Orbiter
December 2013 – January 2014

Photos From Space: The Results Are In

by Lindsay Chaney
January 30, 2014

Richard Welle, left, points out features of an AeroCube-4 image to other members of the Picosat Team, left to right, Darren Rowen, Joseph Gangestad, and Brian Hardy. (Photo: Eric Hamburg)

When the Orbiter posted a story last fall in which the Aerospace Picosat Team invited readers to suggest places on Earth to photograph from space, Kaye Shelnutt and Joanne English asked for a picture of the coast of Israel.

The result might well be the most spectacular photograph of the Mideast ever taken from an unclassified satellite. The single picture shot by a camera aboard the AeroCube-4C displays the setting for 5,000 years of recorded history from Egypt to Turkey. Easily identifiable land and water is visible that includes part of Egypt and all of the Suez Canal, the Gulf of Aqaba, the Dead Sea, the historic River Jordan, the Sea of Galilee, all of Israel, all of Lebanon, and large parts of Jordan, Syria, Cyprus, and Turkey, as well as the Mediterranean Sea and a portion of Saudi Arabia.

Portion of Lithuania near where George Paulikas was born. (Photo: The Aerospace Corporation)

The Himalaya Mountains, including Mt. Everest. (Photo: The Aerospace Corporation)

Generally speaking, requests to photograph large land and water masses juxtaposed against each other turned out reasonably well, while requests for land locations without identifying large landmarks produced undifferentiated images.

Dr. George Paulikas, a former Aerospace executive vice president for whom the Paulikas Mall on the El Segundo campus is named, understood this limitation when he submitted a request for a specific longitude and latitude that he identified as his birthplace. The photograph shows an easily recognizable body of water that looks like a fat worm from orbit and is the Kaunas reservoir in Lithuania.

Paulikas could see the river Nemunas leading out of the reservoir and where it passed the small town of Smalininkai. That's where, he noted, at the age of 8 he used to paddle around on logs, much to the horror of his mother. He was actually born about 25 miles to the west in the town of Pagegiai, but said he "gave the coordinates of Smalininkai thinking it would be more recognizable being right on the river."

And he was definitely correct. Photo requests for the San Francisco Bay area, the coast of Los Angeles, and islands such as New Zealand, Hawaii, Puerto Rico, and Jamaica, all came out recognizable.

The setting for 5,000 years of recorded history is shown in this photograph taken by the Aerospace AeroCube-4 satellite. At the bottom middle-left is the Suez Canal; the Gulf of Aqaba is at the lower right, pointing upward toward the Dead Sea, the Jordan River, and the Sea of Galilee. Part of the island of Cyprus is visible in the Mediterranean Sea.

On the other hand, large buildings such as Michigan Stadium, the largest football stadium in the world, with a seating capacity of 109,901, were too small to photograph, even with the satellite's narrowest-focus lens. The same for Lambeau Field, Ohio Stadium, the Eiffel Tower, and other structures requested.

The very first request that came in was for an image of Mt. Everest. The resulting photo of the Himalaya Mountains and Tibet became one of the favorites among the Picosat Team. The image shows the snow-covered peaks in sharp detail along with a clear view of Tibet. At the same time, the view of the lower elevations in the Ganges River Valley is partially obscured by the haze. Mt. Everest itself is in the lower center of the photo, among the snow-covered peaks slightly to the right and below the bowtie-shaped lake.

The idea behind the Picosat Team's offer to take photos on request was to enlist the general Aerospace population for help with testing the capability of the AeroCube- 4C in gathering photographic data from diverse specific locations.

In that sense, the test was a rousing success, as the team refined certain operational procedures and gained a better understanding of the issues involved in targeting multiple specific locations.

Weather turned out to be a big issue in getting usable photographs. The team made many attempts to take photographs of Ireland and other locations in northern Europe, but there were always enough clouds to obscure the view. Then, due to the orbit of the satellite and the time of year, it was night when the AeroCube was over that part of the world during most of December and part of January.

AeroCube-4C is a 1U CubeSat (10 x 10 x 10 cm in dimension) that contains various "first of a kind" mission technologies including solar panel wings that close and open to tune the ballistic coefficient and enable efficient formation flying; three-axis attitude control to better than 3 degrees absolute accuracy; a 0.3-square-meter deployable deorbit device; sub-miniature reaction wheels; and a launch environment data logger that records ascent accelerations, pressure, and temperature.

AeroCube-4C contains three cameras equipped respectively with wide angle, medium, and narrow-focus lenses. The cameras are two-megapixel cell-phone cameras acquired commercially. The narrow-focus lens (22 degrees) will photograph an area approximately 135 by 180 kilometers. The medium focus lens (57 degrees) will photograph an area approximately 500 by 700 kilometers. The wide-angle lens is a fisheye with a 185-degree field of view, and can see the horizon in all directions when nadir pointing. From a nominal satellite altitude of 600 km, the region of the Earth seen by the fisheye lens is about 5800 km wide.

Rich Welle, picosat program manager, noted that the cameras on AeroCube-4C were installed primarily for verifying the attitude-control system of the satellite and that Earth observation was originally conceived as a secondary mission. However, because the AeroCube-4C images were so compelling, AeroCube-7 will now be equipped with an upgraded imaging system that should provide higher resolution Earth photos with possible scientific and/or commercial uses.

