AEROSPACE Orbiter

Print April Article Archive

Article Archive for April 1st to April 30th.
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Going Big With AeroReports

Posted April 30, 2013 · Article

Enjoy this video about AeroReports, a new application that will provide a streamlined consistent approach to managing Aerospace's technical documentation from start to finish.

Kids Find Much to Like at Aerospace

Elisa Haber

Kids eat the results from a demonstration on making ice cream with liquid nitrogen at the 18th annual Take Our Kids to Work Day at Aerospace.

Posted April 26, 2013 · Feature

Children and grandchildren of Aerospace employees watched demonstrations and participated in experiments and spacecraft simulations during the 18th Annual Take Our Kids to Work Day, held Thursday, April 25. The full-day event was hosted by the Aerospace Women's Committee.

All photos by Elisa Haber.


AEROSPACE

Second OPRA Presented at Annual Breakfast

Eric Hamburg

Dr. Wanda Austin presents the second Office Professional Recognition Award to Corey Baer.

Posted April 25, 2013 · Feature · By Heather Golden

Corey Baer, a familiar face on the El Segundo campus, became the second recipient of the Office Professional Recognition Award Wednesday, April 24, during the company's annual Office Professional Advisory Team breakfast.

Baer is a senior office assistant within Government Security Investigations. She can often be found at the A1 reception desk, diligently maintaining access security. Dr. Wanda Austin described Baer as "the corporation's first impression to customers, visitors, and employees when they arrive at our corporate headquarters."

Austin opened the morning's ceremony with a few words of appreciation for the group of more than 100 office professionals sitting at tables clustered around Titan IVA. She credited the corporation's successes largely in part to the crowd gathered before her.

"Everyone here, at every level, whether they're managers or members of the technical staff or support personnel, all know that the company simply could not function if it weren't for you," she said.

"There are hundreds of details that must be juggled daily," Austin added. "You preserve your organization's sanity, even when it seems it will cost you your own. Most amazingly to me, you do all of this with a smile and a positive attitude."

Austin then introduced Baer, a 22-year employee, as this year's OPRA winner and invited her on stage to receive her trophy. The award also included $5,000.

"This is a corporate award on par with the President's and Trustees' Awards, and the Program Recognition Award," Austin said. "It therefore recognizes an extremely high level of achievement."

Baer accepted the recognition on behalf of all of Aerospace's office professionals, saying it was an honor to do so. For her, the award was also confirmation of one aspect of her job that she already loves.

"I tell people all the time that I have the best job at Aerospace, because when I do my job well it's immediately obvious that you appreciate it," Baer said. "To be recognized at the corporate level for doing a job that I love is truly amazing."

She attributed her successes here to the string of "wonderful managers" she's had during her years here, saying they routinely pushed her out of her comfort zone and allowed her to "take the job to the next level."

Baer is the Access Control trainer for all the security officers and receptionists, maintains and updates all access procedures manuals and writes new security procedures as needed. She also helped design the security layout for the new corporate headquarters building and conducted the Annual Security Penetration Exercise, which tested Aerospace's security measures.

Austin said the exercise was "far beyond what's considered normal duties for her position."

"It's a job that I still love," Baer said. "Whether I am helping you to find your meeting room, signing in a visitor, updating a security procedure, or training a new security officer, my job is always interesting – it's a different experience every day."

Baer concluded by thanking a number of her family members, including her parents, Dr. Jack and Betty Anderson; her husband, Erik; and her children, Nikolas and Kayla, for their support.

Video of the Ceremony

Young Scientists Show Their Work at Herndon Science Competition

Posted April 23, 2013 · Article

The 36th annual Robert H. Herndon Memorial Science Competition was celebrated on April 11 on the East Coast and one week later on April 18 on the West Coast.

Middle and high school students displayed their scientific prowess with both experiments and essays on a variety of topics. Monetary prizes were awarded to winners.

Students also enjoyed tours of the Aerospace facilities, as well as a keynote speaker and award ceremony.

