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ORBITER NEWS

News, announcements, and more.

Project West Wing: Outpacing the Threat Starts with Awareness and Understanding

August 30, 2024

In Project West Wing, Dr. Caolionn O'Connell (center) leads a team of more than 50 experts, working together across Aerospace and broader space enterprise to outpace the threat.

As the space domain becomes increasingly congested and contested, Aerospace must understand the dynamic environment and rapidly evolving globally competitive landscape to support government customers in outpacing the threat, and provide relevant information directed at strengthening capabilities to ensure national security. Aerospace's Strategic and Global Awareness Directorate, more commonly known as Project West Wing (PWW), acts as the corporation's tip of the spear in this regard, providing cutting-edge technical intelligence analysis and research across the space enterprise.

Founded in 1957 by the United States Air Force, PWW initially dedicated its focus toward understanding Soviet missiles as part of the Space Technology Laboratories. Members of that team went on to form The Aerospace Corporation in 1960. As the space enterprise evolved, so too did the mission of PWW, leveraging that heritage and institutional knowledge to adapt to support the needs of Aerospace's government partners.

Throughout the years PWW has kept its focus on staying at the forefront of understanding and articulating the threat environment, providing timely and relevant education and actionable insights to government customers and throughout Aerospace, facilitating informed decision-making and establishing connections to address and anticipate the hard problems that the space enterprise faces.

"For Aerospace and our customers, PWW provides the expertise to understand the threats associated with the space domain and how US systems might mitigate those threats. We want to make sure everyone has an appreciation of the capabilities that are already in orbit and how those might affect the programs that they support," said Dr. Caolionn O'Connell, Principal Director of PWW. "We think through and anticipate – as we are developing and building new systems, new architectures, new constellations – what will be up there in five, 10, 15 years. We need to anticipate how those threats might evolve and make sure that whatever is being built ultimately can be agile enough to respond or withstand whatever space domain challenges may arise."

Leveraging the Power of Knowledge

PWW creates working partnerships directly with customers at the highest levels within the Department of Defense (DoD) and Intelligence Community (IC), collaborates with program offices to provide specialized technical intelligence reach-back support, and leverages the ETG backplane for exquisite technical expertise, as needed.

Aerospace and government customers rely on PWW to help ensure national security.

PWW's expertise and work in gathering and analyzing space intelligence data provides a unique resource for Aerospace and the nation to obtain valuable context, knowledge and insights to a wide spectrum of global threats, including foreign space and missile programs, potential adversary capabilities in space, and broader strategic goals of a growing number of space participants.

"Other nation states are employing assets in space to create threats to our systems, and our team is thinking about how we need to change our whole acquisition mindset, to not only deliver capabilities that can withstand any of those threats, but then anticipate the threats going forward," said O'Connell.

Shaping an Integrated Space Enterprise

As announced last September, Aerospace made significant changes to its organizational structure to strengthen the alignment of how the corporation can support government customers and the increasing focus on space warfighting, growing importance of rapid acquisitions and the need for greater unity of e ort between the DoD and the IC. As the principal director of PWW, O'Connell has extensive experience working with government customers and a deep understanding of end-user needs.

“With the focus on integration and kill chains, understanding the threat is a critical component of ensuring mission success,” said O’Connell.

Prior to joining Aerospace, O’Connell held various roles at a number of federally funded research and development centers (FFRDCs), including the RAND Corporation where she had the opportunity to work closely with Dr. Lara Schmidt, Vice President of Defense Architectures and Integration in the Defense Systems Group (DSG). Schmidt was the former principal director of PWW.

Empowering Aerospace to Outpace the Threat

To ensure Aerospace is positioned for success and is equipped to navigate this dynamic era of space, PWW also provides numerous educational and informational resources for employees to better understand the threat environment. This knowledge and broader awareness is essential to enabling everyone at Aerospace to better support Enterprise Mission Success for the nation and customer.

Across the space enterprise, customers and the broader space community rely on the deep knowledge and leadership Aerospace provides, and the PWW team continues to serve as a key enabler of that support.

“The breadth and the depth of the work we do on the threat at PWW was a surprise to me as someone who has recently joined this organization,” said O’Connell. “I can only imagine how many people across Aerospace don’t quite realize the amount of knowledge that’s resident here. If there is ever any question about the threat, turn to us and you might be surprised about how much knowledge we have in-house that can help answer those questions.”

This article has been published on Aerospace.org.

