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Mars rover development advances

NASA has given a green light to JPL's next rover, Mars 2020, to proceed to the design-and-build phase in preparation for launch four years from now.

In the July 15 announcement, the agency and JPL also disclosed a host of new features added to the rover, which is designed to collect and store soil and rock samples for possible future return to Earth.

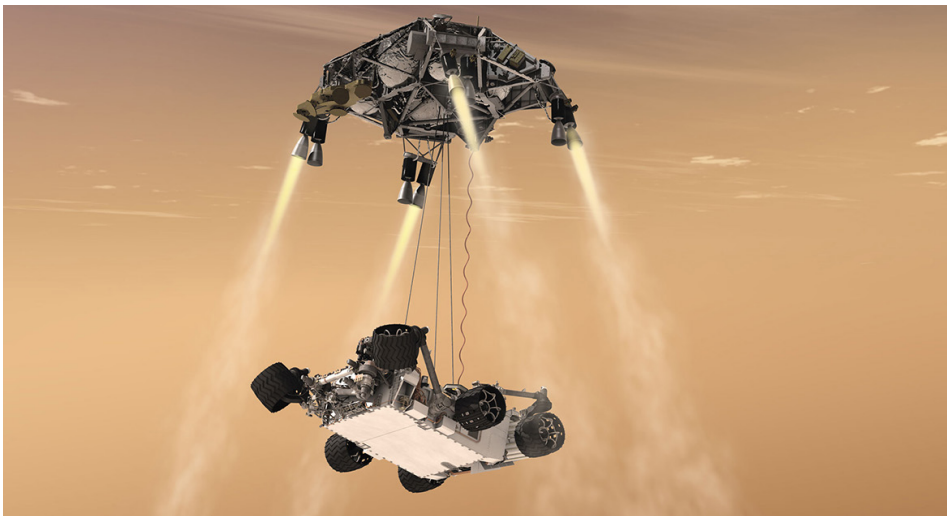
Items added to the rover include microphones to capture sounds on the planet's surface, as well as upward-looking descent cameras that will capture high-resolution views of the rover's parachute opening as it enters the Martian atmosphere. A closeup camera is also being added to the rover's robotic arm.

Two new capabilities will enhance the spacecraft's ability to fine-tune its landing. One, called "range trigger," will shrink the ellipse in which the spacecraft is expected to land by about half. The other, called "terrain-relative navigation," will allow the rover to land safely next to hazardous objects such as large rocks. Areas considered too risky for previous landings could be right up 2020's alley.

The Mars 2020 rover will use the same sky crane system the Curiosity rover used for its successful touchdown in August 2012. But 2020's more robust entry, descent and landing suite also promises a trail to enhanced opportunities for exploration.

The terrain-relative navigation system allows the spacecraft to take pictures, line them up with an onboard map, and figure out its location within tens of meters of accuracy, said entry, descent and landing lead Al Chen.

"The scientists want to see cliffs, scarps and layers, places that give them access to the history of Mars," he added. "It means we don't have to find a 'parking lot' nearby and drive for years to get where we want to go. We can land right on top of it."



Curiosity's entry, descent and landing system will have new features for a more accurate touchdown for Mars 2020.

Deputy Project Manager Matt Wallace said cameras will capture real-time, high-definition video of the sky crane's systems during descent and landing, which will help engineers design systems for the next set of missions. "We can watch the parachute post-inflation, to see whether it's oscillating or breathing," he said.

While Curiosity determined that Mars was able to support microbial life, the 2020 mission will take the next major biological step. The rover will identify and study an environment that scientists consider promising for astrobiology, and look for rocks that have a likelihood of pre-serving biosignatures from possible past life. A collection of the most scientifically valuable specimens will be selected for potential return to Earth by a future mission.

For the 110-member science team, challenges include extremely demanding standards on cleanliness of samples, noted Project Scientist Ken Farley. "We have strict requirements on organic, inorganic and biologic contamination that must be met simultaneously," he said.

Mars 2020 will carry an entirely new subsystem to collect and prepare samples, Farley said. Components include a coring drill on the arm. Mechanisms for processing of sample tubes will be located inside the rover.

About 30 individual sample tubes will be deposited on Mars, each containing approximately 15 grams of rock. "We aim to sample the full diversity of soil and rocks within the region we can traverse, about 15 kilometers," Farley said.

