

# The NRP POST

A publication of NASA Research Park

Spring 2013

## Google Starting Construction on New Campus

by John Letzing, The Wall Street Journal and Dow Jones Newswires

2/22/13



### A rendering of Google's Bayview Campus by architecture firm NBBJ

Google Inc. says it plans to start building a new corporate campus adjacent to its Silicon Valley headquarters as the Internet giant continues to grow at a rapid clip.

"We are beginning construction on our new Bayview Campus, which is a key to our growth and another sign of our commitment to the area," a Google spokesman said in a statement.

Google's headquarters in Mountain View, Calif. was previously occupied by Silicon Graphics Inc. The new campus would be built on land leased from the National Aeronautics and Space Administration. In a 2008 announcement, Google said it had agreed to lease more than 42 acres of land at NASA Research

Park, where it intended to build up to 1.2 million square feet of offices and research facilities "in a campus-style setting."

Google said at that time it expected the first phase of construction on the new campus to begin by the end of September 2013. Under the terms of the 40-year agreement announced then, Google would pay NASA an initial base rent of \$3.66 million annually.

Plans for the new campus were detailed by Vanity Fair magazine, which noted that it will be made up of nine buildings connected by bridges on about 1.1 million square feet.

## BBC TV Visits NASA Research Park

BBC TV visited NASA Research Park for two different shows. On BBC TV World News, a new series of Horizons, "An Insight into the Future of Global Business", began airing "Space Innovation: How science used in space is benefitting us on Earth" (see press release on page 3).

You can watch the 30-minute show at: <http://bit.ly/YXFAYv>

A second BBC TV show on BBC Two interviewed Moon Express CEO Bob Richards as part of their BBC Horizon Special, "Tomorrow's World," also airing this month. You can view this program on Youtube at: <http://bit.ly/12XuLcO>

Moon Express CEO Bob Richards and Dr. Peter Diamandis are interviewed about the Google Lunar X Prize during the first segment on Space.

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# NRP Welcomes

**Chandah Space Technologies**

**Building 19, Room 1070J  
Commencement: 4/16/13**

Chandah Space Technologies' mission focuses on small satellites design, development and operations. An SAA is in progress between Chandah and the Chief Scientist Office, to design iterations on the constellation architecture and capabilities. Chandah plans to develop data services for commercial and industrial markets.

The collaboration with Chandah Space Technologies will provide Ames an opportunity to keep pace in the ever rising global commercial activities so that the advances developed can be used for NASA's own missions and to evaluate its capabilities in designs and development of small satellites.

**Wattminder Inc.**

**Building 19, Room 2007  
Commencement: 4/1/13**



Wattminder's current focus is to create a web platform to enable hands-on STEM learning for all, using a cloud-based lesson delivery system to solve real-world environmental problems, based on Wattminder's proprietary "Pi-powered Portable Educator's Platform" technology and suite of monitoring and diagnostics resources.

**New Company in NRP Brings Back Former NASA Employee**

Mission Critical Technologies, Inc.'s new Northern California office is located in Building 19. CEO Beata Stylianos chose NASA Research Park because of its location near NASA and her interest in expanding the company's commercial work. "NASA Research Park is a perfect place to encourage collaboration with other Aerospace entrepreneurial companies".



**Annette Rodrigues**

She chose Annette Rodrigues as her Manager of the office. Ms. Stylianos was looking for someone who could help her small business grow at NASA and in Silicon Valley. Annette was her choice because of Annette's corporate knowledge of Ames Research Center, her understanding of the corporate culture at the center and her contacts in the industry in Silicon Valley. You see, Annette is not new to NASA or NASA Research Park. Ms. Rodrigues had a successful NASA career, and continued to move into other careers

adjacent to aerospace, always coming back to her roots at Ames Research Center.

Annette was 18 years old when she held her first job at Ames.

She worked on the Biosatellite Program as it was winding down. She went to college at night, worked at Ames during the day, and graduated from San Jose State with a Bachelor's degree in Business Management and a minor in Biology—never thinking she would be able to pursue work in the science area she loved. Little did she know, that eventually she would become the first Crew Trainer at

*Annette cont'd on page 17*

## BBC World News Launches New Series of Horizons Looking at Space Innovation

BBC World News  
2/04/13

Now in its third year, a new series of Horizons starts Saturday, April 6 on BBC World News.

London, 18 March 2012. The third series of Horizons will continue the search for the ideas and people tackling some of the big challenges facing our planet. This season, award-winning business journalist Adam Shaw and his team will report from a wide range of countries, including India, China, Japan, South America, the United States and Europe.

The first episode takes a look at how scientific innovations in outer space are helping to improve health, fitness and well-being here on Earth as Adam visits NASA's Ames Research Centre in Silicon Valley, California, where he talks to Professor Mason Peck, NASA's Chief Technology Officer.

Professor Peck is NASA's principal advisor on technology, charged with ensuring that the knowledge and skills developed from public funding of space mission science are also benefitting the day-to-day lives of ordinary people on Earth by building innovative partnerships with industry and academia.

"We have affected the world in ways we can't even imagine," says Professor Peck, "but the fact is NASA has a role in offering a benefit to all from what it's investing in. Taxpayers expect us to return that investment so the return in their investment in our technologies is spin-offs into the public. We have a role here in creating the future, enabling the future."

In this programme, Adam and Professor Peck discuss NASA's role in technology transfer, sharing new discoveries with the private sector and commercialising technologies that spin off into our everyday lives. At the NASA Research Park, Adam visits two companies collaborating with NASA on projects they believe could not only improve the health of people here on Earth but also extend the boundaries of manned space exploration.



(Above:) Horizons host Adam Shaw with Professor Mason Peck, and (right) Vasper Director of Performance & Training Sebastian Wasowski

Firstly Adam tries out an exercise technology designed by Vasper Systems to increase the production of natural human growth hormones and help the body rejuvenate, a goal that NASA hopes could help prevent the effects of bone and muscle damage on astronauts in zero gravity. Adam also meets the team behind the Scanadu Scout, an innovative home medical diagnostic tool that creates a personalised, real-time health feed by collecting the body's vital signs to help people better understand how their bodies function and provide more information to doctors.

In part two, Adam and Professor Peck discuss how NASA research in astrophysics and Earth sciences are helping scientists not only better understand our own planet, but could also lead to the discovery of new planets capable of supporting human life in the next two decades.

Finally, at SkyTran Adam finds out how computer software designed to operate robots in space could play a pivotal role in a revolutionary new approach to mass urban transportation—a lightweight, high-speed urban personal rapid transit concept designed around a network of elevated guide ways and magnetically levitated, driverless pods.

## Space Portal Delivers

"We are standing at the divide between two remarkable space epochs. In the 20th Century, NASA made the United States a space-faring nation. In the 21st Century, with the rise of commercial space, we will become a nation of space-farers."

– Space Portal, 2005

The Space Portal of the NASA Research Park was established in 2005 to provide a "friendly front door" for the commercial development of space for public benefit. The team pursuing this new role was composed of Dr. Dan Rasky, Lynn Harper, Mark Newfield, Bruce Pittman, and advocated and supported

by Michael Marlaire, Director of the NASA Research Park. This experimental group of award-winning senior space scientists, engineers, managers, technologists and educators began as a volunteer brainstorming group—a group that came together to explore ways of accelerating the exploration and development of space in a manner that amplified the benefits of space for the average American.

Despite its modest funding and informal organizational style, the Space Portal has been instrumental in the development of some of NASA's most highly successful recent space endeavors.

*Space Portal cont'd on page 4*

## NRP Post

*Space Portal cont'd from page 3*

“We live in Silicon Valley and have witnessed the astonishing speed and impact of the biotech, infotech, nanotech revolutions on the American landscape. When the original members of the Space Portal first got together, we looked at how these game-changing new capabilities could be used to develop space. An explosion of ideas resulted. Hours and days went by and new opportunities, great ideas, ones that could serve the country well, kept emerging on all fronts: science, exploration, space technology for planetary sustainability, STEM education, and commercial spinoffs. It was a heady experience,” Dr. Rasky remembers.