No Limits, No Problems: AWC Celebrates Four WOTY Award Winners

August 29, 2024

2024 Woman of the Year awardees Iwona Palusinski., Nicole LaBier, Debbi Johnson and Kara Cunzeman join Aerospace President and CEO Steve Isakowitz (outside left) and Chief Technology Officer Debra Emmons (outside right) during the AWC-hosted ceremony.

Aerospace is at its best when it is leading from the front, collaborating across the enterprise and operating with speed and agility to solve the hardest problems for space. Fostering an environment that empowers individuals to inspire and lift those around them strengthens Aerospace's culture toward achieving Enterprise Mission Success.

Last week, the Aerospace Women's Committee (AWC) celebrated four employees who embody these qualities during the 2024 Woman of the Year (WOTY) Awards. The recipients of this year's WOTY Awards are **Nicole LaBier**, **Debbi Johnson**, **Kara Cunzeman** and **Iwona Palusinski**.

WOTY is part of AWC's annual celebration of Women's Week. This year's theme of "No Limits. No Problems." highlighted the incredible contributions of women to the nation's progress for space and beyond, while also welcoming every individual to embrace their limitless potential.

"This year, we have the distinct pleasure of recognizing four outstanding women who have demonstrated excellence in every aspect of their work," said Debra Emmons, Vice President and Chief Technology Officer at Aerospace. "They've also shown that true success is not just about personal achievements, but about how they've lifted up others along the way. Let's keep this theme of 'No Limits. No Problems.' at the forefront and continue to push the boundaries, challenge the status quo, and also support one another in all of our endeavors."

Founded in 1972, AWC is committed to building a welcoming, supportive and active community. As an Employee Resource Group, it has contributed to policy changes that have positively impacted all employees across Aerospace. AWC celebrates Women's Week every August in observance of Women's Equality Day, which commemorates the 19th Amendment to the U.S. Constitution granting women the right to vote.

"While our methods of communication have adapted… our mission remains the same. Women throughout Aerospace have sought to share opportunities of equality with our community and mentors," said Manzar Chaudhry, National Vice President for AWC. "There are so many people who have helped us to get to where we are, and we are so thankful for everything they've done. We continue to thank them for the progress we've made and continue to look forward to the path ahead."

The awardees were selected based on their contributions across key areas, including performance in their roles, company activities, community involvement, professional career and academic achievements, and demonstration of leadership and mentorship.

Meet the Awardees

Nicole LaBier, Executive Assistant to the Chief Executive Officer

Since joining Aerospace in 2007, Nicole has demonstrated unwavering dedication, exceptional leadership and significant contributions to the company's success. In her role, she often manages heavy workloads in fast-paced, high-impact environments. She has also been integral during a significant time of change at Aerospace, providing leadership and mentorship to the team. Her accomplishments include supporting the enhancement of key programs and initiatives, such as the HERO Awards nomination process, the Aerospace Senior Management Review process, Aerospace Summer Games, Take Your Kid to Work Day, and countless other continuous process improvements. Among her proudest initiatives is the creation and execution of the semi-annual Aerospace Pop Up Store.

"I believe that the only limits we have are the ones we make for ourselves, and this idea has really shaped how I look at things. When we embrace the idea that there are no limits, we open ourselves up to endless possibilities," LaBier said. "This award is not just a recognition of my achievements; it's about the journey, with all its challenges and victories. It proves that we can push past any limits and highlights the power of persistence, passion and always striving to reach our potential. I encourage everyone to live without limits. Don't let doubt or fear hold you back. Instead, see every challenge as an opportunity to show what you're truly capable of."

Debbi Johnson, Administrative Specialist in the Digital Innovation Division

Debbi joined Aerospace in 2021 and has supported many high visibility responsibilities, including the Accelerate 3 cohort series, collaborating with Aerospace University to de ne the ETG Meets the Program Office series, and routinely volunteers to support ERGs, Recruiting and Corporate Communication efforts. She also finds ways to give back through opportunities like Take Your Kids to Work Day, Dr. Martin Luther King Jr. National Day of Service, and VEX Robotics Day. Outside of Aerospace, Debbi supports issues that are important to her, such as the American Federation for Suicide Prevention, the Alzheimer's Association, Saint Jude's and her local Humane Society of Fairfax County.

"I believe I'm right where I'm supposed to be with Aerospace… We all have something different to bring to the table. Bring your whole self to work. Don't be afraid to speak up for change, but you also need to offer solutions to the issues that you're highlighting," Debbi said. "There is no limit to what we can accomplish. Challenge yourself and don't be afraid to dream big. When you are open to possibilities, beautiful things happen. Have faith. This has been a truly humbling journey, and I've learned that my life does make a difference, and yours can too."

