National Aeronautics and Space Administration

The NRP Post

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Summer 2012

Silicon Valley Campus Celebrates Decade of Success

by Nichole Dwyer

Some of CMUSV's original founders with CMU leadership (L-R): Drew Perkins, Jared Cohon, Duane Adams, Martin Griss, Raj Reddy, Gordon Bell, Jim Mitchell, Pradeep Khosla, Ed Frank, Mark Kamlet, Eric Daimler, Philip Lehman, and Jim Morris

The winds were gusty, but the spirit was joyous as hundreds gathered to celebrate the 10th anniversary of Carnegie Mellon University's (CMU) Silicon Valley Campus, located in the NASA Research Park.

The celebration included remarks from university leadership and local government officials, short videos showcasing the campus and celebrating its existence, recognition of the campus founders, a time capsule ceremony, and a technology showcase.

California State Assemblyman Paul Fong and Mountain View Mayor Michael Kasperzak offered resolutions celebrating the Silicon Valley Campus (SV). CMU President Jared L. Cohon and CMU Provost Mark Kamlet offered remarks on looking back at the history of the campus and looking forward to the future. President Cohon proclaimed, "Truly, this is the center of innovation of the world. The present, and even more so the future, is about networking in a collaborative mode that benefits everybody."

Provost Kamlet recognized the campus founders and how the SV campus became the start of CMU's global networking.

CMU-SV cont'd on page 3

President of Bulgaria Visits NRP

Rosen Plevneliev, President of Bulgaria

The President of Bulgaria, Rosen Plevneliev, the U.S. Ambassador to Bulgaria, James Warlick, and the Bulgarian Ambassador to the U.S., Elena Poptodorova, along with 15-20 U.S. and Bulgarian government and media representatives, visited NASA Research Park on May 17. The objective of the visit was to learn about the NASA Research Park (NRP) and public/private partnerships for technology R&D. Bulgaria is planning a similar type of research park in their capital city Sofia. The visit was coordinated by the U.S. Department of Commerce.

(L-R): Rosen Plevneliev, President of Bulgaria; John Boyd, Senior Advisor to the Center Director; and Lewis Braxton III, Deputy Director.

Lewis Braxton III, ARC Deputy Director, welcomed the president on behalf of Ames Center Director Dr. Pete Worden who was on travel. Michael Marlaire, Director, NASA

Bulgaria Visit cont'd on page 2

CONTENTS

NRP Welcomes

Rhombus Power, Inc.

Bldg. 19, Room 1070G
Commencement 5/1/12

Rhombus has developed proprietary solid state technologies for the detection of neutrons, gamma rays and other sub-atomic particles. With the help of these technologies and an international collaboration with researchers at leading universities in the Bay area and in South Korea, Rhombus is developing neutron detectors for homeland security, oil & gas exploration, aerospace applications, and deep space exploration.

Quintessence Labs Inc.

Bldg. 19, Room 1077
Commencement 8/1/12

Quintessence Labs Inc. is the first in the world to exploit a new generation of quantum cryptographic technology to enable unbreakable, secure storage and communication of sensitive information through the generation of an ultra secure cryptographic key.

Bulgaria Visit cont'd from page 1

Research Park, briefed the guests on the NRP and introduced a number of Silicon Valley and NRP leaders: Dr. Russ Hancock, CEO, Joint Venture Silicon Valley Network; Jason Popko, Marketing Supervisor, Bosch Healthcare; Carol Ruth, Finance & HR Manager, Lyncean Technologies; Alexis Roos, Master Principal of Sales, Oracle Healthcare; Dr. Martin Griss, Director, Carnegie Mellon University Silicon Valley; Ravi Deepak, Taksha University; Michael Gooding, Director, Marketing and Sales, Space Systems Loral; Dr. Robert Baertsch, Chief Technology Officer, SkyTran; Rob Nail, CEO, Singularity University; Bob Richards, CEO, Moon Express; Adarsh Deepak, CEO, and President, Science and Technology Corporation (STC) and Tiffany Montague, Google.

Discussions continued over a stand-up lunch. Afterwards, the President and a small entourage were taken to tour the NASA Ames Supercomputer facility. The other guests toured NRP partner Sky-Tran's facility. A note from the Bulgarian leadership was received after their visit, "Let me once again express our appreciation to your efforts and great support and engagement to the Bulgarian visit in San Jose. The NASA event was the highlight of the program with lots of impressive attendees. It was a big challenge for all of us but the event with you added a great value to the success of the whole mission." ■

Gigapan photo of CMU-SV 10th anniversary attendees. The interactive photo can be viewed at http://www.cmu.edu/silicon-valley/10years/

CMU-SV cont'd from page 1

"The Silicon Valley Campus really represented the start and the learning curve for us on how to best network what we are doing and how to best take advantage of who we can interact with," Kamlet said.

Recognizing the rapidly advancing technology industry, the SV campus also put together a time capsule, in which over 20 items from the campus and surrounding community were added. The capsule will be opened in 15 years during the 25th anniversary of the campus.

SV Campus Director Martin Griss gave the final remarks, thanking those who helped push the campus to success, especially the College of Engineering.

"The College provided a home for us to grow and a vehicle and assistance to develop and strengthen many ties," he said.

After the program, photos of SV alumni were taken, as well as a Gigapan photo of the attendees. Gigapans are gigapixel panoramas, digital images with billions of pixels. GigaPan was formed in 2008 as a commercial spin-off of a successful research collaboration between a team of researchers at NASA and Carnegie Mellon University.

A technology showcase followed with over a dozen demonstrations and posters offering glimpses into the research being performed at the campus.

Finally, a delicious reception capped the evening, after which the winds had died down, but the sky still shone blue. ■

