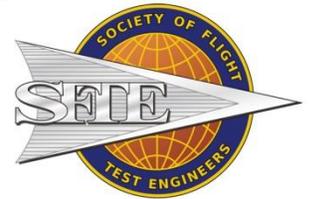


FLIGHT TEST NEWS



Published by the Society of Flight Test Engineers

Russ Erb's Paper wins 2017 Best of Symposium

Russ Erb earned top honors at the 2017 Annual Symposium with his paper, *Dealing with the Wind: An Analysis of the Turn Regression Airspeed Calibration Technique*. The paper is included as an attachment with this edition of the *Flight Test News*, and I urge you to read it.

I first met Russ in the Pitot-Statics course at USAF TPS (2007), but what I remember most is what he taught us during the walk around of several gliders in Tehachapi. In addition to helping us see, in each aspect of the glider, what we had learned in the classroom courses, he taught us how to look at aircraft in a whole new way, as engineers. He showed us things that had been hidden in plain sight, aspects of aircraft design and how the theory competes with pragmatism.

When he stepped onto the stage at the Symposium, his presentation, poise, and professionalism were exemplary. In addition, his approach to the topic was innovative and insightful. He reflected great credit upon himself, the USAF Test Pilot School, and the Society.

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Commentary

The Turn Technique Erb discusses deserves a quick background story. In February 2015, the *Flight Test News* first presented "What is Orbis?" a piece co-authored by Al Lawless and Mark Jones. It discussed the theory behind a continuous turn FTT designed primarily for air data calibration in RVSM airspace. The method was first introduced informally by Al in 2008, but a 2015 Symposium paper built on that foundation. In May 2016, another article appeared in the *Flight Test News*, "Exploring (and Improving) GPS-based Air Data FTTs." One of our readers responded to that article in the November 2016 edition, and several papers addressed Orbis at the 2017 Symposium. The topic has been looked at extensively. In the May 2016 article, though, I introduced noise into the model used to evaluate the solutions provided by the Orbis method. In the course of that discussion, I posed several questions about the wind and assumptions we make about wind. Is constant wind a fair assumption? Is constant wind plus some modeled, random variance a better assumption? Is there data on the variance in wind speed and direction? Erb's work in this paper represents a major step, a major finding, in addressing these questions. So without further commentary, I present the author's bio and abstract, in his own words.

Biography

Mr. Erb is a Flight Test Engineer graduate of USAF TPS Class 89B and the Performance Master Instructor for the USAF Test Pilot School. He is responsible for the first phase of instruction which teaches Test Pilots and Flight Test Engineers to measure and evaluate aircraft performance and also introduces them to structured test conduct and working as a flight test team. He is well known as the Pitot-Statics Instructor for TPS since 1997. In addition to classroom instruction, he flies to teach and evaluate airborne test conduct, and is a Certified Flight Instructor for the curriculum events accomplished in gliders. His flight test experience includes the MC-130H Combat Talon II, B-1B Operational Test and Evaluation, and other small programs in support of USAF Academy flying programs. Mr. Erb is a long time member of SFTE, having joined in 1983 as a charter member of the Texas A&M University student chapter, the very first student chapter ever. He has held positions in the Antelope Valley Chapter and is currently a Senior Member. He has previously presented three Symposium papers and three Symposium training classes.

Abstract

A simple project to determine position corrections for the author's Bearhawk morphed into an investigation of the assumptions and sources of uncertainty in two airspeed comparison flight test techniques. This investigation led to the realization that the "constant wind" assumption in the Cloverleaf flight test technique really meant time-invariant and location-invariant winds, which in practice is too idealistic. Continued investigation into how uncertainty in the wind had resulted in less than desirable results from the Cloverleaf technique in the past led directly to a justification for the structure of the Turn Regression technique. The robustness of the Turn Regression technique in the face of time-invariant but location-varying winds is demonstrated. The effects of sample size on results are discussed, as is the importance of flying a complete turn. Actual position corrections were determined.

