
Cold Weather, High Latitude Testing to Validate Formation Flight System

The wind was howling, as it often did here. With his eyes closed, he thought back just a few months, imagined the howling wind blowing over the Tehachapi Mountains, blasting his face like a furnace. The 418th Flight Test Squadron had completed the developmental testing of the Formation Flight System at Edwards AFB in September and had conducted an operational demonstration at Pope AFB, North Carolina a month later. Both of these were build up for the Cold Weather, High Latitude FFS testing intended to demonstrate that the system, which relied heavily on GPS position information, continued to function in high latitudes. The test would also demonstrate GPS guided airdrop bundles in high latitudes and validate ballistics of cold-soaked parachute and rigging equipment in the high north. Cold weather was a side effect, but during the airdrop portion of the formation flight, temperatures inside the cockpit would drop sufficiently to put the avionics near their lower limits.



He walked across the ramp, snow crunching under his feet, towards the formation of test articles arrayed in front of him. The column didn't represent a routine formation, but the engineering team at Boeing (formerly McDonnell Douglas) had designed the formation to stress the FFS. It was, they thought, the most challenging edge case. Two columns in four rows—eight total—led by a singleton in the front. The formation should be able to maintain position during any weather, especially IMC, and at a large range of speeds, which included high-speed transit at cruise, high-speed low-level formation, and low speed formation specifically configured for air drop.

Schedule pressure was mounting, and he tried to leave his anxiety behind him while he walked. Management wanted this test done now. The mission was real. He knew that, but the fact that it was cloaked in secrecy meant that he couldn't talk to anyone about his stress. He couldn't call any of his buddies to talk about the effect of the schedule pressure on the test flight risk.

He'd covered the distance while these thoughts went through his mind and found himself standing next to the crew chief, arm outstretched, extending the aircraft forms for his review. He reviewed the pending inspections, the complete work, and saw where the maintenance superintendent had signed the exceptional release, a red slash indicating the orange boxes that contained the experimental systems, instrumentation and development avionics. Finally, he closed the binder and glanced one last time at its cover: Special Access Northern Track Area. Handing it back to the crew chief, he donned his watch cap, and RED 01 mounted his sleigh.

Note: *The FTSF can neither confirm nor deny that the C-17 FFS testing validated the design of a system used in classified operations conducted in cold weather, high latitude on eXperimental Mission Aircraft Series designation X-25.*

Check out these links to read more about the C-17 Formation Flight System
<https://www.edwards.af.mil/News/Article/395159/formation-flight-system-keeps-c-17s-in-line/>
<https://ntrs.nasa.gov/api/citations/20205006743/downloads/AIAA20124802.pdf>
<https://www.dvidshub.net/video/97025/formation-flight-system-keeps-c-17s-line>

Merry Christmas from the Flight Test Safety Committee and the Flight Test Safety Fact

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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.

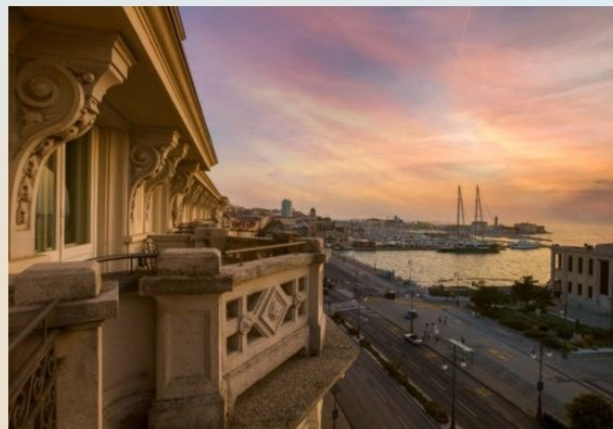
European Flight Test Safety Workshop 4th and 5th November 2025

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





This Month in Flight Test History: “Miller, Smyth safe after F-14 crashes returning from test flight”

<https://flighttestfact.com/miller-smyth-safe-after-f-14-crashes-returning-from-test-flight/>

CALVERTON, N. Y., DEC. 30, 1970.

No. 1 F-14 crashed and burned in a wooded area about one mile south of the runway here this morning returning from its second test flight. Both pilots on the flight, Bill Miller and Bob Smyth, ejected safely from the aircraft and are in fine condition. There were no people injured on the ground, nor was there any property damage on the ground.