“But when we costed the implementation of these ideas using traditional NASA approaches, the price tag was much too high. That’s when we came to the realization that all the high tech fields we knew produced considerably better products today for considerably less money than they did 30 years ago; except for space. After poking at this for a while, it became clear that if NASA could leverage commercial best practices in space development, the prohibitive costs of space exploration could be significantly reduced to the point that these ambitious space goals could be affordable while concurrently increasing the use of space-derived technology on earth”.



Lynn Harper (left) and the late Dr. Baruch Blumberg (right)

That realization ultimately led to the Space Portal team committing to promote the development and use of commercial space on projects that would benefit NASA and the public. At the time, 2004-05, commercial space was a very low priority activity in NASA. Even though Scaled Composites had just won the \$10 million Ansari X-Prize, almost all of the aerospace community considered space entrepreneurs to be, at best, a flash in the pan. Most thought that these space entrepreneurs did not understand how hard space was and that their business cases wouldn’t close. “We investigated further and were surprised to discover that several of these companies did seem to have a credible case to make and many attractive opportunities could emerge for NASA if commercial capabilities could be used to help accomplish its missions,” noted Lynn Harper. Led by the Space Portal, NASA Ames signed an agreement to work with Virgin Galactic in 2006.

From the beginning, the Space Portal took an outcome-focused approach, placing a priority on finding opportunities for NASA and public benefits through the development of space. For example, the Space Portal members played a key role in the initiation and program foundation of the now very successful Commercial Orbital Transportation Services (COTS) Program. This program has played a key role in supporting the development of the SpaceX Falcon-9 rocket and Dragon capsule capability which has now traveled four times to the International Space Station and returned successfully to Earth – the first commercial company to ever accomplish such a feat. The second COTS partner, Orbital Space Sciences, plans the first launch of their Antares rocket in April 2013. They hope to be launching payloads to the ISS later this year.

During the COTS program initiation, Space Portal members recruited venture capitalist Alan Marty and blended his insights and expertise with NASA procurement enablers and constraints. They advocated the use of public/private partnerships as a way to develop economical transportation to the ISS that would benefit both NASA and the public. This involved changing some long-standing government ways of doing business, such as using a funded Space Act Agreement, with industry proposed milestone-based payments that NASA would approve, in place of standard cost-plus contracting.

The Space Portal members were also early and vocal advocates for the development and use of the International Space Station as a premier microgravity laboratory. In 2005, they organized a workshop called “An Entrepreneurial Paradigm for the International Space Station (ISS).” The Space Portal organized an unusual venue for what would be a historic meeting. For the first time, potential users of the ISS, potential suppliers of ISS services, and potential funders of ISS activities, such as venture capitalists and NASA program science offices, came together to exchange ideas, needs, restrictions, solutions, and opportunities. It was an eye opening experience for all.

The Space Portal also organized the ISS National Laboratory Workshop in 2007, chaired by medical giant and Nobel Prize winner Dr. Baruch Blumberg and featuring Human Genome Project pioneer Craig Venter as the keynote speaker. The workshop roster read like a Who’s Who in the high tech community and included presentations by NASA’s top executive for human space flight William Gerstenmaier, astronauts Don Petit and Marco Runco, Josh Zimmerberg, Director of NIH’s Center for 3-D Tissue Culture, high-tech startup guru Tom Stedding, and a special recorded greeting by Texas Senator Kay Bailey Hutchinson. The Masters of Ceremony were Matthew Gardner, President of BayBio, Russell Hancock, CEO of Silicon Valley Joint Ventures, Adrienne Bousian, Deputy State Director of the Office of Senator Barbara Boxer, and Cathy Gordon, Director of Google’s New Business Development.

*Space Portal cont'd on page 5*

*Space Portal cont'd from page 4*



(L-R): Terry Pagaduan, NASA Ames; Michael Marlaire, NASA Ames; Hawaii Governor Neil Abercrombie; Dr. Rebecca Spyke Keiser, NASA HQ Associate Deputy Administrator for Strategy and Policy; Dr. Dan Rasky, NASA Ames; and Lt. Governor (now U.S. Senator) Brian Schatz in a 2011 photo of signing ceremony.

Through the Space Portal's workshops, some of the world's greatest technical and entrepreneurial thought leaders came together to help develop the potential of commercial and other private space endeavors. Apollo astronaut Buzz Aldrin was a frequent visitor, along with Tetris billionaire Henk Rodgers, venture capitalist Steve Jurvetson, legendary Apollo flight control inventor Ken Cox and representatives from the new entrepreneurial space "turks" like SpaceX, Bigelow Aerospace, XCOR, Moon Express and Centennial Challenges Lunar Lander winner Masten Space Systems.

These continuing leadership relationships and conferences led to a NASA agreement with the State of Hawaii in 2011 to work together on a concept for a terrestrial test site in Hawaii for potential missions to the Moon and Mars. (For more information about the Hawaii/NASA conference, watch "This Week at NASA" at <http://1.usa.gov/17zQOoY>) Hawaii is currently funding over \$2 million a year on this endeavor and has hosted major conferences brain storming on a potential international lunar research park concept, modeled after the NASA Research Park. The NASA-Hawaii agreement was extended for another year in April 2013.

The Space Portal is a small operation involving only a handful of people. How was this small group able to attract so many top-notch, busy people to plan and dream of space?

"I think these people wanted to participate directly in the development of space," said Bruce Pittman. "We had all seen 2001: A Space Odyssey and that was the space program that most of us dreamed of; we did not want to watch other people do it; we wanted to do it ourselves." The Portal was able to take advantage of previous commercial efforts going all the way back to the 1970s. One of the key paradigm shifts of the 21st Century space program is the willingness of key individuals

to put their own hard-earned wealth at risk to create this new space reality, and they are willing to help the rest of us get there as well.

Space Portal members had exceptionally diverse backgrounds, but each had done something extremely difficult in the government, overcoming not only technical challenges but also bureaucratic obstacles. The other thing they had in common was a willingness to learn from others and a belief that the system could be made to work. "Most civil servants should never use the term 'business case' and think they know what it means," said Dan Rasky. "On the other hand, NASA serves the taxpayers and our role is not only to promote business successes, but also to ensure that the investments made in the national space program serve the public well, which is something that entrepreneurs don't always understand. A lot of what we do is to listen hard and exchange ideas in a nurturing manner. New ideas are fragile and often the voice of reason is soft."

The NASA 2007 Inventor of the Year, Dan Rasky, who would be voted by the Space Portal membership as the Director, had developed PICA, an advanced thermal protection material which enabled the NASA Stardust Mission that eventually brought back to Earth the first pristine samples of a comet. PICA also enabled the recent Curiosity rover mission to Mars; it was also selected by SpaceX for use on their Dragon capsule, the first private company in history to return a spacecraft safely from orbit. The Stardust PICA heatshield is currently on display as part of "The Milestones of Flight Exhibit" in the Smithsonian National Air & Space Museum in Washington D.C.

Bruce Pittman, who earned NASA's Exceptional Public Service Medal in 2011, was instrumental in the development of the first commercial venture in manned space flight—the development of SpaceHab, which flew 17 missions on the Space Shuttle. It enabled thousands of investigations to be conducted in space that would have been grounded because of insufficient flight capabilities and opened the door to some of the most important advances in space biosciences and materials sciences.

Mark Newfield was the Ames Project Manager for the Mars Exploration Rover Thermal Protection System hardware (SIRCA) that allowed soft landing of two rovers on Mars in 2004. He was Project Manager for Honeywell's Integrated Vehicle Health Management system for the NASA 2nd Gen program to obtain aircraft-like ground operational efficiency from space vehicle systems and developed the project structure leading to the delivery of the Ames TPS system for X-37.

Lynn Harper was the initiating founder of the science of Astrobiology, an achievement that earned her NASA's Outstanding Leadership Medal, had led or played key roles in the successful development of five Congressional new initiatives, and had

*Space Portal cont'd on page 6*

## NASA Invites Media to Showcase of Solutions Finalists Announcement

by Ruth Marlaire, NASA Ames PAO  
2/13/2013

Last fall, NASA and Sustainable Silicon Valley (SSV) invited researchers, inventors and companies to submit their creative solutions for competitive review by a panel of experts from academia, research, business and venture communities. After evaluating more than 100 entries that addressed water management, energy use, and transportation, judges will announce the most compelling entries from 6-8:30 p.m. PST Thursday March 7, 2013 at Microsoft Research Silicon Valley, building 4, Mountain View, Calif.

