

Teaching Satellites to Battle a Cyberattack

March 26, 2019

Even space systems in the far reaches of orbit are susceptible to cyber attacks. Once on orbit and equipped with computer hardware and software that cannot be easily updated, these systems risk becoming easy targets for these attacks. Even worse, engineers on the ground have little way of knowing that their system has been compromised.

The Watcher, an ongoing project of researchers at Aerospace, aims to toughen the cyber defenses of national security spacecraft, including those already on orbit.

[Click here](#) to read the entire story.



A cyber-protection program uses artificial intelligence to detect surreptitious intrusions into space system software.

Delta IV Launches WGS Satellite After a Few Challenges

by **Randolph L Kendall**

March 20, 2019

The most recent Delta IV launch from Cape Canaveral wasn't without challenges. This was a classic case of a mature launch system where everything looked relatively smooth through the Aerospace President's Review and the SMC commander's Flight Readiness Review. But in the days leading up to launch and all through the countdown, numerous issues with ground systems, launch vehicle systems, and range support assets cropped up.

Among other things was a two-day launch slip from March 13 to March 15, resulting from an anomaly during second-stage hydrazine loading that required the system to be off-loaded and reloaded over the weekend. All health checks were nominal, and the system was restored to a nominal flight configuration.

On launch day, the launch was initially delayed 14 minutes due to a launch tower swing arm problem that delayed cryogenic operations.

[Click here](#) to read the complete story.



The WGS-10 mission ready for launch at Cape Canaveral Air Force Station. (Photo: United Launch Alliance)

Editor's note: Randolph L. Kendall is Aerospace vice president of Launch Program Operations.

xLab: Rapid Prototyping for Resilient Space

March 07, 2019

Maybe you've heard about xLab and you're wondering what it's all about. Check out the following Q&A to learn more!

What is xLab?

xLab (short for Experiments Lab) is a new Aerospace organization that architects, develops, and transitions prototypes at speed necessary for a resilient space enterprise. It is responsible for delivering products including hardware, software, and major testbeds.

Why do we need xLab?

In this time of change in the space enterprise, Aerospace wants to be recognized by policy makers and Department of Defense and intelligence community senior leaders as the FFRDC able to rapidly prototype to meet emerging needs.

As an independent organization reaching across the space enterprise, Aerospace is uniquely positioned to discover, develop and deliver the new space assets required by the space warfighter.

Hasn't Aerospace done prototyping work for a long time?

Yes, Aerospace has a long history of building prototypes, but xLab brings all those efforts together under one organization and highlights their growing importance to the space enterprise.

Who works in xLab?

In mid-2018, the Space Instrumentation Department, Project Management Department, Small Satellite Department, D1 Fabrication Services, and Office of Product Management from the Technology and Laboratory Operations were combined to become what is now xLab.

Currently, there are 66 full time staff (41 MTS and 25 ATS/OS). Lynn Friesen is the acting principal director.

How does xLab fit into Aerospace's organizational structure?

xLab reports to Dr. David Miller, the Chief Technology Officer at Aerospace. Miller also oversees iLab, the Hubs, and the Aerospace Fellows. Check out the handy [org chart](#).

Where does the funding come from for xLab?

xLab projects are largely funded through our FFRDC contract and other off-ceiling work from the Civil Systems Group.

What capabilities are under xLab?

xLab is capable of developing prototypes from concept through operationally relevant test and evaluation. Prototypes include ground, airborne and space flight systems. The legacy xLab organizations have a long history of developing space science instruments and nano satellites. Bringing Aerospace's prototyping effort under one organization will enable the company to take on new missions at a larger scale.

In addition to the actual building and operating of prototypes, xLab also has the Office of Product Management (OPM) which develops the command media and processes necessary to support the full lifecycle of a prototype. OPM also supports other organizations outside of xLab to help leverage the Aerospace Product Development Process for smaller projects and testbeds.

Where is xLab physically located?

The various staff and laboratories that form xLab are located in A6. There are plans to build out a new laboratory space in A6 so xLab staff can be located together.



What are some examples of prototyping work Aerospace is doing?

Aerospace has done and is doing some great prototyping work, such as:

[AeroCubes](#)
[SPORT](#)
[LLITED](#)
[DAILI](#)
[NIRAC](#)
REACH
ECP-Lite
MAFIOT

How can I get involved?

