Orbiter
June 2016

President of Virgin Galactic to Lead The Aerospace Corporation

June 28, 2016

Steve Isakowitz

Steve Isakowitz, president of Virgin Galactic, has been elected president of The Aerospace Corporation effective Aug. 1. He will assume the position of Aerospace president and CEO upon the retirement of Dr. Wanda Austin on Oct. 1.

“After a year-long search process, the board of trustees is pleased with the result. Building on Dr. Wanda Austin’s legacy of excellence and accomplishment, Steve Isakowitz has the right set of skills and experience—in government and industry—to lead Aerospace in a rapidly changing environment of constrained customer resources, challenging threats, and exciting new space technologies,” said Ambassador Barbara Barrett, chair of The Aerospace Corporation board of trustees.

The selection of Isakowitz was a unanimous decision by the board and its selection committee, which was chaired by the Honorable Michael Donley, former secretary of the Air Force, as part of the board’s planned succession process. The board was assisted in its search process by the executive search firm Spencer Stuart.

Donley said Isakowitz was selected as the top choice from an exceptional slate of candidates because he possesses a broad range of diverse experience in space management, science and technology, budgeting, and financial administration in both government and corporate environments. “Steve Isakowitz has demonstrated tremendous integrity and leadership in complex jobs that required both strategic vision and technical competence—qualities that are absolutely essential to ensuring Aerospace’s continued success,” said Donley.

Austin started her career at The Aerospace Corporation in 1979 and has served as president and CEO since 2008.

“On behalf of the board and The Aerospace Corporation, I want to thank Dr. Austin for her more than three decades of service to Aerospace and the nation. A pioneer, innovator, and mentor, Dr. Austin led Aerospace with great vision and capability,” Barrett said.

“I am honored to have had the privilege of leading this great Aerospace team as we delivered 100 percent mission success to every customer,” Austin said. “Steve is a proven leader across the space enterprise. I am confident that we will transition seamlessly and the organization will be positioned for even greater success.”

“I am extremely excited to be leading this extraordinary organization as we develop solutions, innovate, and continue to deliver mission success for all of our customers,” Isakowitz said. “Technological progress, global competition, and security threats are all increasing at rates unparalleled in the history of the Space Age, and I look forward to collaborating with customers and the talented Aerospace team to tackle the important challenges of the 21st century—which will surely be known as the century of space.”

Isakowitz served as president of Virgin Galactic from 2013 to 2016 and as its chief technology officer from 2011 to 2013. At Virgin Galactic, Isakowitz had broad leadership responsibilities, which included the development of privately funded launch systems, human spaceflight vehicles, advanced technologies, and other new space applications. Previously, he held a wide variety of senior engineering, business, and management roles across the private and government sectors, including positions at NASA, the Office of Management and Budget, the Intelligence Community, and the Department of Energy.

Paper-Thin Spacecraft Could Take Out the Trash in Space

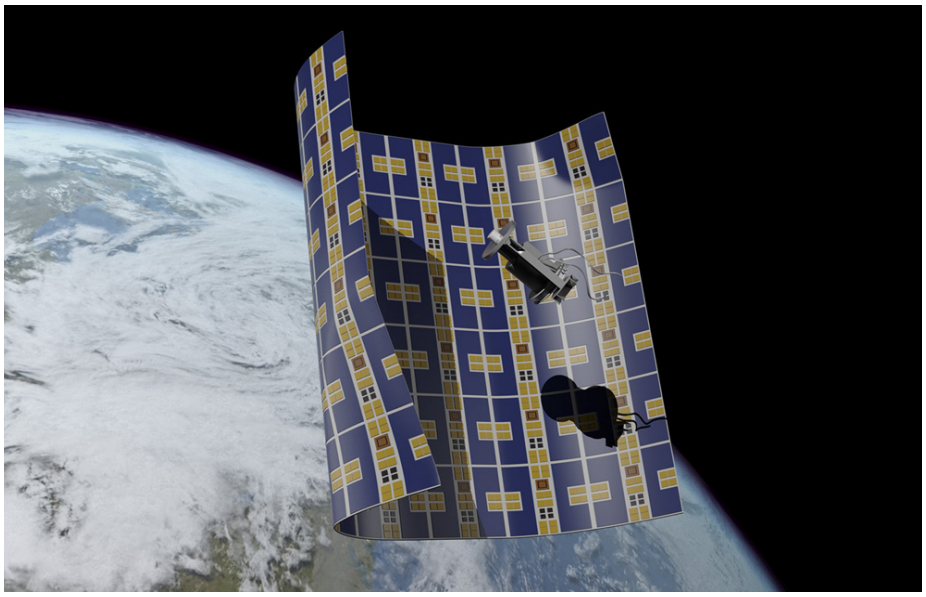
by Laura Johnson
June 06, 2016

NASA has awarded Aerospace a grant to investigate the possibility of developing an extremely thin spacecraft that would wrap around debris and remove it from Earth's orbit.

The innovative concept, called Brane Craft, is a 1-meter square spacecraft that is less than half the thickness of a human hair, and therefore exceptionally light, maneuverable, and fuel efficient.

"The Brane Craft concept is based on the one-dimensional compression of a complete spacecraft and upper stage into an essentially two-dimensional object in order to maximize power-to-weight and aperture-to-weight ratios," said Dr. Siegfried Janson, the lead investigator on this project.

If you have trouble wrapping your brane, er brain, around the concept, think of the spacecraft as a large piece of high-tech plastic wrap zipping through space and enveloping flying garbage.



An artist's conception of Brane Craft about to capture a piece of space debris. (Graphic: Joseph Hidalgo)

The Brane Craft is one of 13 ideas that were picked for the NASA Innovative Advanced Concepts (NIAC) program, which, according to NASA, "nurtures visionary ideas that could transform future NASA missions with the creation of breakthroughs — radically better or entirely new aerospace concepts."