Speakers include Hon. Chuck Reed, mayor, San Jose, Calif.; Daniel Rasky, director and co-founder, Space Portal at NASA Ames; Nancy E. Pfund, managing partner, Double Bottom Line (DBL) Venture Capital Investors, San Francisco, Calif., and Josh Henretig, director, Environmental Sustainability, Microsoft Corp., Redmond, Wash. Reporters interested in attending the finalist announcement must send requests for media credentials to Kenneth Heiman, [kheiman@sustainablesv.org](mailto:kheiman@sustainablesv.org) or call 408-230-2304. Reporters also can register at this website: <http://showcasefinalists.eventbrite.com/#>

"NASA's work in creating and maintaining sustainable human habitats in space pays off for the American taxpayer when the results of this space research and development are applied to create solutions on our home planet," said Steven Zornetzer, associate director for technology at NASA Ames. "This is technology transfer at its best for it may lead to game-changing solutions here on Earth."



Dr. Dan Rasky spoke at the NASA/SSV solutions showcase on March 7, 2013.

Finalists were judged on creativity, approach and game-changing goals. These goals include developing and implementing multiple elements as part of the solution; mitigation, adaptation or scalable strategies; reasonable risk; and a combination of elements that reinforce one another to create an ecosystem of solutions that generate a positive environmental and economic impact.

The winning solutions and their inventors and technologists will be presented at the May 23, 2013 Showcase of Solutions. Attendees can network with others who share their passion and entrepreneurial spirit for global sustainability. Angel investors and venture capitalists also are expected to attend the event. For more information, read the NASA press release at: <http://1.usa.gov/WEab9J>

### Space Portal cont'd from page 5

been instrumental in the successful development and implementation of more than fifteen space flight investigations. She brought with her the creative genius and wisdom of Nobel Laureate Baruch Blumberg to the Space Portal.

So what's next for the Space Portal? Planetary Sustainability...

In addition to continuing leadership in commercial space, including holding a weekly NASA-wide telecon on commercial space, the Space Portal began a new focused endeavor in 2012. "From our successes with the benefits of public-private partnerships, venture capitalists, entrepreneurs from our commercial space endeavors, our location with the NRP partners, and our Ames expertise in earth sciences and environmental control and life support systems, we believe the Space Portal can, once again serve as a catalyst, this time for solutions to planetary sustainability," said Dan Rasky.

Recognizing that potential, NASA Ames and Sustainable

Silicon Valley, SSV, (<http://www.sustainablesv.org/>) signed an agreement in July 2012 "to provide a forum for NASA ARC and Silicon Valley leaders from many sectors (business, finance, venture capitalists, government, academia/research and civic) to explore large scale, advanced, technology solutions to sustainability at a planetary scale, many of which are inspired by NASA's human exploration of space. NASA ARC and SSV will also collaborate on the development of the Planetary Sustainability Institute concept to pursue future collaborations bringing together advanced solutions and resources on an on-going basis."

"By developing a nation of space farers, leveraging resources talent and facilities with commercial space businesses, universities, government organizations, and nonprofits, we will be able to increase space scientific discoveries and accelerate their utilization on earth for all to benefit."

—Space Portal 2013

## May 23 Showcase of Solutions for Planetary Sustainability

NASA Ames Research Center's Space Portal and Sustainable Silicon Valley (SSV) are partnering to showcase game-changing solutions to regional and global sustainability. The Showcase of Solutions for Planetary Sustainability, to be held May 23, Bldg. 152, at NASA Ames, will feature winners in a "Call for Solutions" competition and expert multidisciplinary panels. For more information go to: <http://www.sustainablestv.org/home>

An Annex to the partnership agreement between Sustainable Silicon Valley and NASA Ames Research Center was added to co-host a meeting, "Call for Solutions for Planetary Sustainability" in that "the Parties will bring together NASA researchers and Silicon Valley inventors, entrepreneurs, investors, academia, and other leaders to create innovative ideas, realistic approaches, and scalable, feasible technology solutions contributing to improved health and sustenance of local, regional, and global environments. The Parties will work together to select and recognize the most meritorious ideas and concepts presented at the event. The Parties recognize the potential for technology advancement and technology transfer to advance research surrounding planetary sustainability."

"To speed us towards innovative, feasible solutions that we can implement at real scale, we need to encourage and tap our most creative thinkers and inventors to address our planet's unprecedented challenges," said Marianna Grossman, director of Sustainable Silicon Valley.

"NASA has been interested in sustainable human habitats for some time," said Ames Associate Director Steve Zornetzer. "The International Space Station is a closed environmental system that must conserve all resources, and relies largely on solar power. Ames Sustainability Base is an example of bringing NASA's aerospace technologies back to Earth." (<http://www.nasa.gov/sustainability-base>)

The "Call for Solutions" attracted more than 100 entries. Solutions feature innovations in transportation and commutes, alternative

work place, water management, urban irrigation from satellite imagery, green chemistry for fuels, sanitation and power supply for urban slums, and battery storage among others.

### The Science

**Leading scientists lay out the global challenges we face and what it will take to change the underlying driving systems.**

Our petroleum-fueled economy and our consumption-based society have damaged the life support systems of the planet. Changing our habits, rebuilding our infrastructure and accommodating billions of people moving into the middle class in the developing world, are challenges that will require revolutionary change to accomplish.



View of the Earth as seen by the Apollo 17 crew

Climate, oceans, earth systems and social change experts will explain where we stand and what scope of change is required for a habitable planet.

May 23 showcase speakers include: former NASA scientists James Hansen and Waleed Abdalati; Japan Prize winner and author Dennis Meadows; Anthony Barnosky (UC Berkeley and Stanford); Banny Bannerjee (Stanford); Wes Jackson, The Land Institute; Wallace J Nicholls, Oceans, California Academy of Sciences; Kristiina Vogt, Forest Resources, U. Washington; Dan Rasky, John Hogan, and Forrest Melton, NASA.

## What if you could mine the Moon?

by Regan Morris, BBC News, Los Angeles  
4/7/13

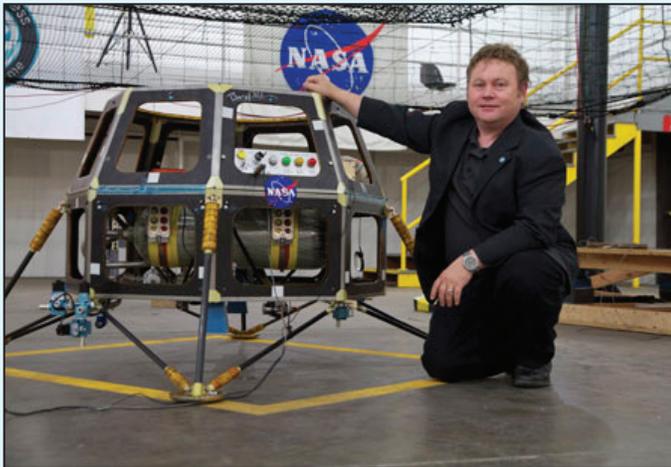
Space exploration has long been about reaching far off destinations, but now there's a race to exploit new frontiers by mining their minerals.

When Neil Armstrong first stepped on the Moon in 1969, it was part of a "flags and footprints" strategy to beat the Soviets, a triumph of imagination and innovation, not an attempt to extract precious metals.

No one knew there was water on that dusty, celestial body. What a difference a generation makes.

Mysterious and beautiful, the Moon has been a source of awe and inspiration to mankind for millennia. Now it is the [center] of a space race to mine rare minerals to fuel our future—smart phones, space-age solar panels and possibly even a future colony of Earthlings.

*Moon cont'd on pg 8*



Bob Richards, CEO of Moon Express with their lunar lander.

"We know that there's water on the Moon, which is a game-changer for the solar system. Water is rocket fuel. It also can support life and agriculture. So exploring the Moon commercially is a first step towards making the Moon part of our world, what humanity considers our world," says Bob Richards, CEO of Silicon Valley-based Moon Express, one of 25 companies racing to win the \$30 million in Google Lunar X Prizes. It is considered to be among the top-three teams in the running for the prize. The other two are Pittsburgh-based Astrobiotic and Barcelona Moon Team.

