.

A transcript of cockpit communication leading to the 1990 crash of Avianca flight 52 in New York revealed the pilot did not declare an emergency situation when he reported being [low on fuel](#).

The plane crew reported "running out of fuel" instead of signaling an emergency situation with the words "Mayday" or "Pan Pan", another international distress signal.

"While in plain English, 'we're running out of fuel' may sound like a declaration of emergency, in the context of controller-pilot communications, where there is a [specific prescribed phraseology](#) for the declaration of an emergency, this statement would not be interpreted as such," Dr Estival said.

The statement could, and apparently was, interpreted as a mere concern and not an emergency situation. The plane crashed after running out of fuel.

Dr Estival said other examples included the incorrect use of the words "inbound" and "outbound", saying "no" instead of "negative" or "yes" instead of "affirm" and using terms for numbers such as "nina" for nine.

"Not knowing the right terminology, phraseology and using the exact words can be deadly important," she said.

Plane crashes where poor communication may have contributed to disaster:

- Tenerife Airport Disaster (1977): Dutch-speaking pilot's lack of English proficiency

- Avianca Flight 52 (1990): Did not declare an emergency when reporting it was running out of fuel.
- Linate Airport Disaster (2001): Poor radio communication
- Dan Air Flight 1008 (1990): Pilot appears to have mistaken "inbound" for "outbound" and flew in the wrong direction.
- American Airlines Flight 965 (1999): An air traffic controller's lack of English proficiency

Air Traffic Controllers And Pilots Can Now Communicate Electronically

The control tower at a major metropolitan airport can be a pretty chatty place.

Some of the chatter comes from air traffic controllers **literally and phonetically** spelling out the routes pilots need to follow to their destinations, using the foxtrot-lima-sierra-tango alphabet.

When a weather issue - say, a line of thunderstorms - pops up, routes have to be changed, often while the plane is already on the taxiway. So the controllers spell out new directions to the pilots, the pilots take them down and then carefully read back the instructions to the tower.

If To Err Is Human, Should Technology Help Us Shed Some Humanity?

If the pilot mishears the instructions - well, the process begins again.



All of this can take several minutes, delaying departures, burning fuel and emitting carbon.

But now technology is coming to the rescue. The Federal Aviation Administration's new system, called [Data Comm](#), lets traffic controllers and pilots exchange information electronically - still in the air-traffic lingo, but displaying like text messages.

One carrier already using the new system is delivery company UPS. In the cockpit of a Boeing 767, UPS pilot Capt. Gregg Kastman points to a screen near the center of the console. This is where he now receives "a lot of the messaging we used to have to receive via voice" over the radio, he says. That includes route clearance, route changes and frequency changes.

The Data Comm system "allows us to view the message, and reprogram our computers in seconds, which used to take minutes to process," he says. And that difference of a few minutes, he adds, "is tremendously important."

Imagine inclement weather moving in on a busy airport. Some 30 or 40 airplanes may be there waiting for takeoff, needing new routing instructions, Kastman says: "A couple minutes multiplied by 40 aircraft can easily lead to well over an hour in delays."

For a cargo company managing an intricate schedule of arriving and departing flights, coordinated also with ground transportation, such delays can be a major headache.

For customers, a delay may mean the shoes you ordered don't arrive in time or an important replacement part doesn't get delivered. For passengers, it could mean a missed connection.

FAA Assistant Administrator Jim Eck says passengers should notice a difference from the new technology.

Data Comm is intended "to make the whole system feel more stable and more predictable," he says, "so there isn't a lot of time spent sitting in an airplane wondering what's going on, and when am I going to get off."