The flight had started at 10:08 a.m. Accompanied by three chase planes, the F-14 lifted off from the Calverton runway, climbed effortlessly into a dazzling blue sky, banked right, and turned southeast toward the flight test area over the Atlantic Ocean. On the ground, about 50 people, including Company officers and program and flight test personnel, watched the twin-jet fighter as it disappeared over the horizon.

For the first 20 minutes or so, Miller, who was piloting the plane, and Smyth, Grumman Chief Test Pilot who was monitoring instrumentation equipment, flew the F-14 with wheels down, while testing the craft’s stability and control in various flight maneuvers. Then they retracted the gear and accelerated slowly from 133 knots to 180.

The first hint of possible trouble came about 25 minutes into the flight. It was then that Bill Miller reported a loss of pressure in a prime hydraulic system (a chase plane also reported fluid streaming from the craft) and that they were returning to Calverton. At the time of the initial failure, the F-14 was about 30 miles southeast of the field, about 4-5 miles over the water, flying at 14,000 feet.

Back-up system

The F-14 has two prime hydraulic systems working in tandem-if one fails the other automatically takes over the entire workload in actuating controls, etc., necessary for operating the plane in flight.

Although there was evident concern among those awaiting the returning plane, everything seemed under control in the air, with both Miller and Smyth reporting progress of the flight in unhurried, precise terms.

Miller delayed lowering his landing gear until the plane had descended to about 2,500 feet and was about four miles out and in sight of the runway. When he announced over the radio that he had blown the gear down with pneumatic pressure – “Nose wheel down and locked, both main landing gears down and locked” – there was a concerted shout of relief from the ground.

That mood changed quickly. Just a few minutes from touchdown, Miller re-ported that the aircraft had lost its flight control system (the other prime hydraulic system) and in a desperate effort to save the test plane, Miller switched to the Combat Survival System that allowed him to operate certain flight controls. (Normally, this option is used only at higher altitudes to permit a pilot to fly away from a trouble spot, say an enemy combat zone, to a safer area where he might eject.)

‘Can’t hold it’

But it was too late. The F-14, only a few hundred feet above the trees in its final approach to the runway, dipped lower and lower. Miller was fighting to hold the plane in the air, but it began to porpoise, nose up, nose down. Finally, Miller informed Smyth, “Nope, I can’t hold it-eject!” It was 10:45.

As flight crews, Company officers, and various members of the F-14 team watched, the F-14 disappeared into the trees, exploded, and sent a giant fireball rising into the morning sky. Disbelief turned to grief.

Through the black smoke, however, first one, then two mushrooming parachutes were spotted from the field but the feat persisted: Was it possible for two men to eject practically at tree-top level, in close proximity to the crash site, and survive?

When the rescue team reported some minutes later that both pilots were safe and unharmed, there was a loud cheer of unrestrained relief. Bitter disappointment had been sweetened by the safe return of Bill Miller and Bob Smyth.

In a debriefing session shortly after their return to the test flight facility here, Miller and Smyth described their flight at some length. The only apparent evidence of their narrow escape was a small Band-Aid on Miller’s hand.



One veteran pilot who was on the scene during the entire event noted that “I’ve never seen guys so cool after such a harrowing experience.” And his estimation seemed to hit the mark. Smyth, who piloted the F-14 on its maiden flight December 21, remarked that “I just sat obediently” until Miller decided they had to eject.

Smyth’s troubles weren’t completely over. He started to come down into the fireball, but “the thermal action from the fire carried me up and away to a safe distance-but my chute got singed.” Miller’s only concern, reports a crash-rescue man who met him walking away from the crash scene, was for Smyth’s safety. He hadn’t seen Smyth’s parachute mushroom and was worried about his flight mate.

Ejection system successful

Both were saved by the F-14 seat ejection system. The seat-ejection system had been proved out successfully earlier this month at China Lake Naval Weapons Center by an F-14 Crew Escape and Ejection Systems test team. Using instrumented dummies in an F-14 cockpit mockup mounted on a rocket-propelled sled, they chalked up a whole series of ejection conditions, from zero altitude/zero velocity to 600 knots.

