

NRP Post

A publication of NASA Research Park

Happy New Year

Winter 2010

Photo Courtesy Charles Barry, Santa Clara University



CREST Santa Clara University students (L-R): Mike Rasay, Paul Mahacek, Jose Acain, Ignacio Mas

From the Surf to Above the Earth - Students Conduct Missions at NRP's Center for Robotic Exploration and Space Technologies

by Dr. Christopher Kitts, Director, CREST

The Center for Robotic Exploration and Space Technologies (CREST) students have been active this past year, conducting a wide range of science missions and technology demonstrations using a variety of novel robotic platforms and advanced control systems.

A consortium of academic institutions, CREST uses student-centered projects to develop advanced technologies and conduct exciting science missions using spacecraft and robotic systems.

CREST works with collaborators and sponsors to explore novel concepts, prototype emerging capabilities, and validate state-of-the-art systems through experimental field demonstrations. This provides partners with low-cost innovations in an environment that can tolerate risk, and provides students with cutting-edge, hands-on, interdisciplinary engineering education experiences.

Santa Clara University (SCU) is the lead institution for the consortium, and partners include U.C. Santa Cruz (UCSC), Ohlone College, San Mateo Community College, the University of Nevada Reno (UNR), the University of Alaska Fairbanks, the University of Hawaii (UH), St. Louis University (SLU), and others. Past partners have included Stanford University, Cal Poly SLO, and San Jose State University. Sponsors of CREST missions and research have included NASA, NSF, NOAA, the U.S. Air Force and Navy, and several companies.

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SV STAR, Inc. brings Green Aviation Research to Ames

by Diane Farrar

A sleek Pipistrel Sinus motorglider sits in Ames' Hangar N211A being prepped for modification. Its gas powered engine will be removed, and an electric motor and battery pack installed for the aircraft to fly solely on electric power. This electric conversion is the first step in a new collaborative green aviation research effort between NASA Ames, Stanford University and Silicon Valley Space Technology & Applied Research, Inc. (SV STAR).

SV STAR was co-founded by San Gunawardana, currently completing his PhD in Aerospace Engineering at Stanford, and NASA Research Park partner Andrew Gold. SV STAR purchased the Pipistrel in August 2009 to support the joint venture's first green aviation research project. SV STAR chose the Pipistrel aircraft for its efficiency and flexibility as a test platform. Pipistrels have won several green aviation competitions in the past, including the NASA sponsored CAFE (Comparative Aircraft Flight Efficiency Foundation) competitions for efficiency and noise pollution.

"We are creating a rich environment for applied research and the development of very interesting technology," said Gold. "Ames leadership wanted green aviation research, so SV STAR moved quickly to provide this platform, and we will continue to engage NRP partners and additional students. The sky's the limit," Gold said.

The team plans to perform the electric conversion, and install the battery packs and motor in February 2010. "The main obstacle for electric aviation is the low energy density of current batteries compared to gasoline," said Gunawardana.

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(L-R) Andrew Gold, CEO, International Network Solutions and Co-Founder SV-STAR, with Ames' Paul Espinosa, Programs and Projects Directorate, Project Management Division, NASA Liaison to the SV STAR green aviation project.

Photo by Diane Farrar



SWATH Boat During a Bathymetric Mapping Mission in Lake Tahoe

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Mission Operations for NASA Ames Spacecraft

One of the most compelling activities involves the operation of several NASA Ames Research Center spacecraft. These include GeneSat-1, launched in December 2006, PharmaSat, launched in May 2009, and O/OREOS, being readied for launch in early 2010. CREST students at SCU developed all ground communication and control software for these spacecraft, perform experimental operations for NASA science teams during the primary part of the missions, and conduct educational activities with the spacecraft until the satellites' end of life. Ohlone College students contributed by developing a public database for amateur radio operators who receive satellite beacon data and share this data with others. For the upcoming O/OREOS mission, students at SLU and UH will help to install and operate remote communication stations.

Mapping Geologic Features in Lake Tahoe

CREST students have been conducting geologic and marine habitat surveys of Lake Tahoe for several years. In October SCU students conducted a bathymetric mapping mission with a new student-developed SWATH (Small Waterplane Area Twin Hull) boat. This deployment was the first science mission for the autonomous boat, which uses an innovative twin-hull mechanical design that improves the boat's stability in waves. In addition, a suite of high-precision sensors measures the boat's position and dynamic properties to properly interpret and resolve the sonar data, thereby improving map quality. Students, with a science team from the U.S. Geological Survey (USGS) and UNR, operated the boat to create a high-resolution map of a series of boulder ridges on the Tahoe Shelf along the northwestern shore of the lake. These ridges are proof that a tsunami wave occurred in the lake during the McKinney Bay landslide thousands of years ago. Using SCU's Triton underwater robot during a series of dives in 2005 and 2006, the CREST-USGS team discovered these ridges, which represent a highly significant scientific finding as the first-ever proof of a tsunami in the lake.

Engineering Innovation

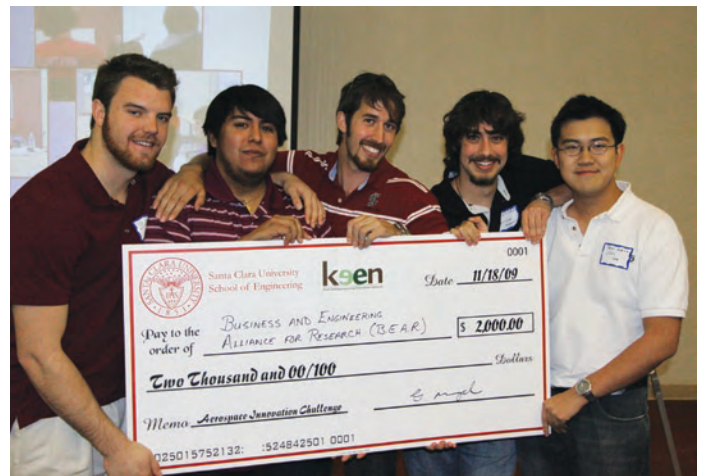
CREST students work with sponsors and collaborators to develop and perform cutting-edge engineering research, all developed and demonstrated at the CREST facility, Building 583C in NASA Research Park. Students at UCSC and SCU have teamed to demonstrate the use of computational linguistics and spoken dialogue interfaces for controlling robots. SCU students have developed a new multi-robot control framework, and the NSF has just awarded corporate partner ACRi and SCU an SBIR Phase I grant to demonstrate multi-robot smart antenna beamforming. SCU students also teamed with a visiting student from Germany as part of a BMW program to apply advanced diagnostic techniques originally developed for small spacecraft to BMW automobiles.

The ability of students from diverse local and national academic institutions to participate in hands-on, student-developed science missions and technology development programs pays remarkable dividends. In addition to motivating students and providing them with compelling hands-on educational experiences, highly valuable science missions and technology programs are successfully conducted.

CREST Aerospace Innovation Competition

On Nov. 18 CREST hosted a mentoring reception at its NRP facility for Santa Clara University engineering students, showcasing a recent three-week challenge and awarding the prize for its Aerospace Innovation Competition.

Thirty six students organized into six teams competed for a Grand Prize of \$2,000. Teams participated in a series of tasks requiring them to work together and exhibit a range of skills such as engineering design and prototyping, marketing and communication.



B.E.A.R. Team Student Winners

Photo courtesy Ignacio Mas, Santa Clara University

Next Generation Inventors Win \$750,000 in Robotic Digging Competition

By Mark Newfield, Space Portal

Twenty-three teams representing 12 states and Canada pushed their robotic digging machines to the limit to compete for \$750,000 in NASA prize money at this year's Regolith Excavation Challenge, held Oct 17-18 at NASA Research Park, Bldg. 503, Moffett Field, CA.