More than 50 high-resolution photos taken by AeroCube-4C are available at this link. Mouse over a photo to read the caption.

Aerospace employees are welcome to download any of the pictures and post to their personal websites, email to friends, or use in printed material. For any use, please put in a conspicuous location near the picture "AeroCube-4 photo © The Aerospace Corporation."

Johnson-Roth, Stevens Get New Assignments in SPEQ

by Kimberly Locke
January 29, 2014


Gail Johnson-Roth

Systems Planning, Engineering, and Quality has announced the promotion of Gail Johnson-Roth to principal director, Enterprise Systems Engineering, and the appointment of Christine Stevens to principal engineer, Corporate Chief Engineer's Office.

In her new position, Johnson-Roth leads the enterprise systems engineering activities for the Chief Engineer's Office interfacing with counterparts in Aerospace, government, and industry.

Her organization will lead special studies and assessments focused on engineering process improvements for standards, best practices, and design guidelines in coordination with the Engineering and Technology Group (ETG) and program offices. She is also responsible for the Space Quality Improvement Council, Space Suppliers Council, and annual U.S. Space Industry Mission Assurance Summit.

Johnson-Roth joined the corporation in 1981 as a member of the technical staff in the Materials Science Laboratory where she performed research and analysis of space- related materials.


Christine Stevens

Her most recent previous assignment was as a systems director to the Acquisition Risk and Reliability Engineering Department, Systems Engineering Division of ETG, where she led risk and reliability engineering technical analysis across the customer portfolio and assumed key leadership roles in developing and promoting new corporate mission assurance initiatives through the development of command media and leading technical training on the implementation.

In her new role, Stevens serves as the technical liaison to the Operations Support Group, National Systems Group, and the Space Systems Group and is focused on key matters spanning contracting, workforce development, knowledge sharing, and the corporate communication of mission assurance, quality, and technical policies.

Stevens joined Aerospace in 1983 as an MTS in the Engineering Analysis Programming Department, Information Processing Division. Her most recent assignment was as the principal director, Engineering Directorate, Engineering and Integration Division, Space Systems Group, where she led support to the Space and Missile Systems Center's Engineering Directorate for life cycle mission assurance, systems and software engineering, and independent reviews.

Aerospace Explores Nanotube Applications for Space

by Heather Golden
January 22, 2014

The Aerospace Corporation is pioneering space applications for an exciting new technology that holds the potential to revolutionize several industries.

Carbon nanotubes, commonly referred to as CNT, are cylindrical carbon forms that are one of the strongest materials found on Earth. They also have exceptional electrical, mechanical, thermal, and optical properties that make them highly anticipated and valuable, said Dr. Don Walker, senior MTS, Energy Devices, Energy Technology.

"All CNTs are not alike," he said. "They can be multi-walled or single-walled. They can be metals or semiconductors. They are stronger than steel and more thermally conductive than copper. They have all the great properties."

"It is that magical; it's a wonder material," he added.

Currently, nanotubes are used in some clothing and as a composite material (mostly carbon fiber) to help strengthen marine paint, wind turbines, and sports gear, like skis, ice hockey sticks, surfboards, hunting arrows, bicycles and baseball bats. Nanotubes are expected to make an appearance within electrical circuits, electrical cables and wiring, actuators, within radar absorption equipment, telescopes, a broader expanse of textiles, the medical field, speakers and headphones, ultra capacitors, solar cells and hydrogen storage for future fuel use.

Aerospace's interest in the technology centers around the potential for use as a coating for the solar panels that help protect and power space vehicles, Walker said.

"These are a big deal," Walker said. "They are thin, conductive and flexible. Because it is so pervasive, we can use them in almost all spacecraft technology."

The group's goal is to find a way to use nanotube technology successfully as a stronger, lighter conductive coating for solar panels, allowing the panels to be thinner, lighter, stronger, and flexible, while still protecting the panels against electrical arcs that can render them inoperable. The coating that spacefaring solar panels currently use darkens with time and exposure to radiation, hindering the performance of the solar cells.

Dr. Don Walker demonstrates how to use one of the pieces of equipment that his team employs to work with nanotube technology. Nanotubes are currently used in consumer-based industries, but there are possibilities for future space applications. (Photo by Elisa Haber)

The Aerospace team exposed the nanotubes to radiation to test how much or how quickly they would darken when exposed to the sun's radiation in space. Not only did they learn the nanotubes will not darken, but they also stumbled upon an unexpected problem.

The radiation forced the semiconducting CNT material to switch from being conductive to ten times more resistive. The semiconducting CNTs nanotubes will be one way on Earth, and become the opposite once in space. The metallic CNTs remained roughly the same conductivity.

Aerospace is currently trying to resolve issues with nanotube technology that only occur in the harsh environment of space. (Photo by Elisa Haber)

"These are extremely sensitive to the chemical environment," Walker said. "Much of our own common knowledge is based on how these react in an oxygen-rich environment. What is true here on earth won't be true in space. The requirements in space are different than here on Earth."

