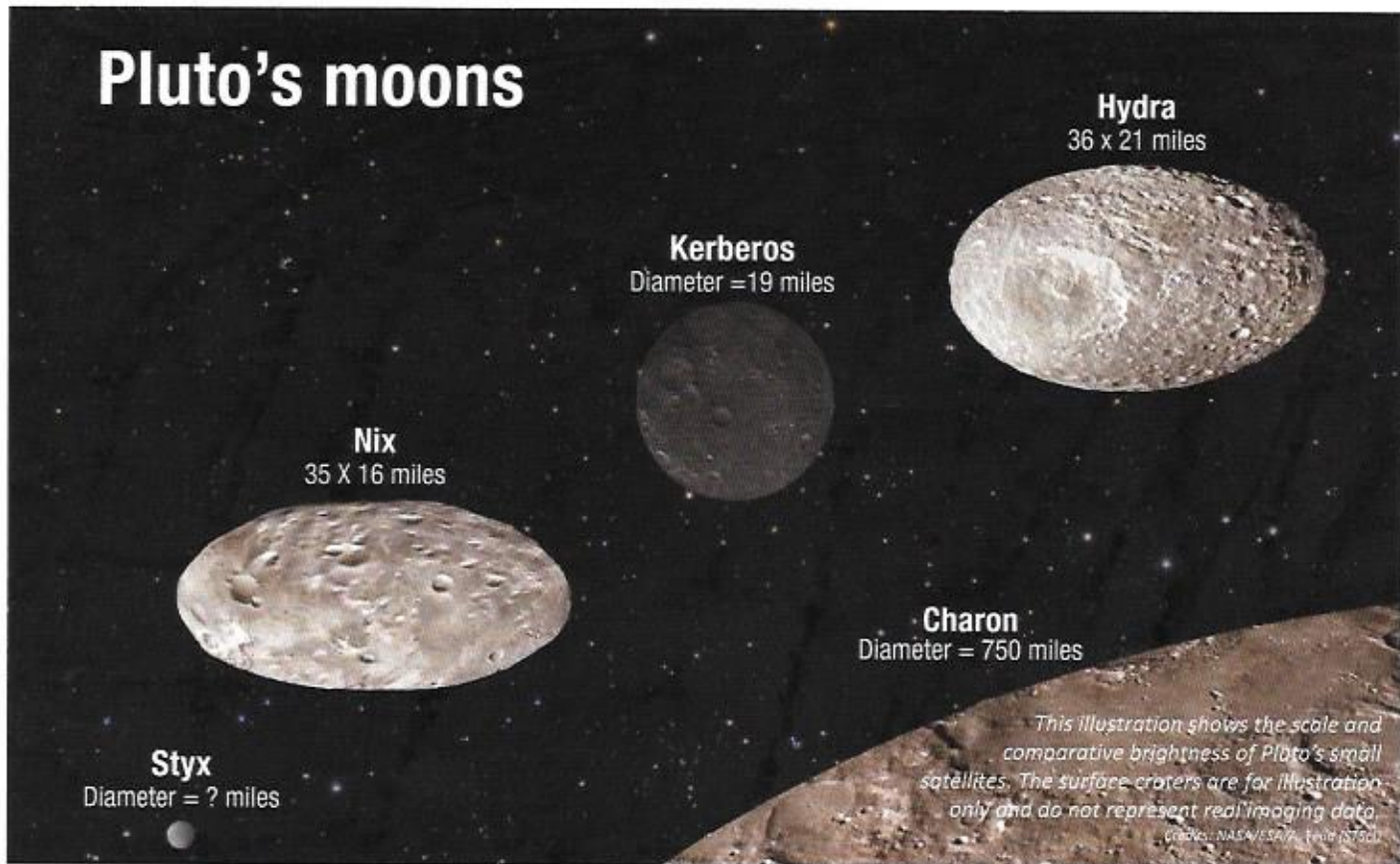


Pluto's moons



This illustration shows the scale and comparative brightness of Pluto's small satellites. The surface craters are for illustration only and do not represent real imaging data.
Credits: NASA/ESA/D. Brown (STScI)

PLUTO'S CHAOTIC MOONS

By Henry M. Holden

CHAOTIC RHYTHM for a cosmic dance – this is the new view gained of Pluto and its moons revealed by a comprehensive analysis of data from NASA's Hubble Telescope which shows that two of Pluto's five moons, Nix and Hydra, wobble unpredictably.

