

Return of Aerospace Summer Games Makes a Splash

July 28, 2022

The long-awaited return of the Aerospace Summer Games drew more than 5,000 beachgoers from across the space industry this past weekend. On Saturday morning, employees, friends and family from over 40 companies joined at Dockweiler Beach in Playa del Rey to have fun, show off, and flex their competitive spirit.

“It was really rewarding to see everyone come together for this event after a few years,” said Aerospace’s Nicole LaBier, who along with Madison Piechowski, organized the company’s participation. “The Aerospace Summer Games is a really great opportunity for the industry to come together and for Aerospace to come together as a team to just have fun.”

More than 200 Aerospace employees and 60 of their guests came out to represent the “A-Team,” donning bright orange Aerospace T-shirts, bucket hats and leis, which were so popular attendees from other companies were trying to get some for themselves.

President and CEO Steve Isakowitz led the team in cheers throughout the day and ran the Aerospace flag across the shore as the A-Team rallied during their events. Chants of “A-E-R-O Space!” could be heard across the beach as the team supported their colleagues competing on the sand. With the help of Senior Vice President Todd Nygren, Aerospace started “the wave” effect through the crowd, inspiring other teams



After a two year wait, the Aerospace Summer Games returned to the beaches of Los Angeles with thousands in attendance.



The A-Team showed off their athleticism, teamwork and spirit during the games.

“The whole day was such a positive experience,” said Samanta Corte, Intern in the Office of Diversity, Equity and Inclusion. “We were all just out there having fun and we all went home tired and happy.”

Throughout the day, teams competed against one another in a variety of activities and events. The A-Team held on tight during tug of war standing firm against their opponents, dashed across the sand carrying sponges full of sea water during the relay race, and displayed its mastery of lift and drag maneuvering during ultimate frisbee.



“No one cared if we were winning or losing,” said Corte. “We were just having so much fun and we were so happy to be working so well together as a team.”

Other events included sand soccer, dodgeball, volleyball and balloon toss, among others. The A-Team finished in 10th place and proved to be the talk of the town.

“Our Hawaiian themed tent was a huge hit,” said LaBier. “At the end of the day, we had more than 100 people in line from other companies trying to get some Aerospace swag. It was great to see everyone at the event having so much fun and sharing that Aerospace spirit.”





Aerospace Experts Track Massive Uncontrolled Reentry

July 27, 2022 (Updated July 30, 2022)

Aerospace's experts at the Center for Orbital and Reentry Debris Studies (CORDS) closely tracked the uncontrolled reentry of a massive 23-metric-ton rocket booster. The falling space debris, measuring in at 53.6 meters in height, was the result of the Long March 5B launch on July 24, 2022 to deliver the Wentian experiment module to China's Tiangong Space Station.

View the [reentry data](#) here. Additional helpful links:



Long March 5B rocket lifts off with the Wentian module bound for China's Tiangong space station 24 July 2022. [Credit: CASC].

- [A Quick Guide to Understanding Orbital Debris Reentry Predictions](#)
- [Aerospace Experts Tracking Massive Uncontrolled Reentry](#)
- [Another Uncontrolled Chinese Rocket Body is Plummeting to Earth. Questions?](#)

Due to the uncontrolled nature of its descent, there is a non-zero probability of the surviving debris landing in a populated area—over 88 percent of the world's population lives under the reentry's potential debris footprint. If this sounds familiar, it's because similar uncontrolled reentries of Long March rockets occurred in 2020 and 2021. A reentry of this size will not burn up in the Earth's atmosphere, and the general rule of thumb is that 20–40 percent of the mass of a large object will reach the ground, though it depends on the design of the object.

Aerospace's space debris experts monitored the reentry and provided updates as data became available. They will also be provided additional analysis as developments unfolded.

Tracking the Reentry

As they do with all reentries, Aerospace's CORDS experts actively updated their predictions of the rocket body's reentry path as new data became available. Be sure to follow [@AerospaceCorp](#) on Twitter to stay current and for additional analysis.

On Thursday, July 28, Aerospace hosted a discussion on Twitter Spaces where our CORDS experts were joined by other space leaders to discuss the reentry, the importance of ensuring space safety, and opportunities to implement best practices for the future.