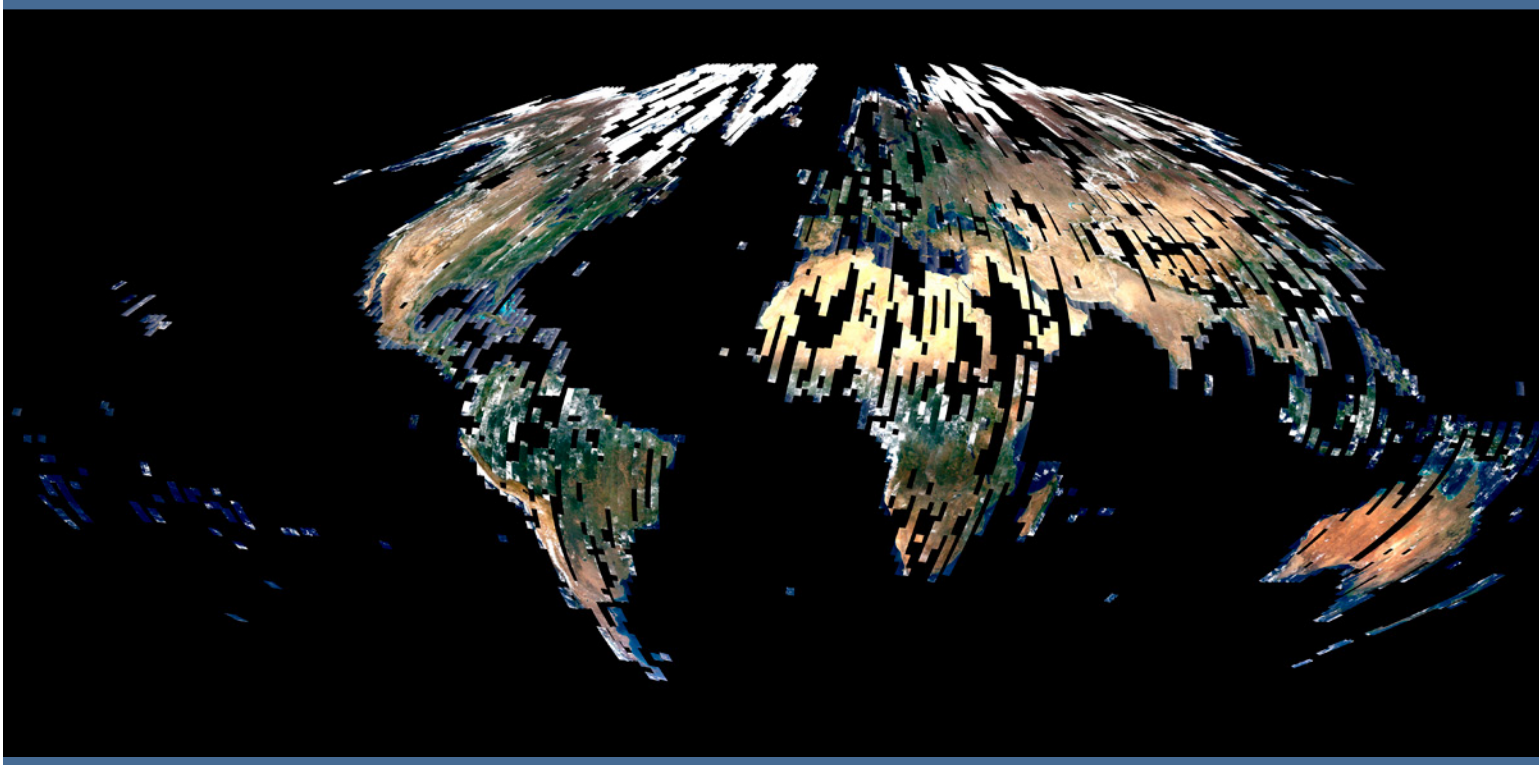
NASA Ames Associate Director for Mission Support, Deborah Feng, congratulates CMU for ten years at NRP.

NRP hosts US Market Access International Business Leaders

US Market Access Center (US MAC) is a non-profit business accelerator located in the heart of Silicon Valley. The US MAC is supported by the San Jose State University Research Foundation and focuses on helping emerging technology companies from other countries who seek to do business in the US. Since 1995 US MAC has worked with over 800 such companies from over fifty countries. Michael Marlaire, NRP Director, briefed the US MAC guests from University of Salford, England; Aalto University, Finland; Urban and Regional Innovation Research (URENIO), Greece; and University of Lodz, Poland.

NASA Earth Exchange Joins NRP Partnership

by Jill Dunbar



First application of NEX: global vegetation density estimates at 30-meter resolution (nearly 340 billion pixels) from Landsat satellite data.

Take one of the world's fastest supercomputers, add thousands of terabytes of Earth science data, mix in state-of-the art software tools, and blend with an array of international experts. The result: NASA Earth Exchange (NEX), the only complete collaborative workspace for engaging and enabling the extended Earth science community.

The newest partner to join NASA Research Park, NEX offers a unique capability to share knowledge, research, and tools to address global environmental challenges. The three key components of the NEX workspace architecture—a web portal for sharing project information and findings, a sandbox with tools for building software codes and testing ideas, and high-performance computers for running data analysis and modeling and simulation on a large scale—are accessible to a variety of Earth scientists from universities, government, industry and non-profits around the world.

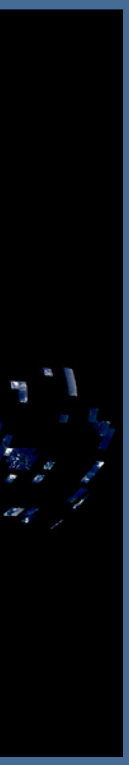
"The idea is to give scientists a gateway to all the technologies they need to join forces, make new discoveries, and share knowledge gained to fast-track our understanding of the planet we live on," said Dr. Ramakrishna Nemani, NEX principal scientist from the NASA Advanced Supercomputing (NAS) Division at NASA Ames. "NEX is a natural fit with NASA Research Park partners who are working to develop innovative technologies and accelerate scientific breakthroughs."

According to Jennifer Dungan of NASA Ames' Earth Science Division, who co-manages the NEX project, a key advantage of being located on the NRP campus is the ease of including non-NASA researchers in NEX-sponsored events. During the highly successful 2012 "Summer Short Course for Earth System Modeling and Supercomputing" held this past July, early-career scientists from the U.S. and around the globe were introduced to NEX and attended lectures on a wide variety of topics, including Earth observing systems, Earth science modeling and data analysis codes, handling big data, and publishing results.

One of the most promising real-world results enabled by the NEX environment involves the Amazon rainforest, which has gone through two extreme droughts since 2005. When NASA scientists studied the first drought, it took 18 months to process and analyze all the data. In sharp contrast, using NEX workflow capabilities and the Pleiades supercomputer (see sidebar on page 5), scientists completed an analysis of the 2010 drought in just one month. This quick analysis led to further investigations that revealed widespread reductions in the health of forest vegetation in the Amazon basin.

Not all NEX members need to use Pleiades to advance their research. Many stick to the web portal's trove of cross-disciplinary information to find out what other researchers are studying, and build their science social network through

NEX cont'd on page 14



NEX
NASA Earth Exchange

Meet Up in the NEX World

The NASA Earth Exchange (NEX) office is located in building 19 at NASA Research Park in rooms 2030, 2031, 2033, and 2034. To find out more about NEX research areas, projects, resources, and joining the NEX community, see: http://nex.nasa.gov.

