



What does safety sound like?

“On July 10, 1989, United Airlines flight 232 left Denver and headed to Chicago with 285 passengers on board.”¹ Seventy minutes after takeoff, this DC-10 had an engine failure in the tail and lost all hydraulics. As you may recall from history, the airplane crashed on the runway at Sioux City, but the incredible airmanship of the crew saved 185 people. (This is a story you probably already know, but you may not have considered what it sounded like on the flight deck that day.)

After the crash, investigators conducted a thorough analysis of the cockpit audio from the CVR. During the flight, the crew communicated in “short, urgent bursts.”² These interactions were not—for the most part—commands or checklist responses. They were something else that almost defied definition, which is why they ended up with such an ambiguous phrase, “short, urgent bursts.” Here’s an example:

“Dvorak is talking to maintenance. I’m gonna alternate gear you. Maybe that will even help you. If there is no fluid, I don’t know how outboard ailerons are going to help you.”³

Scientists call these types of short bursts “notifications.” During this flight the crew communicated at an average of 60 notifications per minute, more than three times the normal average of 20/minute which usually takes place during critical phases of flight like takeoff and landing.⁴

I think there are several observations we can make about that incident as we look at the way the crew communicated. First, it is certain that “tomorrow” we will face a situation we are not prepared for and haven’t trained for, something we haven’t imagined, just like this crew did. Second, we will fall back on our ability to execute the fundamentals. Third, communication is a fundamental, and finally, we need the whole team, communicating together, everyone doing their part. I don’t think anyone will disagree with these observations, but how do we prepare in such a way that we are successful at communicating in those dire circumstances?

That is an important question, and I don’t have the whole answer. Additionally, from this vignette, I believe that we can see three kinds of communication as they apply to us.

Test team comments – like the crew “notifications” and “short, urgent bursts” and like the kind we are already familiar with in flight test, including observations about data quality, air quality, and workload, for example.

Flight test reports – we know what these are. In the example above, we are talking specifically about the analysis and conclusions from the transcript and accident investigation.

Stories – this is a new kind of communication I am adding to this list, but I think we agree. Whether it’s a story told at a Symposium or this vignette, we need stories. Stories do many things and are covered in great depth elsewhere. For the sake of simplicity let’s say that stories like this inspire and inform.

You probably already recognize that the Flight Test Safety Committee tries to use all three forms of communication listed here. The benefit of **this** medium is a forum for “short, urgent bursts.” You don’t need a complete thought to submit a letter to the editor. You don’t need a finished test program. You don’t need lessons learned.

As I read the transcript and mulled over the “notifications” in my own mind, I recognized six things that happen when we communicate in “short, urgent bursts.” I grouped them in three clusters.

Head

Sometimes words convey “what I know”
Sometimes words communicate “how I think”

Heart

Sometimes words communicate “how I feel”
Sometimes words communicate “what I believe”

Hands

Sometimes words communicate “what I do” (observable behavior)
Sometimes words communicate “how I do it”

For example, the flight engineer might tell the pilot he is “looking for the circuit breaker now” (an example of “what I do”), and this may have been preceded by the pilot, wondering aloud, “I wonder

In This Issue

2025 Flight Test Safety Workshop Call for Abstracts/2025 European Flight Test Safety Workshop Announcement

2025 Levier Flight Test Safety Award Call for Nominations

Qualitative Approaches – Letter to the Editor

Flight Test Safety Podcast Channel: EP61 – Interview with FTSC Chairman

Chia Chat – FTSC Subcommittees & new award



if we should reset the circuit breaker” (an example of “how I think”). The copilot may pipe up at this point, “I’m skittish about pulling the cb with this kind of malfunction” (an example of “how I feel”). And thus the conversation continues.

