What Got Us Here   Mark Jones Jr

Many years ago, I took my wife to Colorado Springs to visit our son, an exchange student there, and we drove to the top of Pike's Peak. On a clear day, you can see for more than fifty miles, and if you take the time to rotate slowly in every direction, you can see that far *in every direction*. The view up and over one's head is even better, even farther. I could barely catch my breath in the thin air much less absorb everything to see. If you tried to soak it all in, it would be impossible, and to illustrate what I mean quantitatively, consider the photograph below. Let us agree, for the sake of discussion, that the photograph is simply one thousand by one thousand pixels, which yields more than one million pieces of information. Then, if we allow for color variations in each pixel, we have hundreds of millions of pieces of information. None of us—nor our computers—can take it all in. Frankly, it's overwhelming. We are drowning in data and facts, pixels and posts. It's a flood of biblical proportions. The answer isn't more compute, better dashboards, or even safety management systems. In an attempt to convince you of the answer, I want to spend a few minutes looking back at what got us here.

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The question "What got us here?" means different things depending on the context. From the top of a mountain like Pike's Peak, one might observe sharp curves in the road that led to this vantage point. It's possible that we might even remember the drive, with its twists and turns, though I suspect otherwise, for most of us have allowed our powers of observation to deteriorate in the age of digital navigation. Just the other day, it occurred to me that part of the problem with modern navigation is the reactive character of the task. Most of us drive without observing much about the route, waiting to respond, almost thoughtlessly, to the next voice command provided by the gps-based navigation app.

If I were in the cockpit of a Cessna 152, training at cross-country navigation, I might be forced to recall the clock-to-map-to-ground mnemonic that reinforced a certain awareness, so I would observe more about the features of the landscape I flew over. In that place, "What got us here?" would remind me that a heading of 235 was the correction I made several minutes ago, an attempt to compensate for the unseen forces of wind. This particular airplane with its six-pack of "steam gauges" didn't even have a heading bug, much less a moving map display. If I looked a little more carefully, I could also see a set of scribbled notes, numbers, and lines on the aeronautical chart in my hand, and they too served to stir memories. In this case, what I remembered was the time and energy I put into mission planning, the decisions I had made before flight about my route, the landmarks, and distinguishing features on the map I would use to evaluate my progress. In those days, we were disciplined in what we created and the techniques we used to help us *remember* key navigation information. I fear we have lost the art of complementing dead reckoning with pilotage and all the airmanship that goes with it. Part of the problem may be that—in our haste—we have lost sight of one of the key ingredients of this art. "How much did I change my heading last time, and was it enough?" Remembering.

It is an implicit but important part of this skill that may have atrophied, and it seems that same part of the skill has waned outside of the cockpit, like when we are in the cubicle or conference room, hanging out at the water cooler, or at home on the couch.

Remembering. It's a crude word compared to the refined concept in my mind, and I hope it can do some heavy lifting. I want it to be the one concrete word that symbolizes all the things I hope to convey as part of my solution to dam the flood and control the flow of information, the deluge that's threatening to wash us away.

At first glance, we can take the word at face value. We ought to remember. This season gives us many pictures of what that might look like. For example, who among us is not familiar with the Christmas Newsletter or the holiday post card that contains pictures from the past year together with an entirely too short commentary to go with those images. If pictures are worth a thousand words, than many times these newsletters leave us wanting more words about the friends or family that sent them. What if we made a Christmas card newsletter for our profession, what images would it include for the last year? What words would we use to convey ideas too big for pictures? Take time to do this kind of remembering because it reminds us of relationships and results. Results are why we are in this line of work, but relationships should come first in the phrase. And a conjunction should join them. Relationships and results. Another one of the reasons for remembering is gratitude, and I believe that gratitude is a pitch and power setting that will help us make the most of life.

Remembering is also important because we need information about the past to help us steer a new course. If the wind causes our ground track to drift farther north than expected, right of the intended course, then a heading of 235 may not be enough. We need to steer left even more, some to get back on course, and some to prevent further drift.