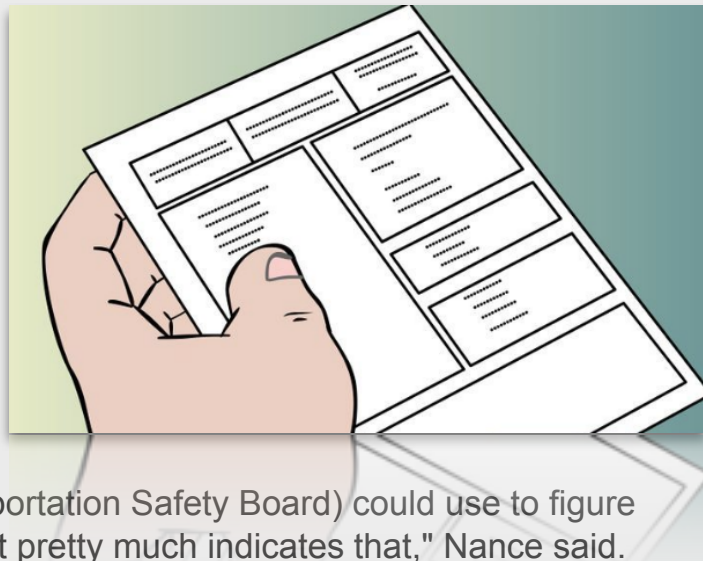
The Data Comm system - [part of the FAA's Next Gen program](#) to modernize the nation's air traffic control system - is already up and working at most of the major airports, for now with the exception of Chicago's O'Hare. The \$740 million upgrade is expected to be in service at more than 50 towers by year's end.

The FAA says all the major airlines have signed on; eight U.S. passenger and cargo airlines have added or are currently adding the system.

Aviation expert: Fire in Air 4 crash hindered investigators

When the Air 4 helicopter crashed and burst into flames in March 2014, aviation expert John Nance predicted that ferocious fire might hinder investigators.

"And a lot of other things, including the hydraulic system of the helicopter, might not be in a condition that the NTSB (National Transportation Safety Board) could use to figure what had happened. The report pretty much indicates that," Nance said. The report confirms that heavy damage caused by the fire and the lack of a flight recording device prevented investigators from discovering why the chopper lost hydraulic boost.



One theory is offered: About the way pilot Gary Pfitzner [performed pre-flight hydraulics tests](#).

While he had been trained on the most recent flight manual procedures, [the checklist inside the chopper was a previous version](#).

Tests conducted during the investigation show that if Pfitzner performed pre-flight checks according to that older checklist, those steps could have caused a noticeable ["heave"](#) with the chopper.

The report states: "He may have been startled by an uncommanded increase in collective and the accompanying heave. The pilot may have reacted manually increasing collective pitch, resulting in an unplanned takeoff."

But neither the NTSB nor Nance says this indicates pilot error or blame. "If there's anything indicated here in terms of a failure of the flight crew or pilot, it would be [that he was startled](#) by something that happened that was set up by the sequence of the checklist."

The NTSB calls it the most likely scenario, but it is clear to point out no determination could be made about the pilot's action during pre-flight checks.

Nance calls it a lack of complete clarity that may frustrate some.

"People outside the NTSB discipline don't understand because they're looking for blame. [There may be 20 different components that led to a particular accident like this.](#)"

DGCA suspends licenses of 3 aircraft maintenance engineers

The Directorate General of Civil Aviation (DGCA) has also withdrawn ["acceptance"](#) of Chief Executive Officer of a MRO operator as accountable manager, said source.

The civil aviation regulator DGCA has suspended the licenses of three aircraft maintenance engineers and taken "enforcement" action against 13 other

personnel of various air operators and maintenance, repair and overhaul facility providers for [alleged violation of safety norms](#).

Besides, the Directorate General of Civil Aviation (DGCA) has also withdrawn "acceptance" of Chief Executive Officer of a MRO operator as accountable manager, sources said on Thursday.

The alleged violations, according to DGCA investigation, included [forged signatures](#) on various documents which are supposed to be certified by the aircraft maintenance engineers before undertaking any flight, among others.

The action came after DGCA conducted random checks on some seven such companies, operating out of Mumbai's Juhu airport in May this year, and found "[gross violation of safety norms](#)" by these personnel, they said.

Of the 16 personnel, six are from Indamer Aviation Pvt Ltd (an MRO operator), three each from Kiaan Airways and Eon Aviation (air charter service providers) and one each from SpiceJet, Indigo, Air Pegasus and Airworks, they said. Earlier, as many as 270 airline crew members, [mostly pilots](#), were found violating safety norms this August this year by the DGCA, which suspended over 150 of them for such air safety violations.



