Scientists hope comet-chaser spacecraft wakes up (Update)

January 20 2014, by Frank Jordans

This image provided by the European Space Agency ESA shows an artist's impression of the Rosetta orbiter deploying the Philae lander to comet 67P/Churyumov–Gerasimenko. The image is not to scale; the Rosetta spacecraft measures 32 m across including the solar arrays, while the comet nucleus is thought to be about 4 km wide. Scientists at the European Space Agency are expecting their comet-chasing probe Rosetta to wake from almost three years of hibernation at 11 a.m. Monday Jan. 20, 2014 (1000 GMT; 5 a.m. EST) and phone home to say all is well. (AP Photo/ESA, C.Carreau, File)

Europe's Rosetta probe is due to wake up from years of hibernation Monday, but scientists face an agonizing wait of several hours until the first signal reaches Earth and they can celebrate a new milestone in their unprecedented mission to land a spacecraft on a comet.

Dormant systems on the unmanned spacecraft were scheduled to switch back on at 11 a.m. (1000 GMT; 5 a.m. EST) in preparation for the final stage of its decade-long mission to rendezvous with comet 67P/Churyumov-Gerasimenko. They had been powered down in 2011 to conserve energy, leaving scientists in the dark about the probe's fate until now.

"We don't know the status of the spacecraft," said Paolo Ferri, head of mission operations at the European Space Agency. "There is a possibility that we're not going to hear anything. Two-and-a-half years are a long time. We're talking about sophisticated electronics and mechanics. We've taken all possible precautions for this not to happen but of course we cannot exclude that problems may have happened."

Scientists will bridge the time between Rosetta's alarm going off and the first signal traveling the 800 million kilometers (500 million miles) back to Earth by holding a social media competition. Space enthusiasts are being asked to compose and perform songs to "wake up Rosetta," with the top entries being beamed to the spacecraft and the winner invited to witness the landing from ESA's mission control room.

The agency says the earliest it might receive the probe's all-clear call is about 6.30 p.m. (1730 GMT; 12:30 p.m. EST). If no signal is received by Tuesday, scientists will try to manually restart the probe from the ground.

In this 2013 file photo provided by the European Space Agency, ESA, employees work in the control room of ESA in Darmstadt, Germany. Scientists at the European Space Agency are expecting their comet-chasing probe Rosetta to wake from almost three years of hibernation at 11 a.m. Monday Jan. 20, 2014 (1000 GMT; 5 a.m. EST) and phone home to say all is well. (AP Photo/ESA, Juergen Mai, File)

Rosetta is named after a block of stone that allowed archeologists to decipher ancient Egyptian hieroglyphs. Scientists hope the probe's findings will help them understand the composition of comets and thereby discover more about the origins and evolution of our solar system.

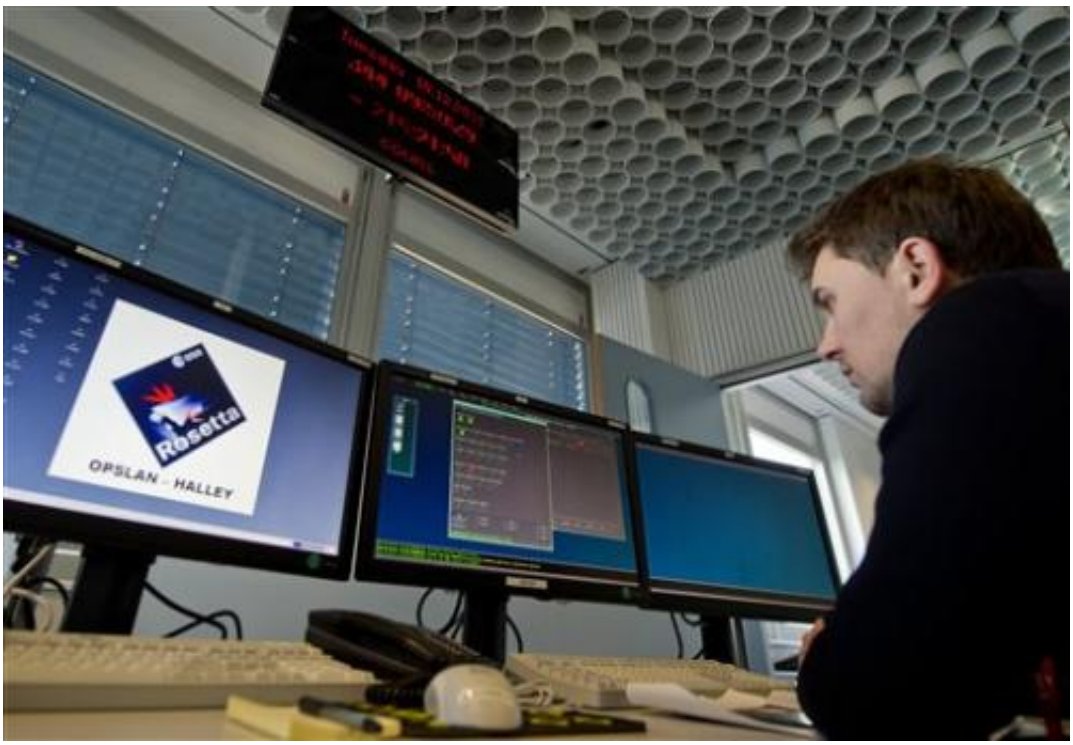
Comets are regarded as flying time capsules because they are essentially unchanged for 4.6 billion years. Scientists have speculated that comets—which are essentially giant, dirty snowballs—may be responsible for the water found on some planets. And like asteroids,

comets also pose a theoretical threat to life on Earth.

"Over the millennia comets have actually affected our evolution," said Ferri. "There are many theories about comets hitting the Earth and causing global catastrophes. So understanding comets is also important to see in the future what could be done to defend the Earth from comets."

If all goes as planned, Rosetta will reach 67P in the coming months and fly a series of complicated maneuvers to observe the comet—a lump of rock and ice about four kilometers (2.5 miles) in diameter—before dropping a lander onto its icy surface in November.

The Philae lander will dig up samples and analyze them with its on-board instruments.



In this Dec. 10, 2013 file picture a European Space Agency, ESA, employee sits in the control room for the Rosetta mission at the ESA in Darmstadt, Germany.

Scientists at the European Space Agency are expecting their comet-chasing probe Rosetta to wake from almost three years of hibernation at 11 a.m. Monday Jan. 20, 2014 (1000 GMT; 5 a.m. EST) and phone home to say all is well. (AP Photo/dpa, Boris Roessler, File)

The probe and its lander will keep sending back data until their batteries die or the debris streaming off the comet irreparably damages their sensitive instruments.

The mission is different from NASA's Deep Impact probe that fired a projectile into a comet in 2005 so scientists could study the resulting plume of matter. NASA also managed to land a probe on an asteroid in 2001, but comets are much more volatile places because they constantly release dust and gas that can harm a spacecraft.

This undated image provided by the European Space Agency ESA shows an artist's impression of the Philae lander. Scientists at the European Space Agency are expecting their comet-chasing probe Rosetta to wake from almost three years of hibernation at 11 a.m. Monday Jan. 20, 2014 (1000 GMT; 5 a.m. EST) and phone home to say all is well. (AP Photo/ESA ATG medialab , Astrium E, Viktor, File)

NASA is planning another space rock mission between 2019 and 2021. The agency is looking into sending a robotic spaceship to lasso a small asteroid and haul it close to the moon, where spacewalking astronauts would explore it.

More information: www.esa.int/rosetta