The team is also working to mitigate two other issues, both of which resulted from attempts to use nanotubes in bulk.

The nanotubes' recorded strength properties are from tests done on single tubes. Much of the strength is lost when the tubes touch, and there is a resistance to conductivity where they are joined.

"What we have to try to do here is discover how we can bridge from nano scale to bulk scale," Walker said. "We need to understand the differences in behavior in space and figure out how to eliminate these problems."

Team of the Year Award Goes to Picosat Group

by Matthew Kivel
January 24, 2014

The Aerospace Team of the Year Award was presented during a luncheon in Titan IVA on Thursday, Jan. 23.

Dr. Wanda Austin spoke at the beginning of the event, explaining the significance of the award and outlining the thorough selection process. Austin expressed how challenging it was to select a winner, saying that her reward for making the difficult decision was simply getting the chance to "announce the winner."

Dr. Wanda Austin, left, and Dr. Willie Krenz, right, with members of the picosat team who won the Aerospace Team of the Year Award. (Photo: Eric Hamburg)

Austin presented the Aerospace Team of the Year Award to the "Key Aerospace Contributions to PicoSat" team. The team members were given individual plaques commemorating their efforts. The picosat team was recognized for consistently leading its field in innovation and for building groundbreaking spacecraft while meeting immensely restrictive budget and scheduling requirements

In her remarks, Austin spoke of her deep satisfaction with Aerospace's Corporate Awards Program. "The objective of the program is to recognize exceptional contributions and outstanding achievements that specifically demonstrate excellence exceeding expectations," said Austin. "I feel very proud when I look back at the history of our Corporate Awards Program and am reminded of the superlative accomplishments and dedication demonstrated by our award recipients over the years."

As the recipients posed for photographs and shook hands with Austin, Vice President of Enterprise Information Services Willie Krenz spoke enthusiastically about the team's work and the value of its contribution to Aerospace.

Krenz' speech was followed by remarks from David Hinkley, senior projects leader, Mechanics Research Department. Hinkley explained the history of the picosat program and detailed a number of its significant accomplishments.

"We now have a team, built around the individuals in this room, that are the world experts in all aspects of miniature satellites, and The Aerospace Corporation is recognized as a world leader in this field," said Hinkley. "No company and no team has a more varied capability and experience, is as practiced in satellite design and assembly, has flown more missions, or has had a better success rate."

The speeches were followed by a catered luncheon.

The 22 members of the award-winning team are: Peter Carian, Andrew Chin, Alan Choy, Richard Dolphus, Renny Fields, Francisca Fuentes, Jerry Fuller, Rachael Galvan, Joseph Gangestad, James Gee , Brian Hardy, David Hinkley, Siegfried Janson, Petras Karuza, Geoffrey Maul, Jerry Michaelson, Leslie Peterson, Darren Rowen, Daniel Rumsey, Timothy Smith, Catherine Venturini, and Kevin Zondervan.

Inaugural Gravely Award Goes to Austin

by Lindsay Chaney
January 20, 2014

Dr. Wanda Austin received the inaugural Admiral Samuel L. Gravely Leadership and Service Award from the Pacific Battleship Center (PBC) on Monday, Jan. 20.

The award presentation took place aboard the Battleship IOWA in San Pedro.

The PBC recognized Austin for her courageous service and leadership in the community and for demonstrating innovation in her field.

In accepting the award, Austin noted that both Dr. Martin Luther King, Jr. and Adm. Gravely were trailblazers in bringing diversity to the workplace, and that she, personally, had benefited from their efforts.

She went on to say that "at Aerospace, we have taken to heart the contributions made by Adm. Gravely and other pioneers. Following their lead, we, our customers, and our industry partners have put into effect a number of programs that are dedicated to celebrating and incorporating diversity into the workplace."

Bryan Moss, left, a veteran of the USS Iowa, and Jonathan Williams, president of the Pacific Battleship Center, present Dr. Wanda Austin with the inaugural Samuel L. Gravely award. (Photo: Elisa Haber)

More than a dozen Aerospace staff and executives attended the ceremony and were treated to a tour of the IOWA beforehand. During the award presentation, a Los Angeles Fire Department fireboat gave an aerial water salute in honor of Austin.

The Admiral Samuel L. Gravely Leadership and Service Award, which will be conferred annually, recognizes African American leaders in Battleship IOWA's community who exemplify the trailblazing, courageous service of the late U.S. Navy Vice Admiral Samuel Lee Gravely. Monday's event was part of Battleship IOWA Remembers, a series of events and ceremonies presented by the PBC aboard Battleship IOWA. The series commemorates national, military and naval dates of importance.

A Los Angeles Fire Department fireboat gives an aerial water salute to the Battleship IOWA. (Photo: Elisa Haber)

Nice Guys Sometimes Win

by Laura Johnson
January 15, 2014

A retired general who overcame his reputation as a "nice guy" shared his lessons on leadership in a presentation to Aerospace and Space and Missile Systems Center (SMC) personnel on Jan. 15.

The presentation, given by retired Air Force Gen. Lester Lyles, was part of the SMC Leadership Series, and held in Aerospace's Titan IVA and IVB Meeting Center.

