Orbiter
August 2018

# REACHing Into Orbit

by **Lindsay Chaney**
August 20, 2018

*REACH team members Doug Holker (left), Joe Mazur (middle) and Bill Crain (right) display the ECP and REACH payloads along with their micro-dosimeter chips. (Photo: Erik Henderson)*

As space becomes increasingly contested, satellite operators must be able to identify and discriminate between natural and man-made threats to the space enterprise. An Aerospace team has developed a forward-looking and highly cost-effective method for making this distinction in real time by monitoring the radiation environment around satellites in low Earth orbit.

The team developed a space-grade, miniaturized version of a dosimeter – a device used to monitor and measure radiation. Beginning in 2017, these dosimeters were launched onboard commercial satellites in order to measure the radiation associated with space weather in orbit. The project, Responsive Environmental Assessment Commercially Hosted, or REACH, serves as a groundbreaking proof-of-concept for the future of satellite situational awareness.

Click here to read more about REACH and view a video.

# Communicating and Converging CubeSats

by **Laura Johnson**
August 02, 2018

*Geoffrey Maul, left, and Jacqueline Tardif work on one of the OCSD CubeSats. (Photo: Eric Hamburg)*

A satellite smaller than a loaf of bread beamed a laser to the ground, transmitting 100 megabits of data per second, a rate 50 times greater than typical communication systems for this size CubeSat. This same satellite also demonstrated much-needed maneuvering capabilities that brought it within 20 feet of its twin satellite.

The Optical Communications and Sensor Demonstration (OCSD) mission, funded by NASA, launched two 1.5-unit CubeSats on Nov. 12, 2017 as secondary payloads on a resupply mission to the International Space Station (ISS). Their goal is to demonstrate high-speed optical (laser) communications and proximity operations.

Click here to read full story and see video.

# USGS Director Briefed on Landsat Options

August 23, 2018


*USGS Director Dr. Jim Reilly, center, with Aerospace's Cathy Steele, left, and Kathi Chambers. (Photo: Kelly Hart)*

Aerospace recently hosted Dr. Jim Reilly, the new director of the U.S. Geological Survey (USGS), to discuss Aerospace capabilities that can help with future development of the Landsat program.

The meeting on the Chantilly campus included representatives of the Civil Systems Group (CSG), the National Systems Group (NSG), and the Engineering and Technology Group (ETG).

The USGS owns and operates the Landsat series of land remote-sensing satellites, a program that started in 1972. The Earth observation satellites operated by the USGS collect global imagery that is used internally by the USGS and freely distributed to other government agencies and the general public. Aerospace provides operational support to the two current Landsat satellites — Landsat 7 and Landsat 8.

Click here to read entire story.

# Aerospace Stars in IMAX Documentary

by **Lindsay Chaney**
August 08, 2018

*Dr. Nahum Melamed prepares to discuss asteroid defense as a film crew sets up a shot for an IMAX documentary. (Photo: Erik Henderson)*

Although it sounds like a TV movie, near-Earth objects (NEOs) such as asteroids and comets really do pose a national security threat. In fact, in a recent survey, 62% of Americans felt that one of NASA's top priorities should be monitoring asteroids and other objects that could collide with Earth.

One of the leading subject matter experts in this field, Dr. Nahum Melamed, conducted an asteroid deflection simulator course in the STARS mission operations center last month so that Aerospace employees and other scientists could learn more about the challenging topic of asteroid deflection.

A crew filmed Melamed teaching this class to include in an upcoming IMAX documentary focused on planetary defense and how it would work by illustrating the techniques of asteroid deflection. Click here to read full story.

# Press Release: Launching Government Payloads From Foreign Countries

August 09, 2018

LOGAN, UT, Aug. 6, 2018 – The Aerospace Corporation's Center for Space Policy and Strategy (CSPS) released a new issue brief today, Launching U.S. Government Payloads on Foreign Soil: Regulatory and Policy Analysis, which examines the emergence of new, venture-class launch providers for small satellites. The U.S. government is interested in reducing costs and gaining faster access to space by working with these emerging launch providers, but many are subsidiaries of foreign companies or maintain

launch sites overseas. Current U.S. law and policy require U.S. government satellites to be launched using U.S. launch providers, but the details of how these rules are applied is a matter of some contention.

“The U.S. government is seeking to balance policies that protect the domestic launch industry and its U.S. government payloads, with those that seek to assure access to space by fostering competition and opening doors to more launch providers and sites,” said Dr. Jamie Morin, executive director of CSPS.

Authors Barbara Braun and Eleni “Sam” Sims of Aerospace’s Space Innovation Directorate highlight several U.S. laws and policy statements that require launch vehicles for U.S. government satellites to be manufactured in the United States.