1st Place Winner, Paul's Robotics from Worcester, MA, with their robot "Moonraker"

The event was co-hosted by the California Education & Workforce Institute and the California Space Authority (CSA) in collaboration with NASA, and held in a test area containing simulated lunar dirt, known as regolith. The two-day competition, open to industry, academia and individuals, required teams to design and build robotic machines that can navigate, excavate, and transfer a minimum of 330 pounds of regolith into a collector bin within 30 minutes.

This is the first time in the competitions' three-year history that teams actually qualified for a cash prize. After two days of intense competition, Paul's Robotics of Worcester, MA claimed the top prize of \$500,000, successfully moving 965 pounds of regolith in the allotted time. The \$150,000 second prize went to Terra Engineering of Gardena, CA for moving 595 pounds, while Team Braundo of Rancho Palos Verdes, CA, took home \$100,000 for third place, moving 580 pounds.

The winning teams achieved a real technical accomplishments, building innovative robotic systems that were robust, lightweight, and powerful enough to excavate and move through the sticky grains of regolith.

"After three years, it's great to have three cash prize winners," said Andrea Seastrand, CSA's Executive Director. "Various members of the winning teams are returning competitors and have learned through this challenge that there is no such thing as failure. It's great to see them rewarded for their determination, innovation and creativity. Their success is a testament to what a tinkerer will do."



Teams display their robotic excavating machines while waiting for the opportunity to compete.

The majority of the teams had representation from the private sector, with many having student participants. Approximately 11 teams were affiliated with universities, all the ingredients for a real hands-on educational experience. Team E-REX from Little Rock, AR earned honorable mention for transferring the most regolith, 165 pounds, in a single deposit into the collector bin. NASA officials also noted the creative excavator designs that could one day provide practical solutions to digging on the moon. UBC Thunderbird Robotics TEAM TREAD robot from Vancouver, BC, for example, produced very little airborne dust during regolith excavation and exhibited advanced autonomous operations when navigating their robot to the collection bin.

"This was an incredibly tough competition and teams came up with fantastic ideas, some of which might find use in future missions to the Moon," said Greg Schmidt, Deputy Director of the NASA Lunar Science Institute (NLSI). The biggest win is getting so many talented young people involved in NASA's mission of exploration."

The robotic contest was part of NASA's six existing Centennial Challenges Prize Competitions for "Citizen Inventor", drawing heritage from the early years of the first century of flight where in 1927, an unknown 25-year-old airmail pilot named Charles Lindbergh, in his single-engine "Spirit of St. Louis", won the \$25,000 "Orteig Prize" for the first non stop flight from New York to Paris. This achievement sparked rapid progress in aeronautics, ultimately paving the way for development of U.S. commercial aviation. The Centennial Challenge competitions are a



2nd Place Winner, Terra Engineering

stunning example of how today's NASA can inspire and attract public participation in space exploration, helping America create innovative solutions that enable new markets while educating and developing future talent through hands-on science and engineering activities.

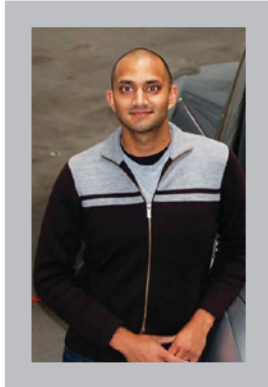
In a speech to the National Association of Investment Companies on partnering with private sector to inspire the next

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However, in the next five to ten years, it is expected that battery energy density will increase several fold. We want to make sure that aviation is ready by laying the groundwork for those future electric aircraft now. In addition to obvious environmental benefits, an electric motor has only one moving part and thus the potential for lower maintenance costs. Understanding these requirements and beginning the process for FAA acceptance and certification of electric motors is one goal of our project," he said.

SV STAR believes there are also many opportunities for development of components surrounding the battery pack, such as motor controllers and battery pack energy management systems. These advances could benefit any device that uses batteries, including cars and laptops. For flight, these components must be evaluated and modified to meet stringent weight and reliability constraints. "If a component fails while driving an electric car you can just pull over; but reliability and safety are needed for airworthiness," said Gunawardana.



San Gunawardana, Stanford University; CEO, SV STAR, Inc.

The aircraft will not sit idle while waiting for the modification. "Prior to this project, Stanford did not have access to a research aircraft to fly experiments. SV STAR is making the airframe available to Stanford for innovative applied research in aeronautics, including green aviation advances. Our project gives students a chance to get their hands dirty with applied research," said Gunawardana, who will use data from the flight tests to complete his dissertation.

The initial project involves installing an Attitude and Heading Reference System and GPS to measure the behavior of the aircraft. In conjunction, the control stick, rudder pedals and throttle position will be instrumented to record the pilot inputs. By correlating the input against the output, control law specialists will be able to perform system identification of the vehicle to support eventually transforming the Pipistrel into an autonomous UAV. Additionally, the data obtained will be used in several controls classes taught at Stanford.

Another avenue of collaborative research between Ames and Stanford is the design of a new generation of efficient, quiet propellers, combining advances in the fields of computer simulation, acoustics and aerodynamics. "As strange as it may seem, there haven't been significant changes in small aircraft propeller design since World War I. This has been partly due to the absence of a strong need, but this is changing because of the current need for fuel efficiency and noise abatement, particularly in UAVs," said Gunawardana.

The near term goal of the research collaboration is insight about how to optimally design and operate small scale (2-6 passenger) electric aircraft. However, the ultimate objective is to identify avenues of research to support scaling green aircraft up to larger vehicles. "With current technology we can do a small,

two-seat green aircraft fairly easily. The same isn't true for something the size of a regional turboprop or 120-seat Boeing 737," said Gunawardana.

"We foresee a time in the future when people can travel from San Francisco to LA or New York City to DC in mid-size ultra efficient electric planes with zero carbon emissions. The goal of our research is to help make this a reality," Gold concludes.

"This is a great opportunity for NASA Ames to support a local entrepreneur in demonstrating technologies that support the future of green aviation. We are really excited about being able to support university research and education, and provide the infrastructure that would be difficult to find anywhere else in the Bay Area," said Paul Espinosa, Ames Project Management Division Liaison.

NASA Ames: Water Found on the Moon

Mountain View Voice, Nov. 13, 2009

Scientists at Mountain View's NASA Ames Research Center dramatically announced Nov. 13 the discovery of water on the moon.

"We found water," principal investigator Anthony Colaprete told reporters at Moffett Field's NASA Ames Research Center. "We didn't find just a little bit, we found a significant amount."

The announcement comes a month after NASA's LCROSS spacecraft -- developed at Ames -- was intentionally crashed into the moon Oct. 9. After over a month of analyzing the data collected from the resulting dust cloud, researchers believe it's safe to say they've found evidence of water in the moon's Cabeus crater, which is permanently hidden from the sun on the moon's South Pole. The discovery has major implications for future human activities on the moon.

Using instruments called spectrometers, LCROSS scientists discovered "dips" in data graphs that suggested the presence of water, Colaprete said.

The scientists - including researchers from NASA Ames, UC Santa Cruz, and other institutions across the country - collaborated and were able to confirm the results.

"It wasn't an 'aha' moment, it's been a 'holy cow' moment every day since impact," Colaprete said.

Scientists say finding evidence of large stores of water ice is like striking gold -- if a space station were to be built on the moon, it could cost \$50,000 per pound of water to transport it from Earth. Hydrogen from water can also be used to make rocket fuel, which could someday launch rockets from the moon - a place with much less gravity than earth.

