

Stealing Pluto's thunder

by Catherine E. Borsché



This artist's concept shows the planet cataloged as 2003UB313 at the lonely outer fringes of our solar system. Our sun can be seen in the distance. The new planet, which is yet to be formally named, is at least as big as Pluto and about three times farther away from the sun than Pluto. It is very cold and dark. The planet was discovered by the Samuel Oschin Telescope at the Palomar Observatory near San Diego, Calif., on Jan. 8.

NASA/JPL/Caltech

It looks as if the schoolteachers may be redoing their solar system charts.

A new planet has been discovered in the solar system. And, if you were to craft this planet out of foam for a school science project, it would be roughly 20 to 30 percent larger than Pluto.

On July 29, 2005, Dr. Mike Brown of the California Institute of Technology (Caltech) announced the discovery of the new planet in the outer region of our solar system. The planet, which hasn't been officially named yet, is about 97 times farther from the sun than Earth, or 97 Astronomical Units (AU). In comparison, Pluto is 30 AU from the sun.

This places the new planet in the Kuiper Belt, a dark realm beyond Neptune where thousands of small icy bodies orbit the sun. The planet appears to be typical of Kuiper Belt objects, only much bigger. Its sheer size in relation to the nine known planets means that it can only be classified as a planet, Brown said.

Backyard astronomers with modern detectors mounted on large telescopes can find the new planet, which looks like a dim speck of light moving very slowly against the starry background.

The planet was discovered by Brown, Chad Trujillo of the Gemini Observatory in Mauna Kea, Hawaii, and David Rabinowitz of Yale University in New Haven, Conn. They first photographed the new planet with Caltech's 48-inch Samuel Oschin Telescope on Oct. 31, 2003. The object was so far away, however, that its motion was not detected until they reanalyzed the data in January of this year.

"We are 100 percent confident that this is the first object bigger than Pluto ever found in the outer solar system," Brown said.

The planet's temporary name is 2003 UB313. A permanent name has been proposed by the discoverers to the International Astronomical Union (IAU), and they are awaiting a decision before announcing the name. However, scientists have nicknamed the planet Xena after the fictional warrior princess.

And, to add even more wonder to the discovery itself, this planet has company out in the recesses of the solar system.

"Since the day we discovered Xena, the big question has been whether or not it has a moon," Brown said. "Having a moon is just inherently cool – and it is something that most self-respecting planets have, so it is good to see that this one does too."

Brown estimates that the moon, dubbed Gabrielle after Xena's sidekick, is at least one-tenth the size of Xena.

"Pluto once seemed a unique oddball at the fringe of the solar system," Brown said. "But we now see that Xena, Pluto and the others are part of a diverse family of large objects with similar characteristics, histories and even moons, which together will teach us more about the solar system than any single oddball ever would."

To be or not to be...a planet

Not everyone in the astronomy community agrees with Xena's, or for that matter Pluto's, planetary distinction.

"There's been a big debate going on for some time, even before the tenth planet Xena was discovered," Dr. Ed Barker, planetary

astronomer in the Astromaterials Research and Exploration Science (ARES) Directorate at JSC, said. "I'm really on the side that it's not a planet."

The debate heated up as astronomers learned more about our solar system and found that Mercury, Venus, Mars, Jupiter, Saturn, Uranus and Neptune were not alone. Scientists began discovering objects that did not fit neatly into the planet category, but were still significant nonetheless. It became clear these objects were not planets, but "little planetoids," Dr. Mark Matney, JSC ARES planetary scientist, said.

As a result of these findings, a separate "minor planets" category was designated. Ten years ago, there were about

"Having a moon is just inherently cool – and it is something that most self-respecting planets have..."

28,000 minor planets, also known as asteroids. Now close to 300,000 have been discovered.

"It's clear that Jupiter, Saturn, Uranus and Neptune are a family, the gas giants. But Pluto we've known for a long time is different from the others. Then, with the discovery of Kuiper Belt objects, people began talking about Pluto maybe being a big Kuiper Belt object," Matney said. "And here you find an object [Xena] that's clearly bigger than Pluto..."

To complicate matters, Xena has a moon. "And that's where the parallels really are. In fact, there are two or three other Kuiper Belt objects that have moons also," Barker said.

So, is Xena just really a Kuiper Belt object with a moon – or a planet?

Unfortunately, it's more in the eye of the beholder than anything else. The IAU has not officially ruled on whether or not Xena is a planet, or even how they plan on defining a planet in general.

