

# Aviation Human Factors Industry News

*Volume XV. Issue 03, January 27, 2019*



*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)

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Quarterly, December Issue

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Airman




## FAA Aviation MX Human Factors Quarterly, December Issue




**December 2018**  
**Vol 6, Issue 5**

# FAA Aviation Mx

## HUMAN FACTORS Quarterly



**Dr. Bill Johnson**, a frequent contributor to this newsletter, 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, a professor, and an FAA scientific executive.



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[https://www.faa.gov/about/initiatives/maintenance\\_hf/fatigue/publications/](https://www.faa.gov/about/initiatives/maintenance_hf/fatigue/publications/)

## Retirement - Enough Already!



### **Gene Benson Is returning with Vectors of Safety!**

In December 2016, I announced my retirement from my Safety Initiative. I did my best at trying to be retired for two years, but I found that I just have too much passion for all things aviation and especially for aviation safety. If you are no longer interested, you may easily unsubscribe at the bottom of this email.

So here we go again. I am starting slowly and I plan to scale it back a bit from the 50+ hours a week I devoted to it the last time around. But I want to try some innovative approaches to delivering the safety message and I have some exciting ideas. Multimedia and micro-learning courses seem to be promising, so I am exploring those avenues.

I have put up a basic website which will be the main portal for information. Like before, it can be found at [GeneBenson.com](http://GeneBenson.com). I have a blog on the site and I will try to make timely updates.

I have produced two relatively brief e-books that are available on Amazon. However, they are reprints of articles I have written over the years, so if you have followed my work for the last ten years you have probably already read them. If not, they are ["Thoughts on Being a Better, Safer Pilot - Vol. 1"](#) and ["Thoughts on Being a Better, Safer Pilot - Vol. 2"](#).

But I am really excited to announce that my full-length book will be out soon, probably within the next two months. This will be available as both an e-book and also as a paperback. But the e-book edition will feature multimedia content and will include embedded video. It has been an exciting project and I am anxious to release it.

I particularly enjoy presenting at live, on-site events and I am presently booking events for the upcoming summer and fall. If you are planning an event and would like a speaker, please contact me.

Like before, you can always email me at [gene@genebenson.com](mailto:gene@genebenson.com) with any thoughts, questions, or requests.

[https://genebenson.us7.list-manage.com/track/click?  
u=8535e3f62b4c8409c09ccccbb&id=4afa1469e5&e=163c0f8721](https://genebenson.us7.list-manage.com/track/click?u=8535e3f62b4c8409c09ccccbb&id=4afa1469e5&e=163c0f8721)

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u=8535e3f62b4c8409c09ccccbb&id=5cda3bb96d&e=163c0f8721](https://genebenson.us7.list-manage.com/track/click?u=8535e3f62b4c8409c09ccccbb&id=5cda3bb96d&e=163c0f8721)

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u=8535e3f62b4c8409c09ccccbb&id=9441e18b75&e=163c0f8721](https://genebenson.us7.list-manage.com/track/click?u=8535e3f62b4c8409c09ccccbb&id=9441e18b75&e=163c0f8721)

## **When it all Goes Sideways**

Having reached their 43,000-foot cruise altitude, the crew of a corporate Citation XLS had their world almost literally turned upside down. Like a rogue wave far out at sea, [clear air turbulence](#) can come from nowhere, and a routine flight can instantly become a heart-stopping roller coaster ride. Like many before them, this crew battled not only a gut-wrenching upset and aerodynamic stall, but even more significantly, they experienced the paralyzing effects of shock.



In this episode, we'll hear from one of the pilots, as well as experts in the field of upset recovery training. We'll also learn how [proper conditioning](#) can enable pilots to react quickly and calmly when confronted with a "one in a million" event.

## [LISTEN TO THE EPISODE](#)

### [Improper maintenance leads to forced landing](#)

The commercial pilot stated that he had experienced engine roughness during previous flights in the Kitfox 7.

Maintenance personnel determined that the airplane was not receiving adequate fuel at full power, even with both electric fuel pumps operating. As a result, they installed check valves in the fuel system and replaced the fuel pressure regulator.



On the day of the accident, the engine experienced a total loss of power after both fuel pumps were turned off during a pre-takeoff engine run-up.