Lyles, who was told he was too nice to be a general, nonetheless achieved the rank, and completed a successful career in the Air Force. He talked about some of the various places he worked, and what he learned about leadership during those assignments.

The first lesson he shared was the importance of mentoring and taking care of your people. He gave an example of a mentor who convinced him to stay in the Air Force at a time when he was planning to quit. According to Lyles, a mentor does not have to be similar to you, but can be anyone willing to give advice and help you.

His second lesson was the importance of communication. Leaders should talk to everyone, listen, and keep everyone involved. They should not be afraid to admit they don't know something.

The third lesson was the need to take care of the organization, and do what's best for it. This includes sometimes saying no to someone above you.

Finally, leaders must have integrity, and stick to their values. Lyles told the story of a time when he said what he thought at a congressional hearing, even though the questioner wanted him to give another answer. He advised leaders not to take the easy way out.

His talk was well received by the audience, and he fielded a number of questions afterward.

Retired Air Force Gen. Lester Lyles discussed leadership issues Jan. 15 in El Segundo. (Photo: Eric Hamburg)

Big Boost for Small Spacecraft

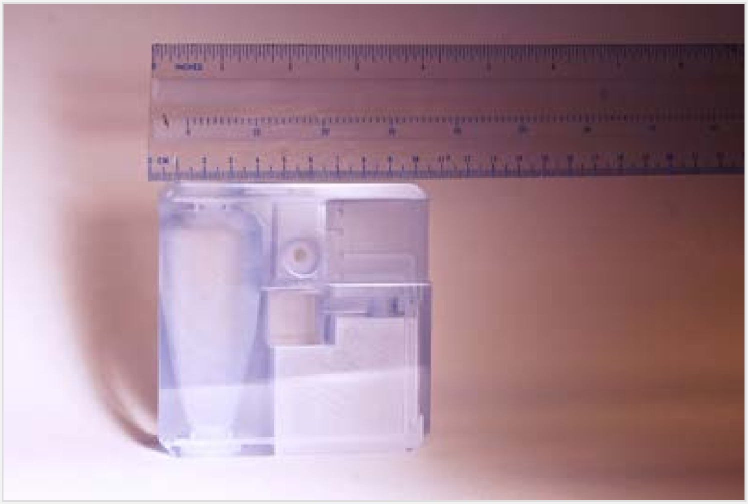
by Matthew Kivel
January 13, 2014

The picosat revolution is in full swing. Scientists, engineers, and students alike are all participating in the development of these cheap, small, and increasingly complex spacecraft. Much like the ubiquitous blizzard of smart phone apps that has overtaken the general public in recent years, so too have picosat applications within the space science community. But the technology is still at a nascent stage, and though picosats are advancing technically at an exponential rate each year, they still lack many basic capabilities. For instance, most picosats don't have propulsion of any kind.

Often a secondary payload, picosats are consistently at the mercy of the primary payloads that they are launched with. There is currently no effective way for picosats to enter into new orbits or complete precise maneuvers while on orbit.

Research scientist Teresa Moore has spent years working on a promising new propulsion system for picosats. (Photo: Elisa Haber)

Essentially, picosats are stuck in a limited orbit without the ability to move autonomously in space. This lack of dynamism, in terms of navigation, greatly constricts the kinds of research and functions picosats can perform. Currently, the vast majority of picosats continue to lack engines or propulsion systems, and those propulsion systems that are available are utilizing technology that is expensive or doesn't work particularly efficiently. Aerospace's Teresa Moore plans to change that.



Prototype of the new propulsion system shell. Water reservoir is on the left. (Photo: Elisa Haber)

“Everybody, not just Aerospace, but everybody in the community is really eager to develop propulsion for picosats because it’s so useful,” says Moore. Aside from the obvious navigational improvements that will come with propulsion, Moore also believes that such systems can directly extend mission life. “As secondary payloads, picosats are usually placed in low earth orbit where there’s a lot of atmospheric drag,” says Moore. “So as a result, you crash and burn in a few months. But if you could use propulsion to make up for that atmospheric drag or move the picosat to a higher orbit, then you could extend your mission and remain useful for a long time.”

Over the past few years, Moore has developed a propulsion system for picosats using electrolysis to generate gas, which is then burned to create thrust. The concept took shape over a number of years, during which Moore became deeply familiar with the multifaceted uses of electrolysis/combustion systems.

In 2005, Moore began work on a Defense Advanced Research Projects Agency project that utilized electrolysis as a means of dynamically reshaping a helicopter blade. By altering the blade’s cross section, the helicopter would hopefully retain a higher weight capacity. The project stalled and was eventually scrapped, leading Moore and her colleagues to apply their research in a new area. Their next electrolysis project involved the development of a system that could detonate mines in an underwater minefield. Moore would work on numerous incarnations of the DARPA project until 2011.

As her work with DARPA was winding down, Moore met with Aerospace’s CubeSat team and discussed the possibility of developing a thruster for their CubeSats. Moore’s main goal was to develop a thruster that improved greatly upon the capabilities of the cold gas thruster. Cold gas thrusters had flown in picosat missions before, but are inherently inefficient. Moore saw a great opportunity for innovation and set out to develop a CubeSat propulsion system of her own. In collaboration with the CubeSat team, Moore wrote an Independent Research and Development (IRAD) proposal and received funding for the project in 2010.