Scientists had already known the moon's polar regions contained large amounts of hydrogen, but did not know until LCROSS that "a lot of that hydrogen is in the form of water," said Greg Delory, a senior fellow at UC Berkeley's Space Sciences Laboratory and Center for Investigative Planetary Sciences.

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NASA Partner to Revolutionize Personal Transportation

by Ruth Marlaire, September 2, 2009

The morning commute may never be the same.

NASA officials have signed an agreement with Unimodal Systems, LLC to collaborate on the use of NASA-developed control software and human factors techniques to evaluate acceleration, jerk and vibration of an advanced transportation vehicle system. The control software was originally designed to control robots and other applications. The collaboration will help NASA better understand the software's usefulness, human performance and safety.

"This collaborative effort is anticipated to help NASA with its aeronautics and space activities, while Unimodal gets to develop the next generation high-speed transportation system," said Jeffery Smith, former deputy chief of the Entrepreneurial Initiatives Division at NASA Ames Research Center, Moffett Field, Calif. "NASA will receive valuable feedback from our systems software usage."

Per the agreement, Unimodal will contribute its SkyTran vehicle, currently located at NASA Research Park, and its advanced transportation technology; NASA will provide its Plan Execution Interchange Language (PLEXIL) and Universal Executive (UE) software to control the vehicle.

In the future, SkyTran will use small vehicles running on elevated, magnetically levitated (maglev) guideways, which distinguishes it from other railed systems. The vehicles are lightweight, personal compartments that can transport up to three passengers. Travelers board the pod-like vehicles and type their destinations into a small computer. Using intelligent control system software, SkyTran will run non-stop point-to-point service without interrupting the flow of traffic.

These vehicles will eventually travel up to 150 mph and move 14,000 people per hour, both locally and regionally. SkyTran will serve as a feeder system to other transit systems, such as BART and high-speed rail.

"SkyTran's personal rapid transit has generated serious interest with local, regional and state transportation leaders who are considering funding the building of the Unimodal maglev PRT system in the NASA Research Park," said Michael Marlaire, director of NASA Research Park at Ames. "This construction and new R&D partnership may usher a new 'green' technology maglev PRT system into Silicon Valley."

"We're working with NASA and aerospace engineers to ensure aerospace-level standards that exceed the safety records of current transportation systems," explained Christopher Perkins, former chief executive officer of Unimodal Systems, LLC, based in NASA Research Park.

Both organizations will mutually benefit. NASA will receive feedback on its software's usefulness in ground-based propulsion systems, while Unimodal will develop a transportation system designed to eliminate traffic congestion, mitigate greenhouse gases and reduce dependence on foreign oil.

"For cities across the nation, SkyTran will create greentech jobs and launch a new era of public-private partnerships that will make public transit affordable to install, and profitable to operate," said Perkins.

reQall, Evernote Work Together to Retrieve your Notes

Posted on Sept. 17, 2009 2:00 pm by Philip Michaels, Macworld.com

A pair of productivity powerhouses are sharing their super-powers in a partnership that would make the Wonder Twins envious. reQall and Evernote announced the other day that users of their respective products will be able to easily share, link, and find information across their services.

Evernote, as you know, lets you capture notes and manage information, whether it is via the desktop app, Web site, or mobile offering. reQall offers an iPhone app that's billed as a voice-enabled memory aid: just record a voice memo, and reQall converts what you say into text.

Under the partnership between the two services, users will be able to save items to Evernote that reQall can retrieve. As detailed at the reQall Web site, all users have to do is connect their Evernote account to reQall via the latter's Web Settings page. The reQall iPhone app can then search all notes at Evernote for anything related to reQall items by way of title, tag, or words in an image. Whatever is found is listed under the Related Items buttons on the reQall app's Here and Now and Item Details screens.

Evernote offers a free iPhone app that works with free and paid Evernote.com accounts. (A paid account costs \$5 per month or \$45 per year.) reQall for the iPhone is a free download as well; it works with either the free reQall Standard account or a \$25-per-year reQall Pro membership.

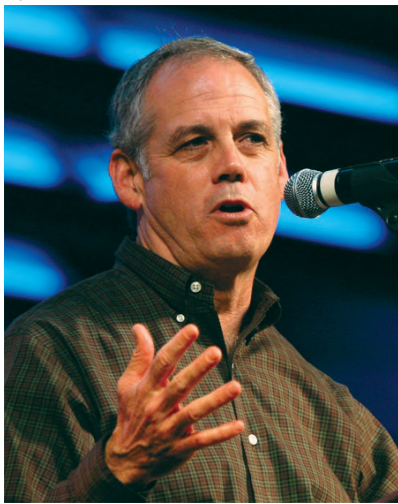
ReQall is an internationally based company, with 30 staff in Hyderabad, India, five staff in Hong Kong and one person in Cape Town, South Africa, in addition to its headquarters at NASA Research Park.

Dec. 20, 2009 marked 70 years since a small group of aeronautical researchers, with national defense in mind, took over part of Moffett Field. In 1939 the U.S. government watched closely as Germany built an unprecedented air arsenal. NASA Ames was built by the National Advisory Committee for Aeronautics (NASA's forerunner until 1958) and has been on the cutting edge of aeronautics research ever since. - MV Voice



Kris Kimel, Innovator, Educator, Visionary

by Diane Farrar



Kris Kimel is President and a founder of Kentucky Science and Technology Corporation (KSTC), an internationally known non-profit designing and implementing a range of innovative initiatives for more than twenty years. An author and contributor to numerous articles and reports, Kimel is widely recognized as a leader in science and technology policy, lecturing on entrepreneurship and innovation at national and international conferences.

According to Kimel, "There are two kinds of companies and organizations in today's world....innovative and dead!"

Kimel's vision led the implementation of Kentucky Space - a unique enterprise involving a consortium of universities, companies and other organizations centered on the design, launch and operation of small satellites and other spacecraft. Two student-built satellites designed by Kentucky Space are now ready for a NASA launch.

Ky Sat-1, built by students from all Kentucky Space consortium universities, is in the queue for a 2010 launch to test communications power systems and other space hardware. The Kentucky Space clean room and engineering lab are at the University of Kentucky, Lexington; primary ground operations are at Morehead State University, which has a 21-meter dish about an hour away. Kentucky Space and Morehead State University have a relationship with Stanford University and famed former Professor Bob Twiggs, inventor of CubeSat, and regularly bring students to interact with Ames and Stanford on spacecraft design.

A NASA Research Park partner since 2004, KSTC has managed dozens of projects supported by corporations, private foundations, and state and federal governments. KSTC funds R&D and technology commercialization projects at numerous Kentucky universities, and designed and manages the Kentucky Enterprise Fund (KEF), an early-stage venture fund which holds over 60 equity positions in innovation-driven Kentucky companies.

Kimel's vision led the implementation of Kentucky Space - a unique enterprise involving a consortium of universities, companies and other organizations centered on the design, launch and operation of small satellites and other spacecraft. Two student-built satellites designed by Kentucky Space are now ready for a NASA launch.



Kentucky Space students

In 2000, Kimel founded the international IdeaFestival®, a world-class event that brings diverse thinkers from across the globe to celebrate innovation, imagination and cutting-edge ideas. Idea Fest 2009, held in September at the Kentucky Center for the Performing Arts, Louisville, featured Chef and Food Network star Anthony Bourdain, pianist Richard Kogan, an urban farmer, artists and writers like A.J. Jacobs, of Esquire magazine and author of *The Guinea Pig Diaries: My Life as an Experiment*. Dr. Moira Gunn, NPR radio host of *Tech Nation*, with a new book subtitled "My Unexpected Odyssey into the Land of Small Molecules, Lean Genes, and Big Ideas!" was also featured.

