

Comet-hunter ready to rendezvous

After a decade-long journey, the Rosetta spacecraft is to enter the orbit of 67P/Churyumov-Gerasimenko and begin manoeuvres around it in preparation for the first-ever landing by a spacecraft on a comet

Comet named after Klim Churyumov and Svetlana Gerasimenko, who discovered it in 1969

Nov 11, Landing: Philae probe released

Aug 2015: Closest approach to Sun

Jan 20, 2014: Rosetta woken from hibernation

Aug 6, Rendezvous: Rosetta maps comet to find suitable site to dispatch lander

June 2011 After four flybys of Earth and Mars, Rosetta is put into hibernation to save energy

Mar 2004: Rosetta launched

Dec 2015: Nominal end of mission

ROSETTA ORBITER: Instruments to measure structure of nucleus, dust and plasma tails. Others for visible, ultraviolet and infra-red imaging

PHILAE LANDER: Must attach to nucleus of comet – travelling through space at 20 kilometres per second

Experiments: X-ray spectrometer measures elemental composition of comet's surface; radiowaves probe internal structure of nucleus; six micro-cameras take panoramic pictures

Gas analysers identify complex organic molecules and isotopic ratios of light elements

Weight: 100kg

Sampling system: Can drill 20cm into surface. Samples deposited in ovens or delivered for microscope inspection

Legs: Absorb kinetic energy to reduce risk of bouncing. Can rotate or tilt to return lander to upright position

Harpoon: Fired to anchor probe to ground. Sensors measure density, and thermal properties of surface

Recent images taken by Rosetta show comet has "contact binary" nucleus – two objects joined together. Icy, bean-shaped core is around 4km wide

5km (3 miles)

COMET STRUCTURE

Dust tail

Coma

Nucleus

Plasma tail: Molecules – ionised by ultraviolet solar radiation – blown away by solar wind