

FLIGHT TEST NEWS

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Build the Scaffold: The Future of SFTE

Loosely speaking, three things happened during any Apollo mission. The launch was a disruptive phase during which the transformation of fuel and energy created a tremendous amount of heat and smoke as the rocket built momentum very slowly. During the second stage, material was discarded to focus limited valuable resources on the remaining task. Finally, ultimate success required precise navigation to the destination. This seems like a good analogy for any organization, but there is an important aspect that this analogy overlooks—the scaffold.



The scaffold itself was a marvel of engineering. Anyone who drives by a road or bridge construction project can watch similar feats unfold in real time. The investment of time and work in the scaffold is definitely non-trivial.

In several poignant cases, our members have been building the scaffold for our Society. This month two stand out. In both cases, we see our members doing activities that support our primary purpose but do so on the periphery. In this way, they are not attracting the attention commanded by a Saturn V, but they are investing in the future of SFTE, flight test engineering, and the aerospace profession. Vanessa Bond, last year's Kelly Johnson Award winner reflects on the legacy of our Society and this award, and in so doing highlights the efforts of another member. Chili Sakis discusses the STEM Rocket Day recently hosted in the Emerald Coast region and the value he places on investing in the next generation of FTEs, scientists, and industry leaders.

Vanessa Bond Launches Engineering Adventure

You may recall from last year that Vanessa Bond had to miss the SFTE Annual Award Ceremony to coach a soccer game for her daughter. Family values were, and continue to be, one of her top priorities, one of many personal characteristics which place her in high regard.

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Flight Test News

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In This Edition

Historical Spotlight

Facts and figures that highlight our 50th anniversary this month!

Flight Test Foodie: Savannah Suggests

Continuing a new tradition started last year, we collated a variety of suggestions for eats (and activities) laced with Southern Charm, from the Coastal Empire members, as they will generously host the Annual Symposium in just a few days.

Politecnico Di Milano Flight Test Campaign

Dr. Lorenzo Trainelli returns with more news from Italy, and he provides details on the staff led annual flight test campaign of the Flight Testing graduate course at the Politecnico di Milano University (PoliMI), their unique Flight Test Instrumentation package, and a light aircraft recently certified using both instrumentation and graduates of PoliMI.

Build the Scaffold

Dr. Vanessa Bond and Chili Sakis describe what they value in both our historical legacy and the future of our profession.

The Future of SFTE (continued)

Vanessa Bond (continued)

Retirement (from the Air Force) has given Vanessa more time to spend with family and the opportunity to embark on an adventure in entrepreneurial endeavors as an engineer. She shared both of these observations with me as she reflected on the historical legacy of our Society, Kelly Johnson, and the award named after him.

Reflections on Clarence “Kelly” Johnson Dr. Vanessa Bond I am humbled by the request asked of me, to reflect on this great heritage. While I certainly knew the legacy left behind by such an ingenious engineer, Kelly Johnson, I wanted to know more. In this last year I got that opportunity first hand. I had already started my own company but only recently had the chance to work directly on those hallowed grounds—with streets named Ben’s Place, Dragon Lady Drive, and of course, Kelly’s Way. There Kelly Johnson built a way of thinking and innovating that is infectious, and his influence is apparent in the innovations of the people that carry on his legacy. I am humbled, again, by the fact that I get to work with them to solve hard engineering problems—things that have never been done before—and determine how to flight test these innovations in the near future. Truly amazing and breakthrough work is done across the small worksite he started and across the nation. Kelly's mindset continues to live and breathe – a small group of people with honed skills and determination can do great things most people just dream of. For example, just recently, I went to my daughter’s elementary school class, where a friend, colleague, and SFTE member in our local chapter, taught the students how rockets and airplanes work and then helped build a model rocket. It was priceless to see the excitement in their faces as we pass on that legacy to them, but they returned the favor with the energy and gratitude they gave back to us. Kelly passed on his legacy from his very modest beginnings as a child to soaring heights he made possible. Not only was he able to design and build new inventive machines, he had to develop new tooling, new fuels and avant-garde ways to test—and they flew soon thereafter! For example, here is a short excerpt from his book (I highly recommend it): “This billion dollar [SR-71] program was initiated in February 1963. The first operational aircraft will begin flight testing in early 1965, and deployment of production units to the Strategic Air Command will begin shortly thereafter...”