In December KSTC produced a Regional Climate Change forum panel on global climate models and their forecast for that region, with featured speaker Dr. Radley Horton, The Center for Climate Systems Research, Columbia University. Dr. Horton collaborates with NASA's Goddard Institute for Space Studies, NY, NY.

Kentucky Space Part of Venture Involving Space Station

Kentucky Space (KS) announced in September 2009 that it is a partner with NanoRacks, LLC a Houston-based aerospace company that has just signed a Non-Reimbursable Space Act Agreement with NASA that provides a unique opportunity for NanoRacks to design, coordinate and conduct research on the International Space Station (ISS) for itself as well as on behalf of national educational and commercial clients.

The NanoRacks Research System interfaces standard CubeSat-type modules into the International Space Station (ISS) Express Racks. The CubeLab™ Platforms are small modules designed for use within a pressurized space station environment in orbit, with a nominal length, width, and height and a mass of 1 kg (extended CubeLabs™ are possible).

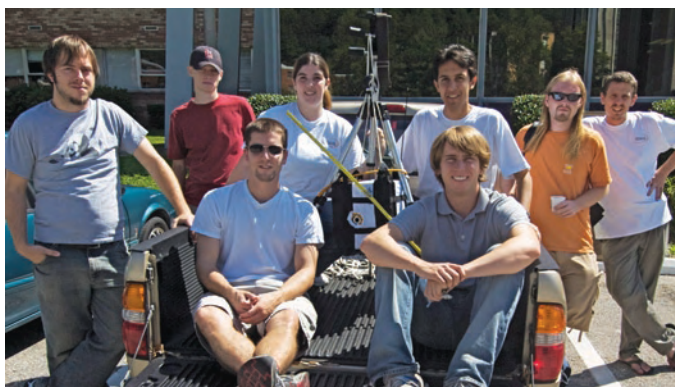
Up to 16 of NanoRacks CubeLab™ modules can be inserted into a NanoRacks liner inside an Express Rack. Each plugs into a standard USB connector thus providing structural, electrical and data connectivity in one simple operation.

"Our business model seeks to encourage entry level space station research at affordable prices," explained NanoRacks Managing Director Jeffrey Manber. "By adopting a known and widely used platform for industrial and educational space research, we expect to stimulate a new generation of space station users, just as Cubesats have done for microsatellites." Adds Manber, "given advances in nanotechnology and minimization of electronics, the size and hence cost of ISS space research is no longer the impediment it was in the past."

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The NanoRacks venture includes Kentucky Space, a nonprofit enterprise which is recognized as a leader in entrepreneurial and educational space platforms. Kentucky Space brings the combined resources and capacity of the University of Kentucky, Morehead State University, University of Louisville, Western Kentucky University, Murray State University, the Kentucky Community and Technical College System, The Kentucky Space Grant Consortium, and the managing partner Kentucky Science and Technology Corporation. Also a pioneering member of the team is the national engineering services firm Belcan.



Kentucky Space students

The NanoRacks team also enjoys the expertise of CubeSat inventor Bob Twiggs and former head of the Stanford University Space and Systems Development Laboratory "Now experimenters and students can get thirty days of microgravity using proven hardware that is already known to the space and educational communities, explained Twiggs, who is now a visiting professor at Morehead State University.

"All of us associated with NanoRacks take seriously this unique opportunity to bring a new kind of fast-paced innovation and low-cost to space station research" said Kris Kimel of Kentucky Space. "Through our university and other facilities we can offer seamless support for payload design, development and testing."

NanoRacks expects to fly its platform to the ISS in mid 2010.

NanoRacks is a fast-paced enterprise focused on small entrepreneurial and educational space opportunities and markets. The company brings together entrepreneurs, scientists and engineers who have real-life experience and share a passion for entrepreneurial space including humanity's utilization of low-earth orbit. Please visit: www.nanorackslc.com

For more information: Kris Kimel, Kentucky Space: 859-229-6161 or Jeffrey Manber, NanoRacks: (815) 425-8553.

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The LCROSS results are "painting a really surprising new picture of the moon. This is not your father's moon," Delory said.

LCROSS scientists are still delving into the data to identify other compounds in the moon's surface, Colaprete said, noting the satellite crashed into a perpetually dark region of the moon where ground temperatures average about 220 degrees Celsius below zero.

Further investigation will try to determine where the water came from and how it got there, Delory said. The inquiry could shed light on lunar history, and even on the history and development of Earth, he said.

The results announced this morning demonstrate the continuing importance of space exploration, NASA administrator Doug Cooke said.

"Many have said that we learned everything we could about the moon from the Apollo missions" that ran from 1963 to 1972, said Cooke, who addressed the press conference via video feed from Washington, D.C. "LCROSS is demonstrating there's much more to learn, and there always is."

More information: lcross.arc.nasa.gov

— Bay City News Service

Responsive Access to Space Technology Exchange Coming to the NASA Research Park in 2010

by Bruce Pittman, Space Portal

NASA announced in October a partnership with the U.S. Air Force Research Laboratory to develop a technology roadmap for the commercial reusable launch vehicle (RLV) industry.

"NASA is committed to stimulating the emerging commercial reusable launch vehicle industry," said Lori Garver, Deputy Administrator at NASA Headquarters in Washington. "There is a natural evolutionary path from today's emerging commercial suborbital RLV industry to developing the capability to provide low-cost, frequent and reliable access to low Earth orbit. One part of our plan is to partner with other federal agencies to develop a consensus roadmap of the commercial RLV industry's long-range technology needs."

The study will identify technologies and assess their potential use to accelerate the development of commercial reusable launch vehicles that have improved reliability, availability, launch turn-time, robustness and significantly lower costs than current launch systems. The study will provide roadmaps with recommended government technology tasks and milestones for different vehicle categories.

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University Associates-Silicon Valley, LLC Selects Team Led by TMG Partners and The Related Companies

Nov. 16, 2009 -- University Associates-Silicon Valley LLC (UA-SV) has selected TMG Partners (<http://www.tmgpartners.com/>) and The Related Companies (<https://www.related.com/>) as the master developer team for a 77-acre sustainable community for education and research at the NASA Research Park (NRP) in Moffett Field, CA.

UA-SV, established by the University of California, Santa Cruz (UCSC) and Foothill-De Anza Community College District (FH-DACCD) to further their educational, scientific and public purposes in Silicon Valley, signed a 95-year ground lease for the NRP university development area with NASA Ames Research Center in December, 2008. The goal of this public-private partnership is to create an integrated educational and research community featuring classrooms and laboratories, sustainable housing, and room for entrepreneurial partnerships. The new community will be comprised of approximately 3 million square feet of residential and non-residential development. It will, in conjunction with adjacent NASA research facilities, serve as a test-bed for advances in green technologies and provide an environment that nurtures innovation, entrepreneurship and sustainability.

UA-SV is very pleased with the selection of TMG Partners and The Related Companies, two highly successful companies with particular expertise in mixed use development, as partners in this exciting new development. TMG/Related and UA-SV will enter into an exclusive negotiating agreement that specifies the business terms of their relationship through pre-development activities, which include master planning and completing site entitlements in conformance with the California Environmental Quality Act (CEQA).

UCSC Chancellor George Blumenthal, chair of the UA-SV board, said the board "is enthusiastic about working with TMG/Related as we bring this exciting, green project to fruition. They bring outstanding credentials, expertise and financial strength with a commitment to the future vitality of this region. I am confident TMG/Related will position this project to meet the educational and research needs we value so highly."

NASA Ames Center Director S. Pete Worden said: "The University Associates-Silicon Valley selection of TMG/Related is a critical step in advancing our partnership to develop part of the NASA Research Park with a consortium of universities led by UCSC. The UA-SV development will assist NASA with R&D and science, technology, engineering and math (STEM) education and help us bring forth new ideas in both education and technology to address the great challenges facing our nation."

