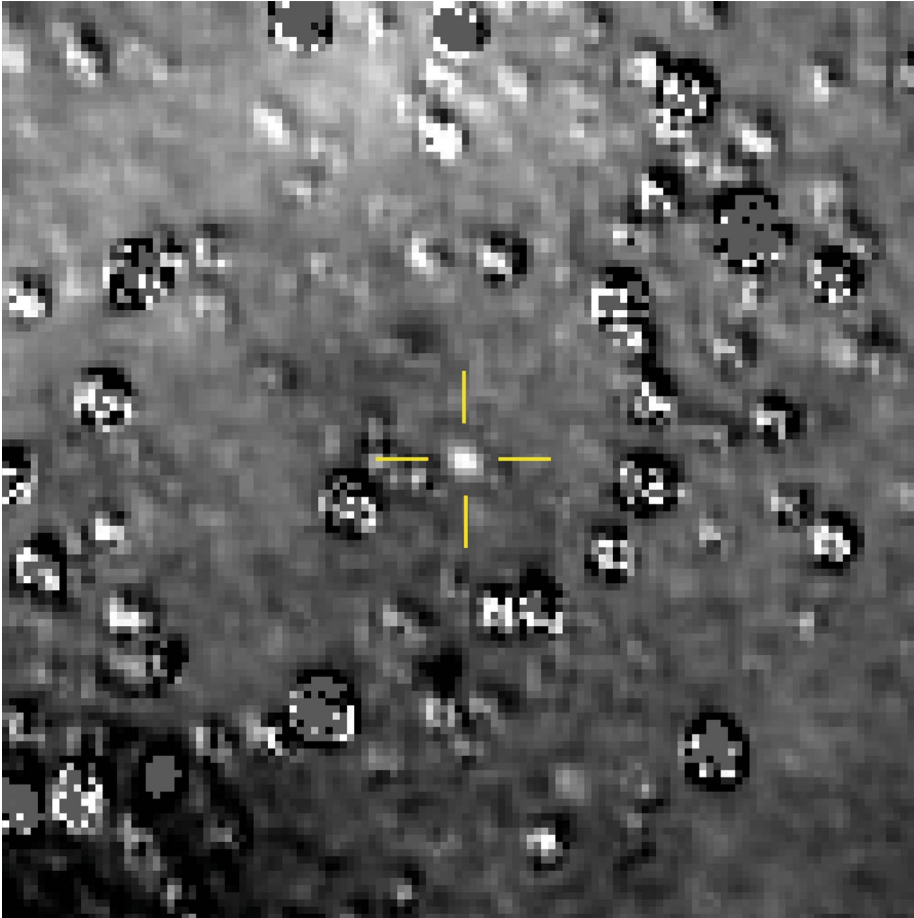


SMALL BODIES

Preparing to meet Ultima Thule

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Credit: NASA/JHUAPL/SwRI

Since NASA's New Horizons mission left its rendezvous with the dwarf planet Pluto in late 2015, it has been preparing for another close encounter, with cold classical Kuiper belt object (CCKBO) 2014 MU₆₉, also known as Ultima Thule (seen at the centre of the image in its first observation by New Horizons with the Long Range Reconnaissance Imager, LORRI). The flyby is set for 1 January 2019, during which the spacecraft will pass within 3,500 km of the target — more than three times nearer than its closest approach to Pluto. In a recent paper, Jeffrey Moore and other members of the New Horizons team summarize the observations they have planned and what they expect to see.

The flyby of Ultima Thule is not only a unique opportunity to study CCKBOs up close, but also a chance to study the early Solar System, since CCKBOs are dynamically and chemically pristine. Planned observations will focus on

compositional measurements and high-resolution imaging to study its morphology and the surface for signs of accretion, tectonics and cratering. New Horizons will also determine whether Ultima Thule is in fact a (contact) binary object, in common with many other CCKBOs, and whether it has satellites or rings.

At closest approach, and if Ultima Thule is not rotating too quickly, the combination of LORRI and Multispectral Visible Imaging Camera imaging is expected to produce images with a resolution of 42–78 metres per pixel. The LEISA imaging spectrometer, observing in the 1.25–2.5 μm window, should be able to detect and map water, methane, methanol and carbon dioxide, and in the best case scenario, ammonia and its hydrates.

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