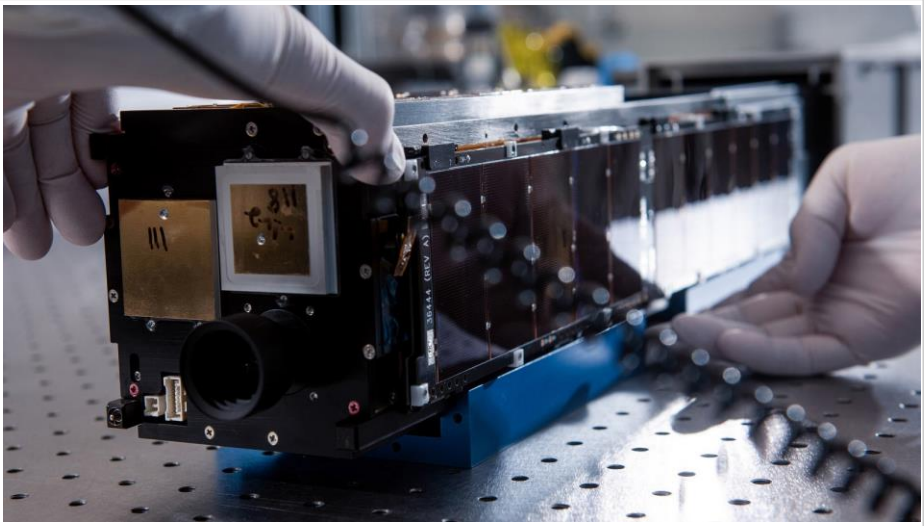
New CubeSat Could Shed Light on Earth's Atmosphere

December 27, 2021

Modern technology is increasingly reliant on space-based capabilities that enable essential things like navigation, weather monitoring and communications. With so many signals and radio waves beaming back and forth from ground systems to satellites in space, it is more important than ever to understand Earth's atmosphere and avoid potential disturbances that could disrupt critical operations.



DAILI is an instrumented six-unit (10x10x60 cm) CubeSat that images the limb of the Earth at approximately 3 km vertical resolution from 140 to 290 km in two colors.

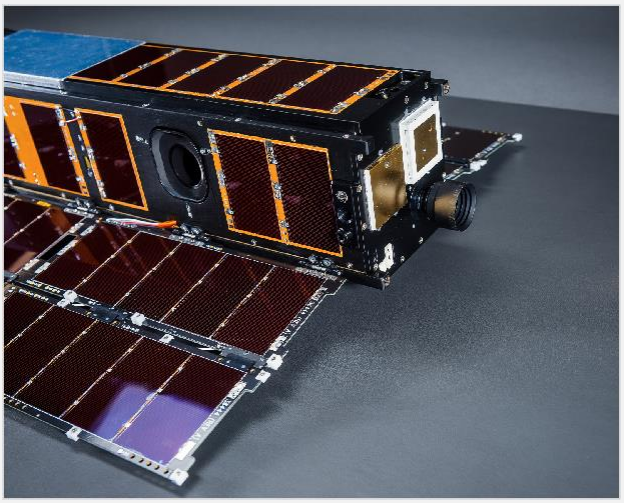
Scientists at Aerospace are leading the way to unlocking this information with the Daily Atmospheric Ionospheric Limb Imager (DAILI), which will study molecular oxygen density of Earth's upper atmosphere.

"The ultimate goal is to really understand the processes that affect the upper atmosphere and ionosphere," said Dr. James Hecht, Senior Scientist at Ionospheric & Atmospheric Sciences at Aerospace.

DAILI is an instrumented six-unit (10x10x60 cm) CubeSat that images the limb of the Earth at approximately 3 km vertical resolution from 140 to 290 km in two colors. These two colors allow information to be obtained about the neutral atmosphere during the day and the ionosphere at night.

The DAILI data though will primarily be used to study the neutral atmosphere at an altitude range of about 140 to 200 km, a region where measurements are scarce, and density and composition are highly variable.

The variability of molecular oxygen in this altitude regime is particularly difficult to measure.



DAILI will study molecular oxygen density of Earth's upper atmosphere and help unlock information about the ionosphere.

"We should be able to see how the dynamics change in this portion of the atmosphere, which is something not very well known right now," said Hecht.