Kara Cunzeman, Director of Strategic Foresight for Aerospace's Center for Space Policy and Strategy

Kara founded the Strategic Foresight directorate at Aerospace and serves as its first director. In her role, she champions the discipline of strategic foresight, helping the space enterprise adequately prepare its organizations and capabilities to proactively shape the future. She has supported over 30 different program offices, including the White House, ODNI, OSD, the Space Force and NASA. Her contributions have also spanned across Project West Wing, Aerospace's Corporate Strategy, Workplace of the Future, and in advancing innovation and portfolio management. Kara is also a nationally recognized public speaker and author and has been the recipient of numerous awards. She has also co-founded two nonprofit organizations in the Federal Foresight Advocacy Alliance and the U.S. hub for Teach the Future.

"Women leaders make the workplace better. It's that simple. Study after study shows us that the way women collaborate, lead, transform organizations – it helps us all. So, why is it still that only one in five workers in the space industry are women and 10% of Fortune 500 executives are women?" Kara said. "For those of you wondering why we even have this award at all, it's because we need to recognize the incredible opportunity we're leaving on the table as a company, as an industry, and as a country. I hope I can help serve as proof to this rising generation of women that you're only limited by what you can dream for yourself. You may not be able to have it all, but you can strive to build a life you are passionate about in all facets. Own your multiverse and own your future."

Iwona Palusinski, Systems Director of Payload Systems Engineering in GEO/Polar MW MT

Iwona's achievements at Aerospace span across a wide breadth of program offices, government customers and mission areas. Accepting each new challenge as an opportunity to develop and demonstrate her skills, she's taken on increasing responsibility while at Aerospace. Currently, Iwona is leading a department on delivery of SSC OPIR payloads during concurrent NGG and NGP constellation developments. Prior to this role, she successfully built a new department to shore up Aerospace's optical engineering capability. She has also served as the principal investigator on three ISS payloads with her experiments having received the NASA Discoveries ISS Award in 2014. Beyond her dedication to technical excellence, she's participated in various mentorship, ERG and AEA programs to provide employees opportunities to connect and engage with the broader Aerospace community. Outside of the company, she has been active through technical and career workshops, as well as in community service endeavors, such as the Saint Francis Animal Ministry to help animals in need.

"I chose Aerospace over 21 years ago because I wanted to be part of the legacy ensuring a strong U.S. space presence while learning from and being mentored by resident world experts. Another appealing aspect was the ability to move positions and develop a custom career path," Iwona said. "Our FFRDC status enabled me to collaborate with other entities on problems of national importance. I never expected such networking to lead me to be the PI of three ISS experiments. I am energized by mentoring, helping people grow, and recruiting. It is rewarding when others understand their unique gifts, find their path, reach their potential, and are excited about the future."

Congratulations to Nicole LaBier, Debbi Johnson, Kara Cunzeman and Iwona Palusinski for all you have accomplished!

The Aerospace Women's Committee (AWC) is an Aerospace Employee Resource Group (ERG). Membership and participation in all ERGs are open to all employees, regardless of identity.

Aerospace Champions Spirit of Innovation at SmallSat 2024

August 28, 2024

The pace of innovation rapidly transforming the space industry has been remarkable, and there is perhaps no better example than the field of small satellites of how creative energy, diversity of ideas and brilliant engineering can converge to push boundaries. From humble beginnings, the advancements in smallsat capabilities continue to expand imaginative possibilities for the future of space.

Aerospace leaders and experts engaged with the SmallSat community at this year's conference, sharing ideas for innovative concepts, capabilities and missions.

At the 2024 Small Satellite Conference, Aerospace engaged with the broader smallsat community to explore the latest innovations, concepts and capabilities in the field. This year's event highlighted how automation is being integrated into smallsat systems across the space, launch, ground, and user segments, making them smarter and more effective.

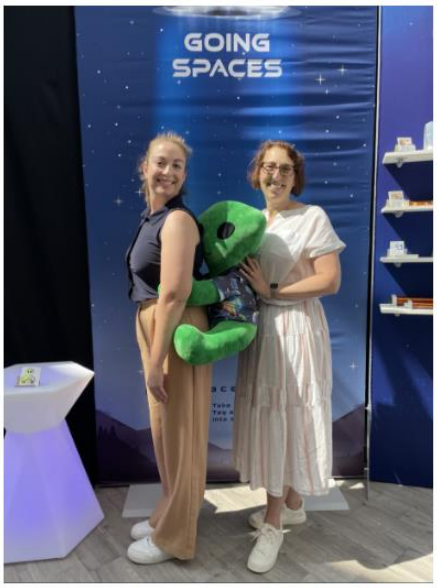
"We are so fortunate to be able to attend the SmallSat Conference here," said Steve Isakowitz, President and CEO of Aerospace. "It's a place that started 40 years ago with a few dozen people and has grown to nearly 4,000 people. It brings together people from the community that are talking about some of the latest, most exciting technologies in small satellites, and the increasingly important role that it's playing in the future. Aerospace has been there from the beginning, and I'm so proud of our presence here."