NEX members who would benefit from using supercomputing resources for large-scale projects addressing NASA climate and environmental change research can apply for access to the Pleiades supercomputer—currently ranked as the fourth most powerful system in the U.S. Potential users undergo a formal application and review process, and must meet federal security requirements in order to use Pleiades and mass storage resources at the NAS facility. Approved users also have access to NAS's hyperwall-2, a supercomputer-scale environment to visualize, explore, and analyze large, high-dimensional datasets produced by NASA supercomputers and instruments. For more information on the Pleiades supercomputer, see: http://goo.gl/LsOln

Airship Ventures Provides Zeppelin Airship Pilot School for the U.S. Air Force

U.S. Air Force test pilots learned how to fly a Zeppelin airship in Long Beach, CA.

Future test pilots from the U.S. Air Force and other countries tested their lighter-than-air flying skills in a Zeppelin airship during an airship flight evaluation for the Air Force Test Pilot's School (AFTPS) in Long Beach, Calif. on Tuesday, May 29.

The AFTPS encourages students to fly as many different aircraft as possible—jets, small planes, helicopters, and in this case, a fly-by-wire, Vertical Take Off and Landing (VTOL) airship, the Zeppelin NT-07 Eureka.

"This was an amazing opportunity for our students," noted Mary E. (Lyn) McNeely, instructor flight test engineer at the U.S. Air Force Test Pilot School. "The airship provides a unique type of aviation, something you can't learn in a classroom and our students looked forward to this all year."

During the one-day Zeppelin training school, select U.S. Air Force pilots learn the theory and technique behind flying a 246-foot-long Zeppelin in ground school, and then put it into practice during a flight over the Pacific Ocean. Each student flies the airship at a variety of speeds and practices hovering using the airship's vectored thrust engines.

"Through relationships with military and defense organizations like the U.S. Air Force, Airship Ventures continues to advance its special missions capabilities," said Francis Govers, Airship Ventures' special missions manager. "Our Zeppelin is a unique resource, which has been finding increased utility not only as a training platform, but also in the evaluation of new sensors and systems that may go on other manned or unmanned aircraft."

Airship Ventures also offers a similar school to members of the public who are current private or commercial pilots. The pilot experience for civilians is a two-day course which includes learning about an airship flight from Zeppelin pilots, stick time in the cockpit, and a behind-the-scenes look at Airship Ventures and airship operations. For more information on Airship Ventures Pilot Experience visit http://goo.gl/Bem9C or call 650-969-8100 x 111.

NASA Lunar Science Forum held at NRP

By Teague Soderman and Greg Schmidt

The NASA Lunar Science Institute (NLSI) hosted its 5th annual NASA Lunar Science Forum on July 17–19, 2012 in the NASA Research Park (NRP) at Ames Research Center (ARC)—a world-class, shared-use R&D and education campus for industry, academia, non-profits, and government. This year, the NLSI made significant improvements to Building 152 to help transform the space into a cutting-edge conference center that will be available for years to come for multiple uses. Beyond just the Forum, the new audio-visual systems and building improvements provide a lasting benefit to the ARC community.

Steven Zornetzer, NASA Ames Associate Center Director for Research, welcomes guests to the NASA Lunar Science Forum.

This year's forum featured sessions from the Lunar Reconnaissance Orbiter (LRO), Acceleration Reconnection Turbulence and Electrodynamics of the Moon's Interaction with the Sun (ARTEMIS) and the Gravity Recovery and Interior Laboratory (GRAIL) satellites. As in past years, science sessions were structured to report on both recent results and future opportunities for lunar science, exploration, education and outreach.

Each year the conference reviews the state of knowledge, and opportunities for science: Of the Moon: investigating the composition, structure and history of the Moon as each relates to the evolution of the Earth, Moon and Solar System; On the Moon: investigating the effects of lunar material and the environment on terrestrial life and robotic equipment; and From the Moon: exploring science that is uniquely enabled by being on or near the Moon, including celestial and Earth observations.

The Forum consists of invited and contributed oral and poster presentations, together with breakout sessions to plan for the future of lunar science. Continued exploration and scientific research produces emerging markets and new opportunities to expand human commerce to the Moon, and efforts spawned from the Google Lunar X-Prize offer significant new opportunities for the lunar science community. Bruce Pittman addressed these exciting prospects by chairing a breakout session on lunar commerce held in Building 555, the NASA Ames Space Portal.

Education and public outreach sessions were also included to better understand how lunar exploration can be used to stimulate public interest in space exploration and improve science literacy. Two dedicated side meetings by and for graduate students and young lunar professionals explored opportunities for the next generation of explorers, and the annual Shoemaker Medal, named after pioneering lunar scientist Gene Shoemaker, was presented to Dr. S. Ross

Jim Green from SMD discusses the importance of lunar science.

Mike Wargo from HEOMD discusses how science enables exploration.

Taylor in recognition of his significant scientific accomplishments.

More than 300 scientists attended the Forum to hear analysis from the five U.S. spacecraft currently studying the Moon, and for the first time much of the Forum was webcast, a fitting new feature given the virtual nature of NLSI. In addition to discussing science results, the Forum attendees also focused their attention on the future. NASA officials praised the performance of the current NLSI and announced an expansion of the charter to allow additional emphasis on research that will support both science and exploration of not only the Moon, but other human targets as well. In NASA organizational terms, this means a closer alliance between the NASA Science Mission Directorate (SMD) and the NASA Human Exploration and Operations Directorate (HEOMD).

The joint virtual presentation at the Forum by NASA Associate Administrators John Grunsfeld (SMD) and William Gerstenmaier (HEOMD) outlined their rationale for the expansion of the Institute, providing insight into the new era of enhanced collaboration between science and exploration.

NASA representatives stressed that there is a strong future for lunar science research, saying we need researchers who are passionate about understanding our nearest neighbor, the Moon, and who want to improve our understanding of the origin and evolution of planet Earth.

"The NLSI catalyzes collaborative research within and among its seven teams, but also strives to include and support the broader lunar science community in a variety of ways," said Yvonne Pendleton, Director of the NLSI. Greg Schmidt, deputy director of the NLSI, said, "The world is returning to the Moon, and our growing number of international partners greatly amplify the value of the work of our domestic teams."

In his summary review of the conference, distinguished planetary scientist David Kring of the Lunar and Planetary Institute in Houston said "We have made more progress in three years with the NLSI than was made in the previous 30 years of lunar studies, but a lot of questions remain unanswered that require a return to the lunar surface, using both robot and human explorers."

