At a time when the Bush administration has submitted a fiscal year 2006 budget that seeks deep spending cuts across the federal government, NASAs proposed funding over the next five years will increase between 2 and 3 percent each year, JPL Director Dr. Charles Elachi told staff Monday.

Noting that this is the toughest budget the administration has ever proposed, including a commitment to cut the deficit by 50 percent over the next four years, based on preliminary numbers, almost all directionary agencies (excluding the Department of Defense and the Department of Homeland Security) are proposed below NASA growth. "We should all be proud and thankful for what I would consider a very good budget in this environment—both for NASA and for JPL," Elachi said.

Under the budget proposal submitted by the administration to Congress on Monday, NASAs Science, Aeronautics and Exploration Areas will be funded at about $9.7 billion in FY 2006, an increase of about $700 million over FY 2005. Projecting to FY 2010, the budget calls for $12.8 billion.

"There is not only growth in absolute numbers, but also a growth in the percentage of science being done at NASA," he said. "So clearly there is a commitment from the administration and from the agency that science is very important and is a significant and critical element of NASA."

Programmatically, the technology demonstration mission associated with the Jupiter Icy Moons Orbiter, faces some funding constraints. Its FY 2006 request for $230 million is $112 million less than this year, but the budget request increases each year thereafter through the decade.

"This is a very prudent and pragmatic decision to first conduct a demonstration of a propulsion system technology that will revolutionize our ability to conduct deep space exploration," Elachi said. "One of the advantages of a demonstration effort is that it prepares not only in technology development, but gathering knowledge of the uses involved in a more ambitious future mission to Jupiter and its moons. Concepts presently under consideration include a lunar orbiter, asteroid rendezvous and a Mars orbiter mission, all enticing destinations when important science can be conducted."

"If we Science Mission Directorate, which funds most of JPLs activities, is proposed to receive significant increases over the next five years. Currently, Elachi said, the Science sector represents about 33% of the NASA budget. If the proposed spending is implemented, in five years funding for Science would be at 38% of NASAs overall budget.

In the Earth Science Division of the Science sector, which is a combination of Earth sciences and space physics, there is a small drop in the FY 2006 budget request, to $2.06 billion, down from this years $2.16 billion. "It will pick up slowly after that," Elachi said. "I dont envision any significant impact on our activities here."

Elachi said considering how important Exploration Systems will be in the near future, his intent over the next year is to transform JPLs Exploration Systems and Technology Office into a directorate, excluding Prometheus. Mike Sander, the manager of that office, is considering applications from JPLers to spend a year in Washington, D.C., working with Craig Sodd, the offices new director, then returning to JPL.

Within Exploration Systems is Constellation Systems, which mainly concerns the crew exploration vehicle, which NASA is committed to demonstrate by about 2008 but not operate until 2012 or 2013. Although this is a mostly human spaceflight-related area, there could be a role for JPL. "There are a number of areas where we could make major contributions—particularly because that vehicle is intended not only to go from here to the International Space Station or to the moon, but a capability may allow it to go deeper—to asteroids, the L1 point and ultimately to Mars," Elachi said.

Another possibility for the Lab under Exploration Systems is Prometheus, the technology demonstration mission associated with the Galileo Mission. "Prometheus really helps in a major way," Elachi said.

He also credited the Aldridge Commission report for providing a blueprint for the NASA transformation and praised The New Age of Exploration, a document defining NASAs strategic planning efforts and roadmaps.

Elachi also weighed in on institutional issues at the Lab. "We are still going to be a very busy organization for the rest of the decade," he said. noting that JPL is committed to developing and launching an average of one mission every four months through 2010.

The recent selection of the NuSTAR mission as a directorate, excluding Prometheus. Mike Sander, the manager of that office, is considering applications from JPLers to spend a year in Washington, D.C., working with Craig Sodd, the offices new director, then returning to JPL.