DECEMBER 23, 1964. DEPARTMENT OF DEFENSE NEWS ANNOUNCEMENT: “First flight of the U.S. Air Force SR-71, the new long-range strategic reconnaissance aircraft took place yesterday at Palmdale, California.”

(Excerpt from “Kelly” by Clarence L. Johnson)

From design to flight of such a marvelous aircraft in such a short time is just one of Kelly’s many accomplishments. He did it with a team of highly skilled and motivated people, like the kind we associate with every day in this Society. Thank you for what you do every day in leading this flight test community into the future.



Chili Sakis Leads Emerald Coast STEM Days

Chili Sakis was the mastermind behind the recent 2-day STEM Model Rocket activity, co-sponsored by the Southeast Alabama Rocketry Society and the SFTE Emerald Coast Chapter. Here are his reflections on the past and future of our profession.

Reflections

Chili Sakis

As a kid growing up in Queens, NY, that loved flying model rockets and model aircraft, I would scope out any small patch of green grass, parks, etc. – basically, any place not covered in concrete and asphalt, which is tough to find in Queens – in order to fly my models. Even now, every time I see a large open field, my mind always thinks about what I can possibly fly there. When I was stationed here at Eglin back in 2010, I would always drive by Eglin range C-61A, a huge 1 mile by 1/2 mile grass field on SR 285. It's used as a C-130 drop zone among other things. I thought to myself, “what a great field this would be to teach kids to fly model rockets!” And that's how it started. Since “DJ” Johnson, my classmate from TPS class 01A was the Ops Group commander, I approached him with the idea. I also contacted the Eglin safety office and one of the guys there told me he was a member of a local model rocket club called the Southeast Alabama Rocketry Society, and they would be happy to support us with their equipment and personnel. (They have the most Gucci model rocket launch equipment!) Luckily, I had saved all the paperwork from the 2013 event, so it was a little bit easier this time around. I contacted Col Devon Traynor's exec, Capt Anderson, and asked if he could gauge the front office's pulse for having an event like the previous one again. I wanted to make sure it was feasible and agreeable to the leadership before doing all the coordination again. Once I got the green light we began the planning. Craig “Tacs” Porter, Nathan “CAP’N” Cook, and Daniel “Razor” Sharp helped with some of the coordination and set up for the event. I contacted the Vice Principal at Bluewater Elementary School in Niceville after meeting her for the first time at my daughter's birthday party. Her daughter and our daughter are in the same 4th-grade class. She loved the idea, so we picked a Friday morning to build the rockets at the school, teach the kids a lesson on the science behind rocket flight, and then they would all come to the range the next morning and fly their creations.

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The Future of SFTE (continued)

Chili Sakis (continued)

The Emerald Coast Chapter of SFTE picked up the tab for all the rocket kits, building supplies, glue, and Estes rocket motors.

The classroom rocket lesson and build were very exciting. The kids really enjoyed building those rocket kits. There were many parents there helping and guiding as well, and even the teachers were helping to build. I only wish we would have allotted more time to answer their questions—that would be one thing I would change for the next time because there were so many little hands raised, but we only had a limited amount of time before their lunch hour began. Launch day was magical. The look on their faces as their rockets streaked skyward was priceless. So many parents and teachers came up and thanked us before leaving. Their science teacher loved it so much she said: “What else you got! We’d love to have you come back!” Definitely, a day to remember. Yep! STEM model rocket day was a success.



Flight Test Foodie: Savannah Suggests

Continuing a new tradition started last year, we collated a variety of suggestions for eats (and activities) from the Coastal Empire Chapter members as they will generously host the Annual Symposium in just a few days. These recommendations are better than Yelp, because they are engineer friendly!

Things to Do

Bonaventure Cemetery

“Bonaventure Cemetery is unique, really unique. It is not in the city but well worth the short cab ride. Wealthy 18th century colonial religious relics meet voodoo and Spanish moss. The statues and monuments are amazing” (Ben Luther).

Eats

The Chromatic Dragon

chromaticdragon.com

“I think Bob Brock here has been campaigning to lead a group to this place. To be fair, it’s my family’s favorite place to go downtown. Even the menu is game-themed” (Mark Mondt).

