Orbiter
July 2014

Retiring He is After 43 Years at Aerospace, Milo Whitson

by Kimberly Locke
July 30, 2014

Milo Whitson was honored July 29 for his 43-year career at Aerospace. (Photo: Elisa Haber)

Friends and colleagues gathered at a lunchtime celebration held July 29 in recognition of Milo Whitson Jr., senior project leader, Acquisition Support and Information Department, Systems Engineering Division, Engineering and Technology Group (ETG), who is retiring July 31 after 43 years of service to the corporation.

Springing off a “Star Wars” theme, Whitson’s management and coworkers referred to him as a “Jedi” of sorts for a variety of reasons including his role in mentoring many in his department, especially in preparation for his departure and the need for his coworkers to be able to successfully meet continuing department requirements.

Gifts included a Jedi lightsaber and a card depicting Whitson wearing a Jedi robe and signed by well wishers.

Matthew Marshall, Whitson’s director, led the festivities and said it was a privilege to work with him. He recounted some of Whitson’s achievements during his career at Aerospace, adding he wished he had met him sooner. Marshall called Whitson’s support of department tasks “awesome.”

Rosalind Lewis, principal director, Acquisition Analysis and Planning Subdivision, also praised Whitson for his contributions saying “we were blessed to have him in our organization.” Lewis added that the department gained an even greater sense of credibility to perform the work that was needed because of his experience.

With Whitson’s low-key disposition it’s easy to miss the key roles he has played on several major programs including the Space-Based Infrared Systems (SBIRS) and Space-Based Radar programs. For both programs, Whitson served as the ground systems director.

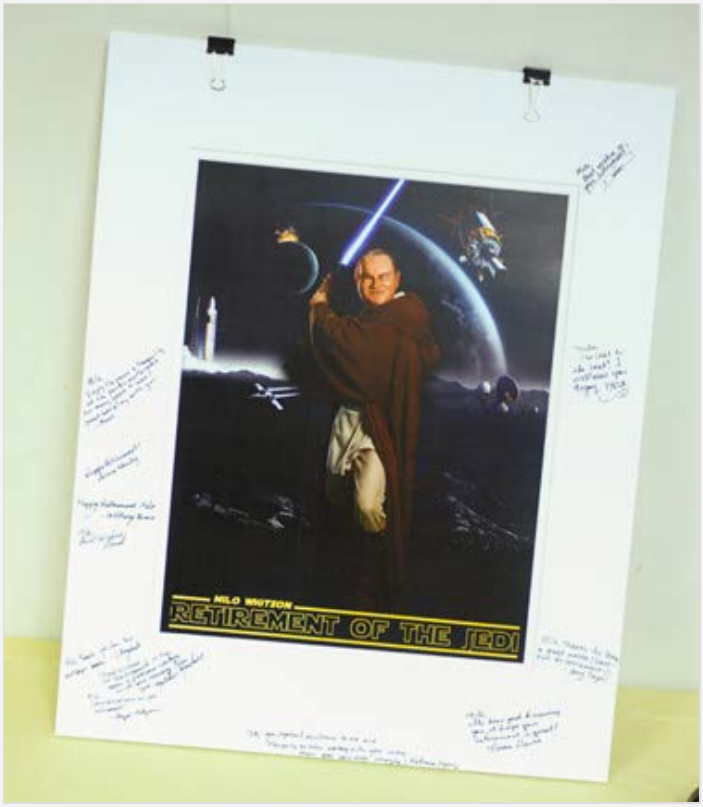
In 1971, when he joined Aerospace, the space industry was experiencing a lull but fortunately for Whitson, the labs were busy and he was hired in as an associate member of the technical staff. As he worked his way up to member of the technical staff, Whitson was able to ply his educational background in physics — he holds both bachelor’s and masters’ degrees in the subject from USC — by doing what he called “experimental physics,” a field he had a hankering for since his grade school days. His dad, who was head of the mathematics department at Cal Poly San Luis Obispo, had an obvious influence on him.

“I always enjoyed doing hands-on science,” recalled Whitson of his fondness for physics.

When asked what kept him at Aerospace so long, Whitson explained that it’s been the wealth of different opportunities he has had. “It’s as if I’ve had five or six different careers here,” he said. “I’ve been able to go from working in the labs to supporting technical and acquisition activities for multiple program offices. And now, as part of ETG, I never know what issue is going to come my way and that keeps it interesting,” he added.