The pilot and mechanic then performed another run-up check, during which the engine operated normally.

The pilot subsequently departed and entered the traffic pattern at the airport in Cody, Wyoming. While on the downwind leg, with both fuel pumps operating, he reduced engine power and the engine experienced a total loss of power.

He performed a forced landing to a field, during which the nose landing gear collapsed.

Post-accident examination of the engine revealed that the [fuel pressure and airbox pressure differential was not within the engine manufacturer's limits](#). The fuel pressure regulator was adjusted within those limits, and the engine was subsequently test run with no anomalies.

**Probable cause:** Improper maintenance of the fuel pressure regulator, which resulted in an excessive fuel and airbox pressure differential and subsequent loss of engine power.

NTSB Identification: [CEN17LA065](#)

This December 2016 accident report is provided by the [National Transportation Safety Board](#). Published as an educational tool, it is intended to help pilots learn from the misfortunes of others.

## **REPORT ON FATAL FLIGHT TRAINING ACCIDENTS RELEASED**

### **AOPA AIR SAFETY INSTITUTE STUDY ANALYZES 16 YEARS**

The AOPA Air Safety Institute and the Liberty University School of Aeronautics has released its [Fatal Flight Training Accident Report 2000-2015](#)—a comprehensive 16-year study on accidents during flight training.

The report categorizes [fatal flight training accidents](#) according to the Commercial Aviation Safety Team and International Civil Aviation Organization Common Taxonomy Team and calculates the accident rate using FAA survey data.



# Fatal Flight Training ACCIDENT REPORT 2000–2015

The analysis of 240 fatal instructional accidents in piston-engine airplanes from the year 2000 through 2015 concludes that the greatest risks in flight training are [loss of control during flight](#) (54 percent) and [midair collisions](#) (10 percent).

However, the overall accident rate has decreased 35 percent from 2000 through 2015, and along with general aviation overall, [flight training is gradually becoming safer](#). “The study sheds light on fatal flight training accident causes. But it also confirms a reduction in accidents over a 16-year time period,” said AOPA Air Safety Institute Executive Director Richard McSpadden. “The best way we can continue that positive trend and decrease these types of accidents, and all accidents, [is through](#) training, implementation of new technology, and continued education.”

McSpadden also elaborated on the partnership between the Air Safety Institute and Liberty University, explaining that, “The collaborative effort between ASI and Liberty University not only provides an opportunity to share this information with a broader audience, but also gives the flight training industry an all-encompassing report in order [to raise awareness and improve safety](#) throughout the industry.”

General aviation continues to get safer, and McSpadden noted that we must also “acknowledge the tremendous accomplishments of the flight training industry in reducing the fatal accident rate below the overall GA rate.”

<https://www.aopa.org/-/media/files/aopa/home/pilot-resources/safety-and-proficiency/accident-analysis/FatalFlightTrainingReport20002015.pdf>

## **EASA Proposal Aims to Enhance Runway Safety**

A notice of proposed rulemaking (NPA) from the European Aviation Safety Agency aims to mitigate risks associated with runway safety, **focusing mainly** on preventing runway incursions and excursions, and on assessing and reporting runway surface conditions. The NPA also addresses ground collisions, runway confusion, foreign object damage and related occurrences as well as runway pavement maintenance.



In particular, the proposed rule changes the framework for the operation and conformance of vehicles and their drivers in aircraft movement areas. Linked to this is **a new requirement on communications** and a proposal for controlling pedestrians at airports.

New requirements would also be introduced for assessing and reporting runway surface conditions, snow control plans, airport maintenance, aircraft towing, and performance standards for runway surface-friction measurement devices. This latter requirement also provides for alignment with ICAO recommendations as regards runway surface condition assessment and reporting which will be applicable worldwide by November 2020. Comments on the NPA are due March 18, 2019.

At the same time, this NPA was published, EASA released a related NPA, also with a comment deadline of March 18. This proposal revises rules to improve firefighting and rescue operations at airports.

