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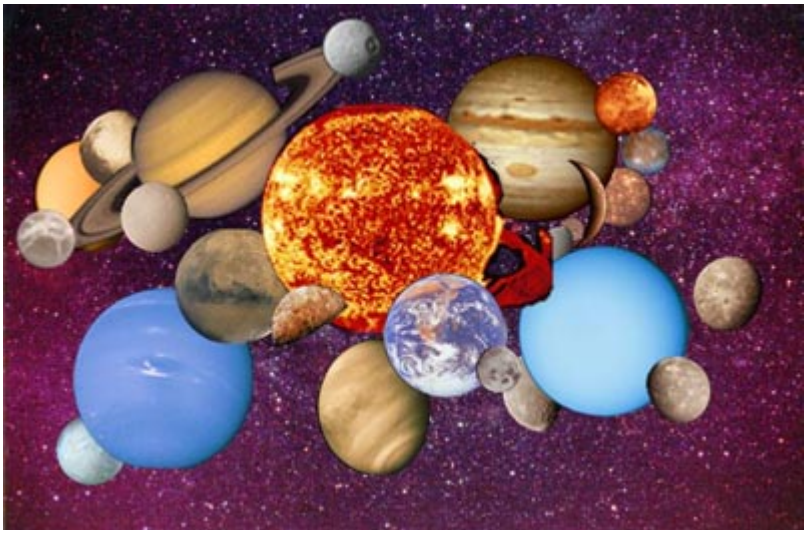
Space and astronomy news



MAY 15, 2008 BY NANCY ATKINSON

Mapquesting the Solar System

Map generators like Mapquest and Yahoo! Maps have bailed me out quite a few times, helping me get where I needed to go. So imagine in the future, navigating on other bodies in our solar system and having the ability to find landmarks and destinations to point you in the right direction. This type of technology is now under development and could create three-dimensional â€œsuper roadmapsâ€ of other planets and moons. In addition it could also provide robots, astronauts and engineers details about atmospheric composition, biohazards, wind speed and temperature, and could help land future spacecraft and more effectively navigate roving cameras across a Martian or lunar terrain.

The Rochester Institute of Technology's Rochester Imaging Detector Laboratory (RIDL), in collaboration with Massachusetts Institute of Technology's Lincoln Laboratory are developing a new type of detector that uses LIDAR (LIght Detection and Ranging), a technique similar to radar, but which uses light instead of radio waves to measure

This is a new generation of high resolution, low power consuming optical/ultraviolet imaging LIDAR detectors that will significantly extend NASA's science capabilities for planetary applications by providing 3-D location information for planetary surfaces and a wider range of coverage than the single-pixel detectors currently combined with LIDAR.

The LIDAR imaging detector will be able to distinguish topographical details that differ in height by as little as one centimeter.

"The imaging LIDAR detector could become a workhorse for a wide range of NASA missions," says Donald Figer, director of the RIDL. "You can have your pixel correspond to a few feet by a few feet spatial resolution instead of kilometer by kilometer," Figer says. "And now you can take LIDAR pictures at fine resolutions and build up a map in hours instead of taking years at comparable resolution with a single image."

The device will consist of a 2-D continuous array of light sensing elements connected to high-speed circuits. The $547,000 NASA-funded program also includes a potential $589,000 phase for fabrication and testing.

LIDAR works by measuring the time it takes for light to travel from a laser beam to an object and back into a light detector. The new detector can be used to measure distance, speed and rotation. It will provide high-spatial resolution topography as well as measurements of planetary atmospheric properties: pressure, temperature, chemical composition and ground-layer properties. The device can also be used to probe the environments of comets, asteroids and moons to determine composition, physical processes and chemical variability.

The imaging LIDAR detector will be tested at RIDL in environments that mimic aspects of operations in NASA space missions.

Orginal News Source: EurekAlert