The New Horizons probe was due to have made the first-ever flyby of Pluto on July 14, cruising within 7 800 miles of the frigid planet's surface. Earlier, in June, New Horizons began looking for undiscovered moons, rings, and other hazards that could potentially damage the spacecraft as it approaches Pluto.

New Horizons is travelling at a higher velocity than any other spacecraft, and it is currently zooming along at 32 550 mph relative to the sun – so fast that an encounter with even a small piece of debris could cause serious damage.

John Spencer, of the Southwest Research Institute in Boulder, Colorado, said it was not expected to find anything that would present a serious problem.

A new study into the characteristics and orbital dynamics of Pluto's known moons has the New Horizons' team feeling comfortable about their chances. (Pluto's largest satellite, Charon, is much larger and is considered to comprise half of a Pluto-Charon "binary planet.")

"The system is quite full," Spencer said. "It is hard to put additional moons in there in random locations, because they probably would not be stable – they would be thrown out – and there's a limited number of additional places that you could put moons, most of which tend not to be

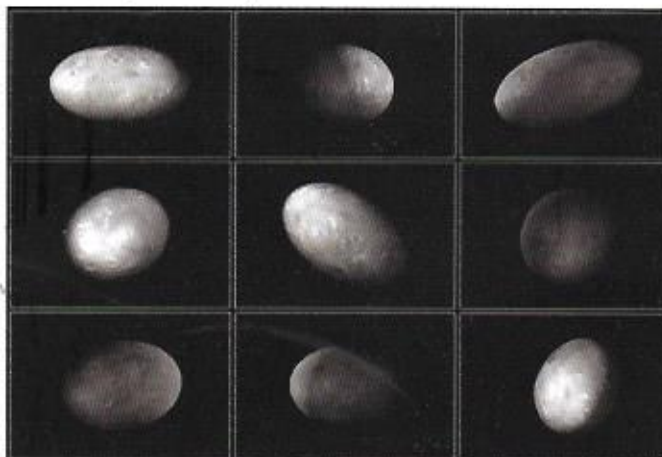
very close to where the spacecraft is flying through the system."

According to Spencer, undetected moons do not pose much of a collision risk in themselves, but they could be shedding dust and other material that New Horizons should avoid.

If the analysis of the data does turn up something problematic, the team could divert the craft to one of three alternate trajectories and/or rotate its high-gain antenna forward, using the dish as a shield.

"We don't want to do that unless we have to because that would reduce the amount of science we could gather during the close approach," said Spencer. "So we would only intend to do that if we thought there was a significant chance of some danger."

NASA provided this explanation of the two moons' wobble: "Because they're embedded in a gravitational field that shifts constantly. This shift is created by the double planet system of Pluto and Charon as they whirl about each other.



This set of computer modeling illustrations of Pluto's moon Nix shows how the orientation of the moon changes unpredictably as it orbits the "double planet" Pluto-Charon.

Credits: NASA/ESA/M. Showalter (SETI)/G. Bacon (STScI)

Pluto and Charon are called a double planet because they share a common centre of gravity located in the space between the bodies.

"Their variable gravitational field sends the smaller moons tumbling erratically. The effect is strengthened by the football-like, rather than spherical, shape of the moons." Scientists believe it is likely Pluto's moons, Kerberos and Styx, are in a similar situation.

Scientists also found that three of Pluto's moons are presently locked together in resonance, meaning there is a precise ratio for their orbital periods. →