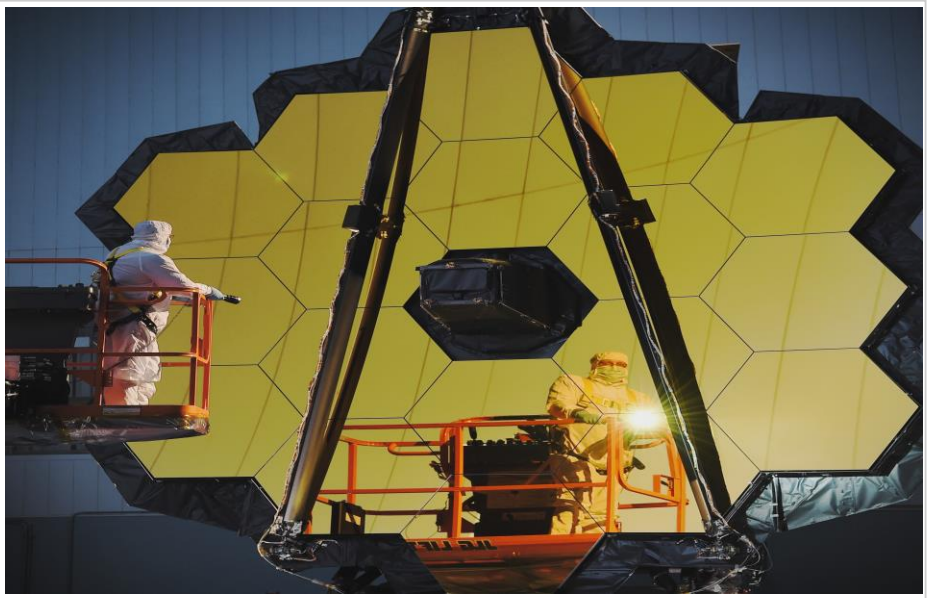
There are several aspects of DAILI that contribute to its ability to study neutral atmosphere variability. DAILI's forward three-unit long sunshade reduces intense scattered light from the Sun, the Earth's surface, and low-altitude clouds by a factor of almost a trillion. DAILI's sunshield is perhaps the most sophisticated ever flown on a CubeSat, Hecht said. The sunshade is key to DAILI's ability to examine the upper atmosphere's dynamic variations during daytime. This gives DAILI the ability to track these variations continuously unlike other techniques currently being used.

Read the full article on Aerospace.org.

NASA's James Webb Space Telescope to Piece Together Universe's History

December 23, 2021

Ever since first gazing towards the stars, humans have been curious about the universe – its earlyformation, its gradual evolution and the potential for life among other planetary systems.



NASA's James Webb Space Telescope could advance humankind's current knowledge of the universe's story beyond the capability of any other telescope in history. (Credit: NASA/Chris Gunn)

NASA's James Webb Space Telescope will peer back in time to search for answers. With its longer wavelength coverage and increased sensitivity, Webb could advance humankind's current knowledge of the universe's story beyond the capability of any other telescope in history. Besides

unveiling new information,the telescope will build upon and complement the discoveries made by its predecessor, the renowned Hubble Space Telescope.

Over its lifetime on the ground, the Webb mission has engaged a team of various space stakeholders. Aerospace is proud to have been one of the many contributors towards the Webb mission, offering diverse support throughout.

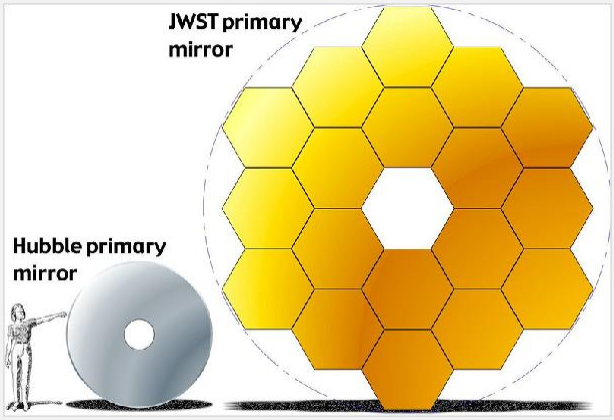
“One of the real benefits of this program is that it’s tangible; it touches everyone,” said Kevin Bell, Senior Vice President of Aerospace’s Space Systems Group. “There are a lot of people’s lifetimes engaged in this. It’s an incredible chance to inspire the next generation for what’s possible in space.”

The Wonders of Webb

The observatory is scheduled to launch on Dec. 25 onboard an Ariane 5 Launch Vehicle from Arianespace’s ELA-3 launch complex in French Guinea. After liftoff, the telescope will travel 1 million miles to reach its intended orbit around the Sun and undergo multiple phases of deployment, optics checkouts and instrument calibrations over a period of months before conducting science operations.

The Webb mission’s scientific objectives are inspired by Hubble’s observations. While Hubble has mainly viewed the universe through optical and ultraviolet wavelengths, Webb’s infrared ability will help scientists see more of the universe.

“The James Webb Space Telescope’s infrared eyes will be able to peer through the dust and debris to see the heat signature of creation at the planetary, stellar and galactic levels in unprecedented clarity,” said Jeff Hanley, General Manager of Aerospace’s Human Exploration and Spaceflight Division. “The Hubble Space Telescope has re-written the astronomy textbooks of its day, and now Webb – with its infrared sight and much larger aperture to capture heavenly light – will provide the next great leap in understanding the inner workings of the outer universe.”



Webb’s primary mirror is more than two times larger in diameter than Hubble’s. (Credit: NASA)

In addition, Webb’s primary mirror is more than two times larger in diameter than Hubble’s, allowing the observatory to have over six times more collecting area than its predecessor. Webb’s characteristics will make it possible for the telescope to see faint light from distant star-forming regions that are over 13 billion light years away.

“Webb is a huge leap in technology advancement beyond Hubble and the logical successor to that mission,”said Eric Breckheimer, Assistant Principal Director in Aerospace’s Civil Space Programs Operations Division. “I look forward to seeing it in operation as it collects unprecedented images and data on the very earliest years of existence of the universe.”

As the newest eye to the universe, Webb will enlighten both scientists and the public with the insights it gathers from each target it studies.

“Webb will be able to observe from our solar system to the most distant observable galaxies in the early universe,and everything in between,” said Uma Bruegman, Principal Director in Aerospace’s Strategic Assessments and Studies Division. “It will help us understand the origins of the universe and what it looked like millions of years ago.”