The new rover is projected to launch in summer 2020, with landing in February 2021. Wallace said the mission is currently supported by about 500 JPLers.

NASA/Aubrey Gemignani

With the spacecraft logo emblazoned into the grass beneath their feet, members of the Juno team visit the Rose Bowl prior to the spacecraft's July 4 orbit insertion.

Celebrating Juno

The Juno spacecraft's successful entry into Jupiter's orbit July 4 generated significant buzz locally as well as throughout social media and traditional media outlets.

The NASA website registered 7.9 million page views of Juno activities, which is among the most-viewed of the agency's missions this year. At the Rose Bowl, thousands of fans on hand for fireworks were treated to a live NASA TV view of JPL mission control as the Juno team anticipated and then celebrated orbit insertion.

Via Twitter, a congratulatory message to Juno from the Nasdaq stock market in New York City's Times Square.

"Exploration purely for the purpose of furthering human knowledge remains NASA's forte. ... That unadulterated desire to explore, to peer beyond the gravitational confines of what we already know, is the rocket fuel that makes us look to the sky and wonder."

— Dallas Morning News

"The mission marks a giant leap for research in space. It is also a big step for humans here on Earth."

— Washington Post

"The Juno mission may be one of NASA's finest hours yet."

— Pittsburgh Post-Gazette

NASA/Aubrey Gemignani

JPL mission control reacts with joy July 4 as Juno reaches Jupiter's orbit. From left: Jim Green, NASA Planetary Science Division director; Juno Principal Investigator Scott Bolton; Geoff Yoder, acting associate administrator for NASA's Science Mission Directorate; JPL Director Michael Watkins; Juno Project Manager Rick Nybakken.

A final farewell

Dutch Slager / JPL Photo Lab

Dutch Slager / JPL Photo Lab

Josh Krohn / JPL Photo Lab

JPL celebrated Charles Elachi as he prepared to retire as Lab director with June ceremonies on the mall.

Guests included Caltech President Tom Rosenbaum, the mayors of Pasadena and La Canada, and current and former JPL colleagues.

Clockwise, from top left: Elachi blows a kiss to the crowd as Rosenbaum, rover engineer Adam Steltzner and Human Resources Director Cozette Hart look on; Elachi and wife Valerie with a rover model presented to him as a parting gift; JPLers pack the mall to get a closer look; Elachi greets former project manager and Executive Council member Tom Gavin.

Dutch Slager / JPL Photo Lab

News Briefs

Sophia Sánchez-Maes

Service award to Sánchez-Maes

JPL research undergrad student Sophia Sánchez-Maes has received an honor from the Jefferson Awards Foundation for outstanding national or global service by an American 25 or under.

Currently a student at Yale, Sánchez-Maes is working in the Exoplanet Exploration Program Office. Her summer research project is on precision radial velocity survey modeling for finding Earth 2.0.

Last summer, at age 17, Sánchez-Maes worked with a JPL thermal team to develop code for the Mars Curiosity rover, using the power of high-performance computing to improve Earth-Mars time delays.

Previously, she was named a National Science Foundation Young Scholar for her work on energy-positive wastewater treatment. Sánchez-Maes also presented a study about using algae to generate energy at the 2015 White House Science Fair.

Sánchez-Maes recently created Girls Get Tech, a series of summer workshops for young Latinas in Los Angeles.

JPL IT honors noted

JPL's Information Technology Directorate was recognized with two prestigious industry honors in June.

The Laboratory was named a CIO 100 Honoree by CIO magazine. The award honors 100 organizations that have distinguished themselves through their innovative use of technology to create business value. The award recognized JPL's enhanced search capability and its use for analysis of data within the science, engineering, business, and flight mission communities. NASA's Glenn Research Center was also named to the CIO 100. This marks JPL's fifth consecutive appearance on the CIO 100. The honorees will be profiled in the August issue of CIO magazine.

On June 13, JPL was named one of the Best Places to Work in IT by Computerworld magazine. JPL was ranked 17th among large companies on the Best Places to Work in IT list. This is JPL's fourth consecutive time to be honored with inclusion on the list, a ranking of the top 100 work environments for information technology professionals.

JPL named to sensor consortium

The White House in June named JPL a member in the newly created Smart Manufacturing Innovation Institute, a Los Angeles–based consortium that will spur advances in smart sensors.