His most challenging assignment at the corporation was providing mission support to the program office for the Defense Satellite Program (DSP). “There, I had the responsibility of analyzing DSP data in ways that had never been done before while working for some really great people,” he explained.

Whitson’s Aerospace career has included earning various distinctions. He received a Group Achievement Award while working



Whitson was depicted as a Jedi knight from the "Star Wars" movies on a card signed by coworkers. (Photo: Elisa Haber)

No retirement celebration is complete without a cake. (Photo: Elisa Haber)

in the Mission Support and Talon Shield/Alert offices of the Defense Support Program for his efforts in developing the SOLE DSP processor. Additionally, he was recognized with a Team Achievement Award for the Large Offset Pointing Technique concept.

Earlier in his career, Whitson published a number of professional papers on such topics as gas phase chemical kinetics, infrared properties of materials, and solar energy. It was around this same time that he designed and deployed the Aerospace Solar Measurement Facility for collecting data used for the design of the Southern California Edison 10 megawatt solar demonstration plant.

In retirement, Whitson will spend much of his time in Washington state involved with his hobbies, which include woodworking and photography.

His advice to those just starting their careers is, "find out what Aerospace is all about and explore the opportunities."

Delta IV Successfully Launches Air Force Payloads

July 29, 2014

Delta IV launches from Cape Canaveral on July 28. (Photo: United Launch Alliance, LLC)

A Delta IV launch vehicle placed two Air Force payloads into orbit early Monday evening.

Ray Johnson, vice president Space Launch Operations, reported from Cape Canaveral Air Force Station on Tuesday morning: “Delta IV with the AFSPC-4 payloads was successfully launched Monday night from Space Launch Complex 37 at Cape Canaveral. The vehicle lifted off at 7:28 p.m. EDT [4:28 p.m. on the West Coast], about 45 minutes into the launch window. This launch finally occurred on the fifth attempt because of significant weather challenges caused by daily evening thunderstorms.

“The two GSSAP satellites and the ANGELS secondary payload were successfully deployed early this morning. There were no significant technical issues during the mission, and no problems were identified that will impact our next launch which is Atlas V/GPS IIF-7 scheduled to launch this coming Friday night. Congratulations to the Delta launch team for this outstanding success.”

Yee Upped to Senior Engineering Specialist

July 28, 2014

Dr. Patrick Yee

The Engineering and Technology Group announces the promotion of Dr. Patrick Yee to senior engineering specialist, Fluid Mechanics Department, Vehicle Performance Subdivision, Vehicle Systems Division (VSD).

In his new assignment Yee is responsible for leading analyses, planning, and evaluation of thermal issues for launch vehicle and spacecraft systems in support of Space Systems Group and National Systems Group programs, as well as commercial customers. He is also playing a lead role in the acquisition, development, and validation of analytical tools for the prediction of thermal protection system performance.

Yee joined Aerospace in 1992 as a member of the technical staff. His most recent previous position was manager of the Aerothermal Analysis Section of the Fluid Mechanics Department, Vehicle Performance Subdivision, VSD.

Mission Assurance Improvement Workshop Aids Space Industry

by Kimberly Locke
July 21, 2014

For the past seven years, Aerospace subject matter experts have gathered with industry colleagues from across the nation at the Mission Assurance Improvement Workshop (MAIW) to tackle issues relevant to the space community.

“The MAIW provides a unique forum that allows industry to collaborate, at the technical subject matter expert level, on issues and concerns the space industry is having with respect to mission assurance,” said Russ Averill, general manager, Space-Based Surveillance Division, Space Systems Group. “There is no other forum that provides this level of involvement by so

many space industry professionals involved with tackling key issues."

"The products developed by workshop participants are available not only for their implementation but for all national space contractors and vendors," said Averill. "Another huge benefit of participating in this workshop is the network of expert resources that attendees have access to long after the workshop is over."

A year prior to the workshop, topics with a defined charter and desired deliverable are selected by a steering committee of industry, government, and federally funded research and development members. Core teams of subject matter experts are assembled from across government and industry to develop the draft deliverable, such as a best practice guide, over the course of several months.

The draft products are sent out to additional subject matter experts for wider review prior to the workshop. The teams work through the feedback at the workshop to refine the deliverable products, which are released at the Mission Assurance Summit in the fall.

Participants in the Mission Assurance Improvement Workshop. (Photo: Brian Mack/Orbital Sciences Corp.)