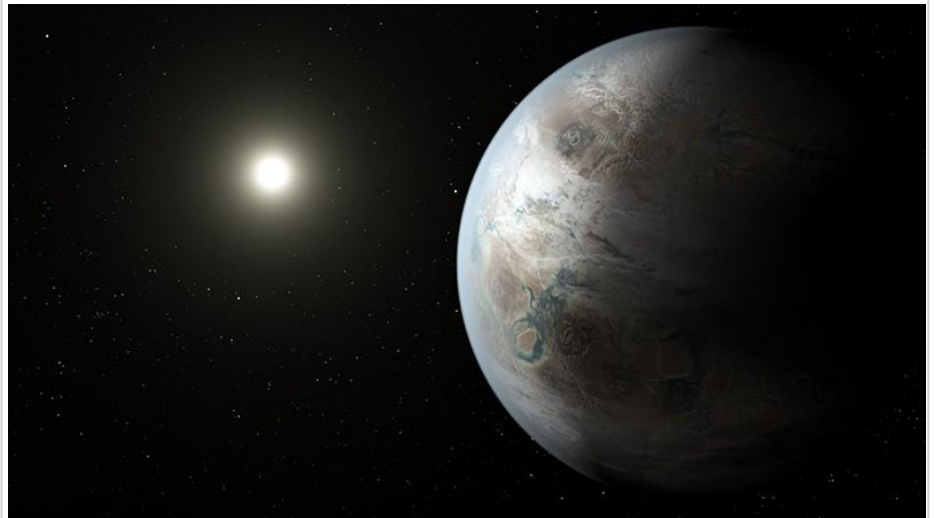
Aerospace Expands Search for Exoplanets with an Astrocomb

July 26, 2022

Thirty years ago, astronomers made the first definitive observations of exoplanets, inspiring questions about the existence of Earth-like planets and the likelihood of lifeforms beyond the solar system. Since then, the number of detected exoplanets continues to rise, with over 5,000 currently confirmed and numerous more to be surveyed.

Experts at The Aerospace Corporation are currently working as part of a broader team to build a tool that leverages optical frequency comb (OFC) technology to aid in the

hunt for exoplanets. Known as an Astrocomb, the tool is a laser that produces a rainbow of light at highly stable, uniformly spaced frequencies such that its spectrum resembles the teeth of a comb. This “spectral ruler” is compared with light from planet-hosting stars to measure the wobble caused by orbiting exoplanets. The project is sponsored by a grant from the Heising-Simons Foundation in a joint effort between Aerospace, the W.M. Keck Observatory, Caltech, JPL, and UCLA.



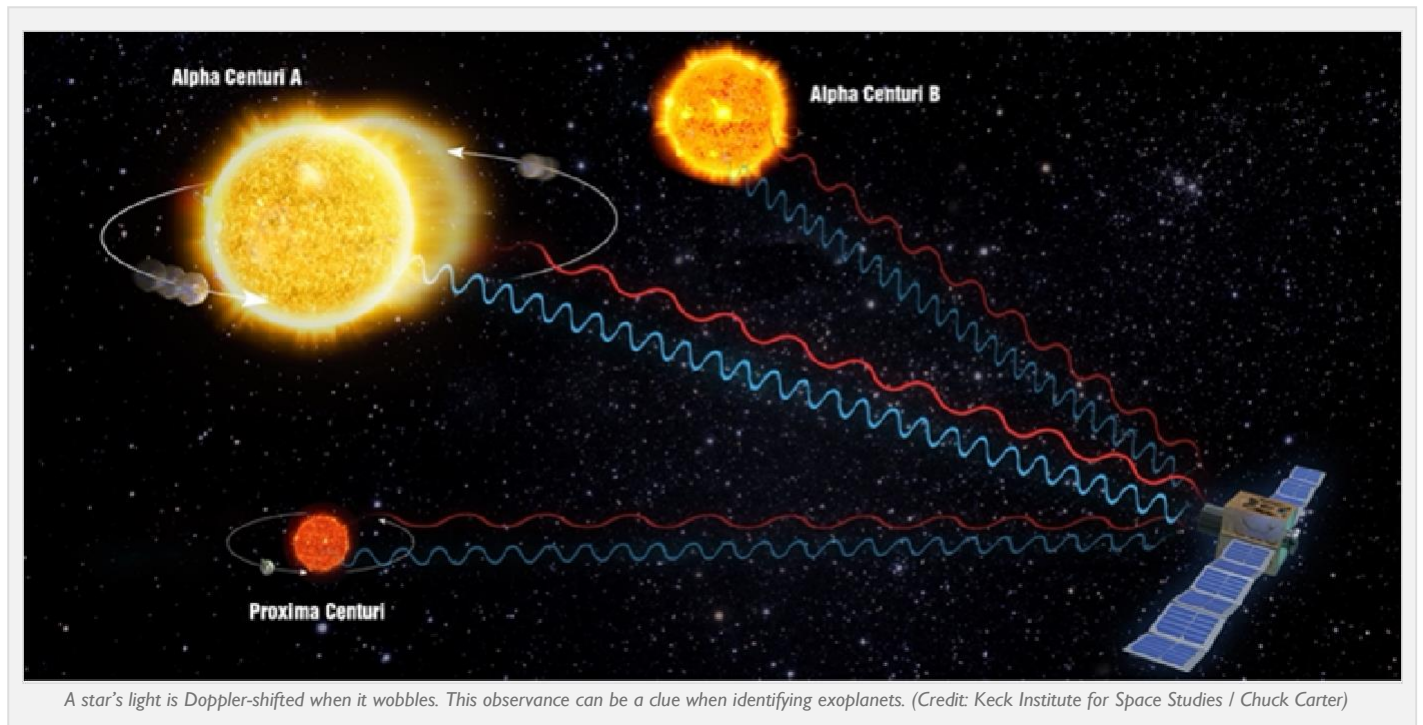
Aerospace is part of a collaborative effort to build a new tool that will strengthen the search for distant worlds and demonstrate the power of this next-generation technology. (Credit: NASA Ames/JPL-Caltech/T. Pyle)

