

AeroCube-7 to Be Highlighted at Small Satellite Conference

by Alexandra Thornton

July 26, 2017

The Aerospace Corporation will be well-represented at this year's Small Satellite Conference, Aug. 5-10 at Utah State University in Logan, UT. The theme of the event is "Small Satellites — Big Data." One of the presenters, Dr. Richard Welle, senior scientist in the Space Science Applications Laboratory at Aerospace, will speak on how a network of small satellites, like CubeSats, could use lasers to transmit data to ground stations more efficiently than current systems, which use radio-frequency (RF) transmitters.

Satellites can transmit data directly to ground stations, but require a direct line-of-sight, which is available for just minutes per day. In his paper, *A CubeSat-Based Optical Communication Network for Low Earth Orbit*, which will be presented at the Small Satellite Conference, Welle describes how a constellation of small satellites could receive and transmit data to other satellites

within its network, that have immediate access to a ground station. This system could provide extended communication between satellites and ground stations, and be a service to any satellite in low-Earth orbit (LEO).

NASA is currently sponsoring an Aerospace CubeSat — the AeroCube-7. The program, called Optical Communication and Sensor Demonstration (OCSD), consists of two flight units and an engineering model. The engineering model was flown in 2015 to provide risk reduction for the flight units. The flight units were completed in 2016, but a launch pad fire at Cape Canaveral delayed their launch. It has now been rescheduled for this coming October.

Aerospace's design for the OCSD is a 1.5 unit CubeSat that's 10x10x15 cm and weighs about 2.3 kg. Each carries a laser hard-mounted to its body. The laser is guided by the satellite's attitude control system (which stabilizes the satellite and points the laser), rather than the larger and more complicated two-axis gimbal control that larger spacecraft use for laser pointing. These pointing capabilities are critical, Welle says, "because it allows the laser beams to be very narrow, which is required to support very high communication rates." From the experience with AeroCube-7, and an expectation of increased downlink requirements, there's "a preference for including laser communication where appropriate on future CubeSat missions being developed by Aerospace," according to Welle.

In his paper, Welle writes that technological advances have "allowed satellites to shrink significantly in size, disrupting a legacy industry where traditional satellites cost \$500 million to \$1 billion to build and launch." There are increasing opportunities, he writes, for companies to launch microsattellites for data collection. Small satellites, used as a network to relay data, could also help companies reduce the need for additional or extended ground stations. "An available LEO network could minimize, or even eliminate, the need for new satellite companies to develop their own ground network," he writes.

About two dozen Aerospace employees will attend the Small Sat conference, and among them they are scheduled to present 11 papers. Aerospace is also a sponsor, exhibitor, and student paper judge, and will be located at booth 173 throughout the week-long event.



AeroCube-7 (Photo: The Aerospace Corporation)

Center for Space Policy and Strategy, Space Policy Institute Host Space Leadership Conference

by Dianna Ramirez
July 14, 2017



Steve Isakowitz provided opening remarks at the conference. Scott Pace is seated at right. (Photo: William Atkins, GWU photographer)

Aerospace's Center for Space Policy and Strategy and the Space Policy Institute hosted the Ensuring U.S. Space Leadership conference at George Washington University, Washington, D.C. on Friday, July 14.

More than 100 attendees gathered to hear from former and current senior officials and business leaders about the opportunities and challenges for space leadership as the new White House Space Council is being formed. Four reporters from the leading space, defense and policy publications were also in attendance, covering the event.

Steve Isakowitz, Aerospace president and CEO kicked off the conference with opening remarks, "Policy making is a team sport; collaboration is critical."

Scott Pace, director of the Space Policy Institute for George Washington University and incoming executive secretary of the National Space Council, was the moderator for the first panel, former White House officials from multiple administrations.

Panelists included Gil Klinger, vice president, Harris Space and Intelligence Systems; Peter Marquez, vice president for global engagement, Planetary Resources; and Benjamin Roberts, former associate director, Aeronautics and Space, White House Office of Science and Technology Policy.

Keynote speaker, Congressman Brian Babin, chairman of the House Space Subcommittee, shared his thoughts about space challenges and the role of the commercial sector.

