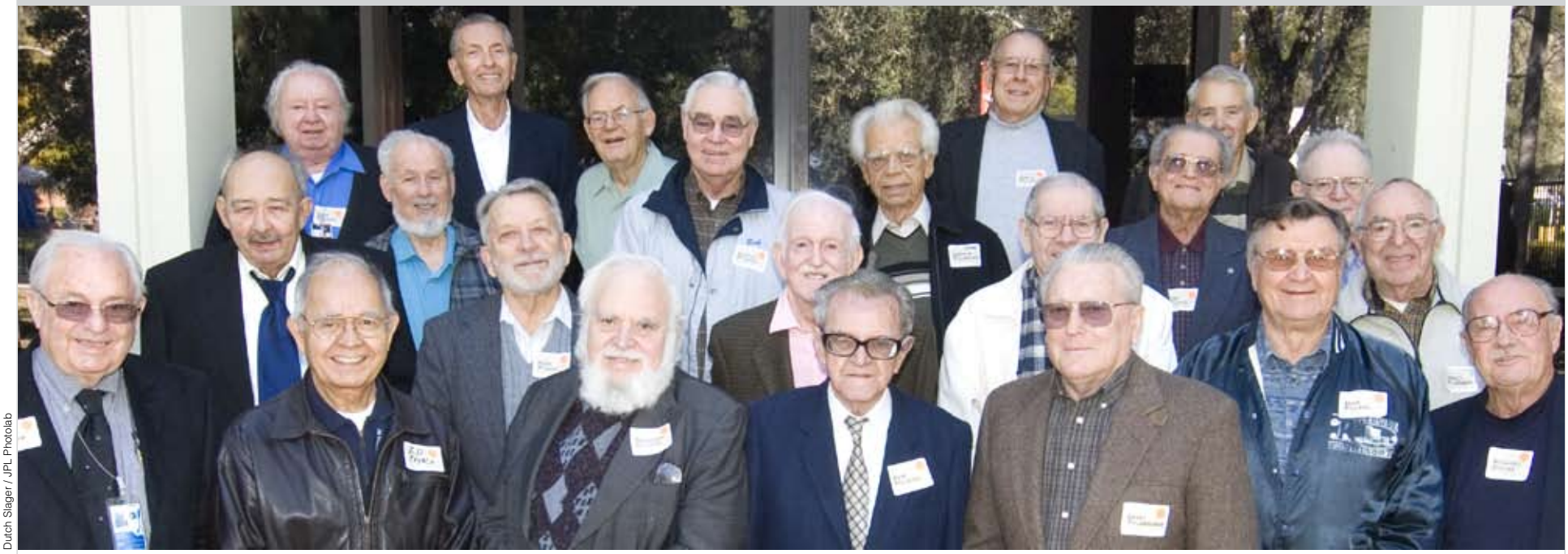
Jet Propulsion Laboratory

Universe

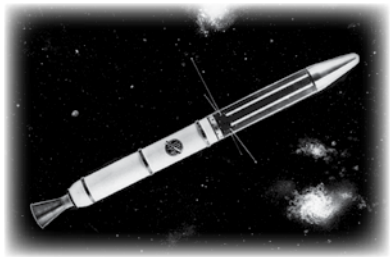
FEBRUARY
2008
VOLUME 38
NUMBER 2



Dutch Slager / JPL Photolab

Explorer 1 veterans gather during the mission's 50th anniversary celebration Jan. 30. From left, front row: Henry Richter, Ed Caro, Solomon Golomb, Leonard Piasecki, David Trowbridge, Dick Postal, Richard Davies; second row: Roy Summers, Fred Riddle, Herman Bank, Lou Sola, Stanley Friedenberg; third row: John Eyraud, Robert Lockhart, Robert Hughes, Steve Stefanovich, Carl Raggio, Sam Benesch; fourth row: Fred Eimer, Herbert Holbeck, Edwin Dobies, Walt Downhower.

Space pioneers return



Veterans of Explorer 1, America's first satellite, recall the JPL of 50 years ago

By Mark Whalen

They came from as far away as Hawaii and as near as La Cañada, a group of a couple dozen space pioneers who, as much as anyone, set the stage not only for the JPL of today and for space science, but who, in the eyes of many, helped save a nation's self esteem.

Most of the surviving members of the team responsible for Explorer 1, developed quickly in response to the Soviet Union's 1957 launches of its Sputnik satellites, gathered at JPL in late January to celebrate 50 years since Explorer's launch.

Memories came back quickly.

When Fred Riddle came to JPL, he noted, he was charged with developing a transistor-based telemetering system "so the JPL folks could find out how their Corporal missiles were failing." He said vacuum tube–based telemetry failed due to destruction of the tubes by the intense vibration caused by the rocket motor.

As Explorer approached, Riddle said, "I was collared one day by Dr. Pickering, the JPL director, who asked me to redesign my circuits into a starvation mode, to stretch battery life, and to accompany him to the State University of Iowa to work out details of connecting the system to Dr. Van Allen's radiation detection instruments.

