AEROSPACE

ORBITER NEWS

News, announcements, and more.

Aerospace Cyber Experts Take Tops Honors at World's Largest Hacker Conference

August 29, 2023

Aerospace experts were recognized with one of the highest honors at the world's largest hacking conference. Hosted in Las Vegas, Nevada earlier this month, DEF CON 31 welcomed the broader hacker community as well as a growing ecosystem of cybersecurity professionals, government customers, security researchers, mainstream news outlets and other service providers.

Aerospace's cyber experts (pictured here with the ICS CTF event organizers) took home the Black Badge award, which is the highest honor bestowed by the DEF CON conference. [Credit: @icsctf/Twitter]

An Aerospace team comprised members from the Cybersecurity and Advanced Platforms Subdivision (CAPS) finished in first place out of 108 teams in a three-day Capture the Flag (CTF) competition focused on hacking Industrial Control System (ICS) devices. Considered one of the most challenging CTFs, the Aerospace team was awarded the coveted "Black Badge" in recognition of their overall elite skills and outstanding contribution to the security community.

"Aerospace demonstrated that it has the technical personnel with the experience and knowledge on ICS cybersecurity – winning the CTF and delivering direct customer support are all examples of how we have expanded our capabilities in this area over the last few years," said Sky Troyer, Associate Principal Director of CAPS. "Congratulations to the team. They are in elite status now within the DEF CON community."

Up on the big screen, the Aerospace Red Alert ICS CTF team takes the stage to accept the Black Badge award. [Credit: @icsctf/Twitter]

The team comprised Randi Tinney, Charlie Tucker, and Peter Herman from the Cyber Assessments and Research Department (CARD) and Henry Reed of the Cyber Defense Solutions Department (CDSD). Additional support was also provided by two former Aerospace employees, contributing to the success of the team.

In addition to this accomplishment, Aerospace's cyber expertise was well represented throughout the conference. Winston Li and Ari Bender-Long in Defense Cyber Operations along with Nick Cohen in CAPS won the White House Office of the National Cyber Director badge challenge.

As previously highlighted, Aerospace developed the Moonlighter cyber test platform in partnership with Space Systems Command (SSC) and Air Force Research Laboratory (AFRL) for the Hack-A-Sat 4 challenge. The CubeSat was delivered to low-Earth orbit in June, facilitating the world's first CTF exercise in space. Aerospace's presentation on the Space Attack Research and Tactic Analysis (SPARTA) matrix was also well received at the Aerospace Village.

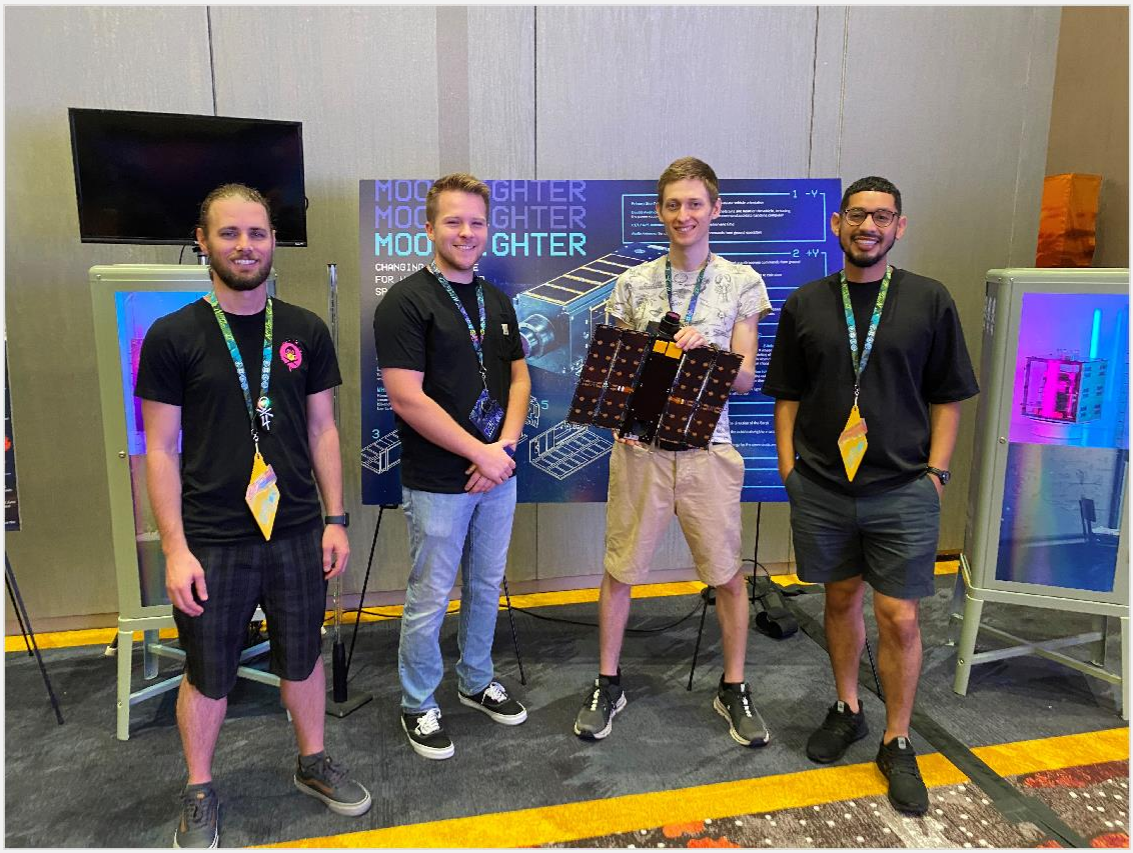
Capture the Flag: More Than a Game

While ostensibly structured like a "game," a CTF challenge involves high-level competition and skills for complex problem-solving to find text strings, called "flags", which are secretly hidden in purposefully vulnerable programs. In the case of the Red Alert ICS CTF, teams were tasked with breaking through several layers of security in a virtual supervisory control and data acquisition (SCADA) environment and eventually take over complete control of the system. The contest housed actual ICS devices from various vendors on a testbed showcasing different sectors of critical infrastructure.