The 2012 NASA Lunar Science Forum was perhaps the best yet. If you missed the meeting or just want to relive some of your favorite talks, the public Adobe Connect sessions are available online at: http://goo.gl/G8oY0

We look forward to another exciting meeting at the NRP next year! ■

Dr. Stuart Ross Taylor gives the Keynote Lecture after receiving the annual Shoemaker Award.
Photos by D. Hart/ARC.

NASA ROSES Seagrass/Coral Reef Project

In July 2012, the UAV Collaborative was awarded a two-year NASA ROSES Grant as part of NASA's Airborne Science UAS Enabled Earth Science Program, with Dr. Stanley R. Herwitz (Director of the UAV Collaborative) serving as Principle Investigator. The Project is entitled "High Resolution Assessment of Carbon Dynamics in Seagrass and Coral Reef Biomes", and it is now commonly referred to as the Seagrass/Coral Reef Project.

The Seagrass/Coral Reef Project research team consists of the following co-Investigators: (1) Prof. Frank Muller-Karger, Ph.D., Institute for Marine Remote Sensing, University of South Florida, College of Marine Science, St. Petersburg, FL; (2) Prof. Chuanmin Hu, Ph.D., Optical Oceanography Laboratory, University of South Florida, (3) Kimberly Yates, Ph.D., U.S. Geological Survey, Center for Coastal and Marine Science Center; (4) Paul Carlson, Ph.D., Florida Fish and Wildlife Research Institute; and (5) Deanesh Ramsewak, Institute of Marine Affairs, Trinidad and Tobago.

The research objective is to determine the optimal spatial, temporal, and spectral resolutions for monitoring the productivity dynamics of optically-complex coral reef and seagrass coastal biomes. Understanding the productivity dynamics of these vulnerable nearshore environments is critical for assessing their current state and predicting their response to the effects of global climate change (e.g., sea level rise; changes in seawater chemistry and temperature).

The research activity involves repeated high-resolution airborne observations of diurnal and seasonal variation at the Sugarloaf Key site in the Florida Keys using low-flying long-duration Unmanned Aerial Vehicles (UAVs); specifically, the Bat-4 and the SIERRA UAVs equipped with complementary multispectral and hyperspectral sensors. The airborne datasets are being augmented by in-water measurements and satellite data. We are predicting that our coordinated inter-disciplinary earth science mission will provide new insights into coastal benthic productivity dynamics, and new advancements in remote sensing technology. The results are being made available to coral reef and seagrass monitoring programs, providing a tool for acquiring data in remote areas of the world where traditional in-water methods are logistically difficult or limited in spatial coverage.

In preparation for the recently completed May 2012 Deployment of the Bat-4 UAV to Sugarloaf Key in the Florida Keys, pre-Deployment flight tests were conducted in California at San Bernabe Vineyard (March 15, 2012) and at Moffett Field (March 20, April 18 and April 24, 2012). The flight tests at Moffett Field were historic, with the Bat-4 becoming: (1) the first "Category 2" UAV to takeoff and land at Moffett Field, making it the largest UAV ever operating at Moffett Field; (2) the first Moffett Field-based UAV to fly at 1,000 ft MLS, making it the highest flying Moffett-based UAV; and (3) the UAV reaching the furthest flight distance from its Moffett-based take-off site (Fig. 1).

After months of preparation that began in July 2011, the Seagrass/Coral Reef Project embarked on its 1st UAV Deployment to the Sugarloaf Key site in Florida in mid-May 2012. The Sugarloaf Key site was selected because it has a readily accessible paved airstrip positioned close to seagrass and patch reef environments located in the Florida Keys National Marine Sanctuary (Fig. 2). Airborne data acquisition using a Tetracam multispectral camera system integrated

Fig. 1. Bat-4 UAV at Moffett Field: (a) pre-flight; (b) takeoff; and (c) in-flight.

on the Bat-4 UAV was successfully conducted on four flight days (May 16, 17, 18 and 19, 2012). Data analysis is currently in progress. Deployment of both the SIERRA and the Bat-4 UAVs to the Florida Keys is now planned for October 2012 and May 2013.

In addition to obtaining an approved Certificate of Authorization (COA) from the FAA, approval of the intensive in situ field measurement and field sampling activity was obtained from the National Oceanic and Atmospheric Administration's (NOAA's) Office of National Marine Sanctuaries (ONMS). The UAV Collaborative prepared and submitted the required permit application. On April 21, 2012, NOAA's ONMS issued Permit Number FKNMS-2012-043 to the UAV Collaborative, enabling field research activity at the Sugarloaf Key site as part of the NASA ROSES Seagrass/Coral Reef Project. ■

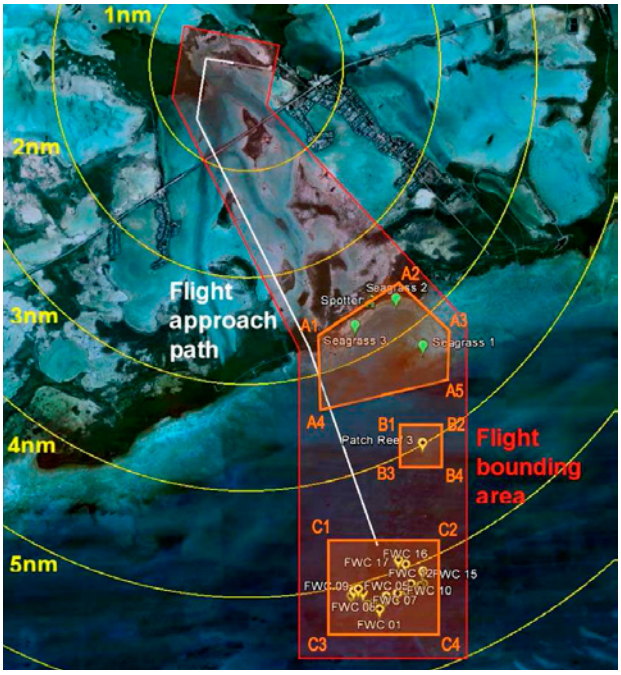
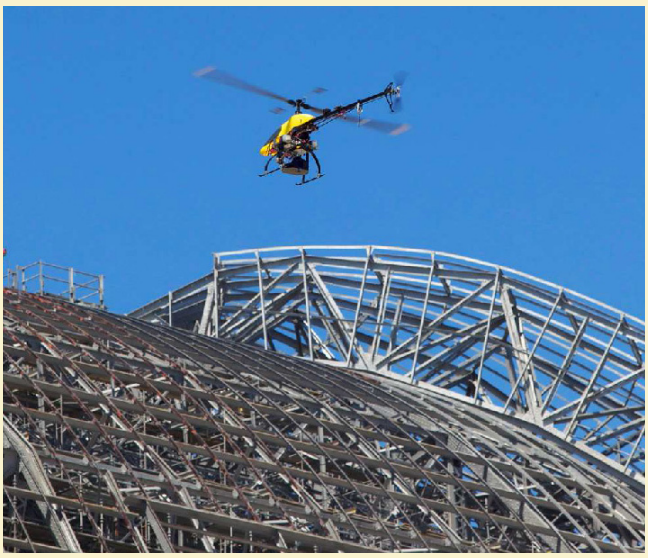


Fig. 2. Imaging areas A, B and C shown within FAA-approved flight bounding area.