FAA: Shift away from enforcement mindset enhances safety

FAA officials said the "[compliance philosophy](#)" adopted by the agency a year ago, which shifted FAA's emphasis away from punitive enforcement actions, has enabled it to aggregate and analyze key safety data voluntarily provided by airlines less concerned about being penalized.

"There's [widespread sharing of safety data](#) and that's a good thing because that data can be analyzed,"

FAA Office of the Director of Flight Standards senior technical advisor Chris MacWhorter told the US Air Cargo Industry Affairs Summit in Washington DC.

"Enforcement is a tool that we have to use, but it's only one tool that we use ... We want to make sure we have incentives in place [for airlines] to report safety information so we can aggregate

it and share it ... We're going to reserve [enforcement action] for those things that are [reckless and/or are criminal](#). Otherwise, we're going to look at the system and see what caused [a specific safety] issue."



FAA Compliance and Enforcement Division manager Angel Collaku said the agency historically had a "very simple way of looking at" airlines' compliance with regulations. "There's a regulation, there's a violation, come down with the hammer," he said, describing FAA's [old approach](#). But FAA is now looking at how "you nuance the issue of safety," he added, explaining, "We're seeking to work with the operators, recognizing that there are issues that shouldn't necessarily be dealt with by an enforcement action."

"We recognize that people [make honest mistakes](#) and we recognize that systems are never perfect," MacWhorter said. "Enforcement is still there as a deterrent, but it is reserved for things that we just can't tolerate."

In explaining the new approach when it was introduced by FAA last year, administrator Michael Huerta said the agency concluded that safety is best served when there is "an open and transparent exchange of information and data between the FAA and industry," adding, "We don't want operators who might inadvertently make a mistake to hide it because they have a fear of being punished. If there is a failing, [whether human or mechanical](#), we need to know about it, to learn from it and make the changes necessary to prevent it from happening again ... That open and transparent exchange of information requires mutual cooperation and trust, which can be challenging to achieve in the traditional, enforcement-focused regulatory model."

Huerta noted that the changed enforcement/compliance approach is connected to FAA requiring all US airlines to establish a [safety management system](#), which uses data analysis to identify safety risks, by 2018.

FedEx Corp. lead counsel-regulatory affairs Mark Hansen, also a speaker at the US Air Cargo Industry Affairs Summit, said FAA's new approach is changing the relationship between the agency and the airlines it regulates. "It involves a lot [more conversation](#) between the FAA and the regulated entity," he explained. "The inspectors are still out there, but they're learning a lot more about our business and how it operates and there is a constant dialogue going on ... Inspectors who know the business of the people they're inspecting make sounder decisions ... There is a lot more communication and that is really a good thing."

If a "mechanic puts in the wrong fastener [on an aircraft], what we're doing now is peeling back the onion and figuring out what led to the mistake," Hansen said. "Was the manual clear enough? ... You're always asking, [how did this happen and what can we do?](#)"

The "hitch" in the new approach is that carriers such as FedEx have to get used to FAA raising a safety issue, gleaned from data, even though the issue may not be tied to an existing regulation, Hansen said. FAA inspectors are now "interested in things that aren't necessarily regulatory, but things that may raise a safety issue," he explained. "It's in these gray areas that aren't really regulated where we'll have to do a bit of a kabuki dance for a while ... That relationship [between FAA and airlines] is going to have to be worked out because it's different than what we had."

In fact, MacWhorter said, the vast majority of voluntary reports from airlines since the new approach took effect last October ["are pointing to system flaws"](#) not related to adherence to a regulation. "The huge success we've had with these reporting programs is getting information that is not of a regulatory nature but of a safety nature," he explained. "From an anecdotal perspective, we've gotten positive feedback from the industry [regarding the changed approach] ... I understand that enforcement has always been a deterrent. However, everyone wants a safe system, whether it's on our side or on the industry side. What's the best way to achieve that? Do we achieve it in an adversarial manner or do we achieve it collaborating? ... We can find problems before they lead to an incident [through] a professional, collaborative atmosphere."