Hydrogen and oxygen being generated through electrolysis of water with a polymer electrolyte membrane. (Photo: Elisa Haber)

There are many engineering restrictions that come with the development of a CubeSat. First, and most significantly, is the size. Since the CubeSat itself is quite small (a standard 1U cubesat is 10 X 10 X 10 cm), any additions to the satellite must be compact and efficiently designed. Since CubeSats tend to be secondary payloads, they are forbidden from carrying hazardous or high-pressure materials that might compromise the successful deployment of the primary payload. So, when developing her propulsion system, Moore had to produce a design that was incredibly small and free of any chemicals that might be considered hazardous— a very difficult proposition when building a propulsion system.

But Moore’s experience with electrolysis proved to be the solution. With her design, electrons from the CubeSat’s solar panels are pumped through a polymer electrolyte membrane assembly submerged in water, which splits the water into hydrogen and oxygen gas. “CubeSats have tons of restrictions, so if you wanted to launch just a tank of oxygen and a tank of hydrogen, you couldn’t do it,” says Moore. “But, you can use water because water is benign. So, if you launch with pure water you can wait till the CubeSat is on orbit and use electrolysis to turn your water into hydrogen and oxygen. It’s safe to launch and it gives you the high-performance of hydrogen and oxygen combustion.” In addition, Moore’s design only takes up ¼ U, leaving plenty of room on a CubeSat for scientific instruments or supplementary applications.

The initial tests of Moore’s propulsion system have been successful, showing that it can change the velocity of a CubeSat by 50 meters per second (50 m/s delta v), which, based on the thruster carrying about three tablespoons of water, could potentially raise a 1U CubeSat by about 100 km while on orbit. In tests, the electrolysis propulsion system clearly outperforms the cold gas system and meets all of the power specifications for a 1U CubeSat. In addition, the cost of Moore’s design is exceptionally low, totaling between $5,000 and $10,000, while current commercially available cold gas systems cost between $100,000 and $500,000. Moore has developed a remarkable system that is more efficient, more concise, and cheaper than anything on the market today.

Still, more testing is required before Moore’s design gets to take flight. She sees a bright future for propulsion as the evolution of the CubeSat continues to accelerate. “It’s going to be very exciting when we start getting more CubeSats with propulsion on them,” says Moore. “We can make inspector satellites and maybe even repair satellites or refueling satellites or garbage-collecting satellites. There’s a lot of space junk in orbit and it would be really great if you could have a garbage truck satellite that could be used for clean up. There are tons of possibilities.” Moore’s propulsion system and others like it will undoubtedly revolutionize the uses and applications for picosats in the coming years. Propulsion brings autonomy to the small satellite, allowing it to control its own destiny while on orbit— no longer helplessly floating in space.

Aerospace Stands Out With CT Scanning Facility

by Lindsay Chaney
January 08, 2014

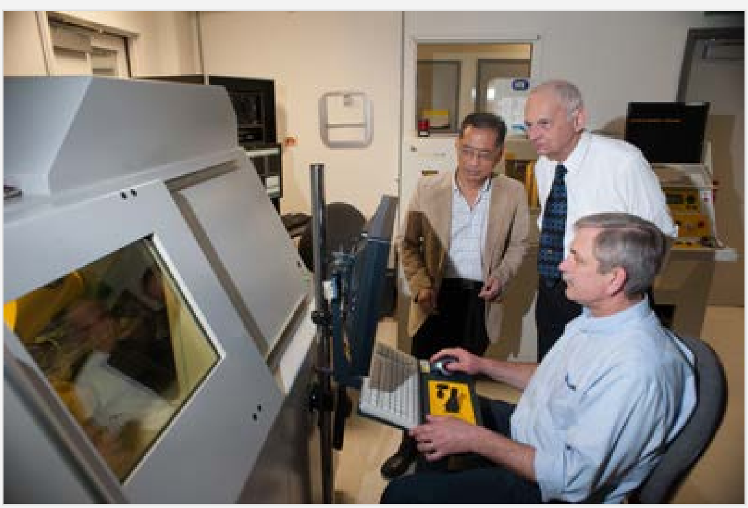
Recently, the manufacturer of a hydrazine valve for NASA’s Orion project found that the valve was leaking, but there was no obvious reason why.

X-ray CT image of a small black garden ant. Bright region on the right is a digital cross-section showing structure of the exoskeleton. (Photo: Aerospace image)

The manufacturer turned to Aerospace Distinguished Scientist Dr. Gary Stupian of the Electronics and Photonics Laboratory and Neil Ives of the Microelectronics Technology Department (MTD) for help. With a Civil and Commercial Operations contract quickly put into place, Stupian and Ives were able to determine that the cause of the leak was a piece of perforated mesh backing on the valve seal that had come loose and lodged in the valve seat.

It was another example of how, among NASA program offices and others in the space industry, Aerospace has become known as the “go to” organization for quick turnarounds on high quality X-ray computed tomography (CT) investigations and inspections.