NIAC provides $100,000 for nine months of research, with the possibility of another $500,000 for two more years if the results are promising.

Janson's idea for the Brane Craft is definitely cutting-edge, and it could provide a solution to a difficult problem—how to get rid of all the orbital debris that could harm active spacecraft.

Janson had previously considered a concept called the Distributed Orbital Garbage Sweeper (DOGS). DOGS would consist of many small satellites sent to "fetch" individual pieces of orbiting debris and bring them down to burn up in the atmosphere. The problem was the cost.

"Sending conventional spacecraft, even CubeSats, to each of the thousands of 10-cm or larger debris objects for active deorbiting is prohibitively expensive," Janson said.

Undaunted, Janson, who has worked in the field of small satellites for about 20 years, decided to go even smaller, at least in mass, with the Brane Craft.

To put the mass in perspective, a GPS IIF satellite weighs about 1500 kg, and a standard CubeSat is about 1 kg. The Brane Craft would only weigh about 50 grams.

The 30-micron-thick spacecraft would have a very high thrust-to-weight ratio, and would be capable of traveling long distances, which opens up other possibilities beyond just the removal of space debris.

"Brane Craft prospectors could land on any near-Earth asteroid, Phobos, Deimos, a wide variety of main belt asteroids, or orbit Mars or Venus, and return," Janson said. "Brane Craft could access just about any orbit within cis-lunar space [between Earth and the moon] several times, with propellant to spare."

It sounds great in theory, but obviously there are a number of engineering challenges associated with actually creating a flat spacecraft.

Janson has identified a number of current technologies that he believes could adapted for the Brane Craft, such as thin film solar cells and electrospray thrusters to propel the craft through space. To allow the Brane Craft to change shape, he is

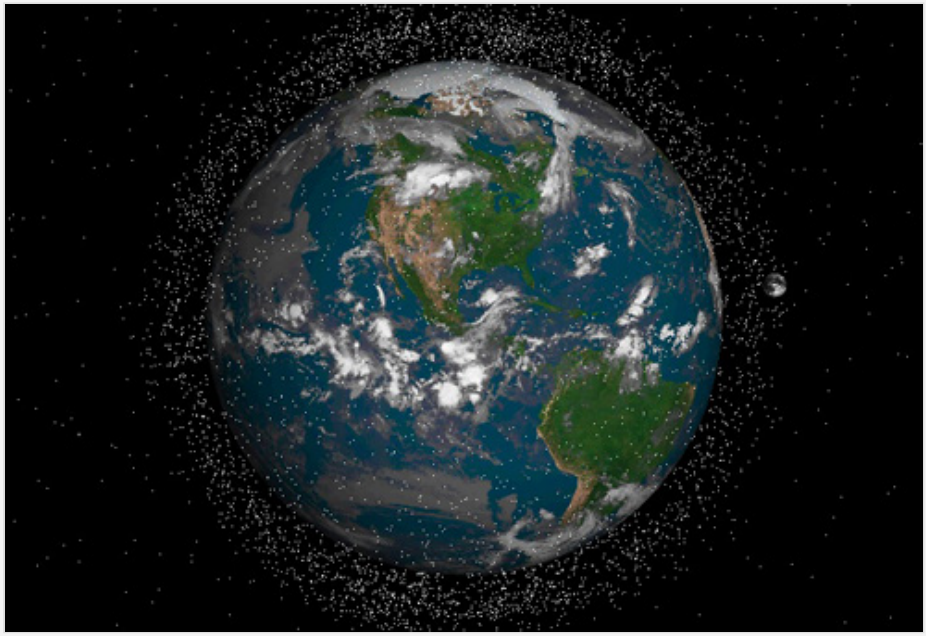
considering electrostatic polymers that will contract like muscles when a voltage is applied. He'll also be investigating thin film transistors, super flat cameras, and more.

"This whole exercise is to see: can I get everything that I need for this spacecraft to fit on a thin sheet?" he said.

That's what he will spend the next nine months researching. If successful, the Brane Craft project could provide a method of cleaning up the plethora of junk around the Earth, not to mention a really cool spacecraft with other potential uses.

According to NASA, "NIAC projects study innovative, technically credible, advanced concepts that could one day 'change the possible' in aerospace."

The Brane Craft project aspires to do just that.



A graphic representation of the debris orbiting Earth, created with Aerospace's Satellite Orbit Analysis Program. (Graphic: John Coggi)

REBR-W2 Fails to Send Data During Fiery Ride to Earth

by Heather Golden
June 22, 2016

The Reentry Breakup Recorder-Wireless 2 finally returned home today, but failed to send data as the Cygnus cargo craft burned up in the atmosphere.

The year and a half in space may have proved too much for the REBR-W2, which was designed for a relatively short duration mission on orbit.

While it may have collected the data from various wired and wireless sensors installed in the Cygnus, the Iridium satellite, which uploads data sent from the REBRs to a website that can then be accessed by Aerospace scientists, never received the data from the REBR-W2.

The Cygnus spacecraft with the REBR-W2 aboard leaves the International Space Station on June 14. (Photo: European Space Agency/NASA)

"The return of data from REBR-W, and the REBR predecessors, is highly risky," said Dr. Mike Weaver, director of the Fluid Mechanics Department and project manager for REBR-W. "For the previous REBRs, we received data from three out of four reentries. For REBR-W, it has been on orbit for a year and half, and we don't know what ionizing radiation events may have occurred to upset our electronics. Even without that unknown, the reentry breakup process is like a hypersonic train wreck – very violent.

"We are confident that REBR-W2 had plenty of battery life remaining, and that was definitely not a problem," he added.