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AIRS marks milestone

From the AIRS Team

Special Events Calendar

**February 22**

Claremont Graduate University School of Communication Science and Management—Hosted by Professional Development from 9:30 to 11 a.m. in the 100-1 conference room. The workshop will be focusing on currently offering two degree pro- grams and career certificate programs, focusing on both theory and application masters and doctorates in information systems, and certificate programs with both a management and technology. For more information, call (626) 395-6299. For questions on the open house, call Professional Development at ext. 4375 or visit http://oeh/caltech.edu.

**Wednesday, February 22**

JPL Library orientation—Stop by for 11:30 a.m. at Building 111-114 for an overview of the Library's products and services, and learn how to access numerous electronic resources from your desk. For more information, call the reference desk, ext. 4-4200.

**Thursday, February 23**

JPL Toastmasters Club—Meeting at 5 p.m. in conference room 103. Call Dirk Rang, ext. 34-368, or visit www.jpl.toastmasters.org.

Volunteer Professionals for Medical Advancement—Meeting at 5 p.m. in the Caltech Credit Union. 520 Foothill Blvd. La Cañada.

**February 24**

Imago Theatre—This mask theatre troupe will present a glimpse into the Strange World of Public Communication—4 p.m. in the Library, Building 102, ext. 104. If you have questions about participation in a series, email or participate, call Teresa Bailey at ext. 4322.

**Friday, February 24**

Imago Theatre—This mask theatre troupe will present a glimpse into the Strange World of Public Communication—4 p.m. in the Library, Building 102, ext. 104. If you have questions about participation in a series, email or participate, call Teresa Bailey at ext. 4322.
What's your background? What brought you to JPL?

I had been working as a contract historian at NASA's Langley Research Center since 1999 when the JPL job opened up. I started there by writing a history of supersonic transport research, which will finally be published this year, and then I pitched NASA on the idea for a history of atmospheric science research NASA-wide. It would include stories from JPL, as well as from Langley and Goddard Space Flight Center. I'm a chapter away from finishing the first draft of the book, which is due to NASA in September. I've been working in aerospace history since 1996, at the National Air and Space Museum and at Langley. I was offered this job in May 2004, after the Lab had looked at applicants for nearly a year. It was a huge honor and really exciting—for a historian of 20th century science and technology, this is one of the very few perfect places to be. There's all sorts of great staff to write about here, and more is happening every year.

What are you working on? What are your goals here?

I've started to build up an oral history collection. I'm interviewing the directorate heads and other long-serving JPLers, and I'm pursuing topical sets of oral histories, starting with the atmosphere and oceans groups. Another short-term goal is to soon begin oral histories with some of the Prometheus mission leaders, with the help of Michael Hooks, the JPL archivist, and with the Mars Science Laboratory and Mars Telecommunications Orbiter teams. I'll also be expanding the range of the oral history collection over time to capture more of JPL's missions.

Longer term, I plan on talking to the various directorates to gauge their interest in funding histories of their flight projects. There's a new history of JPL coming by Peter Westwick that will provide a very top-level view of our history, but I'd like to foster histories of some of the more important projects so that there's more detail, and more personal stories, in the historical record. It takes three or four years to research and write a solid history, so I can't do them all myself.

What is an oral history?

It's generally an audiotaped interview accompanied by a paper transcript. Sometimes these take several sessions to complete. I try to get key players to tell me about their careers and their involvement in projects, in scientific research and in management. The goal is to build up the Lab's history by getting the stories of the people who make up the Lab. Eventually we will have a set of oral histories on each of JPL's projects.

Everyone I've talked to has been very receptive; in fact, some have been rather enthusiastic and very happy to be asked to share their experiences.

Are you going to concentrate on JPL's current missions or those from the past?

I'd like to strike a balance. It's on my agenda to try to get histories on past missions that have not already been published by the NASA History Office. Each year, they fund a single history project for the agency. Galileo's history is being done now and Voyager is finished. So from JPL's past planetary missions, Magellan is the only major project yet to be done. Of course, there's also the whole Mars program of the last 15 years too, but because it's ongoing I don't quite see it as "past."