Dr. Jamie Morin, Aerospace vice president and executive director, Center for Space Policy and Strategy, moderated the panel that raised the question about taking policy and goals and implementing them within large, complex organizations.

"Space is an engineered domain even more hostile and dangerous for human endeavor than air or sea," said Morin. "To get things done there, our approaches must be simultaneously technically feasible, economically viable, and policy permissible – and all three of those areas change over time."

Panelists included The Honorable Michael Donley, former U.S. secretary of the Air Force, 2008-2013; Richard DalBello, vice president, business development and government affairs, Virgin Galactic; and retired Air Force Gen. C. Robert Kehler.



Dr. Jamie Morin moderated a panel on implementing policies and goals. (Photo: Dianna I. Ramirez)



Congressman Brian Babin was the keynote speaker. (Photo: William Atkins, GWU photographer)

Fifty Years of Getting up Early and Working Hard

by Kimberly Locke

July 28, 2017

It's being on the cutting edge of space technology that continues to motivate Gerald Guydan, even some 50 years past his first day at Aerospace. Guydan serves as a systems director in the Alternate Launch Vehicles Mission Analysis Department, Space Systems Group.

His admiration for space began at an early age when he would look up at the stars from his hometown backyard in Western Pennsylvania and tell himself he would go there one day. Although he hasn't travelled into space, Guydan feels he has achieved his goal to a large degree by supporting a range of missions aimed at sending people and satellites there.

"Planning and executing launch vehicle capability to accurately insert spacecraft into the required orbits is interesting work, and every launch is exciting," Guydan said. "All disciplines come together in the mission analysis certification and verification, so that provides an overview of the entire launch vehicle. Post-flight analysis looks at the overall vehicle to identify any issues," he explained. "Currently, my work on alternate launch vehicles gives me the opportunity to be a part of a transformational time in their history."

His endeavors have included managing efforts to acquire and process real-time telemetry data from Cape Canaveral Air Force Station and Vandenberg Air Force Base to Aerospace's El Segundo facilities in support of all launch-related activities. This approach to real-time data acquisition and telemetry processing led to development of the General System for Plotting and Listing analysis system. These efforts would become the forerunner to the STARS Mission Operations Center located at the corporation's El Segundo offices.

Guydan was also instrumental in the formation of a team to perform launch collision avoidance analysis to protect orbital assets, such as the International Space Station and active satellites, from the launch vehicle and the payload.

The initial development effort, he said, has been improved and has become standard practice for launches. Just recently, Guydan formed a team to develop a Flight Margin Verification computer tool to rapidly evaluate launch vehicle performance, orbit insertion accuracy, and upper stage disposal compared to expected vehicle dispersions. This effort, according to Guydan, significantly reduced post-flight analysis time.

Guydan's motto, at least in part, is "Get up early. Work hard." It's apparent by his list of accomplishments that he has been doing that over the course of his career. His advice to upcoming engineers is "work at what you enjoy. If you enjoy your work, it's not just a job. Strive to make a difference."

His hobbies include boating, catch-and-release fishing, cooking, and taking long walks with his dog. Guydan says he will continue to contribute to Aerospace's mission and eventually retire. When that day comes, he plans to spend more time with family and friends, expand his hobbies, and increase his boating time.

"I have enjoyed the unique opportunity that Aerospace provides to contribute to the success of space systems by working with our talented staff, the Air Force, and contractors to evaluate, analyze, and identify risks and make recommendations to improve methods and processes," he said. "Every day brings new challenges and opportunities so that looking back, it doesn't seem like a long time. I'll certainly miss being involved in the new frontiers of space."



Gerald Guydan receives his 50-year service certificate from Aerospace President and CEO Steve Isakowitz. (Photo: The Aerospace Corporation)

Aerospace's "A-Team" Hits the Sand at the 2017 Aerospace Summer Games

by Jen Langone
July 31, 2017

Bright and early on El Segundo's Dockweiler Beach the set-up began. By 8 a.m. there was no mistaking where The Aerospace Corporation team had staked its claim on the sand. Held annually at Dockweiler State Beach, the Aerospace Summer Games brings together local aerospace and aviation companies for a fun-filled day of friendly competition. More than two thousand people, representing 23 companies, gathered on Saturday July 29 to participate in events such as volleyball, sand soccer, tug of war, watermelon eating, or to just enjoy a sunny day at the beach and cheer on their colleagues.



