

One year after comet touchdown, what's next for Philae?

November 10 2015, by Mari ette Le Roux, Pascale Mollard-Chenebenoit



An artist's impression of Philae on the surface of comet 67P/Churyumov-Gerasimenko, released by the European Space Agency

A year ago on Thursday, the world held its collective breath as a European spacecraft dropped a tiny robot lab onto the surface of a comet hurtling towards the Sun.

The 12 months since that bumpy landing have yielded many exciting scientific finds, and more than a little drama, as Philae intermittently phoned home from its alien host between long bouts of sleep.

Now, after four months without word, perched on comet 67P/Churyumov-Gerasimenko, ground controllers are hoping for a last chance to make contact and even do some science before the lander finally runs out of steam.

"We hope to resume a series of scientific operations with Philae in the coming weeks," lander scientist Jean-Pierre Bibring told AFP.

Assuming the lab's instruments are working and its [solar panels](#) tilted at the right angle, "we could have several contacts with the robot beginning this week" and instruct it to run experiments, possibly even the drill it has not yet successfully deployed.

Conditions will be best in the period from the end of November to the beginning of December, scientists say.

Philae touched down on 67P on November 12 last year after a 10-year, 6.5-billion-kilometre (four-billion-mile) journey through space, piggybacking on European mothership Rosetta, now orbiting the comet.

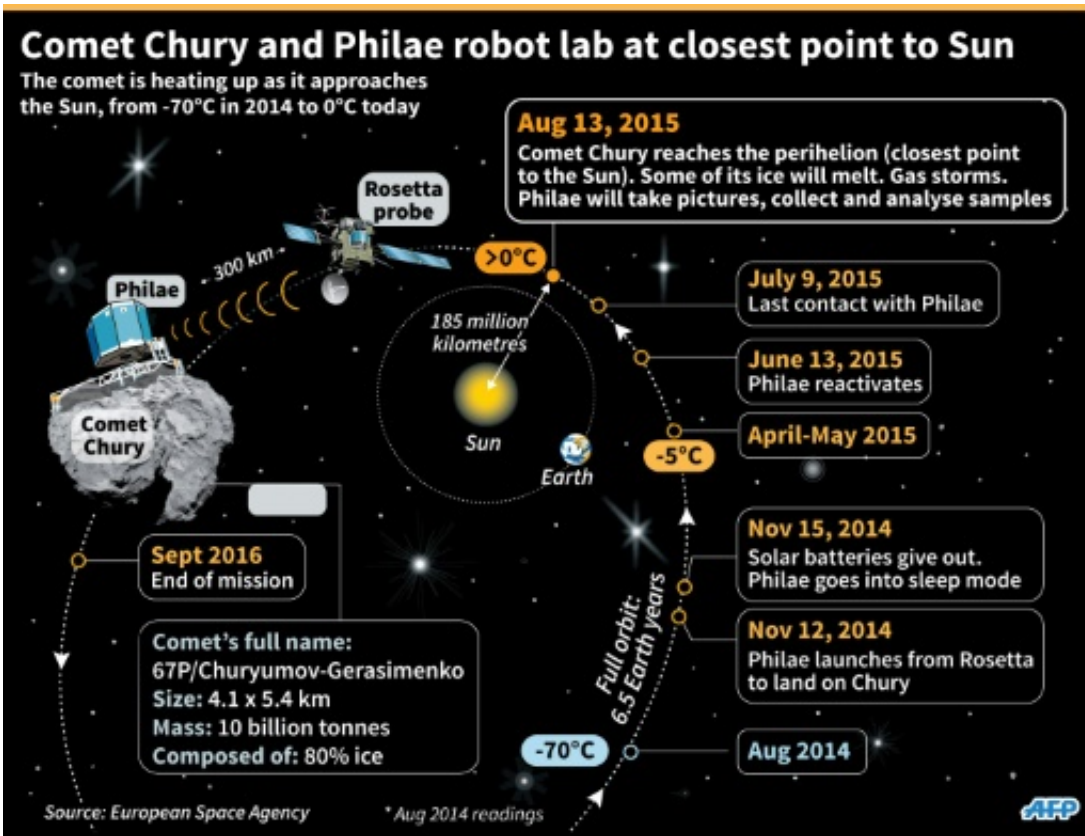
The landing was bumpy—the washing machine-sized lab bounced several times on the craggy surface before ending up at an angle in deep shade, deprived of battery-replenishing sunlight.

Philae sent home data from about 60 hours of comet sniffing and prodding with eight of its 10 instruments, before going into standby mode on November 15, 2014.

Status unknown

The lander's power pack was recharged as 67P drew closer to the Sun on its elliptical orbit, and Philae woke up on June 13, to great excitement on Earth.

It made eight intermittent contacts, uploading data, only to fall silent again on July 9.



A graphic shows key dates in Philae's journey

The robot lab's current status is unknown.

Part of the problem is that Rosetta had to move into a more distant orbit, out of radio reach, as its sensitive star-navigation system became confused in the outpouring of dust from 67P as it shaved past the Sun.

So Philae may be awake and trying to establish contact, without anyone knowing.

The comet passed its closest point to the Sun, or perihelion, in August this year, and Rosetta has now started descending as the dust has diminished.

By Monday, it was at about 200 km—down from some 300 km at its widest orbit, and 10 km at its narrowest.

In theory, Philae should have enough solar power at its current distance from the Sun—some 270 million kilometres—and a healthy core temperature.

But the window for contact is short, said Mark McCaughrean, senior science advisor at the European Space Agency.

Calling it quits?

"I wouldn't put bets on it, but it's maybe four to eight weeks wide, where Philae gets enough power and we are close enough," he said.



Scientists celebrate in 2014 after Philae becomes the first ever probe to land on a comet

"The amount of sunlight that Philae should be getting at the location we roughly believe it to be, that's going to start decreasing by the end of December."

For now, nobody knows, but Philippe Gaudon, Rosetta project manager at French [space agency](#) CNES, has declared himself "reasonably optimistic" of making a fresh link.

The ground-breaking mission was conceived to learn more about the origins of life on Earth.

Comets are pristine leftovers from the Solar System's formation some

4.6 billion years ago. Some experts believe they smashed into our infant planet, providing it with water and the [chemical building blocks](#) for life.

Philae has found several organic molecules, including four never before detected on a comet.

There is of course the possibility that we may never hear from the lander again.

In July, controllers expressed fears it may have shifted on the surface, out of radio range. Another risk was that its solar panels have been covered in comet dust.

"There comes a point next year when we're going to have to declare the search over even if we don't have definitive proof that Philae is dead," said McCaughrean.

"Broadly speaking, people are thinking January-ish, maybe give it another few weeks just to be absolutely sure... and then say sayonara, so long, we've got to go do other things now."

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