We would love to hear about your ideas for prototypes.

Where can I learn more about xLab?

Visit the [xLab website](#)

Attend the xLab webinar on March 27. Watch for announcements on Inside Aerospace.

Email xLab@aero.org

Onboarding Program Expands With New Course

March 12, 2019

Aerospace University continues to improve and expand the onboarding program for new employees. With the goal of offering a robust first-year experience, employees will attend New Hire Orientation on day one, complete the Immersion program at approximately three months on the job, and participate in the new Building Meaningful Connections at Aerospace course around the six-month mark. Aerospace University is committed to offering an exciting and effective onboarding experience for each new employee who joins The Aerospace Corporation.

On March 5, the initial offering of Building Meaningful Connections at Aerospace was held in Chantilly. Twenty-five students learned a variety of skills, such as how to identify networking opportunities specific to Aerospace and how to create an intentional development plan to grow professional contacts. Thomas Kramer, a course facilitator with Aerospace University, led the program.



Thomas Kramer leads the Building Meaningful Connections at Aerospace course. (Photo: Aerospace)

“The Building Meaningful Connections at Aerospace class was the most useful networking workshop I’ve experienced. The speaker, Thomas, was engaging and entertaining. He presented the content in a way that was easy to digest. Through the class, I was able to interact with new connections and further my relationships with existing connections,” Britany Chamberlain, a member of the technical staff in the Mission Analysis and Operations Department, reported after attending.

Following the class, participants attended a networking session where they practiced their freshly learned skills. One of the guests, Andrew Abraham, senior MTS, also from the Mission Analysis and Operations Department, said “I love meeting new employees and determining how their unique skill sets enhance Aerospace’s ability to deliver value to our customers.” Another attendee, Cathy Carney-Peters, NSG strategic people partner, said “What an excellent way to bring our people together and continue building strong



A networking session followed the course. (Photo: Aerospace)

connections across Aerospace! This is essential to our culture and fosters benefits for both our people and our customers.”

The event was well-attended by a mix of invited guests including various levels of staff and leadership from ETG, program offices, and Office of the Chief Velocity Officer.

Following the successful first offering of this program, AU plans to offer subsequent sessions in El Segundo as well as a virtual version for employees located in regional offices.

Aerospace Business Was Active During Last Quarter

March 21, 2019

The last quarter was a busy time for The Aerospace Corporation as the company oversaw some critical launches, participated in other mission success projects, sponsored forums on “Strategies to Outpace the Threat,” and laid out plans to create new centers of study, among other activities.

Three launches during the quarter were: the first GPS III satellite, a national security satellite, and the 10th Wideband Global SATCOM (WGS) mission.

The first GPS III satellite launched Dec. 23 on a SpaceX Falcon 9 rocket, the first Aerospace-verified national security launch for SpaceX. This new generation of GPS satellites provides increased anti-jam capability for military users and introduces a new civil signal designed to be compatible with other international satellite navigation systems. Over the past five decades, Aerospace has played a key role in the development and deployment of every generation of satellite in the Global Positioning System.

The GPS III launch also marked the first use of several Aerospace agile mission assurance tools and techniques, including trajectory validation in the cloud and the Automated Flight Margin Verification Tool.

The NROL-71 mission that launched from Vandenberg Air Force Base aboard a Delta IV Heavy rocket on Jan. 19 faced numerous challenges on its way to orbit, starting with a May 2018 strike at the contractor that impacted work at the factory and the launch pads. Then, a plumbing overflow near the launch pad damaged ground computers. The first launch attempt on Dec. 7 was scrubbed due to a ground system problem and an attempt the next day was scrubbed by a vehicle issue resulting in a delay to Dec. 18. On that attempt, ground winds delayed the launch to Dec. 19, when a hydrogen leak forced a postponement to Jan. 19.

The WGS-10 mission from Cape Canaveral on March 15 aboard a Delta IV added a 13,000-pound high-speed communications satellite to the WGS fleet, which forms a network that relays video, data, and other information between battlefield commanders. The fleet transmits both classified and unclassified signals. WGS-10 will operate in the X-band and Ka-band frequencies.

Other mission success activities in the quarter include:

Commercial Crew Demo: Aerospace assessed contractor activities in preparation for the SpaceX Demonstration Mission 1 launch on March 2, including propulsion and structural assessments. This mission tested autonomous spacecraft approach and docking procedures with the International Space Station, remained docked for several days, then conducted the full reentry, splashdown, and recovery steps. This will provide data needed to subsequently qualify for flights transporting humans to the space station.