For this year's workshop, teams explored the following topics while creating significant related products: Guidelines for Hosted Payload Integration; Root Cause Investigation Best Practices; Risk Identification at Program Inception; Radio Frequency Breakdown Prevention; and Counterfeit Prevention Strategies.

Guidelines for Hosted Payload Integration

Jack Kawamoto, senior project engineer, Acquisition Risk and Reliability Engineering Department, Systems Engineering Division, Engineering and Technology Group (ETG), was one of three co-leading a team that worked on process improvements for the design integration and interface verification as hosted payloads (HPs) are installed on host space vehicles (HSVs).

Kawamoto explained, "When HPs are installed on HSVs with available capacity, a reduced cost for successful HP orbital operation is the usual result." The "do no harm analysis" was initially included in the team title as an interface failure modes and effects analysis (FMEA) is performed to verify that propagating failure modes from the HP do not affect successful operation of the HSV's primary mission, he said. "In the broader sense, 'harm' is the result of any negative effect that can influence successful mission performance and those identified by the analysis are a subset of this broader category," said Kawamoto.

Russ Averill addresses the Mission Assurance Improvement Workshop, which was hosted by Orbital Sciences Corporation. (Photo: Brian Mack/Orbital Sciences Corp.)

Unnoticed gaps between the HSV/HP requirements, capabilities, and environments are more frequent in hosted payload projects as the HP and HSV are commonly developed separately, he said. Checklists were created for 14 disciplines (such as attitude control, power, electrical-mechanical design integration, and fault management) to identify and eliminate potential interface incompatibilities. Critical analyses for ensuring interface compatibility and a "test as you fly" verification process are described and included.

"The team benefited from two co-leads from prime contractors who worked on past MAIW projects and were experienced with the integration of HPs into both commercial and government HSVs," said Kawamoto. Because the team members were divided equally between payload and bus contractors, both viewpoints were presented during the discussions, he added.

Team members brought perspectives from both host and payload as well as from various disciplines, such as systems engineering, product assurance, electrical and mechanical design integration, thermal design and analysis, reliability analysis, and FMEAs, which are reflected in the final product.

Root Cause Investigation Best Practices

Roland Duphily, left, at a working session of the Mission Assurance Improvement Workshop. (Photo: Brian Mack/Orbital Sciences Corp.)

Roland Duphily, senior engineering specialist, Acquisition Risk and Reliability Engineering, Systems Engineering Division, ETG, led a team that resulted in the creation of the Root Cause Investigation (RCI) Best Practices Guide. This team addressed the Root Cause Analysis (RCA) element of the broader Root Cause and Corrective Action process with a focus on space systems.

The team addressed anomaly or failure investigations that did not establish definitive root cause and resulted in acceptance of a residual risk, which may not have been recognized, a lack of leadership and guidance material on performance of (RCA), and variability in techniques used for executing RCAs that may result in ineffective or inefficient root cause investigations.

The RCI Best Practices Guide, which previously didn't exist for the national security space community, includes a basis overview for RCAs, definitions and terminology, commonly used techniques, and needed skills/experience; key early actions to take following an anomaly/failure; data/information collection approaches; team facilitation techniques; and RCA pitfalls.

Risk Identification at Program Inception

Andrew Hsu, senior engineering specialist, Acquisition Risk and Reliability Engineering, Systems Engineering Division, ETG, and Dr. Amy Weir, senior project engineer, Program Executability, Engineering and Integration, Space Systems Group, co-led the team on risk identification at program inception.

According to Hsu, risk management is a robust and well documented process applied in commercial industries and government programs. Risk identification is an important first step in the process, he added. However, many problems encountered by programs were not identified as risks and therefore the methods and tools available to manage those risks were not implemented.

"Unidentified risks will manifest themselves in one of two ways: at best they will contribute to program cost and schedule overruns," Weir said. "These cost and schedule overruns can be traced to an unrealistic risk profile at program inception. At worst, the unidentified risks will cause critical mission failures that should have been avoided if the failure was identified as a risk early in the program life cycle and was properly managed," she said.

To help ensure due diligence in identifying potential risks, the team produced a guidance document to assist the space community with recognizing barriers that inhibit effective baseline risk identification. The document also provides recommended actions to help prime and sub-contracting agents, risk process owners, and risk management practitioners more effectively address these barriers. The document includes a method to assess the completeness of risk identification activities.