Editor's note: we are eagerly awaiting publication of an FTT textbook by Mr. Erb.

#Winning in the New Year

This is Jake, my youngest son, and he just turned seven this past June. I wish this picture had better resolution so you could see the look on his face. I snapped it with my phone, and the fact that I was able to time it so he was halfway down the ramp is a miracle. If you could see the look on his face, you would recognize that it is a look halfway between deathly afraid and pure joy. This picture captured that moment when fear gives way to euphoria.

Just a few moments before, he wouldn't even get on the ramp, wouldn't even stand at the top. He was too scared, and this wasn't even our first trip to the skate park. We'd come one week before, and he was too intimidated by all the big kids around him to even use his scooter at all. On this trip, it took him thirty minutes of scooting around on the flat concrete to work up the nerve to get on the ramp. If you could have seen him look down the ramp, seen the fear in his eyes...

So there I was, in the waning hours of the day, watching my youngest conquer his fears and transform them into an adrenaline rush. It was a proud moment, so like any Dad with a variety of social media accounts, I immediately imagined posting the picture on facebook and adding an epic caption: #winning. It's pronounced "hashtag winning."

Some readers have no idea what I'm talking about, so I'll try to explain. There aren't a set of rules that tell you when you can and can't use this hashtag. Furthermore, it is starting to get overused like its predecessor, #epic. But I'm sure you can imagine a situation during which you succeeded at life in a surprising way... what you accomplished was so surprising or so fulfilling that it needed its own label.

For Lee Bell, a fellow FTE who has two very young children, it was the time he first successfully changed a diaper without getting IT everywhere. It also applies when you remember to select duplex before printing the 100 page report, or that time you almost dropped your coffee cup but somehow managed a ninja move that didn't spill a single drop!



And like the picture, it applies when your dad skills rise to the occasion. When you are able to coax your son off the top of the ramp onto his scooter, and when you are lucky enough to snap a split-second photograph of said epic moment, something suitable for sharing on facebook.

"Hashtag winning"... Perhaps you've heard this phrase before or even used it yourself. If you have, it might surprise you to know that my wife and I have recently banished this phrase from our vocabulary. We have replaced it with something we think is more appropriate. We made the decision to replace it based on a variety of factors...

Just a split second after the previous photo, Jake swerved wildly and bit the dust, ending up with the wound pictured (on the next page) along with one on his hip and a severely bruised ego. Luckily, Mom was there to provide the appropriate first aid and comfort his broken spirit.

It wasn't this accident that made us change our mind, convinced us to get rid of the label #winning. We had already made the decision before the crash. It was something else. Something was missing from the popular phrase.

For example, I am happy to report that just two weeks ago, I took my two youngest boys back to the skate park. Both of them have now conquered the ramps. They've even made it down bigger obstacles. So you can begin to see that the word "winning" doesn't tell the whole story. It suggests that the game is over and you can rest on your laurels.

As we all know—as you can see—that's not true in parenting, and it's not true for us today, whether we identify as an experience flight test professional or a new graduate. Therefore, we need a word that reminds us of everything I've said for the past few minutes, that it's okay to celebrate this moment, but the next moment may bring something different. And if it doesn't happen in the next minute, maybe it will happen in the next day or week or year.

What is that word? I'm not sure I know the answer, but my wife and I have adopted this phrase: #2points.

It's a basketball analogy. In this case the phrase is meant to convey two things. First it means that you can celebrate the moment. You made the shot. For the new graduates especially, I encourage you savor the moment. You deserve this. But after you let out a cheer, it's time to hustle back down the court and set up on defense. For the past year, the graduates have had someone keeping score for them, but they are entering a new stage.