Mike Brandy, interim Chancellor of Foothill-De Anza Community College District, stated: "We are excited to see this development move forward

with the selection of TMG/Related. The new community being planned at NASA Research Park promises to build on Silicon Valley's reputation as a leader in creative thinking and environmental stewardship. It will advance and augment the most critical element of the Valley's success—the investment in education."

William Berry, President and CEO, UA-SV LLC, stated: "The selection of TMG/Related, two highly regarded, well-established development companies, demonstrates the considerable attractiveness of this project, even in a tough economy. We are looking forward to working with TMG/Related to fulfill the vision of this development as a highly innovative regional education and resource center."

On receiving the news of the selection of TMG, Michael Covarrubias, Chairman and CEO of TMG, said: "TMG and Related are honored to have been selected to partner with UA-SV on this development. The opportunity to lead the master development of this three million square foot, mixed-use campus on behalf of NASA Ames and University Associates-Silicon Valley is extraordinary. A new community integrating the commercial, science and residential components with technology companies of Silicon Valley can be found nowhere else."

"The master plan to add a residential and retail community to this consortium presents the opportunity to create a true community, not just a series of buildings", added William Witte, President of The Related Companies California. "This has the potential to become a model for sustainable development."

Contact: UA-SV Community Relations, Cindy Rubin: 831-662-4522 or 650-823-2639

UA-SV, William Berry: 650-604-0511

TMG, Michael Covarrubias: 415-772-5900

The Related Companies, William Witte: 949-660-7272

NASA Ames, Michael Marlaire: 650-604-4190

University Associates – Silicon Valley LLC Delivering the Future, a Sustainable Community for Research, Education and Innovation

Nov. 2, 2009 -- The University of California at Santa Cruz (UCSC) and Foothill-De Anza Community College District have formed a public-private partnership to establish a new sustainable community on 77 acres of land in the National Aeronautics and Space Administration (NASA) Research Park (NRP). The academic institutions, working through University Associates – Silicon Valley (UA-SV) LLC, a non-profit organization, are developing plans for a community of the future dedicated to research, education and innovation while serving as a test-bed/prototype for advanced green energy technologies and regenerative water and waste management systems. The proposed 2000 household development will feature state-of-the-art housing, research and teaching laboratories, classrooms, and work environments built on new ground-

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Scientists Conduct Successful First Test Flight of X-SCAV UAV

by Sylvia Leong, Director of External Relations and Admissions
Carnegie Mellon Silicon Valley

On September 29, 2009, Carnegie Mellon Silicon Valley, in collaboration with NASA Ames Research Center, successfully conducted its first series of flight tests of an 20-foot wingspan unmanned aerial vehicle (UAV) called the eXperimental Sensor Controlled Aerial Vehicle (X-SCAV) at Crows Landing, CA. The X-SCAV, which can support up to 50kg of



X-SCAV UAV's First Flight test

payload, is the latest result of ongoing collaboration between the NASA Ames Research Center and the Carnegie Mellon Innovations Laboratory. Carnegie Mellon scientists Ritchie Lee, Yoo-Hsiu Yeh, and Khalid Al-Ali worked with NASA Ames Research Center scientists on the platform for this unique unmanned aerial system designed to carry large payloads for short range deployment.

The X-SCAV is a small ultra-low-cost unmanned vehicle testbed used for experimental control systems research, development, and experimentation. The X-SCAV is unique in its class, providing ample carrying capacity that rivals large UAVs but at a fraction of the cost and complexity. The X-SCAV uses the NASA Reflection Architecture, a central component-based plug-and-play software infrastructure. This successful series of flights paves the way for continued X-SCAV flights at Moffett Airfield, demonstrates the operational status of the platform to support control system research experiments, and demonstrates agile concepts for robust low-cost UAV design. The X-SCAV is built on a commercial airframe manufactured by Bill Hempel.

"The X-SCAV platform is unique in its size and cost versus carrying capacity. Very few UAVs at this size and price point can support the

amount of payload capacity that this airframe can support. In support of disaster response such as wildfire response, this aircraft has the advantage of being able to be deployed and retrieved on-site, which obviates the need for complex FAA approvals that hampers large UAV deployments," explained Corey Ippolito, the Project Lead for the team, and a NASA Ames Scientist who also just started his Ph.D. in Electrical and Computer Engineering at Carnegie Mellon.

Lee, Yeh and Al-Ali from the Carnegie Mellon Innovations Laboratory (CMIL), worked together on the design and construction of the vehicle. Ritchie Lee, who served as the Systems Engineering Lead for the team, describes how his research involved converting a remote-controlled (RC) aircraft kit into a UAV. "Our work focuses on developing flexible software and hardware platforms that optimize the scientific return of a payload sensor by adjusting parameters such as flight path and flight controllers. The X-SCAV was developed as a testbed for this research and others. This successful flight test, in remote-control mode, marks the aircraft's first flight, and is validation of the design and implementation of the airframe and avionics."



CMIL's X-SCAV UAV at Crow's Landing

CMIL, located at Carnegie Mellon Silicon Valley, has established itself as one of the world's leading ground and aerospace technology research centers since its founding in 2003. CMIL focuses on identifying, researching, testing, and maturing forward-looking ground and aerospace technologies with applications to mobile vehicles. Leveraging its location at NASA Research Park, CMIL brings together the best and brightest aerospace research professionals from both Carnegie Mellon and NASA to explore new possibilities for micro vehicle platforms, aircraft, spacecraft, and associated technologies. Dr. Khalid Al-Ali, Director of CMIL, serves as Principal Investigator for this on-going project.

"This collaboration is a clear example of the long list of CMIL successes, where Carnegie Mellon innovation is coupled with NASA resources, producing work with significant impact," says Al-Ali.

How Time Flies— Happy First Anniversary Airship Ventures!

by Gus Holweger, Nov. 23, 2009

November 5, 2008 was 'Eureka's' first passenger flight over Moffett Field and the Bay of San Francisco. Since then the Zeppelin NT "Eureka" has become a familiar sight and "flightseeing" from the airship has become a most enjoyable pastime for Californians and tourists alike. First year's operating statistics shown below through Nov. 17, 2009 substantiates this. As you view the statistics, keep in mind that the airship depends heavily on the weather (wind velocity, visibility and precipitation):

We look forward to a successful year in 2010 as a partner in NASA Research Park.

	# of days flown	#of flights	# of hrs. flown	# of passengers:
Moffett Field	93	229	293	2204
Oakland	70	214	223	2169
Monterey	9	35	41	327
Long Beach	21	90	149	923
Totals	193	568	706	5623

Education - Airship Ventures helps AEE expand its scope

The mission statement of NASA Ames Exploration Encounter(AEE), housed in a renovated supersonic wind tunnel at NASA Ames Research Center, is to "Inspire Kids about Space and Science." Dedicated active and retired NASA staff work as volunteer docents to inspire and encourage students to pursue careers in science, technology, engineering and mathematics. The program includes having students meet world class NASA scientists who tell them about science, aeronautics, and space.

Larry Manning, Technical Specialist Quality in AECOM Design wanted to expand the scope of the program by including information about Zeppelin NT airships. He contacted Alex Hall, CEO of Airship Ventures, wondering if AV would be willing to provide AEE docents with a technical briefing to use in courses with AEE students. Alex agreed and promised Larry in March 2009 that the docent group would be briefed and provided with information about the airship "Eureka".

Alex Hall asked me to work on this project and, thanks to her support and that of Jim Dexter, Director of Flight Operations, on October 13,

Larry Manning and twenty AEE docents got what they asked for -- a briefing, a folder with technical and general information about the Airship, and a close-up view of the Zeppelin NT 'Eureka'. Alex Travell, Special Missions Sales Manager at Airship Ventures, assisted Jim Dexter at the briefing. Judging from the feedback from the participants, the project fully met their expectations and will benefit the students.