There are probably more cultural reasons to classify Xena as a planet than anything else. If Pluto stays categorized as a planet because it has long been considered one, then Xena too must be a planet. Xena clearly has more heft than Pluto, and has a moon to boot.

"Whatever happens to Pluto, it sounds like Xena will be in the same category," Matney said.

One thing is for sure. "There's just a lot of leftover building blocks out in the outer solar system," Barker said.

Which means, as Matney said, "There may be some more Xenas before we're done."

A new day

A new day

a new mission

ST-12

by Catherine E. Borsché

On Sept. 30, humankind again reached for the stars with the launch of the Expedition 12 crew. Onboard the trip to the orbiting complex were Expedition 12 Commander William McArthur, Expedition 12 Flight Engineer Valery Tokarev and spaceflight participant Gregory Olsen.

Although station operations and maintenance will take up most of the time for the Expedition 12 crew, research, science-focused educational activities and Earth observations will continue to be priorities.

"In its very broadest sense, our goals are first to maintain the operational state of the International Space Station, to conduct research that is targeted toward enhancing our capability to live and work in space," McArthur said. "We would like to see expansion of this unique laboratory environment so that future crews will have an even more capable space station to work in."

The operation of individual experiments on Expedition 12 is expected to total several thousand hours, adding to the more than 100,000 hours of experiment operation time already accumulated aboard the station.

One such experiment "gives us the opportunity to grow some plants on the space station to be ready to go for long-duration flights to the other planets," Tokarev said. "For example, there is an experiment called Plants. That experiment allows [us] to obtain peas grown on the station in the fourth and fifth generation, and we'll be able to also grow greens that we will be able to consume as food."

The ability to grow and harvest food in space is of considerable importance, as it will be necessary for long-duration flight and our ultimate survival.

"In any case, we are now living in a world with limited resources," Tokarev said. "People who don't look ahead and don't think about the future don't live in the future."

On Nov. 7, the crewmembers participated in their first spacewalk together. This excursion was the first station-based spacewalk in United States suits in more than two years. This spacewalk was also a first for Tokarev.

Camera installation on the Port 1 Truss was the first primary task. The new device is similar to the camera assembly on the Starboard 1 Truss. This camera will play a big role in future station assembly, as it will be used after the arrival of the Port 3 and Port 4 Truss segments during STS-115.

McArthur and Tokarev spent about two hours, 10 minutes on the camera assembly installation. In order to have daylight for the Floating Potential Probe jettison, they moved on to one of the get-ahead tasks: the retrieval of a failed remote joint motor controller. Engineers said they were anxious to get this one back to see what went wrong before others are sent to the space station.

The crew then removed and jettisoned the Floating Potential Probe, which is designed to measure the station's electrical potential and compare it to the surrounding plasma.

Crewmembers then completed a second get-ahead task: removal and replacement of a remote power controller module, a kind of circuit breaker. This is on the mobile transporter, which moves along railroad-like tracks on the station's main truss.

This won't be the last time the crew ventures outside. An additional spacewalk is slated for December. There may even be a third spacewalk in early 2006 originating from the Quest Airlock, but that is still being discussed.

Expedition 12 will have ample opportunities to make its mark toward the Vision for Space Exploration during the crew's six-month stay. There are still many unknowns that need to be solved before we can venture to the moon, Mars and beyond.

"Well, to steal a few words from Mark Twain ... He wrote that, in 20 years, you'll be more disappointed by the things you didn't do than by the things you did do," McArthur said. "I think space exploration has been this tremendous catalyst for the development of technology in this country, and in the world. It's been a tremendous catalyst for us to make the human condition better."

McArthur offers another viewpoint on where space exploration needs to be.

"I think we cheat a little bit right now. We launch from Earth, we spend a long time on orbit, and we go back to Earth where we have this cadre of wonderful people there to scoop us up and keep us warm and safe," McArthur said. "It's almost like we're the child that's peeked out of the womb, gotten a little bit scared, and we've gone back in where it's nice and safe and comfortable. Well, we need to give birth to true interplanetary space exploration. And, I would say the space station is going to allow us to do that."



Pictured left to right:
Rep. Ken Calvert (R-CA),
Rep. Sheila Jackson Lee (D-TX),
and Rep. Al Green (D-TX),
during a visit to Johnson Space
Center and Mission Control on
Oct. 24, talk with Expedition 12
Commander Bill McArthur
(above right) and Flight
Engineer Valery Tokarev aboard
the International Space Station.