(continued next page)

#Winning (continued)

“Hashtag 2 points” is a basketball term, but I could have picked any of a number of phrases. We could have used Nascar racing or running or even combat. But the point of this phrase is NOT to explain all of life’s existential questions but to remind us that the game is not over.



As the new graduates arrive—as a new year begins—we all need to remember that the game is not over. The holiday break was halftime, but now we have to get back in the game. The coming year will serve as a major milestone in our Society, but it will also give us a chance to evaluate our game plan. What does it mean to win in the next half-century? What worked well and what didn’t? How have the demographics of our Society changed and how does this affect the way we do business? A similar line of questioning applies to each of us, individually as well. I hope we can all think about these things as we start off our New Year and the next stage of our profession. How do each of us measure progress, success, in the next stage of a career? How do we keep getting better, and how do we make sure everyone around us is getting better too? How do we adapt to the changes, and how do we make it better for those coming behind us, those following in our footsteps. It’s a lot to think about, but there are people counting on us. Let’s hustle!

ETPS Graduates Ten

David Widginton, Principal FTE Tutor at Empire Test Pilot School in Boscombe Down, United Kingdom sent this photograph and list of graduates.



FltLt M Spector (RAF); FltLt R Podmore (RAF); Mr J Sequeira (RAAF); Capt B Sterby (CAF); FltLt B Graham (RAAF); Mr D Welman (QinetiQ); Mr R Bentley (QinetiQ); Mr T Locher (Armasuisse); Capt B Mattock (CAF) (not pictured); and IPA J B Saint-Pierre (French Navy).

They class patch, designed by the students, also appears below.



Do you have an ETPS class patch or original graphics files? Email editor@sfe.org for submission. We’d like to include this kind of visual depiction of our history in an anthology of sorts, a project we plan to publish as part of our 50th Anniversary celebration coming up. You can also submit your current patch or nametag from the flight test department, OEM, school-house, etc., that you work for now. If you can include a brief description of the symbolism or history of the design, that would help us greatly. We look forward to sharing your photos.

ITPS hosts 6th Annual Flight Test Seminar and Graduation Ceremony

The 6th Annual ITPS Flight Test Seminar and Graduation event took place December 14-15, 2017 in London, Ontario, Canada. This time the seminar was a joint event with the SETP Canadian Section and the SFTE Canadian Chapter gathering flight testers from around Canada, US and overseas. A total of 19 technical papers were presented spanning, civil, military, fixed wing, rotary, transport, combat and UAS flight tests.

The event was attended by several SFTE members including Past President and SFTE Fellow James Sergeant who presented on “F-35 Program Update for 2017”, current Vice-President Panos Vitsas who talked about “NDI principles and FQ testing of modern combat aircraft” and Canadian SFTE Chapter President Adam Emond who presented on “Testing the CT-114 at the Aerospace Engineering and Test Establishment”. The seminar was capped by the Graduation event and Gala dinner, where the graduating classes of test pilots and flight test engineers received their certificates and were warmly welcomed to the profession by their peers. Keynote speaker of the evening was spaceship Test Pilot Brian Binnie SETP(AF) who talked on his experience and lessons learnt from the Spaceship One and Rotary Rocket projects.

The 7th Annual ITPS Flight Test Seminar will take place December 13-14, 2018 in London ON, Canada.



After the graduation dinner, the FTE graduates received their SFTE patches and one year of free membership by the current Vice President.



NTPS Announces 12 & 6-month Course Graduation

The National Test Pilot School in Mojave, California congratulated its FTE graduates in December: Twelve-month Course Graduates: Benjamin Habeck; Tino Kuenstler; Jared Basile; Matthew Chapman; and Stephanie Luongo.

Six-month Course Graduates: Simone Cataldo; Adrian Mueller; Ilka Breva; Michael Wiedmann; Michael Haase; Pasquale Di Biase.

NTPS did not have a class patch at the time of publication. We would be delighted to share the patch in the future, of this or any NTPS class. Email editor@sfte.org for submission of this or any graphics files.



