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Astronauts Walk on "Mars," Start Experiments

After months of anticipation, three brave astronauts set foot on Mars—or rather, a darkened, sand-filled room designed to simulate Mars. The explorers make up half the crew of the Mars500 mission, a project designed to study the psychological effects of a year-and-a-half long, deep-space voyage to the red planet.

Since June 2010 six men—three Russians, two Europeans, and one Chinese—have been living in isolation in a 19,423-cubic-foot (550-cubic-meter) "spaceship" outside Moscow, doing maintenance work, conducting experiments, and trying to stave off boredom by playing Rock Band and reading the complete works of Gabriel García Márquez. The crew is made up of volunteers, some with no real-life space experience but all with applicable skills, such as engineering and medicine.

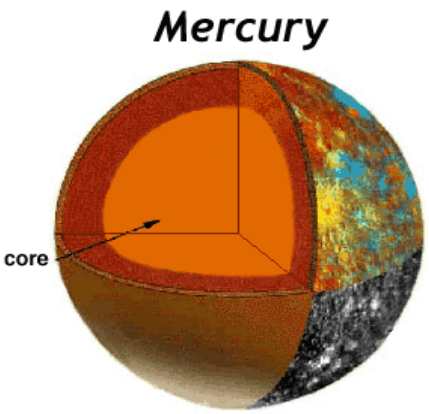
Radio communications with project leaders are delayed to simulate the communications lag between Earth and Mars. Illnesses are handled by a crew member serving as the ship's doctor. The only food comes from packets of dehydrated meals. Since the project started, scientists have been remotely studying everything that happens to the ersatz astronauts, from their internal bacteria to how they breathe at night. But now, after almost a year under the microscope, the astronauts are the ones performing the experiments.

The spaceship entered a mock orbit around Mars, and three of the astronauts entered a separate compartment meant to simulate a Mars lander. These crew

members "landed" on Mars. Now the hatch has opened for the first of three planned extravehicular activities, or EVAs, on the "Martian" surface. The room that's standing in for Mars is designed to look like the surface around Gusev Crater, the landing site of NASA's Mars rover Spirit. Over the next two weeks, the astronauts will collect soil samples, deploy magnetometers to study the simulated Mars's magnetic field, and plant national flags. The astronauts who remain "in orbit" will drive a virtual robotic rover around Mars in something like an advanced computer game.

In preparation for landing, the three Mars walkers slept heads-down, to simulate the effects of going from Zero-G to an environment with gravity—albeit a third that of Earth's. The room itself won't simulate Martian gravity or weather, but astronauts will wear spacesuits during the EVAs that are about two-thirds lighter than real spacesuits, to preserve the illusion that gravity's pull is weaker on the faux red planet.

Mercury Home to Violent Magnetic Storms, Ancient Volcanoes



Mercury is wracked by intense magnetic disturbances more extreme than any on Earth, new research suggests.

The small, rocky planet also experienced volcanic activity for much longer than once thought, according to several new studies based on observations during the latest flyby of the small, rocky planet by a NASA spacecraft.

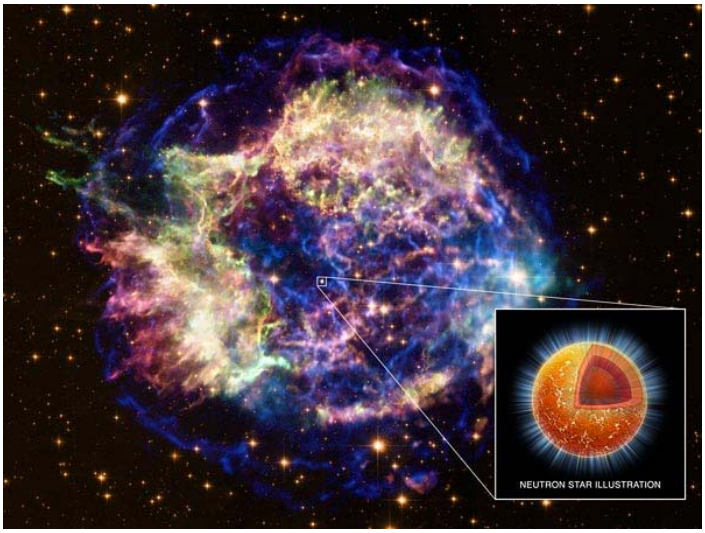
The new findings come from data collected by NASA's MESSENGER spacecraft, which unearthed even more secrets about the closest planet to the sun during its third and last flyby of Mercury last September. To start, the probe discovered Mercury's magnetic field, or "magnetosphere," apparently releases energy in violent magnetic disturbances called substorms far more extreme than comparable ones seen on Earth, which include spikes in the size and intensity here of colorful auroras and the outermost Van Allen radiation belt.

NASA launched MESSENGER in 2004, and it zoomed within 142 miles (229 km) of its Mercury's surface during its most recent flyby. The craft, destined to orbit around the planet this year, has already yielded a trove of knowledge, solving mysteries such as whether it had volcanoes. The MESSENGER craft found that volcanic activity on Mercury may have lasted far longer than researchers previously thought.

"It changes a lot of our preconceived notions about how Mercury might have evolved," planetary scientist Louise Prockter at Johns Hopkins University told SPACE.com. New data suggests that the volcanism that created Mercury's plains must have been fairly recent.

Scientists also found that the very tenuous atmosphere of Mercury, or "exosphere," made of elements such as magnesium, calcium, and sodium, is apparently created and maintained by a number of different processes, such as the forces generated by the planet's magnetic field. These findings help shed light on the composition of Mercury's surface and how matter is moved over the planet.

IMAGE OF THE DAY – **Superfluid Star**



Combined x-ray and optical data lend a kaleidoscope of colors to the supernova remnant Cassiopeia A in a picture released to illustrate a new study of the famous object.

At the heart of Cas A is a neutron star (inset illustration), the ultradense core of a massive star that exploded. The new study, conducted with NASA's Chandra X-ray Observatory, found that a strange form of matter called a superfluid exists inside the neutron star.

Note: The Image of The Day section's aim is to create curiosity in your mind and make you want to search about the image or topic, rather than us giving full details about the image. We are expecting you to ask yourself questions and to search for information about the image of the day to get answers and learn more.