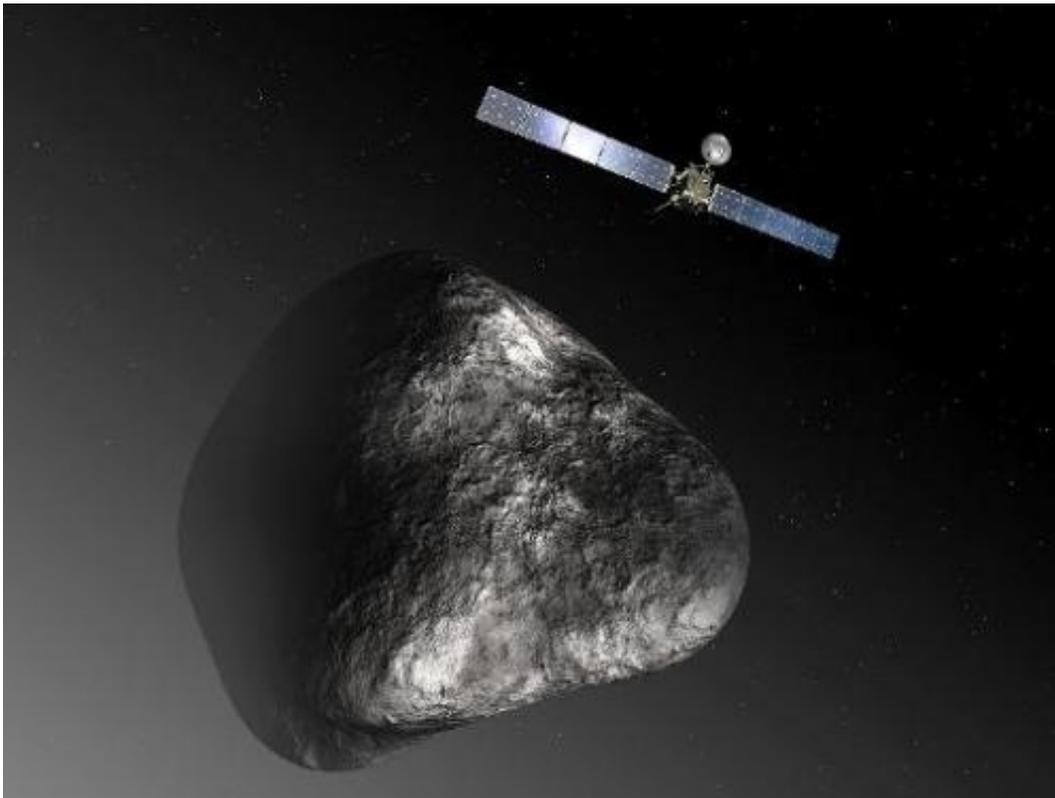


# Comet-probing robot to wake from hibernation

March 26 2014, by Véronique Martinache

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An artist impression released by the European Space Agency on December 3, 2012 of the Rosetta orbiter and the 67P/Churyumov-Gerasimenko comet

A fridge-sized robot lab hurtling through the Solar System aboard a European probe is about to wake from hibernation and prepare for the first-ever landing by a spacecraft on a comet.

The delicate operation, starting Friday, marks the next phase in the European Space Agency's billion-dollar mission to explore one of these ancient wanderers of our star system.

Sent to sleep in 2011 to save energy, the lander will start a weeks-long process of progressively waking up, checking and updating its systems ahead of its historic rendezvous with Comet 67P/Churyumov-Gerasimenko.

