Orbiter
December 2015

Visitors to Aerospace, Late 2015

December 28, 2015

Aerospace regularly hosts a variety of visitors who have an interest in the space program or the skills that Aerospace can bring to national or international organizations. Whether they are trade representatives from foreign countries, students, or government officials, they all have a stake in the work done at Aerospace.

Japanese Delegation

Aerospace officials with members of the visiting Japanese delegation. (Photo: Eric Hamburg)

A delegation of Japanese government officials, trade organization representatives, and commercial vendor executives, all associated with the space industry, visited The Aerospace Corporation in November.

The group was hosted by Roy Nakagawa, systems director of JPL & Robotics Programs. Aerospace has been advising the Japanese government, civil space, and commercial sectors in regard to space issues.

The 30-person delegation, which is in the United States primarily to visit major aerospace and defense contractors to promote the sale of their products, was interested in learning more about Aerospace's roles and responsibilities with respect to the U.S. space industry.

During their two-hour morning visit, the group heard presentations from Dr. Dave Gorney, executive vice president, who gave a corporate overview, and Dr. Walter Buell, principal director, Electronics and Photonics Laboratory, who explained the operations of the Physical Sciences Laboratories.

Assemblyman David Hadley

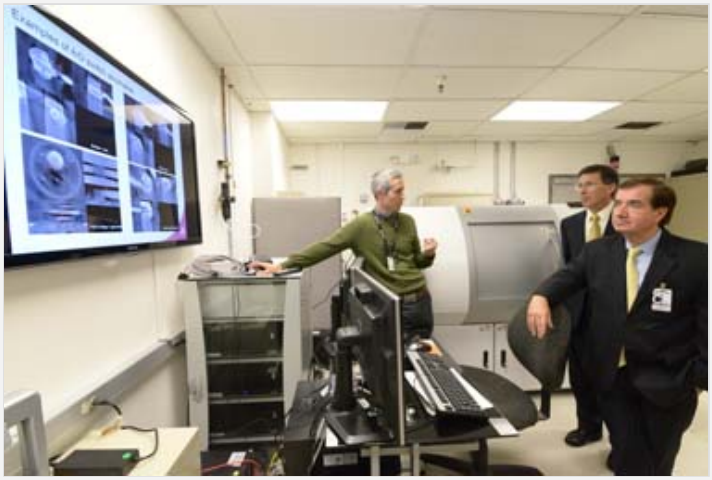
66th District Assemblyman David Hadley, center, with Randy Kendall, left, and Dr. Wayne Goodman, right. (Photo: Elisa Haber)

Assemblyman David Hadley of the 66th Assembly District in the South Bay visited The Aerospace Corporation El Segundo campus on Dec. 14 to meet with corporate officers and tour the company's facilities.

Dr. Wayne Goodman presented a corporate overview during a discussion in the Dr. Sally Ride Boardroom. Hadley then received a tour of the Physical Sciences Laboratories.

Congressman Ed Royce

Congressman Ed Royce, of the 39th Congressional District centered in Fullerton, visited the Aerospace El Segundo campus on Sept. 22. Royce, chairman of the House Foreign Affairs Committee, first met with corporate officers. Ed Swallow provided a corporate overview. Afterward, Royce toured the Spacelift and Telemetry Acquisition and Reporting System (STARS) facility and the Physical Sciences Laboratories.



Congressman Ed Royce, right, listens to a presentation from Dr. Brendan Foran, left, while Dr. Wayne Goodman observes. (Photo: Eric Hamburg)

Austin Recaps Busy First Quarter and 'Outstanding' Year

by Lindsay Chaney
December 16, 2015

In her December CEO's Report to Employees, Dr. Wanda Austin called FY15 an "outstanding year" and described positive reaction from the board of trustees. She also recapped a busy first quarter of fiscal year 2016 that included two retirements from the board of trustees, two successful launches, airborne sensor work, and new Vaeros business.

In addition, she announced the winner of the Aerospace Team of the Year Award.

