

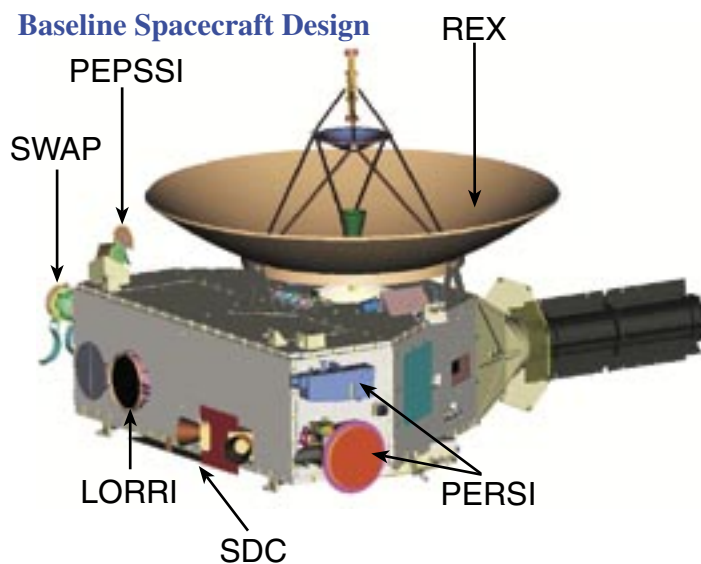
NEW HORIZONS: Shedding Light on Frontier Worlds



Mission Overview. *New Horizons* is an exciting scientific investigation to obtain the first close look at Pluto-Charon, a binary planet, and then multiple Kuiper Belt Objects (KBOs). Owing to their fundamental relationship to understanding our solar system's origin and evolution, a Kuiper Belt-Pluto flyby was the top priority in the National Research Council's Decadal Survey of Solar System Exploration.

New Horizons seeks to learn more about the surfaces, atmospheres, interiors and space environments of Pluto, Charon and KBOs by using imaging, visible and infrared (IR) spectral mapping, ultraviolet (UV) spectroscopy, radio science, and in situ plasma sensors. Scheduled for launch in 2006, *New Horizons* could fly through the Pluto-Charon system as early as 2015. Over a 150-day period it would conduct the first spacecraft reconnaissance of these worlds, then continue into the Kuiper Belt for further encounters.

Baseline Spacecraft Design



Mission Management

Principal Investigator: Dr. S. Alan Stern, Southwest Research Institute (SwRI)
 Project Manager: Mr. Thomas Coughlin, The Johns Hopkins University Applied Physics Laboratory (JHU/APL)
 Payload Manager: Mr. Bill Gibson, SwRI
 Spacecraft: JHU/APL

Baseline Mission Summary

Launch vehicle: Atlas V 551
 Launch date: January 2006
 Jupiter flyby: February 2007
 Pluto-Charon encounter: July 2015
 Kuiper Belt Object encounter(s): 2017-2020

Mission Benefits

- Education/Public Outreach: comprehensive formal and informal education programs
- Potential Technology Transfer: low-power digital receiver
- Small Disadvantaged Businesses: proactive small and small disadvantaged business plan

Science Payload

- PERSI:** Visible mapping, infrared spectroscopic mapping, and ultraviolet imaging spectroscopy (SwRI, Ball, NASA/Goddard Space Flight Center)
- REX:** Radio science and radiometry (Stanford, JHU/APL)
- SWAP:** Solar wind (SwRI)
- PEPSSI:** Energetic particle spectrometry (JHU/APL)
- LORRI:** Long-range and high-resolution visible mapping (JHU/APL)
- SDC:** Student-built dust counter (Univ. of Colorado)