Google's \$20 million first prize will be awarded to the first privately funded company to land a robot on the Moon that successfully explores the surface by moving at least 500m and sends high-definition video back to Earth. A second place team stands to win \$5 million for completing the same mission, with bonus prizes for teams that travel more than 5km or find water. The deadline is 2015.

But \$30 million is a relatively small amount of money when it comes to funding a Moon mission. The companies competing have business models far beyond the Google prize, with the real prize being the potential treasure trove of valuable minerals.

"The most important thing about the Moon is probably the stuff we haven't even discovered," says Mr. Richards. "But what we do know is that there could be more platinum-group metals on the surface of the Moon than all of the reserves of Earth. The race is on."

But can anyone own the Moon, and what happens if multiple companies and countries succeed in getting there?

According to the 1967 Outer Space Treaty no nation can own the Moon, and most people believe that extends to individuals and companies. But would-be Moon miners can have something like property rights. And there is an advantage to getting there first and staking claims.

"Appropriation and ownership is not allowed under the treaty, but free access exploitation is encouraged," says space lawyer James Dunstan. "You can't own it, but you can go there and use it, so how do we balance those two?"

China has plans to land a probe on the Moon later this year and astronauts by 2020. Because China's lunar plans are more ambitious than most, some fear they may get too much control of the moon.

Dunstan does not think China would flout international laws to gain an upper hand in space, but it will be difficult to police. "Trade sanctions would be very harsh if there were a rogue country or rogue corporation driving around ripping up other people's stuff."

If Moon Express and others are right, it's conceivable that in the future the lunar surface could host a colony of mining robots and astronauts who could use the Moon as a base to explore further into the solar system. Richards believes humans will discover ways to live on the Moon permanently.

"We're becoming a multi-world species. That will happen. The first footprints on Mars by human beings will happen in our lifetime in the next 10 to 20 years," he says. "People, themselves, will be transformed. They'll be merging with their technologies. And that which we call human will become redefined as we find how to reprogramme our bodies to live longer, how we find machines that are able to symbiotically work with us to cure disease. So that which we consider human today will continue to evolve."

Moon Express, which has its offices at the NASA Research Park, is funded by entrepreneur Naveen Jain. Jain says that location is key because he believes Silicon Valley will become the home to space pioneers.

"We are those crazy people who think that every idea is a crazy idea until we make it happen and then people say, 'Of course,'" he says.

So, if we're going to live on the Moon one day, shouldn't we worry about polluting it? Won't armies of digging robots mess up our future real estate?

NASA planetary scientist Margarita Marinova thinks we won't make the same mistakes in space that we've made on Earth and that man can't afford to explore space without tapping the local resources to survive.

"For me, it's a little hard because I do see these planets as very beautiful and very pristine in a way we don't really have on Earth anymore, and so the idea of mining is a little difficult," she says.

## Wattminder, Inc. Building Resources to Boost STEM Education

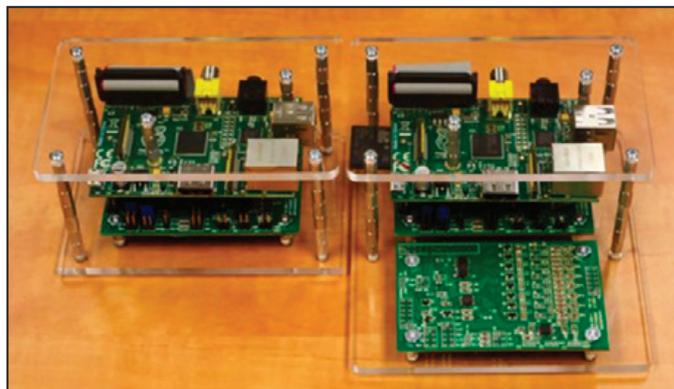
by Steve Yang, CEO, Wattminder, Inc.

Wattminder, Inc. relocated their Sunnyvale headquarters to NRP for closer collaboration with NASA and other NRP partners. Our current focus is to create a web-platform to amplify and enable, at anytime and anywhere, the access to hands-on STEM learning for all. Established as a California corporation in 2010, with 5 to 7 employee-partners, we've developed web-based fault detection and diagnostics, power quality, and energy consumption monitoring and diagnostics resources. Our web services are aimed to help assure optimal photovoltaic generation for solar power plant owners and operators, with free innovative analytics. This effort has been supported by three SBIR grants, totaling over \$1 million, with CMU-SV as our collaborator. Much of our basket of IP is being re-factored into a cloud-based lesson delivery system.

Wattminder evolved from an energy and electrical engineering consultation business by founder Stephen Yang, P.E. We originally focused on fault detection and diagnostics, power quality, and energy consumption monitoring with limited load management features. This later expanded to include low-cost, intelligent monitoring of gas and water consumption, and PV generation. Further evolution focused on the photovoltaic industry with web infrastructure, complex databases and the algorithmic framework to diagnose problems in buildings and solar power plants. Our experienced team members are experts in analog electronics, digital signal processing, high performance computing elements (FPGA), physics, web applications and systems engineering.

Recently we have realized that ultra-low cost computing, combined with the "Internet of Things" has resulted in a potential transformation in education. We feel the rich repertoire of sciences and technologies developed over NASA's seven decade history can and should be tapped as a resource for promoting STEM education.

Reflecting on enabling trends in open and online education, with the backdrop of declining interest among students in K-16, we realize our large basket of IP, mostly web-based sensors and instrumentation electronics, signal conditioning, and algorithms, has become a rich hot-bed of innovation to unleash the power of low-cost platform and internet, into a de-



Prototype "Pi-powered Portable Educator's Platform," in a web-connected learning system

livery vehicle for STEM education. Our current product family includes RasDas-1 & RasDas-3, Audio & Optical Explorer, Signal Conditioner, Distributed PowerSupply, all linked and powered by the Raspberry Pi, the \$35 nano-computer on a board. RasDas-3 now sports software defined radio capabilities. Out of the box, one can now carry out dozens of experiments such as measuring speed of sound, sonar, and speed of light. We seek to deepen our collaboration with CMUSV, as well as other neighbors at NRP, to help us build the ecosystem that will transform the education system, starting with a hands-on, experiential lesson delivery for STEM topics.

Wattminder had built a web-portal framework to enable and assist operators of revenue-critical solar power plants to maintain optimal performance by alerting about under-performance, and diagnosing for cause of under-performance with actionable message to promptly restore optimal performance. Wattminder has offered its innovative second-generation photovoltaic analytic service free to the world's solar power owners and operators at [www.pvwizard.com](http://www.pvwizard.com).

Starting with our Personal Electronic Bench, we are now building a cloud-based eLearning portal that will transform the delivery of STEM education.

Wattminder hopes to grow and prosper, along with our new neighbors at NRP.



March 12, 2013—United States Geological Survey (USGS) executives visited Ames and NRP to discuss partnership opportunities with Ames and to assess the viability of locating on site.

## Science and Technology Corporation's (STC) Education Outreach

Since the early 1990s, former professor at both European and American universities, and program manager of the Science and Technology International Education Program ([www.STIEP.org](http://www.STIEP.org)), Dr. Amar Choudry has provided opportunities to motivate graduate students in Europe to conduct internship research on diverse aerospace topics at different U.S. research facilities. These topics range from wake vortex studies to orbital debris management. Working through Science and Technology Corporation (STC), STIEP has provided over 120 research internships, with approximately 4-6 interns per year. The program's philosophy aims to rectify the reality that talented people can be found anywhere in the world, but opportunities to advance and motivate those talented few are not as available or accessible.