There are two more kinds of remembering that this time of year should bring to mind. November 11 is a reminder to the world of the cost of world war and the armistice that ended the first one. Many of us earned our wings and flight test credentials through military service, and none of us can deny the influence the defense industrial complex has on the progress of aerospace technology. The military forces of the world also prevent war, and for that we ought to be thankful, which brings us to another time of remembering, the Thanksgiving holiday. The internet tells me that five nations have an official holiday centered on Thanksgiving and four more have similar celebrations. My tradition is to share one or two photos each day in a special Thanksgiving photo album on my facebook

page, and usually the pictures come with a host of words to explain all the things you can't see for which I am thankful. It's definitely a discipline to take time for this activity, but therein lies another reason why remembering is important.

Taking time to remember creates margin. In some cases, I am taking time away from other things that are important or urgent, but I never regret the sacrifice. Often, "slowing down" the pace of whatever is happening in the cockpit gives our minds time to process and respond. It's a safe choice. This is also a well documented way to solve problems. Doing something else, like a shower or a walk (or taking time to remember), can allow the brain to continue to work, and before you know it, you too can run the Greek streets with water dripping and shrieks of "Eureka!".

I believe strongly that remembering should bring us to the blank page. We would not have maps without cartographers, and without maps, we could not navigate the old Cessna 152. The metaphor is apt because work and life don't have a gps. I am certain we all wish for a chart that would guide us in our relationships, an app that voices commands telling us to "steer clear" of this or that emotional traffic jam we aren't aware of, but alas, these do not exist. Even more, who wouldn't want a moving map display that shows us the effect of a schedule decision or program problem that needs solving! Thus, the benefits of the map should compel us to write down what we remember as a way to offer a chart to those who follow us.

One of those charts we use to navigate through life is what I will call "oral history." If you are a member of SETP, you will have noticed that we have accomplished some "oral history" projects in the past, and the tenure of our new president features a revitalization of this important project. In the next column, I'll talk more about oral history as it pertains to us and flight test safety. But before we arrive there, I want to exhort the youngest among us—the new TPS grads matriculating from all over the world as well as the new hires who have six months of work under their belt after graduating college this past year—do not skip over this section. Here's your task: Make a short audio clip or voice to text message, and in it convey six or seven things you remember. Maybe it's the feeling of being new or the satisfaction of looking at how far you have come. Perhaps there is a project you have just completed or one you are just starting. There may be people you want to remember, or something said you don't want to forget. Many years from now you will wish you remembered what you know and feel today. And if you end up with a list that you are willing to share, send it to mark@flighttestfact.com in a letter to the editor. Oral history is not (only) for the old, and before you know it, a new face in the office will signal that you are no longer a rookie, and you will have advice you can share: "Here's what I learned..."

Remember what got us here. For all the reasons. Because what got us here won't get us there, and because so much of the verb *aviate* requires us to remember. Remember that your experience is valuable to the people around you. Remember that relationships and results are both important, and remember all the ways life taught you that principle. And if you didn't already realize it, remember that you can't take it all in. That's actually a feature of life and the human mind. Finally, remember that you only get one chance at this life, and learning from the past—what you remember—can help you navigate more successfully in your future.

Award-winning Flight Test History   *Martin Shubert and Dave Sizoo*

The Javier Arango Memorial Award was established in memory of Javier Arango. Javier was a renowned authority on World War 1 Aircraft and aircraft collector who died in the crash of a replica biplane in 2017. This award recognizes the individual or individuals who share a similar passion for <u>aviation history</u> *and the connection between pilot and aircraft. The Award is given to the presenter or presenters whose presentation at the Annual Symposium has a significant* <u>historical</u> *or Human Machine Interface (HMI) focus. The 2025 winners of the Javier Arango Memorial Award are Martin Shubert and David Sizoo.*

State based Advanced Fly by Wire Flight Control (with built in automation / envelope protections) demand a new way of testing. However, we do not want to disregard lessons learned from legacy FBW mishaps.

Marty's Take - Marty Schubert is a retired Bell Helicopter Test Pilot, who tested the V-22 tiltrotor for 23 years.