ICS systems are critical to the nation's infrastructure and space domain because they're used to control industrial processes such as manufacturing, product handling, production, and distribution. In fact, Aerospace is providing direct support to government customers for resilient solutions against cyber issues in this area.

Moonlighter: First CTF in Space

Hack-A-Sat is an annual space security challenge jointly hosted by the Air Force Research Laboratory and Space Force to raise awareness of space cyber security issues, educate the public, and bring the space and cyber communities together. Aerospace has supported the competition since its inaugural year in 2020, and this year, delivered a gamechanger in Moonlighter for the challenge. During the event, some of the best hackers in the world pointed the vehicle to take pictures, exploited the GPS receiver, and executed a timing side-channel attack on the CPU.



Aerospace's Moonlighter team played an integral part to ensure Hack-a-Sat 4 was a success.

Cybersecurity testing for space has usually occurred in the lab or in a simulation activity on the ground. Applying cyber defense theories and approaches in the actual space domain has been restricted by the limited availability of suitable already-existing vehicles in that environment. Understanding the value that a real in-space system could provide regarding this gap, teams from across Aerospace came together to design, develop, and build Moonlighter.

"To have a vehicle where we can try out these technologies, and try out different tactics, techniques, and procedures that have been developed during the years in a live environment is an incredible perspective," said Aerospace's Aaron Myrick, in an interview with *Payload*. "It's never good enough to do it in a sim environment."

This Is...SPARTA

Cybersecurity matrices serve as robust resources of collective knowledge that have benefited many security professionals to better understand Tactic, Techniques, and Procedures (TTP). Having identified a gap to address challenges emerging in the space environment, Aerospace developed SPARTA as a resource to ensure the space-cyber community is empowered to continually educate engineers and system defenders so they can overcome the unique cyber-threats they face in the domain.

At DEF CON, Aerospace's Brandon Bailey delivered a presentation on SPARTA, which can be found here, demonstrating best practices for extracting TTPs from reports and building various attack chains using the matrix. SPARTA can be used to build attack chains to drive baseline countermeasures and security controls for the spacecraft.

“We see SPARTA’s utilization across the community increasing and SPARTA TTPs will evolve over time as new information becomes available through security researchers (i.e., Hack-a-Sats), and space-cyber threat intelligence is shared across the community,” said Bailey, Senior Project Leader in CARD. The TTPs are a means to educate on the defenses needed and SPARTA provides countermeasures against tactics and their supporting techniques. One of SPARTA’s primary goals is ensuring engineers are informed on the countermeasures available to aid in TTP/threat mitigation. From a hacker community perspective SPARTA provide resources to educate the community as well as a mechanism to communicate their research to better position the space industry against adversary aggression.”

Embrace Your Multiverse: Women of the Year Awardees Celebrated During AWC’s Women’s Week

August 28, 2023

Fostering an inclusive culture at Aerospace means recognizing that every person is dynamic in their own way and capable of making an impact at the workplace and outside of it. Throughout Women’s Week, the Aerospace Women’s Committee (AWC) is highlighting the theme of “Embrace Your Multiverse,” celebrating the many diverse aspects of life that contribute to employees being their best selves.

As part of these celebrations, four employees were recognized with the AWC Women of the Year Award during a ceremony in AGO and broadcasted across Aerospace’s campuses and remotely. The recipients of this year’s award were Lynda Chrisco, Angela Couture, Elena Viscarra and Dr. Wendy Chiado.

“The community has really come together and changed over the years and the aerospace industry is very different than it was years ago. I really think that we have come a long way,” said Dr. Wayne Goodman, Executive Vice President of Aerospace. “The Aerospace Women’s Committee has been an invaluable part of Aerospace and it’s amazing. It’s been around for 50 years and has helped shape, develop and grow generations of women to look at different ways of exploring and finding their own multiverse. Today, your mission remains as vital as ever, and I really appreciate all that you do for Aerospace and on behalf of the nation, serving the space enterprise.”

The recipients of this year's Woman of the Year (WOTY) Awards were Angela Couture, Lynda Chrisco, Dr. Wendy Chiado and Elena Viscarra.

Goodman also spoke about the importance of not being afraid of opening the door to a world of possibilities, new ideas and new perspectives.

Goodman shared how embracing uncertainty and diverse opportunities shaped his career and enabled him to become a better leader. He also spoke about the importance of helping others pursue their career development, while recognizing each individual is made up of many parts, with diverse experiences and perspectives that shape who they are – tying back to the Women's Week theme.

"The theme was inspired by the Oscar winning movie Everything Everywhere All at Once, in which one woman becomes an unlikely hero by channeling her gifts and talents from her alternate realities," said Erin Hong, AWC National Vice President and Women's Week Chair. "To this point, we want to highlight and embrace the fact that we women at Aerospace are engineers, scientists, leaders, community members, mothers, daughters, athletes, artists, caregivers and so much more."

Meet the Women of the Year Recipients

Lynda Chrisco is an Administrative Specialist in the Space Security Directorate. Before joining Aerospace in 2019, she worked at General Atomics as a department assistant and project manager. Throughout her time at Aerospace, she has been lauded for her valuable support and contributions across a variety of projects including planning and organizing National Intern Day, as well as planning numerous TEC Talks which earned her a strategic Imperative Hero Award for People Excellence.

Chrisco has taken on a variety of roles throughout her life as a wife, mother, sister, aunt, photographer, lasagna chef, AWC National Treasurer and Goodness Ambassador for Colorado Springs. She believes in the importance of giving back to the community through events like MLK Day of Service where she volunteered at a local food bank and through STEM outreach events at local elementary and middle schools.

Lynda Chrisco, Administrative Specialist in the Space Security Directorate

“In a world that constantly presents us with new opportunities and challenges, let us remember that every step we take, every effort we make has the potential to create a positive impact,” said Chrisco. “Let us remain steadfast in our commitment to excellence and innovation. A couple of Aerospace corporate values also let us never forget to extend a helping hand to those that are still on their journey. For true success is when we lift each other up.”