AeroCube 11: Also known as “R3” for Rapid+Responsive+Reimagined CubeSat was launched Dec. 16 aboard a Rocket Lab Electron launch vehicle from New Zealand. The satellite is an experiment in small satellite technologies with a focus on faster development of new prototype concepts at lower costs. R3 will be able to perform nearly comparable ground imaging at a small fraction of the size and cost of traditional satellites such as the Landsat series.

The Advanced Extremely High Frequency (AEHF-4) satellite, launched last October, reached orbit a month early due to key Aerospace recommendations for lower power level thruster performance that enabled longer burns during the orbit raising process.

During the quarter, Aerospace hosted a series of forums on the topic of “Strategies to Outpace the Threat.” The first event was held in El Segundo on Feb. 12 and another was held in Crystal City on Feb. 21. A third event is scheduled for Capitol Hill on March 28.

An exciting project begun during the quarter is the “Center Initiatives,” which is evaluating five potential new centers to be established at Aerospace. They would join the Center for Orbital Reentry and Debris Studies (CORDS); the Center for Space Policy and Strategy (CSPS); the Economic Market Analysis Center (EMAC); and the Concept Design Center (CDC), among others.

Each of the new centers must address strategic company needs, have a business case to justify corporate investment, and represent Aerospace’s intent to assume a critical role at the top of that capability nationally.

The current FY20 Center Initiatives candidates are: Space Warfighting; Model Based Systems Engineering & Digital Engineering; Artificial Intelligence & Data Analytics; Laser Communication; and Cybersecurity.

In an effort to make Aerospace an even better place to work, a companywide employee engagement survey was conducted in January to get employees’ opinions in areas including the company’s direction and performance; whether the proper tools and resources are available; performance of leadership, and overall job satisfaction.

Changes have already begun as a result of feedback from the survey. One of the most noticeable is that the name “Avengers Council” has been changed to the more descriptive “Executive Team,” in an effort to transition to a family of leadership names more universally known and reflective of the larger leadership that supports our important mission.

A second survey is scheduled for this summer.

In company news, Matt Hart has been named to head the Strategy Office, replacing Mark Goodman, who retired last year. Also, two corporate officers are retiring – Cathy Steele, senior vice president of National Systems Group, and Dr. Sherrie Zacharius, vice president of Technology and Laboratory Operations.

Imperative hero pins given out during the quarter included the following:

Shaping the Future:

Terrence Ladau and Brian Duffek, for leading the development of a concept of operations for the protection of high-value assets in a contested environment.

Michelle Cinlemis, for leading the development of a new strategy to ensure the integration of commercial and government satellite communications.

Lisa Hague, for leading the SMC Portfolio Architect efforts on the enterprise plan for defense of high-value assets.

Innovation:

Christina Tan and the WGS & DyCAST team for shaping the WGS follow-on satellite design for maximum operational capability.

Deborah Salvaggio, John Hackwell, Todd Nuteson, Tamara Volquarts, and the team developing Project Z, a ground-based compact sensor that will help the warfighter.

Mark Barrera, for his successful development of solutions that brought STPSat-5 into mission operations after a string of on-orbit anomalies, saving the government and SMC considerable time and money.

Growth: Amy Misakonis and Mike Graybill of CSG and the team for their work on commercial crew and the in-plant support to NASA in the SpaceX plant.

Velocity: Gail Johnson-Roth, Dave Christopher, Teri Spoutz, Dave Hebert, Jo Ann Apostol, and Jacob Bain, for their efforts in planning the first “Strategies to Outpace the Threat” events.

And finally, two **007** pins were awarded during the quarter:

Lubo Jovic, Katie Feistel, Jim Hant, Chris Kobel, Terry Lomheim, and Andrew Takano, for their extraordinary work on the 60-day Architecture Study, a launch and deployment analysis of a projected 600 satellites in the 2028 timeframe; and, Ginger Macheske, for her support of the successful launch of NROL-71.

Awards and Recognitions, March 2019

March 18, 2019

Aerospace employees frequently earn recognition for their professional accomplishments. This Orbiter feature acknowledges those honors and awards, including the publication of books. To nominate someone for consideration in this section, send details of the award in a timely fashion to orbiter@aero.org



Petras Karuza

Petras Karuza has won the NASA Silver Achievement Medal for his support to the Commercial Crew Program Safety and Mission Assurance team during the past year. He took a leading role in performing government surveillance activities for NASA at the SpaceX facility in Hawthorne.