Aerospace's Jerry Fuller (left) and Todd Sheerin (right) showcase the Autodynamic Flexible Circuit during SmallSat 2024.

Isakowitz was a keynote speaker at this year event, exploring the evolution of smallsat technologies and their significant impact on the broader space industry today. He also highlighted some of the bold concepts and prototypes—leveraging new enabling technologies and developments like growth in computing power and launch vehicles— that could shape the architectures of tomorrow.

"I do believe the smallsat revolution is here to stay, from those early hungry days, it is shaking up the industry for real change," Isakowitz said during his keynote. "Everybody needs to get on board with taking advantage of the kind of entrepreneurship, innovation and risk-taking that we're seeing out of it. I think it's imperative that we have the kind of future with swarms of these smallsat technologies."

Aerospace experts had the opportunity to share some of their novel projects with the community, such as DiskSat, Deorbit Motor and Autodynamic Flexible Circuit. They also engaged in meaningful discussions on topics such as automation, rendezvous and proximity operations, and adapting mission assurance. These contributions not only drive innovation forward, but also advance solutions for some of space's hardest problems.



Aerospace experts, like Claire Alvine (left) and Catherine Venturini (right), embrace the creative and innovative spirit that permeates throughout SmallSat.

"It used to be the case that you could put a satellite up and let it take many years for the orbit to slowly decay or to reenter," said Jerry Fuller, Senior Engineer Specialist at Aerospace. "It's not the case anymore. There's so much stuff in space now that we need to be actively bringing things down."

Aerospace pioneered some of the first small spacecraft in orbit and were integrally involved in developing and promoting the CubeSat standard, and continues to forge new innovative approaches today.

"SmallSat has a special place for a lot of us in Aerospace. A lot of us have been building and flying CubeSats for a very long time, so being a part of the community is really special to us," said Catherine Venturini, Principal Engineer and Scientist at Aerospace. "SmallSat is also a great opportunity for us to engage with vendors, customers, academia, and everyone else interested in the smallsat community and smallsat missions."

This article has been published on Aerospace.org.

Fly High, Dream Big: AWC Kicks Off Women's Week with Keynote from SWF2030's Melanie Stricklan

August 22, 2024


Aerospace President and CEO Steve Isakowitz asks the AWC Women's Week keynote speaker, space industry leader Melanie Stricklan of Space Workforce 2030, a question after she delivered her keynote speech. Stricklan's talk opened the celebrations for Women's Week 2024.

The Aerospace Women's Committee (AWC) kicked off this year's Women's Week with a keynote delivered by space industry leader Melanie Stricklan of Space Workforce 2030 (SWF2030), which is a strategic partnership between Aerospace and Space Foundation. As a cornerstone event of AWC for over three decades, Women's Week continues to be a powerful platform for inspiration and empowerment. This year's theme is "No Limits. No Problems." As the inaugural executive director of SWF2030 and cofounder of Slingshot Aerospace, Stricklan shared a thoughtful exploration of mentorship and the power of perseverance in her talk, "Reaching New Heights: A Mission-Driven Journey Fueled by Mentorship, Resilience, and Grit."

"Mel Stricklan is someone who I deeply admire," said Steve Isakowitz, President and CEO of Aerospace. "She has had an incredible career, both in terms of leadership and technical excellence. And she's one of the, unfortunately, too few examples of women who have done incredibly well in a startup and the commercial space industry. And I hope she's the beginning of many, many more."

In addition to her work with SWF2030, Stricklan serves as a member of the National Space Council User Advisory Group and the FAA Commercial Space Transportation Advisory Committee. In 2022, she was named Executive of the Year by Via Satellite, and in 2023, received the Outstanding Achievement Award from Women in Aerospace and was named CEO of the Year by the Los Angeles Business Journal.

"The incredible message in Mel's keynote this week was a powerful reminder of the talent and tenacity women bring to the space industry and it underscored the work that remains in closing the gender gap," said Erin Hong, National President of AWC. "By elevating diverse voices and creating opportunities for all women at all levels, we can drive innovation and progress that benefits us all."