“Our Astrocomb will provide astronomers the tool they need to turn infrared spectrographs into instruments for planet-hunting. A wider class of stars potentially hosting exoplanets can be observed by looking further into the near-infrared part of the spectrum,” said Dr. Stephanie Leifer, Senior Project Leader in Aerospace’s Research and Technology Collaboration Office of the Physical Sciences Laboratories and the project’s Principal Investigator. “On a broader scope, the Nobel Prize-winning OFC is making its way into next-generation technology for a lot of Aerospace’s customers. Aerospace’s demonstrated interest in OFC technology helps the corporation remain at the forefront.”

Shedding Light on Exoplanet Identification

A spectrograph breaks down light into a rainbow of different colors. Each type of star has a unique signature represented by its pattern of spectral lines. When the star wobbles, its light is Doppler-shifted, making those lines appear bluer or redder as it moves closer or further away from observers on Earth. Noting these changes can help scientists identify if there is a planet orbiting that star.

This exoplanet-searching technique—called the radial velocity method—was awarded a Nobel Prize in 2019 and is the only known way to determine from ground-based observatories whether an exoplanet is rocky like the Earth or a gas planet like Neptune. Even so, the search for exoplanets has other obstacles scientists must navigate.



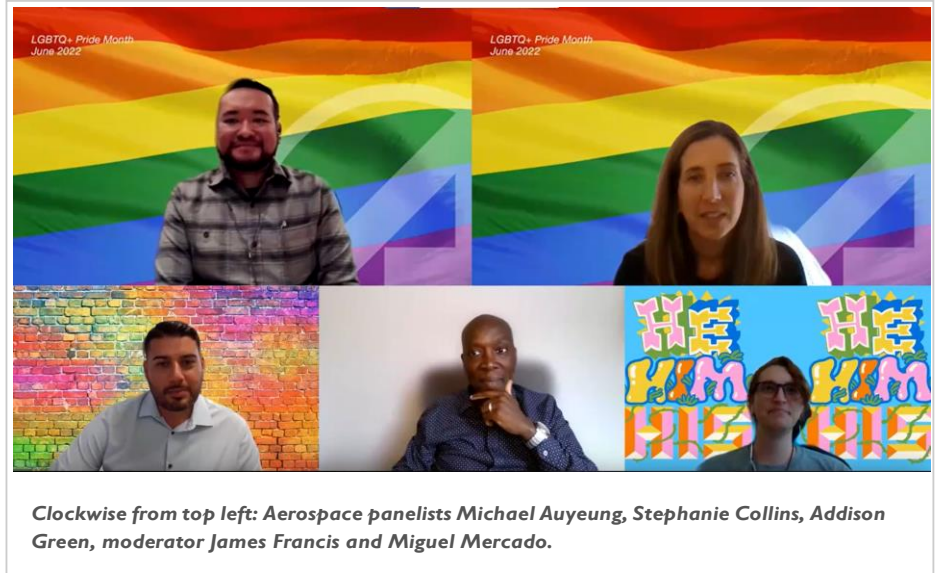
“In general, stars are noisy and can create shifts that mimic Doppler shifts but actually aren’t. There’s also a large class of smaller and cooler stars that are candidates for hosting planets, but their peak emissions are in the infrared,” said Leifer. “Since stars are quieter in the infrared than in the visible spectrum, our Astrocomb will enable scientists to observe stars along a broader spectrum to help build confidence in detecting exoplanets and for characterizing them.” The new Astrocomb is the reddest yet, able to go further into the infrared than any other Astrocomb deployed to date.

To learn more about the Astrocomb, read [the full article on Aerospace.org](#).

Aerospace Employees Discuss Effects of Gender Stereotypes at ERG Event

July 21, 2022

Creating an inclusive workplace at Aerospace means providing employees an environment where they can be their best selves. To achieve this vision requires engagement at all levels, continuously adapting with more empathy and compassion to combat stereotypes and unconscious biases. Recently, several Aerospace Employee Resource Groups partnered to host a panel discussion on “[Addressing Gender and Masculinity Stereotypes](#)” to shed more light on the negative effects of perceived “normality” and the importance of allyship.