"It was a nail-biter, but I had no doubt we could get it done. Within less than 80 working days, telemetry packages were delivered. They were subsequently installed and launched, and operated successfully for a number of weeks until the batteries were discharged."

Henry Richter, a lead engineer for Explorer, noted that, in fact, there was a lot more work behind the team than just 80 days.

Indeed, he told an audience at a lecture at the JPL Library, Explorer "had two years of work behind it. The 80 days were to do the final assembly and put the science into it."

"We had a lot of confidence," Richter said, because of JPL's collaboration with an Army unit in Alabama that later became the Marshall Space Flight Center. The Alabama group had developed Jupiter C rockets that Richter described as "very much a known quantity."

President Dwight Eisenhower "thought Sputnik 1 was a stunt," Richter said. But there was no doubt that the situation got much more serious when on Nov. 3 the Soviets launched Sputnik 2, carrying a 1,200-pound payload, including a dog.

"The Sputniks cut through the core of the entire nation," noted Richard Davies, who worked on spacecraft dynamics and post-launch data analysis. "The Soviets were not supposed to be ahead of us."

After the Navy's Vanguard rocket—launched in response to the successful Sputniks—failed on the launch pad in December 1957, JPL and the Army quickly got the go-ahead to develop Explorer. "There was excitement. We were chafing at the bit," Davies added. "We had been working on solid rocket stages for many years."

Leonard Piasecki, who supplied Explorer's igniter system and the propulsion for the rocket's upper stages, described his role as "providing the muscle" for the launch, as the "last man off the gantry." He said the mission's unsung heroes were those who went to work at overseas tracking stations.

But it was Richter who built an amateur satellite tracking station in the basement of the Temple City Sheriff's station, the first one to receive Explorer 1's signal during Pick-

Continued on page 4

Budget proposal includes outer-planets mission

NASA on Feb. 4 unveiled a budget request for fiscal year 2009 that Laboratory leadership viewed as very positive for JPL—including funding for the new start of a flagship robotic mission to the outer planets.

The outer-planets mission, currently in the study phase, is expected to be led by JPL with possible participation by Europe and Japan. It is expected to have an overall U.S. budget of about $2.1 billion.

In other areas, the budget request includes funding to start development of the Soil Moisture Active Passive mission, an Earth sciences project that was ranked a high priority by the National Academy of Sciences' decadal survey. In addition, funding is provided to start planning of a medium-class mission to detect exoplanets—planets around other stars—that would launch in the middle of the next decade.

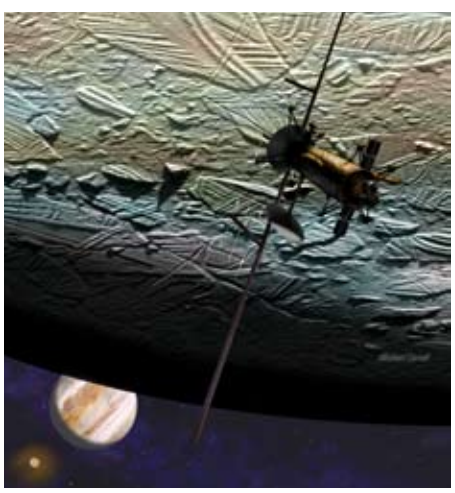
The budget also funds Cassini's extended mission through 2011. It provides for the Mars program beyond the Mars Science Laboratory launching in 2009, focusing on a sample return by late in the next decade. Other JPL missions currently under development are to receive full funding, including Juno, Kepler, Grail and NuStar.

"We're delighted with the overall NASA budget request for FY 2009," said JPL Director Dr. Charles Elachi. "In a year when we are celebrating the 50th anniversary of the launch of the first U.S. satellite, Explorer 1, this budget confirms JPL's role as a lead research and development center for the robotic exploration of space for NASA."

In submitting the budget request, NASA noted that all operational missions managed by JPL are fully meeting or exceeding their requirements—17 spacecraft, two rovers and seven science instruments. In addition, NASA's Science Mission Directorate reiterated its commitment to maintain JPL's workforce at 5,000.

The budget request presented by the White House now goes to Congress for consideration over coming months. Fiscal year 2009 begins next October.

For the outer-planets mission, JPL is currently involved with partners in studies of three concepts.



Artist's concept of the proposed Europa Explorer.

One would target Jupiter's moon Europa, another would send a spacecraft to the Jupiter system and its moon Ganymede, and the third would visit Saturn's moon Titan while also observing the ringed planet and its other moons.

The Jupiter System Observer would study Jupiter and three of its moons before arriving in orbit at Ganymede.

Those studies grew out of a first phase of studies that began about a year ago in response to recommendations by the NASA Advisory Council's Planetary Science Subcommittee and the agency's Outer Planets Assessment Group. At that time, NASA commissioned studies of four concepts to send a major flagship mission to Europa, Ganymede, Titan or Enceladus. JPL led the Europa and Ganymede teams, while the Titan study was led by Johns Hopkins University's Applied Physics Laboratory, and the Enceladus study was led by NASA's Goddard Space Flight Center.