But in general my focus will be on current and future missions, even missions that get proposed and are later canceled. For example, I've found that a lot of people on the Mars Exploration Rovers mission had involvement in a proposed Mars sample return mission that was since canceled. I want to capture these shifts in more detail than in the past, because the development, movement and dissemination of expertise is an interesting topic historically.

Additionally, it's interesting to chronicle projects in development because the most major projects change significantly from proposal to launch. With Prometheus, for example, I want to capture how oral history the evolution year-by-year for however long it runs. It will be a fascinating study.

I will also try to pursue topical histories. In other words, instead of covering individual projects I might look for a topic—such as infrared astronomy—that ought to be covered by describing a number of missions.

Do you intend to write books about the Lab and its missions?

I'll pick a book project late this year. But I can only work on one book at a time, so until my atmospheric history is done in September I will concentrate on the oral histories and a few journal articles. I'll probably write two articles this year for popular publications such as Astronomy and Air and Space Smithsonian. I will also target one article this year for one of the scholarly or academic history journals. The nice thing about articles is that they're relatively quick to do, and there are a lot of small but important topics here that can be done nicely in an article.

How will your work align with that of the JPL Archives?

My function will be to help Michael Hooks and Kay Schardin, the records manager, archive more visibility. I'll also be providing new oral histories for his collections, of course. Hooks is the custodian of all the Labs old records, including oral histories, and is responsible for making the records available to researchers. I'll also review the archives and records management functions from time to time to make sure they keep doing well.

Also, any work that I do will eventually be publicly releasable and the Archives will make it available.

Will JPL's history also be available on the Internet?

There is already a JPL history website run by the Library [http://beacon.jpl.nasa.gov/WhatsNew/JPLHistory.htm]. At least in the short term, I don't plan to expand it much. It has the basic information that it should have. If I can resolve some legal issues regarding electronic distribution of oral histories, I may also add a selection of them to the site as Johnson Space Center has started to do. But that's a year or two away.

As far as purely electronic histories go, bring a computer hobbyist leftover from the 1970s, I'm afraid electronically based histories may not survive. Look at all the formatting and software changes that have happened. Can you read a Microsoft Word file from 1990? Scientists may wrestle with this, but we historians are poor, we can't cope with the cost of format changes.

Paper and libraries may be old-fashioned, but we know we'll be able to read them in a couple hundred years. I don't believe that we know yet how to preserve electronic records in perpetuity.

Why is it important for JPL to have a historian and a historic record? Do the other centers have historians?

Actually, it's a legal requirement for NASA and JPL to preserve all of its records. As a matter of fact, the Columbia Accident Investigation Board's findings raised the issue of the inability to find records. But beyond the requirements, JPL should—and does—want its history to be recorded and disseminated. There has been and will continue to be so much important research done here.

As for the other centers, when I began working at Langley, most of the centers did not have their own historians, except for Johnson Space Center and Dryden. To this point, just about all of the human spaceflight program has been recorded, but the history of the robotic element of the agency is lacking.

But it seems things are starting to look better, as most of the other centers are now starting to set up history programs. The impetus is not coming from Headquarters, but rather from the centers' own feelings that they need to do it.

Will you ever run out of things to profile at JPL?

I don't think so. I have a list of book projects already that would take a lifetime to complete, and it doesn't include any of the upcoming missions. So there are several lifetimes worth of work to do here.
Six JPL staff members last month concluded their graduation from train-
ing for JPLs Urban Search and Rescue Team. The group is made up of 85 volunteers and 24 firefighters who serve the Lab as trained emergency re-
ponders in the event of a major disaster.

The graduates, from left—Richard Hillquist (Section 2655), Leslie Paal (333X), Kelly Clarke (137G), Robert Bertisch (25157), Merrell Felton (NASA Math and Methods) and Ken Hofmann (3060)—spent the last six months in twice-weekly training to form the basics of technical rescue. Examples include manual response to terrorism, rescue skills, advanced collapsed structure rescue, victim care and mass morn.

The six graduates have completed all requirements and will continue in training to move in advanced skills..