“You’ve seen these places on The Big Bang Theory; now’s your chance to experience it for yourself! Ever wanted to go to a bar where you and your friends could play Dungeons & Dragons or Cards Against Humanity? How about Mario Kart and Mortal Kombat? Maybe board games like Ticket to Ride or

Settlers of Catan? All the while enjoying delicious food and drink? The Chromatic Dragon is the place” (Bob Brock).

Rise Biscuit Donuts

The Editor’s pick – the only thing I know about this place is that it serves donuts that look amazing (admittedly everything looks amazing on the internet).

Collins Quarter

www.thecollinsquarter.com

“Your source of espresso in the Deep South. For visitors who need espresso, Rebecca works the bar at Collins Quarter, about 2 blocks from deSoto. She knows that a macchiato doesn’t have syrup in it, and that there’s nothing express about it.”

“New-Australian cuisine and best coffee in Savannah. Best for brunch.”

“Located in one of Savanna’s many vintage buildings, the Collins Quarter offers an intimate setting for dinner as well as one of the best brunches I’ve ever had. The wine selection is great and they have one of the best avocado toasts I’ve had for brunch. I get a Lavender Mocha every time.”

Soho South

www.sohosouthcafe.com

(Right across the street from DeSoto) “Beautiful restaurant built in an old garage. THEY HAVE THE BEST GRILLED CHEESE I’VE HAD. You’ve got several kinds of cheese including a smothering of pimento and I get mine with bacon and jalapenos. Perfect setting for a lunch.”

Flying Monk Noodle Bar

www.flywiththemonk.com

Asian Pho Dishes and Asian Style Curry. This place is very popular with lots of very flavorful dishes true of the culture. And they are fast!

Little Duck Diner – Upscale Diner Feel, Brunch/Lunch/Dinner

The Public – Right by the DeSoto, Clean and Simple Food Options (salmon, chicken, veggies, etc.)

Green Fire Pizza – Very good pizza... Right in the hustle and bustle of Savannah. It is an old gas station remodeled into a cool pizza place!

Other Food/Drink

Jen’s & Friends – Unique Dessert Drinks, More of an Order and Take to Go Place

Peregrin Rooftop Bar

www.perrylanehotel.com/dine/peregrin

Very cool Bar on top of the Perry Lane Hotel! European Beach Day Vibe, Upscale and Wonderful view of Downtown Savannah.

During the early hours of the evening, a perfect place for a date or quiet conversation. During the later hours, a perfect place to enjoy an evening of revelry with close friends. The vistas are best from the rooftop of one of the finest hotels in town.

Note: There were so many great recommendations, we couldn’t print them all. But I’m sure our hosts would be happy to take you out with them for a night on the town.

Politecnico Di Milano Educational Flight Test Campaign

Lorenzo Trainelli

Between May 25 and June 1, staff led the annual flight test campaign of the Flight Testing graduate course at the Politecnico di Milano University (PoliMI).¹ Four days of focused work were necessary to carry out 20 flight missions, one for each student attending the course. Students acted as Flight Test Engineers (FTE) responsible for each test mission, flying alongside an expert instructor pilot, who, incidentally, took the same course a few years ago and graduated the university's aeronautical engineering program.

"Since many years", says Lorenzo Trainelli, PhD, professor of Aircraft Design and Flight Testing at Politecnico di Milano, "we've been running a flight test campaign using an instrumented ultralight two-seater. Students learn the fundamentals of the job of an FTE by doing it!"