The Cygnus, an Orbital ATK cargo craft, was released from the International Space Station Tuesday, June 14. Cargo crafts carry supplies to the ISS and carry away trash and other refuse for disposal during controlled, destructive reentries into the South Pacific Ocean.

The REBR-Ws are designed to collect and transfer reentry data from vehicles returning to Earth from space. They measure hull

temperatures at four locations, tumble and breakup dynamics, pressure changes, structural frequency response, and speed changes. They essentially function as a black box, and are designed to survive the breakup on the host vehicle during its reentry. It then “phones home” while still falling to Earth and sends all its data to an Iridium satellite orbiting space, which then uploads the data to a website. This data is downloaded and used to validate the results from simulations done with models.

“We use physics-based models to predict the trajectory, the heating environment, the temperature changes, how the vehicles come apart, and how many pieces can survive reentry,” Weaver said. “We need to be able to compare predictions with actual results. We can compare the models with data collected from ground testing, but that doesn’t capture all aspects of reentry. All this data can give better understanding of what is happening.

“We’ve flown four REBRs before and collected dynamics data from three; we were the first to do that. Aerospace is a leader in that area,” he added.

REBR-W2 installed in the Cygnus cargo spacecraft. (Photo: NASA)

The REBR is the predecessor of the REBR-W, which has the additional capability to record and collect data through both wireless and wired external sensors, a benefit not included with the original REBR.

Aerospace, through its connection to the Air Force’s Space and Missile Systems Center, is responsible for assessing the risk for all Department of Defense missions to and from space, and part of that assessment includes reentries and space debris. Because of Aerospace’s work with REBRs, funded by the Air Force, NASA contracted Aerospace to produce a series of REBR-Ws to validate reentry models in anticipation of the ISS eventually coming back to Earth. The DoD’s Space Test Program provided integration and safety support for the REBRs and REBR-Ws.

The REBR-Ws record the internal events surrounding a reentry breakup. What completes the picture is an external, visual record of those same events.

The SETI Institute, which partners with NASA Ames to support scientific and technical missions, was onsite in a plane that took off from New Zealand, watching for the reentry and documenting what they saw. The SETI Institute, which adopted its name from the collective term for the scientific search for extraterrestrial intelligence and life, has interests in objects reentering the Earth’s atmosphere.

“SETI Institute is looking at the building blocks for life, astrobiology, and likes to observe reentry and characterize the types of temperatures involved,” Weaver said.

Although the REBR-W2 failed to send any data to the Iridium satellite, the observation campaign was a complete success, Weaver said.

Half the funding for this observation campaign came from Aerospace, and the Federal Aviation Administration provided the other half, as they also have a need to assess reentry risks for commercial spacecraft. The plane carried twelve researchers from around the world, including Janna Feeley from Aerospace. Aerospace’s Dr. Bill Ailor will lead Aerospace assessment of data returned from the plane.

Weaver said he and his team had hoped to collect details from inside Cygnus with REBR-W2 and from outside with the help of SETI Institute. Had the REBR-W2 been successful, it would have been the most comprehensive coverage of reentry breakup ever, he said.

Voyage to Space

The second REBR-W’s journey, which was supposed to be short and sweet, instead turned into a saga spanning over a year and a half, far longer than the anticipated couple of months.

The current REBR-W, dubbed REBR-W2, replaced the original REBR-W1 after the explosion of the Antares launch vehicle in October 2014. Aerospace had a replacement built, tested, packed up, and off to NASA two short and frantic weeks later.

The REBR-W2 finally made it up to the ISS in January 2015, and was scheduled to return on the ATV-5 at the end of February. But, four days before the European ATV-5 was scheduled to depart ISS, one of its three power systems began to fail, and the European Space Agency decided to change from a shallow reentry to a steep reentry to avoid the risk of the surviving debris crash-landing in populated areas. The REBR-W2 would have to wait for another host vehicle to reenter the atmosphere.

“ATV-5 was to fly a shallow reentry to mimic that of ISS when it is eventually de-orbited,” Weaver said. “A steep reentry was less useful to NASA to validate models, but also REBR-W2 software is expecting an ATV-5 shallow reentry and planned engine

burn characteristics. There are ATV-5 events used to trigger REBR-W responses; the REBR-W software would not behave properly on an ATV-5 steep reentry. We had to rapidly evaluate our options, and decided to keep REBR-W2 at ISS to wait for an appropriate reentry opportunity."

Aerospace and NASA assessed possibilities for another seven months, when NASA decided to put all ISS reentry experiments indefinitely on hold, and gifted REBR-W2 back to Aerospace to do with it what Aerospace and DoD Space Test Program chose. Promising discussions had already been held with Orbital ATK for use of their Cygnus as the host vehicle. With a relatively small investment of new funding from the Air Force, Aerospace focused REBR-W2 on achieving DoD model validation objectives.

After going over the programmed algorithms in great detail, with valuable insight by Aerospace's Dr. Brian Hardy, it was determined the Cygnus would be a viable solution with only minor modifications to its original trajectory, which Orbital ATK made with no interference to their normal operations, Weaver said. The only change to the REBR-W2 system itself was sending a replacement temperature sensor up with the Cygnus when it launched to the ISS in March of this year because the original sensor already with the REBR-W2 in space would not fit anywhere useful in the new host vehicle.

But this mission would not be possible without the man on the inside–the astronaut living in the ISS who installed the REBR-W2 in the Cygnus and activated it Monday, June 13.

"The astronaut doing all the work on ISS was Jeff Williams," Weaver said. "He reviewed our crew procedures and REBR-W overview, then installed and activated the REBR-W2 and its external sensors. Inside Cygnus before launch, astronaut Tom Marshburn participated in a fit check, alongside Aerospace's Geoff Maul, and even selected a couple sensor locations for us."