Naval aviation trying to fix flawed safety culture: 1-star



Aviation safety protocols are, the saying goes, [written in blood](#). That's why every time a helicopter nearly topples on deck, a cable fails to stop a landing plane, or a pilot runs low on breathing oxygen in flight, witnesses are trusted to report it.

In addition to these critical incident reports, squadrons are routinely assessed for aviation safety to prevent the next mishap.

But all too often these squadron leaders [weren't fixing safety issues](#) over the last three decades, according to the leader of the organization charged with investigating Navy and Marine Corps mishaps, who said some commanding officers [stashed the surveys](#) rather than fix the problems. The Navy only got serious about fixing this [flawed culture](#) two years ago, he said.

"It was an organization basically frozen in time for about 30 years," Rear Adm. Chris Murray said Sept. 10, referring to the state of things when he took over the Naval Safety Center in 2014. "Great at investigating things, but not doing a whole lot to prevent mishaps."

That was most apparent in the aviation community, he said, where squadrons members are anonymously surveyed on safety.

"We've been doing surveys in squadrons forever," Murray told the audience of aviators at the annual Tailhook reunion near Reno, Nevada. "Frankly, it was a great one-on-one with our guys and the squadron's CO, [but it never really got any further than that.](#)"

"If we found something that was pretty troubling, that kind of went in the CO's desk," said Murray, a career naval flight officer who has commanded a carrier air wing. "And frankly, some of our COs went, 'Yeah, my [projected rotation date] is in two or three months, so maybe I'm just going to keep that in my desk and let my [executive officer] deal with it.' "

The safety boss said the [culture has been revamped](#) so that these squadron surveys are get more scrutiny from higher ups and that officials are using more mishap data to assess the causes of mishaps. A spokeswoman for the Naval Safety Center said Murray's example was intended to show the gravity of the problem and he didn't intend to suggest this was typical.

"Rear Adm. Murray did not intend to suggest that COs shoving safety reports in their desks was ever the norm," said his spokeswoman, Margaret Menzies. "This was more of a metaphor used to gain the audience's attention and reinforce how valuable the information contained in a safety report can be -- and in fact, it should not be shoved in a desk."

Naval aviation has faced questions about whether it has been doing enough mitigate known dangers. Indeed, officials are trying to fix oxygen problems in F/A-18 Hornets that some aviators say they've been reporting for years to no avail. And a 2015 Navy Times investigation found that the NSC and Naval Air Systems Command had ignored years of reports that helicopters landing on destroyers and frigates were vulnerable to waves that could wash them overboard -- changes only came in the wake of a 2013 helicopter crash. The Navy Times report was based on [13 official hazard reports in the years before a helicopter tragedy](#); more sailors came forward after this report to say they had seen waves strike their helicopters.

"These surveys are very in-depth and provided me with a different perspective on what is going well and not so well," retired Capt. Sean Butcher, an HH-60H pilot, told Navy Times. "Sometimes the squadron leadership tells the CO what they think he wants to hear, not what he needs to hear and these surveys help ensure we are on the right track or if we need to change direction a bit. "

Butcher said he always took action to remedy any problems they brought up, adding he wasn't aware of any fellow COs who swept them under the rug.

Still, there is some debate about how widespread the survey problems were and the severity of the issues that were not reported or fixed. Making changes has largely been left up to the squadron's skipper, according to a retired Navy and Marine Corps mishap investigator.

"Yeah, it's not mandatory. [It's a CO's mirror, so to speak, on the culture and the command climate,](#)" Matt Robinson told Navy Times in a Sept. 19 phone interview. "It's up to them whether they want to address the issues if there are any or not."

Still, in most cases he saw, COs took the results and made necessary changes.

"I may have seen it a couple of times where the squadron climate was caustic, but it is very rare," he said. "The survey, from what I have seen, works -- and every single survey that I have heard about, been a part of, the CO has taken the comments to heart and has implemented change to make it better."

Making changes

The year Murray came on board was also one of the worst for naval aviation deaths in years.

The old safety survey system has been phased out, according to Murray. Now, after a visit from the safety center, the results are briefed up the chain of command to helicopter squadron commodores and air group commanders for another set of eyes.