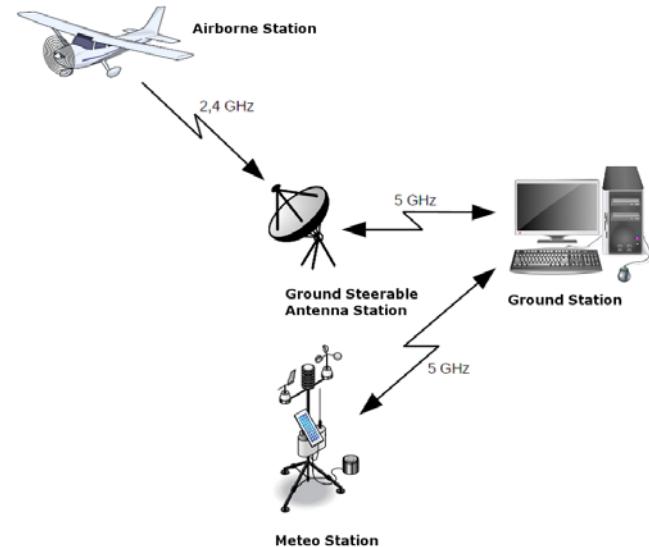
Active since 2005, the Flight Testing graduate course is an elective within the Aeronautical Engineering MSc curriculum offered at PoliMI.² The aim of the course is to provide fundamental concepts and skills on the flight testing process, its principles, techniques, operational organization, and practical execution. Its program closely adheres to the typical content of an introductory course offered in a professional flight testing school. However, within academic courses at large, it has a unique feature: each student is required to plan, perform and report on a real flight test experience. The flight test experience encompasses a wide array of topics in performance and flying qualities, including stalls, climbs, glides, level accelerations/decelerations, longitudinal and lateral-directional static and dynamic stability. The students must prepare a Flight Test Planning Document and the corresponding flight cards, according to typical FT guidelines and best practices. This documentation is discussed with the manufacturer and the pilot for final approval: "Plan the flight – fly the plan!" The tested aircraft was the G70, a two-seater designed by the Italian ultralight manufacturer Nando Groppo.³ This high-wing, tricycle airplane was equipped with the Mnemosine flight test instrumentation (FTI) developed at PoliMI's Department of Aerospace Science and Technology. This equipment, designed especially for light aircraft, allows the high-frequency retrieval of over 40 time-stamped flight parameters.

Third G70 prototype fitted with the "Mnemosine" FTI system



A group of PoliMI's Flight Testing students in front of the G70 second prototype with the pilot and the course teachers.

Fitted onboard eight different airplane models to date, the Mnemosine FTI supported over 300 flight test missions and was instrumental in obtaining the type certification of two of Nando Groppo's products.^{4,5} "The equipment is completed by a telemetry link, a ground segment including a control station and a weather station," says Alberto Rolando, adjunct professor of Aircraft Instrumentation and Navigation Aids at PoliMI and Mnemosine designer/developer, "as well as a 'smart kneepad' for the FTE, fitted with top/event switches and a display which repeats a set of acquired parameters in real time."⁶



Mnemosine FTI telemetry system architecture

The data gathered by the FTI, together with the students' annotations, in flight and during the briefings, are processed and results are presented in a Flight Test Report, which constitutes an essential requirement for the course evaluation. Trainelli recalls that "For the first time this year, the traditional flight test campaign was complemented by an immersive exercise at Italian Naval Aviation Test and Evaluation Center", as reported in *Flight Test News*, Vol. 49, No. 6. "This added much to do to an already packed schedule, but the educational outcome of this effort was definitely rewarding."



"Smart kneepad" on the FTE's right thigh

Once again, this complex activity was completed successfully, bringing a very special flavor to the students' last semester. A grateful thank goes to manufacturer and airfield manager Nando Groppo and to pilot Simone Quaglietta for the wonderful job performed.



Student flying the mission as FTE.

References

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3. See: <http://www.groppoit/site/en/>
4. Trainelli L., Rolando A., "Reliable and Cost-effective Flight Testing of Ultralight Aircraft", Journal of Aircraft, 48 (4): 1342-1350 (2011). <http://dx.doi.org/10.2514/1.C031277>
5. Trainelli L., Rolando A., Gadarco T., Terzaghi V., Riccobono M., "Flight Testing of a New Ultralight Airplane for LTF-UL Certification", 27th Annual Society of Flight Test Engineers European Chapter Symposium, Nuremberg, Germany, May 10-12, 2016. <http://www.sfte-ec.org/node/948>

6. Rolando A., Rossi F., Castelletti T., Reghennani F., "Mnemosine Mark-V: the Fifth Generation of an Ultra Light Machine-Dedicated FTI System", 27th Annual Society of Flight Test Engineers European Chapter Symposium, Nuremberg, Germany, May 10-12, 2016. <http://www.sfte-ec.org/node/946>

Thoughts for the Future

I think we need to think about the future more. Here are some of my random thoughts in no particular order.