As a previous tiltrotor test pilot and now subcontractor to STI, I welcomed the opportunity to tell the tiltrotor story from my point of view. I took Dave's direction to focus on mode transitions and quickly found that many of the important tiltrotor accidents didn't fit neatly into the FBW bucket of interest. So, I opened the aperture a little bit to see if they made more sense in a broader context: the tiltrotor representing a new and revolutionary design, and the powered-lift reconfigurable aircraft, both of which I see in the new eVTOL designs.

With this in mind I super-imposed the transition corridors of the three tiltrotors and identified the various accidents that have occurred over the years in tiltrotors. They are depicted below as a combination of nacelle angle and airspeed. The various numbers represent the

occurrence of the 17 selected tiltrotor accidents discussed. The boundary determinations for the conversion corridors and their implications in these accidents are discussed in our paper.

From this study I identified 6 general categories of causal factors for accidents, and focused much of the discussion on the first causal category, "Balancing flight control in powered-lift designs". From this analysis we gained new insights into why the new eVTOL designers choose to move away from the attitude/axis control of current tiltrotors (i.e. direct control of pitch and thrust) to state-based/trajectory control (i.e. inceptor control of states such as acceleration and flightpath angle). We then took this

opportunity in our paper to examine some of the issues with the evolving state-based designs that both Dave and I have identified through our participation in NASA, FAA, and university flight simulation studies.

In the end, the analysis of these tiltrotor accidents, along with recent eVTOL accidents, and fly-by-wire helicopter and airplane accidents, brought out various insights into handling reconfigurable aircraft, new aircraft, and automation. In this vein I see this information helpful for:
New powered-lift designs
Upcoming work of the MV-75 tiltrotor for the Army
And the many aircraft that are employing greater amounts of automation

Dave's Take - David was the FAA sponsor for the STI project and a retired FAA Flight Test Pilot and subject matter expert in Powered Lift Aircraft Certification.

The FAA requested Systems Technology, Inc to perform an analysis of Fly By Wire (FBW) aircraft mishaps. This analysis was performed on a limited, targeted data set. We asked the team to consider mishaps in FBW Airplanes, Helicopters, and Tiltrotors where mode transitions were a probable cause.

Why did we choose to study these specific mishaps? The short answer is to understand lessons learned from legacy FBW systems and extrapolate findings to newer, advanced FBW systems that are relevant to current eVTOLS and highly augmented and automated aircraft.

As the certification project test pilot for JOBY, BETA, ARCHER, LILIUM, WISK, VERTICAL, SUPERNAL, AIREV, EMBRAER EVE, and ELECTRA, we recognized that newer FBW systems demand a new way of testing. These and other eVTOL projects share two common traits. They incorporate Distributed Electric Propulsion (DEP), and are over-actuated. Consequently, some conventional flight test techniques may not apply. On a conventional aircraft with a mechanical (non FBW) system we measure Stick Force per G and Stick Force per Velocity as a metric for Handling Qualities. On an advanced FBW state based system that closes the loop with flight path (and where the pilot does not control tilts of the propulsion system directly) these metrics do not mean much. Consequently, we need a new way of testing to supplement traditional flight test techniques.