The event was a collaborative effort between the Aerospace Black Caucus (ABC), Aerospace Lambda Alliance (ALA), Aerospace Latino Members Association (ALMA), Aerospace Military Veterans (AMV), Aerospace Totally Adaptable Group (ATAG) and Aerospace Women’s Committee (AWC). The event was moderated by James Francis, director for DEI for [Balancing Life’s Issues](#), and panelists included Aerospace’s Michael Auyeung, Addison Green, Stephanie Collins and Miguel Mercado.

“If something or someone is different, let’s not equate that to being wrong,” said Francis. “There’s a dangerous word sometimes we tend to hear. We tend to associate people with it. The word ‘all’ — it’s tricky because there’s no such thing. If we have the concept of all people, all men, all women, all trans, all people in the LGBTQ+ community, all tall people — it is such a prejudged prejudice, an unconscious bias that we may have, and it comes from self-awareness.”

The conversation explored a wide range of interrelated topics, such as identity and acceptance — the different versions of themselves people believe they must be when at work versus at home or in their communities. Each of these environments may come with distinct pre-conceived expectations.

“To not challenge this is to just accept the status quo, and is the status quo really OK to accept?” said Auyeung, Director in EIS. “Your culture expects you to act one way because of your gender, and then outsiders expect you to act a certain way because of both your gender and your culture. I think it’s really

nice to be able to unpack all of this and have a frank discussion about everybody [being] themselves. There's no reason to apply a label to anybody."

Creating an inclusive environment requires consistently reinforcing the message that everyone is welcome, helping to provide team members important reassurance to not only be themselves, but also support others as allies. Asking questions to advance understanding and mutual respect is essential to strengthening the sense of belonging for everyone.

"As much as you want to understand what other people are going through, why they do the things they do, identify the way they do it — at the end of the day, it is not always going to be something you can understand right away," said Green, Recruiting Coordinator in People Acquisition, who spoke about his experiences as a transgender male. "The important thing is that you listen to what someone is telling you, and you show them respect and the support they need to be able to live [their] truth. That understanding may come with time or it may not, but at the end of the day, your job is to respect, support, understand and help that person, and to love them."

The panelists and audience members also shared their own personal experiences. Employees reflected on instances where they felt they had been marginalized or were compelled to intervene to support a colleague. Some employees discussed lessons learned from confronting their own unconscious biases, as well.

"It takes a lot of courage to ask the questions," said Mercado, Security Director in Security and Safety. "It also comes down to vulnerability. How do we foster that safe environment? When you think vulnerability, you think weakness. It's actually a strength because if I'm able to say, 'Hey, I have a problem' or 'Hey, I'm not feeling comfortable about this' to another person, they might've been through that situation before. When we talk about it, it creates that kind of activity and that level of understanding ... I think that makes the biggest world of difference."

Fostering dialogue on these topics serves to create more awareness of how certain environments can prompt negative feelings or perceptions; it also provides opportunities for employees to engage with each other for support and understanding. Gaining new perspectives and tools through education and continuous updated training at all levels is essential to ensure these principles are reflected in Aerospace's culture.

As the panel noted, allyship is not a one-day event and the positive impact supporting each other — especially by voices outside of the minority group — against biases can't be overstated.

"There are still people who are struggling, particularly on this issue of gender and masculinity where perhaps expectations are more conventional and traditional expectations are not meeting their reality or their truth today, and they're still having trouble," said Collins, Assistant General Counsel in the Office of General Counsel and Secretary. "When it comes to Aerospace and the workplace, I want to think all of us as allies who want to make sure people are comfortable bringing their whole selves to work."

Atlas V USSF-12 Launch Delivers Two National Security Space Payloads to GEO

July 18, 2022

A United Launch Alliance (ULA) Atlas V launch vehicle lifted off from Space Launch Complex-41 on July 1 and successfully delivered the Wide Field of View (WFOV) and USSF-12 Ring spacecraft to geosynchronous orbit (GEO) for the United States Space Force (USSF).

The USSF-12 mission used an Atlas V 541 rocket, which included a short 5-meter payload fairing, four strap-on solid rocket boosters and a single engine Centaur III upper stage.



The launch was delayed one day due to weather conditions during the initial launch attempt. The USSF-12 mission to GEO for delivery of both spacecraft was completed in a little over six hours and 45 minutes. The launch marked the 94th successful launch of an Atlas V rocket, the 151st launch for ULA, the ninth 541 configuration vehicle, the 100th flight of the RD-180 booster engine and the second Atlas V National Security Space Launch (NSSL) mission of 2022.