The West Coast keynote speaker was Dr. Kenneth Phillips, curator, California Science Center, for the Space Shuttle Endeavor's Journey to Los Angeles. Garnett Stowe, president and CEO of Stowe Strategic Services, was the keynote speaker on the East Coast.

Watch the video to see some highlights of the event. See below for a list of winners.

East Coast Competition Winners

High School Experiment

1. Kaelin Davis, Briar Woods High School, "Prosthetic Hand"
2. Makonnon Makonnen, T.C. Williams, "Engineering of Sound Dampening as a Technique to Reduce Duration of Sound"
3. Felix Ngako Tanyi, T.C. Williams, "Salt Water Conductor: The Effects of Temperature on Voltage Transfer"

Middle School Experiment

1. Sarkis Ter Martirosyan, Swanson Middle School, "How Ultrasonic Sensors Detect Objects Made From Different Materials"
2. Jamison Delgado/Stephen Tan, Gunston Middle School, "The Effect of Metal on Thermal Conductivity"
3. Tyla Holoman, Forcey Christian Middle School, "Robotics"

High School Essay

1. Eric Rothacker, Briar Woods High School, "Determining Objects Shape with Acoustic Location"
2. Jed Alcantara, Briar Woods High School, "The Effect of the Variance in Low Crested, Submerged Structure of a Tsunami Barrier on the Horizontal Inundation Distance of a Tsunami"

Middle School Essay

1. Kaela Peters, Irving Middle School, "Innovations Logic Gates and Nanotechnology"
2. Ibrahim Bholat, Irving Middle School, "Enterprise Mobility Management"

West Coast Competition Winners

High School Experiment

1. Palos Verdes Peninsula High School, "The Efficacy of Utilizing an Induced Magnetic Field for the Purpose of Recycling and Reusing Ag-Fe Nanoparticles in the Water Treatment Process"
2. Morningside High School, "Suppliment or Solution"
3. Sun Valley High School, "Vertical Aquaponics Rotating Greenhouse"

Middle School Experiment

1. Monroe Middle School, "Solar + Hydrogen = Sydrogen"

2. Dana Middle School, “Get a Grip”
3. Bert Lynn Middle School, “Sports and Its Robots”

High School Essay

1. Michael Konrad, Palos Verdes High School, “The Implications and Applications of Quantum Entanglement”
2. Jacqueline Garcia, Compton High School, “Lithium Ion Battery: From a Liquid Electrolyte to a Solid Electrolyte”

Middle School Essay

1. Tamara Tran, Manhattan Beach Middle School, “Robotic Surgery”
2. Kristella Jackson, Dana Middle School, “Exploring the Possibility of Colonizing the Red Planet”

Go Generic

Posted April 22, 2013 · Article

Learn how Anthem Blue Cross PPO participants can become better health care consumers. Watch this video to see how simple it is to Go Generic.

Aerospace Prints Rocket Motors in 3-D

Elisa Haber

Jerry Fuller, a senior research associate in the Mechanics Research Department, holds a helical star grain, printed in acrylic with a 3-D printer.

Posted April 17, 2013 · Feature · By Matthew Kivel

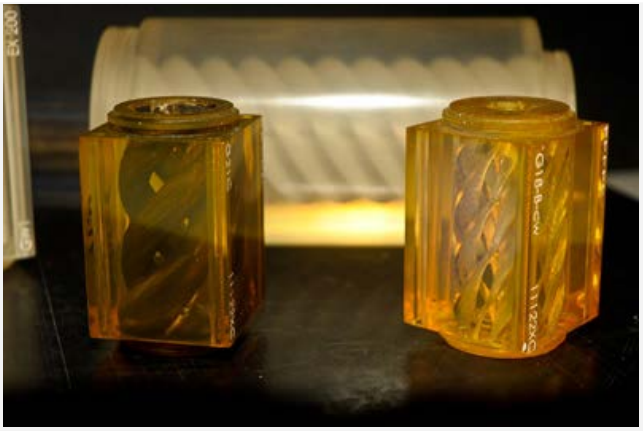
Over the past few years, Aerospace’s Jerry Fuller has worked as a developer of rocket fuel grains. His primary responsibilities include developing mechanisms and technologies for the corporation’s picosatellite program, and other mechanics research. But his work with fuel grains is gaining increasing attention, primarily because it utilizes a versatile method of production that is just beginning to come into its own — rapid prototyping.

