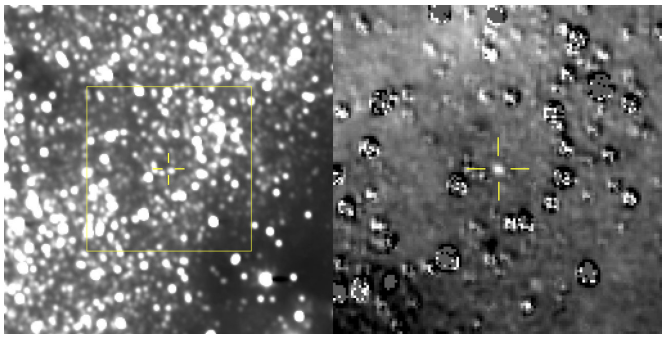
New Horizons makes first detection of Kuiper Belt flyby target

29 August 2018



The figure on the left is a composite image produced by adding 48 different exposures from the News Horizons Long Range Reconnaissance Imager (LORRI), each with an exposure time of 29.967 seconds, taken on Aug. 16, 2018. The predicted position of the Kuiper Belt object nicknamed Ultima Thule is at the center of the yellow box, and is indicated by the yellow crosshairs, just above and left of a nearby star that is approximately 17 times brighter than Ultima. At right is a magnified view of the region in the yellow box, after subtraction of a background star field "template" taken by LORRI in September 2017 before it could detect the object itself. Ultima is clearly detected in this star-subtracted image and is very close to where scientists predicted, indicating to the team that New Horizons is being targeted in the right direction. The many artifacts in the star-subtracted image are caused either by small mis-registrations between the new LORRI images and the template, or by intrinsic brightness variations of the stars. At the time of these observations, Ultima Thule was 107 million miles (172 million kilometers) from the New Horizons spacecraft and 4 billion miles (6.5 billion kilometers) from the Sun. Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute

NASA's New Horizons spacecraft has made its first detection of its next flyby target, the Kuiper Belt object nicknamed Ultima Thule, more than four months ahead of its New Year's 2019 close encounter.

Mission team members were thrilled – if not a little surprised – that New Horizons' telescopic Long Range Reconnaissance Imager (LORRI) was able to see the small, dim object while still more than 100 million miles away, and against a dense background of stars. Taken Aug. 16 and transmitted home through NASA's Deep Space Network over the following days, the set of 48 images marked the team's first attempt to find Ultima with the spacecraft's own cameras.

"The image field is extremely rich with background stars, which makes it difficult to detect faint objects," said Hal Weaver, New Horizons project scientist and LORRI principal investigator from the Johns Hopkins Applied Physics Laboratory in Laurel, Maryland. "It really is like finding a needle in a haystack. In these first images, Ultima appears only as a bump on the side of a background star that's roughly 17 times brighter, but Ultima will be getting brighter – and easier to see – as the spacecraft gets closer."

This first detection is important because the observations New Horizons makes of Ultima over the next four months will help the mission team refine the spacecraft's course toward a closest approach to Ultima, at 12:33 a.m. EST on Jan. 1, 2019. That Ultima was where mission scientists expected it to be – in precisely the spot they predicted, using data gathered by the Hubble Space Telescope – indicates the team already has a good idea of Ultima's orbit.

The Ultima flyby will be the first-ever close-up exploration of a small Kuiper Belt object and the farthest exploration of any planetary body in history, shattering the record New Horizons itself set at Pluto in July 2015 by about 1 billion miles. These images are also the most distant from the Sun ever taken, breaking the record set by Voyager 1's "Pale Blue Dot" image of Earth taken in 1990. (New Horizons set the record for the most distant image from Earth in December 2017.)

"Our team worked hard to determine if Ultima was detected by LORRI at such a great distance, and the result is a clear yes," said New Horizons Principal Investigator Alan Stern, of the Southwest Research Institute in Boulder, Colorado. "We now have Ultima in our sights from much farther out than once thought possible. We are on Ultima's doorstep, and an amazing exploration awaits!"

Provided by Johns Hopkins University