Among highlights of FY 2015 were a final report card score of 99.3%, the hiring of 274 new employees, an unqualified opinion on the FY15 financials, and formal recognition from the board of trustees for the hard work performed by Aerospace employees on a daily basis. Immediately following the CEO's Report, a letter from Chairman of the Board Barbara Barrett was posted on the Aerospace internal homepage, in which the chairman described board members' appreciation for the work done by Aerospace employees and the leadership provided by corporate officers.

Dr. Wanda Austin described FY15 as an "outstanding year." (Photo: Eric Hamburg)

The first quarter FY16 board of trustees meeting was the last for board Vice Chairman George Muellner, who has been vice chairman since 2013, and Jeff Smith. The new vice chairman will be the Hon. Michael Donley, who served as Secretary of the Air Force from June 2008 to June 2013. He has been a member of the Aerospace board of trustees since September 2013.

The first of the quarter's two launches supported by Aerospace was the Oct. 8 national security launch aboard an Atlas V from Vandenberg Air Force Base. In addition to its primary payload, the rocket successfully deployed 13 CubeSat satellites, including Aerospace's AeroCube 7 (A). The CubeSat suffered a software problem on orbit that disabled its primary mission, which was a technically challenging laser communications test.

Such occasional problems and failures are "an inherent risk in working on the very cutting edge of our industry," Austin said. "Setbacks will happen. It's part of the process. It's how you innovate." The cause of the failure has been identified and solutions have been implemented for the next two AeroCube launches.

The second launch was the GPS IIF-11 satellite, launched Oct. 31 from Cape Canaveral. The GPS IIF-11 is the penultimate satellite in the GPS IIF block.

In other launch news, Austin mentioned that Aerospace has been working with the Space and Missile Systems Center to prepare several new-entrant launch vehicles for certification. These include the SpaceX Falcon 9 Upgrade; the SpaceX Falcon Heavy; and the United Launch Alliance Vulcan.

Austin reported that Aerospace's Mako sensor was successfully used in four government-sponsored airborne hyperspectral imagery collection campaigns. The goal of these campaigns was to identify, characterize, and validate spectral signatures from certain high-interest activities. Aerospace-developed software allowed raw data to be analyzed and screened for predetermined signatures of interest within minutes of being collected.

The former Civil and Commercial Operations, which was rebranded this year as Vaeros, a division of The Aerospace Corporation, was the home of several projects that Austin summarized in her report. Among them were:

Vaeros provided a detailed report on plutonium disposition options for the Department of Energy and supported the department in its testimony to Congress on the subject;
The FBI renewed its $2.9 million contract for support to the Sentinel Program;
Vaeros delivered a congressionally directed study on the feasibility and practicality of a potential human mission to fly by Mars.
Vaeros obtained a small contract with Google Skybox for integration and test support. Skybox is a Google-owned company that uses low-cost, small satellites to provide observational imagery and video of the Earth.

The Aerospace Team of the Year Award for 2015 went to the National Capability Restoration team. Details of the team's accomplishments are limited due to the sensitive nature of its mission, but Austin gave some general information. She said the multi-disciplinary team studied and characterized the physics involved in a space-asset failure — something that had never been done before.

The team's work involved mining extensive data sets to pinpoint the cause and effect of the failure; producing innovative software to detect subtle errors in massive amounts of data; developing a new sensor; and outfitting and operating a new laboratory with a diverse array of state-of-the-art equipment. The team's efforts and subsequent recommendations resulted in a change to government operations that produced increased capabilities for the nation.

Employees in El Segundo applauded at several points in the CEO's Report to Employees. (Photo: Elisa Haber)

The 16 members of the Team of the Year are: Eric Aamot, Jabin Bell, Dr. Walter Bloss, Dr. Kathryn Brenan, Dr. Timothy Graves, Dr. Craig Heatwole, Aimee Hubble, Dr. Russell Lipeles, Keven MacGowan, Dr. John McHale, Dr. Samuel Osofsky, Preston Partridge, Enold Pierre-Louis, Robert Santoro, Gerald Trombley, and Michael Yonezaki.