This newsletter is a place for short, urgent bursts. Emails to the Editor or FTSC Members are a place for notifications. Furthermore, I think participating in that kind of activity exercises our communication muscles. Unstructured rehearsal is what we need for success in unpredictable situations. We can use these forums to exercise the fundamental communication skills, and when disaster strikes, we’ll be armed with the basics and some similar unstructured experiences, and our brains—the thing that sets us apart from machines—can help us do the rest. Consider this your invitation to reach out with thoughts and ideas. Consider this a challenge to create opportunities for your test team to exercise those communications muscles—before you need them.

I believe that Humans are the advantage, and I know that communication is something unique to us. Let’s make sure we put in the work today to prepare for the uncertainty we will face tomorrow.

Endnotes

1. Coyle, Daniel. *Culture Code: The Secrets of Highly Successful Groups*. Bantam Books, 2018.
2. Ibid.
3. Ibid.
4. Ibid.

Next month:

There are two more “projects” that we need help with: “oral history” and “crowd sourced flight test mishap data” (Houle collection). Hunter is going to pitch his ideas about the latter, and I will explain what we mean by oral history.

2025 Flight Test Safety Workshop - Call for Abstracts

2025 Flight Test Safety Workshop
6-7 May 2025
Greensboro, NC

The Flight Test Safety Committee, a joint committee of SFTE, AIAA, and SETP, is pleased to announce that the North American Flight Test Safety Workshop will be held 6-7 May 2025 in Greensboro, NC.

A Tutorial will be held on Tuesday 6 May, followed by a Technical Tour of HondaJet. Technical presentations will be held on Wednesday 7 May followed by an Award Dinner where the Dave Houle Best Paper Award, Tony LeVier Flight Test Safety Award and our new Flight Test Safety Lifetime Achievement Award will be presented.

This is an official call for abstracts.

For the technical presentation portion of the Workshop, we want to hear from testers on all subject matters.

Each technical presentation selected is given a 30-minute slot (25 minutes for the technical presentation and 5 minutes for questions from the audience). No proceedings are published for this Workshop, therefore formal written papers are not required.

Please send abstracts to the 2025 Flight Test Safety Workshop Chairman, Terry Pearce, via Susan@setp.org.

The deadline for abstracts is 3 February 2025 to allow time for appropriate consideration and inclusion in the program.

Hotel Reservation Information: Sheraton Greensboro at Four Seasons (3121 W Gate City Blvd, Greensboro, NC 27407)

A limited block of rooms is reserved at the group rate of \$152.00 per night. Please click [HERE](#) to book your room.

This year we have a limited block of rooms reserved at the government rate of \$123.00 per night. Please use this link [HERE](#) to book your room at this rate if you are active duty military, DoD personnel or a U.S. Federal Gov't employee. The appropriate I.D. for government rate rooms will be required at the time of check-in. **PLEASE NOTE:** The government rooms are very limited and need to be available to those who qualify. You are not eligible for this room rate because you are retired military or because your company has a federal contract. Please reserve your room by **6pm EST Friday, 4 April 2025** in order to guarantee these rates.

European Flight Test Safety Workshop

4th and 5th November 2025

Savoia Excelsior Palace
Trieste, Italy
Hosted by Pipistrel, Textron eAviation

For more information contact
Marco Rizzato, Workshop Chairman
marco.rizzato@pipistrel-aircraft.com
or
chairman@flighttestsafety.org



PIPISTREL



Save the Date - 4 & 5 November 2025 European Workshop.

Qualitative Approaches – Letter to the Editor

Ben Luther

I write to thank the flight test community. Earlier this month I completed a doctorate in risk that is based upon the unique practices of the profession of flight test; practices that were shared with me in a research setting at the 2023 SFTE, 2023 Euro FTSW, 2024 SFTE-EC conferences and other discussions. Flight test presents a unique risk management perspective where the risk manager is internal to the system and faces catastrophic consequences that preclude mitigations after risk realisation. That is not common outside of flight test, and that focus presents a unique research opportunity. We, the flight test community, are a case study from which I've been able to extract risk management principles for broader industry.