### Classifieds

#### For Sale

- **AIR CONDITIONER**, for window, 5700 BTU, 3 seasons. $125. 626/203-2494.
- **GUITARS**: Flamenco, 2000 Cordoba 75F, exc. cond., 10/100/1000 Mb/sec, $15. 395-6804, lv. msg.
- **COMPUTER**, brand new HP Pavilion notebook, 1.6 GHz Intel Celeron, 512 MB RAM, 80 GB, 15 in. CRT, $700. 626/395-5275.
- **COMPUTER**, Sony Vaio, Pentium III 850 MHz, 128 MB RAM, 80 GB, 15 in. CRT, $500. 626/357-8210.
- **DRYER**, Whirlpool, barely used, electric, white, very quiet and clean, $500. 626/798-4821.
- **EDS Pro Carbon front fork, no pedals, vg cond., $100/obo. 694-0190.
- **FLUSHMASTER**, 10 cycle, 4 burners, elec. ignition, self-clean, 6 yrs. old, vg cond., $900. 626/376-2421, dirtbikebarney@earthlink.net.
Holzmann receives rare academy election

By Mark Whalen

DR. GERARD HOLZMANN, who is involved in efforts to improve the reliability of JPL’s mission-critical software systems, has achieved the rare and prestigious honor of election to the National Academy of Engineering.

Holzmann joins Dr. Charles Elachi, the JPL director, and John Casani, manager of the Project Prometheus Office, as the only current Lab employees who are academy members. Retirees Lew Shost and Bob Parks are also members.

Holzmann joined JPL in May 2003 to develop the newly established Laboratory for Reliable Software, which conducts research that targets the application of both new and existing formal verification techniques to mission software. The election in the academy recognizes Holzmann’s career-long work in software reliability, with a particular emphasis on logic model checking.

“The area is a very prestigious body,” Holzmann said. “This is quite an honor.”

Holzmann—who worked for more than 20 years as a researcher at Bell Laboratories—is credited with the development of Spin, a highly successful and widely used software model-checking system. Spin was initially developed to assure dependability in complex telephone switching systems, which have stringent reliability requirements. But as computers have become more powerful, this verification tool has found applications in everything from Internet protocol software and railroad-signaling systems to distributed control software essential to the correct functioning of nuclear power plants and spacecraft.

When he joined the Lab, Holzmann was quoted as saying, “JPL has some of the most difficult software challenges on the planet.” Does he still believe that today?

“Yes, even more so than when I started here,” he said. “For one thing, the software built here becomes very difficult to access. With a telephone switch, you can always open it up and see what’s going on. Of course, we can’t do that very easily with spacecraft. There’s the fascinating additional problem of being able to maintain and debug a system that may be millions of miles away.

“One thing I learned since I came here is how smart people are in building these systems and making it possible to recover from occasional mishaps,” he added. “There are all sorts of software malfunctions that can be completely unpredictable.

“It’s very hard to produce something of significant complexity that is absolutely flawless. That is true for anything humans do. But the design can be robust enough that it doesn’t matter that there are a few small problems, because the rest of the architecture can be designed to recover from the occasional malfunctions. This is the art of building reliable systems from unreliable parts, and the people at JPL are very good at that sort of thing.”

Working side by side with the principals of the Software Quality Initiative, Holzmann works with Laboratory for Reliable Software colleagues Rajeev Joshi and new hire Alex Grace. The group’s work has included pre-launch software analysis for the Spirit Space Telescope and Mars Exploration Rovers. Some MBR analysis was also done during the cruise phase. The members of LARS also participated on a tiger team for the Deep Impact mission.

Holzmann’s long-term goal is to reduce by an order of magnitude the number of residual defects in flight software that remain after testing. “At that point, these are software processes, there are typically between 1 to 10 residual defects for every 1,000 lines of code,” he said. “We need to be able to reduce that by a factor of at least 10 in the next few years.”