Much like medical CAT scans, the Aerospace scanning technique produces 3-D images of an object in astounding detail. But it’s more than having the right equipment that makes a lab stand out for performing challenging X-ray CT analyses. Dr. Martin Leung, associate director of the MTD who has worked with Stupian and Ives for 30 years, noted that “the skill of the scientists makes all the difference” in the quality of the CT image, or even whether it is possible to have a useable image.



Checking on a CT scan are, seated, Neil Ives, and standing, left to right, Dr. Martin Leung, and Dr. Gary Stupian. (Photo: Eric Hamburg)

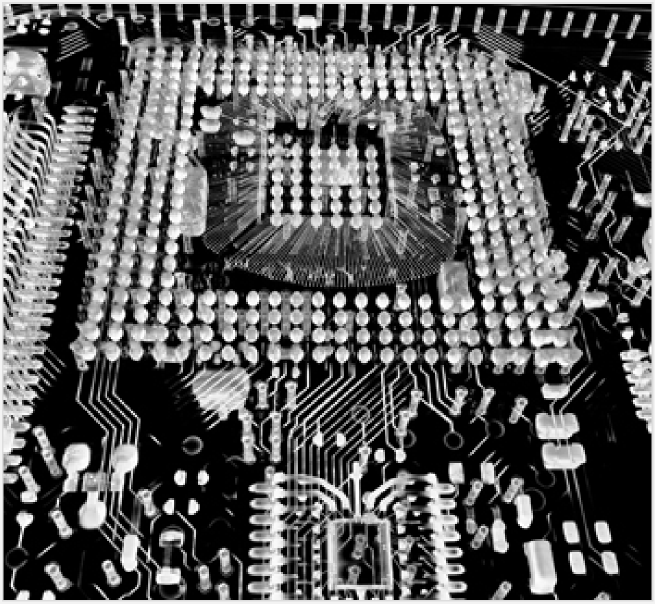
“The key is having a lot of gray scale dynamic range in the image,” said Ives, a senior scientist in MTD. This involves knowing how much power to use and the length of the exposure, among other parameters. “With the right settings and an experienced operator, you can image a low-density object inside of a higher-density object.”

Aerospace experience in X-ray imaging of space parts goes back nearly twenty years to 1994 when the company purchased a Feinfocus 2-D X-ray system for the MILSATCOM program office. For several years, Aerospace had the only real-time X-ray facility in the space community. As a result of the company’s success in the area, “Feinfocus” became the common term for any X-ray inspection.

But the real turning point came around the turn of the century when Stupian and Ives, with encouragement from Leung, set about modifying their original Feinfocus system to add an X-ray CT scanning capability.

The essence of a CT scanner is that it is an X-ray machine that takes a series of 2-D X-ray images of its subject – hundreds or even thousands of individual projections of the subject. A computer program then takes these 2-D images and assembles them into a 3-D rendering of the subject, whether that is a person's chest or the valve of a rocket engine.

One difference between CT scanners for space equipment and people is that the scanners for inanimate objects can use much higher doses of radiation. Another is that for people, the X-ray equipment rotates around the person, while with an object, the object can be rotated and the X-ray source held immobile.



Three-dimensional view of a small circuit board showing components and six layers of circuitry. (Photo: Aerospace image)

Ives and Stupian built their first CT scanner from the 2-D Feinfocus platform. Although CT was already an established technique in medicine, it took a good deal of effort to take a 2-D X-ray system and successfully turn into a CT scanner. They modified the computer codes to command the system to rotate the test object, turning it 1 degree for each X-ray image. They then put together the necessary CT rendition software for creating the 3-D image. This homegrown CT scanner provided considerable experience in and the scientific understanding of the X-ray CT scanning technique for the Aerospace lab. This unique expertise was used in a number of root cause investigations. Image quality and spatial resolution, however, were limited by the focal spot size of the X-ray tube and mechanical instabilities in the system designed for 2-D imaging only.

In the meantime, realizing the importance of CT imaging, commercial X-ray equipment vendors addressed these issues and began building and selling their own systems designed to provide high-quality CT analysis.

To maintain Aerospace's leadership position in X-ray analysis within the space community, the lab bought two new X-ray CT scanners in 2010 and 2011 to handle nano and micro scaled objects, that is, a nano scanner for objects smaller than about half a centimeter, and a micro scanner for things that are about half a centimeter to 12 cm long.

Since there is a constant demand for performing CT analysis on space components larger than what the current systems can handle, Stupian hopes the next purchase will be a large-format CT scanner, which he says will further augment Aerospace's ability to provide the highest-quality X-ray products for the company's national security space and civil and commercial customers.

Kevin Bell Promoted to Associate GM

by Lindsay Chaney
January 03, 2014

Kevin Bell

Kevin Bell has been promoted to associate general manager of the Systems Engineering Division, Engineering and Technology Group (ETG).

The division continues to emphasize and grow Aerospace's strength in front-end architecture development, concept design, and system acquisition, essential in properly structuring new starts. Equally important, the division provides mission assurance and system engineering support from cradle to grave, positioning programs for mission success.

Bell joined Aerospace in 1992 as a member of the technical staff in ETG's Vehicle Systems Division. His most recent previous position was principal director of the GEOINT Development Office in the Imagery Programs Division, National Systems Group.