Demonstrating True Grit

Stricklan's story began as a young girl in rural West Texas with a passion for flight and space. She learned the true meaning of resilience and community in the aftermath of her mother's brainstem hemorrhage when Stricklan was 7 years old.

"We were told she'd never walk, never talk, never breathe on her own," she said. "But my dad didn't accept it. He knew that my mom had resilience. My mom had grit. My mom had the strength to get through this, and so he refused to give up on her. She was the first person to fully survive a brainstem hemorrhage in the United States, and because of that grit and a few

other miracles along the way, my mom walks, she talks, she breathes, she eats all by herself today. It was an unforgettable lesson about the power of empathy, the power of compassion and, most importantly, the power of team."

Later, with that example of perseverance and her own continued infatuation with the night sky, Stricklan set her sights at a commission in the U.S. Air Force to fly with the hope of one day becoming an astronaut.

The crowd in El Segundo reacts to the keynote delivered by SWF2030's Melanie Stricklan.

Flash forward to today, from a successful 21-year military career in the U.S. Air Force to her entrepreneurial ventures cofounding Slingshot Aerospace and in her current role leading SWF2030, Stricklan has consistently sought to make a meaningful impact in the space industry. Her work at Slingshot Aerospace revolutionized satellite tracking and space traffic coordination, while her leadership at SWF2030 aims to inspire and prepare the next generation of space professionals and leaders.

Embracing the Power of Mentorship

But she has never done any of this alone. Stricklan emphasized the pivotal role mentorship played in her life — from the uncle who convinced her not to give up on her dream to fly, to mentors during her military career and in the Civil Air Patrol who encouraged her to continue striving and dreaming through failures.

Stricklan's message to the crowd was that mentorship isn't just about guidance—it's about opening doors and believing in someone's potential, even when they don't see it themselves.

"Mentorship is about fostering a culture of exploration and growth, not just in oneself, but a team," she said. "Each one of you are a mentor, whether you're officially a mentor or not. People are watching you. So, as mentors, empower those that watch your steps. Guide them to take their own steps. Encourage them to embrace the unknown and remind them that it's OK not to have all the answers. The key is to keep moving forward. Don't stop trusting that each step will lead to new opportunities."

Melanie Stricklan is the inaugural executive director of Space Workforce 2030 and the cofounder of Slingshot Aerospace.

Building the Workforce of the Future

As she reflected on the lessons learned from her journey, Stricklan highlighted the importance of thorough preparation and adaptability in the face of the unknown, particularly as she moves forward toward her next challenge and chapter as the executive director of SWF2030.

"I like to solve big problems, and I like to bring teams together to do that," she said. "And now I have the opportunity to tackle our industry's most pressing challenge — closing the STEM gap and bringing more diversity of background onto the field, leveling the playing field like it's not been done before."

Stricklan was one of the first CEOs who signed on to SWF2030, a collective effort of 30 space companies committed to improving diversity in the space industry and holding accountable to measurable results.

“We’ve got a big job to do, and we can’t do it alone,” she said. “To truly make an impact, we need mentors like you. We need leaders like you. We need women like you. We need men like you. The future of our industry depends on us working together to solve this. We innovate better together. Our national security, our global security and our global U.S. leadership in space depends on this.”

Celebrating Women’s Week with AWC

President and CEO Steve Isakowitz and Senior Vice President Kevin Bell join the AWC National Executive Board, (left to right) Lynda Chrisco, Manzar Chaudhry, Katy Veliz, and Erin Hong, after the Women’s Week keynote.

Women’s Week, a cornerstone event of the Aerospace Women’s Committee for over three decades, continues to be a powerful platform for inspiration and empowerment. Held each year around Women’s Equity Day and the anniversary of the enactment of the 19th Amendment to the U.S Constitution, which granted women the right to vote, this weeklong celebration highlights the progress made by women in aerospace.

“The year’s theme of ‘No Limits. No Problems.’ captures the essence of challenging boundaries and embracing new possibilities,” Hong said. “Aerospace’s Employee Resource Groups are essential in this journey as they empower individuals from all backgrounds to excel, and ensure every perspective is valued in shaping the future of the space industry.”

This year, Women’s Week events include the keynote speaker event, Women of the Year Awards (WOTY) ceremony, WOTY reception (invitation only), a roundtable on implicit bias, speed mentoring, a fun run, a clothing drive, and a book raffle. Through activities like Women’s Week and an annual calendar of workshops and other community-building activities, AWC continues to empower employees and foster a more inclusive and equitable environment at Aerospace. Membership is open to all employees, of any gender.