The research is a celebration of what flight test already do and an appropriate response from flight test would be to remark disparagingly that it appears I was paying attention. That is the point. We, flight test, are unique and what we do is worth dissecting for use outside of flight test. In doing that, it makes us think about our cultural norms, to codify those. The research is directed at broader industry, but I also believe that it provides a language for flight test professionals to continue arguing for what we do.

If you are interested in the research outcomes for broader industry, this is the product of the research: <http://doi.org/10.1002/sres.3118>. If you can't access it, contact me directly. It is a heavy read.

Outside of a university setting, for a flight test audience, the things that I celebrate in the research are:

1. Faced with catastrophic consequences when we are internal to the system, our risk management behaviours are different to contemporary corporate practice. Concepts of resilience and robustness aren't relevant to someone who is dead. So, we don't focus risk mitigation efforts upon the probability – we reserve qualitative approaches for our use in high consequence activity and that is a strength. That can be a heuristic approach like, "I'm the grey beard and I say that ain't happenin'." Risk mitigation that averages losses and leverages low probability is not appropriate when faced with catastrophic consequences. One technique is technically referred to as a Precautionary approach. In flight test, it is akin to the Incremental Approach where at each step, the consequence is mitigated to be tolerable. At that point, risk is independent of probability. Check your incremental approach. Are you dividing the activity to fit the available schedule? Or are you dividing the activity to present a tolerable risk consequence at each step?
2. Beware of subjective probabilities. Noting that subjective probabilities come from Nobel Prize winning economic utility theory, there is a place for this approach. Per the father of economic utility theory, Friedman, if you have a statistically valid sample of knowledgeable people to cast their opinion on the formation of a valid subjective probability – go for it. But I am yet to encounter such rigor in flight test. If you don't have that, don't confuse your opinion with a subjective probability. (A statistically valid sample would run to some tens of people, nominally 30.) Find another way. I suggest risk management tools that are independent of



probability. On par with Friedman is Knight. He calls out subjective probability in recognising that sometimes knowledge to build a valid dataset isn't available. For that, consider using the concept of likelihood. Likelihood is a qualitative uncertainty, different to the mathematical precision of probability. If you are going to be mathematically precise, be sure to aim that precision carefully since precision is not accuracy.

3. Cynefin can be a useful tool for flight test to categorise our systems. When systems are Clear, yellow vests and hard hats are appropriate risk mitigation. So are statistical approaches to risk management because the system is deterministic and static. When the system is Complicated, statistical approaches are valid because the system is still deterministic and static. But now the statistics are hard to come by. We use reliability as a proxy for hazard probability to enable system safety approaches. Then, our flight test risk management capability comes into its own when the system becomes Complex – that is non-deterministic and dynamic. Dynamic means that there is no prior knowledge about the system because it is changing (or because it is the first encounter – sounds like a first flight!). For this, don't pretend to have valid statistical knowledge to use as a probability. Instead, use qualitative approaches to risk management. Cynefin is the tool to make the categorisation of the attributes of the underlying system, for application of appropriate risk management tools.

Thanks again to all those I've had the pleasure of engaging with about risk management over the last decade. It is something of a passion project. I'm attempting to present the outcomes of the research (these and others) at the conferences in 2025 and I hope to see you there. Kind regards,
Ben Luther

2025 LeVier Award - Call for Nominations

The Flight Test Safety Committee is soliciting nominations for the Tony LeVier Flight Test Safety Award. Download the nomination form here from the Flight Test Safety Committee website: <http://www.flighttestsafety.org/awards/35-awards/information/54-tony-levier-flight-test-safety-award>.



The Flight Test Safety Committee established the award to formally recognize a single individual, or group of individuals, who over some period of time, has made a significant flight test safety contribution to a specific program, organization, or the flight test profession as a whole.