That could complicate things, though, Butcher said.

"The survey was only briefed to the COs of the squadron because of concern that sharing potentially derogatory information about the CO and the command to the wing commodore could have a negative impact on the command," he said. "The fear that the commodore's perception of the squadron and ranking of his squadron commanders could be influenced by information from these surveys is a very real concern."

The revamped safety center has also done a deep dive into its mishap data, mining the causes of accidents in the MH-60 Seahawk and Hornet communities, the two places hardest hit. The compiled reports include unit assessments, hazard reports filed, Aviation Safety Awareness Program filings and causal factors of past mishaps, to widen the investigations beyond Class A mishaps and include data on near-misses and other identified dangers.

The so-called hazard maps shed new light on the causes of mishaps as well as any particular geographic problem for VFA squadrons.

Despite his previous assumption that most mishaps caused by human error could be blamed on pilots, due to procedural mistakes, communication errors or just lack of experience, [the data show something different](#), Murray said.

It turns out that the Navy has 160 percent more mishaps because of [maintenance errors than anything pilots do](#). They also found that in the VFA community, squadrons based at Naval Air Station Lemoore, California, are much more likely to have maintenance problems than their East Coast counterparts at NAS Oceana, Virginia.

"Anyone that's been a [commander, air group] out in Lemoore and a CO at Oceana, like I have been, can tell you that you have maintenance master chiefs waiting like cordwood to be your maintenance master chief at Oceana. That does not exist out in Lemoore," Murray said.

He attributed that to Oceana being a more favorable duty station, which can siphon off some more experienced E-9s.

That concern has been forwarded to the air boss, Vice Adm. Mike Shoemaker, in hopes of persuading more experienced Hornet maintainers to go to California, Murray said.

With two more weeks to go in fiscal year 2016, naval aviation has seen [14 mishaps this year](#), including four within three weeks this summer, all Marine Corps Hornet crashes and deaths.

Still, that's down from 19 in the previous year, and a vast improvement in the long term, Murray said.

"When I started flying in '84, naval aviation averaged 40 class A mishaps a year. Almost all totally lost airplanes," he said, adding that the numbers have been cut in half in each successive decade.

"We've gotten much, much, much more safe."

An Oregon company takes aim at the bird strikes that made 'Sully' famous

Among the Hollywood blockbusters out and about at present is the tale of Capt. Chelsey ["Sully"](#) Sullenberg.

He's, of course, the U.S. Airways pilot who managed to safely land an Airbus A320 airplane and 155 passengers and crew in the middle of the Hudson River after it [hit a flock of geese](#) that killed both engines. It's a film that hits close to home for the Bend company Precise Flight, which among other aviation technologies developed a [pulsing light system](#) designed to steer birds clear of aircraft.



"The movie certainly gave us an added opportunity to open the door to this conversation with prospective clients while bird strikes are in the mainstream consciousness," said Precise Flight CEO Doug La Placa in an email exchange.

La Placa, the former CEO of Visit Bend, also **answered a few questions** about where Precise Flight's Pulselite System came from, how it works and the difference it's made in commercial aviation.

Can you talk a little about where the idea for Pulselite System came from?

The origination was working in collaboration with general aviation to increase the conspicuity of aircraft. A big threat to aviation safety is midair collisions. Visibility is hampered by darkness, clouds, snow, low light, dust storms – it's important to be visible on the ground as well as in the air.

The general aviation and business jet segment quickly realized that not only was it beneficial to increase visibility to other pilots and ground maintenance crews, but this also contributed significantly to the reduction of bird strikes. From there we did comprehensive testing – with Qantas Airways – and found a significant and immediate reduction in bird strikes. That's where the idea for the Pulselite System as a bird strike reduction application spawned from.

Does it essentially work by alerting birds and then they steer clear? There is a big difference in bird reactions when they encounter pulsing lights versus steady or static lights. Research has confirmed that static lights create the false and dangerous impression that it's a stationary object. Pulsing lights better reflect the speed and directional movement of aircraft.

Not only do static lights not deter birds and wildlife, but a growing body of research indicates that they even attract birds and wildlife. A recent FAA advisory instructed ground operators to replace static lights with pulsing lights. This will become law in the future.