Summer intern Radhika Bhatt races to the waterline as part of the final event in the relay race while members of the Aerospace team cheer her on. (Photo: Eric Hamburg)



Coach Steve Isakowitz checks his putting angle while Vice President Kevin Bell looks on. (Photo: Elisa Haber)

Although the overall top prize went to repeat champions SpaceX, Aerospace placed 10th overall, according to preliminary results, a significant improvement over 2016 when the corporation team placed 14th. Notable achievements included the sand soccer team and human pyramid squad, which both placed third overall, the tug-of-war squad, which placed fifth overall, and advancing to the playoff rounds in dodgeball.

Check out Aerospace's [Facebook](#) and [Twitter](#) feeds for the day's highlights.

Led by Coach (and CEO) Steve Isakowitz and with attendance bolstered by the summer 2017 intern cohort, this year for the first time, Aerospace fielded a max capacity roster in every division for all 10 events. Bedecked in bright orange T-shirts, and waving rally towels with the Circle A emblazoned on them, 150 Aerospace employees showed up in a formidable presence.

Aerospace fielded 16 teams, each led by a volunteer team captain who took charge of coordinating the team and, in many cases, holding practices to work on communication and strategy. Teams were formed based on participant-ranked preferences, with the exception of the volleyball gold team, for which tryouts were held to ensure Aerospace had its best players against some tough competition. Employees and interns played side-by-side, along with a few members of the Avengers Council. Vice President Randy Kendall played on the volleyball gold team and Vice President Kevin Bell participated in the relay race and partnered with Steve Isakowitz for executive golf.



The Aerospace Corporation team, easily identifiable in their orange, gathers for the group photo. (Photo: Elisa Haber)

Yeoh and Koenig Recipients of 2017 Liang Award

by Lindsay Chaney
July 20, 2017

The Aerospace Asian Pacific American Association (AAPAA) has honored Aerospace employees Amy Koenig and Dr. Terence Yeoh with the 2017 Dr. Alexander C. Liang Award, recognizing their service to the mission of Aerospace and the community. Named for Dr. Alexander C. Liang, who had a 38-year career as an engineer at Aerospace and was known for his character and desire to help others, the award is given annually in his memory.

The afternoon ceremony on July 13 began with the pledge of allegiance and an event introduction by ceremony chair Stephanie Charoensub. She described Liang as a role model who advocated to ensure that “minority voices and perspectives were included” in corporate spaces. She then introduced Dr. Malina Hills, who was greeted with a lei, as were all speakers, winners, and honored guests. “In the Pacific Islander tradition, a lei is presented to honor special guests or to show respect and appreciation,” Charoensub said.

“Aloha and mahalo,” Hills, senior vice president of Space Systems Group, began as she greeted and thanked the crowd. She recalled that the AAPAA achievement awards ceremony was nearing its 40-year anniversary. In highlighting the qualities Liang possessed, she called him “not just a teacher, but an awakener.” Hills mentioned how diversity is the champion of progress and shared an anecdote from Aerospace’s CEO Steve Isakowitz’s collision theory. She paraphrased that there are so many creative and different backgrounds, but they are isolated. A collision between colleagues of different personal and professional backgrounds would be impactful.

Dr. S. K. Ramesh, dean of the California State University, Northridge College of Engineering and Computer Science and a professor of electrical and computer engineering, gave the keynote address.

The theme of Ramesh’s speech was “show them you care, they’ll learn.” He shared how his family valued education and also demonstrated care for others in how they taught him. He continued that there are educational and professional challenges today, but also opportunities for a “diverse and inclusive” culture. Of the engineering field, he quoted from a 2008 study by the National Academy of Engineering, and said, “Few have such a direct and positive impact on people’s everyday lives” as engineers.

Ramesh provided statistics for Asian Americans in the tech space — which are higher than the national average — and said that a curriculum that included “global education,” acquiring “soft skills” like communication and organization, and mentorship like that which Dr. Liang provided, would help increase the leadership presence of underrepresented groups in STEM careers and academia. He said “everyone can be a mentor ... if you show you care.”