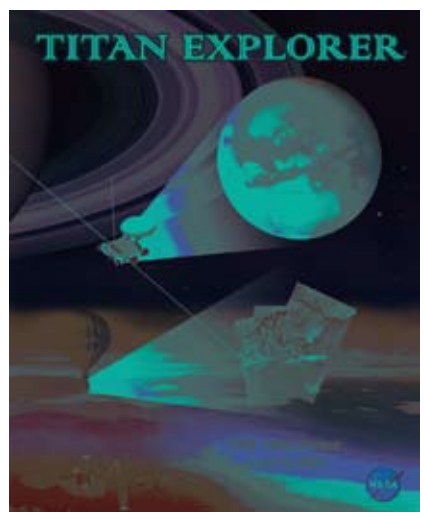
In December, NASA approved three of the concepts to proceed to a second phase of study—the Europa, Ganymede and Titan missions.

The Europa Explorer is designed to study that moon's intriguing subsurface ocean, its ice shell, chemistry and geology to understand if it could host life. After various approaches such as flyby missions, subsatellites and landers were considered, the concept going forward calls for a single, highly instrumented orbiter. After six years in transit from Earth to Jupiter (with Venus and Earth flybys), the spacecraft would tour Jupiter for about two years before settling into orbit at Europa for detailed investigations of that object. Led by JPL, the Europa study team in 2007 was headed by Karla Clark with Ronald Greeley of Arizona State University and Bob Pappalardo of JPL serving as co-chairs of the science definition team. Other partners in the study included UCLA, the University of Texas, the Applied Physics Laboratory, Goddard and the Woods Hole Oceanographic Institution. Clark will lead the second-phase study beginning this month.

The second concept going forward, the Jupiter System Observer, is a mission to investigate Jupiter and its major moons Io, Europa and Callisto before arriving in orbit at the moon Ganymede. Scientists are interested in Ganymede because of its diverse geology and possible liquid ocean, and because it is one of only three terrestrial bodies in the solar system known to have a magnetic field. Ganymede's radiation environment is also about 30 times less harsh than Europa's, enabling a mission lifetime of more than five years in the Jovian system. After considering a broad array of architectural combinations, the team narrowed its scope to a single orbiter with highly capable remote sensing and fields and particles instruments. The study in 2007 was led by JPL's Johnny Kwok with Louise Prockter of the Applied Physics Laboratory and Dave Senske of JPL serving as co-chairs of the science definition team. Other partners in this study were the University of Arizona, Goddard, Arizona State, UCLA and Wheaton College. The second-phase study will be led by the European Space Agency.

The third concept approved to proceed, Titan Explorer, was led by an Applied Physics Laboratory study team, with significant involvement by a JPL team led by Kim Reh. Saturn's moon Titan was revealed by Cassini and the Huygens probe to be an exotic world with vast expanses of sand dunes at the equator and seas of liquid methane and ethane near the poles. The concept studied in 2007 called for an orbiter, lander and balloon to explore the haze-shrouded world; the approach going forward consists of an orbiter with the capability to accommodate an in situ vehicle. The four-year orbital mission would return orders of magnitude more data about Titan than Cassini. In addition to the Applied Physics Laboratory, other partners in the study included the Southwest Research Institute, University of Arizona, Ames Research Center, Langley Research Center, Goddard, the SETI Institute, UCLA and the University of Iowa. Reh will lead the second-phase study.

JPL's work on the outer-planets concept is under the leadership of Dr. Jim Cutts, chief technologist for JPL's Solar System Exploration Directorate and manager of strategic studies and advanced concepts.



The Titan Explorer orbiter would return much more data about the Saturn moon than Cassini.

The mysteries of exoplanets

By Mark Whalen

Carol Lachata / JPL Photolab

Wes Traub manages JPL's Center for Exoplanet Science, which comprises diverse research areas of interest to many scientists at the Laboratory and in the astronomical community at large. The center will host an Exoplanet Science and Technology Fair on Feb. 22 to showcase exoplanet work at JPL and in Pasadena, which Traub discusses here with Universe.

HOW DO YOU DEFINE AN EXOPLANET? ARE MANY PEOPLE INTERESTED IN OR AWARE OF THEM?

An exoplanet is a small object, up to the size of Jupiter, that's orbiting a star. Similar objects might be drifting in space, having been kicked out of orbit early in a star's life, but these are not counted as exoplanets. There are 270 exoplanets known today.

It's our obligation to follow through the whole grand scheme of astrophysics—we talk about the Big Bang, how stars and galaxies formed and how discs form around stars, because that's what we can measure. Far-off planets haven't been talked about that much because we couldn't measure them. But now we can, so this is where we should be going. Once you find a planet it is very natural to ask if the planet can support life—that's a perfectly reasonable question.

In the old days, before exoplanets were found, talking about life in the same breath as astrophysics was heretical; Carl Sagan was criticized for searching for life in the universe and popularizing this search, but he was only criticized in the astronomical community.

IN WHICH AREAS OF STUDY DO EXOPLANETS BELONG?