Two questions were submitted before the CEO's Report to Employees. Following are those questions and answers, edited for space and conciseness:

Question: What is the rationale for the corporate policy of providing lump-sums in place of raises for some employees' merit increases? Does the corporation understand the pernicious and demotivating effects of giving some of its employees a lump sum instead of a merit raise?

Answer: Every year the company compares its salaries for all job categories to the marketplace. In general, employees who have salaries below the marketplace for their job category, experience level, and other factors are given base pay increases, while those with salaries above the marketplace or their peers receive smaller base pay increases and/or lump sums. Internal equity, job performance and a person's relative value are other factors used in determining merit raises, whether base pay or lump sum.

The use of lump sums allows managers to recognize employees who are well compensated and otherwise would not merit a base pay increase.

Lump sum payments, which were initiated a few years ago, are commonly used by other companies. It is one of a number of tools available to managers to reward employees, which also include performance recognition payments and awards. Lump sum payments as well as awards are included in pension calculations when determining contributions to ASAP and the annual accrual of AERP.

Question: How many Aerospace staff members have been affected by the Office of Personnel Management data breach?

Answer: The OPM is contacting employees directly and has not released a list of names to the company of those affected; to

date, more than 400 employees have reported receiving notification letters from OPM, although Willie Krenz anticipates that that number will eventually top 1000.

If you haven't received notification from OPM, an online verification center has been set up where you can check whether you were affected: https://www.opm.gov/cybersecurity/. Also keep in mind that any notification from the OPM will come in the physical mail, not by email.

Letter from Chairman of the Board Barbara Barrett

December 15, 2015

Dear colleagues,

As chairman of the Board of Trustees that governs The Aerospace Corporation, I wanted to share the deep appreciation the trustees have for your efforts and for the leadership provided by the corporate officers. Each quarter, we review Aerospace's contributions to the nation. While we are always impressed by the accomplishments of the company and its employees, this year stands out as particularly noteworthy in the following areas:

The company's efforts to create new strategies for next-generation space systems and new ways to protect them from threats.
The company's work to develop a new generation of launch service providers and new launch vehicles.
Aerospace support of the launch of eight successful and important missions.
The company's help in recovering the use of critical space assets, and life-extension and improvement of other assets.

All of this has been achieved while operating the company in a very cost-effective manner that is responsive to our customers' requirements.

In our conversations with the leaders of the customer community this year, we heard repeatedly how much they appreciate your efforts. They rely on you for your timely and valuable help with today's challenges, as well as your innovative ideas for future systems. They recognize the space program is entering a period of profound change brought on by the need to protect our space assets and improve their capabilities, and they are relying on you and your capabilities in this new era.

The Board of Trustees extends its congratulations for the outstanding accomplishments and recognition to each of you and to an unparalleled and dedicated leadership team. Thank you for your efforts and dedication to mission success.

Sincerely,

Ambassador Barbara Barrett
Chairman
Board of Trustees
The Aerospace Corporation

Michael Campbell Named Principal Engineering Specialist

December 23, 2015

Dr. Michael Campbell

Dr. Michael Campbell has been named principal engineering specialist in the Computer Applications and Assurance Subdivision (CAAS) of the Computers and Software Division (CSD), Engineering and Technology Group.

In his new position, Campbell's primary responsibility is to coordinate enterprise ground activities in CAAS. Further, he is providing senior technical leadership to expand the CAAS Vaeros portfolio and is developing and executing a CAAS strategic plan for technical investment within CSD lines of Aerospace Technical Investment Program research.

Campbell joined Aerospace in 1992 in CSD, and served as the principal director of the Computer Science and Technology Subdivision from 1998 through 2006. Most recently, he joined the Ground Engineering Subdivision in the Ground and Communications Division of the National Systems Group (NSG), serving as a bicoastal liaison.

Campbell earned a bachelor of science in mathematics degree from the University of

California, Riverside, followed by a master of science and Ph.D. in computer science from the University of California, Los Angeles.