2017 Dr. Alexander C. Liang Award recipients Amy Koenig, left, and Dr. Terence Yeoh, right, with left to right, Dr. Peter Fuqua, selection committee member, Hamid Haque, selection committee member, Stephanie Charoensub, ceremony chair, Dr. Jason Ly, AAPAA national president, and Tammy Choy, selection committee member. (Photo: Eric Hamburg)



Keynote speaker Dr. S.K. Ramesh. (Photo: Eric Hamburg)

Dr. Jason Ly, AAPAA national president, continued the theme of care and mentorship when he shared how after he arrived at Aerospace, Liang sent him to the Aerospace Institute to take a class on improving his English. Ly had arrived in the U.S. as a teenage refugee from Vietnam and didn't speak English at the time. Liang even assigned someone to help Ly with English vernacular and idioms. Ly said that Liang was the type of manager who wanted to see people succeed, even if that meant them leaving, but Liang would also welcome them back if other opportunities proved not to be a good fit.

Ly next thanked the awards selection committee before presenting the winners. Yeoh was the first recipient. He is the associate systems director for the Directorate H program, National Systems Group. He shared that Dr. Liang was a "maverick" and a mentor. He recalled one story he heard that Liang would call out people who walked by and challenged them to "rocket past their limitations." This "drive-by mentoring," Yeoh said, was informal, but effective. "True mentorship," Yeoh said, is "when a piece of you is ground up in the process. For both parties involved, otherwise it's just advice." He finished by encouraging others, including himself, to mentor, nurture, and "care for the ones that come after us."

Amy Koenig also won an achievement award. She thanked the selection committee, her nominators, lab staff, managers, and mentors for their support. She also thanked her best friend and her mother, who had both flown from her birthplace of Trinidad to attend the ceremony. Koenig is a technical project management support member to NASA Science and Technology in the Civil Systems Group and former president of AAPAA.

Koenig discussed her early background, and said that her culture is an important part of who she is. Hard work, learning, and improving were instilled in her growing up. "We can always learn something new, or try something different. And even if we fail, it is the attempt that keeps us moving forward," she said.

The ceremony concluded with final remarks by Ly and a standing ovation for the award winners.

Awards and Recognitions, June-July 2017

by Gail Kellner
July 12, 2017

Aerospace employees frequently earn recognition for their professional accomplishments. This Orbiter feature acknowledges those honors and awards, including the publication of books. To nominate someone for consideration in this section, send details of the award in a timely fashion to orbiter@aero.org, or contact Gail Kellner at gail.d.kellner@aero.org.

Timothy Anderson

Timothy Anderson, director, Integrated Cost and Schedule Analysis Department, received the 2017 International Cost Estimating and Analysis Association (ICEAA) Service Award on June 7 in Portland, for making significant and sustained contributions for over 21 years.



Every year, the ICEAA recognizes the outstanding contributions of its members to improve cost estimating and analysis in government, industry, and academia.

Dr. Selma Goldstein and Dr. James Womack

The Human Rated Spacecraft Frangible Joint Assessment Team has been selected to receive the Group Achievement Award at the 2017 Agency Honor Awards. The team consists of Dr. Selma Goldstein, associate director, Mechanical Systems Department, and Dr. James Womack, Directors Office, Reliability and Statistics Department.

The prestigious Agency Honor Awards are approved by the administrator and presented to individuals or groups who have distinguished themselves by making outstanding contributions to NASA's mission.

Goldstein and Womack will receive their awards at NASA headquarters in October.

Christine Kovich

Christine Kovich, engineering specialist, Explorations Systems Directorate, Civil Systems Group, has been awarded the NASA Johnson Exploration Integration and Science Directorate Director's Commendation Award. The award citation reads "for technical leadership and contributions to the Asteroid Redirect Crewed Mission (ARCM) project in the areas of both extravehicular activity and systems engineering."

Kovich represented the ARCM project while fostering improved communications and system engineering strategies. She demonstrated NASA's teamwork core value consistently by coordinating numerous diverse organizations across the agency to accomplish the work required. Her work was performed with such a high degree of excellence and teamwork that it will be the foundation for all future exploration projects, according to NASA.

Kovich accepted the award at NASA Johnson Space Center in Houston on May 18.