A ULA Atlas V lifts off from Space Launch Complex-41 at 7:15 p.m. EDT on July 1, 2022 for the USSF-12 mission. [Photo Credit: United Launch Alliance]

USSF-12 features co-primary payloads: the Wide Field of View Testbed for Space Systems Command's (SSC) Space Sensing Directorate and the USSF-12 Ring spacecraft for the Defense Department's Space Test Program (STP).

The forward payload, WFOV, is a testbed that informs the Next Generation Overhead Persistent Infrared (OPIR) program. The Next Generation OPIR program will replace the Space Based Infrared System (SBIRS) program and is designed to provide a resilient space-based global missile warning capability against emerging missile and counter-space threats.

The WFOV testbed has a mass of approximately 3,000 kg and is designed for a 3- to 5-year life. WFOV's primary mission in orbit is to explore future missile warning algorithms with data collected in space.

The aft payload is a propulsive EELV Secondary Payload Adapter (ESPA) named the USSF-12 Ring. The Ring contains a classified suite of smaller payloads that will be used to demonstrate future technology for the Department of Defense.

As with prior National Security Space missions, The Aerospace Corporation conducted independent analyses and evaluations of the flight systems, working with the USSF to augment ULA's mission assurance process to ensure the continued NSSL program's legacy of 100 percent mission success. Special attention was placed on first flight hardware items implemented for performance improvements and/or cost savings.

"My sincere thanks to our SSC and Aerospace teammates on the success of another Atlas V launch," said Col. Erin Gulden, Mission Director for the Atlas V USSF-12 mission and Senior Materiel Leader, Assured Access to Space-Launch Execution Delta at Space Systems Command. "This USSF-12 mission demonstrates new missile warning and battlespace awareness sensing capabilities and helps our nation build modular, flexible opportunities for experiments and prototypes. Whether on spacecraft or launch vehicle ... engineering, production, integration or launch ops ... the years of teamwork and partnerships are what make missions like these a success!"

Written by Craig Larson, General Manager of Launch Operations Division.

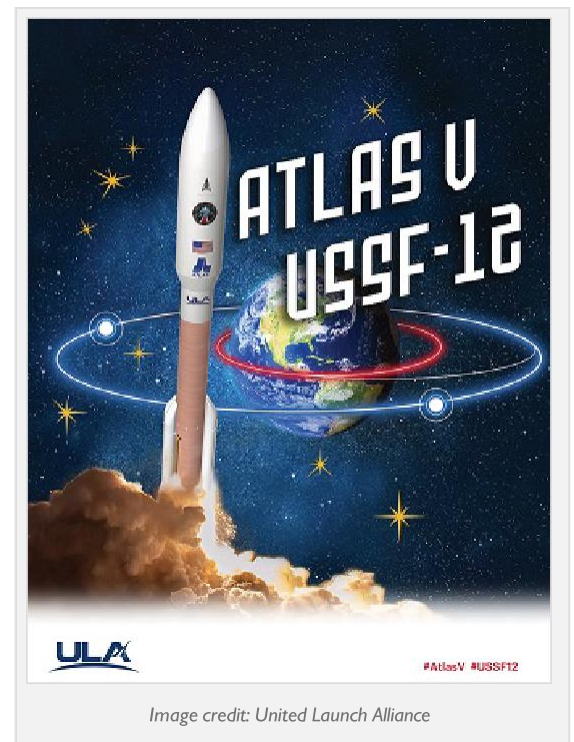


Image credit: United Launch Alliance

Aerospace Women's Committee Promotion Parties Spotlight 2022 Promotees

July 13, 2022

Continuing a company tradition held for more than 30 years, the Aerospace Women's Committee (AWC) recently celebrated the professional advancements of women employees from all Aerospace's location over the past year. This year's festivities included events hosted in El Segundo, Albuquerque, Colorado Springs, Houston, Huntsville, the Washington area and virtually to recognize the 237 women promotees.



As part of AWC's women promotion celebrations across Aerospace's nationwide locations, promotees in the Washington area were recognized for their achievements.

“This year’s celebration was a bit different than the promotion parties we’ve had in the past,” said Britany Chamberlain, National President of AWC. “We have had to adapt to new ways of operating and took opportunities to try new things. Sometimes we are forced by external circumstances to change our plans. Each one of this year’s promotees have demonstrated their abilities to push through a changing and challenging environment and thrive. I am honored and proud to be part of an organization with so many incredible women to look up to.”

Across Aerospace’s regional campuses, employees were celebrated in a variety of ways. In El Segundo, a virtual lunch was hosted on Teams where each promotee was recognized individually. Guest speakers Rosalind Lewis, Marilee Wheaton and Denise Betts also shared words of wisdom with attendees.



At the Huntsville celebration, each promotee was presented with a certificate and galaxy-themed cookie.

Employees in the Washington area joined an on-site promotion party with their managers and local general managers. Each promotee was presented with a certificate of congratulations from AWC and a long-stemmed red rose. Following the certificate ceremony, attendees enjoyed a networking reception over chocolate-covered strawberries, cheese and crackers, and other treats.