“A set of policies and laws exist that require U.S. government satellites to be launched on U.S. launch providers,” said Braun. “Many U.S. government agencies are investigating the legal and policy implications of launching with these new providers.”

As venture class vehicles are proliferating and the U.S. government is looking to expand launch partnerships across the globe, clarifying the regulatory landscape surrounding launches from foreign soil will be necessary.

“The National Space Transportation Policy and Commercial Space Act of 1988 state that Department of Defense payloads should be launched on U.S.-manufactured launch vehicles and that U.S. commercial space launch services should be utilized to the fullest extent, but the venture-class space launch business is more global in nature,” said Sims.

The CSPS issue brief outlines the laws and policies that establish a two-part test to determine if a launch vehicle is manufactured in the United States and authorized to launch U.S. government satellites. To understand the policies and laws that government agencies must follow to launch their satellites, download the issue brief at: www.aero.org/policy.

# Press Release: New Standard for Smallsats

August 09, 2018

LOGAN, UT, Aug. 6, 2018 – The Aerospace Corporation (Aerospace) announced details of a new small satellite (smallsat) standard called a Launch Unit (Launch-U) during a briefing at the Small Satellite Conference in Logan, Utah. This standard provides major benefits to the smallsat industry—manufacturers, launch providers, and satellite users—by increasing access to space and decreasing launch costs. It also enables the space community to come together to work innovative solutions for sharing costs, adopting new business models, and adapting to regulatory or statutory changes.

“We are proud to partner with industry, government, and academia to develop the first official Launch Unit standard,” said Steve Isakowitz, Aerospace president and CEO. “The Launch-U team’s efforts will help reduce the complexities on the satellite and launch vehicle sides. It will also lead to shorter integration timelines and increased access to space.”

The space community was in search of a standard to make launching small satellites more flexible. Given Aerospace’s role as an objective technical advisor, the community identified the corporation as the ideal partner to work across all elements of the space enterprise, from satellite and launch manufacturers to service providers and government officials.

“The Launch-U concept was born out of the industry’s continuous requests for help, said Dr. Randy Villahermosa, general manager of Aerospace’s Innovation Initiatives. “The goal was to create a standard that industry would view as enabling rather than an impediment to growth. Aerospace was a key broker in making this a reality.”

Carrie O’Quinn, senior project engineer for Aerospace’s Research and Development Department and the Launch-U lead, emphasized that currently there are no industry standards for satellites between the size of a CubeSat (approximately the size of a toaster) and an EELV Secondary Payload Adapter (ESPA) class satellite, which is about the size of a large dorm refrigerator.

“The Launch-U standard seeks to change this through our volume recommendation of 45 cm x 45 cm x 60 cm, said O’Quinn. “That’s roughly the size of two carry-on bags strapped together. We also address a mass range, fundamental frequency, and loads in the recommendations.”

The space access industry is altering in an exceedingly rapid pace and is driven by smallsat and small launch vehicle development, the increasing popularity of multi-manifest missions, and a
widespread interest in reducing launch cost and timelines while deploying even more spacecraft. Currently, industry experts estimate that 6,000 to 20,000 smallsats could be launched over the next 10 years.

O’Quinn explained that the group’s vision for the Launch-U standard is the solution the industry is looking for. “This is not envisioned to be a requirement levied on spacecraft developers, but rather a standard that is embraced by all as a game-changer.”

For industry, the next step is to develop hardware and other technical solutions needed to support the Launch-U. O’Quinn emphasized that each stakeholder plays a specific role in implementing the Launch-U.

“Launch vehicle providers, integrators, and aggregators can begin considering how Launch-U satellites will affect their business models once implemented,” said O’Quinn. “For example, these companies might publish information on Launch-U launch costs, as Spaceflight Industries and other commercial entities currently do for CubeSat launch costs.” Satellite manufacturers could also build to the Launch-U standard and make it available to the community at large.

For more information about the Launch-U standards, please visit: www.aerospace.org/launch-u

# In the News: Launch-U Featured

August 15, 2018

Geekwire reports on Aerospace’s proposed size and weight standard for medium-class (25-200 kilogram) smallsats called the “Launch Unit,” which would fill a volume of 45x45x60 centimeters (1.5x1.5x2 feet). This is approximately the size of an end table, two carry-on pieces of luggage strapped together or, according to Geekwire, also the same size of a pirate chest. Read the Geekwire article.

Utah Public Radio interviewed Aerospace’s Jamie Morin, executive director of the Center for Space Policy and Strategy and senior project engineer, Carrie O’Quinn about Launch-U Standards and how the more cost-effective method of transporting cargo into space is through this type of ride-share program. O’Quinn explains it this way, “It’s kind of like Uber for satellites so you just book your ride. Sometimes that is two years in advance of when you actually launch.”