The system, first demonstrated at Calverton in August, is the first that Grumman has used with a canopy lock severance system, and the first with zero-zero capability. The canopy and Martin-Baker seats are ejected, in sequence, so as not to collide; an underseat rocket gives additional boost, and a parachute system slows the fall to earth.

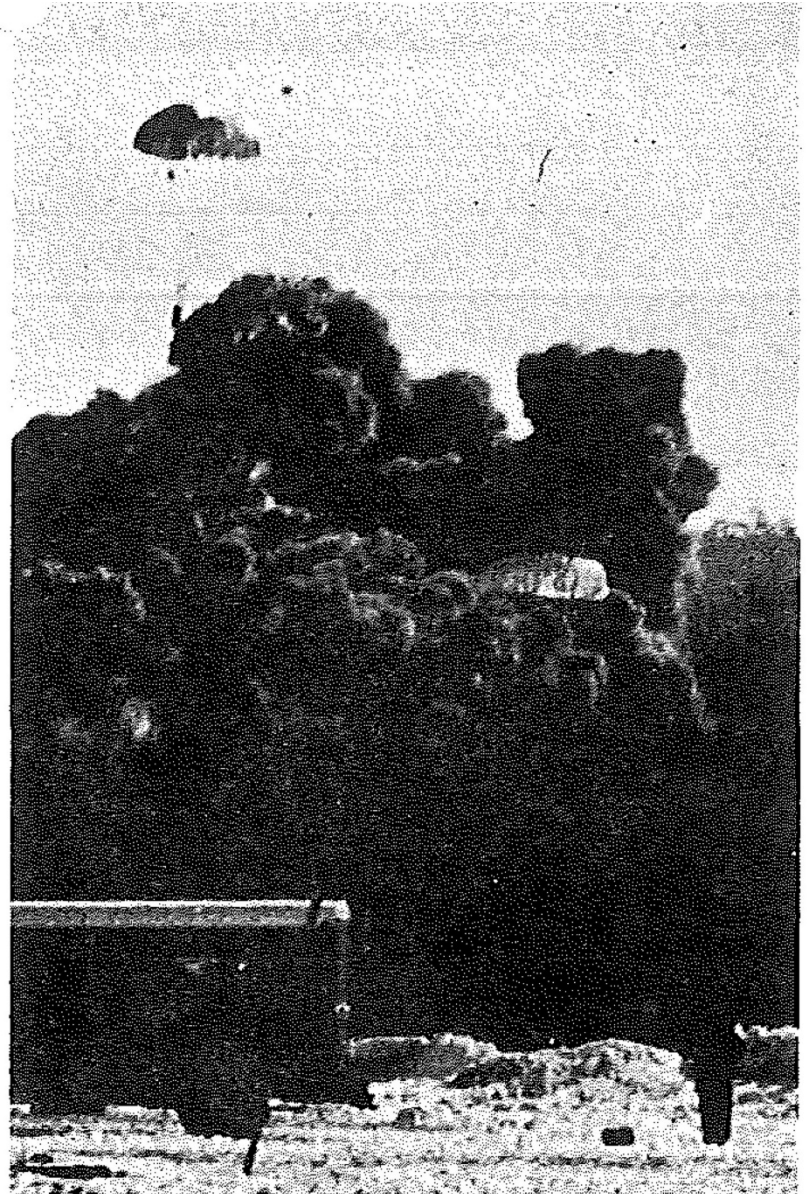
A full report on the F-14 accident will not be officially released until the Navy convenes its accident board which will investigate and try to determine the exact cause of the crash.

Some results significant to the F-14 Program reported after the flight were:

- The No. 2 F-14, scheduled for completion early next year, is instrumented to obtain low-speed technical data that will be needed to meet program requirements. The loss should not unduly delay the program although some changes to instrumentation may be required to collect the data which would have been developed by No. 1 F-14.
- The general handling characteristics were checked to confirm that the design substantially meets its overall qualitative requirements.
- The failure that induced the difficulty was not in the primary structure or propulsion system.
- A re-evaluation of auxiliary systems will set new safety standards and criteria applicable to the whole F-14 series and possibly for other aircraft as well.

Since the F-14 Program is ahead of schedule, it is expected that any program delays will be minimal.

