

AUSTRALIA TO RECEIVE FIRST PLUTO IMAGES

A space tracking station in Australia will become the first place in the world to receive close-up images of Pluto on Wednesday, after the New Horizons spacecraft breaks its radio silence during the 14 July 2015 flyby. After the **NASA craft sweeps within 12,500 km of Pluto, data from New Horizons will take about 4.5 hours to travel back to Earth.** By the time they arrive, these signals from the outer fringes of our solar system will be incredibly weak, practically tiny whispers. But the high sensitivity of the big dish at Australia's Canberra Deep Space Communication Complex will hear them.



Canberra Deep Space Communication Complex

The Tidbinbilla Complex is part of NASA's Deep Space Network and is one of only three tracking stations in the world that has the technology and the people with the capabilities to provide the vital two-way radio contact with spacecraft like New Horizons at such incredible distances – over 5 billion km – from Earth. They have tracked New Horizons since its launch in January 2006 and are currently receiving the latest images and telemetry from the spacecraft which allows the mission team to make decisions about course corrections and to begin the key science observations.

There will be so much data collected it will take up to a year before all of the images and science observations made by the spacecraft are fully transmitted back to Earth. Pluto is thought to contain important clues about the origins of our solar system. Icy bodies like Pluto are thought to be relics of the materials that originally built up to become the larger planets.

During the "Fly-by" the spacecraft will be in data-gathering mode and not in contact with flight controllers. Transmission to Earth recommences the next day.

The Pluto story began a generation ago when young Clyde Tombaugh was tasked to look for Planet X, theorized to exist beyond the orbit of Neptune. Clyde, a farmer's son from Kansas, inspired by a visionary from Boston using a telescope in Flagstaff Arizona, discovered a faint point of light that we now see as a complex and fascinating world in the Kuiper Belt. **Clyde William Tombaugh** (1906 – 1997) was an American astronomer best known for discovering the dwarf planet Pluto in 1930, the first object to be discovered in what would later be identified as the Kuiper belt, He also discovered many asteroids and called for the serious scientific research of unidentified flying objects, or UFOs. **Today, science takes a great leap forward by observing the Pluto system up close and flying into a new frontier that will help us better understand the origins of the solar system.**

New Horizons' flyby of the dwarf planet and its five known moons is providing an up-close introduction to the solar system's Kuiper Belt, an outer region populated by icy objects ranging in size from boulders to dwarf planets. Kuiper Belt objects, such as Pluto, preserve evidence about the early formation of the solar system. **New Horizons' almost 10-year, 5 billion km journey to closest approach at Pluto took about one minute less than predicted when the craft was launched in January 2006.** At 50,000 km/h the spacecraft threaded the needle through a 60 by 90 km window in space – the equivalent of a commercial airliner arriving no more off target than the width of a tennis ball.

THE LONG ROAD TO PLUTO

It took over 9 years for New Horizon to reach Pluto. But even this pales in comparison to the 16 years it took for a Pluto Mission proposal to get to the launch pad. **Since 1990 there have been five Pluto vehicles proposed and cancelled before New Horizon got the green light in 2001.** The first was a 350kg unit, the second a two ton behemoth based on the Cassini craft, the third a couple of light-weight probes launched a year apart, the fourth was the multi-targeted Pluto Express which, when cancelled became the Pluto Kuiper Express. A study by the National Academy of Sciences finally made Pluto a top priority and New Horizon was secured.



Clyde Tombaugh in 1928 with his homemade 9-inch telescope, discoverer of the planet Pluto

In a late-day announcement on Monday, astronomer Alan Stern – who is New Horizons principal investigator – said measurements by New Horizons in the past few days have now confirmed that **Pluto is the biggest object in the Kuiper Belt beyond planet Neptune. It measures 2,370 km in diameter.** Other comparably sized bodies Kuiper Belt bodies – for example, Haumea, Makemake and Eris – had at various times been contenders for the biggest Kuiper belt object title, but now ... Pluto wins!