Hangar One UAV Project

On August 11th, 2012, Xtreme Aerial Concepts working in collaboration with the UAV Collaborative successfully completed the first series of historic flights of the Vision Rotorcraft UAV on the east side of Hangar One at Moffett Field. The flights were historic in terms of being conducted in the National Airspace with FAA and NASA Ames Range Safety approval in close proximity to Hangar One, an exceptionally large man-made structure. The flights featured the acquisition of high-resolution still-frame digital imagery and high-definition video.

The Hangar One UAV Project is motivated by the UAV Collaborative's educational outreach campaign, showcasing the airborne data acquisition capabilities of small low-flying hovercraft-type UAVs. The long-term objective is to measure the complete de-skinned 3D structure of Hangar One for the NASA Ames Historic Archive and for possible future use during re-skinning. The recently completed historic flights involving airborne imaging were conducted in preparation for the 3D scanning effort that will involve integrating a downsized Focus 3D Scanner (manufactured by FARO Technologies, Inc.) onto the Vision Rotorcraft UAV (manufactured by Xtreme Aerial Concepts). The final deliverable will be a precision 3D database representing Hangar One.



The Vision Rotorcraft UAV at Moffett Field acquiring airborne imagery of Hangar One.

Kentucky Space Developments

NASA Research Park partner Kentucky Space (KS), based out of Lexington, KY, has been hard at work on a range of projects in widening the pool of potential space researchers and applications. This includes:

Exomedicine:

The Exomedicine Institute (EI) held a special break-out session on June 28th at the first annual ISS researcher's conference in Denver, CO to speak with current ISS researchers about the Institute. Among the topics discussed were the current commissioning of 10–12 Exomedicine white papers in fields such as oncology, diabetes, and hematology, and to have top level researchers in these respective areas look at the future value of microgravity research as it relates to those fields. Papers in regenerative medicine, protein crystallization, infectious disease, drug discovery, neurodegenerative disease, and cystic fibrosis are already underway by researchers from around the globe. EI hopes to have all the current papers by the fall with all other fields underway within the year.

Commercial Endeavors:

Kentucky Space's Firefly C&DH board

KS is talking to the social financing website KickStarter to gather enough customers for bulk ordering for the Firefly C&DH board. Firefly is an Arduino-friendly system with onboard power, charging, data logging, and medium range communications capability. The board was developed after a prototype was used at KS's first CubeSat Hacker Workshop. Attendees were so interested in the prototype board used during the conference that KS has further developed Firefly for commercial sale. Firefly is licensed and will be available for sale after the KickStarter campaign through the space tech blog evadot.com.

CubeSat Hacker Workshops:

One of KS's main focuses since its inception in 2006 was the emerging entrepreneurial space market. KS has begun hosting a series of two day CubeSat Hacker Workshops for the non-space citizen learn about the basics of small satellite design and factors that a designer must consider. These workshops open space to a new audience who previously thought that these jobs were left to just NASA and large aerospace contractors. Currently there are two more workshops planned: one at the IdeaFestival in late September in Louisville, KY and another hosted by the Silicon Space Center on October 26–28th.

Outreach with Near Space Balloons:

On July 12th, 2012 a near space balloon was launched from the Girl Scouts Camp Cardinal in Olive Hill, KY. This launch was the culmination of several months of work between the Girl Scouts of Wilderness Road and Kentucky Space in which the girls developed their own experiment and came up with a hypothesis of what would happen. The experiment included four fluids held in test tubes that were exposed to the gradually cooling and low pressure air that the balloon experiences as it ascends through the atmosphere. The balloon was located later that day, but was not retrieved until the next week. Results from the flight are being analyzed at this time.

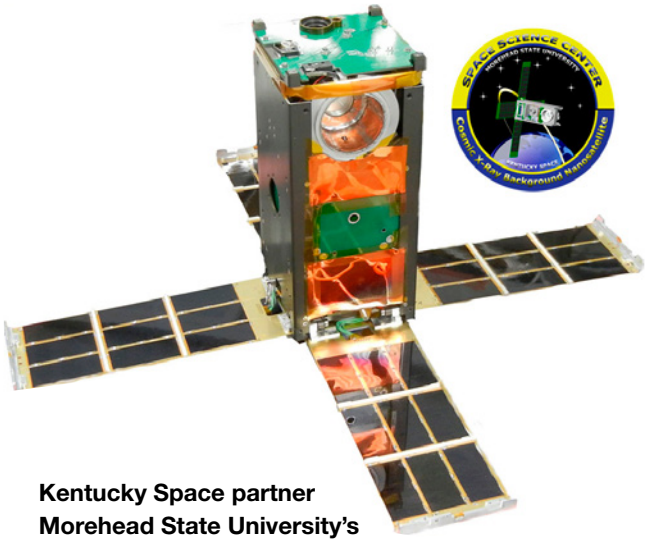
CubeSats:

Kentucky Space partner Morehead State University (MSU) was the leader in a consortium of universities on the Cosmic X Ray Background Nanosatellite (CXBN) to be launched as part of ELaNa VI on the NRO L-36 mission out of Vandenberg AFB scheduled for launch on August 2nd. CXBN will be mapping the ruminates of background radiation from the big bang in the 30–50 keV range.

Kentucky Space is managing the development of KySat-2, which is currently occupying a back slot on both NASA's ELaNa

CubeSat Hacker Workshop attendees

II & ELaNa IV missions. KySat-2 is replacement to KS's first satellite KySat-1 which was lost on ELaNa I. KySat-2 will fulfill the Educational and Public Outreach mission originally set out for KySat-1. This means transmitting on amateur HAM radio bands, open source telemetry, and images taken from the spacecraft on the KS website.