Key Spacecraft Design Characteristics

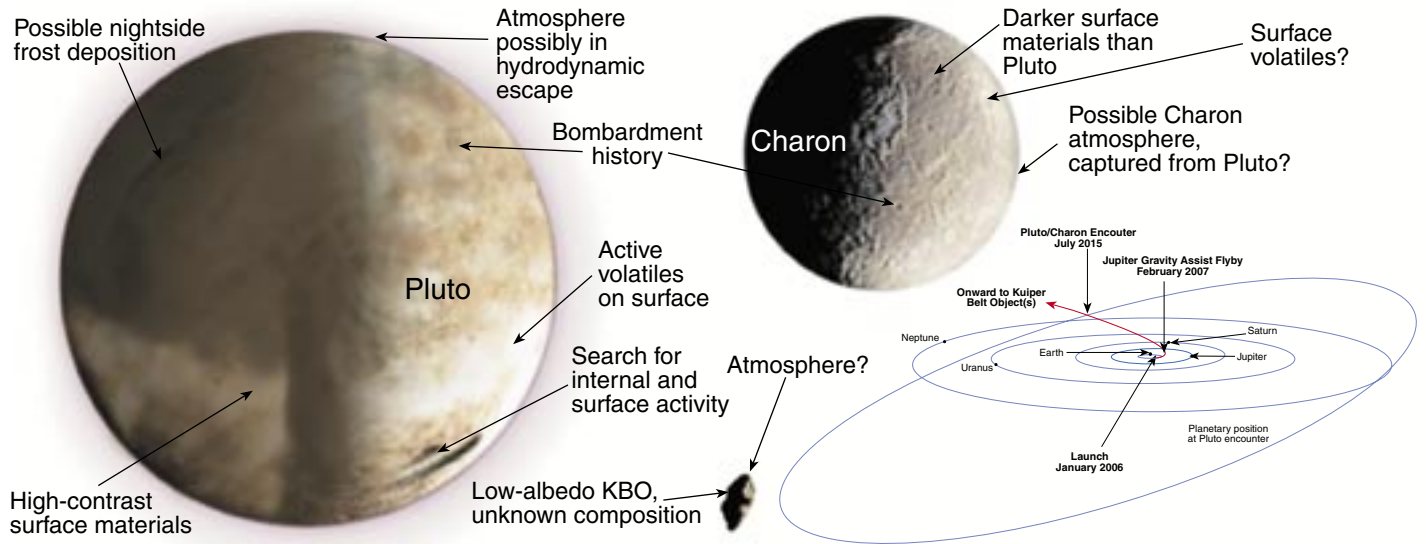
- Power at Pluto:** 228 watts (in 2015)
- Spacecraft mass:** 465 kilograms (including fuel)
- Redundancy:** All major electronics
 Star cameras
 Data storage (Two 64-gigabit data recorders)
- Propulsion:** Hydrazine monopropellant
- Attitude control:** 3-axis & spin-stabilized modes
- Communications:** X-band, 2.1-meter high-gain antenna
- Downlink from Pluto:** 768 bits per second to 70-meter antenna
- Beacon Cruise Mode:** Reduces risk

New Horizons on the Web: <http://pluto.jhuapl.edu>

New Horizons — A mission to explore Pluto-Charon and Kuiper Belt Objects



One of the best images of exotic Pluto and its icy moon Charon, as seen by the Hubble Space Telescope.



At Pluto-Charon, New Horizons would provide:

- *Images superior to those from the Hubble Space Telescope for 75 days before flyby (12 Pluto days)*
- *Global maps of both worlds at 40-kilometer resolution and hemispheric maps at 1-kilometer resolution*
- *Infrared spectral maps at up to 7-kilometer resolution and visible 4-color maps at up to 3-kilometer resolution*
- *High-resolution terminator images at 100-meter resolution*
- *Ultraviolet and radio occultations of both Pluto and Charon*
- *Ultraviolet dayglow and nightglow spectra of Pluto's atmosphere*
- *In situ measurements of energetic particles and the solar wind*
- *Surface temperature maps at 50-kilometer resolution*

Similar data would be obtained at one or more Kuiper Belt Objects

Neptune's moon Triton is thought to be similar to Pluto. This Voyager 2 mosaic shows the fascinating complexity of this world and tantalizes us with the wonders that *New Horizons* could reveal at Pluto-Charon.