The Fly By Wire mishap data set review was the first phase of a larger project. The larger project fit in with other research we sponsored using NASA Langley, NASA Ames, Adaptive Aerospace, Flight Level Engineering, Eagle Works, Auburn University, Georgia Tech, Florida Institute of Technology, National Test Pilot School, and NRC Canada.
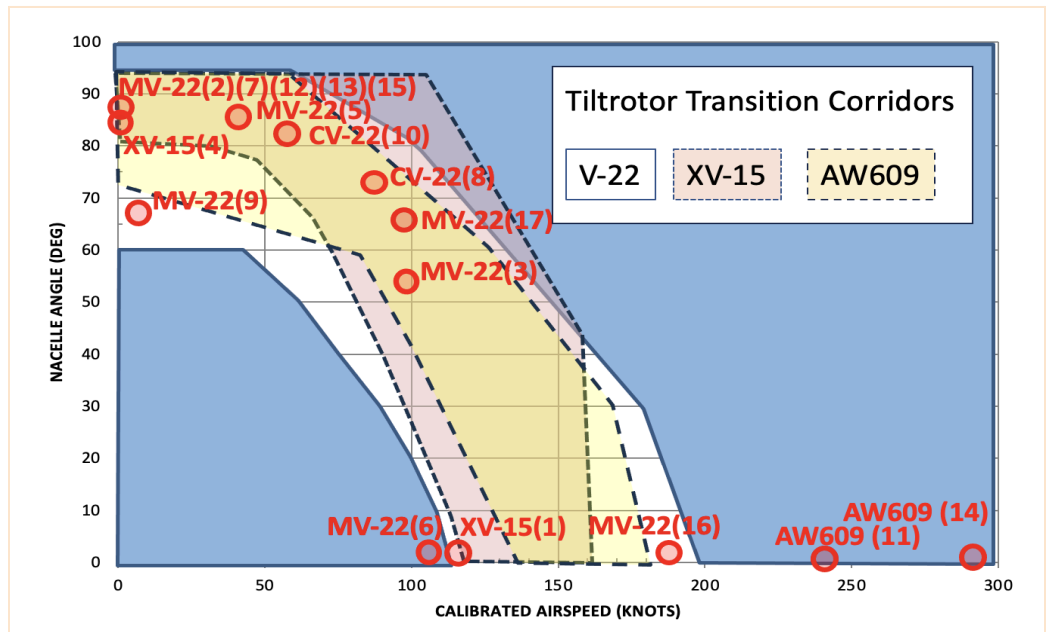
The research portfolio was focused on developing a framework for supplemental, new flight test techniques for stability and controllability requirements of civil aircraft. The flight test techniques developed can be applied to any aircraft with advanced flight controls including fly by wire.

The goal for the framework is to focus simulator and on-aircraft testing to ensure there are no cliffs in handling qualities. Handling qualities are one small piece in overall certification and are assessed with task elements. Task elements (referred to as Handling Quality Task Elements or HQTEs) are isolated from other pilot workload tasks such as running checklists (normal, abnormal and emergency) navigation, and ATC communications.

HQTEs are not pass/fail and do not have absolute prescriptive criteria. The airworthiness authority's decision as to whether the handling qualities are suitable for civil certification must only be made after other integrated evaluations are considered that take into account overall workload in an operationally relevant environment.

HQTEs and supporting data reflect an approach that recognizes system qualities (phase margin, gain margin, bandwidth, etc) as predictors of handling qualities. It is suggested that the FAA request system quality data in the system description documents that applicants provide.

The testing with HQTEs is designed to be bounded and qualitatively assess if the pilot will have any spare capacity to deal with divided attention tasks (other than Handling Qualities) in the performance of an operational mission.

Similar to other research that we sponsored, we have incorporated real flight test and simulators (with OEM participation) to validate concepts that will be used in actual Type Inspection Authorization (TIA) flight test. The goal is to use the R&D to institutionalize these methods with industry consensus standards.

The Last Word
When Mark asked Dave and me (Marty) to comment on the question of "How does one decide to become an amateur historian for flight test?"—I must admit that we are what you might call—accidental historians. We were writing a technical presentation on what we've seen and where we think we are going. When we won the Javier Arango award, I thought to myself that maybe it's a sign that I'm over-the-hill but then the recognition of this as being beneficial to the society made me think of the old saying from Shakespeare's The Tempest, "The past is prologue," or from Mark Twain, "History doesn't repeat itself but it often rhymes."

I must admit that my current situation as a retired test pilot and now consultant has allowed me the time to better reflect on my experiences, and study not only the various accidents, but also the follow-on fixes that resulted. If there is anything that defines one as an historian, it is the detailed study required, as evidenced by the 38 references we have in our paper. Even then, we had to draw lines of study based on the time and funding available. That being said, I would offer that all of you are historians when you share your experiences with the rest of us in a forum like the Flight Test Safety Committee. Take the time to reflect, put your thoughts into a context that helps us understand the story, and then share.

Two Things about Oral History

Maybe you are wondering if you can take the phrase "oral history" at face value, or perhaps you'd like a more precise definition. If so, keep reading, but first read some biographical facts about Tom "Sally" Fields, one of the new Directors on the Board of the Flight Test Safety Committee, which are, incidentally, an example of oral history.