1. Would love to see "us" (the profession) adopt a more modern medium for publication. For example, publish one paper a year (maybe in partnership with SETP) in a Jupyter Notebook/Markdown format. You may recall that a Jupyter notebook is an interactive, web based medium that allows printed material side by side with computer code and interactive graphics. That allows the reader to interact with the data rather than just try to read poorly formatted excel plots, for example. It's also super easy to publish these to the web. We have a professional responsibility to showcase the work of our members as a way to highlight their professional excellence and add credibility. Similarly with book reviews: Book reviews could be on a publicly accessible portion of a better, much better, not so visually displeasing website. Book reviews help the profession at large and our members.

2. Would like to see "us" publish something that influences the profession at large. What are we doing to serve our GOs, VPs, etc. – are the things we print helping them lead flight test orgs?

3. Would like to see us publish item 2 in our more accessible medium, something anyone and everyone can get to...maybe on a public facing web page.

4. Would like to see the Society underwrite the cost of travel for distinguished guests.

5. Would like to see more activity undertaken to mark this momentous occasion, our 50th, for the next several months until the next Symposium.

6. I think the Flight Test profession needs a podcast.

7. Thinking about leadership development is critical, especially how we invest in future FTEs to prepare for leadership of our Society. How do we invest in current leaders?

8. Did you see Cap'n's memo, *A Modest Proposal*?

9. Should we investigate the possibility of recording our Symposium and publishing audio tracks of the talks? What about selling a ticket for the livestreamed event?

10. More graphic design support. Resnik Shaw of Red Emblem Design Company did an amazing job with the Annual Report. What are your thoughts about the future of our Society?

Early Historical Timeline

October 7, 1968: Seattle Boeing FTEs aim to establish a society

October 24, 1968: First SFTE weekly meeting.

October 29, 1968: First Publicity Committee Meeting

November 13, 1968: Board sets paperwork deadlines

November 27, 1968: Initial draft of Constitution and Bylaws

December 4, 1968: Nominating and Elections Procedures, Formation of Chartered Chapters

December 11, 1968: Constitution

December 18, 1968: Bylaws

December 26, 1968: Secretary of State approves the Articles of Incorporation.

1969

February 5, 1969: First report of Members: 7 applicants received at this point

April 9-10, 1969: Flight Test Management Technical Meeting hosted by SFTE

May 1969: Final Constitution Acceptance

May 1969: First National Election

June 1969: Final Bylaws Acceptance

June 4, 1969: Induction of additional chapter (Antelope Valley) Switched to holding monthly meetings

September 3, 1969: Non-Profit Status approval was announced to the Board of Directors

October 1969- May 1970: Six Chapters created, each holding monthly dinner meetings with either local or visiting speakers or flight test films.

October 3, 1969: Antelope Valley Chapter established

November 5, 1969: Long Island Chapter established

February 2, 1970: North Texas Chapter established

April 1, 1970: Patuxent River Chapter established

May 6, 1970: Los Angeles Chapter and Wichita Chapter established



X: Exploring the Unknown

A short history of flight test engineering from 1968-2018

Published by the Society of Flight Test Engineers

Get your copy of the combined historical review and annual report at the 2018 Annual Symposium in Savannah, Georgia.

First Annual Business Meeting

October 5-7, 1970: Held in conjunction with Long Island Chapter's Technical Meeting "Computer Aided Flight Testing in the 1970s"

2 Journal issues published; monthly newsletter now implemented

457 total members; 404 Members, 38 Associates, 15 Affiliates

Second Annual Business Meeting

October 3, 1972: First National Board of Directors Meeting

Elections for a National Board of Directors

Board composed of AV and LA Chapter Members

Mailing address becomes associated with Lancaster, CA

1973 – Kelly Johnson Award established

August 20, 1973: Society Award Program - Award to be presented annually to a member who excelled in his particular flight test field. Kelly Johnson received the award, and the award was then named in his honor.

January 22, 1974: Discussion to implement scholarship program

1984: William E. Houston is first recipient for a Scholarship of \$300.00