The Laboratory for Reliable Software has researched technology that is the closest to bringing ready to infuse into the mission-development process. “We did a broad evaluation of state of the art static analysis tools that are available now, of them that I developed is called UNO,” Holzmann said. “We have evaluated these tools for typical JPL flight software to see how well they do and prove which ones perform the best.”

Holzmann recognizes that while his lab can develop the methodologies and tools, that does not mean those tools will automatically get adopted. “You really have to convince people that there is something to be gained by making a change.

“Just before a launch, for example, there’s no time to redo anything or to change a process,” he said. “The risk of making a change in the process is too great, even though there may be benefits. You have to work efficiently from the start of the cycle. That’s why I think it takes a few years for mature technology to be integrated into the design phase of a mission.”

Pushing the state of the art, Holzmann has done much work in logic modeling techniques. “This is something we can really take advantage of—design verification based on logical models fairly early in the design process,” he said. “We’re working on this, but we have a long road ahead before we reach full integration into a mission.

“The phenomenon we’re seeing in software on spacecraft is that every new mission uses more software than the one before, and the expected number of residual defects goes up with the number of lines of code,” he said. “So the potential risk that is introduced by software slowly increases over time. It then becomes ever more critical to be able to find software defects before launch. If we don’t do anything, the problems may get out of hand. We have to get smarter about handling the software design and testing process.

“Maybe in about five years we will have reached the point where it becomes routine.”

Holzmann is secure in the knowledge that as technologies advance, the need for the software research function be and his laboratory provides will always be an asset to the Lab.

“Software reliability issues won’t easily go away,” he said. “At some point, the technology gets encapsulated into standards and design templates. But humans bring who are they, do stay within what is known; they want to expand beyond that, and that’s probably where there will remain a strong need for our work.”

Continued on page 4

JAMES DONALDSON of the Avionics Systems and Technology Division 34 has been awarded NASA’s Quality and Safety Achievement Recognition (QASAR) Award, which promotes safety, quality, and continuous improvement throughout the agency.

Donaldson was cited for leading a team that identified a possible problem that may have preceded proper firing on the Mars Exploration Rovers’ pyro circuits just hours before the rovers’ entry, descent and landing. Through testbed analysis, the team of eight people determined the need for and tested spacecraft commands that helped the rovers to complete their successful landings on the Red Planet.

This marks the first time that JPL has had a QASAR winner since 1997, said Matt Landano, director of the Office of Safety and Mission Success. Landano and other NASA center Safety and Mission Assurance directors submit nominations for the awards and then vote on them for agency-wide honors. Donaldson received a unanimous vote for the QASAR.

The QASAR recognizes NASA government and contractor employees who have displayed exemplary performance in contributing to the quality and/or safety of products, services, processes, management programs and activities, or the working environment. Headquarters and each center have local QASAR award programs annually.

The “Best of the Best” in each of four categories—NASA Safety and Mission Assurance, NASA outside SMA organization, other non-NASA government agency, and NASA prime or subcontractor—are selected at the agency level.

OAS award honors aid to rover landing

By Julian Leek

Naderi gets NASA’s highest award

By Julian Leek

Dr. Firooz Naderi, Manager of NASA’s Mars Exploration Program, has been awarded NASA’s Distinguished Service Medal, the highest award that the agency bestows. The medal citation recognizing Naderi’s 26-year JPL career reads: “In recognition of your sustained exceptional contribution to space science and exploration.”

The medal and the citation—which was signed by NASA Administrator Alan Shattuck—was presented to Naderi in Washington, D.C. on Jan. 3, appropriately the one-year anniversary of Spirit’s landing on Mars—were presented to Naderi by NASA Associate Administrator for Space Science Al Diaz.

Prior to leading JPL’s Mars Program, Naderi managed NASA’s Origins Program, an ambitious plan to search for other Earths around other Suns. Earlier positions included program manager for space science flight experiments and project manager for the NASA Scatterometer, which monitored winds from Earth orbit.

“JPL’s Mars Exploration Program has been the highest award that the agency bestows. The medal citation recognizing Naderi’s 26-year JPL career reads: “In recognition of your sustained exceptional contribution to space science and exploration.”