Kentucky Space partner Morehead State University's Cosmic X-Ray Background Nanosatellite (CXBN) (Pictured above):

CBXN Mission Description:

- **Goal is to increase the precision of measurements of the Cosmic X-Ray Background (CXRB) in the 30-50 keV range**
- **Constrain models that explain the relative contribution of cosmic X-Ray sources to the CXRB**
- **Produce data that will lend insight into the underlying physics of the Diffuse X-Ray Background**
- **Provide flight heritage for CZT-based X-Ray-gamma-ray detectors and CubeSat technologies**
- **ConOps: Sun pointing, 1Hz rotation, maps entire sky in the X-Ray spectrum**

Spacecraft Specifications:

- **Mass: 2.6 kg**
- **Power: 15 W max generated**
- **Orbit: 268 425 nmi**
- **Size: 2U= 10cm x 10cm X 20cm**

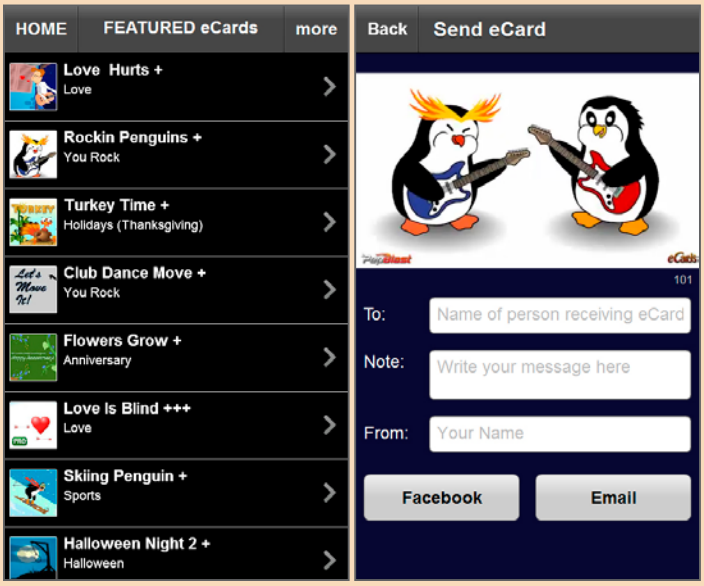
PepBlast Animated eCards in Google Play App Store

Photozig, Inc. has released a new free app, PepBlast Animated eCards, which is available in the Google Play App Store now. A version for iPhone and iPad is coming soon.

PepBlast eCards enables users to send animated greeting cards (fun animations with cool songs). Users can select from over 200 eCard designs in 40+ eCards collections.

There are eCards for nearly all occasions, including Birthdays, Holidays, Love, Congratulations, Christmas, Friends, Family, Work, Graduation, and many more. PepBlast collections also include Space themes inspired by NASA images/videos.

Users can preview these fun video eCards with music, add a personalized message, and send eCards by email or Facebook.



Screen captures from Photozig's new app, PepBlast eCards

When sending an eCard, a personalized web page is created, containing the selected animated video with music, and message. These eCards can be seen on PCs, smartphones, tablets, and almost any web browser.

The free PepBlast eCards App can be downloaded at http://goo.gl/niu0p

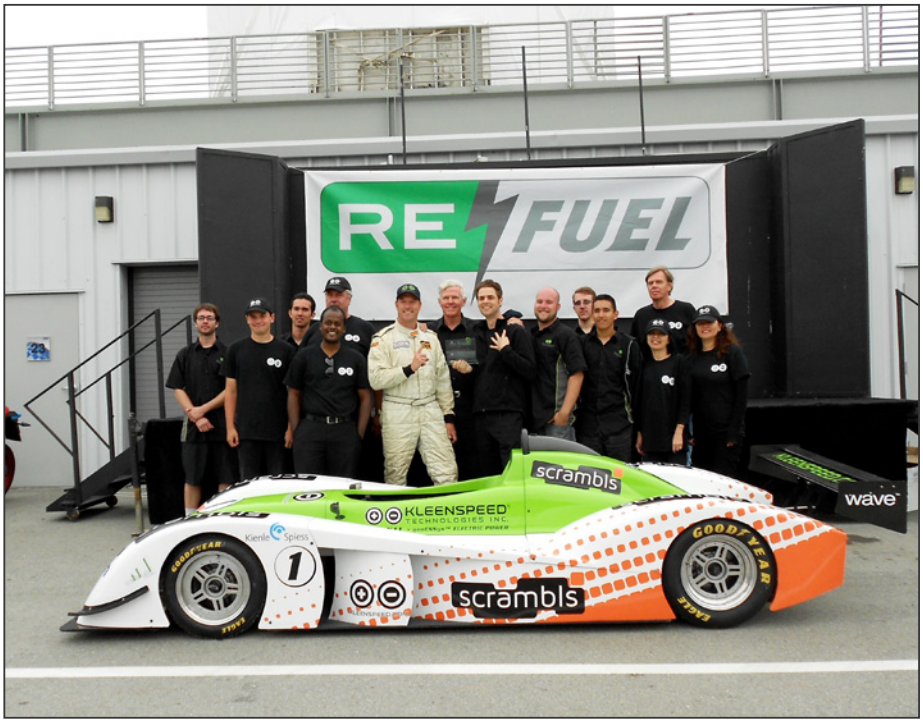
KleenSpeed's Disruptive Technology Leads the Way To a Greener Future

World's Fastest Electric Race Car Sets the Pace at America's Premier EV Motorsports Event

NRP Partner KleenSpeed Technologies won First Place for the fourth straight year at Refuel 2012 held July 1, 2012, Mazda Raceway, Laguna Seca, CA. ReFuel is the leading open competition for electric vehicles held in the United States with classes for electric vehicle (EV) prototypes, EV production vehicles, EV conversions and several classes of electric motorcycles.

Competing in the Open Prototype class, the Scrambls/KleenSpeed EV-X11 shattered the lap time of 1:38.9 it set in winning last year's ReFuel event by over six seconds, completing a hot lap of the challenging Laguna Seca circuit in 1:32.046 to set a new record for the fourth year in a row.

ReFuel 2012 had a considerably larger roster of entrants than in 2011 including the Yokahama Blue Earth HER-02—the EV Class champion at the 2011 Pikes Peak Hill Climb, a large contingent of TESLA Roadsters and an "unofficial" group of TESLA S Pre-Production sedans, a race-Prepped CODA sedan, numerous Nissan Leafs and several BMW Active E sedans. The motorcycle category was led by Brammo's Empulse TTXGP bike and various ZERO models with a full field of privateer entries as well. CODA also held a CODA Driving Experience event.



KleenSpeed and its EV-X11 won first place at Refuel 2012

The Scrambls/KleenSpeed EV-X11 turned the fastest lap of all competitors by a large margin, validating the disruptive technology of the KleenSpeed genESSsys™ Race system incorporated in the world's fastest electric track racing car. The EV-X11 was piloted to the new lap record by Kevin Mitz of Rennworks Motorsports. ■

KleenSpeed's advanced research KAR prototype at the Stanford Center for Automotive Research (CARS) 2012 Vehicle Concept Showcase on June 12, 2012.