Nominations for the Tony LeVier Flight Test Safety Award are reviewed by the Flight Test Safety Committee and the most deserving nominee from the past year is selected. The recipient(s) is announced at the North American Flight Test Safety Workshop in the spring of each year. The distinctive flight helmet trophy (pictured above) is officially presented by the corporate sponsor of the award ([The Gentex Corporation](#)) at the fall Society of Experimental Test Pilots (SETP) Annual Awards Banquet.

The deadline to submit a nomination is 28 February 2025.

New Flight Test Safety Lifetime Achievement Award coming soon!

The Flight Test Safety Committee will solicit nominations for the NEW Flight Test Safety Lifetime Achievement Award after the New Year. Stay tuned for more information!

New Member Highlight

Paul Smith of Airbus A³ is one of the newest members of the FTSC (<https://flighttestsafety.org/about-ftsc/directors>). He presented at the 2024 FTSW, and you can watch his presentation, "Vision-Based Landing System - A Key Technology for Safe Autonomous Commercial Flight", here: <https://flighttestsafety.org/2024-seattle-wa?start=10>.

Paul Smith shared a link to his own thoughts on communication here: <https://acubed.airbus.com/blog/wayfinder/how-aviation-communications-can-inspire-stronger-organizational-communications/>.

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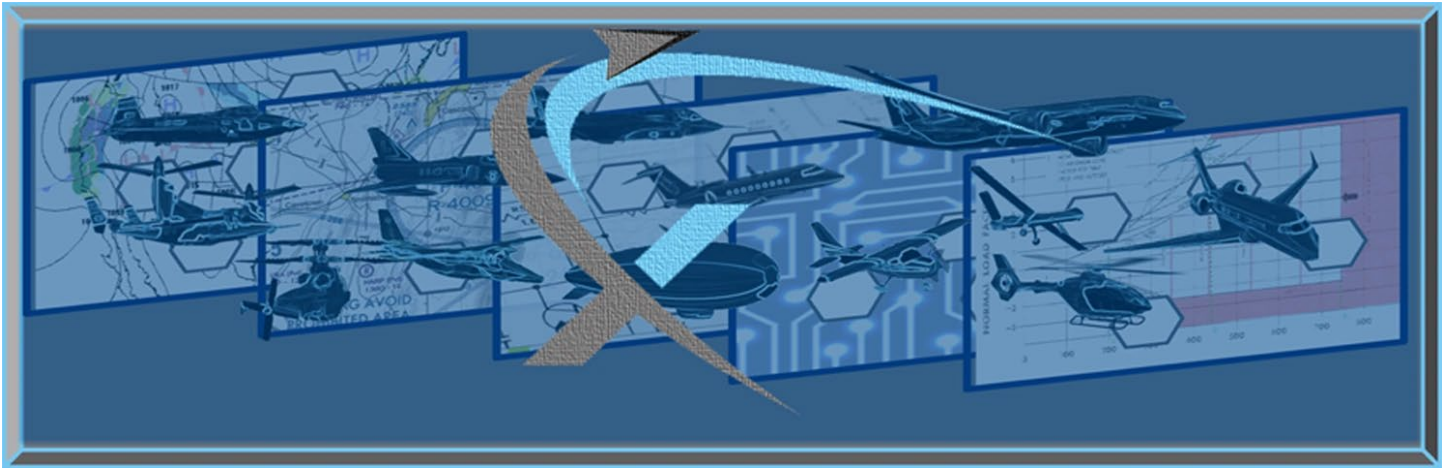
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Connect with us by joining the LinkedIn Group: “Flight Test Safety Committee.”

Episode 61 – Interview with FTSC Chairman Turbo closes out 2024 talking with Flight Test Safety Committee Chairman Stu "Chia" Rogerson. Chia shares his thoughts on what the FTSC has to offer and where it is going.

Also, we are looking for a new name for the podcast—if you have ideas, please send them in.

Happy Holidays to all!