Plant-Inspired Vehicle "AeroSeed" Has Lots of Potential

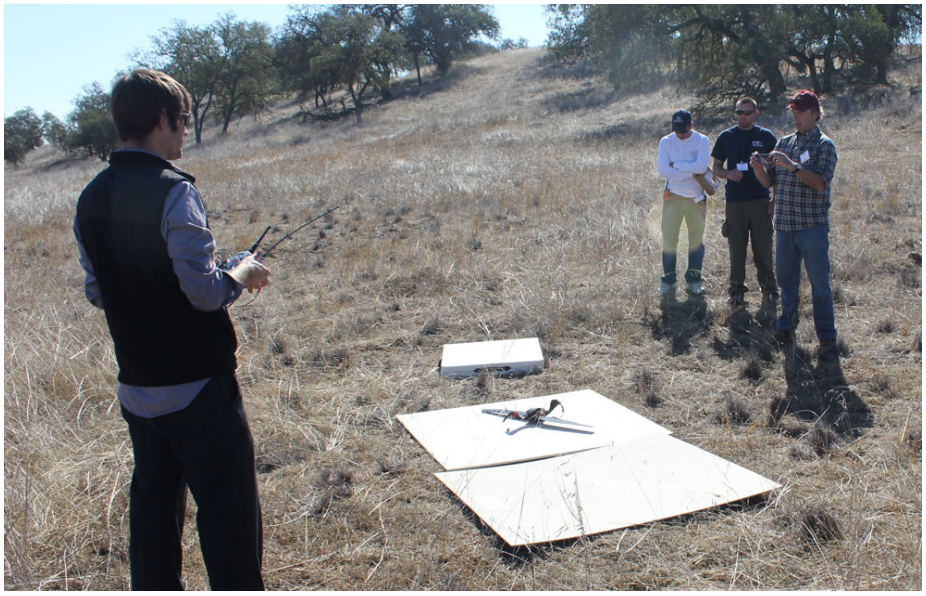
by Laura Johnson
December 07, 2015

Looking at nature for inspiration, an Aerospace team is developing an unmanned aerial system (UAS) that borrows flight characteristics from winged maple seeds.

The small and inexpensive UAS, dubbed AeroSeed, has a number of advantages over current UAS technology, and could be used in a variety of fields.

"The unique capabilities of this vehicle make it multi-purposed," said Chris Dunbar, principal director of the Guidance and Control Subdivision, Vehicle Systems Division.

AeroSeed is a small UAS that spins as it flies, and takes full advantage of the wind. It can fly at high speeds, is agile, and remains stable even in less-than-ideal-weather conditions. For its size, AeroSeed can carry a large payload.



Evan Ulrich, left, prepares to fly AeroSeed. (Photo: The Aerospace Corporation)

If AeroSeed loses a wing and propeller due to functional or mechanical failure, it can continue stable flight. Even with the loss of both propellers, it will simply autorotate to the ground, rather than plummet to the ground like other UASs.

It can also stay in the air for a long time, due to its ability to ride the wind rather than relying completely on battery power to stay aloft. The propulsion system can be turned off and on when needed for takeoff or repositioning to a desired altitude and waypoint.

"Substantial differences exist between the AeroSeed platform and conventional aircraft," said Dr. Evan Ulrich, a member of the technical staff at Aerospace. "The most obvious departure from convention is the lack of a fixed heading/orientation. This configuration solves several historically difficult design and performance challenges for rotorcraft."

Ulrich came up with an idea for a single-wing rotorcraft while studying autorotating plant seeds in graduate school at the University of Maryland. After Ulrich was hired by Aerospace, Dunbar recognized the uniqueness of this concept at about the same time Aerospace was beginning to explore applying its core expertise and skills to the UAS market. Hence, AeroSeed was born.

"The AeroSeed has roots in the autorotating plant-seed world, and as such it features bio-inspired design and functionality," Ulrich said. "For example, the balance of mass and aerodynamic forces mimics that of an autorotating plant seed which enables AeroSeed to use this basic mode of unpowered transit."

