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Thom Wynne / JPL Photo Lab

NASA Administrator Charles Bolden addresses JPL staff in the Flight Projects Center auditorium Oct. 28.

Inspiration is key, Bolden tells JPLers

By Mark Whalen

NASA's ability to inspire the public—particularly children and young adults—is at the forefront of challenges facing new NASA administrator Charles Bolden, who addressed JPL staff Oct. 28.

Speaking to employees from the auditorium of JPL's new Flight Projects Center, Bolden told of his first meeting with President Obama, at which the president recalled fond memories of growing up in Hawaii, being lifted up to his grandfather's shoulders to see the aircraft carrier that retrieved astronauts from the Pacific Ocean following splashdown from an Apollo mission, and returning them to shore.

Obama, Bolden said, remembers waving to the crew as if they could see him. "The president told me how inspired he was, and said he wants NASA to be inspirational to young kids again," Bolden said. "That's the only thing he challenged me to do."

Indeed, Bolden himself was energized by the first family's hands-on approach to reach the public with the White House's Astronomy Night Oct. 7, which hosted 150 inner-city kids from Washington, DC.

"Some of them didn't have a clue as to what a telescope was," Bolden said. "But the best part about it was for the kids to see their president, the first lady, their two kids and their grandmother, 45 minutes in the cold on the south lawn of the White House, going from telescope to telescope, looking with them and learning with them. I thought that was incredible and sent a phenomenal message."

Obama is "passionate about science, engineering and technology," Bolden said, noting the president's commitment to public education. "This is something that's really important to him—and we play a critical role in that."

During Bolden's day at the Lab he met with several early-career hires, and his visit prompted a personal story about a fond memory in which JPL plays a significant part.

As a high school senior in 1993, Bolden's daughter, Kelly, spent a summer at the Laboratory as a participant in JPL's Minority High School Graduate Summer Program, working on the wheels for the first Mars rover (Sojourner). "She became incredibly inspired," Bolden said. "That sealed for her the fact that she wanted to do something in engineering or science; she never gave up on it and eventually became a surgeon.

"So I can tell you, from personal example," Bolden added, "that you touch people, young and old, and you make them want to be like you, and that's really important."

Bolden said he hopes that as part of the effort to inspire kids, the agency should "have something that makes an impact every year or two and shows the benefits—whether it's medical science, planetary, Earth, astronomy—that will capture people's imagination and they will understand that we do serve some value to the nation."

Bolden visited the Lab on the same day NASA conducted a successful test flight of the Ares 1-X rocket, a prototype of the Ares I crew launch vehicle being developed by NASA as part of the Constellation Program. Along the same lines, Bolden noted that the work of the Review of United States Human Space Flight Plans Committee, also known as the Augustine Committee, has been completed.

The panel will present the president with options for human spaceflight, "but the impact goes across the agency," Bolden told the audience. "It affects everything we do and who we are."

It is believed that Obama will soon provide a vision for the agency, based in large part on the Augustine Committee's recommendations. Bolden said that among other goals he hopes the vision includes "a need" for humans to one day travel to Mars. He also endorses the agency moving forward in the near term with human exploration efforts to the moon and possibly asteroids.

"My promise is that I'm going to fight for sufficient funding to do the kinds of things we need to do and I'm not going to ask you to do something until you figure out how to get the money for it," Bolden said.

There is, however, the realization that the United States won't do it alone, Bolden said. Due to the staggering expense coupled with enormous technical challenges, such major initiatives will require solid international partnerships.

Bolden said he advocates extending the life of the International Space Station "so it can be utilized to its greatest extent." He also praised the Laboratory's efforts on missions in which it has participated with international partners, including the current Moon Mineralogy Mapper aboard India's Chandrayaan-1 and the upcoming Aquarius mission to measure the oceans' salt concentrations.