Radio Frequency Breakdown Prevention

Timothy Graves, senior project engineer, Engineering and Integration, Imagery Programs Division, National Systems Group; Preston Partridge, engineering specialist, Antenna and Phased Array Evaluation, Communications and Cyber Division Operations, ETG; and Aimee Hubble, member of the technical staff, Electric Propulsion and Plasma Science, Technology and Laboratory Operations, ETG, co-led the team examining radio frequency (RF) breakdown.

RF breakdown is an issue that continues to plague civil, commercial, and national security space programs. Electron multipactor discharges or ionization breakdown can severely damage RF systems used for communication, navigation, and other RF/microwave missions, Graves explained.

"The number of component and system failures has increased in recent years due to higher available satellite power that pushes legacy components to unprecedented power levels," he said. "Many, if not all, of these failures can be traced back to lack of front-end system engineering and application of proper test/analysis methodologies in place for risk mitigation."

As a product of the workshop, TOR-2014-02137: Standard/Handbook for RF Breakdown Prevention in Spacecraft Components provides a new, rigorous process and engineering standard to be implemented at program inception. "This process is intended to minimize program risk with focus on multipactor breakdown, while also providing a realistic and tailorable solution that can apply to a range of programs and applications," said Graves.

The document includes the overall process for assessing risk for each RF/microwave component and provides margin requirements as well as minimum requirements for margin verification. It also provides guidance, said Graves, to implement state-of-the-art analysis and test tools as well as recommended methodologies that are necessary to reduce conservatism and unnecessary program costs.

Counterfeit Prevention Strategies

David Meshel, senior project leader, System Engineering, Imagery Products Division, National Systems Group, and a subject matter expert (SME) in parts, materials and processes, and mission assurance led the team to develop a document that the contractor community can use as a guide to assist them with implementing a Counterfeit Detection and Avoidance System.

David Meshel, right, at MAIW. (Photo: Brian Mack/Orbital Sciences Corp.)

"The guide is in response to the proliferation of counterfeit electric, electronic, electro-mechanical, and electro-optical parts detected within the U.S. government supply chain," Meshel said. "The volume and sophistication of counterfeit parts is steadily increasing and have been found in almost every sector of the aerospace and defense industry," he added.

Under the requirements of the 2012 National Defense Authorization Act (NDAA) and the Department of Defense's Defense Acquisition Regulations System (DFARS) rule, any DOD contractor faces strict financial liability for any impact caused by counterfeit parts discovered in the product. Further, DOD contactors must implement "Counterfeit Electronic Parts Detection and Avoidance System," a guiding approach to meeting these requirements.

The team's document provides guiding principles and practices that when implemented, could help ensure that the contractor's counterfeit electronic part avoidance and detection system aligns to, and is compliant with, the 2012 NDAA law and DOD regulations regarding counterfeit protection. This document differentiates from other existing industry standards in a number of ways that include:

• Addressing preventative techniques in design, program management, obsolescence management, and procurement management to raise the potential for part availability at the authorized supplier

• Providing lessons learned, best practices, observations, driving philosophies and case studies from government agencies, contractors and recognized industry SMEs who have been refining counterfeit prevention strategies for years

• Outlining key topics for building an effective training program and containing links to fully developed programs that can be evaluated and tailored for incorporation into a supplier's training suite

Peter Fuqua Promoted to Distinguished Scientist

July 08, 2014

Dr. Peter Fuqua

Dr. Peter Fuqua has been promoted to distinguished scientist in the Space Materials Laboratory (SML), Technology and Laboratory Operations, Engineering and Technology Group. In his new position, Fuqua is responsible for providing technical leadership within SML as well as technical guidance on thin film materials and optical coatings to Aerospace customers.

Fuqua joined the corporation in 1997 as a member of the technical staff in Laboratory Operations with a focus on the processing and properties of thin films for spacecraft optical and thermal control applications. He has held positions of increasing responsibility within SML and most recently served as a senior scientist in the Advanced Materials Processing Department.

Fuqua has received numerous commendations for his work on behalf of Aerospace's customers and was a member of the team that received the President's Achievement Award in 2011 "for identification of a critical mirror design flaw."

Awards and Recognitions, July 2014

by Matthew Kivel
July 17, 2014

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 Matt Kivel at matthew.k.kivel @aero.org. Include a photo related to the award, if available.

Dr. De-Ling Liu

The Institute of Environmental Sciences and Technology (IEST) has honored Dr. De-Ling Liu, manager, Contamination Control Section, Space Materials Laboratory, Technology and Laboratory Operations, with the Maurice Simpson Technical Editors Award for her paper “Evaluating Aerosol Aspiration Efficiency in Fast-moving Air.”