<https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2018-14>

<http://tps://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2018-15>



## E-Cigarette Battery Causes Baggage Hold Fire

Canada's Transportation Safety Board has determined that a small lithium ion battery used to power an e-cigarette caused a baggage compartment fire that resulted in a Mayday and subsequent emergency landing in Calgary last summer. The WestJet Boeing 737-700 with 58 people on board had just taken off for Vancouver on June 14 and was climbing through 9,000 feet when a cargo hold fire light came on. The crew hit the fire extinguisher and headed back to Calgary where the plane was met by fire trucks. By then, the fire was out but the potential was obvious.



The batteries were in an outside pocket of a backpack and the bag was loaded with that side down against the fire-resistant liner of the baggage compartment. The TSB determined one of the batteries had a thermal runaway. The subsequent fire consumed much of the outside of the bag and scorched the liner but did not spread to any other bags. WestJet policy is that all e-cigarettes and their batteries have to travel in the cabin and the battery terminals have to be protected. The bag's owner said he knew the policy but forgot he had two spare batteries and their charger in the backpack. The bag was screened but the batteries weren't spotted.

<http://www.bst-tsb.gc.ca/eng/rapports-reports/aviation/2018/a18w0081/a18w0081.asp>

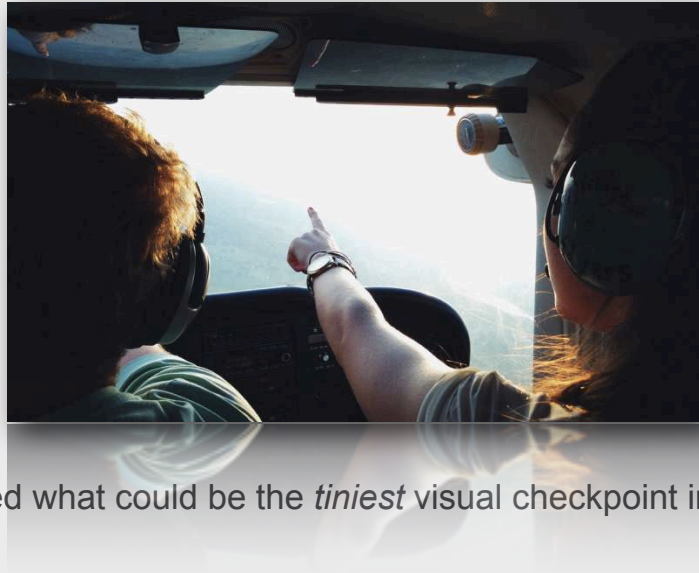
## 6 Most Common Private Pilot Checkride Failures

Checkrides can be intimidating, especially your first one. But knowing the common problem areas helps you prepare and pass.

### 6) Navigation

You're nervous. You're fumbling with your sectional chart or iPad in the cockpit. And you picked what could be the *tiniest* visual checkpoint in the state.

Try to avoid hard-to-see checkpoints like power lines, antennas, and ponds. Stick to the big stuff: larger cities, rivers and major highways. You'll save yourself from heart palpitations on your flight.



### 5) Stalls

The two major problems with stalls: not letting the stall fully develop, and uncoordinated recovery. Make sure you allow the airplane to fully stall, and always 'step on the ball' to stay coordinated throughout the maneuver.

### 4) Landings

Good judgement is a key to being a good pilot, and that couldn't be more true on landings. Make sure you're on speed throughout the pattern, and if things aren't looking and feeling right, *go around*. You'll be hard-pressed to find an examiner who fails a pilot for executing a **go-around** when the landing just isn't working out.

### 3) Emergency Landing

Three words: **fly the airplane**. Too often pilots get distracted with checklists and what's happening inside the airplane. Find a safe spot to land. Run your checklist. But always keep flying the airplane.

## 2) Airspace

Airspace is complex. There are different VFR weather minimums, equipment requirements, communication requirements, and all kinds of different markings on your map. And you need to know all of them. Rote memorization won't do - make sure you dig into all the 'what if' scenarios, so you're prepared for checkride day. (Fortunately, we have just the thing to help you prepare!)

## 1) Weather

Let's face it. Nobody really enjoys reading coded weather reports and forecasts. METARs aren't necessarily that bad, but when you start digging into TAFS, Area Forecasts, Winds Aloft forecasts, AIRMETs, and everything else, there's a lot to know. And, your examiner is going to have you read the coded version of the weather reports, so english-translated versions just won't do. So how should you prepare? Make sure you have a good understanding of all the weather reports and forecasts, and how to read them in their coded formats. Need some help with that? We have just what you need.