Confirmed in August along with Deputy Administrator Lori Garver, Bolden foresaw no major changes for the agency in the near term. He did note that certain of the agency's administrative functions such as accounting and legal affairs would be consolidated. He said he is aware of regional differences among the NASA centers, but noted

Continued on page 4

Lab helps moon water probe reach its target

By Mark Whalen

Artist's rendition of Centaur upper stage rocket approaching the moon with the Lunar Crater Observation and Sensing Satellite.

JPL has played a key role in what NASA has termed "a smashing success" in the search for water ice on the moon.

In addition to a JPL navigation team guiding the Lunar Crater Observation and Sensing Satellite (or LCROSS) to its target Oct. 9 for twin impacts to create debris plumes, a prominent JPL instrument on NASA's Lunar Reconnaissance Orbiter also observed the encounter and will contribute significant data return.

Launched in June as a companion mission to Lunar Reconnaissance Orbiter, LCROSS successfully completed its goals in capturing the impact sequence: the impact flash, the ejecta plume and the creation of a crater from its spent Centaur upper-stage rocket.

To help find a flat, smooth area in permanent shadow, Goldstone Solar System Radar measurements provided by JPL's Lunar Radar Topography Group were used by the LCROSS team to assist in the selection of an impact site, according to Barbara Wilson, chief technologist for the Exploration Systems and Technology Office. "We provided images, topography maps and slope maps of all the targets being considered from our 2006 measurements, which provided the highest-resolution topography maps available at the time," she noted.

In preparation for impact, LCROSS's sheparding spacecraft separated from its Centaur stage about 54,000 miles above the moon Oct. 8 at about 6:50 p.m. Pacific time. The Centaur hit the lunar surface shortly after 4:31 a.m. Oct. 9, creating an impact that instruments aboard LCROSS's sheparding spacecraft observed during a four-minute flyby through the resulting plume. The sheparding spacecraft then impacted the surface approximately five minutes later.

JPL's Brian Kennedy, the LCROSS navigation lead, noted that the maneuvers leading to impact required slowing down the spacecraft by 9 meters per second. With a one-way light time of just a couple of seconds, he said LCROSS was unique in giving the science and ground teams the chance to change post-impact data collection rates in real time, compared to JPL planetary encounters where communications take some 20 minutes each way.

"Providing the spacecraft team and the maneuver team with the trajectory for their work was a critical part of the vehicle navigation," he said.

Meantime, 90 seconds after the LCROSS impact, the JPL-managed Diviner lunar radiometer experiment aboard Lunar Reconnaissance Orbiter obtained infrared observations of the impact site from a distance of about 80 kilometers.

"Diviner unambiguously observed the impact crater in at least four channels," said JPL's Ben Greenhagen, Diviner's observation sequence designer and compositional investigation lead.

Diviner's LCROSS observations involved looking ahead at the limb of the moon as it approached the impact crater and looking down at the crater when the spacecraft was at closest approach. "From an operational standpoint, the targeting of both the limb and crater observations were spot on," Greenhagen said. "From a science standpoint, we already know that Diviner measured very good data. Diviner observations with multiple thermal channels immediately after impact and during subsequent orbits should allow us to determine the temperature and thermal evolution of the impact crater."

The JPL Diviner science operations center is a facility in Section 388 for supporting the instrument's health, sequencing and data downlink, and interfaces with the Lunar Reconnaissance Orbiter's mission operations center to receive data and send sequencing files. The data are processed and sent to science teams at UCLA and Oxford.

"The LCROSS effort was demanding on Ben and on Frank Leader, one of our uplink engineers, because it required preparing files in a short period of time, uploading the sequence and command files, and monitoring the instrument throughout the night," said JPL's Helen Mortensen, the Diviner science operations center manager. "It was very exciting, especially after seeing that we captured the impact. The science team did a fantastic job planning the observations."

Also observing the encounter were telescopes at JPL's Table Mountain facility and at the Caltech-operated Palomar Observatory in San Diego County.