Dr. De-Ling Liu

Annually, the IEST selects the best technical papers it has published during the preceding year based on a paper’s “freshness of topic and approach,” “potential impact in its field,” and “technical quality, scope, and achievement.” Liu’s winning paper was published in the October 2013 Journal of the IEST. She received the award at the EISTECH 2014 Membership and Award Luncheon on May 15, 2014 in San Antonio, Texas.

The Aerospace Corporation / Jeffrey Jacobson

From left, Stan Sims, director, Defense Security Service; Jeffrey Jacobson; John Tunnell, Aerospace Security, Chantilly; and, Richard Lawhorn, DSS director of field operations.

Aerospace’s Albuquerque office has been named a recipient of the 2014 James S. Cogswell Outstanding Industrial Security Achievement Award.

The sole Aerospace Security representative at the Albuquerque office is Jeffrey Jacobson, industrial security specialist, who also received the Cogswell Award in 2010.

The Cogswell Award is “the most prestigious honor the Defense Security Service (DSS) may bestow to cleared industry.” Out of a total group of 13,300 defense contractors subject to assessment by the DSS, an elite few are selected to receive the award each year. There were 40 recipients in 2014. For 2010 there were nine.

To receive consideration for the Cogswell award, a facility must be nominated by its assigned DSS industrial security representative and have two consecutive superior industrial security review ratings. The facility must show a sustained degree of excellence and innovation in its overall security program management, implementation, and oversight.

Jacobson has worked at Aerospace since 1993, serving as the sole Security official at the Albuquerque office for the entirety of

his career.

The Aerospace Corporation

The American Society for Training and Development has selected The Aerospace Corporation as one of its 2014 BEST Award winners.

The honor is presented to organizations that “demonstrate enterprise-wide success as a result of employee learning and development.” Established in 2003, the BEST Awards recognize the achievements of “small, large, private, public, and not-for-profit companies” from across the world.

Debra Emmons

Debra Emmons

Debra Emmons, principal director, Advanced Studies and Analysis, was recently elected to The National Space Club’s 2014-2015 Board of Directors, where she will serve as Goddard Dinner Chairperson / President-elect.

The National Space Club is a “non-profit organization devoted to fostering excellence in space activity through interaction between industry and government, and through a continuing program of educational support. Awards are offered to recognize significant achievements in space science and enterprise. Scholarships and other education support are a major focus of Club activity.”

Emmons has been with Aerospace since 2003, sharing the President’s Achievement Award in 2006 and 2010 for her efforts on the Hubble Space Telescope Robotic Servicing Mission Analysis of Alternatives, and the Review of Human Space Flight Committee support (Augustine Panel), respectively. In 2007, Emmons won the Aerospace Woman of the Year (WOTY) Award, which recognizes women employees at Aerospace who have made outstanding contributions in the areas of job performance, company activities, community involvement, professional/career/educational achievements, and demonstrated leadership and initiative.

In her current role as principal director, Emmons is responsible for advanced studies and analysis program support for NASA and other civil and commercial customers. She manages a geographically distributed team, and provides technical direction to engineering staff supporting various programmatic and technical assessments and strategic studies.

Christopher Named Principal Director in Space Systems Group

July 16, 2014

David Christopher

David Christopher has been appointed principal director, Range and Satellite Control Enterprise Directorate, Launch and Satellite Control Division, Space Launch Operations, Space Systems Group.

In this position Christopher is providing management and technical leadership for a broad range of technical and programmatic activities associated with the directorate. His duties include ensuring effective application of Aerospace resources to the Air Force’s Launch and Test Range System and the Air Force Satellite Control Network. Christopher is also leading and managing the application of rigorous mission assurance and risk management methodologies to the aforementioned programs as well as providing guidance to sustainment and modernization studies and tasks.

He most recently served as principal director for the Computer Applications and Assurance Subdivision, Computers and Software Division, Engineering and Technology Group. Christopher started at Aerospace in 2000 as a senior project engineer in Civil and Commercial Operations, working on NASA programs.