<http://www.boldmethod.com/learn-to-fly/maneuvers/how-to-safely-manage-a-go-around/>

<http://www.boldmethod.com/shopping/package/private-pilot/pkg-pp-nas/>

<http://www.boldmethod.com/shopping/package/private-pilot/pkg-pp-awtxt/>

## New book honors Tuskegee Airman

Just published is “Lost in Heaven,” the story of World War II Tuskegee Airman 1st Lt. James Polkinghorne by Embry-Riddle Aeronautical University aviation history expert Dr. Leo F. Murphy.

The book recounts Polkinghorne’s journey from his days as a bellhop at a Pensacola, Florida, hotel, to his service taking enemy fire over the skies of Italy.

Murphy, an Embry-Riddle professor of aeronautical science and a 30-year U.S. Navy veteran, calls the book his “passion project.” Working on it over the course of years, he looked to hundreds of magazine clippings, personal diaries and books, as well as to the airman’s sister, Maggie Polkinhorne, to unearth details.

“Very little was known about Polkinghorne’s career, and what little had been published was often filled with errors,” Murphy said. “This inspired me to find out as much as possible about Polkinghorne and to research the history of early black aviation and the Tuskegee Airmen so that I could properly position Polkinghorne’s service within this much broader historical narrative.”

In addition to Polkinghorne’s story, Lost in Heaven also chronicles the achievements of early black aviation pioneers, the history of the Tuskegee Airmen, and the struggles the Tuskegee Institute faced in establishing its aeronautical program.



“I knew very little about early black aviation or the Tuskegee Airmen, so all of my research on this topic was a revelation,” Murphy said. “Despite institutionalized racism, some passionate African-Americans refused to be denied the opportunity to enjoy the splendors of flight and, each in their own unconquerable manner, [found a way to fly.](#)”

Murphy, who was recently named a Fellow of the Royal Aeronautical Society, lectures on a variety of aviation history topics, including most recently the enduring mystery of Amelia Earhart’s final flight. He has written three other books: “Flying Machines Over Pensacola: An Early Aviation History from 1909 to 1929,” “Hagler Field: A History of Pensacola’s Airport,” and “From Cropduster to Airline Captain, the Biography of Captain Leroy H. Brown.”

The book is available for \$19.95 from [Blue Water Press.](#)

## **Loss of control while landing fatal for Cirrus pilot**

The pilot was maneuvering in the traffic pattern at the airport in San Antonio, Texas, at the time of the accident.

He entered a continuous right turn from downwind toward the final approach course when [he abruptly lost control](#) of the Cirrus SR22.A witness stated the airplane’s wings were “totally vertical” before it nosed over and descended toward the ground in a wooded area about 1/2 mile southeast from the landing runway threshold.



The pilot died in the crash.

A second witness also reported that the wings were nearly vertical before it descended below the tree line. He added that the engine sounded “fine.”

An NTSB performance study revealed that after the airplane entered the airport traffic pattern, it began a continuous right turn from downwind toward the final approach course suggesting that the pilot did not fly a traditional rectangular traffic pattern, but instead flew a circling base to final pattern.

The airplane approached the extended runway centerline in a 48° right bank, at 103 kts and about 220’ agl.

Lateral accelerations began to increase shortly before the accident and varied between 0.37g and 0.62g for the final portion of the flight. The lateral accelerations were consistent with sideslip angles of 15° to 20° during the final turn. The calculated angle-of-attack (AOA) of the wing subsequently exceeded the critical AOA and the airplane entered a descent which ultimately reached 1,800 fpm.

Although the pilot’s control inputs were not directly recorded, the large lateral accelerations are consistent with [left rudder input and an uncoordinated flight condition](#) for the airplane.

The Pilot’s Operating Handbook noted that extreme care must be taken to avoid uncoordinated or accelerated control inputs when close to the stall, especially when close to the ground.

If, at the stall, the flight controls are misapplied and accelerated inputs are made to the elevator, rudder, and/or ailerons, an abrupt wing drop may be felt and a spiral or spin may be entered.