Longevity of Aerospace’s Support

Perhaps Webb’s most recognizable and iconic features are the 18 gold-coated mirror segments that resemble a honeycomb when fully unfolded. Each hexagonal segment weighs approximately 46 pounds, light and durable in comparison to Hubble’s mirror.

Webb has 18 gold-coated mirror segments that resemble a honeycomb when fully unfolded. (Credit: NASA/Desiree Stover)

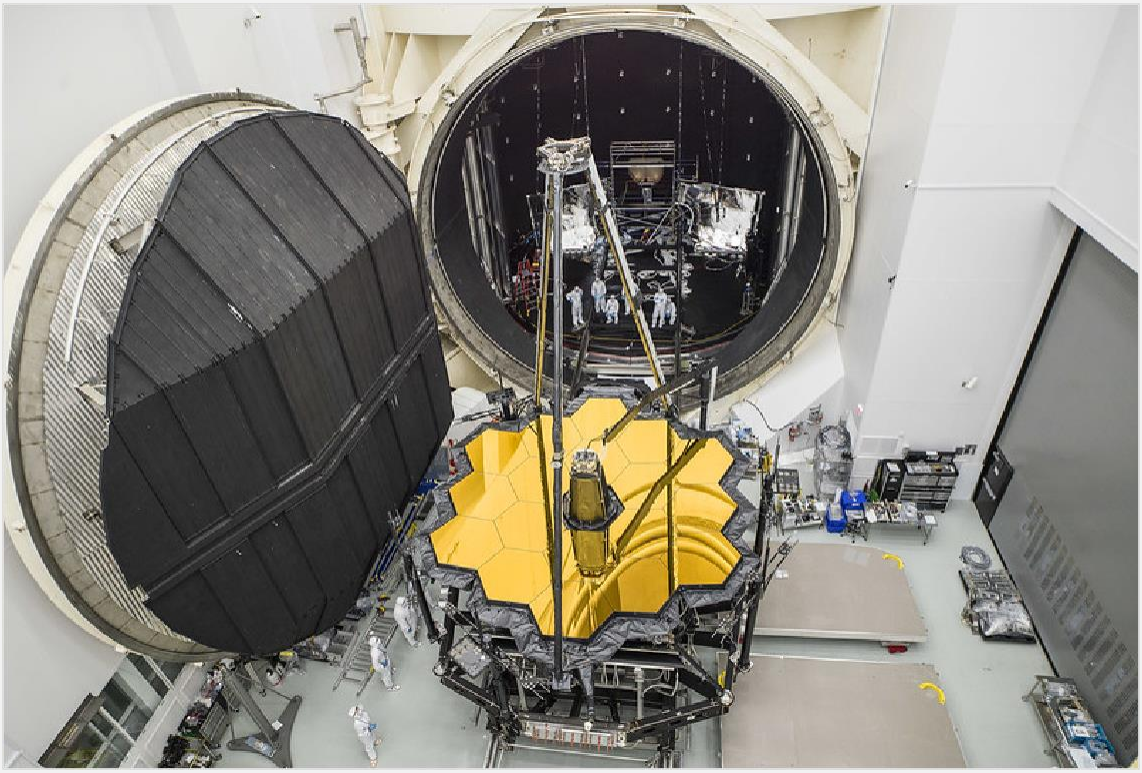
Designing lighter mirror technology hearkens back to earlier conversations among Aerospace’s customers that ultimately fueled the creation of the Webb mission.

“In the late 1990s, there was a multi-organizational need for significantly lighter-weight optical mirrors,” said Dr. Eric Hall, General Manager in Aerospace’s Vehicle Systems Division. “Defense and intelligence organizations and NASA came together to create the Advanced Mirror System Demonstratorprogram. Aerospace had a key part in this program—directly supporting our defense customers and indirectly helping all of the organizations.”

Because a mirror of this size has never been in space before, Webb’s development faced certain challenges. Identifying locations that could test an observatory of this size safely and in the rightenvironment was crucial, and Aerospace lent its technical expertise to this matter.

“Over a decade ago, there was an assessment done on facilities that could be suitable for thermal vacuum testing of the telescope,” said Dr. Rajiv Kohli, Senior Project Leader in Aerospace’s Human Exploration and Spaceflight Division. “NASA Johnson Space Center’s Chamber A, 45 feet in diameter and 60 feet high, was ultimately selected to accommodate the telescope. Since the chamber had been primarily designed for Apollo-related testing, it had to be refurbished to meet Webb’s certain spec requirements.”

The large surface areas of the mirrors also heightened the importance of contamination control. Kohli provided ongoing cleanliness maintenance support for the chamber and reported data to the Webb program on a regular basis to confirm that the contamination levels were within acceptable ranges. These practices helped ensure the telescope’s health—from the mirrors to the actuators—and prevented risks that could have affected the quality of Webb’s data and operations.



Primarily designed for testing spacecraft during the Apollo era, NASA Johnson Space Center's Chamber A was refurbished to accommodate Webb. (Credit: NASA/Chris Gunn)

Throughout the years, Aerospace aided technical reviews and analyses for Webb—ranging from assessing the mission status to providing hands-on evaluation of select hardware. For example, in the late 2000s, Aerospace personnel conducted various analyses on the Mid-Infrared Instrument's (MIRI) electronic boards to assess structural adequacy of the assemblies to withstand the conditions of space. Breckheimer remembers several colleagues he worked with during that time, including current Aerospace employees Enold Pierre-Louis, Brian McCarthy, Tung Lam, Ed Fong, Leslie Peterson and Kelvin Cheung.