Case Closed for Reentry Breakup Recorder

July 15, 2014

Geoff Maul, of the Microsatellite Systems Department, looks on while Asuncion (Jose) Perez of Boeing prepares the heat shield of the next Reentry Breakup Recorder for sealing. The REBR was sent to NASA on Monday, July 14, and is scheduled to launch in October on the Orb-3 resupply mission to the International Space Station. (Photo: Eric Hamburg)

Aerospace Plays Big Role in NEXT Big Thing

by Heather Golden
July 07, 2014

Aerospace, in partnership with NASA, is on the cutting edge of the next big thing in ion engine propulsion – the aptly named NASA Evolutionary Xenon Thruster (NEXT).

What is the NEXT?

The NEXT, which was developed at the NASA Glenn Research Center, is the newest generation of electric ion thrusters and has a fuel efficiency that is 5-to-20 times greater than a chemical thruster. Fuel efficiency can be “chosen” to best match mission needs.

Mark Crofton, senior scientist, Propulsion Science Department, measures movements made by the NASA Evolutionary Xenon Thruster (NEXT) during testing. (Photo: Heather Golden)

Ion thrusters have a lower level of thrust than their chemical counterparts, but each exhaust particle moves much more quickly as it exits, so less propellant mass can do the same job. While they are not powerful enough to launch a vehicle into space, their higher specific impulse (a measure of fuel efficiency) opens up new possibilities for future deep space exploration and longer trips to explore far off asteroids or planets, as well as new motion-intensive applications in near-Earth space.

“This is one of the ways to get very far in a feasible way,” said Mark Crofton, senior scientist, Propulsion Science Department. “You could say it’s got great gas mileage and can run forever.” Crofton is one of the handful of Aerospace scientists who has

worked with the NEXT.

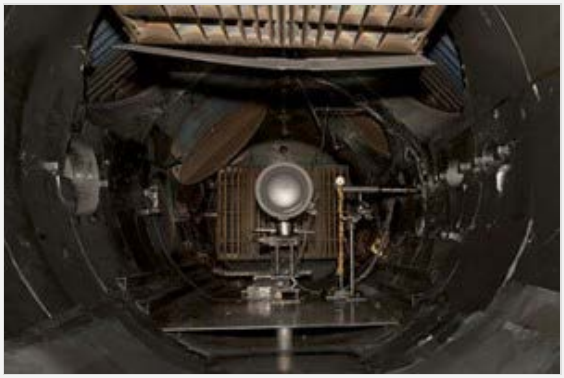
The uniqueness of the solar-powered NEXT engine, however, has mostly to do with its very long lifespan compared to any other thruster, chemical or electric, and improved performance capability relative to other ion engine designs. It can operate at high power levels – up to seven kilowatts and beyond, and process large amounts of propellant over its lifetime.

NEXT set a world endurance record when it operated for about 50,000 hours, equal to more than five years continuous running. During the test, a total of about 2,000 pounds of xenon propellant was run through the engine, setting another world record, this time for throughput. A typical chemical engine would have had to use more than 20,000 pounds of conventional rocket fuel to produce the same amount of total impulse. These performance levels exceed the anticipated requirements for any proposed space missions in the near future, according to a NASA press release.

The NEXT at Aerospace

Aerospace's role with the 7-kilowatt ion thruster is running a series of tests on NEXT to characterize its capabilities, and conducting research development for the technology that comes after.

Aerospace has been working with NASA on its ion engine on and off for five years, two or three months each year. During that time, a litany of testing in Aerospace's vacuum chamber has occurred, with "different members of the department handling various aspects of the testing," Crofton said.



The NEXT inside an open vacuum chamber at Aerospace. (Photo: Heather Golden)

The most recent of those tests was to help NASA, potential future manufacturers, and purchasers understand the thruster's life-limiting component. When the thruster expels ions, they pass through many small holes in an exit plate, or grid, at very high velocity. A small fraction of the ions will collide directly with the grid and change its surface by creating microscopic gouges.

"It changes the geography of the grid," Crofton said. "If too many ions are impacting the surface directly, we have to tailor operating conditions to keep that from happening. There is a background of neutral propellant atoms. Ions that undergo collisions with neutral will have a reaction and form stationary ions. Instead of leaving, these stationary ions can seek out the negative potential of the grid and cause some damage."

Testing things like this as accurately as possible, without being in the vacuum of space, is what Aerospace does best. Through a method using laser-induced fluorescence of molybdenum atoms, Crofton's team assessed the lifetime potential of many possible throttling levels much more quickly than a conventional lifetest can do. The Aerospace lifetest ran more than five years and only looked at five throttle levels.

