New Horizons mission to Pluto and the Kuiper belt

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NASA's New Horizons (NH) Pluto-Kuiper Belt (PKB) mission was selected for development in 2001 following a competitive selection process. New Horizons is the first mission to the Pluto system and the Kuiper belt, and will complete the reconnaissance of the classical planets. The mission was launched on 19 January 2006 on a Jupiter Gravity Assist (JGA) trajectory toward the Pluto system, for a 14 July 2015 closest approach to Pluto; Jupiter closest approach occurred on 28 February 2007. The ∼400 kg spacecraft carries seven scientific instruments, including panchromatic and color imagers, UV and IR mapping spectrometers, radio science/radiometry, a plasma and particles suite, and a dust counter built by university students. These instruments are: Alice, an extreme to far-ultraviolet (50–180 nm) imaging spectrometer; Ralph, a combination of a) three panchromatic and four color imagers inside MVIC (Multispectral Visible Imaging Camera) and b) a short-wavelength infrared (1.25–2.50 micron) composition mapping spectrometer, called LEISA (Linear Etalon Imaging Spectral Array); REX (Radio science EXperiment), in which signal- processing electronics are integrated into the telecommunications system; LORRI (LOng Range Reconnaissance Imager), a panchromatic long focal length imager; SWAP (Solar Wind at Pluto), which will make energy (up to 6.5 keV) measurements of both the solar wind interaction with Pluto's atmosphere and of low energy pickup ions from Pluto; PEPSSI (Pluto Energetic Particle Spectrometer Science Investigation), which will determine the density, composition and nature of energetic (up to 1 MeV) particles escaping from Pluto's atmosphere; and the Venetia Burney Student Dust Counter (SDC), which has been tracing the dust density distribution across the entire Solar System for particles with masses as small as 1 pg.

New Horizons will study the Pluto system over a 12-month period beginning in early 2015. Following that, NH plans to go on to reconnoiter one or two 30–50 kilometer-diameter Kuiper Belt Objects (KBOs) if 1) the spacecraft is in good health, 2) at least one accessible KBO can be located from the Earth or Earth orbit in time, and 3) NASA approves an extended mission. New Horizons previously conducted a successful encounter with Jupiter and the Galilean satellites, has collected and is collecting valuable cruise science data, and became the prototype for NASA's medium-scale, PI-led New Frontiers planetary mission class. The NH flyby of the Pluto system will represent a watershed in the scientific exploration of the Solar System, by exploring a new class of planet in the Solar System — dwarf planets — and an accompanying, extensive satellite system. In this review talk we provide a more in-depth overview of the spacecraft, payload, and flyby plans.