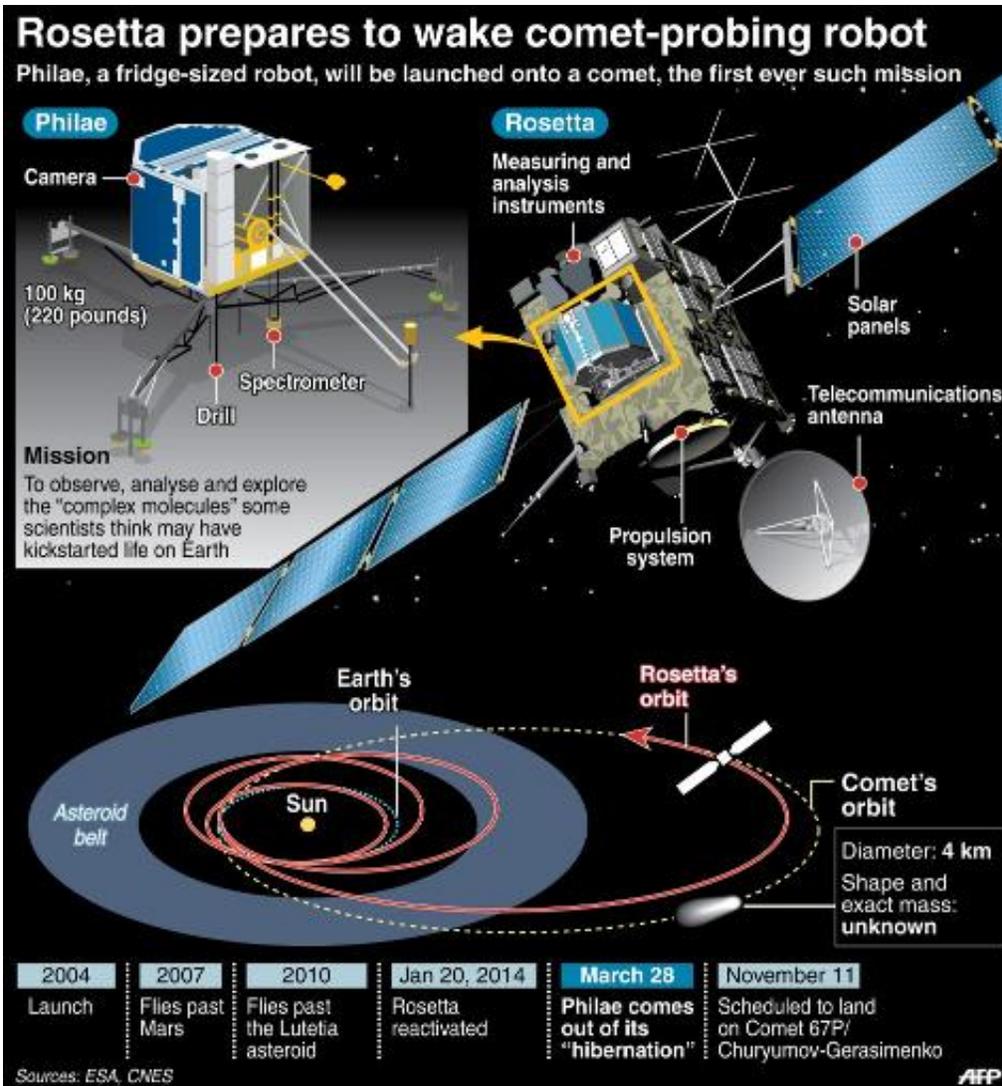
Dubbed Philae, the 100-kilo (220-pound) lander carried by the Rosetta spacecraft is the scientific star in a mission that has already taken 10 years and a seven-billion-kilometre (4.3-billion-miles) trek around the inner Solar System.

Comets follow elliptical orbits around the Sun, spewing spectacular tails of gas and dust as close brushes with the hot star cause surface ice to evaporate.

They are sometimes called "dirty snowballs"—but cosmologists say comets' primeval mix of ice and dust are time capsules, offering insights into how the Solar System formed 4.5 billion years ago.

Some scientists believe comets may have brought much of the water in today's oceans and possibly complex molecules that kickstarted life on Earth.

This is where Philae comes in: it is stuffed with 10 instruments designed to probe and analyse the [comet](#)'s surface, teasing out the secrets of its composition and organic chemistry.



Fact files on the Rosetta probe and the Philae robot it will send down to land on and analyse a comet

Philippe Gaudon of France's CNES [space agency](#) said Philae's 33-month slumber was almost exactly "like an animal in hibernation," for only its temperature was monitored during this time to check it remained alive in the chill of deep space.

The wakeup, he added: "will be like switching on a computer that's been

off for three years."

## **Harpooning a comet**

"By the beginning of July, Rosetta will be about 50,000 km (31,000 miles) from the comet, by the beginning of August no more than 150 km," said Gaudon.

In August, the satellite will be inserted into an orbit 25 kilometres above Comet "C-G", which travels at speeds up to 135,000 kilometres per hour, to start scanning the surface for a suitable landing site for Philae.

On November 11, Rosetta will inch to within two to three kilometres of the comet surface to put down its precious load in a "delicate, difficult" operation, said Gaudon.

The box-shaped lander will touch down on its three legs, fire two harpoons into the surface to provide anchorage, and then further secure itself with ice screws before starting its work.

Cameras will send back images of the surface, and microscopes and spectrometers will analyse the soil from samples taken from as deep as 24 centimetres (9.4 inches).

Over the last quarter-century, 11 unmanned spacecraft have been sent on missions to comets, but none has landed.

The US Stardust probe brought home dusty grains snatched from a comet's wake, while Europe's Giotto ventured to within 200 km of a comet's surface.

If the landing goes well, Philae's mission will last four to six months, enough to explore the comet "from all angles," said Gaudon.

But if it fails to wake up or trips up on landing, the mission will continue with observations by Rosetta itself as it accompanies the comet in its loop around the Sun for a total 17 months.

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