The interest in exoplanets comes from all directions: astrophysicists, Earth scientists, planetary scientists and astrobiologists, as well as people working on star formation and disks around stars. There are several hundred people at JPL working in those areas. There's a strong relationship among what we know about Earth, how we do remote sensing, how we can tell if there's life on a planet and what its properties are, even if there is no life.

There are many connections between these fields, so there should be a lot of interest from people at JPL, whether or not they're working directly on exoplanets.

IS IT JPL'S GOAL TO ACQUIRE AN EXPOLANET MISSION? ARE WE ON THE RIGHT PATH?

Yes. JPL is the leader in developing space technology to find and characterize exoplanets. Today we have Spitzer observing infrared spectra of exoplanets as they cross in front of and behind their parent stars. Next, the Kepler mission, which is also managed by JPL, launches in February 2009. That's going to be a wonderful mission because it will look at a whole group of stars. Kepler will observe these stars so intently and for so long, looking for the brief darkening that happens when a planet crosses in front of the star, that we will be able to tell how many Earth-size planets are out there, in addition to the much larger ones that we also expect.

And after that there are future missions that could detect and characterize exoplanets around stars in the solar neighborhood. To detect them, probably the very best bet is the Space Interferometry Mission, which recently was recommended by an exoplanet task force to be the first mission that NASA should consider sending up for exoplanet study. SIM is a JPL project that would find nearby, Earth-mass planets and a whole lot of larger ones, around at least 65 nearby stars.

We also have follow-up missions that could characterize these planets and search for signs of life on them. By this I mean that once we know where to point the telescope, then we can go in and obtain the colors of these planets so we know what they look like—are they blue like the Earth; green like the outer planets; or brown like the moon and Mars? We follow up with spectra, to look for water, oxygen, carbon dioxide and ozone in the atmosphere, and the reflection of plants on the ground. The missions I came here to work on a couple of years ago—Terrestrial Planet Finder Coronagraph and the related mission, Terrestrial Planet Finder Interferometer—are designed to do this characterization. Much of this work is centered at JPL.

ARE YOU ALSO THINKING ABOUT MISSIONS BEYOND KEPLER, SIM AND TPF?

A project called Life Finder would be a very large version of the Terrestrial Planet Finder Coronagraph. It would nail down whether or not there is life on a planet by looking for spectral lines that are too weak for even Terrestrial Planet Finder. But since about a year ago NASA has asked people to scale back their large dreams to more practical, affordable things.

So we at JPL, and other scientists, have proposed about a dozen different concepts for medium-scale missions, about $700 million, or somewhat larger, at $1 billion to $2 billion. The medium-scale missions come in several different types. Some are coronagraphs, like a small version of TPF-C; some are interferometers; some are all-sky survey instruments, looking at many thousands of stars, hoping to see a transit (planet moving in front of it) of one of these stars, very much like Kepler will be doing with its small patch of the sky.

The exoplanet communities in the United States and in Europe, with whom we have close scientific and technical collaboration, recognize JPL as the lead center, especially since NASA has said the first exoplanet mission will be JPL-managed. We're very happy about that. We also get inquiries from many good people who want to come and work here. Unfortunately, we just can't afford to hire more people right now.

THE CENTER FOR EXOPLANET SCIENCE HAS BEEN IN PLACE FOR ABOUT A YEAR NOW. WHAT HAVE BEEN YOUR SUCCESSES THUS FAR?

Last year the center sponsored a community-wide Navigator Forum at Ames Research Center, focusing on the step from very large to smaller, more affordable missions. That was a precursor to a call for proposals that came out this past fall on astrophysics missions concepts. About 42 proposals were submitted, a dozen of which were exoplanet related.

We also sponsored about a half-dozen small internal research projects such as lab, observing and theoretical work.

And there is our exoplanet seminar series, which last year was alternated between JPL and Caltech, but this year all events will be at JPL. So far we have invited more than 30 speakers, whom we will schedule among two existing series—the astrophysics luncheon seminars on Mondays at noon, and the Thursday afternoon astrophysics colloquia at 4 p.m., both in 169-336.

WHAT IS THE EXOPLANET SCIENCE AND TECHNOLOGY FAIR ALL ABOUT?

This will be an opportunity for everyone at JPL who is working on exoplanets to showcase their results to their colleagues. It will be open to people outside JPL, for example, the Carnegie Observatories in Pasadena as well as Caltech.

The fair will include speakers and a poster session. Each researcher will give a short talk to explain their work. One of our speakers will be Greg Laughlin of the Lick Observatory, a well-known exoplanet theorist and experimentalist. JPL's chief scientist, Dan McCleese, will give an opening welcome and JPL's director, Charles Elachi, will give a lunchtime talk.

Talks and posters at the fair will go on all day. Lunch and refreshments will be available. Visitors can walk around, look at the posters, talk to the researchers and listen to the talks. I want to convey the idea of not just sitting in a chair and listening, like a formal lecture.