Following the accident, President Lew Evans said: “We’ve got a great airplane here, and although we’ve had a setback today, as far as I’m concerned, nothing will slow the program.”

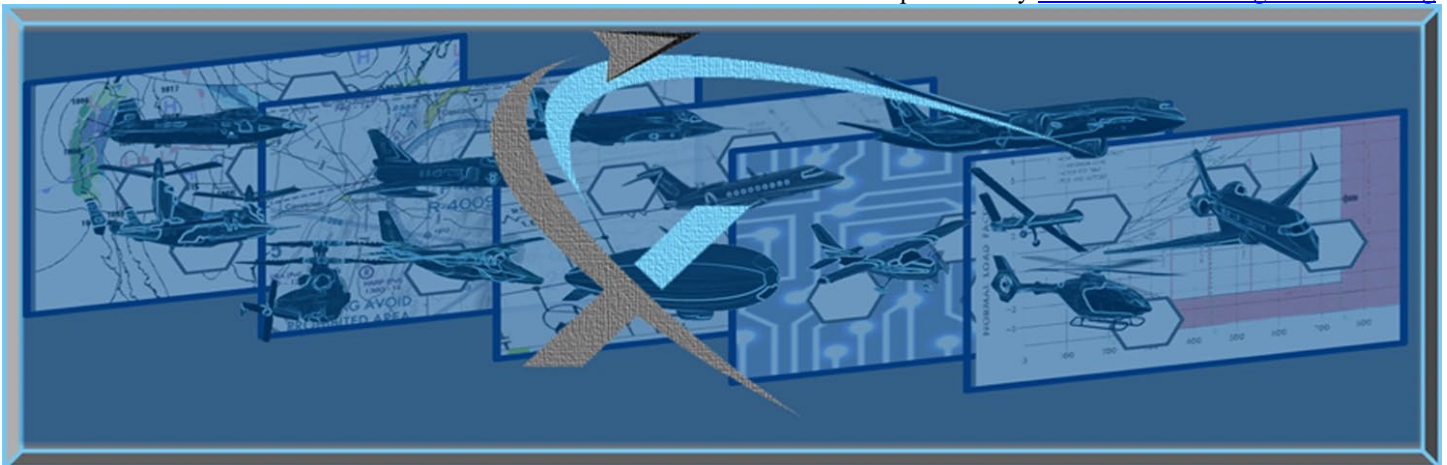


Two chutes, one nearly lost in smoke billowing from the crash, mushroomed seconds after Bill Miller and Bob Smyth ejected from the stricken F-14.



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<p>Episode 59 – A Ghostly Intro to CRM Flight Test Safety Committee Podcast Channel - EP 59 – A Ghostly Intro to CRM</p> <p>Eastern Flight 401 in pop culture: Supernatural S1E4 Mayday, in S5E44 "Fatal Distraction" Why Planes Crash S1E3 "Human Error" FAA Lessons Learned EAL 401 Lockheed Model L-1011 from the Federal Aviation Administration website</p>	<p>Episode 60 – Interview with SETP and SFTE Presidents So what is going on with the Societies of Experimental Test Pilots and Flight Test Engineers? This month we talk with the new presidents for SETP and SFTE and get their thoughts on professional societies and the future for their organizations.</p> <p><i>SETP President</i> AJ Mcfarland https://www.linkedin.com/in/ajmcfarland93/</p> <p><i>SFTE President</i> Jeff Canlani https://1drv.ms/b/s!AksGHDxGenz3galEZZRrbWgNrJmCzA?e=JPPAId</p>

This Podcast is sponsored by [Time2climb Training and Consulting](#).



Chia Chat

My thanks go again to Mark for putting together another great Flight Test Safety Fact. Volunteers are what makes the Flight Test Safety Committee successful, and Mark has been diligently creating this newsletter for years and we are all better for it. As with most safety success stories, we will probably never know the Swiss cheese hole that didn't line up because of a snippet of information a test team member remembered from the newsletter, but I promise you it is making a difference. Please continue to read and share the newsletter so we keep plugging those holes!

