AEROSPACE

ORBITER NEWS

News, announcements, and more.

Two Trustees Appointed to Key Leadership Roles on Aerospace Board

December 21, 2023

EL SEGUNDO, Calif., Dec. 21, 2023 – Gen. Paul J. Selva, USAF (Ret.), former vice chairman of the Joint Chiefs of Staff has been elected chairman of The Aerospace Corporation (Aerospace) Board of Trustees, succeeding the Honorable Stephanie O'Sullivan, who has concluded her service on the board.

Retired space executive David W. Thompson is appointed vice chairman, replacing Gen. Selva. All appointments are effective Dec. 15.

"Our nation is at a critical time in space, shaped by rapidly advancing threats we must outpace and innovative technologies that allow us to operate in space like never before," said Steve Isakowitz, Aerospace president and chief executive officer. "Paul and David bring a wealth of experience that will be invaluable as we navigate this moment and deliver on our mission."

"I want to offer my deepest appreciation to Stephanie for her tireless efforts on behalf of Aerospace, our people, and the important mission we serve, which transformed Aerospace's strategic direction and set us on the path for even greater success in the future," said Isakowitz.

Gen. Selva served as the 10th vice chairman of the Joint Chiefs of Staff, the nation's second highest-ranking military officer. Prior to this assignment, he served as commander of United States Transportation Command, responsible for overseeing all global air, land, and sea transportation systems for the entire Department of Defense. Prior to that, he was commander of

Air Mobility Command. Gen. Selva's distinguished career in the Air Force spanned 39 years and numerous positions in staff, leadership, and command in nearly every operational tier of the Air Force.

Thompson is former president and CEO of Orbital ATK. He co-founded Orbital Sciences Corporation – which evolved to Orbital ATK – and served as the company's chairman, president, and chief executive officer. Under Thompson's 36-year leadership, the company carried out more than 1,000 rocket launches and satellite missions. During that time, the company also grew from a start-up to a NYSE-listed public company with an enterprise value in excess of $9 billion.

Aerospace's Board of Trustees members have a myriad of backgrounds, representing academic and scientific institutions and public, government, and national security interests. These diverse points of view allow the board members to collectively provide better guidance and oversight of the corporation's activities.

ABOUT THE AEROSPACE CORPORATION

The Aerospace Corporation is a national nonprofit corporation that operates a federally funded research and development center and has more than 4,600 employees. With major locations in El Segundo, California; Albuquerque, New Mexico; Colorado Springs, Colorado; and the Washington, D.C. region, Aerospace addresses complex problems across the space enterprise and other areas of national and international signi cance through agility, innovation, and objective technical leadership. For more information, visit www.aerospace.org. Follow us on X: @AerospaceCorp.

Thank you, Wayne: A Celebration for Dr. Goodman's Retirement

December 20, 2023

Please join us in wishing a fond farewell to Dr. Wayne H. Goodman in this virtual celebration of his retirement!

Dr. Goodman joined The Aerospace Corporation on October 26, 1987 as a Member of the Technical Staff and he ascended to the position of Executive Vice President on December 31, 2016. He led Aerospace through a time of immense change across the space enterprise, deepening the corporation's focus on enterprise integration and Enterprise Mission Success in order to deliver end-to-end capabilities needed to outpace the adversary threat.

In his role both as Executive Vice President and as Senior Vice President of the Operations and Support Group, Dr. Goodman ensured the sound function of Aerospace's business operations to enable the overall success of the corporation and its people. He demonstrated an unwavering dedication to mission success and contributed greatly to the development of satellite and space systems critical to national security, working with partners across the Air Force, government and industry in mission areas including communications, surveillance, navigation and weather.

Dr. Goodman had a transformational impact on Aerospace's launch mission assurance capabilities through his contributions to the Launch Veri cation Matrix, paving the way for an unprecedented era of launch mission success.

He is a trusted and respected leader whose unmatched technical acumen, tireless work ethic, and commitment to Aerospace's people made him a friend, mentor, and role model to many throughout his career. Dr. Goodman's outstanding achievements and service to the corporation, the space industry, and the nation have been recognized with numerous awards and distinctions, including the Meritorious Civilian Service Award from the Department of the Air Force, The Aerospace Corporation's President's Achievement Award, and as a fellow of the American Institute of Aeronautics and Astronautics.

