

New Horizons Mission and Ultima Thule

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Manifest Pedagogy

The study of evolution of Earth and the hunt for Earth like planets have been the main agenda of many space agencies. The examiners will be interested in some milestones achieved or new breakthroughs got by space agencies.

In news

NASA's New Horizons has sent a historic flyby to explore the Ultima Thule

Placing it in syllabus

Science and Technology- developments

Awareness in the fields of Space

Static dimensions

1. Kuiper Belt
2. Exoplanets

Current dimensions

Telescopes and Exoplanet missions exploring celestial bodies

Content

The Journey of New Horizons mission

The New Horizons spacecraft began its voyage in January 2006 on a mission to Pluto. After nine long years of travel, it

sailed past the dwarf planet at a narrow distance of 12,500 kilometers, snapping a stunning collection of holiday photos as it passed. As well as capturing Pluto and its moon Charon in colour, New Horizons revealed flowing ice on Pluto's surface and the heart-shaped region around its equator, Tombaugh Regio.

Once New Horizons passed beyond Pluto, it had enough fuel left for the team to select a new target in the Kuiper Belt. Having recruited the Hubble Space Telescope to search for a new object of interest, the team selected Ultima Thule in late 2015. Since the Kuiper Belt sits far out in the Solar System, with its inner reaches brushing the orbit of Neptune, its inhabitants such as Ultima Thule are known as trans-Neptunian objects

About Ultima Thule-2014 MU₆₉

- Nicknamed **Ultima Thule**, is a trans-Neptunian object located in the Kuiper belt, beyond the orbit of Neptune. It is a contact binary 31 km long, composed of two joined bodies 19 km and 14 km across that are nicknamed "Ultima" and "Thule", respectively.
- With an **orbital period of 298 years** and a low inclination and eccentricity, it is classified as a classical Kuiper belt object.
- It is also called "**cold classicals**", which have nearly circular orbits with low inclinations to the solar plane, and which have not been perturbed since their formation perhaps 4.6 billion years ago.
- Ultima Thule is the most distant object of almost **5 billion kilometres from the Sun**.
- It is condensed from **solar nebula**.
- **Formation-** 2014 MU₆₉ is thought to have originally been two objects, nicknamed "Ultima" and "Thule" that formed over time from a rotating cloud of small, icy bodies. Eventually, loss of momentum shifted to other bodies in

- the cloud caused the pair to slowly spiral closer until they touched, forming the bi-lobed object visible today
- It was discovered on 26 June, 2014 by astronomers using the **Hubble Space Telescope** as part of a search for a Kuiper belt object for the New Horizons mission to target in its first extended mission; it was chosen over two other candidates to become the primary target of the mission.
 - In July 2017, Ultima Thule passed in front of a star as seen from Earth (**known as a stellar occultation**), allowing astronomers to determine that its shape is most likely a contact binary (two touching bodies) or a close binary system (two objects that are orbiting each other).
 - With the *New Horizons* space probe's flyby on 1 January 2019, **became the farthest object in the Solar System visited by a spacecraft**, and is believed to be the most primitive, both bodies being planetesimal aggregates of much smaller building blocks.
 - The key draw of **Kuiper Belt objects** is their primordial nature. They are time capsules, preserving the earliest conditions of the solar system at temperatures near absolute zero. The object is in such a deep freeze that it's essentially preserved from its initial formation.
 - Ultima Thule's colour, as well as its shape, holds clues to its nature. The two lobes seem to be of the same colour, and the surfaces seem very uniform, this suggests the **two lobes are constituted of the same material**, and that it is rather homogeneous.
 - Ultima Thule itself is **43 times further away from the Earth than the Sun**.

Test yourself: Mould your thoughts

What is a Kuiper belt? What are the milestones that New Horizons mission has achieved so far? Discuss.

Prelims Questions

1. Which among the following statements is **INCORRECT**?

(a) Pluto is a dwarf planet located in the Kuiper belt.

(b) Study of Trans-Neptune Objects (TNOs) helps in understanding the origin of solar system.

(c) An important mission objectives of New Horizons is to understand the formation of plutonian system.

(d) Ultima Thule is a Non-contact binary object located in kuiper belt.

2. Which of the following statements is/are correct regarding Ultima Thule?

1. It is an icy minor planet at the edge of the solar system.

2. It is the largest celestial object of kuiper belt.

3. Was discovered for the first time by Hubble space telescope in 2014.

Select the correct answer using the codes given below:

(a) 3 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1 and 2 only