Read the article and listen to the podcast.

# Raiford, Williams and Bukley Receive Women of the Year Awards

by **Wendy O'Dea**
August 27, 2018

Shawne’ Raiford, Dr. Ashley Williams, and Dr. Angie Bukley were named the 2018 Women of the Year by the Aerospace Women’s Committee (AWC) at a ceremony held in El Segundo on Monday, Aug. 26. The event kicked off Women’s Week during which multiple activities will be taking place.

The theme of the 2018 Women’s Week is “Stronger Together,” emphasizing teamwork—both internally externally. Winners were selected by a committee that evaluated five areas:

- Job performance
- Company activities
- Community involvement
- Professional, career, and academic achievements
- Leadership and mentoring

Dr. Malina Hills, senior vice president, spoke at the event, noting the variety of avenues women have to challenge the status quo beyond vocal protest.


*Dr. Malina Hills (left) congratulates 2018 Woman of the Year Award winners Dr. Angie Bukley, Dr. Ashley Williams, and Shawne' Raiford (Photo: Elisa Haber)*

“Every day at Aerospace, women are pursuing such paths: by writing new chapters for the nation’s space enterprise, developing cutting-edge innovations, and preserving our national security,” Hills said. “Together we are leading by undeniable and inspiring example. And some of the best examples are the Women of the Year that we are honoring today.”

**2017 WOTY Winners**

**Shawne’ Raiford**

Currently an administrative specialist in the Facilities division, Shawne’ Raiford joined Aerospace in 2011 and has been involved in a wide variety of employee resource groups (ERGs) and other activities, particularly those related to STEM. She serves as chairperson

*2018 Women of the Year Award winner Shawne' Raiford (Photo: Elisa Haber)*

for the AWC STEM Outreach Committee and organized and chaired the Girls STEM Day in 2017 with the goal of motivating female students to become innovative and creative thinkers.

Raiford has also been a member of the Herndon Science Competition Committee, an officer of the Aerospace Black Caucus (ABC), director and recording secretary of the Aerospace Employee Association (AEA), and actively participates in the AWC.

Within the Facilities division, Raiford received a performance recognition award for assisting in a deep dive on the department's results from the 2016 employee survey. She also helped update and roll out a new Facilities Division website in 2017, making it more service based and user friendly.

Raiford, who is also an active member of OPAT, received a bachelor's degree in sociology from California Baptist University in Riverside, and will also receive her Certificate of Achievement in Business Management later this year.

**Dr. Ashley Williams**

Dr. Ashley Williams joined Aerospace and the Control Analysis Department in 2011 after graduating with a Ph.D. degree in control and dynamical systems from the California Institute of Technology (Caltech). She also earned a master's degree in aerospace engineering from Caltech, as well as a bachelor's degree in aerospace engineering and applied mathematics from the University of Colorado, Boulder.

*2018 Women of the Year Award winner Dr. Ashley Williams (Photo: Elisa Haber)*

While working in the Control Analysis Department, Williams was awarded a President's Achievement Award in 2014 as a member of the team that diagnosed and mitigated issues on a critical national program. Her primary contribution was the extension of mathematical techniques to predict and characterize unusual gimbal behavior.

In 2015, Williams transferred to the Information Systems and Cyber Division, first in the role of senior MTS, then as a section manager, and now as director of the Studies and Analyses Office. As project lead of the Aerospace Resiliency Coalition, she manages a team of analysts and developers conducting enterprise analysis.

Williams has gone above and beyond her regular job duties, accompanying senior management on Mission DC, a mission to Washington to raise Aerospace's STE ceiling. She's also been actively involved with TECTalk, starting as a committee member then advancing to chairperson, and now advisor. She also expanded TECTalk coast-to-coast, including organizing events in Chantilly and other regional sites.

Passionate about STEM, Williams helped organize a STEM day for Los Angeles Team Mentoring, an organization that serves at-risk middle school students. She also led a team to victory in the trebuchet competition at the Wiseburn Engineering Hackathon. She is active with AWC, having served as the El Segundo vice president in 2016 and spearheading Take Our Kids to Work Day and the AWC Promotion Celebration.

In addition to her duties at Aerospace and involvement in the community, Williams teaches part time at Cal State Long Beach and the University of Southern California.

**Dr. Angie Bukley**

Dr. Angie Bukley, a senior project leader supporting the Nuclear Thermal Propulsion feasibility study at NASA and several other human exploration projects, has a diverse professional background. With a bachelor's degree in biomedical and electrical engineering and a master's degree in electrical engineering—both from Mississippi State University, and a Ph.D. from the University of Alabama, Bukley has worked in the Aerospace industry as well as serving in administrative roles in the academic world.