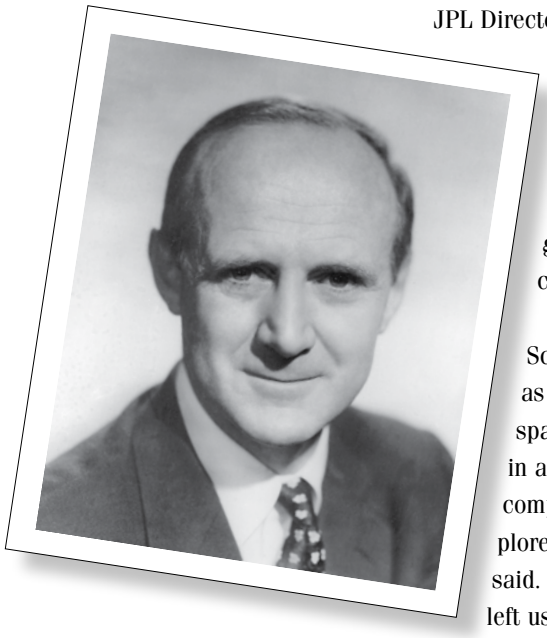
WHERE CAN ONE GO FOR MORE INFORMATION ON THE FAIR AND THE CENTER FOR EXOPLANET SCIENCE?

Visit our website, *http://exoplanets.jpl.nasa.gov.*

Explorer 1 *Continued from page 1*

ering's famed "eight minutes of agony." Richter said the experience served him well, as he later worked as a communications engineer for the Los Angeles County Sheriff's Office.

What differences does he see between today's JPL and the Lab of 50 years ago? "About 30 of us were working on Explorer back then," Richter mused. "Now, it takes an army to do the same thing," he added with a smile.



JPL Director Charles Elachi, in describing the present-day JPL to a luncheon gathering in von Kármán Auditorium, said in gratitude, "We owe you a lot, we stand on your shoulders."

Indeed, the Explorer veterans and their guests got a feel for how things have changed.

Richard Cook, manager of the 2009 Mars Science Laboratory, described the mission as "in many ways the most sophisticated spacecraft NASA has ever flown," weighing in at more than 4,000 kilograms, a monster compared to the paltry 14 kilograms of Explorer. "But it all started with Explorer," he said. "We are honored by what your legacy has left us."

A new biography on former JPL Director William Pickering has been released by the NASA History Office. "William H. Pickering: America's Deep Space Pioneer," authored by Douglas Mudgway, is available through the NASA Scientific and Technical Information Office in Washington, DC. For more information, visit http://www.sti.nasa.gov or call 301-621-0390. The book is also available for loan from the JPL Library. Below, Mudgway joins Pickering's widow, Inez, at a recent celebration of the book's publication.

Tom Wynne / JPL Photolab

Project Design Center opens following upgrades

Ceremonies for the newly renovated Project Design Center were held Dec. 19.

The Project Design Center was remodeled to make more efficient use of the existing space and can now accommodate two full Team X design teams, said Kelley Case, supervisor of the Advanced Design Engineering Group.

Richard Hasegawa / JPL Photolab

JPL Director Charles Elachi, left, joins Firouz Naderi, associate director, project formulation and strategy, in dedicating the new Project Design Center. At center is Susan Jones of the Advanced Design Engineering Group.

Team X is a cross-functional multidisciplinary team of experienced flight-project engineers that utilizes concurrent engineering methodologies to complete rapid design, analysis and evaluation of mission concept designs. The team is co-located in the Project Design Center to complete architecture, mission and instrument design studies in real time. The center, located on the first floor of Building 301, is a state-of-the-art facility consisting of networked workstations, a supporting data management infrastructure, large interactive graphic displays, computer modeling and simulation tools, historical data repositories and a shared project model that the design team updates.

Case said the renovation will enhance JPL's advanced design-methods capabilities and improve the Team X infrastructure, including evolving and enhancing existing pre-phase A/phase A design team capabilities; providing a single JPL focal point for development of a distributed collaborative engineering process with external partners; maintaining concurrent engineering as one of JPL's most vital, strategic capabilities and as a key element of JPL's increased attention to formulation; and improving the usability of the Team X facility.

The improvements included upgraded computer workstations, monitors, projectors and video equipment; restoration of the high-definition rear projection screen; and "smart boards" in each room. Workstation tables were replaced to provide easy team reconfiguration that is customized to the design study.

Physical room improvements also included noise-mitigation upgrades, improved lighting and a new heating, ventilation and air conditioning system. The smaller room, used for vision teams to develop pre–Team X mission concepts, has additional whiteboards, books on innovation, Legos, K'Nex and other "building toys" to facilitate creativity and brainstorming, Case said.

SENIOR RESEARCH SCIENTISTS APPOINTED

The Office of the Chief Scientist has announced the promotion of 10 JPL employees to the senior research scientist grade.

The newly named senior research scientists are:

Robert Carlson (Section 3227), a leading planetary scientist with diverse research interests, ranging from Venus to the outer solar system and planetary spectroscopy to remote sensing.

Steve Chien (Section 3170), a leader in the area of autonomous space systems.

David Diner (Section 3280), a leader in the area of Earth remote sensing with multi-angle imaging spectroradiometry, atmospheric aerosol properties and cloud structure.