Advancing Solutions and Innovations with Aerospace at ASCEND 2024

August 21, 2024

In July, Aerospace joined space industry leaders and innovators at AIAA's Ascend in Las Vegas to shape the future of space. Aerospace was at the forefront of this transformative event, exchanging ideas, forging new relationships, and inspiring the next generation of professionals.

Dr. Debra Emmons, Vice President and Chief Technology Officer (center), joined other space industry leaders for a panel during ASCEND 2024, discussing the critical need for private investment in national security.

"It's been an incredible opportunity for Aerospace to share our new innovations and collaborate technically with others," said Kevin Bell, Senior Vice President of the Engineering and Technology Group at Aerospace.

Aerospace contributed to forward-thinking discussions across a range of key topics, from developing public and private partnerships to collaborating on a global scale.

"It was a great opportunity to hear some of the leaders in space," said Debra Emmons, Vice President and Chief Technology Officer of Aerospace. "They were really all speaking to the theme about commercial space and how important it is for sustaining the space ecosystem.

As a connector and convener for the space industry, Aerospace brings together diverse perspectives to explore new opportunities and tackle emerging challenges.

"Not one country can do this alone," said Ashley Kowalski, Project Leader in International Partnerships at Aerospace. "We really do need to rely on our allies and partners."

Aerospace's participation included a series of enlightening panels and technical paper presentations, providing a unique opportunity to explore the latest technology and trends, foster discussions and collaborations to solve problem and advance innovation.

"At Ascend, Aerospace is in a great position to be able to lead conversations that will bring different opportunities or different opinions and perspectives together.

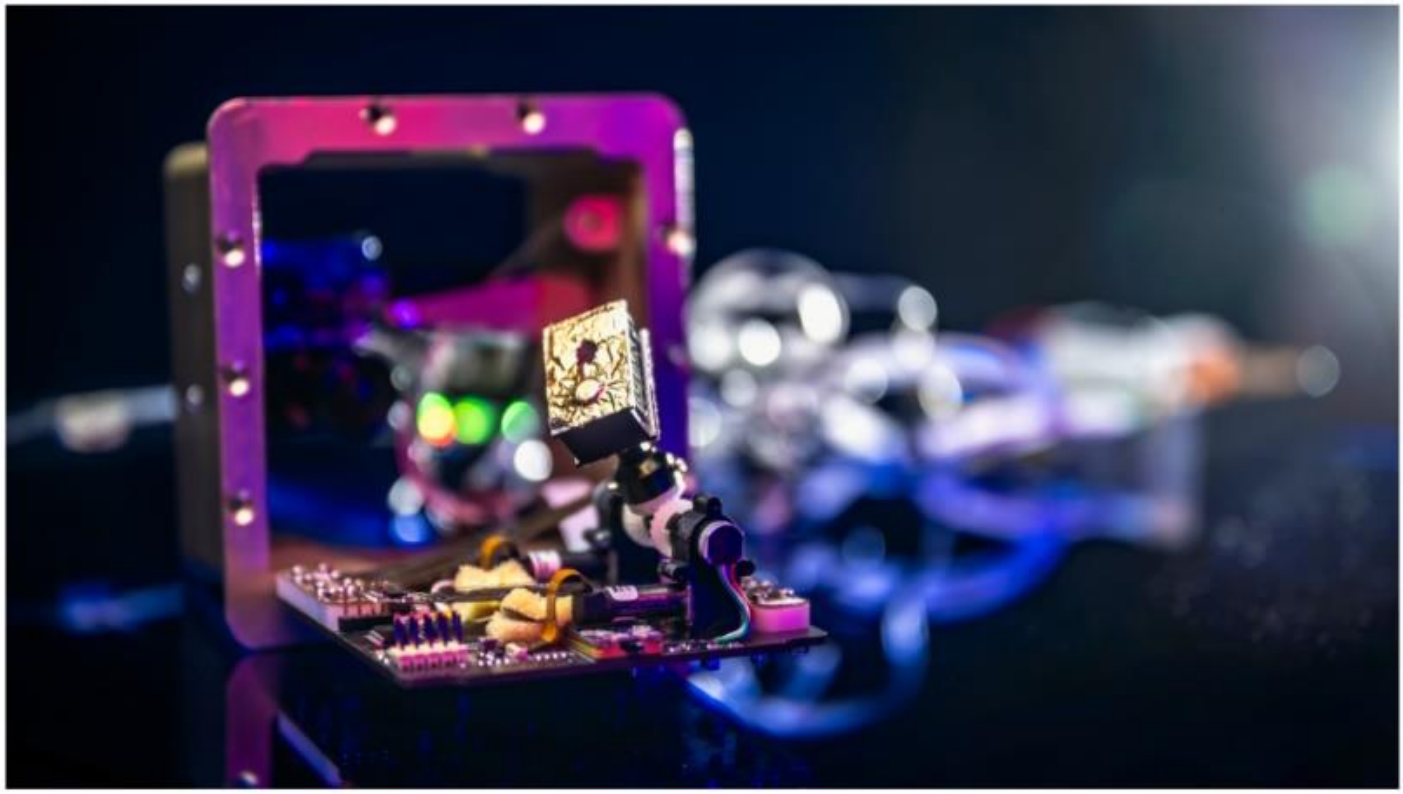
Opportunities like ASCEND enables Aerospace to more impactfully drive important decisions, harness innovation and accelerate integration across the space enterprise.