Earlier in her career, Bukley was part of the Hubble Space Telescope team at NASA Marshall Space Flight Center and was awarded a Center Director's Discretionary Fund Grant to investigate flexible multi body structural dynamics in microgravity. After a move to Albuquerque, she worked with the U.S. Air Force Research Laboratory before joining Aerospace in 1998.

Exploring her interest in academics, Bukley later left Aerospace to serve in administrative roles at Ohio University, University of Tennessee Space Institute, and International Space University (ISU) where she was the manager of the Self-Deployable Habitat for Extreme Environments program. Bukley remains involved with ISU and is currently the Aerospace representative on the ISU board of trustees.

Rejoining The Aerospace Corporation in 2014, Bukley has worked on projects ranging from the National Academies Earth Sciences Decadal Survey to NASA Engineering Safety Center technical assessments and studies.

Over the years Bukley's work has been recognized with multiple awards, including two distinguished teaching awards at Ohio University and being elected to the Sigma Xi scientific research society. She supports the School FUEL program, which provides food to kids who go home to little or no food on weekends, and also supports the Human Rights Campaign.

*2018 Women of the Year award winner Dr. Angie Bukley*

# Strong Showing for "A-Team" at 2018 Summer Games

by **Lindsay Chaney**
August 03, 2018

Frisbees soaring overhead, sand kicked up by soccer balls, human pyramids stacking and collapsing; these were some of the scenes that made up this year's Aerospace Summer Games.

Held annually at El Segundo's Dockweiler beach, the Summer Games boasts a day of friendly competition and fun in the sun for local aerospace and aviation companies. This year, 27 companies gathered and competed in events such as dodgeball and tug of war. The Aerospace Corporation's "A-Team," numbering more than 200 strong and led by Coach Steve Isakowitz, was donned in cerulean and outfitted with deafening thunder sticks to cheer on their teammates.

They astonished the competition with strong showings in Ultimate Frisbee (2nd place), Relay Race (2nd place), Sand Soccer (4th place), and Human Pyramid (4th place) and winning the canned food drive by donating the most items to a local charity. These results propelled the A-Team to 4th place overall, losing out on a spot on the podium by just one point to SpaceX, last year's champions.

*The Aerospace team puts effort into the tug-of-war competition. (Photo: Erik Henderson)*

For more information, check out Aerospace's Facebook and Instagram feeds for the day's highlights.

# Awards and Recognitions, August 2018

by **Gail Kellner**
August 27, 2018

*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.*

**Marilee Wheaton**

Marilee Wheaton, systems engineering fellow, Engineering and Technology Group, received two awards at the 2018 INCOSE International Symposium last month in Washington, D.C. The first was an Outstanding Service Award for “her service and promotion of Systems Engineering and technical education through leadership of Systems Engineering conference activities and Academic endeavors, and her support of INCOSE initiatives and Chapter activities through service in the Corporate Advisory Board.”

The second award was from the INCOSE Foundation, and sponsored by Johns Hopkins University Applied Physics Lab, for the Alexander Kossiakoff Systems Engineering Scholarship in recognition of her outstanding achievement in systems engineering applied research. This award was for her dissertation research that she is performing on an Aerospace Educational Fellowship at the University of Southern California Systems Architecting and Engineering Program.

**Myron Hecht**

Myron Hecht, senior project leader in the Software Systems Quality and Analysis Department in the Information Systems and Cyber Division, was selected as a recipient of a Best Paper Award at the 2018 INCOSE International Symposium. His paper was entitled “Quantitative Resiliency Analysis and Modeling of Microgrids”.

Hecht and James Martin (who was cited in the Awards and Recognitions column last month) were two of just six papers overall that were recognized with Best Paper Awards.

# August 2018 Obituaries

by **Jessie Ding**
August 01, 2018

*Sincere sympathy is extended to the families of:*

**Lynn Kay Beckstead**, member of technical staff, hired July 13, 2015, died June 23, 2018
**Paul Fishley,** technical support staff, hired Aug. 14, 2017, died July 24, 2018
**Greta Macias**, member of administrative staff, hired Aug. 7, 1978, retired Aug. 1, 1987, died May 26, 2018
**Daniel William Melzer**, member of technical staff, hired Apr. 4, 1966, retired July 1, 1997, died Mar. 21, 2018
**James Merrick**, member of technical staff, hired Jan. 3, 1966, retired June 1, 2002, died July 6, 2018
**Mary Lou Murray**, member of administrative staff, hired July 14, 1975, retired Apr. 1, 1998, died July 17, 2018
**Robert M. Okada**, member of administrative staff, hired June 17, 1974, retired Mar. 1, 2001, died July 9, 2018
**Henry J. Roth**, member of technical staff, hired July 30, 1962, retired Feb. 1, 1994, died June 27, 2018

*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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