Mark Milman (Section 3430), whose research is multidisciplinary with primary emphasis on modeling, analysis and control of complex opto-mechanical systems.

Robert Pappalardo (Section 3220), whose research focuses on processes that have shaped the satellites of the outer solar system, notably Europa and the icy Galilean satellites.

Christophe Sotin (Section 3220), one of the world's leading planetary geophysicists. His research focuses on the internal processes of outer planet satellites.

Adrian Stoica (Section 3450), a leader in the field of adaptive and evolvable hardware. His pioneering research is particularly relevant to applications in electronic systems with survivability in extreme environments.

Wesley Traub (Division 324), who has broad scientific interests and has made discoveries in planetary atmospheres, the composition of the Earth's stratosphere, astrophysics and exoplanets.

Marco Velli (Section 3260), whose specialties are in theoretical and numerical simulation in space plasma physics and solar magnetic activity.

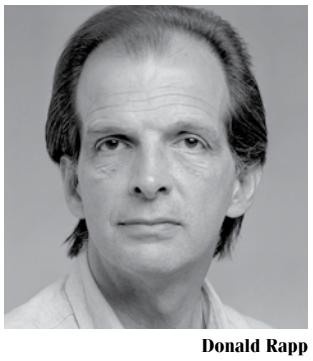
Duane Waliser (Division 3240), whose research has focused on studies of ocean–atmosphere processes and interactions, which drive the short-term variation in tropical climate.

The senior research scientist grade—along with that of senior research engineer—was established to give special recognition and promotion to outstanding individual researchers. Eligibility for the grade is established by the demonstrated ability to meet the research requirements typical for appointment to the position of full professor at a leading university, as evidenced by outside peer review. In addition to demonstrated research leadership, appointment also depends on the individual's active participation in programs related to JPL's institutional goals.

Dutch Slager / JPL Photolab

JPL Director Charles Elachi, standing at left, and Chief Scientist Daniel McCleese, standing at right, join some of the newly appointed senior research scientists. Standing from left: Mark Milman, Wesley Traub and Adrian Stoica. Seated, from left: David Diner, Robert Pappalardo, Steve Chien, Christophe Sotin.

News Briefs



JPL photo

Donald Rapp

Book discusses humans to Mars

Donald Rapp, a retired JPL senior research scientist, has authored a new book about sending astronauts to Mars.

"Human Missions to Mars: Enabling Technologies for Exploring the Red Planet" explores such technical issues as the trip to Mars and back, mission analysis, critical mission elements and in-situ utilization of indigenous resources. Rapp also discusses the reasons for exploring Mars as well as space-mission planning.

The book is available at the JPL Library.

Rapp, who worked at the Laboratory for more than 20 years before his 2002 retirement, served as technologist for the Mechanical and Chemical Systems Division. He said another book he has written on global climate change would be available in mid to late February.

Racquetball, anyone?

JPLers interested in fitness and a healthy lifestyle may consider joining the Caltech/JPL Racquetball Club.

The club utilizes four courts at Caltech's Braun Athletic Center. Club membership is free and is open to all JPL employees as well as Caltech students, staff, associates and alumni.

For more information, call club president Carlos Zeron after 4 p.m. at ext. 4-3530. To register, visit *http://racquetball.caltech.edu.*

$24 million Caltech grant to support new institute

Caltech has received an eight-year, $24 million grant from the W.M. Keck Foundation to establish the W.M. Keck Institute for Space Studies, which will bring together scientists and engineers to develop new space-mission concepts and technology.

Caltech and JPL researchers as well as visitors, students and postdoctoral researchers from many institutions will address enduring questions that have fascinated humanity for centuries, such as: How did the universe begin? What is it made of? What is its ultimate fate? And has life evolved elsewhere? Each year, the institute will adopt one or more new themes and explore those topics through symposia, in-depth studies and development of emerging-technology prototypes for future space missions.

Currently such brainstorming efforts occur in this field, but they are temporary and sporadic. The Keck Institute will provide an ongoing framework for this kind of dialogue as a sort of think tank, with design and prototype development as part of its mission.

"Over the last 50 years, the Caltech campus and JPL have been working together in ways that have helped shape the course of space exploration," said Tom Prince, who will serve as the director of the new institute. "This groundbreaking new grant from the Keck Foundation will help open a new chapter in this relationship by establishing an institute devoted to revolutionary advances in space science and engineering. The institute will bring together the best talent from JPL, the campus and the wider community to create the innovative new approaches and techniques that will influence the course of space exploration for decades to come."

"It is so heartening to see a forward-looking and leading private foundation invest in keeping our country at the forefront of exploration and discovery through the support of space, science and engineering research," said JPL Director Charles Elachi. "I applaud the Keck Foundation for this visionary action."

"We expect the Keck Institute for Space Studies to be at the center of the country's space-science and engineering efforts for generations to come," said Caltech President Jean-Lou Chameau. "My colleagues at both campuses, JPL and Caltech, are deeply grateful to Robert Day and the Keck Foundation for this bold and generous gift."

