ESA's Rosetta mission sets November 12th as the landing date for Philae

26 September 2014, by Tim Reyes

Illustration of the Rosetta Missions Philae lander on final approach to a comet surface. The date is now set for landing, November 12. Credit: ESA

ESA Rosetta mission planners have selected November 12th, one day later than initially planned, for the historic landing of Philae on a comet's surface. The landing on 67P/Churyumov-Gerasimenko will be especially challenging for the washing machine-sized lander. While mission scientists consider their choice of comet for the mission to be an incredibly good one for scientific investigation and discovery, the irregular shape and rugged terrain also make for a risky landing. The whole landing is not unlike the challenge one faces in shooting a moving target in a carnival arcade game; however, this moving target is 20 kilometers below and it is also rotating.

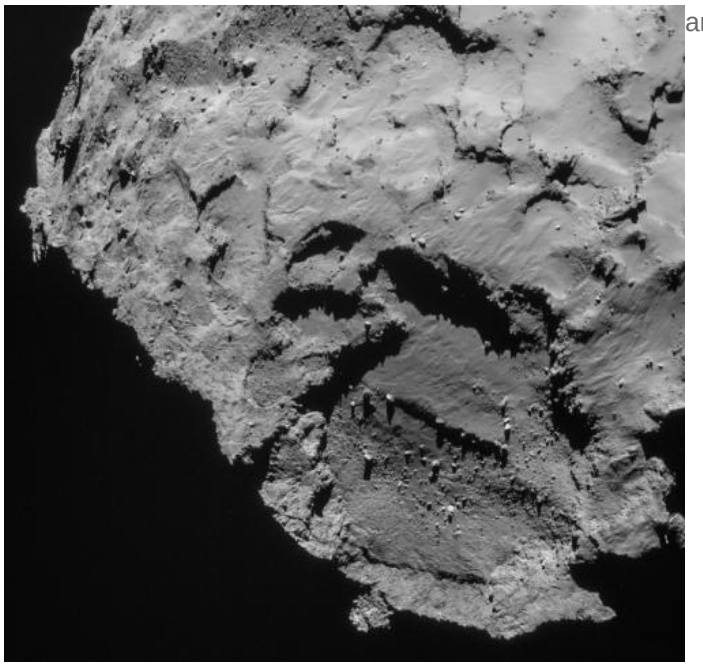
At 8:35 GMT (3:35 AM EST), the landing sequence will begin with release of Philae by Rosetta at an altitude of 20 kilometers above the comet. The expected time of touchdown is seven hours later – 15:35 GMT (10:35 AM EST). During the descent, Philae's ROLIS camera will take a continuous series of photos. The comet will complete more than half a rotation during the descent; comet P67's rotation rate is 12.4 hours. The landing site will actually be on the opposite side of the comet when Philae is released and will rotate around, and if all goes as planned, meet Philae at landing site J.

Before November 12th, mission planners will maintain the option of landing at Site C. If the alternate site is chosen, the descent will begin at 13:04 GMT also on November 12 but from an altitude of 12.5 kilometers, a 4 hour descent time.

Rosetta will eject Philae with an initial velocity of approximately 2 1/2 kilometers per hour. Because the comet is so small, its gravity will add little additional speed to Philae as it falls to the surface. Philae is essentially on a ballistic trajectory and does not have any means to adjust its path.

The actions taken by Philae's onboard computer begin only seconds from touchdown. It has a landing propulsion system but unlike conventional systems that slow down the vehicle for soft landing, Philae's is designed to push the lander snugly onto the comet surface. There is no guarantee that Philae will land on a flat horizontal surface. A slope is probably more likely and the rocket will force the small lander's three legs onto the slope.

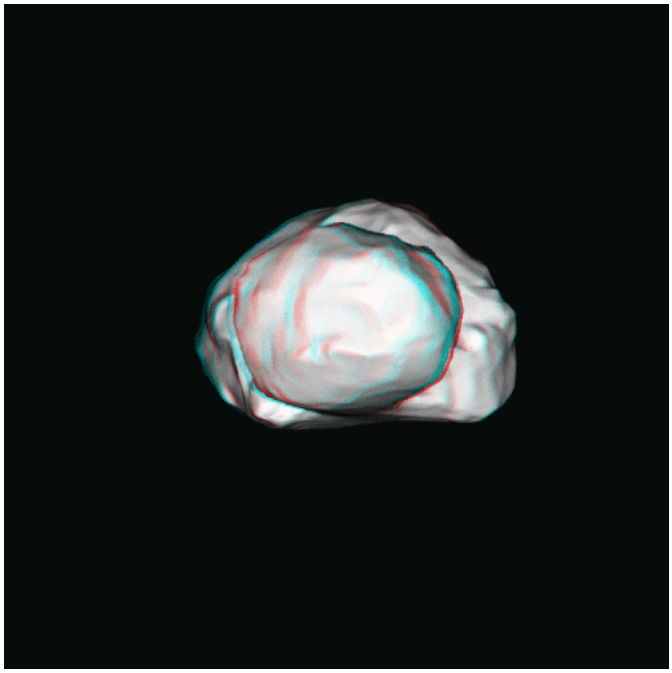
Landing harpoons will be fired that are attached to cables that will be pulled in to also help Philae return upright and attach to the surface. Philae could actually bounce up or topple over if the rocket system and harpoons fail to do their job.



animated GIF. Credit: ESA

Source: Universe Today

NAVCAM image of the comet on 21 September, which includes a view of primary landing site J. Click for more details and link to context image. (Credits: ESA/Rosetta/NAVCAM



A model of the comet P67/Churyumov-Gerasimenko created using images from the Rosetta OSIRIS narrow field camera. Mouse click on the image to start the