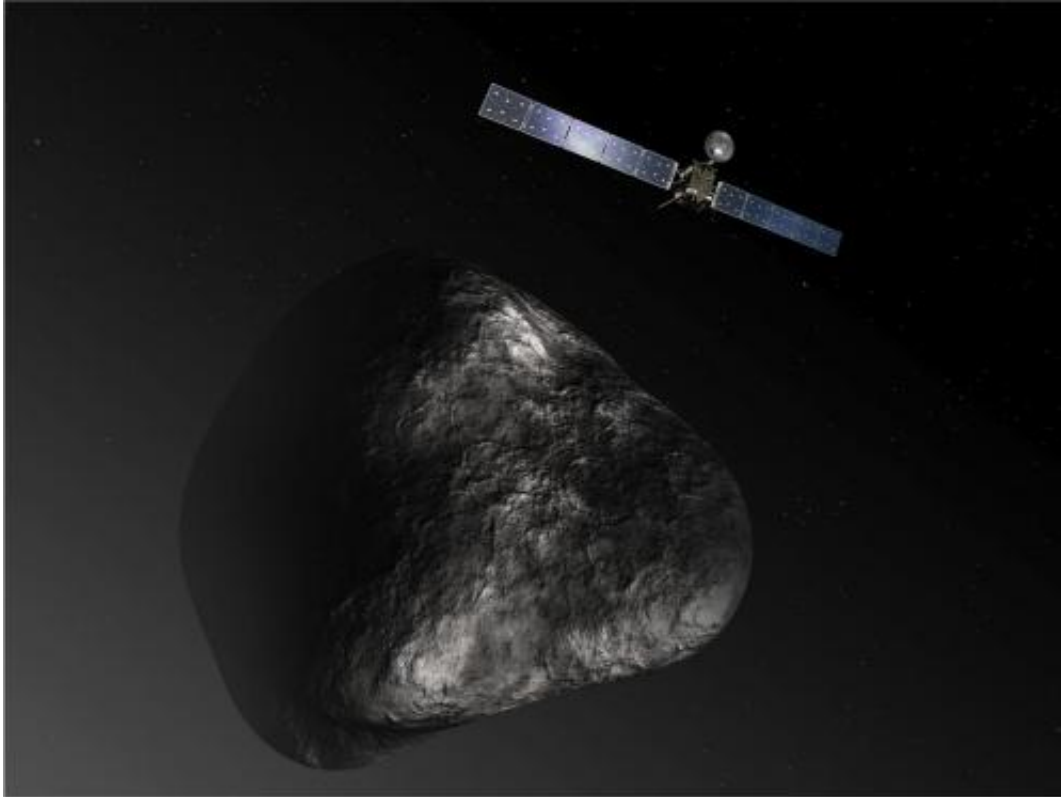


Rosetta: What happens next?

November 14 2014



This artist's impression shows the Rosetta orbiter at comet 67P/Churyumov-Gerasimenko. The image is not to scale. Credit: ESA/ATG Medialab

A University of Leicester planetary scientist has hailed the European Space Agency's mission to land a probe on a fast-moving comet as a success despite issues with the landing.

Professor Stan Cowley, of the University's Department of Physics and

Astronomy, has said the probe, known as Philae, could begin to unlock answers about the creation of the [solar system](#) with data collected from its landing debris.

The small satellite touched down on [comet](#) 67P/C-G at about 3.30pm yesterday after a seven hour journey across empty space following its release from Rosetta.

The moment was witnessed by millions of people across the world who had streamed a live feed from the operational control room, in Darmstadt, Germany.

But evidence soon came to light which showed that the probe's harpoons, which were supposed to anchor Philae to the comet, had not fired.

And ESA scientists are working to figure out exactly what happened and whether the misfire will become an issue.

Professor Cowley, who was involved in the early planning stages of the Rosetta mission, said it is not completely clear what happened with the probe's harpoons.

He said: "Well it looks like everything has gone mostly according to plan – though with a few hiccups, as often happens with something so complex.

"The lander is down on the [surface](#), which is a marvellous achievement, though it is not clear whether the harpoons actually fired into the surface to hold it there – but if they did not, it is unclear why Philae didn't just bounce off again into space.

"Possibly the surface material is light and fluffy and that it stuck into this material – and there is indication that it buried itself several

centimetres into the surface which suggests that it is not very hard.

"On the other hand the screws appear to have worked, which is good, but it is still not very clear how tightly it is gripping onto the surface. We will have to wait for further data to see."

It is the first time that scientists have successfully touched down on a speeding comet and images from the icy surface were due to be released yesterday, but as of yet remain with ESA.

One thing that has come from the landing is the material analysis of dust and ice from the initial impact of the [probe](#).

Scientists are looking at all the surface debris which was disturbed when Philae touched down.

Professor Cowley said data from the material will already explain a lot about the formation of solar system.

"One early result that we are now waiting for is the measurements on the analysis of the debris cloud that was kicked up by the landing.

"One key result concerns the oxygen isotope ratios in the comet water – are they the same as at Earth, and the Sun, or different?

"If different it would put a big question mark over the idea that a large fraction of Earth's water came from comet bombardment early in the solar system's formation, as in 'late heavy bombardment' picture 3.8 billion years ago. We will have to wait and see."

The mission objective is to learn more about the composition of the comet, which is a remnant from the formation of the solar system some 4.6 billion years ago.

Analysis of the water, ice, gas and organic material trapped within the comet could help explain how the Earth acquired its water and could even answer questions about the origins of life on our planet.

Provided by University of Leicester

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