Rapid prototyping — also referred to as Additive Manufacturing — is a group of technologies that use computers to make 3-dimensional shapes. This form of 3-D printing transforms 2-dimensional layers of raw material into a finished product that is capable of structural nuance and complexity that might otherwise be impossible with traditional production techniques. Currently, scientists and hobbyists alike are quickly introducing new materials and products to the technology. Everything, from tennis shoes to chocolate frosting to pieces of art and even cell-based, lifelike prosthetics, is being explored as a potential product of rapid prototyping. The technology seems primed to take off in a paradigm-shifting way that could influence any number of fields including manufacturing, retail sales, scientific research, and healthcare.

Primarily, Fuller has been utilizing rapid prototyping to develop efficient fuel grains for hybrid rockets. A hybrid rocket uses a motor composed of propellants that are in two different physical states — the fuel is typically a solid while the oxidizer is either a liquid or gas. Sometimes humorously referred to as “high-pressure tire fires,” hybrid rockets will often use rubber, plastic, or paraffin wax for fuel and oxygen or nitrous oxide as oxidizer. Fuller and his colleagues at Aerospace have been printing their own fuel grains, which employ a couple of interesting design adjustments, aimed at increasing efficiency.

“The standard techniques of production make it difficult to force the oxidizer and the fuel to mix together,” says Fuller. “But, if you can print the fuel, you can make any internal shape you want. And that gives you two things: It gives you an opportunity to create shapes that force the oxidizer and the fuel to interact. And it gives you a third dimension in which to create surface area. Surface area equals thrust.”

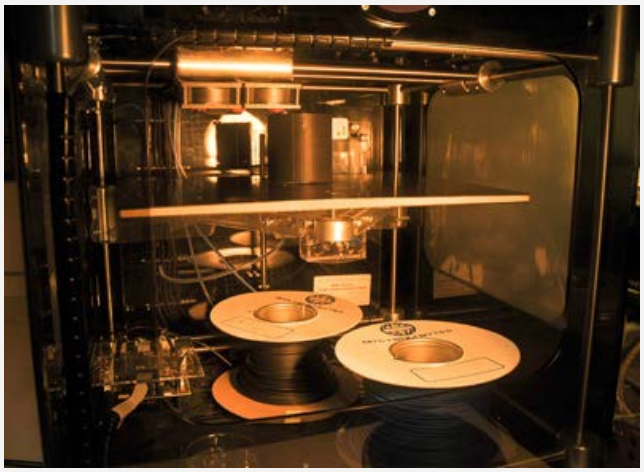
In the fuel grains that Fuller and his Aerospace team have developed, there are a selection of different shapes that have been explored, including a number of variations on the helix structure, a few star-grain designs and a coaxial grain with a combination of port shapes. The helix structure is used to increase



A selection of burned and unburned fuel grains manufactured with rapid prototyping technology. Photo by Elisa Haber

surface area and enhance the mixing of oxidizer and fuel without increasing the physical size of the grain. The increased surface area creates more time for the fuel and oxidizer to interact. A number of these fuel grain designs have been successfully tested in the Aerospace labs and the results confirm that rapid prototyping is a feasible method of production for fuel grains.

With rapid prototyping, many of the inefficiencies associated with hybrid rockets can be mitigated. As the designs are refined and tested further, it is likely that hybrid rockets will be used in situations beyond the launch. “People would like to use hybrid motors more for on-orbit applications,” says Fuller. “And that gets to one of the advantages of hybrids. Hybrids are motors that you can throttle and turn off and turn back on, so that’s really good for on-orbit applications because you can precisely tailor exactly where you’re putting the thrust and when. There are people currently developing small launch vehicles using hybrid rockets.”