Secretary of the Air Force Visits Aerospace

by Lindsay Chaney
January 07, 2014

Dr. Malina Hills, general manager of the MILSATCOM Division, briefs Secretary of the Air Force Deborah Lee James, left, and Dr. Wanda Austin, on more resilient and affordable future MILSATCOM systems. James visited the El Segundo Aerospace campus on Tuesday, Jan. 7. (Photo: Eric Hamburg)

A Snapshot of the Cape

by Laura Johnson
January 02, 2014

Delta IV Common Booster Core at the Air Force Space and Missile Museum. (Photo: Laura Johnson)

Aerospace is devoted to assuring mission success. From the lab rat hidden in the bowels of A6 to the number cruncher sitting in a cubicle in the headquarters building to the employee at the most remote Aerospace office, the ultimate goal is to ensure the customer's mission. A lot of those missions launch from Cape Canaveral or Vandenberg, yet many employees have never been to visit the places where all their hard work pays off.

Recently, I had an opportunity to tour one of these launch locations. A cousin of mine conveniently decided to get married in the fine state of Florida, and was nice enough to locate the wedding within driving distance of the Cape Canaveral Air Force Station. I decided to take a day to visit.

Preparations for my visit started before my flight — of course. Aerospace personnel at the Cape helpfully got me the requisite paperwork so that I could get on the base once I got there. I doubled up on my IDs as requested and showed up at the Air Force station on the appointed day.

After getting my picture taken, and having a quick fingerprint check, I was issued a badge and allowed to enter the area where so many launches have taken place.

Cape Canaveral Air Force Station is located on a barrier island off the coast of Florida, and is sometimes confused with the nearby NASA Kennedy Space Center, which uses Air Force launch facilities.

My tour guide for the day was Bill Uttenweiler, an Aerospace business manager, who explained to me that Aerospace is a small but valuable presence on the Air Force Station. There are currently about 60 Aerospace employees who call the Cape their home office, and bear the label “Eastern Range” in their AeroPhone profile.

I was aware that I would be driven around the base, not walking, but I was not prepared for the size of the facility. We drove around in a company car, and I could not stop commenting on the size of the place. It takes 10 minutes just to get from the entrance to Uttenweiler’s office. (I’ve heard people complain about the parking in El Segundo, but I for one am now grateful that it doesn’t take me 10 minutes to drive from the guard shack to my parking spot!)


The remains of Marvin “Butch” Gardner Jr.’s car after it was hit by launch debris in 1997. (Photo: Air Force)

I learned later that Cape Canaveral Air Force Station is about 16,000 acres of land. That seems large, but is paltry compared with Vandenberg Air Force Base, which is about 100,000 acres in size. More than two-thirds of Cape Canaveral is undeveloped land, and according to the Air Force, “The Cape Commander and staff are stewards of the environment with responsibility for protecting the wildlife, both endangered and protected species, as well as the plant life. “

During my four-hour tour, we spent a fair bit of time in the car. Everything is very spread out and in between I saw a lot of grass. I was disappointed that I didn’t view any strange animals—perhaps an alligator or two could have wandered across our path?

Aside from a bird or two, the only animals I saw were of the human variety. In fact, I got a chance to meet the head of Aerospace operations out there, Marvin (Butch) Gardner Jr., who, in my opinion, has earned the top spot at the Cape. A number of years ago, his car was crushed by launch debris. If that doesn’t solidify your position as a rocket scientist, I don’t know what does.

The author shows John Glenn’s reserved parking spot at SLC-14. (Photo: Bill Uttenweiler)

I also got to meet the director of Delta systems, Bob Barnhart; and I met Paul Utecht, who works in a familiar location — STARS. I had been in the El Segundo STARS lab before, and the one at the Cape just felt like a smaller version. Of course, who needs a big STARS lab to watch a launch when you have the actual launch pad just a short distance away?

And the Cape has lots of launch pads. For starters, there were many old ones that are no longer used. The only thing launching from them were shoots of grass. I got to see Space Launch Complex (SLC) 14, which is where John Glenn took off to become the first American to orbit the earth in 1962. There is still a reserved parking spot for him at this pad.

Of course, not all the launch pads were historical. In fact, at SLC-37, there was a Delta IV getting ready for a February GPS launch. I wanted to take a photo, but Uttenweiler indicated that might not be such a great idea, due to security protocols.

I also saw the horizontal integration facility at this pad. Deltas are assembled horizontally and then hoisted upright for the launch. In contrast, Atlas vehicles are assembled vertically and then moved to the pad.

SLC-41, used for Atlas V launches, was empty, but I was able to see its vertical integration facility (VIF), as well as the old processing facilities. Hiking up and down the steps of the VIF looked like a job — I guess there’s a reason they call it the vertical

facility!

I saw the spot where the United Launch Alliance cameras sit on the VIF and take photos of the launch. These cameras sense the vibrations from the launch and this lets them know when to begin shooting photos. I thought that was a pretty cool way to get close-up pictures from a dangerous area.

We also drove by SLC-40, where they launch the Falcon 9, but we didn't get too close.