Science for the Earth

AV's Jim Dexter and Alex Travell participated in NASA's Zeppelin Ocean Color Science Mission where the airship was successfully used as a Remote Sensing Platform. This goes to show that being part of NASA Research Park creates synergy and a neighborly, collaborative atmosphere that benefits all parties (story next page).

Fleet Week 2009 – Air Show with the U.S. Navy's Blue Angels and Zeppelin NT "Eureka"

Another first for Airship Ventures was our partnership agreement with the Air Show Network to participate in this year's Fleet Week



The Blue Angels over San Francisco Bay makes Fleet Week a wonderful experience for thousands of spectators of all ages.

Air Show. Not everything in the agreement came to fruition, due to the weather which was less than ideal for airship flight demonstrations on the key days, Oct. 10 - 11. But on the preceding days, the "Eureka" was a formidable presence on its "fly-by" missions. "Fly-bys" were mandated as the airship had to be outside the flight space of the Blue Angels, the U.S. Navy's Flight Demonstration Squadron.

The airship's pilots, Kate Board, the world's only female airship pilot, and Paul Stroehle, Pilot Trainer on loan from the Zeppelin Reederei in Germany, circumnavigated San Francisco Bay on the Zeppelin NT "Eureka" at a respectful distance, offering a new and attractive backdrop for the Blue Angels, Golden Gate Bridge and the City of San Francisco.

Airship Ventures has, of course, regular flights out of Oakland, over San Francisco and the Bay – and they are not "fly-bys" (see

AV continued on page 11

UA Future continued from page 12

www.airshipventures.com).

Photos by: Love to Eat and Travel. www.Lovetoeatandtravel.com

Pilot for a Day - your chance to fly a Zeppelin!

A "Unique Experience for Pilots: ground school, flight instruction and stick-time" -- states the Airship Ventures' brochure describing its pilot experience program.

Led by Airship Ventures' experienced pilots and engineering team, this two-day adventure allows participants to see behind the scenes during operation, learn the basics of airship flight and get into the cockpit. Hailed as an "Uplifting Experience", it is offered nowhere else in the world and is truly the opportunity of a lifetime. Originally designed as a one-day course, the program now



includes a more in-depth review of the flight manual, a Q & A session, increased hangar access to the airship 'Eureka', and more involvement with system checks, pre-flight operations -- with no increase in price!

Each session is limited to six qualifying pilots. To qualify for class enrollment, individuals must be pilot rated (private pilot or better) and have a current aviation medical certificate. Each pilot is given at least 30 minutes in the cockpit and nearly four hours of total flight time in the Zeppelin. This affords plenty of time to ask questions and to experience sights from the air while talking with fellow pilots and the Zeppelin crew.

Prior to flying the airship, students will participate in a comprehensive and interactive ground school, covering flight and ground operations and performance, systems checks, and ground handling and preflight procedures. Prices start at \$2,950 per student. Custom and gift packages are available. For details go to: www.airshipventures.com or contact Elaine James at (650) 969-8100 ext. 111.

Alex and Brian Hall and the entire Airship Ventures staff wish all of you the Very Best for the New Year 2010!

NASA Conducts Airborne Science Aboard Zeppelin Airship

by Michael Mewhinney

MOFFETT FIELD, Calif. - NASA launched its first airborne science mission in early October featuring a 246-foot-long Zeppelin NT airship equipped with two imaging instruments to learn more about environmental conditions in the San Francisco Bay Area.

Scientists from NASA Ames Research Center's Earth Science Division are collaborating with Airship Ventures Inc., Moffett Field, Calif., to conduct experiments using the airship's unique flight characteristics, including its high maneuverability and airframe stability, as well as its capability to fly at low altitude over selected target areas. NASA is interested in using these capabilities to measure reflected solar and emitted thermal radiation and conduct atmospheric sampling of aerosols and gas constituents.

"We are very interested in the unique capabilities of the Zeppelin to enable remote sensing and atmospheric science measurements not previously practical," said Stephen Dunagan, a research scientist at NASA Ames.

On Tuesday, Oct. 6, 2009, scientists embarked on an eight-hour flight from Moffett Field to conduct three science experiments aboard the airship using a large format Bayer array color camera and a hyperspectral scanning imager. The camera provides high-resolution imagery that is not affected by vibrations or movement of the airship during the exposure. The hyperspectral instrument measures 256 bands of color imagery in the visible and near infrared spectrum.

In collaboration with the SETI Institute, Mountain View, Calif., scientists studied the extremophile biota in the south bay salt ponds using a hyperspectral scanning imager to identify photosynthetic pigments. Working with the Monterey Bay Aquarium Research Institute (MBARI) scientists studied the distribution and density of harmful algae bloom organisms in Monterey Bay that are poisonous to wildlife, particularly sea birds and fish. They also collaborated with the Pipeline Research Corporation International (PRCI) to search for subsurface natural gas pipeline leaks causing plant root poisoning.

This week's flight featured the first science experiments conducted under the terms of a Space Act Agreement NASA signed with Airship Ventures earlier this summer to use the Zeppelin NT as a platform for conducting airborne science experiments. Future experiments are anticipated to involve such subjects as remote sensing observations, atmospheric sampling collection and electromagnetic field observations.

"We often talk about the airship's stability, maneuverability and panoramas as benefits to sightseeing passengers when, in fact, they are just as beneficial to scientific work. Working with NASA and other esteemed scientific organizations, we will demonstrate that the airship's flight characteristics not only make it a great way to see the world, but also to understand it better," commented Airship Ventures Co-founder and CEO Alexandra Hall."

Pascal Lee Delivers Mars Lecture, Part of NRP Public Lecture Series

By Kathleen Burton

An enthusiastic crowd attended the resumption of the NRP Exploration Lecture Series, with the first lecture of the season held on October 20th in Bldg. 943. The Lecture, which marked the fourteenth in the Series, featured NRP tenant Dr. Pascal Lee discussing "From Earth to Mars: Steps Toward the First Mars Mission".

Rich with images, video and anecdotes, Lee, who is CEO of the NRP's Mars Institute and a planetary scientist at the SETI Institute, discussed his team's historic Northwest Passage Traverse, a record-breaking 494 KM crossing on sea ice which began on April 17, 2009.

Driving the "Moon-1" Humvee Rover and supported by two snowmobiles, Lee led an international research team to the high Arctic community of Cambridge Bay, Nunavut, Canada after an 8-day journey, the longest distance ever driven on treacherous sea ice in a road vehicle.



Dr. Pascal Lee, Mars Institute Chairman, delivers NRP Exploration Lecture. Lee was interviewed on NPR's All Things Considered on December 18, 2009 in a segment entitled "Revisiting an Expedition Across the Arctic."

The primary goal of the Northwest passage, said Lee, was to transport the new Moon-1 Humvee Rover from the village of Kugluktuk to Devon Island, the location of the Haughton Mars Project (HMP). The expedition was part of Lee's work as director of the Haughton Mars Project (HMP), a terrestrial analog for Mars.

At Haughton, the site of an ancient crater, the team conducts research in space science, geology, exploration transportation and human factors as a precursor to future trips to the Moon and Mars. Partners and sponsors of the Mars Institute's Haughton



Lee, with his cattle dog companion Ping Pong, at Haughton Crater during the summer 2009 field season

ton Project and Northwest Passage Drive Expedition include NASA, the Canadian Space Agency, Air National Guard, SETI Institute, Simon Fraser University and others.