A basic 3-D printer, located in the PicoSat laboratory at Aerospace. Photo by Elisa Haber

In its infancy, rapid prototyping was used to build models and approximations of products for reference and marketing purposes. As the technology improved, it became easier to make a fully functional part or product. For years, Aerospace has been pushing the boundaries of what rapid prototyping parts can do in a real world context. In 2006, Aerospace’s David Hinkley, senior projects leader, Mechanics Research Department, flew an elaborate, cold gas propulsion system on a MEPSI PicoSat, which marked the first time an rapid prototyping part had ever flown in space. Since then, the use of rapid prototyping parts in Aerospace’s PicoSat missions has become more and more prevalent.

In the coming years, Fuller believes that the aerospace industry will benefit greatly from rapid prototyping technology. “Spacecraft manufacturers often make very expensive things in small numbers of units,” says Fuller. “When you’re making small numbers of things and you don’t want to pay for tooling that you will never use again, rapid prototyping is perfect.” This need for complex, one-of-a-kind manufacturing exhibits a clear synergy with the rapid prototyping technology and bodes well for its widespread application in the near future.

Currently, rapid prototyping is at a critical juncture where it seems poised to leap into the mainstream as a major force in manufacturing. Websites currently exist where consumers can download design plans for a product and then print it in 3-D on a personal or rented printer. The scope of the technology seems almost limitless, but for now, it will take the foresight and ingenuity of those engineers and scientists on the front lines to push things forward in an effective way.

Space Symposium Focus is on Costs

Jessica Brown

Dr. Wanda Austin moderated a panel on mission assurance in a cost-constrained

Posted April 15, 2013 · Feature

How tight budgets will affect space systems was a theme throughout the 29th National Space Symposium (NSS), held April 8 – 11 at the Broadmoor hotel in Colorado Springs.

During the symposium, Aerospace leadership had an opportunity to meet with industry partners, as well as senior government and academic leaders.

Dr. Wanda Austin moderated a panel discussion on “Mission Assurance in a Budget-Constrained Environment.” Members of the panel consisted of Brig. Gen. Roger Teague, director of strategic plans, programs and analyses, Headquarters Air Force Space Command, USAF; Michael Gass, president and CEO, United Launch Alliance; Rob Strain, president, Ball Aerospace and Technologies Corporation; Gwynne Shotwell, president and COO, Space Exploration Technologies (SpaceX); and James Wade, vice president, corporate mission assurance, Raytheon.

environment at the National Space Symposium.

The Aerospace contingent gathered in front of the company display booth prior to opening ceremonies of the 2013 National Space Symposium. (Aerospace photo.)

Throughout the week, the Aerospace booth in the Lockheed Martin Exhibit Center was popular with visiting schoolchildren as well as symposium attendees. The booth featured a model of the Aerospace Reentry Breakup Recorder, which records temperatures, stresses, and accelerations a space object experiences as it enters the atmosphere and breaks apart.

The annual space symposium, which its sponsors bill as “the premier gathering of the global space community,” had lower attendance this year due to effects of sequestration.

Nygren Promoted to GM in Planning Post

Posted April 11, 2013 · Article

Todd Nygren

Todd Nygren has been promoted to general manager, Developmental Planning and Architectures Division, Systems Planning, Engineering and Quality.

In his new position, Nygren leads and supports the Space and Missile Systems Center in the design, development, and analysis of future space, ground, and launch system concepts to support the warfighter. Additionally, Nygren, who joined Aerospace in 1987 and had been a summer hire in 1985, is working to expand these efforts across the national security space enterprise.

His most recent assignment at Aerospace was associate general manager, Systems Engineering Division, where he led the division’s bicoastal efforts to support customers in space systems architecture and design, acquisition and planning, mission assurance, and system analysis and simulation.