[The FAA Airplane Flying Handbook](#) (FAA-H-8083-3B) notes that coordinated flight is important to maintaining control of the airplane. Situations can develop when a pilot is flying in uncoordinated flight and, depending on the flight control deflections, may support pro-spin flight control inputs.



This is especially hazardous when operating at low altitudes, such as in the airport traffic pattern.

A cross-control stall occurs when the critical AOA is exceeded with aileron pressure applied in one direction and rudder pressure in the opposite direction, causing uncoordinated flight.

The aerodynamic effects of an uncoordinated, cross-control stall can occur with very little warning and can be deadly if it occurs close to the ground. The nose may pitch down, the bank angle may suddenly change, and the airplane may continue to roll to an inverted position, which is usually the beginning of a spin.

**Probable cause:** The pilot's uncoordinated flight control inputs and subsequent inadvertent cross-control aerodynamic stall in the airport traffic pattern that resulted in a loss of control and uncontrolled descent with insufficient altitude for recovery.

NTSB Identification: [CEN17FA084](#)

This January 2017 accident report is provided by the [National Transportation Safety Board](#). Published as an educational tool, it is intended to help pilots learn from the misfortunes of others.

## **Still Looking for a Safety New Year's Resolution? How About Prioritizing More Sleep!**

The New Year is a time to revisit old habits and kickoff new ones. There has never been a better time to listen to the [sage advice](#) of our moms and get more sleep. Poor sleep habits can have a big impact on how we function. They can also affect our safety at work. At Pulsar we focus on delivering solutions to manage fatigue-related safety risk. But that's not all the benefits. [Getting good daily sleep is essential to building and maintaining our health.](#) It also improves our mood and helps strengthen our personal relationships.



### **The Origin and Impact of Inadequate Sleep**

Fatigue generally results from one of three scenarios:

- Work schedules do not provide enough time to get adequate sleep
- Work schedules provide sufficient off-duty time, but we don't use the time available to get enough adequate sleep
- Medical conditions or medication side effects reduce our sleep quality and/or quantity

We all need seven to nine hours of sleep per day to recharge our “sleep battery.” It can be tough to keep this up consistently—especially for pilots, flight attendants, flight mechanics, schedulers, and dispatchers, where work schedules feature night shifts and erratic bursts.

But cutting back on sleep is harmful. Not only does our sleep battery get depleted, causing that groggy feeling—we also start to accumulate a sleep debt, which impairs our alertness. It's something we may not even be fully aware of.

The effect is magnified when we extend the time we're awake in any given day beyond 17 hours. Being awake and on duty at night results in more pronounced fatigue impairment because our bodies are programmed to be sleepy at night.

### **Sleep Debt's Effect on the Body**

So far we've noted that chronic sleep debt contributes to chronic performance deficits. Then there's the health perspective: with a sleep debt, our bodies can start to break down. Risks of weight gain, developing hypertension, sleep apnea, and diabetes all go up.

If you work shifts, it's important to maintain a consistent sleep routine. Make your sleep environment dark, quiet, and comfortable so that the quality of your sleep is the best it can be. If your work shifts are erratic, be mindful of your daily sleep and incorporate naps as needed to supplement any shortfalls. On days off, it's a good strategy to make up for lost sleep during the work week to pay off your sleep debt before the start of the upcoming week. You may already be doing this naturally. In our daily lives we have a lot of activities competing for our time—family obligations, hobbies, binge watching our favorite shows, and so on. It's not surprising that the CEO of Netflix once proclaimed that the company's biggest competitor is sleep!

### **Understanding Circadian Disruption or "Jet Lag"**

If you travel across time zones, you have most likely experienced circadian disruption, also known by the familiar term "jet lag." Deciding whether to stay on your home base time zone or acclimate to your destination time zone will help you plan your sleep schedule and any subsequent activities when off duty (sightseeing, dining out, etc.). Going outside into the sunshine at your destination at the right times of day will help you acclimate, as sunlight works to adjust your body clock. Circadian disruption is not only the bane of travelers. Night shift workers get their sleep during the day during the week, and then on days off tend to flip back to a night sleep schedule to match that of their families. This pattern of behavior leads to a feeling of constant jet lag. Night shift workers should consider pre-duty naps, in-duty naps (if possible), or more breaks before critical tasks. Also, night shift workers need to take extra steps to make sure their sleep environments are quiet, dark, and comfortable to get as much quality sleep as possible during the daytime. This means investing in blackout blinds and white noise generators.