An Oral History of the Flight Test Safety Committee: Tom "Sally" Fields
I am coming out of a period of training and am going through old emails in an effort to catch up. I came across this from last year and I honestly don't think I responded to you. My apologies for the miss. I am excited to be part of the FTSC and while the past 6 months have been fairly hectic, I'm hoping to have more time this fall for engagement.
What is your name? Dail Thomas Fields – I go by my middle name and my callsign is Sally. D. Tom "Sally" Fields | *When did you graduate from college?* December 1995 from Virginia Tech, BS Aero Engineering. Seems like yesterday, but it's been a minute. After college I worked as an engineer supporting ballistic missile defense and my first boss was a retired Marine Test Pilot (Mr. Ed Traasdahl) who mentored me and encouraged me to apply for flight training with the Marine Corps. A couple of years later I was in the pool at MCAS Miramar awaiting F/A-18 training and we were sent on a field trip to Palmdale to check out the X-35, where we were greeted by Turbo, who took time away from a fairly high profile program to entertain a bunch of newly winged Aviators. I share this because both of these people inspired me to apply for Test Pilot School (I got in on my 5th application) and have been a positive

influence in my life. | *When did your flight test career begin?* I started USAF TPS in June 2009, graduated June 2010 with Class 09B. I then moved up to China Lake for a 3 year test tour with VX-31, followed by a fleet tour with VMFA -122 in Beaufort SC, then went back to test in 2015 as the GFTD for F-35 B/C with VX-23 until August of 2017. I spent just over a year supporting Program Management for the AV-8B and F/A-18C/D before returning to China Lake for my final tour on active duty. *When did you retire?* Retired in October 2022. I worked with Boeing for a short time in China Lake and moved to Calspan in the summer of 2023. | *How did you get steered towards this field?* As a young kid I was enthralled with airplanes, and I was also inspired by my grandfather who flew B-17s in WWII. | *As a child / young person, what historical aerospace event first caught your imagination and inspiration?* I was a child of the 70s and 80s and was very focused on the Space Shuttle, completely fascinated with the Apollo program, and will never forget the first time I witnessed the Blue Angels fly over at what appeared to be 10 feet over my head in an A-4.

The Second Thing about Oral History

First, let me make a random interjection: "time history" is not strictly oral history, but it is an important reminder that our work requires history. Second, since the first wasn't really about oral history and it was just randomly interjected, consider this actual second thing about oral history...

"Remember our history, friends, and be warned." That's how Paul opens the tenth chapter of his first letter to the Corinthians before launching into a history lesson, but the lesson is not unique to biblical teaching.

"History doesn't repeat itself, but it often rhymes." That is how Mark Twain conveyed the same principle.

Recently I finished an oral history of World War II that I want to recommend. A journalist by the name of Studs Terkell published "The Good War" in 1984, almost forty years after the war. He was the one who described it as an "oral history," and it's unlike any history book you've ever read. Each "interview" is the transcribed comments of someone who lived through the war, and these short stories only last a page or two, though occasionally one of the stories runs for five or six pages. Everyone who knows about the book admits enthusiastically that it is a really good book. The characters and their stories draw you in. The stories are short enough to keep your interest and keep turning the pages.

The author interviewed people from the entire breadth and depth of the world war, and he included German government officials, children of interred American Japanese citizens, soldiers, sailors, guerrillas from Eastern bloc countries, Jews, Christians, atheists, black and white, male and female, wounded and unharmed...I could contrast a million adjectives, and I would only be scratching the surface of the myriad perspectives that appear in each person's personal account.

I wonder if we remember our history, the history of flight test and test safety.

I wonder what facts I've forgotten, what experience I would cherish if I had remembered to write it down. The list I'm making in my mind isn't short. What could I have done better? Keep a journal? Record my thoughts with a voice recorder?

The truth is. It's easier than ever to "record an interview." I believe we should all be part of the next oral history project, and it starts with you. I would propose that we offer this question as the focal point: If you could only tell one of "your stories" from your career in flight test, who would your audience be? What story would you tell?