"Polar exploration on Earth helps prepare for the future exploration of the Moon and Mars," noted Lee. "The rover is a concept vehicle simulating future pressurized rovers that will be used by humans in future NASA missions on the Moon and Mars."

On the journey, the field team ran into challenging weather and ice surface conditions including a 40 hour whiteout, unseasonably late thick snow cover, rough ice and treacherous snow covered cracks (called 'leads') in the ice, which exposed the vehicle to the liquid sea water below. At one point the Moon-1 sank into a hidden crack in the ice, but was saved by the team's quick actions and the Humvee's unique capabilities. *"For a moment there, I thought this might be it," Lee said.*

Because of the late snow pack and the danger, the crew decided to end the trip at Cambridge Bay and airlifted the Humvee the remaining distance to Resolute Bay, near Devon Island.

During the trip, the team kept a task log for NASA, took snow samples to study the biological impact of human exploration in a pristine environment and measured snow and sea-ice thickness to add to climate change studies and the long-term monitoring of the Arctic environment.

For further information: www.marsonearth.org



Lee's Northwest Passage Traverse

Ecliptic CEO Ridenoure Draws Crowd for November LCROSS Lecture in NRP Public Lecture Series

By Kathleen Burton



Ecliptic Enterprises Corporation's CEO Rex Ridenoure

A technically-savvy and inquisitive audience attended the second lecture in the NRP Exploration Lecture Series on November 9th in Bldg. 3. The lecture, which marked the fifteenth in the series, featured NRP tenant and Ecliptic Enterprises Corporation's CEO Rex Ridenoure discussing "Shooting the Moon; the Inside Story of RocketCam™ and the LCROSS Mission."

After LCROSS, (Lunar Crater Observation and Sensing Satellite) the long-held thesis that the moon is a dry desolate place no longer holds true. On Oct. 9, LCROSS impacted the permanently shadowed region of Cabeus crater near the moon's south pole and spectrometer data, still being analyzed, has shown the signature of water.

Rich with images of the launch, moon flyby and LCROSS' historic lunar impact, Ridenoure discussed his company's key role in the mission. He outlined the reasons why the LCROSS team chose RocketCam for its onboard video imaging system: "because it was a proven, rugged, commercial off-the-shelf onboard video camera that was also affordable, in keeping with the mission cost cap." And, Ridenoure noted, the LCROSS team also chose Ecliptic's Digital Video Controller (which morphed into LCROSS' Data Handling Unit or DHU), which controlled not only the RocketCam video camera but all 8 of the spacecraft's critical science sensors, for similar reasons. *"I think our readiness to step up to the tight schedule and even our California location helped too,"* said Ridenoure.

Mission milestones were extremely tight. NASA's "call for proposals" went out in January 2006, with LCROSS first contacting Ecliptic in March that year. LCROSS launched just under 3 and a half years later, in June 2009.

"The complexity of the sensor data flowing thru Ecliptic's DHU and the 9 science sensors during the mission, including the lunar flyby, the two Earth observations and during the final lunar impact, was

unprecedented," said Dr. Kimberly Ennico, LCROSS' Payload Scientist, who attended the lecture and "backed up" Ridenoure during technical questions from the audience. "But everything performed flawlessly," she said. During the mission, Ecliptic's DHU was on for 10 hours and 40 minutes, Ridenoure noted. Over 13,000 images were returned with no crashes or "hangs", he said. "All in all, the mission was an excellent credibility enhancer for Ecliptic."

Ecliptic's RocketCam visible light color camera, which monitored the launch, lunar flyby and lunar impact, was turned off shortly after the Centaur impact at Cabeus, at around 'impact minus 4 minutes'. From that point on, LCROSS' infrared cameras, infrared spectrometers and flash detectors were on at different times to record and monitor the final impact event.

"Mission accomplished", said Ridenoure. "All 9 sensors operated successfully, and our technology provided an unprecedented low payload cost of less than a million dollars."

The next lunar mission for RocketCam is NASA's GRAIL mission in 2011. Between now and then, Ecliptic will have approximately 15 RocketCam launches, but none to the Moon.

For further information: www.eclipticenterprises.com



Kimberly Ennico, LCROSS Payload Scientist, provided technical information about mission challenges, including the background behind last minute corrections to instrument settings that were uploaded to the spacecraft a few seconds prior to the spacecraft's impact.

NRP's Green Trail Energy Supports Desert Rats



Challenger Center for Space Science Education partnered with Green Trail Energy (GTE) to bring its portable solar/wind generator aka "Power Droid"

to the 2009 NASA Desert RATS exercise in Arizona. Both NASA's Chariot and Tri-Athelete rovers were recharged by the Power Droid.

(R-L) Dennis Wingo, CEO and Ken Kledzik, CTO of GTE. Wingo and Andrew Gold co-founded GTE in April 2009. Wingo is the team leader for the Lunar Orbiter Image Recovery project at McMoon.

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up infrastructure to form an integrated, sustainable community. This exemplar community is being developed in partnership with NASA Ames Research Center and is sited on the lands of the former Naval Air Station at Moffett Field, California.

Advancing World Class Education and Workforce Development

The UA-SV collaboration will foster the creation of a new “Meta-University” model for education and research. This vision, founded on an articulated education program as set forth in the California Master Plan for Higher Education, will operate in an open architecture to facilitate the participation of regional, state, national and international academic institutions. Joint academic programs and research collaborations in science, engineering and innovation management will optimize and draw upon the talents and expertise of each institution. To foster opportunities for collaboration, the site plan itself will be designed to facilitate and maximize the exchange of ideas and energize discoveries. It is anticipated that, ultimately, over 5000 undergraduate and graduate students will be accommodated in the combined educational programs at the site.

Fostering Economic Development through Green Technology Innovation

The Silicon Valley workforce is one of the most productive and highly educated in the nation. This proposed research and education community is positioned to harness and maximize this productivity by attracting industrial partners to the research community with programs and facilities uniquely tailored to their requirements. It is expected the synergy of industry researchers working with university researchers will enable industrial partners to more quickly develop and bring to market technological innovations.

Silicon Valley is now the epicenter of the green revolution and the proposed development will boost this innovation engine. In 2008, Silicon Valley alone accounted for 53% of California and 31% of U.S. venture capital invested in clean technologies. In 2007, the Valley accounted for 20% of California patents in green technology and green jobs grew 88% since 1995 and a remarkable 23% since 2005. The proposed research and education community, with centers focused on research in new energy and sustainability technologies, will bring together research teams in an open environment to address major challenges in physical, biological, materials and environmental science relevant to energy and sustainability. This dynamic, cross-discipline habitat for innovation will serve as a catalyst for expedited development of emerging green technologies.

Modeling and Promoting Environmental Sustainability

The proposed development will deploy, evaluate and demonstrate environmental sustainability: It will be engineered for minimum

carbon footprint by incorporating leading-edge environmental sustainability practices/technologies in energy generation, conservation, potable water and waste management. In addition, the proposed development will take full advantage of existing Valley Transit Authority Light Rail at the site and its direct connection to CalTrain. Automated buses and other innovative people movers will provide an alternative transportation to complement a pedestrian-friendly environment. This new community also will serve as a model site to deploy and validate new renewable energy and resource conservation systems constantly evolving with the current state-of-the-art. A Visitors Center will provide information about the technologies employed at the site as well as providing information and programs on how green technologies can be implemented in homes, businesses, government agencies, etc.

Points of Contact

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(L-R) Diane Farrar, Kathleen Burton, Cyndi Carbon-Norman, Dani Thompson, Bob Lopez

The NASA Research Park team of account managers received an Ames Group Honor Award Oct. 14, 2009 for excellence in the success of the NRP Development and Leasing Program, and for conducting this program with excellent customer care. The team also received an Ames Safety Award for leasing over 250,000 sf in aging facilities (70 years +) with public health and safety being a top priority. The team works daily to transition historic buildings into a safe and healthy work environment for all NRP partners.