USN TPS Graduates 34

(Credit: USN Public Affairs) The U.S. Naval Test Pilot School (USNTPS) held a graduation ceremony for Class 152 at the Holiday Inn in Solomons on Friday, December 15, 2017. Thirty-four students successfully completed an intense 11-month course of instruction and were designated as Engineering Developmental Test Pilots, Test Flight Officers and Test Engineers.

Mr. Michael Carriker a USNTPS Class 87 graduate and former USNTPS instructor delivered the keynote address. He currently is Chief Engineering Pilot, Boeing Test and Evaluation and Chief Pilot, Airplane Development, Boeing Commercial Airplanes.

Rear Admiral Shane Gahagan (Commander, Naval Air Warfare Center Aircraft Division), Captain Thomas Tennant (Commander, Naval Test Wing Atlantic) and Commander William E.R. Hargreaves (Commanding Officer, USNTPS) presented diplomas and offered congratulations to the new "Testers". Graduates included members of the U.S. Army, Marine Corps, Navy, and Air Force; students from Australia, Great Britain, Finland, and Italy; and civil service engineers from the Departments of the Army Navy and NASA.

Capt Nathan Houle, USMC was presented the Outstanding Developmental Phase II Award from Commander Stephen Crockatt, Royal Navy representing Empire Test Pilots' School in Boscombe Down, UK. This award recognizes that individual in the class who produced the best final report and is symbolic of the long standing and mutually supporting relationship between the Empire Test Pilots' School in the United Kingdom and USNTPS.

Mr. Alan Flint, a NASA Engineer, was awarded the Commander Willie McCool Outstanding Student award which recognizes the top performing student in the categories of academics, flight performance, and technical report writing. The Willie McCool Award was presented by Mr. Tom Ganse representing the Association of Naval Aviation. The award is named after Commander Willie

McCool, an alumnus tragically lost in the space shuttle Columbia accident.



Lieutenant Commander Adam Madson, U.S. Navy was presented with the Syd Sherby Leadership Award. Mr. James S. Moran representing the Patuxent River Council of the Navy League of the United States presented the award. The award is named after Captain Sydney Sherby who established the test pilot training division, now the U.S. Naval Test Pilot School, in 1945. It is presented to the student who displays exemplary leadership in the class.

Twenty-four students completed the requirements for the engineering test pilot course. The new test pilots are: LCDR Adam D. Abitbol, National Oceanographic and Atmospheric Administration; LT Robert E. Ball III, U.S. Navy; Capt James M. Cappabianca, USMC; Capt Derek J. Carden, USAF; LT David M. Chapelle, U.S. Navy; LT Matthew J. Dickens, U.S. Navy; Maj Peter G. Farrimond, AAC (British Army); LT Noah J. Gray, U.S. Navy; Maj Benjamin D. Hartley, USMC; Capt Nathan E. Houle, USMC; CPT Nathan A. Klein, USA; LT Daniel M. Krier, U.S. Navy; LT James M. Licata, U.S. Navy; Capt Mikko P.P. Luukkanen, FiAF; LCDR Adam M. Madson, U.S. Navy; CPT Michael J. Monfreda, USA; Maj Aaron E. Okun, USMC; CPT Daniel L. Pechacek, USA; LT Christopher A. Polhemus, U.S. Navy; SQNLDR Mark Searle, RAAF; CW2 Zealand D. Shouse, USA; Capt Davide Sottotetti, ItAF; LT Megan J. Stateler, U.S. Navy and LT Neil W. Whitesell, U.S. Navy.