But while you are making your notes, don't forget to include the basic info that Sally shared as important context: who you are and where you are from. That helps. In closing, oral history is simply an oral account of the historical narrative instead of photographs, journals, official documents and the like. Your story matters, and I hope you share it with someone, maybe even us.

Three Things from the SFTE Symposium (*two are quick and one isn't*)

ONE

There are three things I want to point out from the SFTE Symposium. First is the paper Horizontal Time Safety Margin, by SFTE Fellow Nathan CAP'N Cook. The brilliant application of an existing idea to another domain is in the bullseye of the kind of content we intend to share in this forum. You can read it two ways. First, he has published the paper on his github page, and if you don't understand that sentence you should: https://github.com/cooknl/2025-sfte-htsm/tree/main/_manuscript. Second, SFTE shares their papers for SETP and SFTE members on their website here: https://sfte.org/sfte_papers_database.php

TWO

President Jeff Canclini asked me to point readers to his recent, post Symposium message here. And finally...

THREE

Honored this year as a Fellow of the SFTE, Dr. Guy Gratton also earned the [2025 Jesualdo Martinez Award](#), and in this column, he brings us two things: a perspective of Fellowship and a safety aphorism that applies to life and flight test. Here is G²...remembering.

"Please fit your own oxygen mask before attempting to help others."   *Dr. Guy Gratton, SFTE Fellow*

So Mark Jones, the Editor, has asked me to write a few words on what my recent Fellowship of SFTE means to me. It's a great question, and one I'd like to bundle up with something else I was recently awarded. I'm proud to have just become a Professor at Cranfield University, where I work most of the time.

They both represent something very significant in my professional life, which is a judgment by my peers (actually in both cases, I'd say my superiors) that I've reached the top of a particular professional tree.

And what a tree it is. Without a doubt, the Flight Test profession, whether you are a pilot or an engineer, is one of the most tough, exclusive, skills-and-knowledge-intensive professions on this planet. Where we get our jobs wrong, people die. Sometimes ourselves. Where we get it right, we may sometimes be labelled as an expensive nuisance adding costs and delays to something whose designers were convinced they did their jobs right the first time. Designers who usually don't have our operating experience or who aren't the first to put their own vulnerable bodies in the air.

Flight test is a team sport, and we all work together to deliver safe testing, and the best possible flying machines that we can. This does mean that we all see what each other do, and our contributions to the outcome. And through organisations like SFTE SETP and FTSC we see what our competitors and regulator teams are doing too. The opportunity to be judged: both positively and negatively, by our peers is unavoidable and never ending. My other profession in academia is somewhat similar in that regard, without the risk to life...unless you adopt the Indiana Jones model of Professorship, which perhaps I do.

So that two of my colleagues proposed me as an SFTE fellow, and then that I was one of only two out of eleven incredibly highly qualified people who were elected this year, was a wonderful shock. Whilst I endeavour to keep maintaining the highest standard of our profession, I really didn't see myself as anywhere as near the top of the tree as many others. That level of faith in me by my peers and superiors, took me massively by surprise. And it's a challenge, both this and my Professorship. Along with a third vote of confidence, which is the enormous amount of money spent on me over the last year to enable me to recover from stage 4 prostate cancer, an indication that the country I live in sees my continued health and wellbeing as being of societal benefit too. When I worked out what my treatment is costing, I was frankly staggered.

So I feel I've been presented with a challenge. What will I, Guy Gratton, SFTE Fellow, Professor of Aircraft Test and Evaluation, and cancer survivor, do with these opportunities to do good? That's a challenge I think I'm going to be wrestling with for some time, but certainly I'll do my best. I hope that I can, through my teaching, my research, my professional practice, and my engagement with the societies I belong to, put back more than I received with these honours.

At the same time I keep trying to remind myself of a very well known aviation saying: "Please fit your own oxygen mask before attempting to help others", and I'd remind you of that saying too. I'm no use to anybody if I'm not in good condition myself, and my cancer treatment has reminded me of that very starkly. I've learned over the last year, more than ever before, to prioritise sleep, exercise, a healthy diet, management of stress, and other aspects of self care, as without them I will achieve little else. Please do the same yourself, and recognise that in our high pressured industry, that can be both difficult, and essential.
Regards, G²

I have cancer, I am trying hard not to let this define me or affect my work, but I have a blog if you want to know what I am going through.   https://guywithcancer.substack.com/

Chia Chat

It has been a few months since I last sat down to write the Chia Chat for the FTSF and a lot has happened including two Workshops. Let's first start with the North American Workshop held in Greensboro back in May.