AeroSeed (Photo: The Aerospace Corporation)

Potential Applications

Although the vehicle is still in development, a number of possible use cases are emerging. One potential use is for AeroSeed to collect in situ weather measurements. With the vehicle's unique design, the flight characteristics exploit wind turbulence rather than fight it.

“AeroSeed reacts like a surfer riding a wave or a bird on a thermal, allowing the wind to propel it forward at the same time keeping it aloft,” Dunbar said. “AeroSeed thrives in turbulence.”

This suggests the possibility to assess wind gusts and turbulence prior to a rocket launch. Currently, weather balloons with instrumentation are released prior to a launch, but these have a number of limitations. Having a number of AeroSeed vehicles with the same instrumentation fly in formation and at prescribed altitudes would yield real-time, multidimensional winds-aloft situational awareness.

Other possibilities include using AeroSeed to collect information on forest fires, tornadoes, and thunderstorms. Because the vehicle is small and inexpensive, it would be possible to fly large numbers of them to gather data over large geographic areas.

Development and Testing

With these and other potential uses, the team has been motivated to keep pushing forward. AeroSeed has undergone many iterations in less than a year.

The team is focused on quick and agile “design, build, fly” development, constantly changing things, testing, and then making more changes. Many components are printed on 3-D printers at Aerospace, which helps to accelerate the design pace.

Due to Federal Aviation Administration (FAA) regulations, the team has had trouble finding a place to fly their vehicle, but they haven’t let that slow them down. Always innovating, the team can be seen flying AeroSeed after hours on Aerospace’s campus in a repurposed shipping and delivery tunnel augmented with netting over the driveway to allow for GPS signal access.

Twice this year, the team went to a Joint Interagency Field Experiment (JIFX) hosted by the Naval Postgraduate School in Paso Robles, CA. According to Ulrich, “The quarterly JIFX event allows researchers to conduct experiments in airspace outside the jurisdiction of the FAA.”

At their first JIFX in August, they collected valuable flight data—along with an award for the most spectacular experimental failure, which just shows the team’s dedication to pushing their vehicle and determining its limits. The failure occurred when AeroSeed was flying at its top speed and one of the components melted, causing the motor to fall off.

At the next JIFX in November, the researchers tried out two new versions of the redesigned AeroSeed, one with advanced avionics for cyclic control and the other to collect wind-shear data.

More Info

The team has a SharePoint site for anyone interested in learning more about AeroSeed.

Ulrich’s graduate work is also currently part of a biomechanics exhibit at the Field Museum in Chicago.

“We successfully flew both variants and successfully demonstrated cyclic control (a first for an aircraft of this design),” Ulrich said. “The wind-shear data-collection variant flew successfully to 750 feet altitude and collected and telemetered data that will be used to determine local wind shear.”

Back at Aerospace, they continue to test, improve, and explore potential applications. More test flights will no doubt be in order, and more improvements will be made. The possible uses for this technology make it one to watch.

Holiday Food and Gift Drive Celebrates 25 Years of Giving in El Segundo

by Gail Kellner
December 02, 2015

The Holiday Food and Gift Drive in El Segundo is currently in full swing and will last 25 days through Thursday, Dec. 17, to commemorate its 25th anniversary. Donations are being accepted for food, clothing, and gift cards, as well as through the Angel Trees located throughout the El Segundo campus, which have tags with a child’s name and desired gift items.

The 25-year history in El Segundo has proven just how special the drive is year after year, thanks to Aerospace employees, volunteers, and to the long-standing dedication of Xavier Galindo, procurement administrator, Procurement.

Galindo has been with the giving drive since its inception back in 1990 when it was led by the Aerospace Hispanic Advisory Council. At that time, the organization provided food and gifts to one charitable organization (the Salvation Army) with a volunteer crew of five or six volunteers, and enough gifts for about 300 children.

The program continues to be a very successful one — bringing in record numbers of gifts each year to children registered with 11 nonprofit agencies. Last year, 2,789 gifts were donated by Aerospace, a 7.43 percent increase from the year before.

