Next Mars orbiter arrives at Cape

By Guy Webster

A large spacecraft destined to be Earth’s next robotic emissary to Mars has completed the first leg of its journey, a cargo-plane ride from Colorado to Florida in preparation for an August launch. NASA’s Mars Reconnaissance Orbiter is an important next step in fulfilling NASA’s vision of space exploration and ultimately sending human explorers to Mars and beyond.

The spacecraft’s prime mission will run through 2010. During this period, the project will study Mars’ composition and structure, from atmosphere to underground, in much greater detail than any previous orbiter. It will also evaluate possible sites for future martian landings and will serve as a high-data-rate communications relay for surface missions.

“Great work by a talented team has brought Mars Reconnaissance Orbiter to this milestone in our progress toward a successful mission,” said Project Manager Jim Graf.

The spacecraft arrived at Kennedy Space Center’s Shuttle Landing Facility on April 30 aboard a C-17 cargo plane and was taken to the Payload Hazardous Servicing Facility to begin processing. It was built near Denver by Lockheed Martin Space Systems. Launch is scheduled for Aug. 10 at 4:53:58 a.m. PDT, at the opening of a two-hour launch window.

The spacecraft’s high-gain communications antenna. Another major deployment test will check out the spacecraft’s large solar arrays.

In July, the spacecraft will be filled with hydrazine fuel for the "Mars orbit insertion" engine burn, which will be used to reduce the velocity of the spacecraft and place it in orbit around Mars. The fuel also will be used for attitude-control propellant. On July 26 the Mars Reconnaissance Orbiter will be encapsulated in the Atlas V during prior to being moved to its launch site on Cape Canaveral Air Force Station.

The Lockheed Martin Atlas V arrived at Cape Canaveral Air Force Station aboard an Antonov cargo plane on March 31 and was taken to the high bay at the Atlas Spaceflight Operations Center. The Atlas booster will be transported in May to the Vertical Integration Facility at Space Launch Complex 41 to be erected. The Crawler upper stage will be transported to that facility for hoisting atop the booster in June.

Pre-launch preparations will include a "wet dress rehearsal" in July, during which the Atlas V will be rolled from the Vertical Integration Facility to the launch pad on its mobile launch platform. The vehicle will be fully fueled with RP-1, liquid hydrogen and liquid oxygen, and the tank will perform a simulated countdown. The Atlas V then will be rolled back into the Vertical Integration Facility for final launch preparations.

The spacecraft is scheduled to undergo a functional test on August 1, followed by a final week of launch vehicle and spacecraft closings.

Information about Mars Reconnaissance Orbiter is available online at http://marsprogram.jpl.nasa.gov.

Kids have their day

About 600 attend Take Our Children to Work Day April 28

Youngsters participate in a stardust activity that will allow them to find constellations in North America. Greg Neil’s daughters Rita (left) and Abby are joined by Rachael Wolf and her dad Aron.

Mars Reconnaissance Orbiter will be the first of its kind to orbit Mars and will perform two high-risk operations: the high-gain communications antenna. Another major deployment test will check out the spacecraft’s large solar arrays.

The spacecraft will undergo multiple mechanical assembly operations and electrical tests to verify its readiness for launch. A test this month will verify the spacecraft’s ability to communicate through Deep Space Network tracking stations. A June test will check the deployment of the spacecraft’s high-gain communications antenna. Another major deployment test will check out the spacecraft’s large solar arrays.

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Mars Express Instrument ready to go

Radar will search for underground water

The European Space Agency’s Mars Express orbiter will this month deploy its radar instrument for the first time. The instrument is designed to look below the surface of Mars for different layers of material, most notably water.

Once the deployment is successful, the Mars Advanced Radar for Sub-surface and Ionosphere Sounding (Marsis) instrument will complement the orbiter’s study of the planet’s atmosphere and surface. The instrument was funded by NASA and the Italian Space Agency and developed by the University of Rome, Italy, in partnership with JPL.

The instrument’s co-principal investigator, JPL’s Dr. Jeffrey Plaut, said, “We look forward to the start of the Marsis experiment, and to becoming the first to probe the composition of the deep atmosphere, where the planet may have lost its water to space.”