"We're the only game in town as far as measuring the molybdenum," he added. "Overall, Aerospace has done the most complete beam ion and plume characterization [measuring all relevant parameters] that's been done for any thruster."

The good news is lifetime figures completed on Earth's surface will actually improve once in space. The vacuum of space has the power to pull away neutral, wayward propellant atoms faster and more completely than any vacuum chamber on Earth can mimic, so there will be less around to cause trouble.

What's next after the NEXT?

The NEXT is in its final stages of testing and is considered a "well-developed article," Crofton said. With that, it will not be changed before its first flight sometime in the near future. Proposed missions that use NEXT are being submitted this year for NASA's Discovery program.

In the arena of ion engine technology, the Propulsion Science Department has now turned its attention toward technologies that could eventually replace the NEXT – annular and hybrid ion engines – using the knowledge gained while studying the NEXT and other ion thrusters.

"What we've done with NASA is typical of what we do – make electric thruster measurements," Crofton said. "All sorts of companies come in with thruster systems. We have seen tons of civil and commercial work for thrusters. This is our bread and butter."

There are two main classes of ion thrusters that can be used for sizeable spacecraft – the Hall current thruster and the ion engine. The possibility of a hybrid engine, one that pairs aspects of NEXT with portions of the Hall current thruster, is an exciting one for Crofton and his team because it means being able to combine the best aspects of both technologies into something that cannot be matched by anything on the market today.

The Hall thruster can generate higher thrust, while ion engines have higher exhaust velocities and better mileage. The ion engine under development for the hybrid has an annular rather than round shape, and is itself a big step forward.

A video camera records the NEXT as it operates within a vacuum chamber at Aerospace. (Photo: Heather Golden)

“With these combined, we would have a much wider range over which you can operate the system,” Crofton said. “Each thruster has a sweet spot for exhaust velocity, where they work best. We want to improve the performance and increase the operating envelope at the same time. It is only a perceived advantage. Nobody’s even built one of these yet,” he added. “We are partnering with NASA for that work. NASA has been developing ion engines since the 1960s. NASA-Glenn is the world’s expert on ion engines and it is good for us to get to partner with them.

“Right now we’re building and testing annular ion engines as the first step,” Crofton added. “Raising the thrust to power metric over a wide specific impulse range is a big goal for us, because of the Earth orbit applications.”

There are big benefits to a hybrid, but combining the two types of engines would also mean the interactions would become more complicated and difficult to measure and interpret. Studying NEXT on its own has also opened up new lines of questioning for which the team is still trying to find answers. Crofton said this is no bad thing.

“There are also new physics there that you can come to grips with,” he said. “There are some measurements of the NEXT that we made, even four years ago, that we are still struggling to understand.

“When these measurements are made, you try to understand them,” he added. “If it is precise enough, you get in a regime where interpreting what you find can be a huge challenge. As you understand these new levels, that feeds into the next generation of research.”

That’s Doctor Vice President, If You Please

July 01, 2014

By Lindsay Chaney and Jessica Brown

Dr. Wayne Goodman, left, and Dr. Dave Gorney, in the STARS lab during the launch of DMSP-19 on April 3. (Photo: Eric Hamburg)

In a rare occurrence in the annals of The Aerospace Corporation, three corporate officers, all holding doctorate degrees, take their new posts on the same day.

The three Aerospace leadership changes, effective today, July 1, comprise the executive vice president, a senior vice president, and a vice president. The advanced academic degrees of the incoming officers are a reflection of the corporation’s unique role as the country’s foremost repository of technical expertise in the field of space launch.

Dr. David Gorney is the executive vice president for the corporation and will retain leadership of the Space Systems Group, where he is responsible for Aerospace’s support to all launch programs, ground networks, and satellite programs overseen by the U.S. Air Force Space and Missile Systems Center and for support to Navy satellite programs. The executive vice president position has been vacant since the retirement of Dr. Joe Straus in 2008.

Gorney holds a Ph.D. in atmospheric sciences from UCLA. He received his bachelor’s degree in physics from the University of Bridgeport in Connecticut.

Dr. Wayne Goodman is the new senior vice president, Operations and Support Group, replacing Mike Drennan, who retired on

June 30. In this role, Goodman oversees the Corporate Communications and Public Affairs Division, Inclusion and Equal Opportunity Office, Facilities, Finance and Business Operations, Human Resources, Security and Safety, and the corporation's in-house university, The Aerospace Institute.