This was our first two-day event and was well attended by a diverse group of flight test professionals. For those that were unable to attend, I strongly recommend you check out the videocasts that are available at flighttestsafety.org/2025-greensboro-nc. Workshops are the primary product of the FTSC, and it is the best method to achieve our charter of promoting flight safety, reducing the risk of mishap, promoting risk reduction management and continually improving the profession's communication and coordination.

I really enjoyed the Tutorial, "Brilliance in the Basics" as we focused on the fundamentals that are the bedrock of a successful flight test organization. Whether your organization is well established and needs a refresher or just standing up a brand-new department, there were plenty of important takeaways from the tutorial that will help your team be successful. The Tutorial allows for a deep dive into a topic and this year was no exception with RJ, Marty and Mike doing a great job covering the basics.

Honda was an excellent host as we had an opportunity to tour their flight test and production facilities after the Tutorial. I really appreciate the effort Honda put into making us feel welcome there. It is always interesting to see the common ground amongst so many different flight test organizations, but also their unique solutions to certain technical challenges.

The second day was all papers, and they did not disappoint. I strongly recommend you watch them all. Maybe setup a few "lunch and learns" in your department to start working through them. Of course, as a minimum, you need to watch the winner of the Dave Houle Award for Best Flight Test Safety Workshop Presentation (Sponsored by Bombardier) "AFCS Single Engine Approach Test Safety Improvement" by Tyler (T.J.) Lawrence and Tobias van Esselstyn of Gulfstream Aerospace. This leads me to one of my favorite parts of the FTSW, Panel Discussions and what differentiates between a Workshop and a Symposium. Our standard 25 mins for a paper and 5 mins for questions is great and allows for a good variety of papers to be presented, however the addition of the Panel Discussion allows that deep dive into a topic and to let the conversation naturally wander as needed.

That evening, we had our first official Keynote Dinner and Awards Ceremony. Andrew Klischer from Samaritan's Purse gave a fantastic presentation on the amazing things they are doing with aviation around the world helping folks. We too often forget about the good aviation can do but instead get bogged down in the weeds looking at compliance requirements and data. This was a good reminder of the greater purpose we often serve when working in flight test.

Finally, we had a chance to honor our Award winners, with the Best Paper, Tony LeVier and the brand-new Hugh Dryden Award being presented that evening. Definitely a great way to end the workshop. Thanks to Terry Pearce at Honda for being the Chairman for the event. Mark your calendars for May 5th and 6th in Fort Worth, TX, for the next North American event. If you go to our website you can already book your hotel room, no deposit required.

Our second Workshop for 2025 was held November 4th and 5th in Trieste, Italy. The European Flight Test Safety Workshop is held less frequently than the North American workshop with the last one in London in 2022. However, the European flight test community made it clear they were ready for another workshop. Our original hope was to have fifty folks attend, but we ended up just shy of ninety! Fantastic attendance in a beautiful location. Many thanks to Marco Rizzato at Pipistrel for being the Chairman of the event and bringing it all together. The European event was also a two-day event with a Tutorial and tour on the first day and papers on the second day. For the Tutorial, we decided to pick an important topic that just isn't discussed much in the flight test community, Production Flight Test. Speakers from Airbus, Leonardo, Pipistrel and Cranfield University filled the morning with some great insights into the challenges faced by production flight test organizations. There was plenty of great discussion on this topic and I am hoping this will lead to further collaboration amongst the different organizations, including setting up a Production Flight Test sub-committee. If you are interested, please reach out to the FTSC.

That afternoon the attendees loaded onto a bus for a trip to Pipistrel's Italian facility just south of Gorizia on the Italian, Slovenian border. After a short presentation on Pipistrel, the attendees were shown around the production floor and the telemetry room which was displaying a replay of a recent NUUVA test flight. NUUVA is Pipistrel's hybrid electric VTOL unmanned cargo aircraft. As a special treat, four seats were raffled off to the attendees to get a short flight in the Velis Electro, the first ever type-certified, electric-powered aircraft.