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Bar-Cohen receives honor

Dr. Lucien Froidevaux, senior research scientist and group leader for Nondestructive Evaluation and Advanced Structures, is the recipient of the International Society for Optical Engineering's Annual Nondestructive Testing Award. Bar-Cohen received the honor as a result of voting by about 65 past and present NDEAA members.

Froidevaux cited for pioneering work

Dr. Lucien Froidevaux, an editorial board member of NDE Proceedings, is the recipient of the International Society for Optical Engineering's (ISOE) 2010 Award for Meritorious Service reprinting the Journal. One of the most important services performed for ISOE is the consciousness reviewing of submitted papers. Because of the nature of the reviews, the evaluation process is also one of the trust recognized.

The ISOE said the assistance of the advanced scientific community to ensure high-quality refereeing is of great importance to achieving a uniformly high standard for the quality of manuscripts accepted for publication in ISOE-Journals.

Froidevaux is a member of the scientific team for JPL's Advanced Light Source-Ion Analyzer and has been a member of the AIAA’s Technical Committee on Nondestructive Evaluation and Structure Integrity since 1999. He has been an active member of the ISOE since 2000.

JPL Stamp Club—Meeting at noon in the 167 conference room.

JPL Gun Club—Meeting at noon in Building 110-211.

JPL Softball—An organizational meeting will be held at 11:30 a.m. in the 167 conference room.
The Lab’s “JPL Rules!” system is being used to help a local U.S. Air Force base structure its own document management system.

JPL Rules! is the official repository for institutional governing documents for JPL. Its success was identified by the Los Angeles Air Force Base (LA AFB) in El Segundo as a best practice worth emulating. As a result, they sent 1st Lt. Andrew Huckstadt and 2nd Lt. Richard Quinton to the Lab to analyze and document the system. The lieutenants spent about four months on Lab starting in September of last year.

The two airmen were tasked with generating a set of requirements for a Space and Missile Systems Center (SMC) web-based document management system similar to JPL Rules!, but tailored to their needs. The SMC, based at the LA AFB, is responsible for the acquisition of military space systems. The lieutenants looked at both the functionality of the system and the processes associated with JPL Rules!

Col. James Joresko is the SMC chief engineer and deputy director of systems acquisition at LA AFB. “It took only one look at JPL Rules! to immediately recognize its potential usefulness to the SMC,” he said. “We had lost our discipline when it came to documenting our processes and JPL Rules! offered an opportunity to regain that discipline by building on their experience.”

The airmen learned a lot from their time spent on Lab. Quinton, a systems integration officer, said one lesson learned was to “look at process before technology. We need to have all of our processes laid out before going ahead with implementation. JPL Rules! became institutionalized through customer experience. The JPL Rules! staff works very hard at delivering for their customers. If we plan to achieve the same success in institutionalizing our system, we will have to be customer focused.”

According to Huckstadt, an acquisitions systems engineer, one of the reasons JPL Rules! has been so successful is because “the JPL Rules! staff gathered feedback from users and made improvements based on their comments. This resulted in user-in and produced a sense of loyalty towards the system.” LA AFB will be able to benefit from these and many other lessons learned at JPL when implementing their system.

Another benefit for the lieutenants in partnering with JPL is that JPL Rules! is the official repository for institutional governing documents. According to Col. Rakesh Dewan, director of system engineering for SMC and the lieutenants’ supervisor, “we see the confidence these young officers have gained by actually applying their education and delivering an end product to senior engineers, especially when they receive praise for their work and see their feedback implemented as presented. The joint training effort between LA AFB and JPL builds confidence in our new lieutenants.”

As a result of the time spent scrutinizing the JPL Rules! system, the lieutenants were able to create the “SMC Repository Requirements Document.” This will serve as the “how-to guide” for the Air Force in developing its version of JPL Rules! This document has also allowed the JPL Rules! team to see our system from an outside perspective.