The deployment of the three radar booms will take place in three phases, in a window spanning from May 2 to 12. These operations will be initiated and monitored from the European Space Agency’s European Space Operations Centre in Darmstadt, Germany. Each boom will be deployed separately, with the two 20-meter-long (66-foot-long) 8-hole booms to be unfurled first and the 7-meter (23-foot) monopole boom to follow a few days later.

Before each deployment, the spacecraft will be placed in a “robust” attitude control mode, which will allow it to tumble freely while the boom extends before regaining standard pointing to the Sun and Earth.

The result of each deployment can be assessed only after a series of tests, each taking a few days. After the deployment of the three booms, European Space Agency engineers will start the analysis of the complete behavior of the satellite to be able to confirm the overall success of the operation. The current schedule is subject to change, due to the timing and nature of the complex series of operations.

Once deployment is complete, Marsis will undergo three weeks of commissioning before the start of actual science investigations. This timing coincides with the spacecraft’s orbit reaching a favorable position to examine one of the prime targets for radar observations.

JPL’s Richard Horvitt, project manager for NASA’s roles in Mars Express, said, “The first data from the radar next month will signal the success of an innovative international partnership.” Italy provided the instrument’s digital processing system and integrated the parts. The University of Iowa built the transmitter for the instrument. JPL built the receiver and Astrogen Spacecraft, Carpenteria, Calif., built the antenna.

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Deep Impact has eye on comet

By DC Agle

Sixty-nine days before it gets up-close and personal with a comet, NASA’s Deep Impact impactor spacecraft successfully photographed its quarry comet Tempel 1 from a distance of 64,000 kilometers (39,700 miles). 

The image, the first of many comet portraits it will take over the next 10 weeks, will aid Deep Impact’s navigators, engineers and scientists as they chart its final trajectory toward an independence day encounter: “It’s great to get a first glimpse at the comet from our spacecraft,” said Deep Impact Principal Investigator for the Michael Allison of the University of Maryland. 

With daily observations beginning in May, Tempel 1 will become astronomically more impressive as we continue to close the gap between spacecraft and comet. And no more than a few miles across will evolve by July 4 into the best, most detailed images of a comet ever taken.”

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Van Zyl named to head directorate

Dr. DAVID VAN ZYL has been appointed director of the Astronomy and Physics Directorate, effective June 1. He will replace retiring NASA D总会

Most recently the deputy director for Astronomy and Physics, van Zyl joined JPL in 1998 and held positions of increasing responsibility in the Synthetic Aperture Radar (SAR) field. Van Zyl also managed the Radar Science and Engineering Section, the Earth Science Flight Missions and Experiments Office, the Focused Physical Oceanography and the Small Earth Science Programs Office. Van Zyl received a B.A. in engineering physics and a Ph.D in electrical engineering from Caltech.

Reorganization for Office 107

JPL Deputy Director EUGENE Tatti

has announced a reorganization of the Office of Legislative and International Affairs (Office 107). Previously, the office, managed by DR. RICHARD O’TOOLE, was responsible for Legislative Affairs, including congressional outreach, research and tracking of legislation and budgets, legislative and international relations, and foreign travel processing.

Support Export Compliance, including export licensing of technology and technical assistance, release of controlled technical data and information and the diligence auditing, and immigration (foreign nationals, visas, etc.).

Beginning April 25, the Export Compliance function was reorganized to the Office of the Management System (Organizational 10). OLCG/KC will continue the Export Compliance program manager and improvised official and will report to DR. JERRY MEINDL, manager of Office 108. This reorganization strengthens the role of export compliance at the Laboratory, Tanita said.

Van Zyl to retire

Deep Impact mission manager Dr. C. Tony Van Zyl has been appointed director of the Astronomy and Physics Directorate, effective June 1. He will replace retiring NASA Director of Legislative and International Affairs (Office 107). Previously, the office, managed by Dr. Richard O’Toole, was responsible for legislative affairs, including congressional outreach, research and tracking of legislation and budgets, international and international relations, and foreign travel processing.

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Explore. Discover. Understand May 14–15
JPL Open House

Share JPL’s “Spirit of Exploration” at the annual Open House, scheduled for Saturday and Sunday, May 14 and 15, from 9 a.m. to 5 p.m.