“It’s important that we’re part of these conversations, part of these panels, leading them in some kind of way in order to be a leader in this industry,” said Emily Hardy, who works in Commercial Program Development at Aerospace.

This article has been published on Aerospace.org.

Reshaping the Future of Space Robotics

August 12, 2024



Aerospace continues to solve space's toughest challenges. A team of engineers and scientists have developed a novel technology, called the Autodynamic Flexible Circuit, that will enable new adaptable and resilient approaches for space robotics, satellites and other innovations for space exploration and operations.

While conventional flex circuits have been used in spacecraft for decades, they don't move on their own. They're either static or have to be moved by external forces. While not useful for every application, combining a flexible circuit board with the actuator it powers creates new options and affords greater adaptability for some and allows the exploration of new concepts with drastically reduced volume and mass.

As the scope and scale of space missions and architectures continue to expand, more agile and adaptable solutions enabled by advancements like the Autodynamic Flexible Circuit will be critical for the future. One example could be the possibility of new concepts and designs that address orbital congestion and space debris removal.

"We can't really do that with the old style of robots that we've been building," said Jerry Fuller, Senior Engineering Specialist at Aerospace. "We need things that are lighter, nimbler, faster, better. This may be an approach to doing that so we can make a spacecraft that is something that can address some of the nation's and the world's challenges with regard to space."

Stepping Outside the Box: Adaptable Flex Circuits

The Autodynamic Flexible Circuit is a fundamental shift in approaching space robotics moving from traditional static circuits with boom-and-joint designs, which tend to be heavy, complex, and expensive. While rigid and linear flex circuits can be

found in technologies like smartphones, digital cameras and even space robotics, what makes the Autodynamic Flexible Circuit unique is its ability to support and articulate itself, enabled by materials in the wiring.

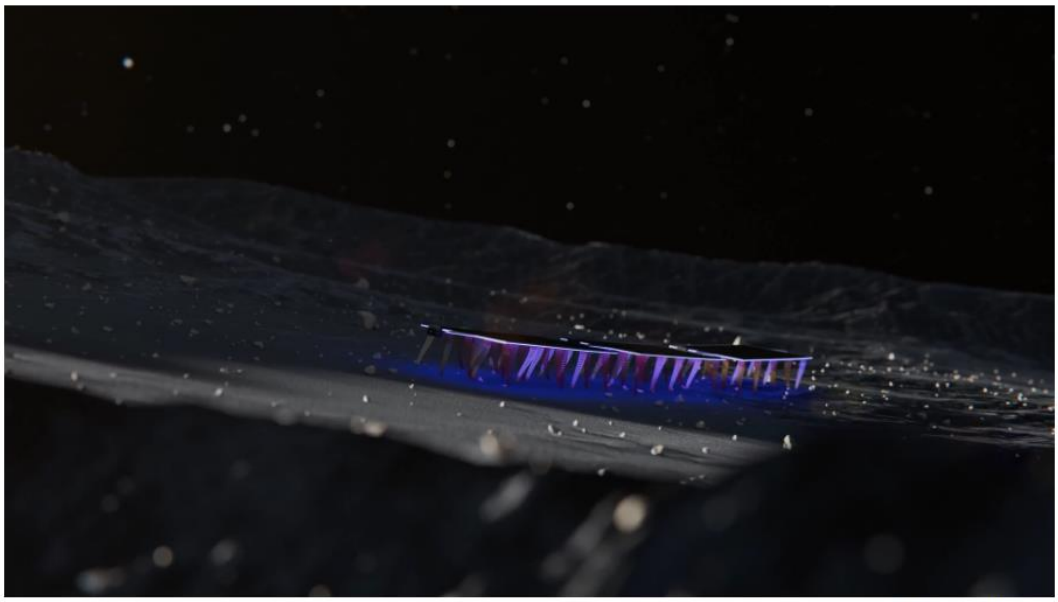
The Autodynamic Flexible Circuit can be utilized on a satellite, adding a shape-changing element that enables increased adaptability.