"And then we were ready for this mission," he added.

Aerospace Investigates Methods of Drone Detection

by Laura Johnson
June 09, 2016

It's a bird, it's a plane … it's a drone?

Businesses, government agencies, and private individuals all have reasons for wanting to know what is flying over their property and why.

An Aerospace team has been investigating different ways to detect and assess drones in flight using 3-D tracking, as well as acoustic and infrared sensors.

The company had previously done research on motion-tracking algorithms and 3-D visualization, so "the team quickly adapted those technologies for the drone problem," said Dr. Randy Villahermosa, the head of the Research and Program Development Office at Aerospace.

Dr. Edward Laag adjusts one of the instruments used to detect drones. (Photo: Lester Chung)

The team of researchers, led by Val Vaughn, has completed two field tests in which they used their instruments to collect data on drones in flight.

Combining input from several cameras, they can create a real-time 3-D track of a drone flying by, which enables them to determine the position, speed, and direction of the vehicle more accurately than with a 2-D video.

By analyzing the flight pattern, they hope to be able to identify the type of drone and determine whether it is carrying something. They may also be able to tell if the drone is flying under manual control or GPS control, or if it is out of control and liable to crash.

The cameras themselves are consumer-grade, of a type that a business might already be using for perimeter security. Aerospace's methods of data processing attempt to glean as much information as possible from this type of standard equipment.

To address drone detection in the dark, the team set up some infrared cameras as well, and collected data with those.

One of the cameras collects footage of the drone and sends it to the on-site computer to be converted into a real-time 3-D track. (Photo: Lester Chung)

One thing they investigated is if they can determine how long a drone has been flying before it reached the camera—in other words, how far away it came from. An infrared camera might be able to pick up a difference in temperature depending on how long the drone has had its motor running.

They also set up microphones to collect acoustic data from the flying drones. Different types of drones make different sounds and they are attempting to detect and identify them based on their signature.

The goal, using all this equipment, is to rapidly identify drones and collect as much information as possible to determine their intent. This would allow security personnel to decide what action, if any, is necessary in response.

The team isn't stopping there, however. They have also considered mounting some of this technology on drones.

The team monitors the performance of their instruments as they fly drones by. (Photo: Lester Chung)

"It's part of a broader strategy to use the motion-tracking algorithms and 3-D model generation methods that we've developed to first track drones (for counter-drone), and then transition to tracking objects based on video taken from a drone," Villahermosa said. "Power line inspections, security perimeter patrols, search and rescue, and autonomous navigation are some of the applications we're exploring."

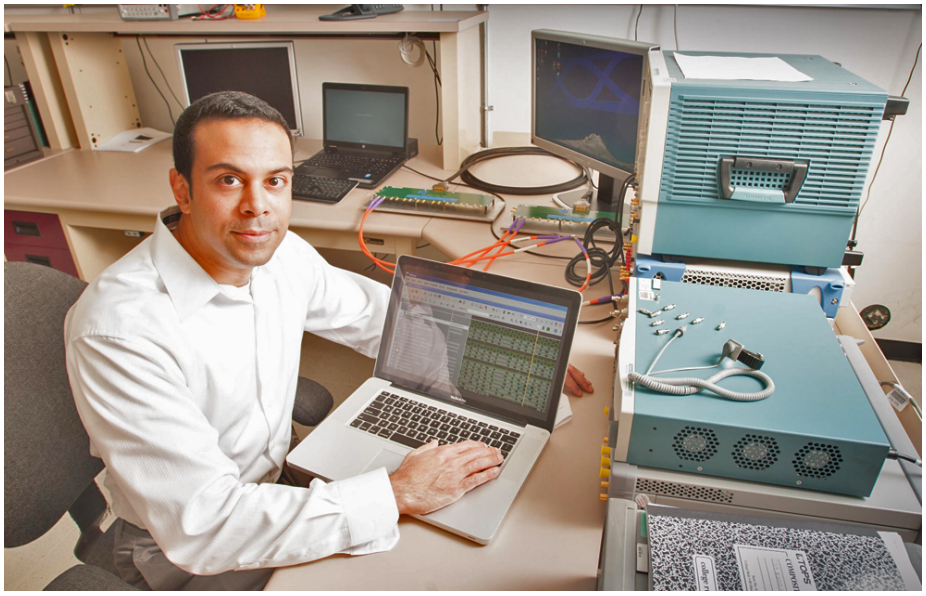
Clearly, the technology has wide application, and Aerospace is poised to explore its many uses.

New Cybersecurity Section Protects Against Hardware-borne Threats

by Heather Golden
June 02, 2016

There's a new cyber sheriff in town.

Hardware and Embedded Cyber (HEC), a recently created section in the Cyber Security Subdivision within the Communication and Cyber Division at Aerospace, fulfills the corporate need to comprehensively address the hardware side of cybersecurity.



Vikram Rao, manager of Hardware and Embedded Cyber, at work in El Segundo. (Photo: Eric Hamburg)

This section is especially vital now, when only about 2 percent of all application-specific integrated circuits (ASICs) used in National Security Space systems come from Department of Defense certified trusted foundries, and the U.S. is having to increasingly rely on foreign-owned or offshore foundries to produce integrated circuits, said Vikram Rao, manager, HEC. The major concern is the increased risk of Trojan horse programs imbedded into these circuits coming from offshore foundries.

"When it comes to cybersecurity, many programs focus first on software or network security, while the hardware security area receives relatively little attention," Rao said. "A recent example of this globalization is the sale of IBM's semiconductor foundry to United Arab Emirates-owned Global Foundries. And that's just the tip of the iceberg; hardware Trojan horse, counterfeit chips, reverse engineering, hardware 'backdoors' and breaking encryption via side channel attacks have all made the headlines in recent years. These are all very real hardware security threats to our programs."