In Albuquerque, Houston and Huntsville, employees enjoyed their celebrations at local restaurants, joined by AWC members and other Aerospace colleagues. AWC members in Colorado Springs hosted an on-site meet and greet where all local AWC members and senior management were able to congratulate promotees over hors d’oeuvres.

Remote employees also joined in the fun, with a virtual celebration that included opening remarks from Tammy Choy, Vice President and Chief Information Officer of Aerospace. Each promotee was highlighted and invited to speak about themselves.

“One of AWC’s requests of Aerospace’s senior leadership this year was to see a representative number of women in leadership,” said Chamberlain. “While there is still much work to be done, each of these promotions is a step in the right direction. Whether they were promoted into a management position or are advancing in their technical leadership, these employees are helping to pave the way towards an Aerospace that enable women to reach their full potential.”

Congratulations to these talented and deserving Aerospace women!



Employees in Albuquerque enjoyed a celebration lunch hosted by AWC.

Slingshot Platform to Showcase Advantages of Modular Payload Architecture

July 05, 2022

Space is rapidly evolving into a more dynamic and challenging domain, requiring more resilient and responsive architectures and processes that accelerate and streamline access to orbit while harnessing cutting-edge innovations to provide greater flexibility and adaptability for space systems.

The Aerospace Corporation's recently [launched Slingshot 1 mission](#) will leverage the potential of open standards and non-proprietary interfaces to simplify and expedite payload development and

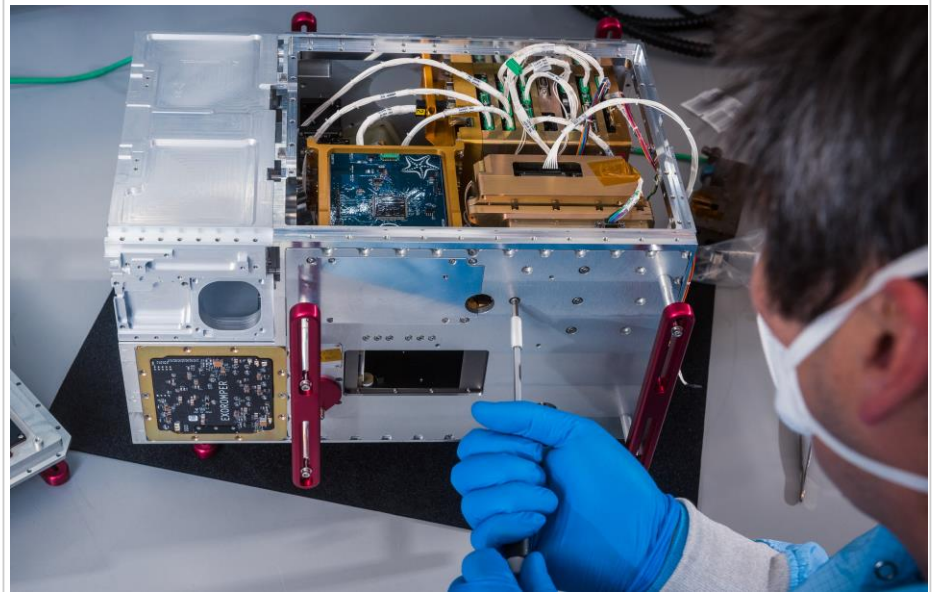
integration on next-generation satellite systems. In addition, the mission's modular architecture and autonomous technologies could usher in a new era of increased space system agility, resilience, and extended spacecraft lifespans by allowing for on-board components to be more efficiently upgraded or replaced as needed.

The Slingshot 1 satellite is a 12U CubeSat hosting 19 payloads, 16 of which were funded by Aerospace. In spite of its diminutive size, Slingshot 1 is brimming with a myriad of autonomy, robotics, propulsion, onboard processing and communication systems whose evolution and maturation require on-orbit testing.

"Customization has traditionally played a major role in payload development and turnaround time," said Hannah Weiher, Engineering Manager in Aerospace's iLab and program manager for Slingshot. "With Slingshot, payloads conform to a basic standard in which they can plug in and work even if they're late in the development timeline."

Modular Payloads, Open Standards

The payloads onboard Slingshot 1 are integrated through a standard interface, enabling a broad range of new technologies to plug together with greater flexibility and adaptability. The experimental payloads heading to orbit include Vertigo, a modular attitude control system that can enable satellites to point at



Slingshot payload assembly.

targets on earth; Blinker, a GPS transponder for space traffic management; Hyper, a hydrogen peroxide thruster; and LaserComm, a next-generation space-to-ground laser communication downlink.