The next day was full of papers and panel discussions over a range of fascinating topics. Congratulations to Tenille Cromwell and Allan Jespersen from Gulfstream for winning the Best Paper award sponsored by NOVA. Their paper was entitled: Building Bridges

– From Experimental Flight Test to Production First Flight. That evening, a Keynote dinner was held at the hotel with a very entertaining presentation by Tine Tomažič, Director of Engineering and Innovation at Pipistrel.

For those that missed the workshop, the majority of the papers and tutorial were recorded and the videocasts should be available soon. Overall, the European FTSW was a great success. Workshops are one of the key deliverables of the FTSC and I am looking forward to the FTSC organizing another European Workshop in two to three years. We are already in discussion with a few different organizations about hosting and if you are interested in helping with or hosting that event, please let me know.

In other news, our sub-committees are continuing to make great progress behind the scenes. As a reminder 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 AI sub-committee is just about to release our first LLM interface with our FTSC Paper Database Search Tool. This would not be possible without the outstanding efforts of our AI sub-committee member Ryan Bowers. How does this tool work? Here is a brief description that Ryan put together on the tool:

The tool uses a technique called Retrieval-Augmented Generation, which uses an LLM connected to a database of information. RAG is a technique to fine-tune an LLM to a specific database, in this case all the resources available on flighttestsafety.org, without the need for retraining, which would be expensive and infeasible for small-scale use.

When you ask a question, the RAG tool first generates a general answer and then backs it up with information retrieved directly from our database. The RAG does the following:

1. Database Creation: The files in the database are broken into text "chunks" which are converted into numerical vectors ("embeddings") that encode their semantic meaning. From this point on, the RAG tool only uses this vector database of chunk embeddings, and does not have access to the raw files (e.g. PDFs) in the original database.

2. Document Retrieval: When you ask a query, it is converted into a numerical vector embedding in the same way as the database files. The retrieval system then searches through the embeddings of all corpus documents to find the document chunks that are most similar to the query (using vector euclidean distance or another metric). These correspond to the most relevant documents.

3. Context Assembly: The most relevant document chunks are retrieved and combined with your original question and conversation history to create a comprehensive context.

4. Response Generation: A large language model (in our case, a lightweight variant of Gemini) uses the combined context from step 3 to generate a response to your query.

Because the context from step 3 only contains the most relevant content from the database, the LLM's response is tailored to your query and is less likely to be distracted by irrelevant content.

Our tool maintains conversation history, as you would expect on a typical ChatGPT type interface. Each new message includes the previous conversation context, allowing for follow-up questions and coherent multi-turn discussions. When you are ready to change topics, you can clear the chat history. Like other LLM-based chat tools (e.g. ChatGPT, Claude, Gemini), this tool uses a system prompt which your query is appended to. This prompt shapes the model's behavior, tone, and things it is allowed and not allowed to say in response to your query.

We do have the ability to tune the system response through the prompt that is appended to the user's question. Once the tool is released publicly, feedback is very much desired, and we can go in and tweak the prompt to try and improve results. Also, if you have additional resources you think we should add to the curated data the RAG access, please let the FTSC know. It is a very simple process to add new data.

The next step once this is released is to start working on a potential replacement for the Flight Test Safety Database using a similar system. It will most likely start as a separate tool, but maybe one day we will be able to combine all of these into a single tool. I read a great article recently that Paul Smith, a member of the AI Sub-committee wrote titled The "Ghost" in the Data: Why Your Safety Review Needs an AI Adversary. This is where the flight test community needs to go in the future, and I am hoping the FTSC is doing a small part to help us get there.

Stuart "Chia" Rogerson

On Conditions – the Flight Test Safety Podcast

NEW Episode of "On Condition" EP 71 - Critical Incident Response Part 2. In this slightly tardy Halloween episode, I share a tale of a spooky airport. I also finish my discussion with Louise Cullinan on Critical Incident Response.

If you are interested in watching the video of this two part series, you can find "On Condition" on YouTube HERE.

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