As reported in the NASA Research Park Post (Spring 2012), STIEP facilitated research internship opportunities for students from Universities in Mexico, Singapore, Spain, France, and the Netherlands. This spring, 2013, eight more students graduated from the program. The STIEP program was especially proud of three students who were selected by their mentors to continue their research



STC Chief Scientist Dr. Mark Schoeberl UMBC PhD Student Steve Buczkowski



NASA Ames Research Center: Deputy Director Lewis Braxton, Chief Scientist Dr. Jacob Cohen, Aeromechanics Branch Chief (and Mentor) Dr. William Warmbrodt, Dean of Students David Morse, Chief Scientist Staff Craig Burkhard; Technical University of Delft, Netherlands: Chetan Angadi, Paul Bucksch, Rik Langeweg, Saish Sridharan; École Nationale Supérieure de l'Aéronautique et de l'Espace, France: Thomas Lambot; International Space University, United States: Iman Datta

and were provided positions at NASA through the EAP program. In addition to their research, STIEP encourages the students become active in their local community where they intern by volunteering at local events or education outreach; for example, the students helped provide organizational support for local events held in the Bay Area, such as the Silicon Valley Space Business Roundtable and the LunarCubes workshop in Palo Alto, CA. In 2012, the students participated in local education outreach in San Jose high schools and middle schools, along with other NASA Ames volunteers.

Sponsored through STC's STIEP initiative, STC's Chief Scientist, Dr. Mark Schoeberl, and the University of Maryland's (UMBC) Professor Vanderlei Martins, developed

a pico-satellite named QubScout. QubScout is a prototype mission to test functionality and design of a new instrument that has been proposed for use on a larger satellite. Designed and assembled by the UMBC students (US citizens), the QubScout was delivered to Morehead State University (MSU), Kentucky (Professor Bob Twiggs, advisor for the QubScout), in under three months and less than \$100,000. Program Manager for STC's Fabrication Division, Jeff Manning, supported the UMBC students by CNC machining the QubScout satellite bus in one day. Unfortunately, due to launch delays, the QubScout was sent back to UMBC for almost two years. This summer, the QubScout will be returned to Kentucky for integration in MSU's launcher and is scheduled for launch summer 2013.

The United Kingdom Trade Mission visited Ames on February 25, 2013. Eight space companies from the UK and representatives from the UK Space Agency, Satellite Applications Catapult, and ADS, visited Ames as part of a trade mission to California. Michael Marlaire, Director of NRP, provided an overview of the NRP partnerships.



## Wolf Creek Care Center Helps Stroke Patients Recover Ability to Walk with Tibion's 100th Bionic Leg

Business Wire

3/13/13

Wolf Creek Care Center has taken delivery of one of medicine's latest robotic miracles—a Tibion Bionic Leg, which enables its staff to help stroke patients and others escape life in a wheelchair by recovering their ability to walk.

The Bionic Leg acquired by Wolf Creek is the 100th such device delivered by Tibion Corporation, a Silicon Valley startup based in Sunnyvale, CA.

Each year, almost half of the more than 700,000 Americans who survive a stroke are left with weakness in the leg on their affected side, which impairs their ability to walk. About 3 million chronic stroke survivors struggle with walkers and canes that put them at risk of a dangerous fall. Until recently, medicine believed that whatever disability remained a year after stroke was essentially irreversible.

The Tibion Bionic Leg is a novel wearable robotic device that enables stroke survivors to regain strength and control in their impaired leg. Through repetitive sit-to-stand transfers, stepping and stairclimbing with the Bionic Leg, patients appear to encourage the brain to "reprogram" around stroke-damaged nerve pathways, so that they regain the ability to put full weight on their affected legs - even 10 or more years post-stroke.

Kelorie Westlund, facility rehab director at Wolf Creek, reports both staff and patients are delighted with their new rehabilitation tool:

"It's just fantastic," Ms. Westlund says. "We use it on new admissions and on our long-term residents. It's broadening our therapists' horizons regarding what we can do for patients who've frustrated us in the past, because conventional therapy just couldn't get them to the state of independence they wanted - and we wanted for them."

Ms. Westlund reports that the staff now looks at each debilitated patient in their 60-bed facility and considers whether they might be a candidate for Bionic Leg therapy.

"One patient we're successfully rehabilitating with the Bionic Leg is a recent admission from Sierra Nevada Hospital, across the street. One of the reasons we earned the referral is because we have a Bionic Leg. In just a few weeks of therapy, we see him making gains we could not expect to see even after months of traditional gait therapy.

"We also put our new Bionic Leg on one of our long-term patients who had a stroke many, many years ago," Ms. Westlund adds. "Like most stroke patients, he had developed what we call a 'compensated' gait, putting as little weight as possible on

his affected leg as he struggled with a walker. That's exhausting, and put him at risk of a fall, which could break a hip. Despite the years that passed since this resident's stroke, we're seeing him reacquire his strength and more appropriate weight shifting—at least twice as fast as we could have expected."

Peter Stack, director of admissions at Wolf Creek, believes their new Bionic Leg will prove a magnet for referrals from Sierra Nevada and other hospitals in the area.

"We can now provide superior rehabilitation for patients with a wide range of disabilities following surgery or trauma as well as stroke," Mr. Stack says.

The success of rehabilitating their long-term resident who had a stroke in the distant past encourages the Wolf Creek rehab team to believe they can help a wide range of impaired patients with their new technology.

"For example, total hip and knee patients can be excellent candidates for Bionic Leg therapy at Wolf Creek," Mr. Stack explains.

"By the time many total joint patients get their surgery, they've usually put up with years of pain, and they've developed a risky gait, and abnormal techniques of climbing stairs. The post-op pain of their new hip or knee doesn't encourage them to break those bad habits. But with the Bionic Leg, we can take the weight off their painful limb and help them gradually reacquire a safer, normal way of walking and climbing the steps in their homes."

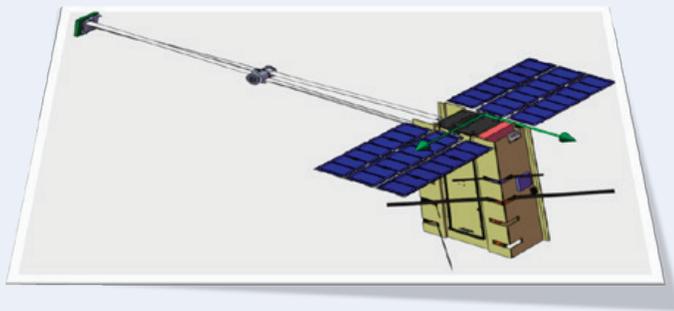
Families of prospective rehab patients should contact the Wolf Creek admissions office at (530) 273-4447. For additional information on the Tibion Bionic Leg, visit [www.tibion.com](http://www.tibion.com) and [www.onstroke.org](http://www.onstroke.org).

*Kern Bhugra was the CEO and Founder of Tibion, which started in the NRP in 2003. Tibion resided here for over 8 years. His company grew from one office to over 6,000 square feet in NRP Building 19.*



**Bionic Leg in action.**

## NASA Ames and Swedish National Space Board (SNSB) Join Forces to Integrate and Test AAC Microtec 6U Satellite



6U satellite illustration

Beginning April 15 and lasting for approximately two months, NASA Ames Research Center, AAC Microtec and COSMIAC will participate in the assembly, integration, and testing of a 6U satellite that will launch in late 2013 as part of a DOD mission. The satellite is based on technology developed by several key suppliers based on the SPA (Space Plug and Play Architecture) compatible architecture standards developed by AFRL and the Rapid Integration Architecture™ family of products developed by AAC Microtec, uniquely positioned to provide fault tolerant high reliability satellites and components. This 6U satellite is expected to demonstrate that small satellites that support complex missions can be constructed in rapid time using a Virtual System Integration approach provided by AAC Microtec and SPA compatible plug-and-play components and payloads.