Angela Couture, Director of University Relations and Recruiting in the Office of the Chief People Officer

Angela Couture is the Director of University Relations and Recruiting in the Office of the Chief People Officer. When she joined Aerospace, she created a centralized university relations and recruiting program. She was awarded the Aerospace Commitment to Our People Awards in 2022 and the People Excellence Award in 2023 as part of the UPLIFT team. She was also a Trustees Distinguished Achievement Award recipient as a part of the Space Workforce 2030 team for increasing diversity and representation across the whole space enterprise.

Truly embracing her multiverse, Couture is also an avid traveler, theater fan, yearly attendee of the US Open, and enjoys spending time with her family as a sister and aunt. She is also heavily involved in her community where she makes a difference in the lives of those around her through her support of organizations including the American Lung Association, Spinal Bifida Association, American Society for the Prevention of Cruelty to Animals, and Dress for Success.

“I firmly believe that each hire isn’t just a job build, but a step towards someone’s personal and professional fulfillment,” Couture said. “Let’s continue to create environments that welcome diversity and celebrate the unique perspectives that everyone brings to the table. Together, we can continue to make a lasting impact on the lives of individuals in the company and the nation that we serve.”

Elena Viscarra is a Senior Project Leader and Systems Engineering Requirements Lead in Strategic Communication Systems. She joined Aerospace in 2007 where she worked in the Computer Science Division. Throughout her time at Aerospace, she led several GPS launch efforts including integration of the GPS III space vehicle with the Falcon 9 launch system.

Viscarra is a member of Aerospace Latino Members Association (ALMA) and previously served as the National Vice President of AWC. Through her work as a mentor with the Graduate Education for Minorities (GEM) Fellowship program, she helps guide students and shows them the exciting opportunities that lie ahead. She takes pride in her many roles as a sister, aunt, wife, and mom, while volunteering as a soccer team mom, classroom reader and science fair judge at local middle and high schools, utilizing her talents to ensure her community is supported.

“I didn’t have to make the harrowing journey to the land of opportunity and promise because that was my grandparents’ story and I didn’t have to earn America’s promise through manual labor in a field, because that was my parents’ story,” Viscarra said. “Every generation of Valdez and Viscarras has a story of adversity and accomplishment. And I’m lucky that I have a beautiful presentation and a beautiful narrator to tell mine, but I want to express my gratitude for the expenses that generations paid for my opportunities. And I hope I’ve earned their pride into how I’ve used that overhead so far. I will keep striving to earn more, to be more, to give more to my smart and capable kids, and the next generation of underserved engineers, women and Latinos.”

Elena Viscarra, Senior Project Leader and Systems Engineering Requirements Lead in Strategic Communication Systems

Dr. Wendy Chiado, Senior Project Engineer in Space Domain Superiority

Dr. Wendy Chiado is a Senior Project Engineer in Space Domain Superiority. After joining the U.S. Navy and working in Italy, Guam, Greenland, the United Kingdom and Hawaii among others, Chiado joined Aerospace in 2014. Since then, she has served as the government technical lead for multiple test events, was an integral part of the SBIRS GEO-6 launch team, and spearheaded the development and testing of a prototype space payload which was the first space test project to be flown by the USAF test pilot school.

Chiado has an affinity for creating her own personal multiverse as a wife, mother, New Yorker, former college varsity soccer player and globetrotter, and utilizes her many talents to give back to her community. Through her volunteer work as the AWC Regional Vice President in Colorado Springs, she led several clothing and holiday drives. She currently serves as Vice President and Security Chair of Temple Beit Torah in Colorado Springs and served on the Colorado Board for Veterans Affairs and the board of Big Brothers Big Sisters of Pikes Peak.

“I help the community because I can and because I have a voice where others do not and because I believe no matter how small my effort or contribution, it matters,” said Chiado. “It improves the world and helps to make everything ever better.”

A Week of Activities

AWC kicked off this year's Women's Week with an Emmy-nominated science communicator, Emily Calandrelli, on Monday for a keynote event. Aerospace President and CEO Steve Isakowitz provided opening remarks before introducing Calandrelli, whose own multiverse includes experiences as an aerospace engineer, author, TV host, producer and mother. She spoke about navigating her career as a woman in a male-dominated space and the importance of speaking up and being the representation for the next generation of scientists and engineers.

AWC also hosted a variety of events, including Women's Week Lighting Talks on Wednesday where speakers from different principles of engineering shared their personal experiences insights. On Thursday, AWC sponsored corporate-wide mentoring talks both in-person and online, allowing employees to connect and learn from one another.

AWC also hosted a week-long book raffle, a remote fun run for employees across the country and a professional women's clothing drive with donation boxes in Chantilly, Crystal City, Colorado Springs, El Segundo, Houston, Huntsville, and Omaha. Employees also have the opportunity to give back and donate to Dress for Success though Aerospace Cares through the end of August.

Congratulations to Lynda Chrisco, Angela Couture, Elena Viscarra and Dr. Wendy Chiado!

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 Interns Share What They've Learned

August 22, 2023

Each summer, interns from all over the country join Aerospace, eager to learn and ready to contribute their talents to the impactful work we do to shape the future of space. In return, they gain real-world experience collaborating with our leading experts and taking on engaging projects that matter.

Although summer internships have flown by, Aerospace's interns take

with them meaningful experiences that will help their personal and professional growth.

On Medium, Aerospace interns shared the biggest things they learned professionally this summer. Read more here.

Four Employees Receive 2023 Dr. Alexander C. Liang Awards

August 17, 2023

At Aerospace, the ability to lead from the front can happen anywhere at the company, through any role. Providing people the right opportunities to shine through their contributions is essential to empowering these leaders to thrive. Last week, the Aerospace Asian Pacific American Association (AAPAA) recognized four employees that have encapsulated these principles with the 2023 Dr. Alexander C. Liang Achievement Award during a hybrid celebration with in-person gatherings hosted in El Segundo and Chantilly.

The recipients for this year's awards were Stacy Shimizu, Dr. Tony Tang, Dr. Xingu Wang and Sandy Yonemoto for their leadership and initiative, career and professional achievements, mentoring, knowledge sharing and community involvement.