The types of problems these risks pose are, for example, that the watchdog functions of ASICs could be compromised, leading to decreased reliability, denial of service, or catastrophic failure; unknowingly incorporating counterfeit parts that pass functional testing, but end up having much shorter lifespans; and compromising the bitsteam encryption that normally protects field programmable gate arrays (FPGAs) from reverse engineering could expose sensitive design information.

"These are just a few of the scenarios that can take place if we don't preemptively address hardware security threats," Rao said. "And, while it's true that some of these threats require physical access to a device, I think recent events have demonstrated that the insider threat is very real, making a trust but verify approach prudent."

The HEC is currently comprised of seven Aerospace members, who were chosen to represent a diverse skill set within the hardware security area, including expertise in the security aspects of these various circuits, gate arrays, embedded systems, microcontrollers, firmware, and cryptography.

The main functions of the team are to advise programs and contractors on protecting against hardware security threats, including providing best practice recommendations for all phases of the integrated circuit lifecycle, from design and manufacture to end of life; hardware security design/process audits and vulnerability/risk assessments to analyze contractor design flow, hardware, processes, and analyses for potential vulnerabilities or other issues, and developing risk assessments; and, finally, performing independent hardware security research, including exploiting, detecting, and mitigating hardware security vulnerabilities.

The team is currently working to assess bitstream encryption vulnerabilities on FPGAs, as well as fault injection vulnerabilities on embedded processors. One of their research projects in the works involves the use of power analysis to detect a hardware Trojan horse on FPGAs. They are also exploring work in the civil and commercial area, including vulnerabilities in Internet of Things, automotive, and infrastructure technology like smart grids, smart meters and nuclear power plants.

World’s Largest Rocket Launches Gigantic Satellite

by Randy Kendall
June 13, 2016

Following a several-month hiatus, the Delta IV team kicked off a busy summer with the launch of a national security spacecraft onboard a Delta IV Heavy vehicle this past Saturday, June 11, from Cape Canaveral’s Space Launch Complex-37.

After being stymied by weather throughout the day on Thursday, the team executed a flawless countdown Saturday and launched at the opening of the window at 1:51 p.m. ET (10:51 PT). Thundering into the sky on more than 2 million pounds of thrust, this was the ninth flight of the Delta IV Heavy, which is the most powerful operational rocket in the world.

“All of our national security launches are important, and this one was absolutely critical. I’d like to thank all the members of the integrated team who worked so hard over the last several months to ensure the success of this mission. I’d especially like to acknowledge the contributions of the long-time Delta IV Principal Director Heinz Butner, who is retiring after this launch. Heinz has been with the Delta IV program from the beginning, supporting all 32 Delta IV launches, and has made innumerable contributions to the success of the program and the security of our nation.”

Next up for the Evolved Expendable Launch Vehicle (EELV) program is the Atlas V/MUOS-5 launch on June 24, the first of five more national security space launches in the next five months.

Editor’s Note: Randy Kendall is Aerospace vice president of Space Launch Operations.

The Delta IV Heavy rises into the midday Florida sky on Saturday, June 11. (Photo: United Launch Alliance, LLC)

Atlas Lifts Huge Navy Satellite to Orbit

by Randy Kendall
June 24, 2016

The Atlas V stands out against the setting sun at Space Launch Complex-41 at Cape Canaveral Air Force Station. (Photo: United Launch Alliance, LLC)

An Atlas V 551 rocket successfully launched the fifth Mobile User Objective System (MUOS) satellite for the U.S. Air Force and U.S. Navy on Friday morning, June 24, from Space Launch Complex-41 at Cape Canaveral Air Force Station in Florida.

The launch occurred at the opening of the window at 10:30:11 a.m. ET on a beautiful clear day, after a very quiet countdown operation. This countdown operation was almost the opposite of the Delta IV national security launch a few weeks ago – it couldn't have gone smoother.

The MUOS-5 satellite is one of the largest satellites launched by the Atlas V, and is the final satellite in the MUOS constellation. The MUOS system provides 10 times more capacity than the legacy system, allowing users seamless beyond-line-of-sight communications around the world.

Augmented by five strap-on solid rocket motors, the Atlas V 551 produces almost 2.5 million pounds of thrust at liftoff – even more than the much larger Delta IV Heavy, although the Delta IV Heavy can lift more mass to orbit because the three large liquid cores thrust for a longer time.

This launch also continues a remarkable pace of operations, representing one of the most active times in launch at Cape Canaveral in recent history, with four Evolved Expendable Launch Vehicle (EELV)-class launches in less than one month. It started with the Falcon 9 Thaicom launch on May 27, followed by the Delta IV national security launch on June 11, and the Falcon 9 ABS / Eutelsat on June 15. The busy summer isn't over yet, though, with AFSPC-6, SBIRS-GEO, WGS-7, and a national security mission all in the queue for EELV over the next four months. In addition to the EELV program launches, there are also two non-national security space Atlas V launches, and up to eight Falcon 9 launches during this time.

This was the 63rd consecutive successful Atlas V launch and the 108th successful United Launch Alliance launch.

Editor's Note: Randy Kendall is Aerospace vice president of Space Launch Operations.

Austin Announces New Vice President and Presents Diversity Award

by Lindsay Chaney
June 14, 2016

In her final CEO's Report to Employees, Dr. Wanda Austin announced a new vice president and chief human resources officer, the winner of this year's Program Recognition Award, and presented the 2016 Excellence in Diversity Award, in addition to recapping company highlights of the past quarter.