Logistically, the program will consist of two major phases—a one-year study phase and a one- to two-year technical follow-up phase. The study phase will include an initiation workshop, a few-day course, a few-week to several-month working period of informal daily discussion sessions and seminars and a closing workshop to present results and offer recommendations on next steps.

During the technical follow-up phase the Keck Institute will fund laboratory investigations and technology developments that were identified as high priorities during the earlier study phase.

Because of Caltech's proximity to JPL, participants can draw on the relevant expertise there to evaluate and validate new concepts, including development of feasibility studies of new mission and instrument concepts.

The selection of topics for study will be an annual process. The institute's administration will solicit ideas from Caltech and JPL scientists and engineers who will consult with external colleagues. Proposals for specific study programs will be submitted, and the institute's steering committee will make the final selection of programs in consultation with an external advisory committee.

The first year of Keck Institute activities includes plans for three study programs: New Directions in Robotic Exploration of Mars, Large Space Apertures and Instrumentation for Cosmic Microwave Background Observations.

Possible future topics include the search for extrasolar planets, new approaches to probing dark energy and next-generation launch and propulsion systems.

Passings

Robert Van Buren

Robert Van Buren, 83, a retired manager in the Technical Information Section (274), died Nov. 21.

Van Buren worked at JPL from 1964 to 1992. As a JPL senior technical editor, he co-wrote the booklet "Levels of Edit," for which he received the Society for Technical Communication's Award of Excellence in 1976–77.

He is survived by his wife, Cindy, and sons Alex and Chris. Services were held Nov. 30 at Santa Rosa Cemetery in Santa Rosa, Calif.

John Flynn, 83, retired supervisor of JPL's Orbit Determination Group, died Nov. 25.

Flynn joined JPL in 1964 and retired in 1979. He worked on Pioneer 10 and 11, missions that in the early 1970s sent the first spacecraft to visit Jupiter.

Flynn joined JPL again in 1983 and completed his employment in 1989. He was credited with authoring a NASA Tech Brief on a structured Fortran preprocessor in 1984.

He is survived by his wife, Dorothy; sons Mark, Ross and John; daughters Joy and Catherine; 14 grandchildren and three great grandchildren. Services were held in Cheyenne, Wyo.

Retiree **Jeannyne Gunckel,** 78, died Nov. 28. She worked at the Lab from 1954 to 1989.

Albert Wagner, 87, a retired member of the technical staff in Section 342, died Nov. 30.

Wagner worked at the Lab from 1969 to 1988. He is survived by nieces Gretchen Turner and Martha Schuman.

His family requests that donations in his name be made to the Red Cross or any local music organization.

Lynn Auld, 80, a retired administrative secretary and computer software librarian, died Dec. 9.

Auld joined JPL in 1962 and retired in 1993. Among the projects she worked on are Ranger, Mariner and Voyager.

She is survived by daughter Leslie Rothrock and her husband John; son Edwin; three grandchildren and a great grandson. Her funeral with military honors was held Dec. 12 at Forest Lawn, Hollywood Hills.

R. William Gulizia, 82, a retired project manager, died Dec. 9.

Gulizia worked at the Lab from 1967 to 1997. Projects he contributed to include the Spartan inflatable antenna experiment, Upper Atmosphere Research Satellite and Advanced Ocean Technology Development Platform.

He is survived by his wife, Janet, and daughters Lynne and Nancy. Services were held Dec. 13 in San Diego.

Retiree **Joseph Klimberg,** 86, died Dec. 17.

Klimberg worked at the Lab from 1966 to 1989. He is survived by his wife, Ruthann, and children Toni, Kathi, David and Lori.

Lawrence Rauch, 88, a retired senior research engineer, died Dec. 18.

Rauch joined JPL in 1978 and retired in 1985. During his tenure he served as the Lab's chief technologist.

He is survived by his wife, Norma, sons Lauren and Maury, and four grandchildren.

Dan Schneiderman, 85, retired project manager for the Mariner missions to Mars and Venus, died Dec. 22.

Schneiderman joined the Lab in 1955 and three years later led the Payload Group. In 1962 he was named spacecraft systems manager; two years later he was promoted to Mariner 3 project manager and continued to manage the Mariners through Mariner Mars 71 (Mariner 9).

For his work on Mariner, Schneiderman earned NASA's Exceptional Scientific Achievement Award in 1965 and the Distinguished Service Medal in 1972. He later managed JPL's Commercial Space Applications Office and retired in 1987.

Schneiderman is survived by his wife, Estelle.

Dan Schneiderman

Retirees

The following JPL employees retired in February:

Richard Emerson, 46 years, Section 333F; **Georgene Peralta**, 33 years, Section 252H; **Julius Law**, 30 years, Section 337C; **Thomas Yunck**, 30 years, Section 3880; **Anita Lacroix**, 28 years, Section 3214; **Cheng-hsien Hsieh**, 26 years, Section 3537; **David Hills**, 23 years, Section 332F; **Kent Fry**, 20 years, Section 388K; **David Spencer**, 20 years, Section 4020; **Charlotte Breese**, 19 years, Section 2631; **Loren Lemmerman**, 17 years, Section 1300; **James Jaeger**, 11 years, Section 3454.