"Throughout the year, AAPAA plays an invaluable role, providing opportunities for its members to learn and grow into leaders," said Steve Isakowitz, President and CEO of Aerospace. "Through concerted corporate level efforts, including development programs and our focus on diversity, equity and inclusion, we have seen a five-fold increase in the number of Asian Americans at the principal director level since 2017. This progress has been made possible by our partnerships with AAPAA and the supportive community you have developed here that gives our team opportunities to grow into leaders."

Isakowitz challenged the audience to embrace opportunities to Lead from the Front, which along with Collaborate Across the Enterprise and Operate with Agility and Speed, serves as the pillars of the company's cultural attributes.

"This year's theme is Advancing Leaders Through Opportunities and that had a special meaning for [Dr. Liang]," said Tammy Choy, Vice President and Chief Information Officer at Aerospace. "He wanted our staff to achieve and actively prepare themselves for these opportunities. He was not one to say it's going to fall in your lap. He expected you to prepare and work for it. All of our winners today not only prepared themselves, but they went that one extra step."

Liang was the former General Manager of the Vehicle Systems Division in the Engineering and Technology Group (ETG) and joined Aerospace in 1970. Throughout his career, he made a great impact as a mentor to others and a champion for AAPI employees, contributing toward a more inclusive and diverse workplace for all. This year, his daughters and their families attended the ceremony in honor of his legacy.

Isakowitz spoke about the importance of being a leader who reaches out and inspires others.

"AAPAA is so proud to support The Aerospace Corporation's goal of fostering a work environment where unique ideas and diverse perspectives are valued and regarded as the cornerstone of the innovative workforce," said Joyce Lew, National Vice President for AAPAA. "Recognizing outstanding contributions of our members and presenting the annual Alex C. Liang Achievement Awards is just one way to do this."

Empowering Leaders to Thrive

This year's keynote speaker was Colonel Mia Walsh, Commander of Space Base Delta 3, United States Space Force. In addition to being awarded the Defense Superior Service Medal, which recognizes service members who perform superior meritorious service in a position of significant responsibility, she was also recently named as Woman of the Year for California's 66th State Assembly District.

Walsh shared experiences from throughout her career and highlighted the power that mentorship has had on helping her get to where she is today. She spoke about the importance of helping others, guiding them throughout their careers and being there for someone every step of the way. Walsh shared that, although much has changed in her 25 years on the job, the constant who has always been there to support her has been her mentor, Colonel Fred Taylor, who she met during missile training at Vandenberg Air Force Base early in her career.

Walsh spoke about her career and the significance of mentors who helped guide and shape her into the leader she is today.

"For those of us who have ever felt out of place or different or hesitant about our abilities and what we bring to the table, mentorship is so important, even for those of us who are really confident and know our value every day," said Walsh. "Mentorship is still really important. I've been extremely lucky to have many, many mentors over the course of my career."

Meet the Liang Award Recipients

Stacy Shimizu, Strategic People Partner Director in the Office of Chief People Officer

Stacy Shimizu is a Strategic People Partner Director in the Office of Chief People Officer (OCPO). Since joining Aerospace in 2018, she has made a variety of significant contributions, including redesigning the Corporate Awards Program's categories, nomination and selection process. She also helped shape Aerospace's Spotlight Cohort and received a Commitment to Our People Hero Pin along with the team for her efforts.

Shimizu is the current National President of AAPAA and served as the group's Vice President in 2022. Through her leadership at AAPAA, she has helped coordinate activities and events to support members and the broader Aerospace community.

"I'm overwhelmed with gratitude to be selected as one of the recipients of this year's Dr. Alexander C. Liang Award," said Shimizu. "The purpose of this esteemed award is to recognize Asian American employees who have made significant individual achievements and contributions to the corporate mission, as well as contributions to the community. It is a great honor to be recognized and become part of this elite group of prior award winners."

Dr. Tony Tang, Director for International Partnerships in the Space Systems Group

Dr. Tony Tang is a Director for International Partnerships in the Space Systems Group (SSG). Since joining Aerospace in 2001, he has demonstrated exceptional leadership and technical excellence, receiving praise and accolades from Aerospace, NASA, and the Intelligence Community. Tang is a subject matter expert on novel materials and mechanical systems, rolling contact fatigue, propulsion systems and space architecture and holds six US patents and two European patents. In addition to serving as an Intern Buddy, mentoring Aerospace summer interns, Tang also volunteers through a variety of STEM events, including the Robert H. Herndon Memorial Science Competition.

"Being a recipient of this award is particularly humbling," said Tang. "Nobody pursues a career expecting an award. We do it out of our passion and responsibility to be good citizens in our community because citizens, as a work, also good citizens at home."

Dr. Xinyu Wang is a Senior Project Leader for the Communications Technologies and Engineering Division in ETG. Since joining Aerospace in 2016, Wang has served in a variety of leadership roles, earned several SPOT Awards, and received an Early Aerospace Career Achievement Award from ETG in 2019. He also holds four US patents, has co-authored six Technical Operating Reports, and has authored 17 papers. Wang is also a dedicated mentor who supports Aerospace employees throughout their career development. He has also given back to the community as a volunteer tutor and was recognized with a Presidential Volunteer Award for his volunteer efforts at a local homeless shelter.


Dr. Xinyu Wang, Senior Project Leader for the Communications Technologies and Engineering Division in ETG

"I recall the moments in my life, starting as an international student growing up to be a team lead in the aerospace industry. I felt so grateful for the opportunity and the trust that Aerospace and our nation gave me. Every time I think about the importance of the work I'm doing, I feel motivated to do my best," said Wang. "I am proud to be American and proud to be part of the Aerospace family."


Sandy Yonemoto, Director of People Experience in OCPO

Sandy Yonemoto is the Director of People Experience in OCPO. Yonemoto joined Aerospace in 2018 with more than 30 years of human resource experience. She contributed greatly to Space Workforce 2030, Future of Work and the COVID-19 response at Aerospace. She has been recognized by Aerospace for her contributions in a variety of ways, including with the Trustee's Award at the 2023 Corporate Awards. In addition to being an active member of both Aerospace Women's Committee (AWC) and AAPAA, Yonemoto serves as a leader in her community. She has volunteered as a leader with the Yonsei Basketball Goodwill Program and serves on the board with the South Bay F.O.R. Youth Sports Association, where she is also involved with their high school scholarship program which is named after and dedicated to her parents.