While in operation, MIRI will see the redshifted light of far astronomical objects and build upon humans' current image of the universe.

Adding to the Universe's Story

When Webb lifts off from the ELA-3 launch complex, it will serve as another testament to the motivation ofhuman curiosity, the power of long-term collaboration and the next step in space science.

"The James Webb Space Telescope is this generation's Hubble and will be its eye to the sky, inspiring generations to come," said Martha Hess, Principal Director of Aerospace's Human Exploration and Spaceflight Division. "Most people can remember seeing their first image from Hubble, so it will be excitingto see the new lens Webb uses to view the universe."

Although Webb's findings will work in tandem with preceding and contemporary spacecraft, the telescope's observations will inspire future questions and shape the astronomical community.

"Pushing the envelope of science even one step further is how we got to the James Webb Space Telescope," said Aerospace Senior Project Engineer Kenneth Harris II, who led a NASA team responsible for integrating the telescope's main payload prior to joining Aerospace. "Webb will present us with additional questionsthat will spark the curiosity of scientists, engineers, and future generations. I'm interested to see how Webb will kick off the future of science and where we decide to travel and point our resources next."

Aerospace congratulates the Web mission partners, which includes integrated teams across NASA, ESA, CSA and many others on this cutting-edge technological accomplishment and looks forward to continuing supporting customers and provide solutions for the space enterprise.

Aerospace Announces Commercial Space Futures at TC Sessions: Space 2021

December 22, 2021

The modern space industry is in the midst of an unprecedented boom. An influx of investor capital and new innovations from a growing community of ambitious startups are driving an acceleration of innovationin commercial space. For the nation's space agencies to maintain leadership and advance the ability to outpace the threat, embracing this dynamic could offer compelling opportunities for collaboration and leveraging new approaches and technologies to deliver faster and more resilient capabilities across diverse space mission.

To nurture and accelerate these opportunities, The Aerospace Corporation is launching a new Commercial Space Futures initiative, which will leverage the FFRDC's unparalleled technical breadth and depth to enable government space programs to harness the rapid advancements of mission-enabling capabilities from the commercial sector. As a nonprofit corporation, Aerospace is uniquely positioned to support the space enterprise as a trusted and objective technical advisor, free of conflicting interests.

Aerospace President and CEO Steve Isakowitz announced the news at TechCrunch's recent TC Sessions: Space 2021. The Aerospace-sponsored conference convened leaders from national security and civil space agencies, the startup community, venture capital and academia to discuss priority issues and new pathways to working together to achieve shared missions.

"It's certainly a very exciting time. What's going on in space today is what I often refer to as the great convergence, where I think for the first time since the dawn of the space age, we see all three sectors of space going through massive changes," Isakowitz said. "It used to be that the government was two-thirds ofthe funding of R&D 40 or 50 years ago, and that has completely flipped. It's now the private sector that's driving the innovations, whether it's AI, machine learning, or robotics. The government realizes that, and realizes it really needs to tap into what's now the leading edge, which is being led by the private sector."

From left to right: Jessica Robinson of Assembly Ventures, Steve Isakowitz of Aerospace, Pete Muend of NRO, and Lt. Col. Tim Trimailo of SSC/DCIR during the Securing Space at Speed panel.

The two-day hybrid TechCrunch event featured discussions across a wide range of topics related to government mission needs, startup maturation, raising venture capital, and highlighted emerging technologies for space.

Leveraging Commercial to Secure Space at Speed

"The pace of innovation on the commercial and industry side is such that in order to be good stewards of the taxpayer dollar, we need to find better ways to leverage the commercial innovation," said Lt. Col. Tim Trimailo of the U.S. Space Force's Space Systems Command. "The U.S. government is not the only government around the world that sees the explosion in innovation and that it is possible to leverage. At SSC, we're laser focused on the threat and we recognize that we need to shift our mentality to more of a buy-before-we-build construct."

Trimailo discussed the need to reassess how government space has traditionally acquired capabilities and shift the priority from a primarily bespoke approach to one that first leverages the commercial landscape for lower-cost and more readily available solutions.

“The government is very interested in the commercial opportunities, but from the industry standpoint, it’s hard to figure out what door to walk through, and how to make that contact,” Isakowitz said. “The Commercial Space Futures organization within The Aerospace Corporation is going to bring greater focus to really up our game in terms of how we work with industry. It’s really to go after what we see as the major obstacles.”

Isakowitz explained the different ways in which Aerospace can collaborate with government and commercial space. The first is to serve as a front door in convening government and commercial opportunities, supporting the alignment of mission needs with attainable capabilities from industry.

TC Sessions: Space 2021 provided an opportunity for leaders and operators from the nation’s space agencies to connect with founders, innovators and investors from the startup community and explore ideas to accelerate the pace for space missions.

Aerospace can also help government agencies assess the technical, operational and financial readiness of early-stage commercial providers.

In addition, Aerospace continues to support the development of standards, regulations and interfaces that enable the execution of commercial integration. Furthermore, with its technical expertise and world-class research facilities, Aerospace is well positioned to support the maturation, verification and validation of commercial capabilities to ensure confidence for deployment in operational environments.