Before starting her report, Austin asked the audience in the packed El Segundo Titan meeting center to observe a moment of silence in memory of last Sunday's Orlando shooting victims. I "urge you not to give in to the fear and divisiveness these types of attacks are designed to incite," Austin said. "Now is the time to come together, as a country, unified across all backgrounds, races, sexual orientations, and religions to support one another during this very challenging time."

Moving on to company news, Austin said the board of trustees last week approved the selection of Heather Laychak as the new vice president and chief human resources officer. She will assume her new role on July 11. Most recently, Laychak was senior director of human resources at Mattel. She also previously spent more than 10 years working in senior HR and talent-

acquisition positions at Northrop Grumman.

Laychak will take over for Charlotte Lazar-Morrison, general manager of Human Resources, who is retiring this summer after 35 years with the company.

Austin noted that the board is continuing its work on the selection of the next CEO, and promised that employees will be notified as soon as the board has made its decision.

At the board meeting last week, the Evolved Expendable Launch Vehicle Program Operational Launch Team was honored with the 2016 Program Recognition Award. The selection was based on the team's exceptional performance over the last 14 years, which includes the launch of 58 national security space payloads and 34 civil and commercial missions. This unprecedented string of successes is the direct result of the hard work and attention to detail by a very broad team of experts from the program office, ETG, and independent review teams. A recognition event for the team is being planned for August.

Dr. Wanda Austin presents Kimberly Locke with the Excellence in Diversity Award. (Photo: Elisa Haber)

Also at last week's board meeting, Heydy Arias received the first Dr. Wanda M. Austin Science, Technology, Engineering, and Mathematics Scholarship, which is part of The Aerospace Corporation's STEM Endowment. Arias, a senior at Montebello high school, will receive a $10,000 scholarship toward her expenses at UCLA in the fall, with an option for $10,000 during each of the following three years, for a total scholarship grant of $40,000. She is a straight-A student who plans to become a math teacher.

The 2016 Excellence in Diversity Award went to Kimberly Locke, a communications specialist in the Corporate Communications and Public Affairs Division. The award was created in 2004 to recognize individuals whose contributions and behavior demonstrate exceptional support of Aerospace's corporate focus on diversity through teamwork, competitiveness, excellence, productivity, and quality innovation.

Heinz Butner, a member of the Program Recognition Award team, watches the CEO Report. (Photo: Eric Hamburg)

Locke was cited by the Diversity Awards Committee for "extraordinary and continuous commitment to the advancement of diversity."

Austin noted that Locke has volunteered time over the years to support diversity at Aerospace by increasing Native-American representation at the company, and by creating awareness within the Native-American community about Aerospace and its career opportunities.

Locke, whose heritage is Native-American Cherokee, served as the first president of the Aerospace American Indian and Alaskan Native Council from 2009 through 2015.

In her award reception remarks, Locke said that Austin's "commitment to today's future leaders through consistent support of education and diversity and inclusion — in essence leading by example — has been an inspiration to me." She added that the "Aerospace environment of offering events and activities that highlight the contributions of so many diverse groups, and of encouraging education and outreach, have challenged me to explore ways to become more involved with the corporation and in my community."

In other company news, Austin mentioned two new contracts negotiated by Vaeros, the civil and commercial operations group of Aerospace. One is a task order with the National Oceanic and Atmospheric Administration and the other is a NASA task order, worth $10.8 and $2.5 million respectively.

She also reported that a national security agency has asked Aerospace to establish a "Future Ground Facility" on the Chantilly campus. The facility will be a testbed and demonstration center to explore new techniques to use data from existing and planned spacecraft, and to test architectures for future ground systems. The facility is expected to open in August.

At the end of her report, Austin took a few minutes to discuss the topic of leadership and her new book on the subject, Making Space: Strategic Leadership for a Complex World.

Austin Shares Leadership Principles in “Making Space”

June 14, 2016

At the end of her final CEO’s Report to Employees, Dr. Wanda Austin took a few minutes to discuss the genesis of her book, Making Space: Strategic Leadership for a Complex World.

Austin explained that a couple years ago, as she began thinking ahead to her retirement, she realized that she wanted to share some of the valuable leadership lessons she learned at Aerospace. Her goal, she said, was simple: “to write down basic principles about leadership that aided me during my career, whether learned through success, failure, or through the advice and experience of mentors and collaborators.”

Austin said she believes very strongly that “each and every one of us, regardless of rank or position, has the potential to be a leader. She went on to say, “it is essential that we make the most of our individual talents in order to inspire greatness in others.”

Three observations on successful leadership that Austin said are applicable in work and in life in general are:

1. Leaders must be able to anticipate and respond to change.
2. Leaders must prepare physically and mentally to determine the way forward and to execute the actions necessary to achieve the goal — have a plan, measure progress.
3. Leaders have an obligation of service; to make those around them strong and confident so that they are in fact developing their successors, the next generation of leaders — work on your bench.

Every employee will receive a copy of the book, which is being distributed this week. Each book has a bookplate with Austin’s signature, provided in lieu of a handwritten autograph.

Unfortunately, there are not enough copies to provide extras for friends and family. However, a Kindle version of the book is available at Amazon.com.

Charoensub, Haque Named Liang Awardees for 2016

by Heather Golden
June 16, 2016

Hamid Haque and Stephanie Charoensub were honored as this year’s Dr. Alexander C. Liang Asian Pacific American Achievement Award recipients during a ceremony presented by the Aerospace Asian Pacific American Association Wednesday.

The keynote speech was delivered by Aerospace’s newest board of trustees member, the Hon. Heidi Shyu. Dr. Malina Hills, vice president, Space Program Operations introduced Shyu. Also attending were members of the Liang family; the family and friends of both 2016 recipients; and many of their Aerospace and Air Force colleagues.

Haque is a systems director for the Space Based Infrared System (SBIRS), Space Based Sensing Division, Space Program Operations; and Charoensub is an IT planning and analysis staff member in the Business Operations Systems and Services Department, Enterprise Information Services (EIS).