Around Nov. 1, Wilson said, the Lunar Radar Topography Group was scheduled to acquire a new set of data using the Goldstone Deep Space Network antennas. "Hopefully a comparison of 5-meter imagery before and after the impact will definitively identify the 'new' crater in the scene," she said.

"The LCROSS project has been a story of efficiency and leverage, and this includes the great assets of this agency," said Dan Andrews, project manager at NASA Ames Research Center. "When it came to navigation and orbit-determination needs, we went with JPL for the best capabilities. I am very pleased to have had JPL as part of this extraordinary team and important mission."

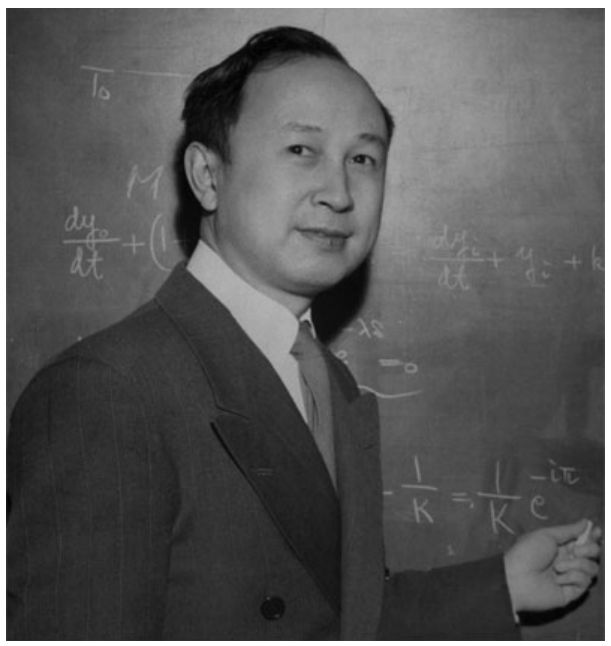
JPL co-founder dies

Qian Xuesen, 98, who was involved in the original rocket experiments that led to the development of JPL and was considered a co-founder of the Laboratory, died Oct. 31.

Qian, a Caltech student and colleague of JPL founder Theodore von Kármán in the mid-1930s, became one of America's foremost experts on rockets and high-speed flight theory as JPL became established. In 1943, Qian and two others in the Caltech rocketry group drafted the first document to use the name Jet Propulsion Laboratory; it was a proposal to the Army to develop missiles in response to Germany's V-2 rocket. This led to the Private A, which flew in 1944, followed by the Corporal and WAC Corporal.

Commended by the U.S. Air Force for his contributions to its technological development after World War II, the Chinese-born scientist was accused of harboring Communist sympathies and stripped of his security clearance in 1950. Although no evidence ever came to light to substantiate the allegations, the Immigration and Naturalization Service placed him under a delayed deportation order, and for the next five years he and his family lived under U.S. government surveillance and partial house arrest with the aim of allowing his technical knowledge to become gradually outdated.

In 1955 he returned to China as a national hero, resumed his research, and went on to become the "father"



Qian Xuesen

of that nation's missile program and its most honored scientist. In the 1970s he began developing a space program for China that put that country's first satellites into orbit. Qian also became a trusted member of the government and the Communist Party's inner circle.

In December 2001, Frank Marble, a Caltech professor emeritus, visited Qian in China and, at the request of Caltech President David Baltimore, presented him with a Distinguished Alumni Award that the Institute had presented to Qian in absentia 23 years earlier.

Visualization goes orbital

By Alex Abels

Tracking NASA's Earth-orbiting satellites, 'Eyes on the Earth 3-D' benefits educators and scientists alike

Little did Kevin Hussey of the Visualization Technology Applications and Development Group ever think he'd be delivering a keynote address to 1,200 global experts on Earth's climate change, but on Oct. 1 he was doing just that at the Governors' Global Climate Summit. This opportunity resulted from the creation of JPL's "Eyes on the Earth 3-D" visualization (*http://climate.nasa.gov/Eyes/index.html*), dedicated to showing real-time data from all of NASA's Earth-observing satellites.

