

FAREWELL ROSETTA

Rosetta made a controlled impact into the Ma'at region of Comet 67P/Churyumov–Gerasimenko on 30 September 2016, targeting a point within a 700x500m ellipse as outlined on the image. Image via ESA.

The European Space Agency (ESA) Rosetta spacecraft – which has been orbiting Comet 67P since August, 2014 – completed its mission in a controlled descent to the comet's surface on September 30, 2016.

End of mission descent video can be seen on the ESA website and covers the last 14 minutes to touchdown at 11:20 UTC on that day. The target point is adjacent to an active pit that the ESA mission team has informally named Deir el-Medina. ESA said:

The target area is home to several active pits measuring over 100 metres across and 60 metres deep, from which a number of the comet's dust jets originate. Some of the pit walls also exhibit intriguing metre-sized lumpy structures called 'goosebumps', which could be the signatures of early cometesimals [i.e. the building blocks of comets] that agglomerated to create the comet in the early phases of solar system formation.

Rosetta's final descent transmissions will be studied for years and may show detailed close-up views of these features.

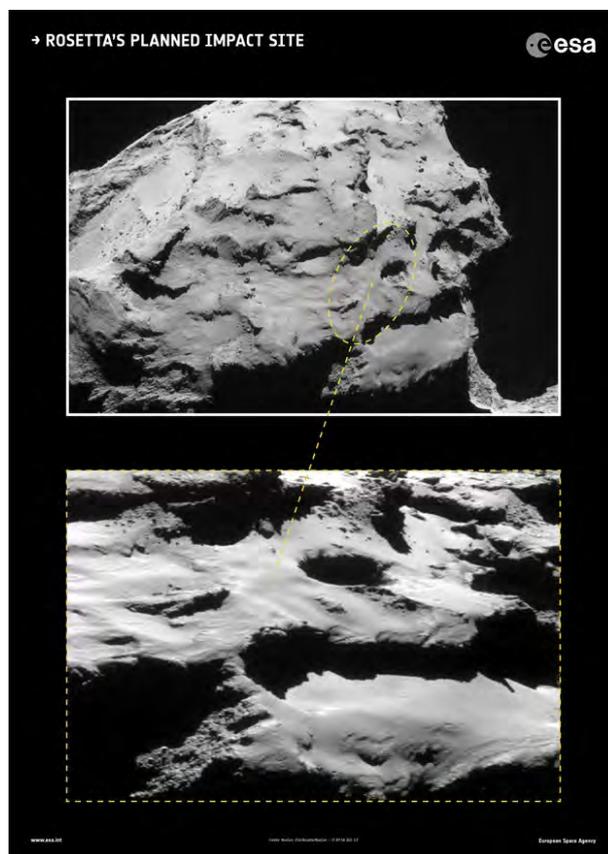
Since August 9 Rosetta has been flying elliptical orbits that bring it progressively closer to the comet. **Sylvain Lodiot**, ESA's spacecraft operations manager, said in a September 9 statement:

Although we've been flying Rosetta around the comet for two years now, keeping it operating safely for the final weeks of the mission in the unpredictable environment of this comet and so far from the sun and Earth, will be our biggest challenge yet.

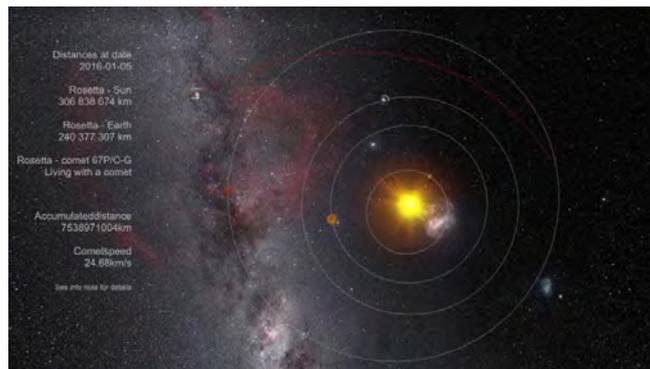
It's sad to see this wonderful mission end, but exciting to see it go out with such a flourish. Who can forget the thrill two years ago, when Rosetta arrived at its comet? But ending the mission now is logical for several reasons:

1. The comet and spacecraft are getting ever-farther from the sun. The craft is heading out towards the orbit of Jupiter and consequently it's receiving less sunlight. The solar power needed to operate the craft and its instruments is waning, and there's been a reduction in the bandwidth available to downlink scientific data back to ESA,
2. Rosetta and her instruments are aging. The mission was launched on March 2, 2004, aboard an Ariane 5 rocket. On its way toward a rendezvous with its comet, Rosetta made four slingshot flybys to boost its speed via gravitational assist — one around Mars and three around Earth.
3. Rosetta has been in the harsh environment of space for over 12 years, the last two of which were in the dusty environment of Comet 67P in the most volatile part of its orbit, as it swung in near the Sun before and after its perihelion on August 13, 2015.

On September 30, Rosetta is some 720 million km from Earth, and the one-way signal travel time for communication is about 40 minutes.



Rosetta will crash into the Ma'at region of Comet 67P. The yellow ellipse marks an approximate outline of the 700- x 500-meter (700- x 500-yard) target area. .



Where is Rosetta? See the red arced line, top of image? It's a depiction of the Rosetta spacecraft leaving the inner solar system after the slingshot around Mars.



Before the Rosetta spacecraft mission, who knew comets looked like this?