Aerospace extends its heartfelt appreciation of Dr. Goodman for his technical excellence, dedication to the mission and service to the corporation. His contributions will have a long-lasting impact on the success of Aerospace and the entire space enterprise.

Thank You, Jay: A Celebration for Mr. Santee's Retirement

December 18, 2023

Please join us in wishing a fond farewell to Jay G. Santee in this virtual celebration of his retirement as an Aerospace corporate officer!

Santee joined The Aerospace Corporation on October 30, 2017 as Vice President of Strategic Space Operations. During these six years, he demonstrated urgency in advocating for changes needed to outpace the adversary threat, a willingness to challenge the status quo and an unwavering focus on new ways to deliver on Aerospace's critical mission.

Santee was instrumental in shaping how Aerospace and the broader space enterprise responded to the threat, including through his work on Project Thor, which resulted in a significant influence on Aerospace's strategic and cultural direction.

He meaningfully strengthened Aerospace's capabilities and effectiveness involving space war fighting and space operations, including through efforts like the Space War fighter Initiative, and he heightened the corporation's emphasis on delivering end-to-end effects to meet the needs of a diverse and growing set of government partners.

Santee is a trusted, empathetic leader who inspired and empowered his organization and the broader Colorado Springs team to "Lead On" by taking risks, pursuing innovations, and driving change in all they do.

Prior to Aerospace, he served his country with honor and distinction for 33 years as a member of the United States Air Force, retiring as a major general following roles as Deputy Director of the Defense Threat Reduction Agency, Acting Deputy Assistant Secretary of Defense for Space Policy, Vice Commander of the 14th Air Force, Director of the Space Operations Center, and many others.

Santee's accomplishments have been recognized with numerous awards and distinctions, including the Ellis Island Medal of Honor, his investiture as a Chevalier de la Légion d'Honneur (France's highest honor), and his induction as an associate fellow of the American Institute of Aeronautics and Astronautics.

Aerospace expresses its profound appreciation for his vision, leadership, collegiality and dedication, enabling the corporation to strategically navigate a time of immense change across the space enterprise.

A Brief History of GPS

December 14, 2023

The Global Positioning System (GPS) celebrates its 50th anniversary on December 17, 2023. It has been foundational to countless innovations that power our modern life. Here's a look at where it all started…

Have you ever used a smartphone app to nd directions to some new restaurant or avoid traffic on your commute? Have you ever used one to hail a ridesharing service? What about to log your miles on a quick run? From things as simple as telling time on your phone or computer to things as complex as self-driving cars, these modern necessities and luxuries are all powered by something most people take for granted: the Global Positioning System (GPS).

Technologies that make GPS have become so profoundly integrated into people's everyday lives that it's hard to imagine a world without it, but it actually came from relatively humble beginnings. In fact, The Aerospace Corporation has played an instrumental role in advancing the concept and technology and continues to support these critical systems today.

A Child Of The Space Race

In 1957, Russia launched Sputnik, the first satellite to successfully orbit the Earth. As Sputnik orbited the planet, the satellite emitted a radio signal. A group of scientists in the Applied Physics Laboratory (APL) at Johns Hopkins University observed a strange phenomenon: The frequency of radio signals transmitted by Sputnik increased as the satellite approached, and the signal frequency decreased as it moved away.

This shift is known in physics as the Doppler Effect. Utilizing the Sputnik's Doppler Effect allowed the scientists to use radio signals to track the movement of the satellite from the ground. They later expanded the idea: If a satellite location could be determined from the ground via the frequency shift of its radio signal, then the location of a receiver on the ground could be determined by its distance from a satellite.

In 1958, the Advanced Research Projects Agency (ARPA) used this principle to develop Transit, the world's first global satellite navigation system. The first satellite for Transit launched in 1960 and the concept, developed by John Hopkins University APL, was capable of providing navigation to military and commercial users, including the Navy's missile submarines. The program was transitioned to the Navy in the mid-1960s and by 1968 a constellation of 36 satellites were fully operational. Transit's technology delivered accuracy to tens of meters and is credited with "improving the accuracy of the maps of Earth's land areas by nearly two orders of magnitude," helping to increase acceptance of satellite navigation.

Transit operated for 28 years until 1996, when the Defense Department replaced it with the current Global Positioning System (GPS).

Advancing GPS Innovation

Testing a transmitter for Project 621B in 1972.