Dr. Jerry Suitor is manager for the Office of the Management System, the office where JPL Rules! resides. “This document will help provide information to others who are interested in the JPL Rules! concept and can describe the approach and requirements from a useful outside perspective,” Suitor said. “Sandia National Laboratories, Air Products, Beck Dickinson, Kimberley Clark and Schneider National Trucking have already expressed a desire to have this document. The majority of the Rules! system is also being recognized by the NASA family. Next month, Laura Mitchell, the JPL Rules! group supervisor will receive the ‘Continual Improvement Team’ award at NASA’s prestigious annual ‘Continual Improvement and Reinvention Conference.’”

Dan Hoffman, a JPL senior systems engineer for the Office of the Management System, acted as the project manager and mentor to the lieutenants. “The document delivered to us will be used to introduce other organizations to JPL Rules! and to the processes underlying institutional document management,” Hoffman said. “The project has enhanced our ability to work with and learn from each other. Its success has eclipsed our expectations.”

Another of JPL’s long-term goals when partnering with the Air Force is to establish a working relationship with LA AFB on matters of common interest relating to institutional governance.

Deputy Director General Eugene Tutlin helped facilitate JPL’s relationship with the Air Force. “Both JPL and the Air Force have an elaborate system of governance documents,” he said. “This is a perfect opportunity for both of us to learn from each other.”

The Air Force document control system will serve the 6,000 people, including civilian personnel, on base and should be implemented within the next year or two.

Cassini logs more Saturn moon images

BY CAROLINA MARTINEZ

Cassini’s Cassini spacecraft had a busy time last week, snapping stunning new images of two of Saturn’s moons—smoggy Titan on Feb. 15 and wrinkled Enceladus on Feb. 16.

Visible in radar images released Feb. 16 are a crater, channels and terrain similar to the area where the European Space Agency’s Huygens probe landed on Jan. 14.

The crater is approximately 60 kilometers (37 miles) in diameter. Earlier last week, the radar team released an image of a giant impact crater dubbed “Circus Maximus” about 440 kilometers (274 miles) wide. From the crater’s size, scientists estimate that it was created when a comet or asteroid roughly 5 to 10 kilometers (3 to 6 miles) in size slammed into the surface of Titan. The feature lacks a central peak, suggesting that it has been eroded or otherwise modified since formation. Rainfall, wind erosion and softening of the solid material in which the crater formed might have altered this impact feature.

Massive channels appear in the images are channels located just east of Circus Maximus, the largest impact crater. The longest channel is approximately 200 kilometers (124 miles) long. The channels appear in flow from the slopes of the crater. The fluid was most likely liquid methane, given the extremely cold ambient conditions at the surface of Titan. The area some what resembles the rugged-terrain plains in the region where the Huygens probe landed.

Just one day after the Titan flyby, Cassini turned its sights on Saturn’s moon Enceladus, revealing a fascinating, tortured world of ice. The spacecraft swept within 1,180 kilometers (700 miles) of the moon’s wrinkled surface, providing the first-ever high-resolution images of this world with the brightest, most reflective surface in the solar system.

Since JPL’s Voyager spacecraft flew past Enceladus in 1980 and 1981, planetary scientists have hurried to the moon’s wrinkled terrain and smooth plains, some of which appear to be relatively free of impact craters. Smooth, crater-free surfaces on moons and planets indicate geologic conditions young enough, while wrinkles may indicate tectonic activity or vulcanism.

“As Cassini has now viewed these terrains at almost 10 times better resolution than Voyager,” said Cassini imaging team leader Dr. Carolyn Porco of the Space Science Institute in Boulder, Colo. “Interestingly, the icy surface of Enceladus appears to have similarities to both Europa and Ganymede—two prominent icy satellites of Jupiter—and topographic relief of about 1 kilometer (6 miles). Both Europa and Ganymede are thought to have subsurface water layers, or oceans, so the similarities with Enceladus are intriguing.”