“We think it’s very important to make sure that there is U.S. space leadership in the future, and a big part of that is commercial space leadership,” said Pete Muend, Director of the NRO Commercial Systems Program Office. “We’re very focused on making sure that the U.S. enterprise is involved in commercial space, or at the forefront, and are going to do what we can in order to help enable that. We pay very close attention to what commercial providers can bring to bear, but also on some of the financial aspects of how the commercial providers present capabilities to us. Of course, in the end, they have to present useful capabilities because we do have a mission to accomplish.”

Read the full article on TC Sessions: Space 2021 at Aerospace.org.

Holiday Giving Continues Thanks to Aerospace Employees

December 20, 2021

In the spirit of giving, Aerospace employees have come together to help those in need in their communities this holiday season. Thanks to the generosity of employees across the country, this year's Holiday Gift Drive has been one of the most successful yet.

After a virtual drive in 2020, the GiftDrive partially returned in person while continuing an online component to maximize giving. This year, thousands of gifts were collected thanks to donations by Aerospace employees all across the country.

In El Segundo, the Holiday Gift Driveteam helped provide 574 children across 11 agencies with at least one gift. One Aerospace employee even donated 450 toys and another community agency donated 150. In total, more than 1,500 toys were donated thanks toemployees.

"Given the circumstances over the past couple of years, thisdrive now more than ever provides these children and their families of much needed relief, joy and hope," said Xavier Galindo, a member of Procurement Staff in Supply Chain, who has been involved in the program for more than 30 years. "These gifts provide them with that."

Aerospace employees Lianne Mcginley, Xavier Galindo and Laura Miramontes shopping at the Mattel tent for the Holiday Gift Drive.

In an effort to provide many ways to give and be involved, the Gift Drive continued this year with the option to donate on Venmo.

In 2021, the program doubled the amount of Venmo donations by collecting $3,800. One way this money was used is for purchasing gifts for teens, an age group that is typically harder to shop for. Gift cards have been purchased from Target and other stores so teens can go out and choose the gift or items they want.

"A lot of these kids and teens have no family support and the gifts we areproviding may be the only gifts they receive over the holidays," said Galindo.

Aerospace gingerbread house in Crystal City.

In Crystal City, gifts were donated to the Salvation Army Angel Tree Mission as well as the Department of Community and Human Services. Through these programs, gifts were provided for children and the elderly. In Greenbelt, Aerospace worked with two agencies to provide gifts and necessary goods to families and theelderly.

The giving team in Huntsville worked with Always Endure to provide gifts for an entire family in need. Through Senior Helpers in Alabama, gifts and other goods were brought to the elderly, many of whom donot have families and who were touched by the generosity of Aerospace employees at this time of year.

As the Security Director for Crystal City, Greenbelt and Huntsville, Journalia Clowers was able to coordinate giving at these three locations,bringing everyone together in the spirit of giving back.

“Aerospace has stepped up to the plate and really exceeded expectations when it comes to giving,” said Clowers. “I cannot tell you how many ‘thank yous’ we have received from these organizations. It’sreally rewarding knowing that we are making such a difference.”

In Chantilly, the Aerospace team provided gifts for children through the City of Fairfax Giving Tree. In total, eight children were sponsored and received all the gifts they asked for.

Always Endure Co-Founder and President Corey Buckner and Aerospace’s Iris Nunn in Huntsville.

“People go above and beyond to support these families. They contribute more than what is asked for on the list,” said Michelle Zentz, Facilities Planning Specialist within DC AREA Maintenance and Operations. “It’s really great to be involved and great to see so much giving.”

The team also helped support Fairfax County Juvenile Domestic Relations District 4, where 100% of the items on the wish lists were purchased. Families in this program seek assistance with more than just holiday gifts. In addition to gifts, items requested and donated included coats, toiletries, grocery gift cards,books and a kitchen set.

“This is an opportunity for us to give them a Christmas they might not have seen this year, but it’s also a chance to help them from a basic needs perspective,” said Edelina Rose, Events Communications Specialist in Corporate Affairs and Communications. “We don’t just donate toys, sometimes the kids ask for things like coats, hats, personal hygiene items like hairbrushes, toothbrushes and school supplies.”

In addition to gift drives across the country, many Aerospace sites held much needed food drives to help their local communities. The Aerospace Black Caucus Food Drive through Aerospace Cares collected $3,600 in donations, more than doubling their donations from 2020 and expanded to two additional locations.

Christina Hayes and Aerospace's Ben Hayes, Jay Northern, Iris Nunn, and Steve Taylor at the Food Bank of North Alabama.

In Huntsville, Aerospace employees provided more than 130 meals for the North Alabama Food Bank anddelivered 210 lbs. of dry food products and 45 lbs. of other items.

As a thanks for their generosity, Aerospace employees were given a tour of the food bank and learnedmore about its operations and how their donations will be used to help those struggling with food insecurity during the holidays.

"I know our people at Aerospace are helpers and givers," said Rose. "It's a warm feeling to know that our people look to give if they can."

2021 Corporate Social Responsibility Report: Unity Through Diversity

December 20, 2021

The Aerospace Corporation's Corporate Social Responsibility Report for 2021, which details the many ways our people are making a difference in the workplace and in our communities.

We invite you to experience the full ***2021 Corporate Social Responsibility Report*** *here.*

Featured in this year's report:

Fostering a Culture of Trust, Inclusion, and Belonging Aerospace is building upon its commitment to diversity, equity, andinclusion (DEI) by providing a forum for employees to examine and discuss unconscious racial and cultural biases in the workplace and is actively engaged in fostering an environment in which these issues can be addressed openly and honestly in productive andhealing ways.