The whole time we were driving, Uttenweiler kept up a steady stream of facts, trivia, and more. My brain struggled to absorb the massive data dump. He pointed out a large American flag that we could see painted on the side of the Vehicle Assembly Building on Kennedy Space Center, and told me that each stripe is the width of a freeway lane!

As we were driving along, we made a stop at the Beach House, which is pretty much what it sounds like — a cheerful yellow house not far from the water. Astronauts can spend a few days there with their families before their departure to space, and it provides a bit of a quarantine since you don't want your astronauts catching a cold the day before a mission.

At the end of my tour, we took a very brief look at the Air Force Space and Missile Museum. It held old equipment that was used for launches in the past — I must say our STARS facility looks a bit snazzier. Outside were larger items of historical significance, such as a Delta IV Common Booster Core, which made for a more permissible photo op than the one sitting on the pad.

Despite the many things I saw, I know there was more. Uttenweiler invited me to come back again for round two. Perhaps I should take him up on it … I do have a few more unmarried cousins.

January 2014 Obituaries

by Carolyn Weyant
January 01, 2014

Sincere sympathy is extended to the families of:

Ruby Bingham, senior programmer analyst, hired June 20, 1964, retired Nov. 1, 1991, died Dec. 3.
Mary McNeil, senior mathematician, hired Feb. 5, 1962, retired Feb. 1, 1994, died Dec. 12.

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

January 2014 Anniversaries

by Carolyn Weyant
January 01, 2014

40 YEARS

Engineering and Technology Group: Ejike Ndefo

35 YEARS

Engineering and Technology Group: Alonzo Prater, Terry Roberts, David Taggart

Executive Offices: Wanda Austin

Operations and Support Group: Thomas Provencher

Space Systems Group: Lowell Dubberke

30 YEARS

Space Systems Group: John Berg

Systems Planning, Engineering, and Quality: John Nolan

25 YEARS

Engineering and Technology Group: Kevin Aaron, Asya Campbell, Brian Gore, Craig Lee, Donald Mayer

Executive Offices: James Jusko

Space Systems Group: Charles Griffice, Ming Lee, Charles Schwartz

Systems Planning, Engineering, and Quality: Steven Dunham

20 YEARS

Systems Planning, Engineering, and Quality: Ruth Matias

10 YEARS

Engineering and Technology Group: John Halpine, Myron Hecht, Yong Jin, Damian Toohey

National Systems Group: John Cymerman, Michael Leon

Operations and Support Group: Nancy Profera

Space Systems Group: Gary Guo, Raymond Diepenbrock

5 YEARS

Civil and Commercial Operations: Paul Kim

National Systems Group: Robert Hill

Operations and Support Group: Jason Bayonne, John Pike

Space Systems Group: Laarni Davidson, Michael Kwan

January 2014 Notes

by Carolyn Weyant
January 01, 2014

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

• Steve Johnson, Diana Johnson, and Sandra E. Johnson, for the recent passing of their mother and mother-in-law, Miriam Johnson.

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

December 2013 Obituaries (posted 1/6/14)

by Carolyn Weyant
December 01, 2013

Sincere sympathy is extended to the families of:

Linda Abelson, engineering specialist, hired Aug. 14, 2000, died Nov. 10.

Robert Berlin, procurement director, hired Oct. 31, 1960, retired July 1, 1990, died Nov. 10.

Stanley Channon, member of the technical staff, hired Sept. 17, 1962, retired April 1, 1979, died Nov. 9.

Alan Hamm, project engineer, hired May 11, 1998, died Nov. 25.

Robert Herold, member of the technical staff, hired Aug. 10, 1964, retired July 1, 1994, died Sept. 27.

Eugene Hertler, principal director, hired Oct. 21, 1961, retired Nov. 1, 1990, died Nov. 10.

Charles Hoskinson, project engineer, hired May 17, 1961, retired July 1, 2009, died Oct. 9.

Stirling Isom, project engineer, hired Oct. 10, 1983, retired Nov. 1, 1993, died Nov. 10.

Ernest Jacobs, member of the technical staff, hired Aug. 1, 1961, retired Nov. 1, 1991, died Oct. 13.

Robert Knabenbauer, office of the technical staff, hired June 12, 1961, retired April 1, 2005, died Aug. 19.

Carolyn Lee-Wagner, senior engineering specialist, hired July 5, 1983, died Nov. 11.

Ralph Morgan, member of the technical staff, hired Dec. 4, 1961, retired April 1, 1986, died Oct. 15.

Frances Petrilla, office of the technical staff, hired Sept. 22, 1975, retired Oct. 1, 2009, died Nov. 23.

Herman Ross, member of the technical staff, hired May 4, 1964, retired July 1, 1988, died Nov. 3.

Frederick Sanner, member of the technical staff, hired July 23, 1990, retired Oct. 1, 2013, died Nov. 13.

Lawrence Sitney, member of the technical staff, hired May 21, 1962, retired Nov. 1, 1985, died April 27.

Joseph Steinborn, member of the technical staff, hired Dec. 15, 1977, retired Nov. 1, 1989, died Nov. 8.

Susan Vazquez, senior repro operator, hired July 20, 1981, died Nov. 7.

Shih Yang, member of the technical staff, hired April 3, 1989, retired April 1, 2007, died Oct. 28.

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