The NASA medal citation reads: “For substantial contributions in the execution of product assurance actions that gave CCP invaluable insight into the manufacturing of the SpaceX Falcon launch vehicle.”

NASA noted that Karuza’s work on the program required “an engineer exhibiting a varied skillset across multiple disciplines, including structures, welding, mechanisms, testing, avionics, and propulsion, all while monitoring safety and quality aspects of the aforementioned systems.”

Karuza will receive his award at Kennedy Space Center on April 18.

Albuquerque Aerospace Office

A team from the Albuquerque office were recognized for their participation in a Discover STEM Day event at the National Museum of Nuclear Science and History in February.

The museum’s director of education sent a thank-you note to the Albuquerque team, commenting “All of you bring and share such stimulating activities and information for kids and their parents to experience and hear about.”

Aerospace participants at the event were: Sam Sims, Riaz Musani, Katie Spatz, Tony Porzio, Ed Vaughn, Lisa Berenberg, Barbara Braun, Tom Atwood, Talia Jordan, Mark Johnson, Tommy Fong, Greg Henning, Gayla Walden, and George Vogen.

Sabbaticals Aid Creativity and Innovation

March 14, 2019

iLab recently passed a milestone in its sabbatical program, with two teams tying for the 50th sabbatical award.

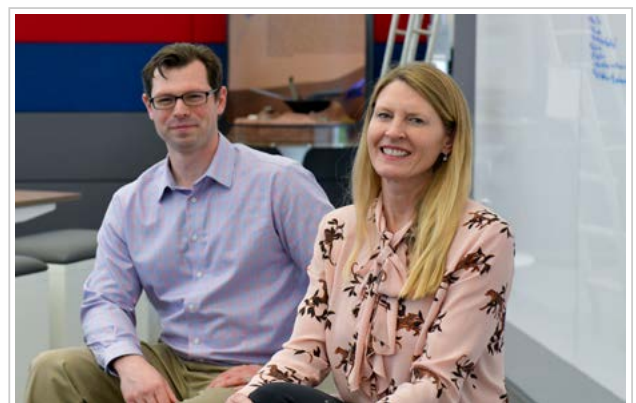
The sabbatical program, started in April 2017, gives Aerospace staff the opportunity to spend 40 hours dedicated to solving a specific problem.

Paul Skinner and Idellyse Martinez-quiles spent their week simulating the change in antenna gain patterns with a magnetized plasma in the vicinity of the antenna.

Kathy Hospodar and Preston Partridge teamed up to research the current and developing technology of small commercial flat-panel phased arrays for mobile communications to assess their capability to acquire, track, and communicate with satellites.

To learn more about the sabbatical program or to apply for your own sabbatical, visit the [iLab website](#).

[Click here](#) to read full story.



Kathy Hospodar and Preston Partridge were one of the two iLab 50th sabbatical teams. (Photo: Elisa Haber)

March 2019 Obituaries

by **Christine T Kato**

March 01, 2019

Sincere sympathy is extended to the families of:

Marilyn Adams, office of technical support, hired Feb. 2, 1981, retired Oct. 1, 1993, died Jan. 31, 2019

William Davenport, member of technical staff, hired March 1, 1973, retired Jan. 1, 1985, died Feb. 10, 2019

Owen Dykema, member of technical staff, hired July 27, 1964, retired March 1, 1994, died Jan. 30, 2019

Luella Green, office of technical support, hired Aug. 5, 1965, retired May 1, 1988, died Feb. 16, 2019

Eugene Hellie, member of administrative staff, hired May 6, 1968, retired Jan. 1, 2007, died Feb. 1, 2019

Jean McDaniel, office of technical support, hired Dec. 19, 1962, retired Nov. 1, 1991, died Jan. 15, 2019

James Petters, member of technical staff, hired March 16, 1961, retired Aug. 1, 1987, died Feb. 15, 2019

Wayne Schneider, office of technical support, hired March 27, 1967, retired Feb. 1, 2002, died Jan. 7, 2019

To notify Aerospace of a death and have it included in the Orbiter, please contact People Operations at (310) 336-5107.

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