Dr. Malina Hills, then 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 last January. (Photo: Eric Hamburg)

Goodman received his doctorate from the University of California, Berkeley, in mechanical engineering. His bachelor's degree, also in mechanical engineering, is from Drexel University in Philadelphia.

Dr. Malina Hills assumes Goodman's prior role as vice president, Space Program Operations. She is responsible for working directly with the U.S. Air Force, government, and industry partners to develop military satellites and to advance national security space systems. Hills oversees four major mission areas: communications, surveillance, weather, and navigation.

She received her Ph.D. in chemical engineering from Caltech. Her undergraduate degree is from Yale University in engineering and applied science.

July 2014 Obituaries

by Carolyn Weyant
July 01, 2014

Sincere sympathy is extended to the families of:

William Allen, graph svc. coordinator, hired Oct. 3, 1960, retired Aug. 1, 1989, died May 27.
Raymond Barenchi, senior locksmith, hired Feb. 2, 1981, died May 31.
Edward Burkart, administrative technical staff, hired April 21, 1979, retired March 1, 1990, died May 31.
J. Jason Gale, member of the administrative staff, hired March 5, 1962, retired April 1, 1979, died May 6.
Madelyn Gault, senior communications coordinator, hired Oct. 3, 1974, retired Oct. 1, 1996, died June 4.
Clinton Greene, manager, hired April 16, 1964, retired Sept. 1, 1987, died June 5.
Ramdas Gupta, member of the technical staff, hired March 28, 1979, retired Oct. 1, 1998, died May 13.
Richard Phelps, senior scientist, hired July 31, 1962, retired Oct. 1, 1996, died May 10.
Lynn Rattinger, secretary, hired March 18, 1963, retired June 1, 1999, died May 27.
Frank Riggs, member of the administrative staff, hired Sept. 5, 1962, retired July 1, 1987, died June 26.

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

July Notes

by Carolyn Weyant
July 01, 2014

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

Tim Bixler and Virginia Bixler, for the recent passing of their mother and mother-in-law, Jeannette Bixler.
Jennifer Castellanos, for the recent passing of her mother, Josephine Serafin.
John Wainscott, for the recent passing of his brother-in-law, Raymond Barenchi.

To notify Aerospace of a death and have it included in the Orbiter, please contact Valerie Jackson in Human Resources at

310-336-0891.

July Anniversaries

by Carolyn Weyant
July 01, 2014

35 YEARS

Engineering and Technology Group: Michael Adams, Donald Brueck, Felicia Mathews, Sharon Robinson

Space Systems Group: John Clark, Francis Knight

30 YEARS

Engineering and Technology Group: Joseph Barger

Operations and Support Group: Susan Jones, Debbie Kellner-Mamiaro

Space Systems Group: Arthur Yamada

Systems Planning, Engineering, and Quality: Dana Speece

25 YEARS

Engineering and Technology Group: Richard Dickinson, Jonathan Gayek, Richard Johnson, Darren Kamimoto, Lynn Ketner, Anna Liu, John Maksymowicz

National Systems Group: Thomas Henkle

Space Systems Group: Paula Collins, Lori Crosse, Andrew Shearon

Systems Planning, Engineering, and Quality: Daniel Sebo, Marlon Sorge, John Shure

20 YEARS

Engineering and Technology Group: James Stepanek

National Systems Group: Patrick Wang

15 YEARS

Engineering and Technology Group: Gebriel Iyanu, Alan Olson, Dhruv Patel

National Systems Group: William Kaida, Keven MacGowan

Operations and Support Group: Wafica Elassadi

Space Systems Group: Rosy Atmadja, Robert Eisenhauer, Timothy Martin, Joe Neuenschwander

10 YEARS

Civil and Commercial Operations: Kaushik Shah, Mohammad Tehrani

Engineering and Technology Group: Steven Benkufski, Michelle Gregorio, Debra Ivons,

John Schwille, David Shockley, Michael Tockstein, Duc Tran, Larry Wong

National Systems Group: Meade Carlson, David Gillard, Aaron Jacobovits

Operations and Support Group: Charles Cress

Systems Planning, Engineering, and Quality: Eric Sundberg

5 YEARS

Engineering and Technology Group: Andrew Brethorst, Rishi Kumar, Christopher Lim, Stephen Schultz

Office of the General Counsel and Secretary: Malissia Clinton

Operations and Support Group: Winston Cortenbach

Space Systems Group: William Bjorndahl

Systems Planning, Engineering, and Quality: Todd Kee