Aerospace continues to invest in opportunities that enhance our employees' abilities to bring their best selves to do their best work, providing them toolkits and training that address unconscious bias and strengthen allyship.

Providing Support for Communities Where Our Teammates Work and Live

The Aerospace Committee for Equality (ACE) assesses, recommends, and executes the corporation's DEI actions through the focus areas of Recruitment, Representation, Retention, Education and Training, K-12 STEM Outreach, and Community Outreach.

Aerospace continues to build on meaningful progress in advancing DEI measures, actively investing in several community outreach programs designed to advance a culture of trust, inclusion, and belongingwithin the workplace and greater community.

Aerospace Volunteers Uplift Their Communities

At Aerospace, our people have a rich history of giving back and creating positive impact within their communities and the causes they are passionate about. As people strive to lead lives that reflect their values, the expression of civic life has evolved. Whether online, at the office, at the local food bank, with a vote, a voice, or a giving contribution, doing good comes in many forms, and Aerospace recognizes and celebrates them all.

Aerospace Names Stem Scholarship Winners

Increasing diversity in STEM is at the core of Aerospace's outreach initiatives. Building on its continued commitment to DEI, Aerospace named five winners of its scholarship and mentoring program: one from the initial flagship program in Southern California and four from regions where the company has major offices.

ACE K-12 Stem Partnerships

Aerospace is committed to nurturing and inspiring the next generation of STEM leaders in an environment that reflects its commitment to DEI. Aerospace's K-12 STEM outreach programs remain focused on nurturing young talent in traditionally underserved communities and increasing community engagement and dialogue that will ensure equal opportunities for future STEM leadership and a robust pipeline of diverse STEM talent for years to come.

Going Farther, Together

Aerospace is dedicated to a celebrating the diversity of our employees and the communities they inhabit, while also ensuring an equitable and inclusive future for all. Read more from the **2021 Corporate Social Responsibility** report on Aerospace.org.

Aerospace Employees to Honor Veterans, One Wreath at a Time

December 19, 2021

On Dec. 18, more than 250,000 wreaths will be placed at Arlington National Cemetery to honor United States veterans as part of Wreaths Across America (WAA). The Aerospace Military Veterans (AMV) is organizing an effort for Aerospace employees to join by volunteering in Virginia and across the country through the program.

Each year, more than 2,000,000 wreaths are placed at the graves of U.S. veterans in over 2,500 locations across the U.S. and abroad to honor all veterans and active military members for their service and sacrifice.

AMV is looking for volunteers to help out this year in a variety of ways. Aerospace's George Vogen, Senior Project Engineer in the Space Systems Group, will be leading a truck at Arlington National Cemetery and is looking for volunteers to help him unpack the truck filled with more than 3,000 wreaths. Vogen and his team will be there bright and early to ensure the wreaths are handed out and placed. As a long-time volunteer for Wreaths Across America, Vogen, who is a retired US Air Force veteran, said that year after year the event has left him with lasting memories, "I learn something new every time I'm out there."

Aerospace's Senior Project Engineer Lauren Perry, who started out as a volunteer wreath layer in 2015, now serves as the Key Volunteer Lead for WAA's Arlington Wreath Project at Arlington National Cemetery. "The mission of Wreaths Across America is to 'remember' the fallen, 'honor' those that serve, and 'teach' the next generation the value of freedom," said Perry. "A few years ago at a WAA event, someone recited an anonymous quote 'A person dies twice: once when they take their final breath, and later, the last time their name is spoken.' The mission of Wreaths Across America takes this to heart."

In keeping with this mission, wreath layers are asked to take a moment to read aloud the name of the veteran where they place the wreath. In doing so, volunteers can ensure that the memory of the deceased lives on. "I think it is a really fitting tribute to the veterans and a memory of their sacrifice and an honor to their sacrifice," said Chuck Allen, President of AMV and aretired US Air Force veteran. "After you see all the wreaths out there on the tombstones, it is really worthwhile."

For those interested in volunteering and supporting ourveterans and Wreaths Across America, there are many ways to participate.

“From buying or donating wreaths to coming out in person and laying wreaths at a cemetery, there are a lotof ways to be involved,” Vogen said. “Everyone is welcometo help out, including friends, family and children, and pay tribute to and honor our nation’s veterans.”

Truck filled with wreaths waiting to be unloaded in Arlington.

“I think by doing things like Wreaths Across America, sending care packages, also sending postcards, these are things we do that to let the troops know that they matter,” Allen said. “What they do matters and their sacrifice matters.”

Visit @TheAerospaceCorporation on Instagram (Link) for more photos of Aerospace employees, along with friends and family, volunteering at this year’s Wreaths AcrossAmerica.

Aerospace Celebrates New and Improved xLab with Ribbon Cutting

December 09, 2021

As an independent organization reaching across the space enterprise, Aerospace is uniquely positioned to discover, develop and deliver the space assets of the future.

A key part of Aerospace’s ability to turn innovative concepts into reality is the work done within xLab, which celebrated the official ribbon-cutting of its renovated facility on Tuesday with a small, socially distanced gathering on the El Segundo campusThe event highlighted xLab’s remarkable accomplishments in

From left: xLab Principal Director Lynn Friesen, CTO David Miller, President and CEO Steve Isakowitz, Aerospace Board Chair Stephanie O'Sullivan, Board Vice Chair Gen. Paul Selva, and incoming CTO Debra Emmons.

advancing space technologies for Aerospace,and noted how the renovations better equip our technical experts to collaborate more effectively and creatively to build innovative prototypes and instruments at the speed necessary for a rapidly evolving space environment.