"I've learned that it isn't always the easy opportunities that build your character, empower you as a leader, define your morals or provide you with self-esteem," said Yonemoto. "Sometimes, it is the interesting challenge or that dreaded fork in the road that truly allows you to learn about yourself and grow as a leader, whether at home or at work."

Congratulations to Stacy Shimizu, Dr. Tony Tang, Dr. Xinyu Wang and Sandy Yonemoto for all you have accomplished!

AAPAA has partnered with Aerospace Cares in creating a giving opportunity to assist those affected by the devastating fires in Maui.

The Aerospace Asian Pacific American Association (AAPAA) is an Aerospace employee resource group (ERG). Membership and participation in all ERGs are open to all employees, regardless of identity.

CCEO: Aerospace's 'Action Teams' Speak Louder Than Words

August 14, 2023

The transformation of the space domain today means the emerging hard problems of tomorrow will continue to get bigger and more complex. To stay ahead, Aerospace must position itself to support the cross-enterprise collaboration needed to address these challenges. One approach recently discussed on Orbiter is the Pelotons program, which leverages the breadth of Aerospace's technical expertise to identify where connections and coordination across the enterprise can be established to advance integrated solutions for priority mission areas.

However, this isn't the only pathway Aerospace has to foster this kind of broader scale collaboration. Similarly, Aerospace has established Action Teams dedicated to applying this integrated approach to strengthen key technical areas of interest that are critical to future success of the broader space domain.

"We rely on Action Teams to facilitate connections and help us get the job done," said Mark Silverman, Chief Engineer and General Manager of CCEO. "Today more than ever, the success of the space enterprise is dependent on cross-customer and mission integration, and Aerospace's unique insights across the DoD, IC, Civil and Commercial play a key role in making this happen."

The Action Teams, which in many ways were integral in shaping the Pelotons model, are supported by Corporate Chief Engineer's Office (CCEO) and convene subject matter experts across multiple disciplines and program areas to share knowledge and identify opportunities that facilitate collaboration, reducing overlap while streamlining efforts and resources.

Bridging the Gap

Aerospace is increasingly relied upon as a trusted partner to bridge gaps across the nation's space enterprise, bringing government customers, commercial capabilities and international partners together to advance integrated solutions.

“The Action Teams work to ensure focus and direction so that we’re not telling our customers different things,” said Lori Gordon, Systems Director of CCEO. “There’s an element of efficiency where we guide customers toward a shared outcome, often developing a common roadmap, framework or toolkit to ensure we can maximize impact.”

The Action Teams contribute in enabling the corporation to lead from the front in this regard. “We have great outreach and engagement with nontraditional Aerospace customers, which is important,” said Gordon.

The first Action Teams formed in 2020 as part of Aerospace’s efforts centered around Enterprise Integration. Similar to the Pelotons, Action Teams focus on advancing integration and using Aerospace’s unique perspective as an FFRDC to get the job done. However, these teams focus on broader mission areas than Pelotons – many of which have potential implications that go beyond the aerospace industry. Breaking down silos and knowledge sharing is key in achieving Enterprise Mission Success and the Action Teams play a key role in forging integration across not only Aerospace, but the broader space enterprise. Through their focus on strengthening capabilities and connections, the Action Teams create value for a diverse breadth of end users.

“A part of this process is to break down silos among the different mission areas and the Action Teams are really good at doing that,” said Jermaine Brinson, Senior Project Engineer in CCEO. “As CCEO, we are looking across these Action Teams and ensuring we get lessons learned to help us build the complete enterprise. We break down the silos within Aerospace and then we can broaden out and focus on breaking down the silos of the mission areas across the enterprise, which helps us achieve Enterprise Mission Success.”

Aerospace’s Dr. Wayne Goodman Reflects on Remarkable Journey During Fireside Chat

August 10, 2023

Aerospace employees recently had the opportunity enjoy a fireside chat with Executive Vice President Dr. Wayne Goodman, who reflected on his remarkable career at the company. Throughout the conversation, he shared wisdom and insight gained from a journey that spans over three decades, weaving across the breadth of the corporation and creating meaningful impact that continues to permeate throughout the space enterprise. As previously announced, Goodman will be retiring in December.

The event was presented at the July Enterprise Awareness Forum sponsored by the Corporate Chief Engineer’s Office (CCEO). Joined by ETG Vice President Todd Nygren, Goodman delved into the inspirations, perspectives and values that fueled and shaped his path—which was by no means a linear one.

“I never aspired to be a vice president or even a general manager. I always aspired to do good things. I was very goal-oriented and liked getting things done. It’s always motivated me,” Goodman said. “I just like to see projects come together. My whole life has been projects coming together.”

During his fireside chat, Aerospace Executive Vice President Dr. Wayne Goodman (left) shared that post-retirement, he plans to spend time with family and friends, as well as do some traveling. He’s also exploring teaching at UCLA next fall.

Since joining Aerospace in 1987 as a Member of the Technical Staff in the Structural Technology Office, Goodman has served in various roles at the company, including as the Vice President of Space Programs Operations (SPO), as General Manager of the MILSATCOM Division, General Manager of the Launch and Satellite Control Division, General Manager of the Launch Vehicle Engineering and Analysis Division, and Principal Director of the Evolved Expendable Launch Vehicle Verification Directorate. He was also the Senior Vice President of the Operations and Support Group (OSG) before taking on his current role as Executive Vice President of Aerospace.

“It’s important to be an expert at something in your career at some point. The reason I say that is because it teaches you to be focused. You’ve got to be really patient, and you really need to understand what’s going on,” Goodman said. “It teaches you how to work with teams, and a bit of humility. It’s really hard to be an expert at something. The more you know, the more you realize you don’t know.”