Dr. Ivan Getting, founding President of The Aerospace Corporation, envisioned a more powerful and accurate system, which he saw as "lighthouses in the sky." In 1963, Aerospace began looking at ways to expand and improve a satellite navigation system. A 1963 Aerospace study, led by Phillip Diamond, recommended a concept called 621-B and with

Getting's energy and foresight, the Air Force formed a new satellite navigation program named 621-B. Further system studies by Aerospace engineers James Woodford and Hideyoshi Nakamura completed in 1966 recommended an architecture where measurements from four satellites would eliminate the need for high-accuracy clocks in the receivers. This served to significantly reduce prohibitive costs, thereby advancing the adoption of the technology by making it more economically feasible.

Based on the architecture, each satellite would be equipped with its own clock, periodically updated via signal from ground stations, which would monitor the positions of the GPS satellites with a high degree of precision and accuracy. Later, the decision to move the clocks from the ground receiver to the satellite would have massive implications: Without the need to include a clock on the ground, GPS devices could be shrunk down –eventually small enough to t inside a cellphone. Throughout the rest of the 1960s, the development of GPS was aided by technological advancements such as solid-state microprocessors, computers, and bandwidth utilization techniques. The development of atomic clocks at the Naval Research Laboratory's (NRL) Naval Center for Space Technology led to advances in a satellite-based navigation system known as Timation (Time Navigation). The first two Timation satellites, launched in 1967 and 1968, were equipped with crystal oscillator clocks. A third satellite, launched in 1974, became the first equipped with an atomic clock, which greatly improved accuracy and provided three-dimensional location coverage.

Forging The Path Forward

B. P. (Pete) Leonard wears a Navstar backpack in this 1978 photo. Leonard, then vice president of Aerospace's Navstar program group, is flanked by Col. Don Henderson (left) of the SAMSO Navstar program office and Ed Lassiter (right), principal director of Aerospace's Satellite Navigation Systems Directorate.

In November 1972, Air Force Col. Bradford Parkinson was tasked with overseeing the satellite navigation program. Parkinson led a team in developing a concept that synthesized the best aspects of TRANSIT, Timation, and Project 621-B. This revised system proposal received Defense Department approval in December 1973 for a passive 1-way ranging system of 24 satellites, which used atomic clocks at medium Earth orbits to provide a 12-hour period.

The primary incarnation of this approach began in 1974 when the U.S. Air Force started development of the first of a series of Navstar satellites, the ground control system, and various types of military user equipment.

In February 1978, the first Block I developmental Navstar/GPS satellite launched, with three more Navstar satellites launched by the end of 1978. More than 700 tests were conducted between 1977 and 1979, in which Aerospace engineers helped con rm the accuracy of the integrated space/control/user system. Additional GPS Block I demonstration satellites were launched in the early 1980s…

*To learn more about the evolution of GPS and the significant impact of its wider adoption through the years, read the full **A Brief History of GPS** article on Aerospace.org.*

Snapshot: Aerospace Engineers Commemorate GPS 50th Anniversary

December 14, 2023

Aerospace employees showing the GPS waveform while celebrating the inaugural International GPS Day on Oct. 23 earlier this year.

The Global Positioning System turns 50 on Sunday, Dec. 17!

Earlier this year, in commemoration of the 50th anniversary of the GPS and Aerospace's pioneering role in developing Global Navigation Satellite System (GNSS) technology, Aerospace employees in El Segundo gathered on the STARS patio to observe and celebrate the inaugural International GPS Day on Oct. 23. Similar to Pi Day, whose Mar. 14 observation date is based on the approximate value of pi, the 10.23 date for International GPS Day was chosen to recognize the significance of 10.23 as a fundamental number upon which all GPS signal frequencies and pseudo-random "spreading codes" are based.vAerospace has played an instrumental role in advancing the concept and technology and continues to support these critical systems today.

Over 30 experts and fans of GPS gathered on the STARS patio for a reading of the official proclamation and the establishment of what are sure to be long-lasting International GPS Day traditions. These included identifying the unique 1023-bit C/A Code PRN sequence printed onto the 10.23 Day cake, followed by several rounds of 10-2-3 trivia and Nav-War card games. As the driving force behind International GPS Day – now recognized by professional societies, international forums, and trade publications – Karl Kovach had the honors of cutting the cake.