President Obama announced a $70 million federal award to the Smart Manufacturing Leadership Coalition, an industry-led nonprofit, to create the nationwide institute. Working with the Department of Energy, the group intends to fuel industry growth and innovation with more than $140 million in public-private investment geared toward developing advanced manufacturing technology and a supporting workforce and education pipeline.

JPL played a lead role in developing the proposal for the appointment and will contribute support in model-based engineering, system engineering, concurrent design and modeling/simulation areas. The Lab plans to support the institute's headquarters as well as the California regional manufacturing center, which is led by UCLA.

Letters

Many thanks to all my friends and colleagues at JPL for your condolences on the death of my father. Your support, kind words, cards, and beautiful plant are deeply appreciated. The plant is a fitting reminder of the life and vitality my dad brought to our family.

Tim Larson


Dutch Slager / JPL Photo Lab

Cinzia Zuffada

Zuffada earns Italian honor

JPL Associate Chief Scientist Cinzia Zuffada has been awarded the Order of Merit of the Italian Republic, with the degree of Knight, the highest-ranking honor bestowed by her home country.

The award honors her distinguished career at JPL as well as her efforts highlighting Italy's contributions to the success of space-based efforts, and for promoting opportunities for Italian university students to experience space-based research.

At JPL, Zuffada led the development of the "GPS ocean reflection" measurement technique for oceanography. She has played a pivotal role in demonstrating the feasibility of the GPS altimetry measurement from fixed sites and airplanes, and is active in chartering future technology developments.

Antonio Verde, Italy's Consul General based in Los Angeles, performed the early-June ceremony during Festa Della Republica Italiana (Italian National Day).

Passings


Robert Lane

Robert Lane, 80, a retired engineer, died Feb. 8.

Lane is credited with the design and operation of JPL's 25-foot space simulator, used in testing NASA spacecraft. He retired in 2000.

Lane is survived by his wife, Patsy; sons Robert and Gary; daughter Cheryl; and eight grandchildren. Services were held in Pueblo, Colo.

Retirees

The following JPL employees recently announced their retirements:

May

Regina Wong, 43 years, Section 393F; **Thomas Glavich**, 38 years, Section 9400; **Margaret Easter**, 36 years, Section 2680; **Gary Kinsella**, 32 years, Section 353J; **Wayne Hartford**, 25 years, Section 4033.

April:

Christopher Leng, 47 years, Section 1733; **Annie Aroyan**, 35 years, Section 702; **Roger Lighty**, 34 years, Section 1640; **Peter Kobzeff**, 33 years, Section 389F; **Kris Capraro**, 29 years, Section 398C; **Ralph Ouellet**, 27 years, Section 393E; **Ronald Sharp**, 20 years, Section 393F; **Robert Miller**, 19 years, Section 2127.

Classifieds

Ads submitted June 25 to July 1. To submit an ad, e-mail *universe@jpl.nasa.gov.*

For Sale

FILM PHOTOGRAPHY: Nikon F3 HP 35mm camera, w/long lens Promaster Spectrum 7, w/case/bag, $500; Nikon F3 vintage 35mm camera, assorted high-quality long lenses, bag and other accessories, $700; Saunders/LPL 4500-II 4x5 film enlarger, was $1,600 new, sell $1,000; tripod, Slik, 444-Sport, made in Japan in '80s, $75; Calumet 4x5 view camera w/Caltar II N 135mm lens, w/instructions, $600; all in excellent cond.; 47"x 54" Calumet dark cloth (focus hood), $30. kdrichar@usc.edu, Katie.

MISC.: Mini steam iron, Rollerblades (men's 8), Bloody Mary set, stemless decanter set, board games, woman's M "Galileo Flt. Team Mbr" LS red turtleneck. 818-272-3262 for photos.

Vehicles / Accessories

'09 HARLEY-DAVIDSON Street Glide touring bike, low mileage (5,000), beautiful cond., customized; Screaming Eagle pipes, custom seat, saddlebags, lighted fairing, custom "black denim" paint; financing avail.; reduced to $14,500. 626-482-1444.

'99 HONDA CR-V EX, automatic AWD, black w/gray int, one owner, all records, new tires, recent oil change/tuneup, excellent cond., full spare, a/c recharged, CD/cass/cruise, cargo mat, pull-out picnic table, 214,000 mi., no accidents, runs great; $2,900. native210@yahoo.com, Kathleen.

