

Rosetta sets sights on destination comet

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Comet 67P/Churyumov-Gerasimenko in the constellation Ophiuchus. This image was taken on 21 March by the OSIRIS Narrow Angle Camera. The comet is indicated by the small circle next to the bright globular star cluster M107. The image was taken from a distance of about 5 million kilometres to the comet. A wide-angle image was taken on 20 March. Credit: ESA

(Phys.org) —ESA's Rosetta spacecraft has caught a first glimpse of its destination comet since waking up from deep-space hibernation on 20 January.

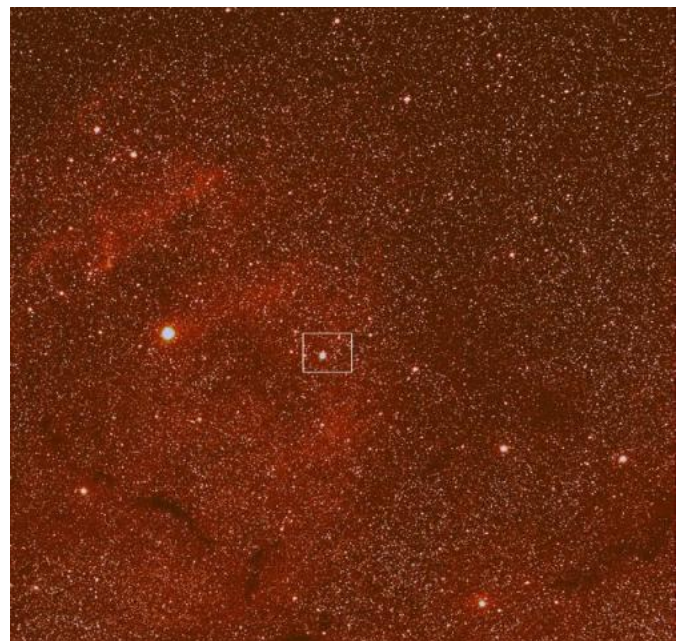
These two 'first light' images were taken on 20 and 21 March by the OSIRIS wide-angle camera and narrow-angle camera, as part of six weeks of activities dedicated to preparing the spacecraft's science instruments for close-up study of [comet 67P/Churyumov-Gerasimenko](#).

OSIRIS, the Optical, Spectroscopic and Infrared Remote Imaging System, developed under the leadership of the Max-Planck-Institut für Sonnensystemforschung in Göttingen, Germany, has two cameras for imaging the comet. One covers a wide angle, while the narrow-angle camera covers a smaller field at higher resolution.

OSIRIS is one of a suite of 11 [science instruments](#)

on the Rosetta orbiter that together will provide details on the comet's surface geology, its gravity, mass, shape and internal structure, its gaseous, dust-laden atmosphere and its plasma environment.

Rosetta has been travelling through the solar system for 10 years, and will finally arrive at the comet in August this year. It first imaged the comet in a long exposure of over 13 hours from a distance of 163 million kilometres, three years ago, before entering deep-space hibernation.



Comet 67P/Churyumov-Gerasimenko in the constellation of Ophiuchus. This image was taken with the OSIRIS Wide Angle Camera on 20 March and shows a wide field 25 times larger than the diameter of the full moon. The colour composite shows a background of hydrogen gas and dust clouds in the constellation Ophiuchus. The white box indicates the position of the close-up taken with the Narrow Angle Camera, with the comet appearing towards the top of this box, close to the bright globular star cluster M107. The image was taken from a distance of about 5 million kilometres to the comet. Credit: ESA

Rosetta is currently around 5 million kilometers from the comet, and at this distance it is still too far away to resolve—its light is seen in less than a pixel and required a series of 60- to 300-second exposures taken with the wide-angle and narrow-angle camera. The data then travelled 37 minutes through space to reach Earth, with the download taking about an hour per image.

With OSIRIS re-activated in the first week of instrument commissioning, Rosetta's 10 other science experiments, along with lander Philae, will provide the focus for the next months' activities.

Provided by European Space Agency

"Finally seeing our target after a 10-year journey through space is an incredible feeling," says OSIRIS Principal Investigator Holger Sierks from the Max Planck Institute for Solar System Research in Germany. "These first images taken from such a huge distance show us that OSIRIS is ready for the upcoming adventure."

"This is a great start to our instrument commissioning period, and we are looking forward to having all 11 instruments plus lander Philae back online and ready for arriving at the comet in just a few months' time," says Matt Taylor, ESA's Rosetta project scientist.

OSIRIS and the spacecraft's dedicated navigation cameras will regularly acquire images over the coming weeks to help refine Rosetta's trajectory in order to bring it steadily in line with the comet ahead of the rendezvous.

Currently, Rosetta is on a trajectory that would, if unchanged, take it past the comet at a distance of approximately 50,000 km and at a relative speed of 800 m/s. A critical series of maneuvers beginning in May will gradually reduce Rosetta's velocity relative to the comet to just 1 m/s and bring it to within 100 km by the first week of August.

Between May and August the 4-km-wide comet will gradually 'grow' in Rosetta's field of view from appearing to have a diameter of less than one camera pixel to well over 2,000 pixels—equivalent to a resolution of around 2 m per pixel—allowing the first surface features to be resolved.

These early observations will allow the rotation rate and the shape of the nucleus to be better understood, crucial for planning maneuvers around the comet. An initial assessment of the comet's activity will also be possible.

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