“I really want to underscore the importance of what the folks [in xLab] are doing. We talk so much about the threat that’s out there and the need to respond. I think this is a good example of things we’re capable of doing,” said Steve Isakowitz, President and CEO of Aerospace. “I am so proud of what this team has been able to accomplish through prototypes. Aerospace is probably branded forour prototyping efforts.”

The 12,000-square-foot space includes a Prototype Design Center, Electronics Testing Lab, Fabrication Lab, Assembly and Integration Lab, as well as open office space andhuddle rooms to drive open communication and creativity.

Short for Experiments Laboratory, xLab architects, develops, and transitions prototypes, and is responsible for delivering products, including hardware, software, and major testbeds. Prototypes coming from xLab include ground, airborne and space flight systems.

“We’re really excited to have this event. It’s been a long time coming,” said Lynn Friesen, Principal Director of xLab. “It’s just a beautiful space and I want to thank especially all of my staff who participated and put their ideas into making this space look the way it does.”

While the new xLab facility has been operational for the past year, an official ceremony to recognize the milestone had been postponed out of an abundance of caution for COVID-19 safety guidelines.

In fact, even before the new facility was fully operational, xLab staff were already working in the labs to ensure deadlines were being met and solutions were delivered as needed.

Aerospace Principal Director Lynn Friesen leads a guided tour of the renovated xLab facility.

Among the projects, developedin collaboration with Aerospace's Physical Sciences Laboratories (PSL) and program offices, include:

- Slingshot, a CubeSat platform that advances on-orbit experiments using modular and autonomous technologies on next-generation satellite systems.
- PIANO, a follow-on instrument to Aerospace's NIRAC, which is a camera currently flying on the International Space Station and using the Earth's natural airglow to capture stunning nighttime imagery.
- The T-Case, a temperature-checking device to keep employees safe during COVID-19.
- AeroCube-10, a pair of CubeSats that completed a proximity operation that brought them within 22 meters of each other in orbit.
- A mobile laser beacon, leveraging off-the-shelf parts, designed and built on an accelerated timeline.
- AeroCube-15, a pair of CubeSats built and launched on a tight budget and even tighter timeline of just 18 months.

Learn more about Aerospace's new xLab facility by exploring this virtual tour, which enables visitors to browse through the various labs and take a deeper dive with videos, explanations and visuals about the exciting work being done there.

ECP-Lite to Understand Space Weather's Impact On Spacecraft

December 27, 2021

Spacecraft in orbit are subject to space weather and at risk of developing problems from exposure—ranging from surface and electronics degradation to temporary or permanent failure, events that could compromise capability and overall performance.

While general interactions between space weather and spacecraft are understood, identifying the exact impact on hardware and operations can take days.

ECP-Lite team members Douglas Holker (left), Dr. Joseph Mazur (middle) and William Crain (right) display the ECP payload.

Scientists and engineers at The Aerospace Corporation, led and sponsored by the Space Systems

Command's (SSC) Development Corps Innovation and Prototyping Directorate (DCI) and Air Force Research Laboratories (AFRL), intend to reduce the time it takes to identify a potential space weather-anomaly for satellites in any orbit.

The Energetic Charged Particle (ECP)-Lite is a package of sub-sensors that can monitor major space weather hazards and launched on Dec. 7. "Trying to understand what's happening to the satellite itself, ruling in or out problems, is becoming more and more important," said Dr. Joseph Mazur, Principal Director in Aerospace's Physical Sciences Laboratories. "ECP-Lite is a low-cost, easily integrable sensor that you can put on a satellite to eliminate the uncertainty."

Weathering the Space Environment

Auroras, such as the northern lights, are a visible example of space weather: the conditions of space near Earth caused by activity on the sun's surface and in interplanetary space. Maintaining awareness of space weather is important as it can hinder technology—causing anomalies on a satellite, impacting radio signals, or even affecting navigation systems—and disrupt human activities.

For these reasons, the U.S. Air Force and U.S. Space Force require ECP sensors to be integrated on its satellites to provide better attribution of environmentally caused anomalies.

"Proliferating affordable sensors, such as ECP-Lite, and aggregating the data will provide information to decrease fog in the space environment. We must leverage this information to attribute hostile acts, inform domain awareness, and support satellite development," said Capt. Zachary Morley, Program Manager for Integrated Command and Control for SSC. "I was extremely fortunate to have a passionate and brilliant team developing the ECP-Lite class of sensors. It is amazing to see the sensors launch, but it is no surprise – the team has always moved with world-class agility, foresight, and passion."

ECP-Lite is a small suite of eight sub-sensors that can monitor space weather's influence on its host's electronics and materials. The device can monitor four major hazards, including single event effects, surface dose, and internal and surface charging. This innovative technology taps into Aerospace's previous internal research and development efforts in creating miniaturized sensors.

"It was truly an enterprise-supported activity," said Douglas Holker, Principal Director in the Developmental Prototypes & Projects subdivision. "They say it takes a village to get a payload launched and ECP-Lite demonstrated that. I believe that it takes everyone—from leadership to those in support-based roles—to make a mission possible."

Read the full article on Aerospace.org.

2021 Value of Space Summit: Securing the Value of Space

December 03, 2021

On Oct. 19 and 20, Aerospace and the Space ISAC reconvened the Value of Space Summit with a fresh theme, "Securing the Value of Space."