Christopher Valencia, 86, a retired member of the technical staff, died Dec. 24.

Valencia joined the Lab in 1947 and retired in 1988. He is survived by his wife, Carolyn, sisters Ernestine and Isabel, daughter-in-law Heather, stepsons Geoff and Philip, and grandchildren Johnny, Bo, Westin, Sophia, Emily, Ethan and Griffin.

Jeanne Beveridge, 73, a retired administrative services employee, died Dec. 31.

She is survived by sons John and Geoff, daughter Mary, and grandchildren Brandon, Sean, Misty, Nikki, Matthew, Dylan, Kaitlyn and Grace.

Memorial services were held Jan. 12 at Assumption of the Blessed Virgin Mary Catholic Church in Pasadena.

Frank Kollar, 72, a retired member of the technical staff in Section 336, died Jan. 9.

Kollar worked at JPL from 1959 to 1997. He is survived by daughter Kimberly, her husband Steve, and grandchildren Danielle, Valerie and Adam.

William Dias, 57, former surface mission operations planner for the Mars Exploration Rovers and Mars Pathfinder, died Jan. 11.

Dias worked at JPL from 1986 to 2004. Among his awards was the NASA Exceptional Achievement Medal for his work on Pathfinder.

He is survived by brother Jeff and his wife Robin, brother Ralph, nieces Chelsea, Elizabeth and Rebecca, and nephew Alex.

Services were held Jan. 26 at La Purisima Mission in Lompoc.

Albert Bauman, 86, a retired biochemist, died Jan 12.

Bauman joined JPL in 1962 and retired in 1979. He is survived by his daughter Christina. Memorial services were held Jan. 29 at Neighborhood Unitarian Church in Pasadena.

Retiree **Floyd Anderson,** 87, died Jan. 17.

He is survived by sons Christopher (and wife Paula) and Gregory (and wife Ellen); brother Loren (and wife Joyce); sisters Pearl and Iona Senske (and her husband David); grandchildren Erin, Jennifer, Kelly, Allison and Matthew; and great-grandchildren John and Dylan.

Services were held Jan. 26 at Mountain View Mortuary in Altadena. In lieu of flowers, donations may be made to Lake Avenue Church Deacons Fund, 393 N. Lake Ave., Pasadena, CA 91001.

Robert Springfield, 48, a mission controller from Section 314, died Jan. 21.

Since he joined JPL in 1986 Springfield controlled interplanetary flight projects including Galileo, Magellan, Voyager, Mars Observer, Deep Space 1 and Cassini.

He is survived by his partner Arthur Escalante, brother Eugene Taylor and family and aunt Annie Maxwell. Services were held Jan. 26 at St. Philip the Apostle Catholic Church in Pasadena.

Letters

My family and I would like to express our deepest appreciation for the kind words, thoughts and prayers received from the JPL community during the recent passing of my father, John Bill Nesmith. We would also like to thank JPL for the beautiful plant and Section 346 for the nice gift basket. Your kindness means a lot to us.

Bill Nesmith and family

My deepest thanks to my JPL colleagues for their expressions of sympathy following the passing of my father. Your words, cards, plants and flowers were much appreciated. Thanks also to JPL for the plant sent to my home. My father was very proud of the fact that I work at JPL and really admired the work we do here.

Rosaly Lopes

Ruth and I would like to express our heartfelt thanks and deep appreciation to our colleagues and friends at JPL for your support, cards, flowers, and expressions of sympathy at the passing of my mother, Marion Edwards, last week. Your kind words gave us strength and peace during this time of loss, for which we are truly grateful. Also, many thanks to JPL for the beautiful plant we received. Sincerely,

Chad Edwards

I'd like to thank my friends in Section 274 and across the Lab for their cards, expressions of sympathy and support upon the passing of my mother, Jeanne Arline Wynne, last month. Thank you.

Tom Wynne

My wife, Joan Horvath, joins me in thanking our many friends and colleagues at JPL who have supported us during the illness and recent passing of Joan's mother, Martha. Thank you for the cards and personal thoughts that you have shared with us. Good friends help us through this sad time in our lives. Thanks also to JPL for the beautiful plant.

Stephen Unwin

My family and I would like to express our sincerest appreciation to everyone in the University Subcontracts Section and Division 26 for their heartfelt condolences and flowers at the sudden death of my stepdaughter LaTanya. JPL, we also would like to thank you for the beautiful condolence plant.

Laura White, Section 2690

Many thanks to everyone in Division 27 for the heartfelt thoughts they shared with me and my family after the passing of my grandmother, Maria Schwarz. Also thank you to JPL for the memorial plant; it will have a special place in our garden at home.

Werner Schwarz

READ AND SUBMIT CLASSIFIED ADS AT JPL'S ONLINE NEWS SOURCE

http://dailyplanet

E-MAIL US AT

universe@jpl.nasa.gov

Universe

Editor
Mark Whalen

Design
Audrey Steffan

Production
David Hinkle

Photography
JPL Photo Lab

Universe is published by the Office of Communications and Education of the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.