KLEENSPEED GenESSys™ 40 SMART Battery

By Dean Seven

KleenSpeed Technologies® announces the completion of prototype design and fabrication of its first commercial Energy Storage System—the GenESSys™ 40 "SMART" Battery. KleenSpeed's engineering team is now in the testing phase of the prototype GenESSys™ 40, which will be installed in the development mule of the KleenSpeed KAR later this summer for additional real-world testing and refinement, prior to finalizing the production specifications. The GenESSys™ 40 is the product of 4 years of intensive R&D and extreme environ-

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ment real-world testing in our EV race car program, and represents the current leading edge in multiple ESS technologies. The GenESSys™ 40 is based on a modular scalable architecture and part of a complete KleenSpeed Technologies system solution to advanced ESS applications. KleenSpeed's passion to develop a truly innovative "BETTERY" has delivered significant engineering breakthroughs enabled by proprietary KleenSpeed® technologies. KleenSpeed's GenESSys System can be incorporated in energy storage systems of many different sizes and capacities meeting various capacity, voltage and current specifications. The GenESSys BMS technology can be tailored to provide application-specific performance, connectivity and telemetrics options as required.

The global market for advanced ESS solutions for a wide variety of applications is anticipated to experience dynamic growth in the next decade as Smart Grids and Smart Energy technologies are implemented worldwide, in addition to the projected growth of the EV marketplace.

GenESSys™ 40 : 40 KWh "SMART" Battery

- State-of-the Art Metrics
  - Volumetric Energy Density : 180 Wh/Liter
  - Gravimetric Energy Density : 120 Wh/kg
- Total System Integration
  - Integrated and Optimized Hardware Components
  - Data Acquisition and Logging
  - Multi-Spectrum Connectivity
    - Telemetry, Intnet, GPS, Mobile, CAN, Wi-Fi, Bluetooth, V2x KS
  - Proprietary BMS System & Software
- Leading Edge Innovations
  - **ENABLE-ON**™ Safe/Live State Activation
  - **AUTHENTICON**™ Real-time Authentication
  - **LIFE ASSURANCE**™ Chemical Life Optimization
  - **SUBCONCIOUS ANIMATION**™ Always-On BMS Monitoring

NRP Partner Receives Service to Frontier Award

Bruce Pittman, Flight Projects Director, NASA Ames Space Portal

Bruce Pittman of the NASA Space Portal in the NRP was honored with the Service to the Frontier Award on July 28th, 2012. The award is given to someone who has dedicated exceptional volunteer service to the Space Frontier Foundation (SFF). As a liaison between NASA and the SFF, Pittman is a linchpin for SFF's partnership with NASA and is an indispensable source of advice. SFF also commends his support of commercial space and efforts to further it.

NRP Hosts United Nations Leaders

NASA Research Park hosted a United Nations (UN) Delegation visit on May 24. The VIP guests included: Dr. Soon-Hong Choi, Assistant Secretary General (ASG), Chief Information and Communication Technology Officer; Mr. Salem Avan, Chief, Knowledge Management Service; Ms. Viktorija Kocman, Special Assistant to the ASG; Mr. Suha Ulgen, Senior Advisor on Special Data Infrastructure, Knowledge Management Service, Co-chair, UN Geographic Information Working Group (UNGI-WG) & Head, Centre of Excellence for UN Spatial Data Infrastructure (CoE4UNSDI).

The UN is interested in potentially establishing an Information and Communications Technology innovation lab in Silicon Valley, and visited to explore the NRP as a site. The dignitaries were welcomed by NASA Ames Center Director Dr. Pete Worden. NRP Director Michael Marlaire gave an extensive briefing on the NRP, followed by presentations from Dr. Martin Griss, Director Carnegie Mellon University Silicon Valley, and Singularity University's Vice President Community Development and Graduate Studies Program Director David Roberts. The UN Assistant Secretary General Dr. Soon-Hong Choi asked if they could build in the NRP and was informed that his initiative would need to start at the State Department and NASA Headquarters.

Three NASA Ames leaders then briefed the guests on NASA programs related to the UN mission: Dr. Trey Smith on international disaster response; Dr. Rama Nemani on the NASA Earth Exchange (NEX) and Patrick Hogan on Worldwind. The guests were very impressed with the many opportunities to collaborate with both NRP partners and NASA Ames. ■

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shared abstracts and papers. Others take advantage of the rich collection of satellite data, tools, and algorithms to explore and analyze large datasets, run Earth system modeling codes, and quickly share results in the sandbox. This virtual compute environment will be expanded in 2013 to include hardware for pre-processing and storing Earth science data. Also on the horizon are enhancements to the web portal, expanded Pleiades resources, and more short courses.

With these new offerings, NEX's state-of-the-art environment for scientific collaboration will help NASA and its partners in the Earth science community more accurately pinpoint sources of change in the Earth system, accelerate our ability to identify and predict emerging patterns, and show us ways to respond and adapt to these changes that could improve life on our planet for generations to come. ■

Polish Top 500 Innovators Class of 2012

NRP Briefing by Michael Marlaire, Director of NRP to Polish Top 500 Innovators: Class of 2012.

Bloom Energy Brings on Big Customers

NASA and Coca-Cola Are the Latest to Partner with Bloom Energy

By Stephanie Ginter
May 2, 2012

The California-based fuel cell manufacturer Bloom Energy is on the fast track to becoming one of the top American fuel cell companies, supplying alternative energy system units to major corporations such as Google, Apple, eBay, Walmart, Caltech, AT&T, and its newest customers: The Coca-Cola Company and NASA.

The firm's advanced on-site power generation systems, Bloom Energy Servers, rank among the world's most energy- and cost-efficient alternative energy systems. Bloom Energy's solid oxide fuel cell (SOFC) technology was originally developed for NASA's Mars program.

NASA

The company's highly efficient Bloom Energy Box provides electrical generation for NASA's Sustainability Base, its latest and greenest facility, located at the Ames Research Center in Moffett Field, California.

NASA's latest mission on Earth is one of the greenest Federal buildings ever created. Sustainability Base's physical structure and landscape are designed "native to place," capitalizing on local natural resources. The facility's positioning in relation to the sun's arc across Moffett Field and the prevailing Bay Area winds allows it to operate without any artificial lighting for around 40 days out of the year.

The building's external and internal materials were locally sourced and many consist of recycled components.

Coca-Cola

In light of its interest and efforts to reduce its impact on the environment in recent years, Coca-Cola plans to install a new alternative energy system consisting of five natural gas hydrogen fuel cells at its production facility in American Canyon, CA.