Utilization and reliance on space- based systems has grown increasingly throughout the 21st century—a transition documented by The Aerospace Corporation's Center for Space Policy and Strategy (CSPS) in its 2020 policy paper, The Value of Space.

The report served asthe foundation that year of the inaugural Space Information Sharingand Analysis Center (Space ISAC) Value of Space Summit, a 2-day event co-hosted by Aerospace that convened stakeholders from across the space enterprise for thoughtful discussion on crucial issues related to modern space operations.

This October, Aerospace and Space ISAC reconvened the Summit on Oct. 19 and 20 with a fresh theme, "Securing the Value of Space" – extending some of the conversational threads from 2020 and opening new lines of discussion on other emerging or evolving issues.

"Continuing the vision of last year, this Summit focuses on the importance of space-critical infrastructure to people living on Earth now and in the future," said Erin Miller, Executive Director of Space ISAC, during opening remarks. "Now, nearly a year later we are bringing back the Value of Space Summit with an increased focus on protection of space systems."

More than 60 speakers from government, commercial, educational, nonprofit and international space organizations convened to share their expertise across 13 different panels on a variety of topics, including space cybersecurity and supply chain risk management, space safety norms and standards, cislunar space development and consideration for space systems as national critical infrastructure, the latter of which had been a dominant topic at the 2020 Summit.

"The evolution of our summit topics from last year's inaugural event is emblematic of the evolution within the space domain," said Ed Swallow, Senior Vice President of Aerospace's Civil Systems Group. "Just since last year's Summit, legislation that designates space systems as national critical infrastructure was introduced in Congress. Aerospace is committed to continuing to work with Space ISAC and the entire enterprise to solve the hardest problems in space that help all stakeholders realize the full value of space."

Demonstrating the value of space in a way both industry stakeholders and the general public can

understand is important. As Chirag Parikh, Executive Secretary of the White House National Space Council, said at the 2021 Space Symposium, "The way we must be communicating about space is not space for the sake of space, but space for the value of that citizen…You need to be able to bring it down to something that a common person who doesn't work in the space industry will actually understand and appreciate."

This imperative was established in the 2021 Value of Space Summit's kickoff session. "Consumers enjoy the benefit of satellite services usually without realizing their source, governments and businesses use services for various high stakes [operations], but the key point is: for all of us, satellites have become integrated in 21st-century society," said Dr. Michael Gleason, Senior Project Engineer at Aerospace and co-author of the Value of Space paper, before urging Summit panelists and moderators to take action-oriented approaches to their respective talks.

Many stakeholders like individuals, businesses, and the government often enjoy the benefit of satellite services without realizing their source.

Gleason's comments threaded through the conversations that followed. Dr. Jamie Morin, Vice President at Aerospace and Executive Director of CSPS, moderated a panel focused on the ongoing debate over how or whether to designate space systems as critical national infrastructure. Morin recounted an article coauthored by Swallow and Summit panelist Samuel Visner, Technical Fellow at MITRE.

"In the article, they made an argument [that] our lifestyle in the United States heavily depends on space systems," Morin said. "We're depending on those, including, of course, the ubiquitous GPS, but also in many areas like communications, weather and beyond. Our lifestyle depends on these systems, [but] they are less secure than we ideally would want them to be."

To learn more about this year's Value of Space Summit, read the full article on ***Aerospace.org***.

December 2021 Obituaries

December 01, 2021

Sincere sympathy is extended to the families of:

- **William Adams,** member of technical staff, hired Feb. 26, 1979, retired Sept. 1, 2006, died June 23, 2021
- **Rodney Barfield,** member of technical staff, hired Sept. 2, 1980, March 1, 2008, died Oct. 25, 2021
- **Insun Chang,** member of technical staff, hired Dec. 10, 2018, died Nov. 14, 2021
- **Billie Fults,** office of technical support, hired Feb. 27, 1978, retired Feb. 1, 1994, died Nov. 19, 2021
- **James Gibbs,** member of technical staff, hired Aug. 9, 1979, retired March 1, 1987, died Oct. 30, 2021
- **David Harvatin,** member of technical staff, hired Feb. 5, 2007, died Nov. 25, 2021
- **Evan Hazelton,** member of technical staff, hired April 18, 1966, retired July 1, 2002, died Oct. 21, 2021
- **Sally Junge,** member of administrative staff, hired Oct. 1, 1962, retired Jan. 1, 2004, died Sept. 26, 2021
- **John Koffend,** member of technical staff, hired Oct. 19, 1982, retired Dec. 1, 2006, died Oct. 23, 2021
- **Mary Kwok,** office of technical support, hired July 3, 1990, retired Sept. 1, 1995, died OCt. 14, 2021
- **William Phillips Jr.,** member of technical staff, hired Jan. 3, 1967, retired June 1, 1985, died Oct. 11, 2021
- **June Snyder,** member of administrative staff, hired Feb. 25, 1974, retired Aug. 1, 1999, died Oct. 24, 2021
- **Robert Whalen,** member of technical staff, hired Sept. 19, 1960, retired April 1, 1996, died Nov. 1, 2021
- **Jerome Wittels,** corporate officer, hired March 26, 1963, retired Feb. 1, 1991, died Nov. 13, 2021
- **Charles Wright,** member of technical staff, hired March 5, 2001, died Nov. 17, 2021

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