Leslie Padilla

Leslie Padilla, senior member of the technical staff, Johnson Space Center Extravehicular Activity (EVA) Project Office, Exploration Systems Directorate, received a NASA Space Flight Awareness Award last month "for outstanding EVA community leadership, integration, and dedication leading to increased efficiency, quality, and safety of critical EVA products."

In his role of extravehicular mobility unit spacesuit assembly hardware manager, Padilla ensures that NASA's astronauts have safe and quality-fitting spacesuits. Padilla's most recent significant accomplishments include leadership of a quick turnaround blue room testing event required for an assigned crew member and resolution of late-breaking anomalies that had the potential to delay a critical International Space Station EVA. He also led the resolution of two last-minute spacesuit assembly issues just prior to EVA 42. Both of these issues could have resulted in delay or cancellation of this scheduled EVA.

IPATs Team Selected as Outstanding Team of the Quarter

The Image Navigation and Registration (INR) Performance Assessment Tool Set Team was recognized as Outstanding Team of the Quarter by the GOES-R Series Program, a collaboration of NASA and NOAA. The award was presented at NASA Goddard on May 19.

The IPATS team is led by Dr. Frank DeLuccia, senior project leader, Calibration and Validation Center of Excellence, and includes Aerospace's Dr. Gabriel Moy, Patrick Johnson, Peter Isaacson, Scott Houchin, Thomas Grycewicz, Justin Graybill, Dr. Christopher Folley, Charles Fink, Pradeep Thiyaratnam, Dr. Philip Slingerland, Dr. Donald Rudy, and Dr. Brian Porter.

The team developed and implemented a new toolset to determine the INR for the Advanced Baseline Imager and Geostationary Lightning Mapper instrument on GOES-R, which has been renamed GOES-16. This tool has proven to be of critical importance to GOES program calibration/validation.

July 2017 Obituaries

by Michelle Love

July 01, 2017

Sincere sympathy is extended to the families of:

Amelia Adams, office of technical staff, hired June 17, 1968, retired April 1, 1983, died April 2, 2017
Lee Barker, member of technical staff, hired Jan. 21, 1963, retired Feb. 1, 1993, died June 13, 2017
Richard Beard, member of technical staff, hired Jan. 11, 1971, retired March 1, 1999, died June 23, 2017
Gerald Comisar, member of technical staff, hired June 26, 1961, retired Nov. 1, 1996, died April 19, 2017
James Donnelly Jr., member of technical staff, hired Sept. 6, 1960, retired Nov. 1, 1991, died May 16, 2017
Patricia Dunn, office of technical staff, hired Oct. 16, 1978, retired Sept. 1, 2010, died May 31, 2017
Ann Eberle, office of technical staff, hired June 3, 1964, retired Sept. 1, 1991, died June 9, 2017
Robert Fillers, member of technical staff, hired Oct. 22, 1973, retired March 1, 2005, died June 22, 2017
Earl Flick Jr., member of administrative staff, hired June 6, 1988, retired March 1, 2001, died May 12, 2017
Arthur Halenbeck, member of technical staff, hired Aug. 21, 1961, retired April 1, 1991, died Jan. 27, 2017
Kathryn Halenbeck, office of technical staff, hired Nov. 3, 1964, retired Sept. 1, 1994, died June 20, 2017
Henry Maier, member of technical staff, hired July 28, 1961, retired Jan. 1, 1988, died June 5, 2017
Robert Payne, member of technical staff, hired June 22, 1961, retired Feb. 1, 1979, died May 27, 2017
Andrew Pope, member of technical staff, hired April 26, 1962, retired July 1, 1991, died June 6, 2017

Karl Sarajian, member of technical staff, hired April 28, 1980, died May 22, 2017

Thomas Ward, member of technical staff, hired July 1, 1963, retired April 1, 2004, died March 12, 2017

Paul Yeh, member of technical staff, hired Sept. 10, 1973, retired May 1, 1986, died May 31, 2017

*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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310-336-5000
www.aerospace.org

Orbiter Staff: orbiter@aero.org
Editor: Lindsay Chaney, 310-336-0961, lindsay.d.chaney@aero.org
Assistant Editor: Laura Johnson, 310-336-1179, laura.m.johnson@aero.org