Bloom Energy will be supplying the facility's solid oxide fuel cells. These units use natural gas-generated electricity to produce hydrogen, which produces even more electricity. Coca-Cola is confident that the amount of energy produced by Bloom Energy's fuel cells and subsequent hydrogen will yield enough electricity to manage most of the facility's energy needs.

Buzz About Bloom

The unveiling of Bloom Energy's "Bloom Box" fuel cell system two years ago immediately sparked widespread buzz. While the private company has expanded its focus to data center security, at the core of Bloom Energy is the fact that the electricity produced by one of its units is 50 percent cleaner than that produced by the electrical grid. Major corporations have justified the hype surrounding Bloom, recognizing the firm's potential to revolutionize the alternative energy sector.

Singularity University's Summer Graduate Studies Program

Singularity University believes small teams of motivated individuals can now take on challenges that only governments and large organizations could in the past. Massive acceleration in improvements of tools like robotics, biotechnology, and computing have given us all access to the resources needed to address the world's biggest problems. The university can point to dozens of small companies that have now touched the lives of billions around the world, and Singularity University has spent the summer training the next generation of leaders that aim to create real impact. Our annual 10-week graduate studies summer program brings together 80 students from countries all over the world to learn about the rapid acceleration in technology, and use them to address global grand challenges in problem spaces like clean water, renewable energy, global health, and education.

This summer, 80 students representing 36 countries began the summer at NASA Research Park, knowing that by the end of their 10-week program they would be tasked with creating a project aimed at positively impacting the lives of one billion people within the decade. Singularity University calls this the 10^{9th}+ Team Projects, and our students must create a solution to a big problem in the areas of our planet's biggest challenges. The students spent the first few weeks hearing from world experts in domains like medicine, energy, networks & computing, and have now been selected into small teams. To learn more about our team projects, and all of the amazing lectures at Singularity University, please visit us at www.singularityu.org. ■

Singularity University's co-founders Peter Diamandis (left) and Ray Kurzweil (right) welcomed students during the 2012 Graduate Studies Program Opening Ceremony held at NASA Ames on June 18th.

Google's Cyborg Glasses Revealed

by J.J. Colao, Forbes Staff
February 22, 2012

Yesterday evening Nick Bilton of the New York Times reported details on the long rumored "Google Goggles", sunglasses that offer augmented reality in the form of an Internet overlay, colloquially as Terminator Vision. The glasses will apparently resemble Oakley Thumps and employ an interface that responds to head movements for scrolling and clicking.

Bilton says, "The glasses will have a low-resolution built-in camera that will be able to monitor the world in real time and overlay information about locations, surrounding buildings and friends who might be nearby, according to the Google employees."

If checking into Foursquare and reading reviews of local restaurants without the ridiculous hassle of pulling out your phone sounds like reality-enhanced heaven, you're in luck: the glasses may be available to consumers by the end of the year for a reported $250 to $600. Seth Weintraub at 9 to 5 Google broke the story in December.

As a reminder, Google's rumored sunglasses represent only the company's latest science fiction-like effort. In addition to developing driver-less cars, Google's co-founders, Larry Page and Sergey Brin, are involved in Singularity University, an executive education program held at NASA's Research Park in Mountain View, California. Established by inventor and futurist Ray Kurzweil, the school offers a curriculum inspired by the Singularity—a hypothetical point in the future where machine intelligence surpasses that of humans, unleashing a whole array of unpredictable consequences ranging from immortal superhuman cyborgs to Matrix-like human enslavement.

According to the New York Times, Page donated $250,000 to Singularity University while Brin mingled with 2010 attendees as "Brinbot", a rolling computer that displayed a video feed from Brin who controlled its movement from miles away. ■

Moon Express Hires Veteran Team From Space Industry to Pursue Commercial Lunar Missions

By Daven Maharaj
August 30, 2012

Moon Express, Inc., a provider of commercial and scientific missions to the Moon, has unveiled its senior technical team of veteran space industry engineers hired to lead the company's flight programs. The Moon Express technical leadership team is described as a who's who of space industry veterans with over 50 NASA space missions to their credit, bringing to the company a deep understanding of NASA know-how and a passion to develop a new era of commercial space exploration beyond low Earth orbit. The announcement was made to commercial space industry leaders during a Commercial Spaceflight Federation meeting in Washington, DC.

The most recent additions to the Moon Express senior technical team are:

- Steve Bailey, Spacecraft Systems Engineering Lead
- Adrian Adamson – Avionics Engineering Lead
- Jim Kaidy – Guidance, Navigation & Control (GN&C) Lead
- Dr. Alan Stern – Chief Scientist and Mission Architect
- Dr. James (Jimi) Crawford – Chief Technoogy Officer and Software Architect
- Jim Cantrell – Vice President, Flight Programs
- Tom Gardner – Mission Systems Engineering Lead

Additionally, company co-Founder, Vice-Chairman and Chief Strategic Officer Dr. Barney Pell led the NASA Ames Artificial Intelligence group, supporting the highly successful Mars Exploration Rovers and Deep Space 1 missions; while company co-Founder and CEO Dr. Robert (Bob) Richards presided over enabling technologies to the NASA Phoenix Mars Lander and the US Air Force XSS-11 missions.

"We are thrilled and honored to have such amazing, talented people join Moon Express," said company co-founder and CEO Bob Richards. "The pedigree of our technical team in planetary exploration is unsurpassed; including missions to the Moon, Mars, asteroids and almost every planet in our solar system. We truly have the lunar Jedi's."

Carnegie Mellon Silicon Valley Hosts PA Governor at NASA Ames

Carnegie Mellon Silicon Valley campus hosted Pennsylvania Governor Tom Corbett August 14-15, 2012 as part of a trade mission to Silicon Valley to promote Pennsylvania as a choice location for high tech growth and investment. Governor Corbett met with influential Valley tech and VC firms such as Google, Facebook, and Kleiner Perkins Caufield & Byers, along with (L-R) CMU Provost Mark Kamlet; CMUSV Director Martin Griss; NASA Ames Research Center Deputy Director Lewis S.G. Braxton III; and Pennsylvania Governor Tom Corbett.

NRP Exhibited at the 2012 Ames Summer BBQ/ Diversity Day

Photo by Bruno Kajiyama

The NRP booth at the 2012 Ames Summer BBQ/Diversity and Inclusion Day Event on August 8th, 2012. (L-R): Cynthia Carbon-Norman, Account Manager; Courtney Hook, Project Liason; Dani Thompson, Account Manager; Mejghan Haider, Chief, Business Development.

NRP Post

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