You have some research showing a vast improvement in bird strikes for those who use the Pulselite System. Are you able to directly attribute that to the system?

Yes. The FAA and ICAO reported a 32 percent decrease in Alaska Airlines' bird strikes for the three-year period after installing the Pulselite System, compared to the three-year period before.

During the same comparative three-year periods, the FAA and ICAO reported a 12 percent increase in bird strikes for all other major domestic airlines combined. Effectively, this means that Alaska's bird strikes dropped by 44 percent in relation to the domestic airlines industry average trend.

Has it been difficult to get airlines to consider adopting it? Large companies like the airlines have long sales cycles, but those that have come to understand the science and financial impacts of bird strikes versus the cost of modifying their fleets with Pulselite System, such as Alaska Airlines, Qantas Airways and regional carriers such as Horizon and Sun State, have adopted the system.

What else is the company up to these days? We have many cool new products coming out in the first and second quarters of 2017. One product we are creating will be the brightest and most durable light for aircraft ever developed. Another one will have a huge military and even sports application.

Whereas currently oxygen masks serve one person at a time, we've developed Ox Box, an oxygen box that will make it possible to serve oxygen to up to eight people at a time. We're very excited about this one.

Finding that Biological Clock Stimulates Thirst Before Sleep Could Lead to Ways to Mitigate Jet Lag

The brain's biological clock stimulates thirst in the hours before sleep. This is according to a study published in the journal *Nature* by McGill University researchers.

The finding—along with the discovery of the molecular process behind it—provides insight into how the clock regulates a physiological function. And while the research was conducted in mice, “the findings could point the way toward drugs that target receptors implicated in problems [that people experience from shift work or jet lag](#),” says the study’s senior author, Charles



Bourque, a professor in McGill’s Department of Neurology and scientist at the Brain Repair and Integrative Neuroscience Program at the Research Institute of the McGill University Health Centre, in a release. Scientists knew that rodents show a surge in water intake during the last two hours before sleep. The study by Bourque’s group revealed that this behavior is not motivated by any physiological reason, such as dehydration. So if they don’t need to drink water, why do they?

The McGill team, which included lead author and PhD student Claire Gizowski, found that restricting the access of mice to water during the surge period resulted in significant dehydration towards the end of the sleep cycle. So the increase in water intake before sleep is a [preemptive strike](#) that guards against dehydration and serves to keep the animal healthy and properly hydrated.

Then the researchers looked for the mechanism that sets this thirst response in motion. It’s well established that the brain harbors a hydration sensor with thirst neurons in that sensor organ. So they wondered if the suprachiasmatic nucleus (SCN), the brain region that regulates circadian cycles could be communicating with the thirst neurons.

The team suspected that vasopressin, a neuropeptide produced by the SCN, might play a critical role. To confirm that, they used so-called “sniffer cells” designed to fluoresce in the presence of vasopressin. When they applied these cells to rodent brain tissue and then electrically stimulated the SCN, Bourque says, “We saw a big increase in the output of the sniffer cells, indicating that vasopressin is being released in that area as a result of stimulating the clock.”

To explore if vasopressin was stimulating thirst neurons, the researchers employed optogenetics, a cutting-edge technique that uses laser light to turn neurons on or off. Using genetically engineered mice whose vasopressin neurons contain a light activated molecule, the researchers were able to show that vasopressin does, indeed, turn on thirst neurons.

“Although this study was performed in rodents, it points toward an explanation as to [why we often experience thirst and ingest liquids such as water or milk before bedtime](#),” Bourque says. “More importantly, this advance in our understanding of how the clock executes a circadian rhythm has applications in situations such as [jet lag and shift work](#). All our organs follow a circadian rhythm, which helps optimize how they function. Shift work forces people out of their natural rhythms, which can have repercussions on health. Knowing how the clock works gives us more potential to actually do something about it.”

<http://www.nature.com/nature/journal/v537/n7622/full/nature19756.html>

Chopper crash survivor helps others heal



<http://www.cnn.com/videos/health/2012/09/05/hf-gupta-laura-sharpe.cnn>