One view released last week is a high-resolution mosaic showing complex systems of fractures and resurfaced terrain. Among the most intriguing features in the images is a series of small, dark spots which in many places seem to be aligned in chains parallel to narrow fractures. A false-color view shows some linear features on Enceladus with a slightly different color from their surroundings. Different colors of ice may be caused by varying compositions or varying ice crystal sizes. Either one can indicate different formation mechanisms or different ages. Another early highlight from the flyby is a high-resolution stereo view of Enceladus. Stereo views are helpful in interpreting the moon’s complex topography.

Other preliminary results from the visual and infrared mapping spectrometer show a surface composed of pure liquid water, with no other compounds detected. Ammonia or ammonium compounds and carbon dioxide were expected, but not seen in the data. Further analysis may find trace amounts. “The spectra look like laboratory-fabricated water ice, indicating the ice is quite pure,” said Dr. Roger N. Clark, Cassini science team member at the U.S. Geological Survey in Denver.

Cassini will conduct an even closer flyby of Enceladus on March 9, coming within about 500 kilometers (310 miles) of its surface. More than 40 additional Titan flybys are planned.

Hollman was most familiar with JPL before he came on board, having enjoyed his work collaborating on small analysis projects for the Cassini, Pathfinder and Deep Space 1 missions. “That was one of the big reasons I wanted to work here,” he said.

Hollman is reminded of his early career at Bell Labs, when the company had “an enormous pool of talent. At JPL, when you run into people you’re never talking about football or the weather—they’re talking about science. It’s been very inspiring.”

Hollman is most proud of the National Academy of Engineering Honor. He doesn’t know who nominated him for the award and thinks he may not ever find out. But that’s OK.

“I’ve enjoyed it immensely. It’s been very rewarding,” he said. “I have an enormous respect for the people who work here. I now understand how dedicated and passionate people are about their work. It’s a joy to work in this environment.”
Celebrating the Voice of Women—Women Change America

Honoring

Dr. Susan Love
President and Medical Director,
Dr. Susan Love Research Foundation,
Pacific Palisades, California

Tuesday, March 15, 2005
11:30 am – 1:30 pm
Brookside Country Club
1133 N. Rosemont Ave., Pasadena
Seating is limited.
All JPL employees are invited to attend.

Ticket Information

Tickets are $22 and can be purchased by sending a check (payable to ACW) to Pat Barley, JPL M/S 125-177, plus the completed Luncheon Ticket Request Form at the bottom of this page. Your ticket will be sent to you via JPL mail. No refunds will be given once a ticket has been issued. One ticket per person.

Luncheon Ticket Request Form

Name ________________________________
M/S_________________________ Ext._________________________

Are you an ACW Alumna: □ Yes □ No

Menu Options (please indicate your choice):
□ Cobb Salad □ Mandarin Chicken Salad □ Pasta Primavera (vegetarian option)
According to a National Cancer Institute report, one out of every seven women born now in the United States will develop breast cancer at some time in their lives. Many of us have a close friend, sister, mother, or wife who has had breast cancer. Some of us are breast cancer survivors. Are you prepared to cope with such a diagnosis? What is being done to find new treatments and eventually cure this disease? Knowing and understanding breast cancer is not only important to women but equally important to the men who know them.

Attend the ACW luncheon to hear Dr. Susan Love, a pioneer in the exploration and discovery of new technologies for treating and curing breast cancer, talk about the important work she is doing. She is the author of Dr. Susan Love’s Breast Book, termed “the bible for women with breast cancer” by the New York Times. Dr. Love has developed a new, non-invasive technique for breast cancer detection, which is breaking new ground in early diagnosis of the disease.

Dr. Love is known worldwide as one of the founders of the breast cancer advocacy movement. She is President and Medical Director of the Dr. Susan Love Research Foundation, a non-profit organization dedicated to the eradication of breast cancer. The organization’s goal is to identify the barriers to research and then to create new solutions. Dr. Love currently sits on the Board of the National Breast Cancer Coalition. She is also a Clinical Professor of Surgery at UCLA and former director of the UCLA Breast Center. Dr. Love is dedicated to breast cancer research, awareness, education, and advocacy.