In addition, they are joined by payloads that provide the enabling capabilities of the modular architecture to work. An essential component of mission operations is Handle, an electrical interface module for satellite payloads designed to streamline the integration using “plug and play” technology. In essence, Handle enables the other payloads to communicate with the host satellite bus and other payloads regardless of underlying bus implementation and design specifics. Handle also eliminates the need for any tailoring of the flight system to incorporate new payloads, allowing for manifest changes at any time in the development process.



The mission will also demonstrate the capability of the Handle module's SatCat5 Ethernet switch, which will allow communication between payloads using commercial tools and open-source code from the extensive Ethernet ecosystem.

“Until now, payloads had to be designed with a specific, proprietary bus in mind,” said Alexander Utter, Senior Engineering Specialist in the Digital Communication Implementation department and project leader for SatCat5. “We designed Handle as a universal interface that serves as an insulating layer between the payload and the bus. This way, payloads can be developed independent of any bus specifications.”

SatCat5 is functionally equivalent to commercially available, unmanaged Ethernet switches for home use. However, its blend of higher-rate and lower-rate data links allow nearly any device to participate in the same local communication network, regardless of its capability level.

Providing satellite-to-ground communications for Slingshot is Software Defined Radio (SDR) 2.0, a next-generation S-band downlink that can remotely provide firmware updates of on-board hardware to suit customer needs.

“Like SatCat5, SDR is commercial technology that’s widely available,” said Andrew Lin, Engineering Specialist in Digital Communication Implementation. “The Slingshot 1 platform is enabling us to fast-track the testing of newer, more advanced iterations of commercial technologies for use in space.”

For cyber defense, Slingshot 1 will make use of Starshield, which protects spacecraft from cyberattacks by detecting signs of cyber intrusion and mitigating attacks on board the spacecraft. Starshield leverages machine learning and other methods including advanced analytics capable of detecting new types of attacks. If an attack is detected, Starshield can automatically intervene to prevent or stop the spread of the attack and give operators on the ground ways to recover the mission.

“Starshield improves space cyber defense by moving the defensive capabilities from ground to onboard, giving spacecraft a way to defend themselves against attacks,” said Nicholas Cohen, Principal Engineer/Scientist in Cybersecurity and Advanced Platforms. “In an era of contested space, this will help ensure space missions continue to operate, even under new threats.

Faster Development, Faster Access to Space

Currently, satellite mission architecture relies predominantly on methods tailoring to different proprietary standards, requiring lengthy development cycles to ensure commands to payloads, power distribution and data systems are operating effectively. Slingshot’s modular approach provides for greater cost and schedule efficiencies, enabling opportunities to accelerate research, development and testing, the simplification of interfaces presents tremendous advantages to parties wanting to get their payloads into space.

“The space landscape is changing very quickly, and technologies are changing very quickly,” Weiher said. “Being able to rapidly test technologies in space is critical, and Slingshot is providing the ideal platform to do that.”

This article has been [published on Aerospace.org](https://www.aerospace.org).

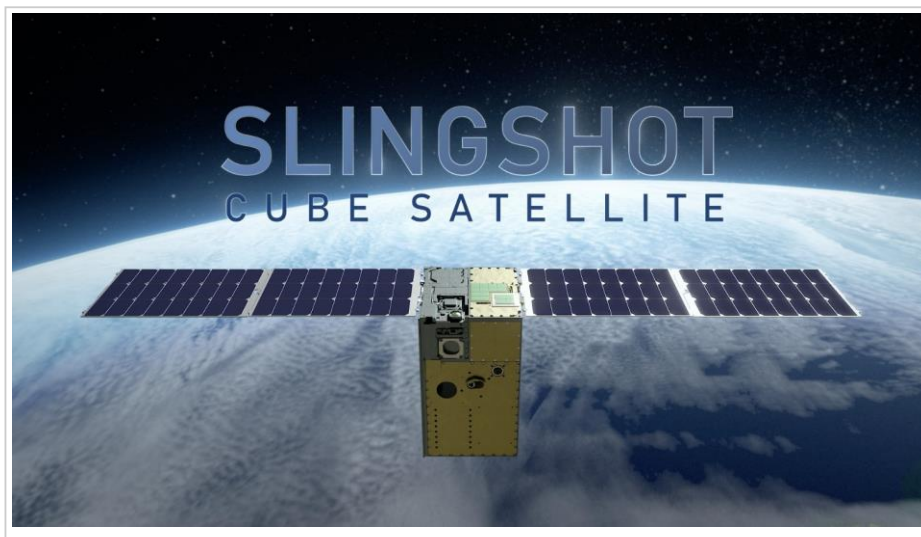
Press Release: Slingshot 1 Reaches Orbit on Mission to Demonstrate Modular Payload Architecture

July 02, 2022

EL SEGUNDO, Calif., July 2, 2022 – The Aerospace Corporation’s (Aerospace) Slingshot 1 satellite successfully launched from Virgin Orbit’s LauncherOne at Mojave Air and Space Port yesterday.