It also means turning off phones and setting ground rules around the home to keep things quiet. Sorry family, no cooking bacon!

A good habit to consider is to take a look at your weekly work schedule and map out how you will prioritize your sleep. This will help you stay as fresh as possible throughout the week. And if you feel that you have medical conditions or need to take medications, be sure to consult with your physician to understand the impacts to your sleep and ability be alert at work.

### **A Shared Responsibility to Ensure Flight Safety**

Aviation has a tremendous safety record but fatigue risks are still present. Fatigue risk management is a joint responsibility between the flight department and crew members. The organization assigns duties, while crewmembers need to show up for every shift alert and fit for duty. Now is the perfect time to reflect on our own sleep habits and consider whether a change could be just the thing to help you perform better and improve your health, personal relationships, and overall mood. Who wouldn't want to hear their mom say "I told you so."?

## **Many Medical Marijuana Users Drive High, Study Shows**

*Researchers who surveyed Michigan medical marijuana users found 56 percent of participants reported driving within two hours of using marijuana, 51 percent reported they drove while a "little high," and 21 percent reported driving while "very high."*



A new study conducted by researchers from the University of Michigan Addiction Center shows that more than half of the people who take medical marijuana for chronic pain say they [have driven under the influence of cannabis within >](#)

[two hours](#) of using it at least once in the past six months. One in five of them said they had driven while ["very high"](#) in the past six months, the researchers reported in a new paper in the journal *Drug & Alcohol Dependence*.

The lead author, Erin E. Bonar, Ph.D., assistant professor of psychiatry and a practicing clinical psychologist at U-M Addiction Treatment Services, said she finds the results of the survey of 790 Michigan [medical marijuana users troubling](#). There are nearly 270,000 approved users of medical marijuana in Michigan alone, as of May 2018, according to a Jan. 9 article about the study by Stephanie Abraham on the University of Michigan Institute for Healthcare Policy & Innovation (IHPI) website. Her article says Michigan trails only California for the highest number of medical marijuana patients in a state.

The researchers surveyed adults in Michigan who were seeking medical cannabis recertification or a new certification for chronic pain in 2014 and 2015. The researchers asked about respondents' driving habits for the past six months. [They found:](#)

Fifty-six percent of participants reported driving within two hours of using marijuana

Fifty-one percent reported they drove while a "little high"

Twenty-one percent reported driving while "very high"

["There is a low perceived risk about driving after using marijuana](#), but we want people to know that they should ideally wait several hours to operate a vehicle after using cannabis, regardless of whether it is for medical use or not," Bonar said in the article. ["The safest strategy is to not drive at all on the day you used marijuana."](#)

She added that there is uncertainty about how marijuana could affect driving for chronic daily users, who might have effects that last even longer.

The study is especially timely because Michigan voters last November approved the use of recreational marijuana, and in December 2018 it became legal under state law for any Michigan resident over the age of 21 to use marijuana inside a private residence and to grow up to 12 plants for personal use.

The study was funded by the National Institutes of Health, including the National Institute on Drug Abuse.

<https://www.sciencedirect.com/science/article/pii/S0376871618308263?via%3Dihub>

<https://ihpi.umich.edu/news/new-study-finds-worrisome-statistics-around-medical-cannabis-users-operating-vehicles>

## **TED Talks - Ideas Worth Spreading**

### **How autonomous flying taxis could change the way you travel**

Flight is about to get a lot more personal, says aviation entrepreneur Rodin Lyasoff. In this visionary talk, he imagines a new golden age of air travel in which small, autonomous air taxis allow us to bypass traffic jams and fundamentally transform how we get around our cities and towns. "In the past century, flight connected our planet," Lyasoff says. "In the next, it will reconnect our local communities."



[https://www.ted.com/talks/rodin\\_lyasoff\\_how\\_autonomous\\_flying\\_taxis\\_could\\_change\\_the\\_way\\_you\\_travel#t-2987](https://www.ted.com/talks/rodin_lyasoff_how_autonomous_flying_taxis_could_change_the_way_you_travel#t-2987)