Chia Chat

Fellow flight test professionals, welcome to the New Year! I have never been one for New Year resolutions, but I do think it is a worthwhile endeavor to reflect on what we have accomplished and what we should strive to improve going forward. 2024 was an exciting year of flight test with many first flights across a multitude of model types along with some exciting other firsts with new technologies and capabilities. More importantly, I feel like the level of cooperation, collaboration and sharing amongst flight test companies and organizations growing since we share that common goal of improving the safety of all things flight test. I think back to all the successful symposiums this past year and of course the Flight Test Safety Workshop. So many great presentations sharing lessons learned that we can take to our home organizations and use. I am also excited to see the number of volunteers for the Flight Test Safety Committee continuing to grow. The FTSC is only as strong as its involved members, and we have numerous new board members and sub-committee members.

Talking of sub-committees, I was recently learned that not everyone is aware of the various sub-committees that the FTSC has. In case you had not heard, you do not have to be a board member to be part of a sub-committee. Our charter defines the maximum number of folks who can be on the board, but there is no limit for the sub-committees, so the more flight test professionals who can be involved the better. We currently have four sub-committees: FTSC Charter, Workshops, SMS Protocols and our newest AI and Large Language Models. If you are interested in serving on any of these committees, please reach out to myself or Susan@setp.org.

The Workshop sub-committee is the core of our organization, and that team has their work cut out for them this coming year with two workshops to plan. As we look to the New Year, my number one goal as the Chairman is to ensure we have successful workshops. However, the most critical element for a workshop to be successful is the papers presented. I encourage all flight test professionals to consider presenting at Greensboro or Trieste this year. We all have stories that need to be told and the rest of us could all benefit from hearing from them. Hopefully you have seen the call for papers already and it won't be long before we start looking for papers for the European FTSW too.

In addition to that call for papers, I hope you have also seen the request for award nominations for the Tony Levier Flight Test Safety Award. Sadly, we all get so busy that we often don't take the time to recognize the outstanding professionals in our organization. This is your chance to reward and recognize those that go above and beyond in the world of flight test safety. How many times have you been in the audience listening to the description of the award winner and thought to yourself, we could have submitted for that too. In addition, we will be requesting nominations for our new Lifetime Achievement Award soon. So often we get Tony Levier award nominations that are amazing, but they don't fit the criteria of the award. The creation of this new award will hopefully give those other individuals a place to be recognized. As soon as we finalize the name for this award, we will send out the nominations request. I am

looking forward to reading those nominations and learning about the outstanding work being done in our community. I know the deciding the award winners will be tough!

Going back to the sub-committees, we are actively recruiting for the SMS protocols. This is a shorter-term commitment as we try to get that activity across the finish line so we can provide a useful product to all flight test professionals. Finally, our newest sub-committee is AI and Large Language Models. This committee has just barely begun, and we are working on defining reasonable goals over the next few years to improve the availability of the FTSC's resources as well as hopefully integrate it with the Flight Test Safety Database's THAs. Exciting times with lots of possibilities. If you are interested in any of these subcommittees, please reach out. They usually meet once a month with some limited "homework" between meetings.

As we transition to 2025, reflecting on past incidents and accidents can help focus our limited resources on items that we hope will have the greatest positive impact on our flight test operations. I always enjoy FTSF's visit to the past, this month with the UA Flight 232 in 1989. An amazing success story that I thought I knew well. However, I had never heard a discussion before on their communication and the use of "notifications." This is just another great example of the requirement to be always learning in this profession to improve our odds of handling that next unknown test risk. As we go into 2025, I hope you will make that a goal for yourself and your test teams; have a mindset that is continuously searching for new things to learn and applying those principles to our organization. I hope you all had a great holiday break, and I look forward to seeing you at a Workshop in 2025!

Stuart "Chia" Rogerson



Photo credit: <https://www.museumofflight.org/exhibits-and-events/aircraft/lear-fan-2100>

Did you know? The Lear Fan 2100 was officially recorded by British officials as December 32, 1980.