The genesis of this effort came after Michael Greene, manager for Public Engagement Formulation and Strategic Alliances, and Randal Jackson, senior Internet producer, created a global change Web site (*http://climate.nasa.gov*) and wanted to expand the footprint. They were familiar with work that Hussey and other JPLers had done on Cassini at Saturn Interactive Explorer (*http://saturn.jpl.nasa.gov/multimedia/CASSIE)*, a 3-D interactive about Saturn with real Cassini mission data. Greene wanted something similar for Earth, a highly interactive visualization of the entire fleet of NASA's Earth satellites. Although funding was an issue at first, Hussey and Greene were able to jumpstart the project, which gained immediate attention and popularity.

Eyes on the Earth 3-D shows the position and location of all of NASA's Earth-observing satellites in a colorful and interactive 3-D display using the Unity Web Player, which embeds a game engine within a Web browser. The site receives data about the satellites' locations in space and shows viewers precisely where the fleet is in real time and where it will be in the future. From this information, people can now track the ozone hole and carbon monoxide concentrations from the Atomosphere Infrared Sounder instrument, and even hurricane over-flights using CloudSat data. Future data inclusions will allow the observation of Arctic sea ice, carbon dioxide, global temperatures, wind patterns and changes in sea level.

"The purpose of this site is to increase public awareness of how engaged NASA is in Earth science," said Hussey. "People don't really know how involved NASA is in this area.

"People have responded well to the visualization, specifically educators and scientists," said Hussey. Educators enjoy it because there are many Earth science lessons to learn from it. For example, educators can use the interactive display to teach about the phases of the moon, change of seasons, Earth phases, carbon dioxide levels and more. "It really is a fun way to talk about the Earth," said Hussey.

Scientists use the site as a simple means to visually analyze the real-time data and facts from the satellites. Hussey emphasized that Eyes on the Earth 3-D does not yet do any numerical analysis of its own and leaves that to the viewers. "This is just about the facts," he said. "It's just telling you what's there from real scientific instrument observations, so you can do your own visual analysis."

Many other JPLers helped spearhead this project. While Hussey, Greene and Jackson created the idea for Eyes on the Earth 3-D, Paul Doronila and Anton Kulikov, both of Visual Technology Applications and Development, programmed, wrote and maintain the application. Justin Moore, an affiliate designer and programmer, handles the flash design for the project.

When Greene was asked to coordinate with organizers of the governors' climate summit to provide NASA Earth science material, he asked Hussey to demonstrate Eyes on the Earth 3-D. The organizers were so taken by the demonstration, they added Hussey to the list of keynote speakers, even though it was only two days before the summit.

Hussey said the feedback and reaction at the summit was tremendous, and he thinks this is due to the accessibility of information that the visualization creates. "People definitely remembered it because of its visual impact, being able to see satellites and data in real time," he said.

This is not the end of the road for Eyes on the Earth 3-D either. There is a version 2.0 due to come out in the middle of next year with the hope of added data sets for every NASA satellite and added features to make it even more useful to educators, students, scientists, media and the general public.

Left: Kevin Hussey shows an Eyes on the Earth 3-D visualization at the recent Governors' Global Climate Summit.

Below: NASA's Global Climate Change site is produced by the Earth Science Communications Team at JPL.

Bolden *Continued from page 1*

Thom Wynne / JPL Photo Lab

"there are ways we can get efficiencies."

In response to an audience question, Bolden discussed the notion of 10 healthy NASA centers. "The way I look at it, instead of spreading the work around so that everybody's doing something on every program, we allow centers to migrate to their strength, and shed things that are their weakness," he said, adding that he would like to rebalance that portfolio for the centers so they are focusing on work within the sphere of their expertise.