Guests will be able to talk with scientists and engineers working on JPL missions, and find out how spacecraft are sent to other planets. Visitors will see exhibits, displays and presentations about new technologies, solar system exploration and spacecraft communication. Spacecraft models will be on display and movies will highlight the excitement of the Cassini-Huygens mission to Saturn and the upcoming Deep Impact mission to a comet.

The Open House is a fun and educational event for children too, with planetary puzzles and games, science projects and the chance to get stilled over by a rover. High school students will display robots they built for regional and national competitions.

In addition to the theme descriptions below, visitors may also find activities by location. Areas open to the public will be color-coded in the Open House program to show areas of interest that are close together.

Here’s a sampling of what’s coming up:

**General Information and Security**

Several buildings will be used as display venues. However, individual offices are off limits to visitors and family members. Please do not take visitors or family members into areas that are not specifically designated as “Open House exhibit.” Exhibits venues will be in buildings 167, 168, 169, 170, 179, 180, 186, 230, 249, 303 and 317. Prior to the event please lock office doors and properly secure sensitive items, equipment and material to prevent theft or damage or disclosure. In addition, personnel should challenge anyone without proper identification in closed buildings and report the incident immediately to JPL Security (4-3530).

The requirement for guests to board buses to get to the Main Gate has been eliminated, which will help in reducing traffic delays, reduce congestion at Turner Round Circle and the Main Gate, and eliminate waiting in line for bus service.

Guests will be directed to park in the West, Blue, East and Arroyo lots. The Blue Lot will be re-configured for off-Lab and will be accessed from the West Lot. The Visitor Lot will be reserved for disabled guest parking.

To help visitors get on Lab, there will be three additional pedestrian entry points, for a total of four, with pedestrian pathways to direct the foot traffic. These entry points will be at the Main Gate, east of Building 277 at Mariner & Explorer via the East Gate, west of Building 310 at Mariner via Arroyo Lot, and west of Building 126 at Explorer and Pioneer Road. Each entry point will be staffed by uniformed Security and Public Services greeters.

Personnel with a JPL badge may park on-Lab but must drive through the South Gate. Please park in lots located north of Explorer Road to maximize guest parking. The Main Gate will be restricted to outbound tour buses and emergency vehicles only.

Additional security measures will be in place. Specifically, all vehicles, persons and possessions will be subject to inspection. Prohibited items include backpacks, ice chests, alcohol, controlled substances, weapons, dangerous devices, explosives, skateboards, roller bladers and pets (except guide animals).

In case of an emergency, from an on-Lab phone, dial 911; from cell phones, dial (818) 393-3333. For non-emergency assistance, from an on-Lab phone, dial 4-3530; from cell phones, dial (818) 354-3530.

**Technology**

**FIRST Robotics Demonstration**
High school robotics teams compete with their own robots as part of the For Inspiration and Recognition of Science and Technology program.

**Spiderbot**
Experience the expertise of JPL robotics engineers as they demonstrate Spiderbot, which can walk and climb as a real spider would.

**Multimission Image Processing Laboratory**
View space science data processing, animations and 3-D images.

**Cutting-Edge Technologies, New Methods**
See the latest in lasers, thermal electronics, artificial intelligence systems and robotic technologies.

Learn about mission safety, quality assurance and launch services that pave the way for space exploration. Keeping a sharp technological edge is the key to successful future missions and instruments. Developing unusual advanced technologies is one of the most exciting pursuits at JPL.

**Earth**

**Image Processing**
See 3-D and stereo images and animations from the Multispectral Imager (SpectralRadiometer), a unique nine-camera instrument onboard NASA’s Terra satellite.

**Earth Science**
See your home planet through the eyes of JPL’s armada of satellites and instruments, which continuously study Earth’s land, seas and sky.

**Solar System**

**Night of the Comet** Video
After a half-year, one-way, 268 million-mile voyage, Deep Impact reaches comet Tempel 1 at the speed of 23,000 mph on July 4.

**“Illing World” Show**
A multimedia presentation about the Cassini-Huygens mission to Saturn and Titan.

**Deep Space Operations**
Visit the “hub” of all communications with spacecraft exploring our solar system.

**Solar System Exploration**
Solar system missions to Saturn, comets and beyond; plus revolutionary technology and communications that would enable the future of solar system exploration.