This allows it to change its entire shape as needed while still maintaining the integrity of the flex circuit. The Autodynamic Flexible Circuits are composed of standard flex circuit substrates with stitching made from shape memory alloy actuator wire, which contracts when electricity flows through it. As for any standard flex circuit, Autodynamic Flexible Circuits may incorporate technologies such as sensors, cameras, heaters, LEDs, and more, just like traditional robots.

“It’s made from the same materials as ordinary flex circuits but has a shape memory alloy wire laced through it in such a way that when we run a current through the wire and it heats up, it causes a rather dramatic shape change,” said Fuller. “That shape change can be controlled so that we can use it as a robot arm. We can even make a shape-changing spacecraft out of this or point or shape an antenna. This would be enabling for over-the-horizon concepts like NASA’s Brane Craft, a shape changing membrane-spacecraft.”

A Multitude of Applications

With their vast potential for application, one of the challenges of the project is narrowing down the focus of Aerospace expertise on the most promising avenues. At face value, the Autodynamic Flexible Circuit has significantly less mass than its predecessors. Being virtually two dimensional, it also allows many to be stored in one place. This means it can accomplish the same task and more without requiring nearly as much mass or volume, which helps to reduce fuel consumption of the space vehicle and extend mission life. Its ability to change shape on command also means that space operators can have more flexible control of their robotics. And by eliminating complicated mechanisms in place of simple systems built from widely available flex circuit and shape memory alloy parts, this technology allows programs to move faster and fly more proliferated systems at lower costs.



One application possibility is a walking robot with a backbone of solar cells and many small legs, controlled with Autodynamic Flexible Circuits, similar to the tube feet of a starfish. This application could allow for the exploration of places not accessible with a wheeled Rover.

“I think that the Autodynamic Flex Circuit allows for an approach in space that really lets go of the heavy structures and mechanisms that may be required on Earth to accomplish a whole lot more, with much less mass,” said Dr. Todd Sheerin, Senior Project Engineer for Developmental Prototypes & Projects at Aerospace. “I’m really excited to see the new opportunities we can chase after with this kind of technology.”

Moving the nation’s space capabilities forward starts with innovative ideas, building on the way circuits were always used, and looking towards new ways the Autodynamic Flexible Circuit could be utilized in upcoming missions.

“I’d like to see a new class of robotics come out of this, one that stores at, goes out to wherever it needs to go, and then takes shape and does so with a grace and dexterity that isn’t available today,” said Fuller.

This article has been published on Aerospace.org.

August 2024 Obituaries

August 05, 2024

Sincere sympathy is extended to the families of:

- **William Dimpfl**, member of technical staff, hired Jan. 7, 1985, retired Jan. 1, 2013, died Feb. 21, 2024
- **Geraldine Edson,** office of technical support, hired Nov. 7, 1966, retired Nov. 1, 1995, died July 16, 2024
- **James Foster**, office of technical support, hired June 30, 1975, retired Oct. 1, 2014, died June 7, 2024
- **Ervin Frazier Jr**, member of technical staff, hired June 20, 1977, retired June 1, 2018, died July 6, 2024
- **Jonathan French**, member of technical staff, hired Oct. 16, 2006, died June 7, 2024
- **Paul Galan**, member of administrative staff, hired May 19, 1975, retired Aug. 1, 2013, died June 30, 2024
- **Rebecca Anne Gick**, member of technical staff, hired Feb. 28, 2000, retired Aug. 1, 2022, died July 2, 2024
- **Joan Greene-Walker**, member of administrative staff, hired Sep. 17, 1984, retired Aug. 1, 2000, died June 22, 2024
- **Simone Hull**, office of technical support, hired Feb. 13, 1976, retired Oct. 1, 1990, died April 17, 2024
- **Donna Silva**, office of technical support, hired May 29, 1972, retired Feb. 1, 2002, died June 8, 2024
- **Charles Young**, member of technical staff, hired Oct. 1, 1979, retired Oct. 1, 1996, died July 4, 2024

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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