Students Celebrate Diwali on Campus



CMU Silicon Valley students, faculty and staff celebrated the Indian festival of lights Diwali on Oct. 21, with candle lights, sand art drawings, Indian food and dance. On this day, people in Hindu, Buddhist, Sikh and Jain cultures illuminate their homes and premises with cotton string wicks in small clay pots filled with oil and colorful lights. "I appreciate CMU's efforts to incorporate our culture. I've grown up celebrating Diwali with my family and it was a pleasure to share this with my classmates," said Shikha Agrawal, a MS Software Engineering student who organized the decorations.

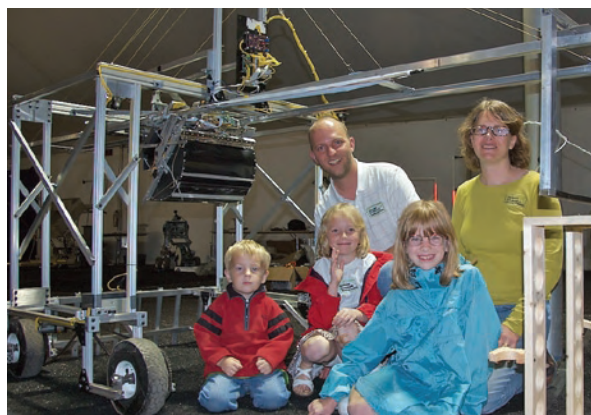
Regolith continued from page 3

generation of entrepreneurs, NASA Administrator Charles Bolden remarked to the potential group of space investors on the weekend's Regolith Excavation Challenge Event:

"NASA just held a competition in California with \$750,000 in prizes for anyone in America who could move the most regolith, or moon dirt, with a robot. The winning team is 'Paul's Robotics'. Paul not only beat out 22 other competitor teams, he beat teams of professional aerospace engineers, and teams of world-class robotics experts. Paul is a college student at Worcester Polytechnic Institute in Massachusetts. He heard about the competition from a high school teacher.

Now that is inspiring."

For more information: www.regolith.csewi.org

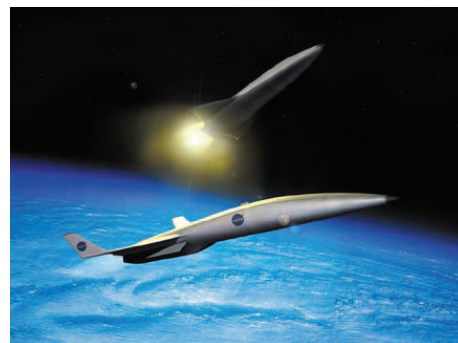


Team Green Cheese Solutions from Hudson, WI with their Robot "B.E.S.S.ie"

CRASTE continued from page 7

"Low-cost and reliable access to space will deliver significant benefits to NASA's existing missions, from science to human exploration to aeronautics, and to our nation's security and to national economic growth," said Doug Comstock, director of NASA's Innovative Partnerships Program at NASA Headquarters. "Part of our plan is to apply lessons learned from the recent past and also from the great successes of the National Advisory Committee for Aeronautics in stimulating the American commercial airplane industry nearly 100 years ago."

NASA and the Air Force study began this study at the Commercial and Government Responsive Access to Space Technology Exchange (CRASTE) 2009, held Oct. 26-29 in Dayton, Ohio. CRASTE is a technology exchange forum for the space launch community to discuss and collaborate on technologies to deliver improved, responsive and cost effective access to space capability. CRASTE provides an opportunity for space access customers (DoD and NASA) to present requirements and objectives, and brings large military system integrators and emerging entrepreneurial space companies together to identify and promote viable solutions to space access challenges.



"CRASTE 2009 was an excellent start for the Commercial RLV technology roadmap study we are pursuing with our Air Force partners," said Dr. Dan Raskey, NASA lead for the study, a senior scientist at NASA Ames and Director of the Space Portal in the NASA Research Park. NASA and the Air Force Research Lab, with participation from the Federal Aviation Administration's Office of Commercial Space Transportation, met with representatives of 20 commercial RLV companies to understand their long-range growth plans and the technology they could use to implement those plans successfully.

NASA Ames will host CRASTE in collaboration with the Air Force Wright Patterson Research Lab at the NASA Research Park Conference Center in late October 2010. CRASTE will remain focused on commercial RLV partnerships and is expanding its customer and vendor base to ensure a successful and worthwhile event for the space launch community.

NASA's Innovative Partnerships Program is leading the Commercial RLV Technology Roadmap study. For info on the Innovative Partnerships Program: <http://www.nasa.gov/offices/ipp/home>

For info about the Commercial RLV Technology Roadmap study: <http://commercialspaceinitiatives.arc.nasa.gov>

For info on the Commercial and Government Responsive Access to Space Technology Exchange 2009: <http://www.usasymposium.com/craste>

NRP Leaders Discuss STEM Education Initiatives

Photo by Meighan Halder



(L-R) Dr. Martin Griss, Carnegie Mellon University Silicon Valley; Dr. Chris Kitts, Santa Clara University; Timothy Collins, KleenSpeed Technologies, Inc.; Susan Fonseca-Klein, Singularity University

A brainstorming meeting on science, technology, engineering and mathematics (STEM) education was held at NRP with leaders from universities, non-profits and green tech CEOs on December 15th. The meeting was organized by NRP Director, Michael Marlaire, to discuss opportunities to work together on potential initiatives to assist our nation in facing challenges in STEM education. The ideas were well received by all attendees and another meeting will be scheduled for mid-January.

Attendees were:

- Dr. Martin Chemers, UC-Santa Cruz, Vice Provost and former Acting Chancellor UCSC
- Dr. Pam Stacks, San Jose State University, Associate Vice President for Grad Studies and Research
- Dr. Maureen Scharberg, Associate Dean College of Science SJSU
- Dr. Martin Griss, Carnegie Mellon University, Director CMU Silicon Valley
- Timothy Collins, President KleenSpeed Technologies, Inc.
- Geoff Brown, CEO m2mi (machine to machine intelligence)
- Dr. Kathy Schubel, CEO Airship Earth
- Tom Grimm, CIO Airship Earth
- Dr. Tom Pierson, CEO SETI Institute
- Edna Devore, Deputy CEO SETI Institute
- Dr. Chris Kitts, Santa Clara University, Director Center for Robotics, Exploration and Space Technology (CREST, located in NRP)
- Salim Ismail, Executive Director Singularity University
- Dr. Dan Walker, SJSU, emeritus, expert in STEM teacher training
- Susan Fonseca-Klein, VP Singularity University
- Tom Clausen, Education Branch, Strategic Communications
- Liza Coe, Education Branch, Strategic Communications
- Michael Marlaire, Director, NASA Research Park Office

Dante Zeviar, VP Electric Technology, wishes everyone a Happy and Prosperous New Year from the KleenSpeed team!

Dante heads up KleenSpeed Technologies, Inc.'s R&D Division. He is enhancing their high performance EV systems by developing new solid state motor drives, lithium ion battery management components and cell pack arrays. One of KleenSpeed's prototype race cars won the First Place trophy at Laguna Seca Raceway's ReFuel event in July. Dante has a B.Sc. in Mechanical Engineering from UC Berkeley, a Professional Degree in Automotive Technology from UTI, and a M.Sc. in Automotive Engineering from Technical University of Munich, Germany. While working for BMW he developed an aluminum connector for high current applications in electric and hybrid vehicles.

Dante's Thought for the New Year
"Be the change you want to see in the world."



Photo by Diane Farrar

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