**Mars**

**Mars Reconnaissance Orbiter**
See a half-scale model of the spacecraft, a one-tenth-scale model of the Atlas launch vehicle and full-size models of several science instruments.

**Mars Exploration**
Visit Mars, where friendly martians will roll rovers over small earthlings and teleport the latest images and discoveries from Mars to you.

**Institutional Activities**

**Education Office**
Learn about activities of the JPL Education Office that benefit students, teachers and lifelong learners in the local community.

“Spirit of Exploration” Show
A multimedia presentation celebrating JPL’s most recent accomplishments—from landing on Mars to Cassini’s arrival at Saturn.

**NASA’s Groundwater Cleanup at JPL**
Displays and materials describe NASA’s projects to clean up groundwater beneath JPL and areas to the east of JPL.

**Spacecraft Fabrication Facility**
Learn about spacecraft fabrication and how mechanical, developmental and flight hardware is made for JPL programs and projects.

**Universe**

**Night Sky Network Telescope Station**
Experience the wonders of the universe.

**Universe Plaza**
See how NASA is exploring the universe, from discovering new planets to investigating stars, black holes and distant galaxies.
The Cassini spacecraft has discovered intriguing dust particles around Saturn's moon Enceladus. The particles might indicate the existence of a dust cloud that could have originated from Saturn's six high-altitude plumes, ring the E-ring. "We found the measurements in the plane of the E-ring," said Dr. Thanasis Economou, a senior economist at the University of Chicago's Enrico Fermi Institute. Economou is the lead researcher on the high-altitude plume-part of a large-scale experiment to study Saturn's cosmic dust analyzers. "It will take a few more flybys to distinguish if the dust cloud is originating from the E-ring as opposed to a source of Enceladus."

Economou says that, "full integration between the two moons of Saturn has been heated Enceladus' causing water volcanism. The measurements are extremely important in order to understand the role of Enceladus as the source of the water ice particles in the E-ring," said Dr. Rana Kafayat, principal investigator of the cosmic dust analyzer team.

**Classifieds**

**For Sale**

**House**

- **City Home for Sale**
  - Great neighborhood, walk to school, or public transportation, walkable to everything, $1,000,000. 714/884-9444, jlopez@caltech.edu.

**Car**

- **'01 TOYOTA Corolla CE, manual trans., 4 dr., white, well maintained, silver with dark violet interior, very reliable, $2,500. 626/296-0912.

**Miscellaneous**

- **Lossless/WAV, music player**
  - Apple iPod digital audio, 20 GB, stereo system, front and rear speakers, two amplifier, one subwoofer, $125. 626/372-4239, Peter.

**Furniture**

- **Furniture**
  - 551-9511, Tues.–Saturday, after 2:30 p.m., garage sale. Tables, chairs, refrigerator, couch, monday. 551-9511, Tues.–Saturday, after 2:30 p.m., garage sale. Tables, chairs, refrigerator, couch, monday.
A JPL-MANAGED SPACECRAFT DESIGNED TO REVEAL
the inner secrets of Earth's clouds has arrived at Vandenberg Air Force Base, Calif., to begin final launch preparations.
The CloudSat spacecraft arrived at Vandenberg from Ball Aerospace & Technologies Corp., Boulder, Colo., on May 22 to begin load-to-spacecraft integration, and spacecraft mission operations. The CloudSat spacecraft developed by Alcatel, the imaging infrared radiometer, payed for the mission. Centre National d'Etudes Spatiales is providing a Proteus satellite on-orbit operations control, and the U.S. Department of Energy (scientific contributions). Ball Aerospace & Technologies Corp. designed and built the spacecraft.

Griffin is being developed through collaboration between NASA and French Centre National d'Etudes Spatiales. NASA Langley Research Center, Hampton, Va., is leading the CloudSat mission and is providing overall project management, systems engineering, payload mission operations and validation, and processing and archiving of data. Goddard Space Flight Center, Greenbelt, Md., is providing project management and system engineering support, and overall program management for the mission. Centre National d'Etudes Spatiales is providing a Proteus spacecraft developed by Alcatel, the imaging infrared radiometer, payload-to-spacecraft integration, and spacecraft mission operations. The Institute Pierre Simon Laplace in Paris is providing the imaging infrared radiometer science oversight, data validation and archiving. Hampton University, Hampton, Va., is providing scientific contributions and managing the outreach program. Ball Aerospace & Technologies Corp. developed the lidar and on-board visible camera.