Auroras Shed Light On Space Secrets

NASA/Goddard/Chris Perry

A sounding rocket carrying Aerospace instruments launches into the northern lights from the Poker Flat Research Range northeast of Fairbanks, Alaska.

Posted April 11, 2013 · Feature · By Heather Golden

The auroras are more than just spectacularly pretty. They are a window into space’s mysteries, a window that a joint team from NASA’s Goddard Space Flight Center and The Aerospace Corporation recently took advantage of, using a suborbital rocket mission named VISIONS.

Aerospace and NASA employees traveled to Poker Flat, Alaska, in early February to wait for the northern lights to begin their enigmatic dance across the night sky. They had a two-week window in which to wait for the perfect conditions before launching the sounding rocket into the red and green depths of the aurora borealis. While the lights appear fairly often, the team wanted a strong magnetic storm to maximize the data collection. They finally got their chance Feb. 5.

A bountiful partnership

The VISIONS project (VISualizing Ion Outflow via Neutral atom imaging during a Substorm) began as a proposal between the two organizations more than three years ago.

When the Goddard team set out to measure the solar winds present within the aurora, they reached out to The Aerospace Corporation for the

company's capability to measure charged particles, said Dr. James Clemmons, principal director, Space Science Applications Laboratory.

"Study is an important concern for any spacefaring nation. NASA is interested in learning about these, and so is Aerospace," said Clemmons, who was one of the handful of scientists from the Aerospace team to travel to Alaska. "We were looking at the drivers — the cause and effect — and NASA Goddard was looking at the effect only."

Among the rocket's instruments were two contributed by Aerospace — electromagnetic analyzers and the Rocket Auroral Imager, which was developed specifically for the VISIONS mission. The analyzers measured the energetic charged particle fluxes, and the imager photographed the aurora from space in four different wavelengths.

The VISIONS team stayed at this motel on the west side of Fairbanks. (Photo by NASA/Goddard/D. Rowland.)

Looking to the sky

The auroras are natural light displays created when energetic charged particles collide. They exist primarily in high latitudes, the most famous of which are the aurora borealis and aurora australis — the northern and southern lights, respectively.

These light shows exhibit some of the unique features found deeper in space. There, in the auroral wind, oxygen atoms get heated enough to escape Earth's atmosphere into outer space, at a fraction of the velocities normally needed overcome gravity.

"We wanted to know how and where are ions accelerated to escape velocities in the aurora zone below 1,000 kilometers, following a substorm onset," Clemmons said. "VISIONS explored low-altitude ionospheric sources of magnetospheric ions."

The Aerospace crew also hopes that understanding certain charged particles, which are not organically present on Earth, but are present elsewhere in space, will help them understand the effect these charged particles have on space equipment, and how engineers can guard the instruments against the sparks these particles can cause.

The auroras offer scientists a chance to learn about these phenomena from what is essentially Earth's backyard, without the time, cost and risk of a more involved, extensive mission traveling to other areas where these things are also present.

"It is a fantastic display, and a fantastic laboratory for space physics, in an accessible place," Clemmons said.

The rocket reached almost 470 miles above the Earth, and flew for 15 minutes before coming back down to the planet's surface and landing in the Atlantic Ocean.

"It was only 15 minutes, but it was a good 15 minutes," Clemmons said.

The next step

Although the team has just started scratching the surface of the data collected by VISIONS, they have high hopes for what they will discover.

Data collected and transmitted in that small 15-minute window gave the team enough information to keep them busy analyzing for the next year.

"We consider this successful. All our measurements worked well, and it looks like they are going to tell us something," Clemmons said.

To see more images of the launch and the auroras taken by both the team and by space and satellite enthusiasts, check out the NASA Goddard Flickr photostream at http://www.flickr.com/photos/gsfc.

Allen Compito Promoted to GM

Posted April 8, 2013 · Article

Allen Compito

Allen Compito has been appointed general manager, Electronics and Sensors Division, Engineering and Technology Group (ETG).