For Goodman, his technical expertise—at least initially—was in ablative nozzles. It was as the subject matter expert of this area where he was able to identify a critical design flaw that averted a potential billion-dollar satellite launch failure as a result. He went on to receive the President’s award in 1997 for his contributions.

Goodman also discussed leading a core team at Aerospace in the early 2000s to develop the Launch Verification Matrix (LVM), which provided an extensive review process for the evolved expendable launch vehicles (EELVs) as they were coming online. The LVM has been described as the “gold standard” for performing launch vehicle mission assurance and is still referenced decades later.

“Aerospace just has tremendous resources. You have to recognize you’re not going to do anything alone. It’s bringing in the right teams to be able to solve the problems and just learning from them,” Goodman said. “I also believe in focusing on the details and having an end state; knowing what you want to achieve in the end. Go after the small successes because success begets success.”

As his career progressed, Goodman continued to embrace new challenges in areas unfamiliar to him, moving from launch to ground systems to MILSATCOM to overseeing the enterprise services groups. Interestingly, he also didn’t shy away from horizontal career progression, which he said he highly recommends.

Goodman said his inspiration for space really took shape during his years as an undergrad at Drexel University and as a grad student at the University of California, Berkeley.

"The amount of learning that goes on every time you have a new job is shocking and you do not know how it's going to apply," Goodman said. "Every job at Aerospace is really fascinating. You just have to open your mind and make the best of it."

That breadth of experience helped him develop a deeper understanding of space systems and customer needs across the mission lifecycle and from an enterprise perspective—principles that are guiding Aerospace's Corporate Strategy today.

"When I was working on solid rocket motors, I didn't even care about the liquid side. It's such a naïve thought because you realize the rest of the rocket's got to work. The satellite's got to deploy, the satellite's got to work and it's got to communicate to the ground system," Goodman said. "Over time, it was an evolution of what mission success really means and appreciating the need for Enterprise Mission Success. Now, everyone has their piece, and that's okay. But it's really helpful to know how your piece fits in."

From nozzles to enterprise-wide solutions, throughout his career Goodman has embodied how Aerospace approaches solving the hardest problems. The impact of his dedication and leadership on the corporation and the nation's space enterprise has been immeasurable.

"There are so many opportunities in Aerospace – whether you're in ETG or in the program office, whether you're in the enterprise support organizations or administrative – there's just opportunities at Aerospace," Goodman said. "If you're willing to take the time and reach out there, you can make a difference. You really can. Out of all the things I'm proud of, it's just making a difference at some point in my career."

Celebrating Taking Big Steps

August 08, 2023

In July, Aerospace celebrated the promotions of nearly 550 employees with an All-Aerospace Promotion Recognition Event. The celebration, which was sponsored by the Aerospace Diversity Action Committee (ADAC), was attended virtually by nearly 300 employees who joined in from locations across the country to recognize the achievements and contributions of the promotees.

Aerospace executive leadership, including President and CEO Steve Isakowitz, DSG Senior Vice President Martin Whelan and Vice President and Chief Information Officer Tammy Choy, participated in the event and acknowledged the exceptional contributions of the promotees during their time at Aerospace.

“We have so much happening at Aerospace and across the space enterprise these days that often leave us hyper focused on the next deadline and deliverable,” said Isakowitz. “And that’s why it is so important that we pause and reflect on how far you have come and appreciate the impacts of your hard work that have had on our company and our nation.”

Throughout the event, which was moderated by Nloh Masango-Dibo Sr., ADAC Liaison, Diversity, Equity, and Inclusion, the names of the promoted employees were shown across the screen for all to see. Aerospace leadership also shared their comments and congratulated the employees for their accomplishments.

“I love how our Aerospace community consistently supports and recognizes each other for their achievements,” said Masango-Dibo Sr. “The thing I love most is that it’s clear that the support for one another is genuine. I can tell by how many people showed up to celebrate and support not only this event, but also the various promotion celebrations taking place across the various Aerospace sites.”

In Albuquerque, employees came together to recognize their accomplishments thanks to AWC’s promotion parties.

In June, Aerospace Lambda Alliance (ALA) and Aerospace Women’s Committee (AWC) teamed up and hosted their own in-person promotion celebrations across the enterprise. In El Segundo, ALA and AWC co-hosted their inaugural, joint in- person celebration and AWC hosted remote celebrations as well as in-person celebrations in Colorado Springs, Huntsville, the Washington DC area and Albuquerque. Hundreds of people gathered to celebrate the promotees and their accomplishments and showed support for one another by gathering together in community.

Shaping Your Career

During the ADAC promotion party, Choy, who also serves as the Executive Sponsor of the Aerospace Asian Pacific American Association (AAPAA), reflected on her career and how taking risks can reap big rewards. She also spoke about the importance to trying new things and being open to learning along the way.

These promotion parties allowed employees to celebrate their hard work together.

“Promotion is a wonderful step,” said Choy. “But be patient with yourself and be open to trying new things. There’s not only one way to attain career goals. So, the most important thing is to remember that this is your own your career path and development.”

She also spoke about continuing to develop one’s skills and the importance of learning from others. Choy reminded the audience of the importance of taking advantage of the resources available for career development at Aerospace through People Ops and ERGs that regularly host events with guest speakers focusing on how to advance one’s career and the importance of diversity within the workplace.

“The reason Aerospace is so successful at solving the hardest problems is because of the diversity of thought we bring to attacking the hardest problems,” said Choy. “This is brought about by the many kinds of diversity we have here at Aerospace and the differences in how we approach, attack and solve problems is what makes us stronger.”

Learning From Others

Whelan shared congratulatory remarks to the promotees encouraging them to lead from the front and inspire others. He spoke about the importance of mentoring others and noted that the promotees would all be great mentors to early career folks, college, and high school students, and can play an important role in inspiring the next generation. He also encouraged people to get involved and shared about becoming a

member of Aerospace Black Caucus (ABC) when he first joined Aerospace and the impact that it had on him, noting that ERGs are open to all employees regardless of background or affiliation.

In El Segundo, AWC and ALA hosted a joint-celebration, one of many promotion parties hosted across Aerospace in July.