On that topic of volunteers, I hope you noticed that Turbo just released his 60th podcast which makes for 5 years of quality Turbotainment with a flight test safety perspective. Thank you, Turbo, for your commitment to Flight Test Safety! This month we hear from the new incoming Presidents of SFTE and SETP and their visions for those organizations and I was excited to hear what they both have planned. One thing that always intrigues me about this conversation is that both SFTE and SETP promote safety as a core value. So why the Flight Test Safety Committee? Do we even need to exist with SFTE, SETP and AIAA being the champion of our cause? First, let me remind you of the FTSC's purpose when it was created back in 1994: "The FTSC is to initiate and sustain a flight test related safety organization intended to promote flight safety, reduce the risk of mishap, promote risk reduction management and continually improve the profession's communication and coordination." That statement seems to align closely with SETP and SFTE's goals, but I think there are a few key differences that make the FTSC important to our profession. First, we are SETP/SFTE agnostic and membership is



irrelevant. The FTSC allows everyone involved in flight test to access our resources so they can be safer. Whether you are an experienced OEM that has been established for decades that is looking for a finesse point to improve safety policy or a brand-new start-up that has no idea where to even begin, we want you to access our resources. Our website resources are open (flighttestsafety.org) to everyone, and we want folks to use them. During our recent AI sub-committee meetings where we discuss the data available to the FTSC, I personally keep stumbling across more and more pearls of wisdom on our website that I bet most folks don't even know exist. I plan to promote those items through our LinkedIn page, so please share those with the greater flight test community.

The second reason I think the FTSC committee was created was a complete and singular focus on safety. One could argue that more effective program management, efficient use of available resources or even a new flight test technique all leads to safety improvements, but the FTSC wants to focus on the "in-your-face" safety lessons learned we can all take home to our respective organizations. To that end, we plan to focus the tutorial at the next North American FTSW on the basics. Whether you are a well-established organization or a brand new eVTOL company, getting a refresh on the basic components of a flight test organization will pay safety dividends and I hope you will be able to attend and contribute to that conversation. The workshops are the primary method that the FTSC meets its objectives, so please make sure you mark your calendars for the North American FTSW or the European FTSW or even both.

Returning to the newsletter, the first article this month certainly brought back memories of being back in Cold Lake, Alberta walking across the ramp when it was 40 below about to climb into one of the NORAD alert aircraft. Of course, we couldn't discuss our secretive mission either, but let's just say NORAD always kept a close eye on RED 01 and the X-25 (<https://www.noradsanta.org/>). As we transition into the winter flying season, most aviation organizations spend a lot of time re-educating their aircrew about the additional operational risks associated with cold weather. Icing, runway contamination, low visibility, extreme temperatures are all dangers that operational crews are reminded about on an annual basis. However, how often do we reflect on how these same operational risks can impact our safety margin when conducting test flights? For example, when was the last time we reviewed our aircraft limitations to ensure we fully understand the capabilities of the anti-ice system? Have we even tested those systems yet? Is the test mission complex enough that adding the challenge of weather mitigation just enough to degrade the crew's ability to handle the next unexpected hazard? We obviously can't just be risk avoiders, or we would never get the mission complete, but instead we need to focus on risk mitigation, which includes operational risk management. For example, if there is icing in the test area, what can we do to mitigate its impact like we do for test specific risks? Can we still get data that is useful but either reduce the scope of that data or be smarter about how we get it to keep the risk acceptable? There are no right answers here, just educated judgement on what is the best path forward. Unfortunately, if we make the wrong call, and the Swiss cheese holes line up, the wrong answer always becomes clear. Remember to apply basics of risk mitigation to operational risks, do not accept unnecessary risks and mitigate the rest down to an acceptable level.

Finally, I enjoyed reading the historical article on the F-14 crash and I could only imagine the emotional tension as the test team anticipated the crew's arrival back to the airport and then things took a turn for the worst. If you are a leader in an organization, either by position or reputation, do not underestimate the emotional impacts on the performance of your test team. I recently participated in the Critical Incident Response Program (CIRP) training, and it reinforced that we need to take care of our people and don't assume they will be fine. Every person responds differently to a significant event and that response can even vary for that same person from day to day depending on what else is going at the time. A simple check in from a peer can make a huge difference and if you have not had the chance to take the CIRP training, I highly recommend it.

Fly safe this holiday season and I hope you are still not being pessimistic with your non-Gaussian distributions when it comes to test risk mitigation!

Stuart "Chia" Rogerson