In his new position, Compito leads and coordinates a bi-coastal ETG organization that provides matrix support for sensor systems and electronics engineering and evaluation.

Compito's most recent previous position was principal director, Reconnaissance Systems Directorate, National Systems Group, where he led vehicle development, integration and test; on-orbit initialization, and post-IOC engineering support for a new national means space system. He has been with Aerospace since 1978.

Van Allen Probes Return Interesting Data, and They've Just Started

Image courtesy Johns Hopkins University Applied Physics Laboratory

An artist's rendering of the Van Allen Probes.

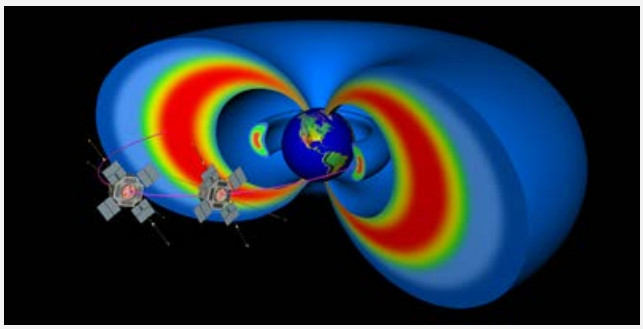
Posted April 4, 2013 · Feature · By Matthew Kivel

In August of last year, NASA successfully launched two Radiation Belt Storm Probes— later dubbed the "Van Allen Probes"— with the central mission of mapping and examining the volatile Van Allen radiation belts: two doughnut-shaped radiation belts that extend from 1,000 km to 60,000 km above the Earth's surface.

Aerospace engineers and scientists participated intensively in the mission planning and continue to be involved in data analysis seven months after the initial launch. The main mission is scheduled to take place over the course of two years, but NASA has put aside resources to potentially extend the mission for an additional two or three years depending on the success of the current research and data analysis.

Scientists are now putting together an impressive set of data from the probes that hints at some wonderful discoveries to come.

For generations, the Van Allen belts— named for James Van Allen, whose cosmic ray experiment aboard the Explorer 1 satellite led to the discovery of the belts in 1958 — have persistently caused problems for spacecraft. During the initial Explorer 1 mission, Van Allen and his colleagues observed a recurrent phenomenon in the satellite's radiation detector. Explorer 1's Geiger-Müller Tube consistently registered a null value while passing through what would later be recognized as the inner belt; a seemingly impossible occurrence since scientists expected at least some detectable level of radiation in the area. Van Allen and his team eventually realized that the Geiger 2 had actually been saturated with radiation to the point that it ceased to function, thus producing the null value. This realization led to the discovery of the inner belt, which is often cited as the first scientific discovery of the space age.



Rendering of the Van Allen Radiation Belts. (Image courtesy Johns Hopkins University Applied Physics Laboratory.)

In a physical sense, the Van Allen belts consist of an inner belt, dominated by very energetic proton radiation, and an outer belt, comprised largely of energetic electrons. These charged particles can easily penetrate spacecraft shielding and cause any number of technical catastrophes in electrical devices.

Between the two belts is a dynamic slot region that, while typically void of radiation, will fill in with ionizing radiation from time to time. The slot and outer zones are the most volatile parts of the region and the wild environmental shifts that they exhibit are the primary catalyst for NASA's Van Allen Probe mission. Understanding, and perhaps one day, predicting the behavior of the region is incredibly valuable information for both scientists and satellite builders alike.

Much of the current mission is focused on mapping and documenting the Van Allen belts in a comprehensive manner. The two satellite probes are being used to gather information and examine the dynamism of the radiation over time in order to enhance current climatology models. Aerospace scientist Dr. Paul O'Brien has been involved in the Van Allen probe mission from the very beginning and sees great synergy between the Van Allen research and the needs of Aerospace's customers. "The data from the Van Allen probes will feed into the climatology models called AE9 and AP9, which will continue to be used to set environmental design and test specifications for future satellite systems," said O'Brien. "This will allow satellite designers to reduce margins where possible and to have higher confidence that the specifications and tests that they are conducting will lead to on orbit success."