"I wanted to learn and the team at ABC took me in, they let me be part of their group and I'm a better person for it. Join somebody, join some group, join some ERG that you are curious about and learn more about it. The only membership requirement is that you have to sign up and anybody who wants to be a member can be a member. You'll educate yourself and you'll educate those around you, and you'll be involved," said Whelan. "So, my most heartfelt congratulations to each and every one of you on your promotions and I love being on the same team as each of you and being in this group called Aerospace so thank you so much, I really do appreciate it."

Congratulations to all the promotees!

Membership and participation in all Aerospace Employee Resource Group (ERG)s are open to all employees, regardless of identity.

Inside the Nanosatellite Revolution: Q&A With the Aerospace Editors

August 03, 2023

In the early 1990s, as the cost of launching spacecraft to low Earth orbit was still extremely high, Aerospace scientists looked to leverage the latest advancements in miniaturization techniques for electronics and mechanical devices to create a vision for small satellites that could provide essential on-orbit capabilities like remote sensing and communication systems at much lower cost.

Using a combination of the corporation's research and development funds and external grants, Aerospace scientists Ernest Robinson, Dr. Henry Helvajian, and Dr. Siegfried Janson created a community of early adopters, including visionaries in the National Security Space community. One output was the radical concept of the kilogram-mass integrated-silicon nanosatellite formally presented at the 1993 International Astronautics Federation Conference in Graz, Austria. Adoption of the smaller form factor began to grow, gradually at first, but hit an inflection point just a few short years later. Since 1997, nanosatellite launches have doubled roughly every 2.4 years, validating the "nanosatellite revolution."

Published by the Society of Photographic Instrumentation Engineers (SPIE), the book is serves as a deeper-level reference on what has—and hasn't—worked in previous nanosatellite programs.

In The Nanosatellite Revolution: 30 Years and Continuing, Helvajian and Janson – in collaboration with contributing authors across the planet, including several from Aerospace – document the missions, technologies, policies and future perspectives offered by individuals and organizations that have participated in the nanosatellite revolution.

The book also includes a Foreword by Aerospace President and CEO Steve Isakowitz, who acknowledges the significant impact nanosatellites have had in shaping the transformed space domain today, enabling countless innovations and serving as an accessible entry point for researchers, entrepreneurs, students, and others to begin experimenting with satellites of their own.

We had a chance to interview Helvajian and Janson to learn more about the book and get more of their insights about the history and potential future of nanosatellites.

Q: This book is actually a follow-up to the highly regarded Small Satellites: Past, Present, and Future, which was published in 2009 by The Aerospace Press. How does The Nanosatellite Revolution build on that work?

Yes, this book is actually the fifth in the series dating back to 1995. The 2009 book was an introduction to small satellite history, available technologies, spacecraft, programs, and missions. The last two chapters (one by Janson and one by Helvajian) looked at the future of small satellites and potential fabrication techniques. Our new book updates and expands on these topics. We have an historical chapter on Russian small satellites for science missions, two chapters on marine traffic monitoring using CubeSats, and four chapters on interplanetary small spacecraft. We have authors from four NASA centers, DARPA, international universities, and of course, Aerospace. Moreover, we have chapters that deal with the space debris problem and space policy issues.

Q: To your point, Nanosatellite Revolution covers a breadth of topics across 26 chapters. What was your approach in developing the book and what do you hope readers will get out of it?

The efforts of scientists Dr. Siegfried Janson (left) and Dr. Henry Helvajian (right), along with Ernest Robinson, were instrumental to enabling Aerospace to pioneer essential innovations since the early days of the nanosat revolution.

The book is less about how to build a nanosatellite but rather provide to the audience mission examples of what worked and what did not. Also, we wanted to fill in some missing pieces from the previous book, like including more NASA programs, expand our international authorship, and provide a current update on nanosatellite technologies. After an internal down-select of possible authors and missions, we sent out chapter requests to a broad group of selected experts. Fortunately, we received more than enough content for this book. We hope that it provides a snapshot of nanosatellite technologies as of roughly 2020 and stimulates more advancements. The epilogue at the end (by

Janson and Helvajian) puts to paper our views of the possible "next steps" in the foreseeable future.

Q: It's evident the tremendous amount of collaboration that went into this effort. Can you talk about your experience in deciding what information to include? What it was like working with the contributing authors to ensure they're properly represented in the book?

This is an 800-page book, and the original manuscripts would have boosted the page count significantly. We pointed out redundant text and asked authors to provide more compact manuscripts. Many figures and tables also required modifications to quickly convey the desired information without confusion. Each author got the revised manuscript of their chapter for final review.

Q: Regarding the trajectory of nanosatellite adoption, are there any key watershed milestones that helped to cement this technology as a viable option for space mission needs?

One major milestone was the development of the CubeSat standard. This enabled a containerized satellite approach that was relatively launch-vehicle agnostic. Design/build/fly/get flight data timelines shrank from about seven years using legacy launch systems and satellite designs, to one year. The CubeSat approach also allowed a ~1-kg mass spacecraft to be launched for $40,000 to $100,000. This allowed universities, small companies, and even individuals to get their own spacecraft flown.

A second milestone was the demonstration by the startup company, Planet Labs, that a space mission –a constellation of nanosatellites for Earth observation – can actually be profitable.

Q: What are some current examples of how nanosatellites are continuing to support our understanding of space? Are there any missions or programs today that readers can look to?

The book identifies many missions where nanosatellites have provided a better understanding of space and Earth. Conducting biological cell testing in near Earth environments. Missions such as Automatic Identification System (AIS) for tracking marine and air traffic. Sub millimeter remote sensing that can penetrate clouds to taking pictures of Mars as the hosted vehicle in a flagship NASA/Mars mission.

Janson (left) retired from Aerospace in 2020, capping a highly esteemed career that spanned over three decades, while Helvajian (right) continues to push the boundaries of smallsat innovation as one of Aerospace's Technical Fellows, who are recognized as the foremost experts not only within the corporation, but in their respective fields.

Q: Miniaturization is a trend that has been fundamental to nanosatellites. What are some new innovations in this area that excites you?