Wanted

SPACE INFO/memorabilia from U.S. & other countries, past & present, for personal use (see http://www.youtube.com/watch?v=S7PvjGp7mCU). mrayman@alumni.princeton.edu, 818-790-8523, Marc Rayman.

UPRIGHT BASS CASE, hard, ¾ size, for air travel. 818-437-3513, Susan.

For Rent

ALTADENA foothills home, comprehensively furnished for extended stays: 2 bedrms., guest room + office; 3 miles/JPL, view; fireplace, oak floors, antiques, fine furniture, beds, dinnerware, starter kitchen supplies, linens, towels & most necessities included, just bring toothbrush & clothes; TV/DVD/Dish satellite, wireless DSL; garden, fruit trees, all organic; secluded, quiet, safe neighborhood near trails. 626-798-3235, gaboon@sbcglobal.net.

ALTADENA (91001), furnished 2-bedrm., 2-bath home completely remodeled in 2012, ideal layout for roommates, bedrooms and baths are at opposite ends of the house; kitchen has refrigerator, microwave, plates, pots/pans, utensils etc.; washer and dryer, gated parking in driveway + carport; nearest cross-st. Fair Oaks/Calaveras; long- or short-term lease avail; renter pays utilities excl. trash, $2,000/mo., small pet OK for additional monthly fee. mpauken@gmx.com, 818-237-0645.

ALTADENA (91001), furn. loft w/awesome view for lease; non-smoker to share a beautiful 4-bedroom, 3-bath house across from community garden; close to local colleges, Pasadena schools, walk to JPL; utilities incl., cent. air/heat, internet access; near 210/134/110 /bus stop/shopping/bank/entertainment/restaurants; $700/mo. 818-370-0601.

ALTADENA (91001), 2-bedrm, 1 3/4-bath condo; security access & gated, alarm, cable internet ready, central air/heat, well maintained, carport parking, nice closet organizers, kitchen w/marble floors, washer/dryer, den, fireplace, patio w/garden + hot tub, community pool and more; you pay utilities excld. trash; $1,875/month. 626-798-6185.

ALTADENA MEADOWS, fruit trees, a laid-back neighborhood and the national forest literally as your backyard; trail-bike ride to JPL, must like dogs, an art studio/workshop environment, DIY and experimental cooking/brewing; laundry facilities, spare bedroom for guests and your own bath; frequent bacon sampling as a perk; $775/month plus utilities with furnishings available. 323-864-7067 or bambam6@earthlink.net.

PASADENA, 2 furn. rooms in a lovely 4-bd./2-bath house, big backyard, hardwood floor, big closet, shared bathrm;, kitchen/laundry privileges; 2 miles to JPL, close to public transport; short- or long-term lease avail.; must like dogs and be very clean; $800 and $850 + $800 deposit. 818-960-8654.

Vacation Rentals

JACKSON HOLE, WY: Luxurious bed and breakfast on 3 acres of solitude on Snake River near Jackson Hole Mountain Resort and south entrance to Grand Teton Natl. Park; see http://www.bentwoodinn.com/; JPL discount. info@bentwoodinn.com, 307-739-1411.

MAMMOTH, Snowcreek, 2 bd., 2 ba. + loft, sleeps 6-8, fully equip'd kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL discount, no pets. 626-798-9222, 626-840-3749 or valeriee@caltech.edu.

MAMMOTH, Snowcreek, beautiful updated condo, 2 bd., 2 ba. + loft (sleeps 6-8), great location by pond/meadow, new appliances, TVs, DVD players, free wireless Internet and washer/dryer, no pets. 818-952-2696 or BigMtnPrettySky@gmail.com.

MAMMOTH, remodeled 2 bed/2 bath + loft, short walk to Canyon Lodge; Courchevel 6 features full kitchen, cable/Internet TV, DVD, Blu-Ray, wireless hi-speed Internet, 2-car garage, Jacuzzis, grill, pool; no pets. http://Courchevel6.com.

MEXICO (1 bedrm.,): Mayan Palace: Acapulco, Nuevo Vallarta, Riviera Maya, Puerto Vallarta; Sea Garden: Acapulco, Nuevo Vallarta, Mazatlan; trades available with II and RCI. 818-272-3262.

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Universe

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