Aerospace engineers have built sensors for the probes that are being used to observe geomagnetic storms in the belts. In addition, Aerospace has also collaborated with a national security agency to build a relativistic proton spectrometer that is measuring part of the proton population in the inner belt that has never been directly measured before.

The Van Allen Probes mission is the first of its kind to utilize two probes in order to study the Van Allen belts. In essence, the probes check each other's work, crossing over previously observed orbital locations in order to observe temporal and spatial variations. "This is definitely the most comprehensive approach," said O'Brien. "We have two probes now and we've learned a lot about how to design instruments so that they will function throughout the entire orbit. It's a more comprehensive data environment for this mission than we've ever had before."

The orbit of the Van Allen probes lasts for nine hours with each probe passing through each belt twice per orbit. This amounts to a total of about twelve passes through each belt in a little more than a day's time. Over the past seven months, the probes have held up beautifully in a region that is outwardly hostile towards electrical devices.

Aerospace employees Dr. Paul O'Brien, left, and Dr. Joseph Mazur, center, consult with Dr. David Byers of the Naval Research Laboratory on preparations for the Van Allen Probes launch last August.
(Photo by Bill Uttenweiler.)

The satellites are poised to deliver fascinating data sets for years to come and early results seem to confirm that there is a wealth of knowledge to be gleaned by the probes. Four days after the initial launch of the probes, scientists observed a third radiation belt that appeared just beyond the outer belt. It remained present for four weeks until it was destroyed by a shock wave from the sun. This discovery ignited the scientific community and has led to a lot of excitement among the general public as well.

Dr. James Clemmons, principal director, Space Science Applications Laboratory, is intrigued by a number of preliminary data sets, but acknowledges that it will take a lot of time and analysis to make sense of all the collected information. "Most of the results are going to take a lot of thinking," said Clemmons. "They are going to take a lot of people to put together. There are five instrument suites onboard the probes and each one has its own science team. People will work on their own data, but we won't get the whole picture until we put it all together."

Though most of the key scientific breakthroughs will present themselves further on in the mission, there are a few unique belt behaviors that have been observed recently. "We have some preliminary results that are pretty interesting" says Clemmons. "One thing we've seen is that after the space weather activity increases, which makes the belts stronger a lot of times, we've seen some very coherent modulations in the fluxes. They go up and down in a regular sort of period. We saw a little of this back in the '90s, but our instruments are superior now and we've seen that they [modulations] are a lot more common and they're much better defined than what we've seen in our measurements." By comparing this data with the electric and magnetic fields data from the same mission, scientists will be able to better understand what directly causes the unique behavioral shifts.

As the mission progresses, there will certainly be new and intriguing revelations about a pair of radiation belts that have beguiled and confounded the satellite and scientific communities for generations.

"The goal of science is understanding to the point of predictability," said Clemmons. "And we have some of that understanding, but not all that we need. And that is why the Van Allen Probes are being flown."

Andrea Amram Named GM for Space Systems Group

Posted April 4, 2013 · Article

Andrea Amram has been named general manager of the Environmental Satellite Systems Division, Space Program Operations, Space Systems Group.

Andrea Amram

In her new position, Amram's responsibilities include managing the technical and programmatic support to Air Force space acquisition programs for terrestrial and space weather, conducting assessments at key program milestones, advising the Air Force on the executability of its programs, and architecting and planning for future weather systems.

Amram, who joined Aerospace in 1983, most recently served as general manager, Developmental Planning and Architectures Division, Systems Planning and Engineering. She led the Space and Missile Systems Center in the design, development, and analysis of future space, ground, and launch system concepts to support the warfighter. In addition, she worked to expand these efforts across the national security space enterprise. The organization is also responsible for identifying and assessing technology improvements needed to realize the proposed architectures on the customer's roadmaps.