IN THIS IMAGE taken by New Horizon's Long Range Reconnaissance Imager (LORRI) instrument on July 12 from a distance of 2.5 million kilometres Pluto's bright, mysterious "heart" is rotating into view, ready for its close-up on final approach. It is the target of the highest-resolution images that will be taken during the spacecraft's closest approach to Pluto on July 14. Apart from the "heart" area, measuring some 2,000 kilometres across, the most prominent feature is an elongated dark area at the equator, informally known as "the whale". The intriguing "bull's-eye" feature at right is rotating out of view and will not be seen in greater detail. Perhaps most intriguing is the fact that all of the darkest material on the surface lies along Pluto's equator.

The New Horizons spacecraft will not only capture images during Tuesday's flyby, but will also gather composition maps, temperature maps, topographic information and details of the atmosphere composition. The eight science payloads are: Visible Imaging Camera; Thermal Mapping Array; Atmospheric Spectrometer; Doppler Shift Radio; Telescopic Long Range Camera; Plasma Detector; Ion Detector; Interplanetary Dust Detector.

New Horizon has detected frozen methane on Pluto's surface; CH₄ is an odourless, colourless gas that is present underground and in the atmosphere on Earth. On Pluto, methane may be primordial, inherited from the solar nebula from which the solar system formed 4.5 billion years ago.

New Horizons is Earth's fastest-moving spacecraft

yet, but it has been travelling for nine years – nearly a decade – to make the 5 billion km journey to Pluto.

During its close encounter with Pluto, New Horizons will fly within 12,500 km of the dwarf planet and capture the first-ever close-up views of this little world and its system of five known moons. See the numerous Phases of the Pluto Encounter below as it passes through the Pluto system.

AK, from EarthSky Notes

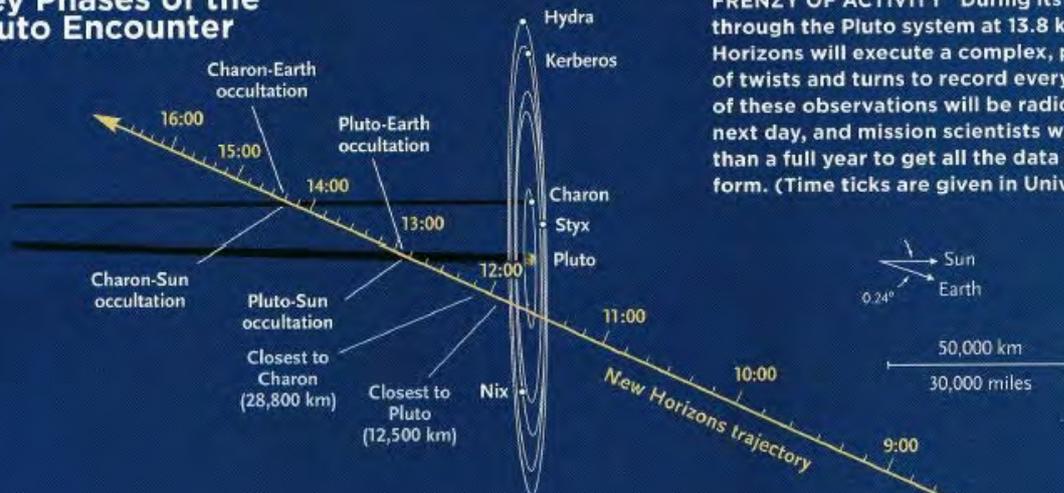


On July 11, 2015, New Horizons captured a world that is growing more fascinating by the day. For the first time on Pluto, this view reveals linear features that may be cliffs, as well as a circular feature that could be an impact crater.



Picture left is the best that the Hubble Telescope could produce of Pluto, compared to the latest from New Horizon on the right.

Key Phases of the Pluto Encounter



FRENZY OF ACTIVITY During its July 14-15 pass through the Pluto system at 13.8 km per second, New Horizons will execute a complex, programmed sequence of twists and turns to record everything it can. None of these observations will be radioed to Earth until the next day, and mission scientists will have to wait more than a full year to get all the data in uncompressed form. (Time ticks are given in Universal Time.)

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