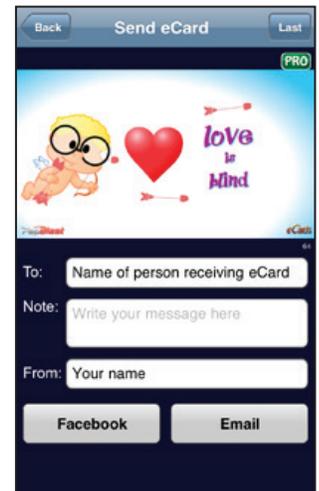
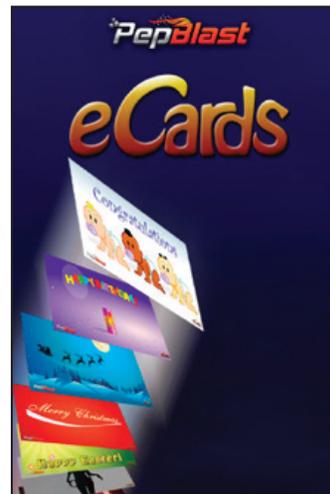
## PepBlast eCards App Approved by Apple iTunes App Store

Photozig, Inc., an NRP Partner, announced that its PepBlast eCards App is available in the Apple iTunes App Store for iOS devices, such as the iPhone, iPad, and iPod Touch. This App allows users to send personalized greeting messages to friends and family. There are over 200 animated eCards containing short fun video clips with music:

- \* 200+ eCards designs
- \* Over 40 eCard collections
- \* Animated video eCards with cool songs
- \* Personalized message
- \* Browse and Preview
- \* Send eCard by email or Facebook
- \* View eCards on PCs, Smartphones, Tablets, etc.

Photozig has created eCards for nearly all occasions, including Birthdays, Holidays, Love, Congratulations, Christmas, Friends, Family, Work, Graduation, and many more.

PepBlast eCards App for iOS can be found at the Apple iTunes App Store: <http://bit.ly/ZU4Z5P>



Screen captures of PepBlast eCards app

PepBlast eCards is also available for Android devices at Google Play: <http://bit.ly/11To8Vw>

For more information about PepBlast eCards, please go to: <http://ecards.pepblast.com>



## NRP Hosts Chrysler Senior Executives

Chrysler Executives visited Ames on March 20, 2013 to discuss and tour the Hyperwall and Supercomputer, Virtual Motion Simulator (VMS), Software and System Capabilities, and the NRP. Bimal Aponso (second from left), Head of the VMS, hosted Senior Chrysler VP Mark Chernoby (middle) to a flight experience.

## First ICES Workshop Held Among USGS, NASA and CMU-SV

by Jessie Hao, Marketing Coordinator, Carnegie Mellon University Silicon Valley

The United States Geological Survey (USGS) recently held its 2013 workshop of the Innovation Center for Earth Sciences (ICES) in Menlo Park, Calif. The meeting brought together scientists and researchers from USGS, NASA Ames Research Center, Carnegie Mellon University Silicon Valley (CMU-SV) and UC Santa Cruz for keynote discussions and poster sessions focused on applying new technologies to solve scientific problems.

CMU-SV professors Drs. Ole Mengshoel, Bob Iannucci and Pei Zhang, and Ph.D. student, Corey Ippolito, participated in and

presented at the ICES Workshop. The workshop was based upon a recent history of successful collaborations between USGS and its NASA and CMU-SV partners. Some core national USGS scientific needs were identified, with the hope of creating new projects to address them.

"We have already had several follow-up conversations with our counterparts at USGS, and many ideas for joint projects are currently in development," says Dr. Ole Mengshoel, Director of the Intelligent and High Performing Lab. Project presentations included "SensorFly: Minimalistic Flying Sensors" by Dr. Pei Zhang, Assistant Research Professor, and "Rethinking Networking for the Internet of Thing," by Dr. Bob Iannucci, Director of the CyLab Mobility Research Center at the Silicon Valley campus.

There is a scheduled follow-up meeting on March 28, where approximately ten project ideas with potential for collaboration will be discussed. The 2013 workshop is the first of a planned bi-annual series of workshops to foster collaboration between USGS and its Silicon Valley partners.

To learn more about the ICES and see presentations and posters from the 2013 ICES Workshop, visit the USGS collaboration site at <http://bit.ly/Y0cLUO>.

Photo by Jonathan Stock



A packed house for the first ICES meeting at USGS Menlo Park.

## Newly Renovated Carnegie Mellon Innovations Laboratory Unveiled

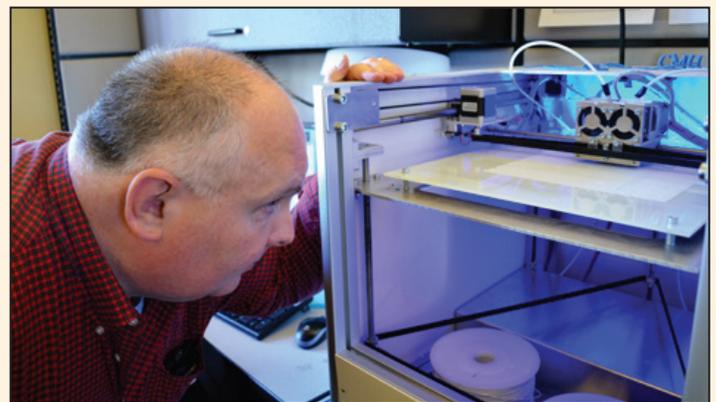
by Jessie Hao, Marketing Coordinator, Carnegie Mellon University Silicon Valley

Carnegie Mellon University's Silicon Valley campus recently unveiled the newly renovated Carnegie Mellon Innovations Laboratory (CMIL). The campus' main lab space held an Open House to introduce the myriad of "making" possibilities open to students, faculty, staff and researchers, including opportunities to hack gadgets and fabricate prototypes.

"The updated CMIL is meant to foster creativity and innovation in our students and faculty by providing a rich lab "maker" environment," said Dr. Jason Lohn, Director of CMIL. "We hope that this will allow students to go from ideas and inspiration to a constructed object easily and rapidly."

Distinguished Service Professor Dr. Ted Selker added that he hopes the new opportunities the CMIL lab provide will "create an environment that motivates and empowers people to develop their technical abilities and to try out their ideas without boundaries."

Among the new equipment available are a laser cutter and 3-D printer, which were both demoed at the Open House with training courses to be offered. In addition to the new machines,



CMU-SV Research Scientist Art Botterell demos the campus' 3-D printer in the newly renovated Carnegie Mellon Innovations Laboratory.

the lab includes an RF/Wireless lab, electronics bench, maker shop and vertical milling machine drilling machine.

Students wasted no time getting their hands on the machines at the Open House, from receiving an introduction to the laser

*CMIL cont'd on page 14*

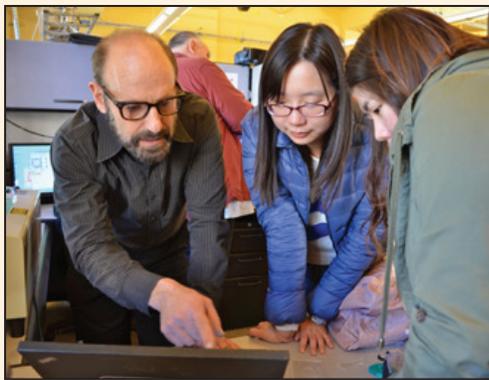
*CMIL cont'd from page 13*

cutter by creating CMU-SV trinkets, to attaching surface mount components to a circuit board using reflow soldering in the RF Lab.

"The new equipment allows students to interface their programs to the physical world, create professional level electronics and embedded systems, and to have the full product development experience," said Dr. Selker.

The lab also strives to supplement the academic programs by creating opportunities for the hands-on learning style emphasized at CMU-SV. For example, students in the new connected embedded systems courses can use the laser cutter and 3-D printer to make enclosures for embedded systems and the solder paste machine to rework systems. In addition, the radio lab tools allow students to view and work with the new worlds of RF identification and high frequency cell communications.

By providing a space for the CMU-SV community to "make" things, the renovated CMIL is situated to become an indispensable resource in the research and educational programs at the Silicon Valley campus. "CMIL gives our students an edge by experiencing that creating in the electronics and physical world is possible, accessible and relevant," said Dr. Selker.



Distinguished Research Professor Ted Selker works with students on the laser cutter at the Carnegie Mellon Innovations Laboratory.

## M2Mi Celebrates Seven Years with NRP

Machine-To-Machine Intelligence (M2Mi) Corporation celebrates its seventh year with NASA Research Park.

"NASA NRP has a track record of being an ideal partner for M2Mi, encouraging M2Mi to demonstrate both business and technology innovation. Over the last seven years M2Mi has become a solid company, gaining the trust of some very large customers," said Geoff Brown, Founder and CEO of M2Mi.