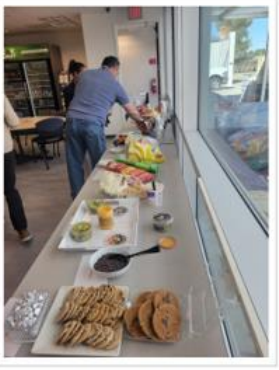
Upon joining the event, ETG Senior Vice President and GPS enthusiast Kevin Bell said, "Events like International GPS Day on 10.23 are essential to bring our teams together and connect them to the mission!"

The use of the term “chips“ to describe the binary bits of GPS signals was celebrated by serving potato and corn chips. A shbowl with 1,023 gold poker chips was displayed and gold chocolate coins were served in recognition of the binary sequences, known as Gold Codes for their inventor Robert Gold, that enable receivers to identify individual GPS satellite signals.

In addition to the El Segundo-based event, Aerospace’s Colorado Springs contingent also got into the action. Located just a few miles from the GPS Master Control Station, Aerospace’s Colorado Springs GPS enthusiasts held an event on the COS-1 patio similarly rife with chips – and guacamole, perhaps as a nod to their California brethren.

International GPS Day begins a series of GPS-themed celebrations, including a formal event in Washington, D.C. in mid-November. These events culminate on Dec. 17, on the day the GPS program was formally approved in 1973, which is the date recognized as the “birthday” of GPS.

Although inaugural events required some last-minute planning, Aerospace organizers had a vision for the festivities. Said Aerospace Tech Fellow Tom Powell. “This was not a random event. It was pseudo-random.”



Chips galore at Colorado Springs.

Aerospace engineers in Colorado Springs enjoying their chips.

Principal Engineer/Scientist Karl Kovach cuts the cake.

Senior VP of ETG Kevin Bell joins the festivities.

Karl Kovach reads the proclamation.

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Cadet Research Within Aerospace Recognized

December 07, 2023

Aerospace's Lina Cashin (far left) and Mick Gleason (far right) with Air Force cadets from the Cadet Summer Research Program (CSRP).

Among the many ways Aerospace is able to shape the future of the nation's space enterprise, one of the most impactful is through providing meaningful mentorship and hands-on learning opportunities for the brightest minds of the next generation. A prime example is Aerospace's participation in the U.S. Air Force Academy's (USAFA) Cadet Summer Research Program (CSRP). "We have an opportunity to educate these cadets on who Aerospace is as the FFRDC for national space. They are all going on to work for the Department of the Air Force, whether as an officer in the Air Force or in the Space Force and they're going to interact with Aerospace," said Marcus Roberts, Director of the C3 Engineering and Operations Department (CEOD) in ETG. "This program gives us a chance to not only bring in an intern to perform a technical project in the summer, but it also helps us strategically in the long term to familiarize them with what we do at Aerospace."

This year, three of the seven cadets Aerospace sponsored received commendations and recognition from Air Force leadership for their research work while at Aerospace. Cadet Olivia Henderson won the Department of Political Science's CSRP award for her summer 2023 research with Aerospace mentors Adina Wadsworth and John Galer. Cadets Amy Cinnamon (Aeronautical Engineering/Data Science) and Shelby Wood (Physics) won the CSRP award for the entire Basic Sciences Division for their summer 2023 research with Aerospace mentors Benjamin Bycroft and Mathew Bissonnette and went on to compete for the top overall research awards.

Employees in Albuquerque alongside the 2023 cohort of CSRP cadets .

As a result, Cinnamon and Wood were also selected to brief their research to dignitaries at the CORONA Conference, a biannual meeting with Air Force senior leaders and major command commanders. The cadets interacted one-on-one with Air Force Secretary Frank Kendall, Air Force Assistant Secretary for Acquisition, Technology and Logistics Andrew Hunter, and various general officers across the Air Force and Space Force.

Formalizing Aerospace in the Cadet Summer Research Program

The CSRP program pairs cadets with mentors in their eld of study to research leading-edge projects with the support and resources offered by the partner organizations. Participants are primarily rising seniors at USAFA, who gain opportunities to interface with industry and gain real world research experience related to their major courses. Cadets in the program will graduate to become officers in the Air Force and Space Force and the program provides them the opportunity to gain first-hand experience with the various partner organizations and their research capabilities.