April Obituaries

Posted April 1, 2013 · In Memoriam

Sincere sympathy is extended to the families of:

- **Albert Androsky**, member of the technical staff, hired June 1, 1964, retired July 1, 1985, died Nov. 2, 2012.
- **Fern Barden**, administrative secretary, hired Oct. 31, 1962, retired Aug. 1, 1986, died March 12.
- **Kathi Bue**, senior secretary, hired May 14, 1990, died March 6.
- **George Chambers**, member of the technical staff, hired Aug. 29, 1960, retired May 1, 1982, died Feb. 6.
- **Alvin Gillogly**, hired July 31, 1961, retired April 1, 1979, died March 14.
- **Gordon Juvinall**, research scientist, hired Sept. 30, 1991, retired March 1, 1998, died Feb. 3.
- **Jesse Katz**, general manager, hired Sept. 8, 1972, retired Sept. 1, 1996, died Feb. 28.
- **Albin Kazanowski**, member of the technical staff, hired Jan. 24, 1980, retired June 1, 1991, died March 14.
- **Genevieve May**, office support, hired Oct. 3, 1960, retired Aug. 1, 1981, died Feb. 26.
- **Maureen Murphy**, member of the administrative staff, hired Jan. 2, 1964, retired April 1, 2000, died Feb. 5.
- **Otto Paris**, member of the technical staff, hired May 13, 1963, retired Dec. 1, 1990, died March 4.
- **Jonathan Pribble**, member of the technical staff, hired June 2, 2003, died March 13.
- **Leslie Ruttner**, project engineer, hired Jan. 14, 1980, retired Dec. 1, 1990, died March 8.
- **Delbert Thomas**, member of the technical staff, hired Dec. 12, 1960, retired Jan. 1, 1987, died March 8.

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

April Notes

Posted April 1, 2013 · In Appreciation

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

- **Brenda Hardy,** for the recent passing of her father, Kelly Howard.
- **Lynn Ketner,** for the recent passing of her sister, Phyllis Schalk.
- **Andy Montoya and Theresa Montoya,** on the recent passing of their mother and mother-in-law, Lois Montoya.
- **Joseph Newman,** on the recent passing of his wife, Patricia Newman.
- **Michael Rolenz,** on the recent passing of his mother, Betty Rolenz.

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

April Anniversaries

Posted April 1, 2013 · Anniversaries

40 YEARS

Space Systems Group: Corrine McCaleb, Paula Ross

35 YEARS

Engineering and Technology Group: Rosanne Modlin

National Systems Group: Manuel Salinas

30 YEARS

Civil and Commercial Operations: Robert Kinsey

Engineering and Technology Group: Steven Beck, Kathryn Hill

Space Systems Group: Craig Mueller

25 YEARS

Engineering and Technology Group: Jeffrey Fedor

Operations and Support Group: Eddie Brown

Systems Planning, Engineering, and Quality: Peter Chang

20 YEARS

Civil and Commercial Operations: Lucinda Holsclaw

Engineering and Technology Group: Lynell Miller

Systems Planning, Engineering, and Quality: John Mayberry

15 YEARS

Civil and Commercial Operations: Robert Sames

Engineering and Technology Group: Randal Douglas, Nelson Ho, Craig Yandow

10 YEARS

Civil and Commercial Operations: Thomas Jasin

Engineering and Technology Group: Barbara Amende, Vinay Goyal, Kenneth Hillblom

Operations and Support Group: Steven Fiumano

Space Systems Group: Ronald O'Byrne

5 YEARS

Civil and Commercial Operations: Jerome Morin

Engineering and Technology Group: Mary Covert, Aditi Crosby, Marissa Estaya, Martha Johnson, Colin Mann, Eric Nelson, Nelson Tong, Pamela Wilkins

National Systems Group: Alicia Staub

Operations and Support Group: Lorrie Orozco

Space Systems Group: Eddie Hall, Karl Sarajian, Christina Tan

Systems Planning, Engineering, and Quality: Rand Fisher, Sean White

End of Archive