Gartner Group announced Machine-To-Machine aka the "The Internet of Things" as one of the top three emerging enterprise trends for 2013.

M2Mi is an enterprise software company that provides high technology solutions under the M2M Intelligence® brand that provides secure connectivity and automation between mobility, sensor networks, M2M telecommunications and corporate cloud data centers. M2Mi demonstrates exceptional innovation in the area of making large-scale global computer systems more robust, simpler, resilient while enabling customers to achieve significant increased revenues via secure services and comprehensive automation. M2Mi's product portfolio also includes patented 'cyber' security innovation and cutting edge 'quantum computing' cryptography – essential technologies for M2M and Cloud computing.

M2Mi has impressive enterprise customers and partners including, Oracle, IBM, Intel, Vodafone M2M, Juniper and Ericsson.

M2Mi currently has over eight million reference production enterprise users and triple digit percentage revenue growth. M2Mi employees are present in the USA, Canada and Europe.



## Direct Shuttle from SF to NRP

RidePal currently offers direct service to Mountain View from San Francisco, San Ramon/Pleasanton and San Jose. The service is supported by Rider fares and corporate subscriptions.

The Rider fares are:  
Monthly Pass: \$200  
10-RidePak: \$85  
DayPass: \$19

Riders can use the current routes, purchase fares and ride right away. Companies can sponsor new stops, subsidy fares, use pre-tax funds, get ridership reports, guarantee seat availability and a number of other options to make the employees' commute as easy and productive as possible.

RidePal has temporarily provided a stop from one of our San Francisco routes to your offices in order to better serve riders. However, this stop may be moved unless there is corporate sponsorship, increased ridership or both.

Currently, Singularity University is the only company taking advantage of the shuttle from SF, but we would love to see more commuters stop driving and get to work with RidePal instead!

## Kentucky Space Announces Space Tango

NRP Partner Kentucky Space LLC today announced the creation of Space Tango, one of the nation's first business accelerators specifically for space enterprises and entrepreneurs. Space Tango is an early-stage venture fund, business accelerator and community of entrepreneurs for space-driven startups, with the goal of assisting businesses in developing innovations, novel applications and diverse markets.

The global space marketplace is now poised for significant growth and opportunity. Unprecedented access to space coupled with the rapid advancement of micro technologies and other innovations are combining to create a dynamic space industry. The 2013 report from the Space Foundation noted that "The global space economy grew by nearly 7% in 2012 reaching a new record of \$304.31 billion. As in previous years, the vast majority of this growth was in the commercial sector, which now constitutes nearly three-quarters of the space economy, with government making up the rest".

Opportunities (including adjacent applications) lie in developing entrepreneurial ideas, companies and products that enable the further exploitation of space. Possibilities involve small high-value satellites and space platforms, the International Space Station (ISS) and opportunities in biotechnology, exomedicine, novel materials, energy, education, and game design and development...as well as areas and applications not yet imagined.

"The successful development of a commercial and sustainable space marketplace is largely dependent upon disruptive thinking and novel experimentation outside of the traditional boundaries" said Kris Kimel, President of Kentucky Space.

In the initial round, Space Tango will invest in up-to six companies from across the U.S. These enterprises will participate in an

# Space Tango™

intensive twelve week on-site program, centered in Lexington, Kentucky, that will

provide a complete constellation of services, advisors and networks necessary to successfully start and grow a space-driven business. Companies will be selected primarily on the basis of their idea, science, technology, market fit, customer understanding, management team, and readiness level.

Selected companies will have access to a full team of advisors (scientists, engineers, entrepreneurs, sales and marketing professionals, investors, etc.) and facilities. These other assets include the Exomedicine Institute, technical and ground operations centers at Morehead State University Space Science Center (21 meter tracking station) and the University of Kentucky Space Systems Lab and offices at the Kennedy Space Center in Florida and NASA Ames Research Center in Silicon Valley (Mountain View, California).

"The Office of Commercialization and Innovation is excited about playing a role in the further development of a global space marketplace...as well as a dynamic entrepreneurial space industry cluster in the region" said Gene Fuqua, Executive Director, Kentucky Office of Commercialization and Innovation.

The marketing and due diligence process to select the initial companies will begin immediately. Further details and contact information can be found at [www.spacetango.com](http://www.spacetango.com).

Kentucky Space LLC is an ambitious enterprise focused on R&D, talent development, commercial and entrepreneurial space solutions. ([www.kentuckyspace.com](http://www.kentuckyspace.com))

## NASA Pod Transports Are Close to Reality—in Tel Aviv

by Peter Coy, Bloomberg Businessweek



A SkyTran pod

Transport pods that look like silvery fish could soon be whizzing above the streets of Tel Aviv. The Israeli city is looking to become the world's first to get a mass-transit system co-developed at NASA's Ames Research Center, Tel Aviv Mayor Ron Huldai said during a Monday visit to Bloomberg News.

The SkyTran system, which Huldai said could help relieve the traffic congestion that plagues his Mediterranean city, consists of two-person vehicles that hang from rails above street level. The pods are nearly silent because their overhead connectors are levitated by magnetism. Pods pull over on side tracks to pick up and discharge passengers so they don't slow those behind them. They can travel at speeds up to 150 miles per hour, but in practice would go considerably slower.

*SkyTran cont'd on page 16*

## NRP Post

### NRP Partner Intrinsyx Technologies Corporation Empowers Biological Research on the International Space Station (ISS).

Intrinsyx Technologies Corporation is proud of the work Dr. John Freeman, Science Test Lead and Plant Scientist, has recently completed while on a team of scientists and engineers supporting Seedling Growth 1 (SG). This team operates under the flight systems implementation branch (Code SCF) in NASA's Space Biosciences Division.

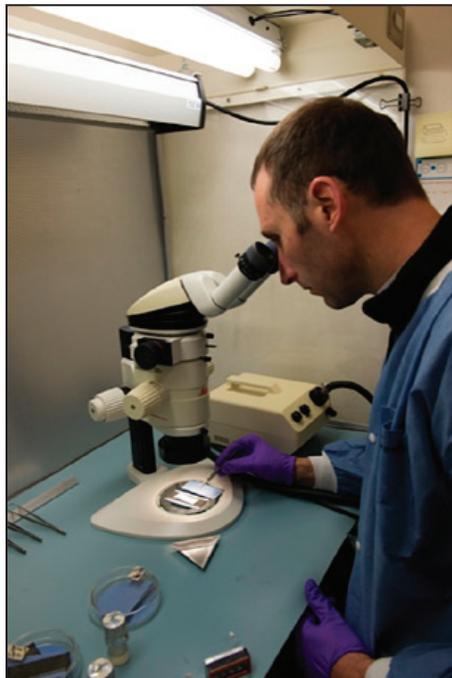
The Seedling Growth flight experiments utilize the European Modular Cultivation System, in conjunction with Experiment Unique Equipment, which is flight hardware developed by NASA Ames Research Center (ARC). This experiment is now onboard the International Space Station and the experiment run operations are scheduled to start in late March 2013. Four SG experiments are scheduled to be completed over the next few years supported by NASA-ARC in cooperation with the European Space Agency (ESA). The major project goals are to determine how gravity and light influence plant growth and to obtain a better understanding of the cellular signaling mechanisms involved in plant tropisms.

Plants rely on sophisticated mechanisms to interpret incoming environmental signals so they can adjust their growth accordingly. NASA Primary Investigators are interested in the cellular and molecular mechanisms of gravitropism and phototropism (directed growth in response to gravity and light, respectively). The gravitropism projects have studied how statoliths (root granules that function in perception of gravity) interact with the cytoskeleton for

gravitropic signal transduction. In terms of phototropism, NASA Primary Investigators have been examining the role of the photosensitive pigment phytochrome in the regulation of directing growth of both roots and stems. NASA has supported spaceflight experiments on the International Space Station which use microgravity as a tool to understand the mechanisms of plant growth responses to light and gravity. Currently, for Seedling Growth 1, Dr. Freeman helped to prepare and sterilize seeds that were placed inside of mini seed cassette containers that he also helped to sterilize and assemble during the flight build of this new experiment. Thanks to the successful launch of Space X-2, this experiment is now onboard the International Space Station. The overarching long term goal of these projects is to understand how plants integrate sensory inputs from their multiple light and gravity perception systems in order to help overcome the many challenges currently associated with growing food crops in spaceships, in future human colonies on the moon or Mars.