Bolden showed appreciation for JPL's mentoring efforts, and urged employees to take part, both as mentors and protégés. "Someone who's senior to you in age or in rank needs to tell you, 'this is what we used to do,'" the administrator said. "There is something you know that people around you don't and you need to find a way to share it." He also encouraged JPLers to seek out senior staff members for counsel as mentors.

To view Bolden's address, log on to *http://jpltv* and visit the asset library.

Poster contest promotes recycling

Three winners have been selected in a contest for the children of JPL employees to create an art poster that depicts the union of the space program and recycling.

Jessica Pham, 15, daughter of JPLer James Pham; Bradon Oh, 10, son of JPL's David Oh; and Krysten Tran, 7, daughter of JPLer Chris Tran, were the winners representing three age categories in the contest sponsored by the JPL Environmental Affairs Program Office.

Their work is permanently displayed on recycling containers called "canables" and can be seen at the visitor control center, Space Flight Operations Center and the Building 321 auditorium.

Bradon Oh with his winning entry in the poster contest.

For more information, call recycling coordinator Taenha Goodrich at ext. 4-1973.

Carol Lachata / JPL Photo Lab

Flight Projects Center dedicated

Local dignitaries and elected officials joined JPL leadership in the dedication of the Lab's new Flight Projects Center Oct. 26. JPL Director Charles Elachi, fifth from left, is flanked by Caltech President Jean-Lou Chameau and La Cañada Mayor Laura Olhasso at a ribbon-cutting cermony. At right is U.S. Rep. David Drier, whose congressional district includes JPL. The ceremonies included the presentation to JPL of a "Gold Certification" under the Leadership in Energy and Environmental Design rating system, set up by the non-profit U.S. Green Building Council. The Flight Projects Center is the first NASA building to achieve that certification.

Passings

Retired JPL engineer **Noel Burden** died Oct. 5.

Burden joined JPL in 1964 as a teletype operator. He left the Lab in 1967 to work in Greenland at a classified tracking station, then returned in 1969 to work with Mariner 9 and Mariner 10 launch operations. He was the senior lead engineer supporting the transition of Voyager and Galileo to new advanced multimission operations system ground data systems, and served as senior integration engineer in mission software integration. He retired in 2003.

Burden is survived by his daughter Staci and brother Jerry. Services were held Oct. 18 at O'Connor Mortuary in Laguna Hills.

Gene Samuel, 72, a retired JPL engineer, died Oct. 8.

An imaging radar engineer, Samuel contributed to the Ranger missions to the moon, the Mariner missions to the planets and Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar, among others.

Samuel is survived by his wife, Yvonne, son Kevin, daughters Shalyn Samuel and Deborah Stumme, and four grandchildren. Services were held Oct. 16 at Montrose Church.

Gene Samuel

Letters

I want to convey my deep gratitude and heartfelt thank you to my JPL colleagues for the thoughtful support provided to myself and my wife Tarnie following the recent passing of my mother Gunhild. The gifted funds from my APD colleagues is supporting advanced cancer research in Sweden and the plant provided by the ERC serves to remind me daily of my mother's remarkable spirit.

Ulf Israelsson

My wife Laura and I sincerely appreciate your kind thoughts and the beautiful plant we received after the death of her father. It helps so much to have the support of the JPL family in sad times.

Henry Kline

Retirees

The following JPL employees retired in October:

Reinhard Beer, 47 years, Section 3280; **Jose G. Hernandez,** 34 years, Section 3819; **Allen Hubbard**, 33 years, Section 382G; **Nancy Greenberg**, 31 years, Section 2033; **Robert Frisbee,** 30 years, Section 3534; **Linda Booth**, 26 years, retired on long-term disability; **John Thomas**, 23 years, Section 3456.

JPL RETIREES:
FOR ACCESS TO CLASSIFIED ADS AT JPL'S ONLINE NEWS SOURCE
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