Five students completed the engineering test flight officer course. They are: LT Sarah E. Gunn, U.S. Navy; LT Jason D. Miller, U.S. Navy; LT Ryan W. Miller, U.S. Navy; LT Tara A. Palmer, U.S. Navy; LT Kyle J. Saraceni, U.S. Navy. Five students also completed the test project-engineering course. They are: Mr. Benjamin D. Breitberg, Naval Air Warfare Center Weapons Division; Mr. Alan N. R. Flint, National Aeronautical and Space Administration; Mr. Andrew J. Macemon, Department of the Army Civilian; Ms. Justine M. Roemer, Naval Air Warfare Center Aircraft Division; FLTLT Aaron P. Thompson, RAAF.

SFTE Call for Patches: We want pictures of your Flight Test patches, especially this and any previous USNTPS class patches. Please send or share photographs or original graphics files on facebook, or email them to editor@sfte.org. If you can include 100 words describing the history of these patches, that would be an excellent addition to your contribution. (This call extends to any FTN reader.)

USAF TPS Graduates 20

(Credit: USAF Public Affairs) The U.S. Air Force Test Pilot School gave the test world 20 new experimental test pilots and flight test engineers Dec. 8.

The “Shockers” of Class 17A stood proudly before friends, families, base leadership and fellow testers in Hangar 1623 as they received their Master of Science Degree in Flight Test Engineering. As each graduate crossed the stage they received the graduate plaque from TPS, the diploma from Air University and the graduate coin.

The graduation is the culmination of an intense, 48-week program that included more than 2,500 hours of academics and approximately 120 hours of in-flight training; transforming top operational pilots, navigators and engineers into elite flight test professionals.

Students from the U.S. Navy, France and the Royal Australian Air Force were among the mostly Air Force class. For their master’s degrees, the students demonstrated learning by planning and executing test management projects.

The guest speaker for the graduation, Thomas Morgenfeld, graduated from Empire Test Pilot School. His aviation career spanned more than 50 years. He flew more than 80 aircraft types, according to his introduction, including the F-117 Nighthawk, F-22 Raptor and the early prototype of the F-35.

“If you don’t remember anything else, remember never, never, never, never, ever, let your guard down,” said Morgenfeld. “New airplanes and new systems will be just waiting to jump on you. There’s just things you don’t know so keep your guard up at all times. There’s no such thing as an easy-peasy flight.”

“Things these days have become so complex that you really do need a team effort to get through this stuff. It’s virtually impossible for one person to know everything about the airplane so build your teams, study hard and trust the teams. Developing a solid team in testing is the key to the whole thing.”



Class 17A graduates join 3,000 alumni including more than 100 general officers and 60 astronauts.

Test programs across the Air Force Test Center and beyond integrate TPS graduates into test teams to shape the technology and weapon systems of the future for the Air Force, sister services and allied nations.

TPS CLASS 17A GRADUATES

Capt. Shane Bellingham; Capt. Philip Downing; Flight Lieutenant Adam Francki (Royal Australian Air Force); Maj. Michael Fritts; Capt. Benjamin Gilliland; Capt. Timothy Grace; Capt. Weston Hanoka; Capt. Alexander Hillman; Capt. Matthew Illowsky; Capt. Jacob Lambach; Lt. Gavin MacGarva (U.S. Navy); Eric Menant (France); Maj. Jacob Rohrbach; Capt. Mark Shaker ;Capt. Thomas Stuart; Capt. Carl Tegtmeier; Capt. Jason Thomas; Capt. Michael Tibbs; Capt. Daniel Welch

USAF TPS Class 17A Class Patch



The “class patch” is a rich source of aviation history, usually mixed with a bit of sarcasm and the character of each TPS class. If I was a betting man, I would wager that leadership weighed in heavily on the design of this particular class patch, since it was such a high-visibility milestone in the the USAF TPS history. I haven’t looked at the patch above upside-down or in a mirror,

but sometimes a class is able to sneak messages and symbols into the design using this kind of subterfuge.

Do we have any USAF TPS grads from 1968? That class patch would make a great addition to the anthology project, a yearbook of sorts. It is something we are working on and planning to publish to commemorate our 50th anniversary.