In addition to Aerospace, other partner organizations include government organizations such as AFRL, NRO, NSA, FFRDCs such as Massachusetts Institute of Technology (MIT), Lincoln Labs (MIT-LL), MITRE, Sandia, and industry partners such as Amazon, Google, Firth Rixson Limited (FRL).

Roberts currently leads Aerospace's CSRP support. In 2017, he recognized the opportunities Aerospace could provide to cadets and connected with Lina Cashin, Senior Project Engineer in DSG, to formalize a Cooperative Research and Development Agreement (CRADA) with USAFA for CSRP. Since then, Aerospace has sponsored and mentored 34 cadets over the last seven summers with feedback from both mentors and the cadets being unanimously positive.

"I've been working with Marcus Roberts since we wrote the initial CRADA for the Air Force Academy. Marcus has led this program, coordinating with the US Air Force Academy and Aerospace since the inception, making it the successful program it is today," said Lina Cashin, Senior Project Engineer in DSG.

Cadet Amy Cinnamon with Brigadier General Gavin Marks (USAFA Commandant) and Chief Master Sergeant Robert Devall (USAFA Commandant's Senior Enlisted Leader) after brie ng them on her research conducted with Cadet Shelby Wood.

The program itself is highly coveted among cadets. Only about 20% of those who apply are selected for the opportunity. Selections are based on a combination of academic and military performance as well as candidate interviews within their academic departments and with the partner organizations. The program aims to not only help cadets explore career paths but also opportunities to gain more familiarity with the professional workplace environment.

"Cadets only get three weeks of leave during the summer. In CSRP, they're typically giving up two weeks of that limited leave period to participate in the internship," said Roberts. "They're sacrificing [their personal time] to come join us, and the positive responses we've received since we started is an affirmation that we're doing the right thing here and we're doing a good job at it."

The value of the CSRP is not just in engagement with the cadets, but also the people they continue interface with who help grow Aerospace's reputation with our government customers. With Aerospace's consistent e orts to reach the future of space leadership, the CSRP has been a successful experience for the cadets and their future career objectives. Many employees at Aerospace, including Roberts are also graduates of the Air Force Academy and can relate their experiences with these cadets as they prepare for their professional futures. These kinds of efforts help strengthen the foundation for long-term partnership between Aerospace and its government customers.

"The program builds our brand as technical experts by demonstrating to the cadets people who care and support one another" said Cashin. "The program is beneficial to the future leaders of the Air Force and the Space Force, providing them with experiential research with caring mentors. Building long-term relationships provides a lasting valuable connection for both Aerospace and the cadets."

December 2023 Obituaries

December 01, 2023

Sincere sympathy is extended to the families of:

- **Ed Aragon**, office of technical support, hired May 26, 1969, retired April 1, 1996, died Oct. 13, 2023
- **Robert Bains**, member of technical staff, hired Sept. 7, 1988, retired Feb. 1, 1990, died Oct. 22, 2023
- **JB (Bern) Blake**, member of technical staff, hired Sept. 4, 1962, died Oct. 21, 2023
- **Richard Briet**, member of technical staff, hired July 19, 1985, retired Jan. 1, 2021, died Oct. 28, 2023
- **Sandra Chang**, member of technical staff, hired Aug. 31, 1992, died Sept. 26, 2023
- **Francis Fest Jr.**, member of technical staff, hired Sept. 11, 1961, retired Oct. 1, 1993, died Sept. 1, 2023
- **Selma Goldstein**, member of technical staff, hired July 30, 1990, died Oct. 12, 2023
- **Donna Hunter**, office of technical support, hired Oct. 3, 1960, retired April 1, 1983, died Sept. 22, 2023
- **Chang (Robert) Lee**, member of technical staff, hired Dec. 5, 2016, died Nov. 15, 2023
- **Harry Lenczyk**, member of technical staff, hired June 1, 1981, retired Jan. 1, 2000, died Oct. 11, 2023
- **Ronald Plummer**, office of technical support, hired Oct. 13, 1981, retired Sept. 1, 1995, died Oct. 25, 2023
- **Carmen Ponce**, office of technical support, hired Nov. 17, 1980, retired April 1, 1993, died Oct. 21, 2023
- **Kelly Starnes**, member of administrative staff, hired Oct. 10, 1966, retired Nov. 1, 1996, died Oct. 19, 2023

To notify Aerospace of a death and have it included in the Orbiter, please contact People Operations at (310) 3365107.

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