Slingshot 1 is one of seven satellites aboard the mission [Straight Up](#) by Virgin Orbit National Systems.

Slingshot 1 is a 12-unit CubeSat, about the size of a shoebox, that fast-tracks the development of modular and autonomous technologies by leveraging the potential for open standards and non-proprietary interfaces to simplify and expedite payload development and integration.



“We are seeing unprecedented growth in the space industry at large, driven by an unprecedented need for novel space capabilities,” said [Steve Isakowitz](#), Aerospace president and CEO. “Modular and autonomous technologies enable the agility and speed needed to harness these latest innovations and deliver resilient systems on accelerated timelines. Slingshot’s modular platform is a critical step toward advancing and testing these important technologies that are blazing a trail for future development.”

Slingshot 1 hosts 19 payloads: 16 were developed by Aerospace, including Vertigo, a reconfigurable attitude control system that enables satellites to find targets on Earth; Blinker, a GPS transponder for space traffic management; [HyPer](#), a hydrogen peroxide thruster delivering high performance for small satellites; and LaserComm, a next-generation space-to-ground laser communication downlink.

“Customization has traditionally played a major role in payload development and turnaround time,” said Hannah Weiher, engineering manager in Aerospace’s [iLab](#) and program manager for Slingshot. “With Slingshot, payloads conform to a basic standard where they can plug in and work even if they’re late in the development timeline.”

Handle, the key payload on Slingshot 1, rapidly integrates payloads through a standard interface and works to expedite the satellite development timeline. Similar to a USB port, the payload uses “plug and play” technology, enabling other payloads to efficiently communicate with the host satellite bus.

Additionally, Handle contains SatCat5, an Ethernet switch, that allows communication between payloads using commercial tools and open-source code from the extensive Ethernet ecosystem. SatCat5 supports high-speed and low-speed data rates, allowing for most devices to participate in the same local communication network.

The integration of these payloads through a standard interface enables a broad range of technologies to plug together with greater flexibility and adaptability.

ABOUT THE AEROSPACE CORPORATION

The Aerospace Corporation is a national nonprofit corporation that operates a federally funded research and development center and has more than 4,500 employees. With major locations in El Segundo, California; Albuquerque, New Mexico; Colorado Springs, Colorado; and the Washington, D.C. region, Aerospace addresses complex problems across the space enterprise and other areas of national and international significance through agility, innovation, and objective technical leadership. For more information, visit www.aerospace.org. Follow us on Twitter: [@AerospaceCorp](https://twitter.com/AerospaceCorp).

July 2022 Obituaries

July 01, 2022

Sincere sympathy is extended to the families of:

- ♦ **Janice Bagley**, member of administrative staff, hired Sept. 25, 1984, retired Oct. 17, 1998, died June 8, 2022
- ♦ **William Baldau**, member of technical staff, hired May 21, 1963, retired Nov. 1, 1989, died June 9, 2022
- ♦ **John Crenshaw**, member of technical staff, hired Aug. 29, 1966, retired May 1, 2003, died March 18, 2022
- ♦ **Margaret Donahue**, member of technical staff, hired March 11, 1963, retired July 1, 1990, died June 9, 2022
- ♦ **Francis Gerardi**, member of technical staff, hired May 15, 1962, retired July 1, 1990, died May 20, 2022
- ♦ **Robert Lillard**, member of technical staff, hired June 15, 1981, retired April 1, 2002, died May 30, 2022
- ♦ **Richard Moss**, member of technical staff, hired Dec. 27, 1963, retired July 1, 1994, died May 22, 2022
- ♦ **Alan Peterson**, member of technical staff, hired Nov. 8, 1999, retired Oct. 1, 2016, died June 14, 2022
- ♦ **Debora Puga**, member of administrative staff, hired May 12, 1997, retired Jan. 1, 2021, died June 21, 2022
- ♦ **Helen Reilly**, office of technical support, hired Dec. 19, 1977, retired March 1, 1986, died June 8, 2022
- ♦ **Zanoni Schwarzbein**, member of technical staff, hired Sept. 4, 1973, retired April, 1, 1986, died May 6, 2022
- ♦ **Harry Tomita**, member of technical staff, hired June 20, 1964, retired Nov. 1, 1991, died May 11, 2022
- ♦ **Patrick Wang**, member of technical staff, hired Jan. 19, 1987, died June 11, 2022
- ♦ **Josephine Washington-Frazier**, member of technical staff, hired June 23, 1980, retired Jan. 19, 1987, died April 15, 2022

These articles are reprinted from The Orbiter, a publication of The Aerospace Corporation 2310 E. El Segundo Blvd., El Segundo, CA 90245-4691 310-336-5000

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Contact Orbiter staff: Orbiter@aero.org