Heidi Shyu, left, and Malina Hills share a laugh before Shyu's keynote address. (Photo: Elisa Haber)

The annual award recognizes employees who demonstrate the same characteristics as the event's namesake, who is remembered as a great mentor, teacher and friend. The award was renamed in 2010 in honor of Liang, who was a general manager of the Vehicle Systems Division, Engineering and Technology Group, and a champion for Asian Pacific Americans working at corporation. The awards committee may select one recipient from members of the technical staff and one non-MTS recipient each year.

Hamid Haque (Photo: Elisa Haber)

"Dr. Liang was a role model not only for Asian Americans, but for everyone who strives to make an impact in this nation and leave a lasting legacy," Shyu said during her keynote speech. "He is deeply admired for his technical accomplishments, as well as his community involvement.

"As an Asian American, I learned to treasure diversity in the workplace," she added. "Diversity in experience, in perspective, in background, in age, in race and gender, in nationality. The sum of those diverse perspectives is far superior to a single homogenous idea. As demonstrated in nature, diversity results in a stronger breed."

Haque was selected for the annual award not only for his efforts at Aerospace with the SBIRS program, but also for his activities outside of Aerospace with various charities, including those supporting domestic violence victims and religious community organizations. He is also a private business owner and is active within his Chamber of Commerce helping to foster economic growth in his community. He cited his parents' many examples of sacrifice, compassion, social responsibility, and constant pursuit of learning as the keys to his success in life now.

Stephanie Charoensub (Photo: Elisa Haber)

Charoensub was selected in part for her time spent helping enrich the company's internal community. She has been a participant in the Aerospace Rotation Program, the 5-on-5 mentoring program, and the Early Career Development Network. She currently serves as the vice president of the Aeroscrappers Club, and previously served as the AAPAA secretary. Charoensub remarked on the vital role mentoring has played in her career, from the everyday examples set by those around her to the formal programs she's had the opportunity to engage with.

Landis Becomes Aerospace Fellow

June 03, 2016


David Landis

David Landis has been promoted to Aerospace Fellow in the Electronics Engineering Subdivision (EES), Electronics and Sensors Division, Engineering and Technology Group.

In this position, Landis is serving as a lead technical expert in electrical power systems and electronics and is providing significant mentoring to less experienced engineers.

Landis originally joined Aerospace in 1990, left in 1998, and returned in 2004. In his previous position, Landis was a senior project leader in the Electronics and Power Systems Department, EES. Landis has supported a wide variety of critical programs, providing valuable insight and expertise in power systems, analog electronics, and failure investigations. He also has extensive industry experience in designing power systems and components for both Boeing and Martin Marietta.

Landis earned a bachelor of science degree in electrical engineering from California State University, Los Angeles, and a master of science degree in electrical engineering from California State University, Fullerton.

Awards and Recognitions, June 2016

by Gail Kellner
June 08, 2016

Aerospace employees frequently earn recognition for their professional accomplishments. This Orbiter feature will acknowledge 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.

Mark Altman, Dr. Anil Gupta, Arthur Hutchinson, Jim Johansen, and Justin Yoshida

A team of five Aerospace employees received a NASA Team Award for their GPS Space Service Volume Study Analysis of Alternatives.

The recipients were Mark Altman, senior engineering specialist, Communication Payload Implementation Office; Dr. Anil Gupta, senior project leader, Economic and Market Analysis Center; Arthur Hutchinson, project engineer, and Jim Johansen, systems director, both of the Advanced Programs and Analysis Directorate; and Justin Yoshida, senior project engineer, Systems and Technology Programs Directorate. The award was presented in March at NASA headquarters.

The certificate of recognition cited “distinguished leadership and technical contributions to NASA in support of refining the GPS III SSV to enable enhanced civil, military, and commercial space operations out to GEO and beyond.”

Roberta Gleiter

Women in Technology International (WITI) recently inducted Roberta Gleiter, Software Architecture and Engineering Department, into the 2016 WITI Hall of Fame.

The honors were established in 1996 to recognize, honor, and promote the outstanding contributions women make to the scientific and technological communities to improve society and business. The inductees are also acknowledged for demonstrating commitment to supporting and mentoring women and girls worldwide.

Gleiter was honored during WITI’s 22nd Women in Technology Annual Summit in San Jose June 5-7, along with four other inductees.

Dr. William F. Ballhaus, Jr.

The second annual William F. Ballhaus, Jr. Prize for Excellence in Graduate Engineering Research was awarded to Matthew Gilpin at USC’s Viterbi School of Engineering in May. This award is bestowed to the best doctoral dissertation.

Ballhaus was Aerospace’s president and CEO from September 2000 to December 2007.

Tim Abel Promoted to Principal Director

June 22, 2016

Tim Abel

Tim Abel has been promoted to principal director, Software Engineering Subdivision in the Computers and Software Division (CSD) of the Engineering and Technology Group.

In his new position, Abel is providing technical leadership for software systems architecting, engineering, development, and acquisition, processes and process improvement, and risk assessment and evaluation.

He joined Aerospace in 2003 as an engineering specialist in CSD. In his most recent position, Abel was the Global Positioning System Next Generation Operational Control System (OCX) chief engineer and systems director in the Navigation Division where he led the development of OCX.

Abel earned a bachelor of science degree in math, with a specialization in computing, from UCLA.

Ruths Attend National Museum of the U.S. Air Force Building Opening

June 09, 2016

Dr. Ed Ruth, chief engineer for Space Launch Operations, and his wife, Susan, senior project engineer in Alternate Launch Vehicles, were invited guests at the grand opening of the fourth building of the National Museum of the United States Air Force on Wright-Patterson Air Force Base near Dayton, Ohio.