For more information on CloudSat and Calipso, visit cloudsat.atmos.colostate.edu and www-calipso.larc.nasa.gov.

CloudSat now at Vandenberg

By Alan Buss

Technicians unload and install the JPL-managed CloudSat spacecraft at Vandenberg Air Force Base.

MIKE GRIFFIN IS SCHEDULED TO VISIT JPL
for the first time in his new role as NASA Administrator on Wednesday, May 25. Griffin will hold an all-hands meeting in von Kármán Auditorium in the early afternoon.

Griffin testified before the Senate Subcommittee on Commerce, Justice and Science on May 12, where he presented an overview of NASA's FY 2006 budget. Over the past year NASA has made great strides in implementing the Vision for Space Exploration and meeting other national priorities, Griffin said. He testified that NASA has adopted a "go-as-you-can-pay," approach toward space exploration, and that several NASA missions and activities will need to be deferred or accomplished in other ways in order to ensure adequate funding for the priorities of the president and the Congress. NASA cannot do everything that we, and our many stakeholders, would like to accomplish," Griffin said. "Several missions will have to be delayed, deferred or cancelled in order to pay for the missions where the priorities were set by the president and Congress. We have to be sensitive to the priorities of the affected research communities, and have listened carefully to their input."

While the proposed budget for NASA currently schedules the space shuttle for retirement in 2010, the next crew-rated vehicle, the Crew Exploration Vehicle, is expected to be ready by 2014. Griffin advocates closing the four-year gap. "The development of space transportation capabilities for human space exploration beyond low-Earth orbit with

transmits pulses of electromagnetic energy and measures the portion scattered back to the instrument. CloudSat's Cloud Profiling Radar is more than 1,000 times more sensitive than typical weather radar. Calipso's polarization lidar instrument can tell the difference between ice and water, clouds, and between liquid and solid aerosol particles. By distinguishing aerosols from ice particles based on combined CloudSat and CloudSat data, we will gain new insight into dynamics and properties of clouds and their influence on Earth's radiation balance.

As soon as CloudSat has completed its mission, it will be launched into a 705-kilometer (438-mile) circular, sun-synchronous polar orbit, where they will fly just 15 seconds apart as part of NASA's "A-Train" constellation of three other Earth observing system satellites. The usefulness of data from CloudSat, Calipso and the other satellites of the A-Train will be much greater when combined. The data will help scientists better understand how sources of local pollution affect air quality and will improve weather forecasting and climate prediction.

The other three Earth Observation System satellites that make up the A-Train are: NASA's Aquarius spacecraft, NASA's Aura spacecraft, and the French Space Agency's (Centre National d'Etudes Spatiales) Polarization and Anisotropy of Reflectances for Atmospheric Sciences coupled with Observations from a Lidar, or Faraday, spacecraft.

Presentation is an international and interagency mission. The CloudSat radar instrument was developed at JPL with hardware contributions from the Canadian Space Agency. Colorado State University provides scientific leadership and science data processing. Other contributions include the U.S. Air Force (satellite on-orbit operations control) and the U.S. Department of Energy (scientific contributions). Ball Aerospace & Technologies Corp. designed and built the spacecraft.

Calipso is being developed through collaboration between NASA and the French Centre National d'Etudes Spatiales. The NASA Langley Research Center in Hampton, Va., is providing scientific contributions and managing the outreach program. Ball Aerospace & Technologies Corp. designed and built the spacecraft.

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Griffin seeks to balance among planetary science, Earth science, solar physics and astronomy within the overall science program by revisiting the Mars exploration program strategy and mission sequence. Deferring the Mars Science Laboratory is an option in this reassessment.

Griffin stated that in order to service the Hubble Space Telescope and provide for a safe detour, NASA will need to defer work on even more advanced space telescopes like the Space Interferometry Mission and the Terrestrial Planet Finder. NASA will also restructure Projects Prometheus, which is nuclear electric systems—to support human and robotic missions with clear priorities focused on near-term needs. "The extent of this deferral and an appropriate follow-on strategy for the Origins program is currently under review," he said. "Space nuclear power and propulsion are absolutely essential for future space exploration. However, we must focus our nuclear technology efforts on our highest priorities for near-term needs. NASA will examine alternative nuclear systems—including surface nuclear power, nuclear thermal and nuclear electric systems—to support human and robotic missions. As a result, we are able to restructure Prometheus Nuclear Systems and Technology, which, in the near-term, helps pay for FY 2005 unrequested Congressional items and agency priorities."