Intrinsyx has supported Ames' Space Biosciences Division since 2000 and is currently providing science and engineering support to all ISS biological experiments.

Image credit: NASA, Eric James



Dr. John Freeman at work in the Lab.

#### *SkyTran cont'd from page 15*

Pods can't substitute for heavy duty rail lines. The maglev rails offer far less carrying capacity than, say, a New York subway line. But they're designed to reduce the need for cars and taxis by connecting areas that don't justify the investment in a conventional train line.

The system was co-developed by engineers from NASA and SkyTran, a privately held company based at NASA Ames Research Center in Mountain View, Calif. Chairman and Chief Executive Officer

Jerry Sanders of SkyTran says he's in talks to raise the roughly \$50 million required to build a line to run a little over four miles. That would connect high-tech Atidim Park with an existing train station at Tel Aviv University and a shopping and restaurant district at the city's north end. After financing and approvals are granted, Sanders estimates that construction and testing will take about 18 months.

The system will be privately owned and will charge fares that are more expensive

than a bus ride but cheaper than a taxi, Sanders says. If the first line is successful, he plans to add some that would intersect with it.

Other cities are interested in SkyTran systems. In Israel, Netanya is close behind Tel Aviv in the approval process, Sanders says, and he is in talks with Stavanger, Norway, as well as two cities in the southern Indian state of Kerala.

## Chandah Collaborations Underway

The NASA Research Park would like to take this opportunity to welcome our new tenant to the park, Chandah Space Technologies. Chandah will have an office in Building 19. A Space Act Agreement is in progress between Chandah and the Chief Scientist Office, to design iterations on Chandah's constellation architecture and capabilities.

"Collaborations with small aerospace startups like Chandah provide NASA the opportunity to learn from the ever-rising global commercial activities so that the advances developed can be used for NASA's own missions. These collaborations also promote the development of a robust commercial space sector. Our collaboration with Chandah will lead to further optimization of design capabilities for a standardized spacecraft," said Jacob Cohen, Chief Scientist at NASA Ames Research Center.

Chandah team comprises individuals with a strong background in commercial venture development, engineering, program- and risk-management, and regulatory compliance. The team's goals are driven by a clear focus on market demand and the recognition built around the commercial potential of small satellite technologies developed by NASA. Chandah's constellation is geared towards producing data and value-added services that will be of value to commercial and industrial companies wanting to leverage Chandah's presence in space for enhancing and optimizing the value of their own terrestrial operations.

In addition to enhancing the capabilities already embedded within the common bus architecture being pioneered at Ames, Chandah intends to further extend the reach of these assets through proprietary research and development, including sensors and instruments that can be used to generate data that fill existing gaps in commercial markets.

"Our vision is to bring the vision of commercial space and advances in small satellites and sensors to the market," said Adil Jafry, President of Chandah Space Technologies.

Chandah intends to be diligent through the use of proven technologies and patient capital that matches its programmatic development, and is very cognizant of time-to-market, service reliability, asset life, and value to its customers. Chandah also intends to partner with technology companies to pursue its broader goal of providing high quality, low cost service to its customers.

"We are privileged to have a robust small satellite technologies ecosystem at Ames, and I am very pleased that Chandah Space Technologies will be based in NASA Research Park", said Craig Burkhard, member of the Chief Scientist Office working on developing partnerships with private companies.

*Annette cont'd from page 2*

Ames; training the astronauts for animal life sciences missions.

It was the beginning of the Space Shuttle program and Spacelab missions that were the precursor to the International Space Station. "We were all learning then," she says, "trying to figure out how we could do biological experiments in space". Annette was working on her mission when the Challenger accident occurred. It slowed down what she was doing in Space Life Sciences, so Annette decided to go to graduate school. She then earned her Masters (MS) in Systems Management from the University of Southern California and continued to work on various NASA projects.

She was the program manager for a renewed design of hardware used on space missions. When the Navy decided to close down Moffett Field and NASA took over the property, Annette was named Deputy Program Manager for the transition. She and her team were the first to know the details of what existed then and its condition. She later came back to assist, as a contractor, in the strategic planning for the property now known as NASA Research Park. If any of you were around for the NASA Open House Day in 1997, you should know Annette was one of the Program Managers on that activity which brought in over 225,000 people. The Open House activity was the impetus to the ideas for a research park.

In 1999 Annette's husband, NASA Ames Dr. Chuck Smith, was transferred to Marshall Spaceflight Center, so the two of them up and left their friends in Silicon Valley and started yet another chapter. While there, Annette started her own business to support the aerospace industry, especially in outreach activities. For the four years she was in Alabama, her business kept her in touch with what NASA was doing and provided outreach to educators, the community and other agencies on the Space Program.

When she came back to California in 2003, NASA Research Park was beginning to take shape with the start of the University Affiliated Research Center (UARC). Annette was instrumental in helping the UARC set up their offices, and in particular, their subcontract management office.

As a contractor at Ames, Annette worked as Program Manager for the business operations contract and the old ODIN contract. Annette also worked for Lockheed Martin Space (across the runway from us) as their Government Relations Manager. Even in that capacity, her business would sometimes require working for and with NASA projects.

Now, Annette is here to manage a small subcontract Mission Critical Technologies has at Ames Research Center. She also helps the company develop new partnerships, collaborations and new business. So if you see Annette, either on the ARC campus or at NASA Research Park, stop and chat with her. She has lots of stories to tell about the place and the aerospace industry.

## What's Happening Here: University Associates Silicon Valley

by Nathan Donato-Weinstein, Real Estate Reporter, Silicon Valley Business Journal  
4/5/13

This week, The Business Journal launches a new occasional feature shedding light on a development project in the Valley that's fallen below the radar. We're starting with University Associates Silicon Valley—a major tech campus whose plans first surfaced in 2008.

### What was it?

University Associates-Silicon Valley LLC was a joint venture of UC Santa Cruz and the Foothill-De Anza Community College District. The JV planned a 77-acre, 3 million square foot campus of housing, office, classrooms and laboratories at NASA Research Park. With much fanfare, UA-SV signed a 95-year ground lease with NASA in Dec. 2008, and selected TMG Partners/The Related Cos. as master developer. Then—nothing.

### What happened?

TMG/Related dropped out when the economy crashed, Gordon Ringold, US-SV's CEO, said. Another development partner, whom Ringold declined to identify, joined up in November 2011. But in late December 2012, that partner pulled out. Ringold declined to say why.

### What's next?

Now UA-SV is "in active discussions" with a new master developer, and hopes to have a signed agreement in the next few weeks, Ringold said. Ringold would not disclose the developer but said it has the ability to do "big, complex projects."



An artist rendering of University Associates' campus by Ken Kay & Associates

### What's the challenge?

The site requires a significant amount of infrastructure development before new buildings can be built. Public/private partnerships can be very complex. But the resurgence of office values could make the project attractive. "We have very good understanding and clear objectives," Ringold said. "Now it's a matter of finding—as it has been from Day 1—a partner who has the financial wherewithal and the skill set to work on what will be a complex federal public-private partnership."

*Moon cont'd from page 8*

The potential resources from the Moon are vast. M Darby Dyar, a professor of astronomy at Mount Holyoke College in Massachusetts, says the reservoirs of water ice in the dark, polar regions of the Moon probably come from comets that hit the moon over the past four billion years, and that future moon miners could strike it rich with precious metals in ancient lunar rocks.

But even if no company makes the 2015 deadline to win the Google Prize, Dyar says the Google Lunar prize has already yielded returns on Earth.

"I lived through the excitement of the Apollo era, my father helped design thrusters on the lunar landing modules and those remembered feelings of patriotism and wonder about the universe are what brought me into lunar science in the first place.

"When I hand a child a meteorite and tell her that it's four billion years old, her entire frame of reference changes, and that's what science should do. Not everyone wants to be a scientist but everyone can get excited about and learn to respect and understand its breakthroughs.

"Competitions like this bring science to the public's eyes. Where better than the Moon, which seems so close to us?"

## NRP Post

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