Space-to-ground optical communications from CubeSats, pioneered by Aerospace under NASA funding, enables transmission of gigabytes of data from a low Earth orbit CubeSat during a single ground station overflight. Use of hundreds-to-thousands of nanospacecraft, either as a formation flying cluster or a

physically-connected assembly, can provide new mission opportunities based on variable spacecraft configuration and deaggregation.

Q: Are there any other emerging technologies or capabilities that could potentially enable major breakthroughs in this area for the future?

Propulsion provides improved orbit insertion, maintenance, and de-orbit options, and reaction wheel desaturation outside of LEO. It is required in geosynchronous Earth orbit, cislunar, and interplanetary space, and may be required in the future for space traffic management in LEO. Another area is miniaturized radioisotope powered sources that could provide electrical power without the need of solar panels, opening routine NASA missions for solar system exploration with nanosatellite probes.

Q: The book also digs into impending issues spawned by the nanosatellite revolution, such as a rapid increase in the orbital debris environment. Have these issues impacted how nanosatellites are planned to be used?

Yes, but the "super-microsatellites" used by the thousands in dense LEO communications constellations, like StarLink, are the fastest-growing component in LEO. These spacecraft have active propulsive deorbit, and more nanosatellites should include this option. An additional option for altitudes below ~700 km to avoid collision with another space object is active attitude control; a nanosatellite can be switched from a modest drag attitude to either a low or high drag mode to prevent a collision a week or more in the future. Improved space tracking to reduce positional error bars from hundreds of meters to meters, will enable a significant reduction in false collision predictions, and drag-based collision avoidance.

Q: Do you have any closing thoughts you'd like to share with our readers?

Enjoy the book! Read the epilogue. This book would have come out in 2020 or 2021 if the world didn't have to suffer through COVID-19. This probably will be our last book (Janson has already retired), so we stop at Vol. 5 as editors.

Q: Where can Aerospace employees or other interested readers obtain a copy of the book?

It is directly available from the SPIE in hardcover or PDF.

Aerospace flew the world's first containerized spacecraft in 2000, and has since delivered about 40 spacecraft to date, operating the world's largest fleet of experimental CubeSats. Even today, we continue to pioneer new innovations for the field of small satellites, including for CubeSats, nanosatellites and other bold concepts. Aerospace established iLab and xLab to accelerate the exploration and prototyping of new capabilities for space. We encourage you to learn more about our work in Small Satellites.

September 2023 Obituaries

September 01, 2023

Sincere sympathy is extended to the families of:

- James E. Gidney, member of technical staff, hired May 25, 1981, died June 2, 2023
- Daniel Anderson, member of technical staff, hired Oct. 1, 1979, died April 20, 2023
- Keith Bagge, member of technical staff, hired April 11, 1977, died July 12, 2023,
- Marjorie Edelen, hired Nov. 13, 1961, died Feb. 7, 2023
- Joseph Estrada, member of technical staff, hired Oct. 30, 2000, retired Aug. 1, 2018, died June 22, 2023
- Gordon Fox, member of technical staff, hired June 5, 1961, retired Oct. 1, 1986, died July 11, 2023
- Roberta Gleiter, member of technical staff, hired Aug. 18, 1980, retired Aug. 1, 2004 died July 22, 2023
- Harold Greenberg, member of technical staff, hired Aug. 20, 1979, retired Aug. 1, 2003, died June 27, 2023
- Dale Gunn, associate technical support, hired Jan. 2, 1962, retired Nov. 1, 1991, died July 5, 2023
- Coleman Hacker Jr., member of administrative staff, hired May 7, 1984, died July 2, 2023
- Robert Hebblewhite, hired Nov. 19, 1962, died May 29, 2023
- Stanley Heller, member of technical staff, hired June 19, 1989, retired Jan. 1, 2000, died April 14, 2023
- Beverly Knowles, office of technical support, hired Jan. 18, 1969, retired Oct. 1, 1997, died July 5, 2023
- Walter Leverton, hired Aug. 22, 1960, retired April 1, 1979, died Feb. 28, 2023
- Robert McNeal hired Sept. 14, 1964, died July 17, 2023
- Benjamina Millado, member of administrative staff, hired Nov. 28, 2005, retired Feb. 1, 2011, died May 15, 2023
- Harold Mirels, member of technical staff, hired July 25, 1961, retired Oct. 1, 1993, died July 2, 2023
- Nancy Nelson, member of administrative staff, hired Sept. 5, 1962, retired July 1, 1994, died July 1, 2023
- Alva Nims, member of technical staff, hired Nov. 3, 1980, died May 31, 2023
- Carl Pearlston Jr., hired Aug. 17, 1964, died July 25, 2023
- Elliot Silverstein, member of technical staff, hired June 30, 1981, died July 3, 2023
- William Tighe, member of technical staff, hired Nov. 17, 2014, retired July 1, 2023 died July 20, 2023
- Gerald Wallmark, member of technical staff, hired June 20, 2005, retired June 1, 2012, died July 5, 2023
- Judy Austin, member of administrative staff, hired July 2, 1984, retired Oct. 1, 2002, died July 26, 2023
- Robert Doebler, member of technical staff, hired May 8, 1962, retired June 1, 1990, died Aug. 10, 2023
- Naomi Jean Gray, office Support, hired May 5, 1980, retired July 1, 2004, died Aug. 13, 2023
- Paul Guzman, hired Dec. 6, 1960, died July 26, 2023
- William Huber, member of technical staff, hired Oct. 4, 1971, retired Jan. 1, 2007, died Aug. 7, 2023
- Richard Merritt, technical support staff, hired April 30, 1979, died June 10, 2023
- John Oien, hired Oct. 3, 60, died July 28, 2023
- Maureen Sie, member of administrative staff, hired Nov. 5, 1979, retired Jan. 1, 2000, died Aug. 1, 2023
- John Travis, member of technical staff, hired March 5, 1963, retired Oct. 1, 1993, died Aug. 6, 2023
- Lloyd Yuan, member of technical staff, hired Oct. 14, 1985, died July 27, 2023

Please note: Due to a previous technical issue, this edition of the In Memoriam includes notices for August and September. We appreciate your understanding.

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