Grand opening festivities were held on Tuesday, June 7, with the centerpiece exhibit in the new building being a restored Titan IVB rocket. The Ruths provided the museum staff with information about the Titan IVB rocket, in particular on materials used in the original rockets.

The museum staff had been collecting and storing parts of a Titan IVB since January, 2006, shortly after the Titan program ended. Restoration and assembly of the rocket began in February 2015 and continued into May of this year.

The Titan IVB is a gigantic launch vehicle, standing more than 200 feet high; each of its solid rocket motors weighs 75,000 pounds.

“The Titan IVB and the exhibit space around it will be crucial for telling the USAF space story,” said Dr. Doug Lantry, museum curator. “These exhibits are important because they illustrate what the Air Force has done in space to defend our nation, how those jobs were and are done and by whom, and how the science, technology, engineering and mathematics of space work in the context of national defense history.”

Dr. Ed Ruth by the Titan IVB exhibit at the National Museum of the U.S. Air Force. (Photo: Susan Ruth)

Rocket Men Ready to Launch a Thousand Ships

June 01, 2016

Jonathan Binkley, director of the Spacelift Telemetry Acquisition and Reporting Systems (STARS) facility in El Segundo, spent a recent Saturday at a booth sponsored by the Space and Missile Systems Center (SMC), where he helped children make and launch more than 1,200 paper rockets.

The booth was part of the Torrance Armed Forces Day Parade on May 21. Binkley also provided demonstrations to kids and their parents on rocket propulsion, orbits, satellites, types of rocket fuel, and other aspects of the space launch business.

Jonathan Binkley shows Lt. Gen. Samuel Greaves, commander of the Space and Missile Systems Center, a model of a rocket engine that was used for explaining rocket technology to kids visiting the SMC booth. (Photo: SMC)

June 2016 Obituaries

by Elaine Young
June 01, 2016

Sincere sympathy is extended to the families of:

Malcolm Clark, member of technical staff, hired Aug. 5, 1962, retired May 1, 1983, died April 2, 2016.
Joseph Clifford, member of technical staff, hired Aug. 6, 1963, retired July 1, 1994, died April 10, 2016.
Stanley Greenfield, member of technical staff, hired April 26, 1982, retired Jan. 1, 1991, died May 10, 2016.
John Krieg, member of technical staff, hired Feb. 14, 1961, retired May 1, 1990, died April 14, 2016.
Lynda Leatherman, administrative specialist, hired Jan.2, 1996, died May 9, 2016.
Jim Martinez, member of administration staff, hired Aug. 19, 1963, retired Feb. 1, 1994, died April 17, 2016.
May Peak, office of technical support, hired April 10, 1961, retired June 1, 1988, died April 27, 2016.
Carol Perkins, accounting clerk, hired Jan. 21, 1985, retired Nov. 1, 1993, died May 16, 2015.
Leo Stuart, budget administration, hired Oct. 15 , 1962, retired Jan. 1, 1988, died April 24, 2016.
Jesse Tillman, member of technical staff, hired Dec. 23, 1985, retired Sept. 1, 1996, died May 6, 2016.
Lawrence Zamos, member of technical staff, hired June 18, 1984, retired March 1, 2006, died May 6, 2016.

June 2016 Notes

by Elaine Young
June 01, 2016

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

Anibal Jaimes, on the recent passing of his grandfather, Jesus Jaimes.

June 2016 Anniversaries

by Elaine Young
June 01, 2016

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Engineering and Technology Group

Albert Leong, Linda Yocum

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Engineering and Technology Group

Allan Cohen, Enold Pierre-Louis, James Gidney Jr, Michael Meshishnek

National Systems Group

Floyd Fernandez

Operations and Support Group

Donna Avila, Gregg Gereaux, Rena Nelson

Space Systems Group

Barbara Hewett, Kenneth Anderson

Systems Planning, Engineering, & Quality

Wallace Somerville

30

Engineering and Technology Group

Robert Soranno, Scott Zechiel

Enterprise Information Services

Jeffrey Thomas

25

Engineering and Technology Group

Bessie McBride

Space Systems Group

Stephen Morrison

20

Engineering and Technology Group

Nicholas Tsacoumangos

Enterprise Information Services

C Jones

15

Engineering and Technology Group

Bounmy Chhouk, Brian Hardy, Jennifer Tanzillo, Khoa Lo, Michael Cavanaugh,

Stuart Kerr

National Systems Group

Kimberly Cornwell

Operations and Support Group

Brian Jett

Space Systems Group

Ray Gordon

Systems Planning, Engineering, & Quality

Angela Stephens

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Engineering and Technology Group

Brendan Foran, Bryan Guernsey, David Jackson, Janna Feeley, Jeremy Young, Joshua Cohen, Leroy Stokes, Loukas Papadopoulos, O'Brian Rossi,

Samuel Liberto, Yogita Shah

National Systems Group

Charles White, John Brownell, Richard Todd

Operations and Support Group

Anthony Luna, Brandon Kaneshiro, Madeline Smith, Robert Tereska

Space Systems Group

Bradley Aniya, Edson Rodriguez, Hung Ha, Lisa Jankovich, Mark Strub, Victor McGee

Systems Planning, Engineering, & Quality

James Schoener

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Engineering and Technology Group

Brett Bolla, Pedro Encarnacion, Rebecca Lin, Selwyn Khaw, Travis Driskell

National Systems Group

James Smith, Tim Tran

Operations and Support Group

Jerome Johnson, Martin Aguilar, Shawne' Raiford

Space Systems Group

Benjamin Likar, Sahar Maghsoudy-Louyeh, Thanh Tran

Systems Planning, Engineering, & Quality

Heywood Paul, Steven Taylor