JPLers will have the opportunity to ask questions of Griffin at his von Kármán Auditorium talk on May 25. For more details, visit http://dailyplanet.org.
AGAIN A HUGE HIT

An estimated 40,000 people took in JPL’s Open House May 14 and 15. Here’s a small sample of the action, as captured by Photolab’s Dutch Slager.
University

A few words about Universe advertising

http://dailyplanet

View the previous issues of Universe at dailyplanet.jpnl.nasa.gov/indexes/index.php

E-mail us at universe@jpl.nasa.gov

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• Real estate ads for (rent and sale) must be signed by an owner or designee. (C) 2009 UNIVERSE. All rights reserved
• Those publishing housing and vehicle ads should be listed as an owner on the ownership listings.
• Prices listed on rental ads are shown per month unless otherwise specified.
• All ads are subject to change and are published in the issue in which they are submitted. All ads in the issue 118 area code unless otherwise specified.

Thank you very much for your compliance.

Classifieds

For Sale

B athhouse, Rancho Santa Fe, luxury, ensuite, ocean views, 3000 sq. ft., all with own 2-car garages, $1,500,000. New construction, built in 2014. 626/296-3140, 3128, 1745, 8442, 5282.

Bedroom set, 8 pieces, 72" round cherry dining table, queen bed and night stand, 3-drawer chest, dressing table, and 2 chairs, $2,900. 626/226-3771.

Computer, Dell Inspiron, 2 GB RAM, 2.66 GHz, Intel Pentium IV, 3.5 inch SATA 7200 RPM hard drive, multimedia sound system, $700. 626/213-5814.

Crib and mattress, Fisher Price, baby crib, $100. 626/226-3119, 3128, 1745.

Desk, chair, filing cabinet, bookshelves, $100. 626/468-6479.

Dresser, oak, solid wood, built in 1935, 6 drawers, 2 cabinets, $600. 626/488-6070.

Guitar, electric, Washburn, $50. 626/277-7561.

Hampton Bay ceiling fans, 6 pieces, new in boxes, $150. 626/527-8513.

Headboard, queen, wood, $50. 626/468-6479.

Home theater equipment, Dolby Atmos, all components, $500. 626/213-5814.

Home gym equipment, Treadmill, $200. 626/226-3771.

Kettle ball, Prada, new, $200. 626/226-3771.

Kitchen table, 42x72, cloth top, $150. 626/213-5814.

Kitchen cabinets, maple, $125 each. 626/226-3771.

Laptop, Apple MacBook Air, 13" screen, 2.53 GHz Intel Dual Core, 4 GB RAM, 128 GB SSD, $500. 626/226-3771.

Mosaic tile backsplash, 18"x24", $50. 626/226-3771.

Oven, Maytag, 30", gas, 4 burners, $200. 626/226-3771.

Piano, used, $100. 626/226-3771.

Posters, art, signed, mostly framed, $300. 626/226-3771.

Refrigerator, Whirlpool, stainless steel, $500. 626/226-3771.

Rocking chair, wood, $50. 626/226-3771.

Sofa, leather, 82" long, $250. 626/226-3771.

Tile, 24x24, polished porcelain, $1.50/sq. ft., $112/sq. yd. 626/226-3771.


Washing machine, Kenmore Elite, electrolux, 24", front loading, 1 year old, new, $200. 626/226-3771.

Wine barrels, wood, $100 each. 626/226-3771.

Vehicles / Accessories

Believe it or not, there are a lot of white-glove delivery services in the Pasadena area. Caltech employees are often on the road as part of their job or for other reasons. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov. If you have a service that you would like to offer to the Caltech community, please submit your information to universe@jpl.nasa.gov.

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• Those publishing housing and vehicle ads should be listed as an owner on the ownership listings.
• Prices listed on rental ads are shown per month unless otherwise specified.

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