“Holidays are a difficult and lonely time for many people, and we have the opportunity to make holidays bright for those who

are less fortunate," Galindo said. "This program would not be successful without the help of volunteers who use their vacation time to help with sorting the gifts, helping with gift pick-ups, and many other tasks," he said.

Galindo shared a letter he received last January from Pat Williams, president, Kids Matter Auxiliary, Crittenton Services for Children and Families.

"You came without judgement; you did not need to know where your child came from, his ethnicity, or his views on the issues of the day," Williams wrote. "You cared for kids of all cultures: gay and straight, teen moms, or those struggling with mental illness or addiction. You brought gifts to unborn children and gave food and necessities to teenagers who aged out of group homes. You brought love and understanding to commercially sexually exploited children. Human trafficking victims of every kind were shocked by the kindness that enveloped them this holiday," she said.

There were many more appreciative stories from just this one organization – and Aerospace provides gifts and food to 10 other nonprofit agencies, as well.

Eight Angel Trees (with tags from specific and general gift requests) from different organizations, as well as collection bins are provided throughout the campus. Angel Trees are in the A1 Credit Union, A3 cafeteria, A5 lobby, A6 lobby, A8 lobby, D8 cafeteria, and the D10 lobby. There is also an Angel Tree in Pasadena.

Food collection bins are located in A1 (first floor lobby and third floor 3335), A2 (west lobby), D3-110TT, and D8 (first, second, and third-floor elevators).

A Holiday Food Drive is also being conducted in Chantilly, Columbia, and Crystal City offices. Donations will go to James Mott Community Assistance Program of Fairfax, Va. Other Aerospace offices also participate in holiday giving programs.

For questions about the El Segundo Holiday Food and Gift Drive, contact Xavier Galindo, at ext. 61813, or Laura Miramontes, at ext. 67524.

For more details, visit the Holiday Food and Gift Drive website.

Xavier Galindo checks one of the Angel Trees on the El Segundo campus. (Photo: Cyndi Pegus)

December 2015 Obituaries

by Elaine Young
December 01, 2015

Sincere sympathy is extended to the families of:

Bettye Carmichael, office assistant , hired March 3, 1969, retired Jan. 01, 2005, died Nov.6, 2015.
John Eylar, member of technical staff, hired Dec. 11, 1972, retired June 1, 1991, died Aug. 4, 2015.
Chester Woodson, member of technical staff, hired Nov. 1, 2010, died Nov. 5, 2015.

To notify Aerospace of a death and have it included in the Orbiter, please contact Cynthia Johnson in Human Resources at 310-336-5806.

December 2015 Notes

by Elaine Young
December 01, 2015

Notes of appreciation to fellow employees and Aerospace for thoughtfulness and sympathy have been received from:

Donald Love, on the recent passing of his mother, Kathleen (Sue) Love.
Suzanne Menichiello, on the recent passing of her mother-in-law, Vera Menichiello.
Art Menichiello, on the recent passing of his mother, Vera Menichiello .

To submit a note of appreciation to Aerospace, please contact Valerie Jackson in Human Resources at 310-336-0891.

December 2015 Anniversaries

by Elaine Young
December 01, 2015

5 Years

Engineering and Technology Group

Ngoc Nguyen

Operations and Support Group

Luis Aguilar

10 Years

Engineering and Technology Group

Arnold Burke, Charles Garcia, Grant Karamyan, Jeffrey Vance, Mary Ambrose

Enterprise Information Services

Lawton Chiu

Space Systems Group

Mitchell O'Donnell

15 Years

Engineering and Technology Group

Brian Jersak

National Systems Group

Rodney Hignite

Operations and Support Group

Gregory Hoffman

Systems Planning, Engineering, & Quality

Mark Shockey

20 Years

Space Systems Group

Paul Rousseau

25 Years

Engineering and Technology Group

Gee Lui, Gouri Radhakrishnan

Enterprise Information Services

Stewart Sutton

Space Systems Group

Jonathan Wyse

30 Years

Engineering and Technology Group

John Hackwell, Sandra Mundy