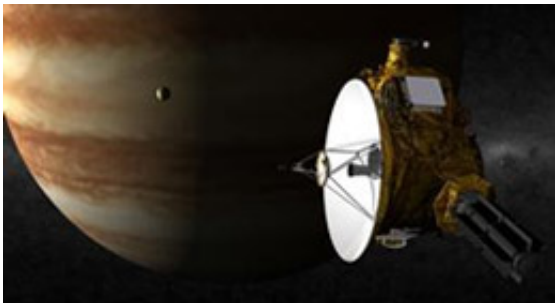


# Scientists readying for flurry of data as New Horizons nears Pluto

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Artist impression of the New Horizons spacecraft as it approached Jupiter en route to Pluto. Credit: NASA

With each passing day, mankind gets a better look at Pluto. And each day, Pluto is showing mankind it has a lot to learn.

First, Pluto revealed itself in a mix of beige and orange, while Charon, its largest moon, appeared gray when the New Horizons spacecraft captured color images of the dwarf planet in early June. Then, scientists at the Johns Hopkins Applied Physics Laboratory in Laurel, Md., spotted unusual dark poles on Charon. In late June, they saw mysterious dark streaks spaced evenly along half of Pluto's equator.

New Horizons will pass within 7,800 miles of Pluto on July 14 after a nearly decade-long, 3 billion-mile journey. As the spacecraft nears that close encounter, the scientists are getting one never-before-seen look of

Pluto after another. They expect to make daily revelations of new discoveries - and new questions - over the next week and a half.

"A few weeks ago, the faucet hadn't turned on," said Alan Stern, principal investigator for the \$700 million NASA mission. "Now it's dripping a little every day. Soon it'll be a rush."

New Horizons' seven instruments are probing Pluto for evidence of its composition, terrain and atmosphere. While they began observing the dwarf planet this year, teams at the Hopkins lab are preparing for their most intense - and valuable - period of data collection. The lab designed, built and operates the New Horizons spacecraft.

While planning the commands that guide the spacecraft's operations typically takes a couple of months, the scientists have worked since 2009 on the plan for the final days of the mission's journey to Pluto, when it will intensely observe the distant planetary dwarf.

When New Horizons makes its closest approach to Pluto, the mission will be out of the scientists' hands - there will be a 22-hour period during which they won't be able to contact the spacecraft until the pass is complete. The spacecraft cannot observe and communicate at the same time.

"We have to trust that it's doing what it needs to do," said Alice Bowman, the mission operations manager.

When New Horizons launched in January 2006, exploration of Pluto and the Kuiper Belt in which it resides was among planetary scientists' top priorities. The relatively small, icy bodies there contrast with the gaseous giants of the outer solar system and the terrestrial planets closer to the sun.

Since then, scientists have learned much more about Pluto. They knew about Charon but found four more moons between 2005 and 2012. They also reclassified Pluto from its status as the solar system's ninth planet to [dwarf planet](#) in 2006.

Discoveries in the past month or two have raised more questions than answers.

Seen in better detail, the faces of both Pluto and Charon suggest a diversity of landscapes, including what may be frost left over from a polar cap on Pluto that has evaporated in summer sun. The difference in color between the two bodies, which swing around each other with a center of gravity between them, surprised scientists.

Color images from one of New Horizons' two cameras showed two contrasting faces of Pluto, with one hemisphere marked by 300-mile-wide dark streaks distributed along its equator. And Charon's poles also are marked by mysterious dark terrain, something not seen anywhere in the solar system except for Jupiter's moon Io, Stern said.

"They're puzzling," said Stern, who is a planetary scientist at the Southwest Research Institute in Boulder, Colo., but will spend the next month at the Hopkins lab overseeing the mission.

Over the next couple of weeks, the scientists will gather more pieces of the puzzle. The most intense flurry of observations will occur around the spacecraft's closest pass, but valuable data will be collected throughout its approach and after it passes beyond Pluto's orbit.

Coordinating the fly-by was no simple task. Four groups - focused on geology and geophysics, atmospheric science, spectroscopy, and charged particles and plasma - laid out their priorities for what observations to make and when.

With such urgency to maximize the data being collected, "you increase your chances of overextending the spacecraft," Bowman said, though mission managers are confident the grand piano-sized spacecraft will manage the encounter well.

"We were able to come up with an efficient sequence that accomplishes all of the science," Bowman said.

There will be some immediate gratification - the spacecraft will turn toward Earth and beam back its first burst of data about eight hours after the fly-by. The Hopkins scientists expect to have it by 9 p.m. on July 14.

But that data will be relatively limited. Some of the earliest transmissions are scheduled to include observations focused on mapping of Pluto and Charon's geology and topography as well as determining the composition and characteristics of Pluto's limited atmosphere. But the transmissions will continue for nearly a year, with a handful of downloads each day for about 300 days.

"It's really just a tease," Stern said of the initial data downloads. "We can't even tell if it's the best stuff or the boring stuff."

Still, any data is new data. New Horizons is the first spacecraft to explore Pluto, and the first NASA space probe to any "new" planetary frontier since the Voyager missions launched in 1977 to explore Jupiter, Saturn, Uranus and Neptune.

Already, the mission has pleasantly surprised [scientists](#).

"Pluto is turning out to be the belle of the ball," Stern said.

And New Horizons' exploration might not stop with Pluto. If NASA approves a budget for it and the spacecraft holds up, an extended

mission could venture beyond the [solar system](#) to three bodies in the Kuiper Belt - only another billion miles away.

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