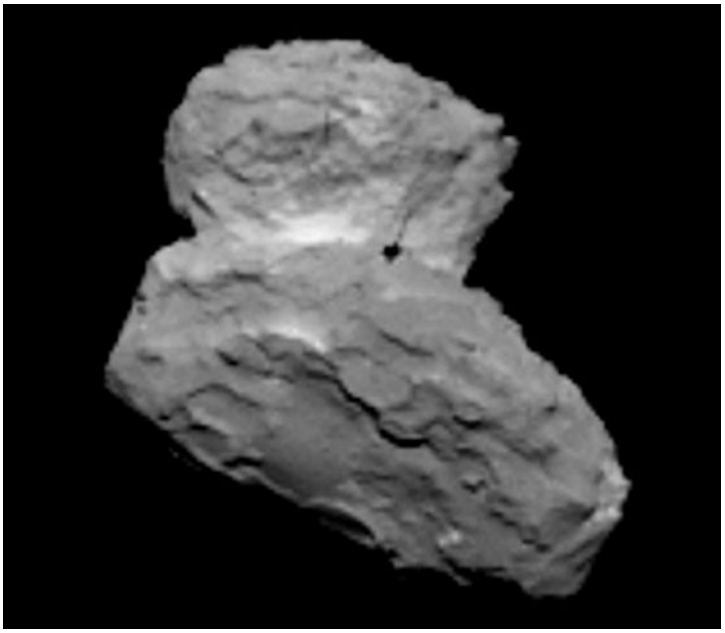
ROSETTA UPDATES

As the ESA's Rosetta spacecraft closes to within 1000 km of **Comet 67P/Churyumov-Gerasimenko**, the Rosetta science team has released a new image and made the first temperature measurements of the comet's core. The temperature data show that 67P is too hot to be covered in ice and must instead have a dark, dusty crust.

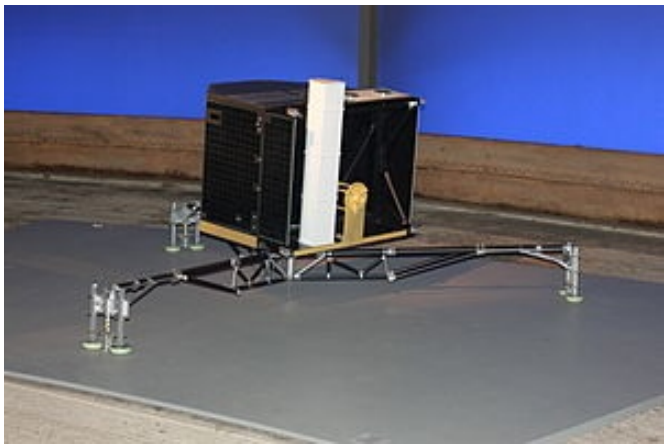


OSIRIS narrow angle camera view of 67P/C-G from a distance of 1000 km on 1 August 2014. Note that the dark spot is an artefact from the onboard CCD.

The new image was acquired on August 1st at 02:48 UTC by the OSIRIS Narrow Angle Camera onboard Rosetta at a distance of approximately 1000 km. It shows the rough surface of the double-lobed core in amazing detail.

Thermal observations of the comet were made by Rosetta's visible, infrared and thermal imaging spectrometer, VIRTIS, between 13 and 21 July, when Rosetta closed in from 14 000 km to the comet to just over 5000 km. At these distances, the comet covered only a few pixels in the field of view and so it was not possible to determine the temperatures of individual features. But, using the sensor to collect infrared light emitted by the whole comet, scientists determined that its average surface temperature is about -70°C.

Although -70°C may seem rather cold, importantly, it is some 20–30°C warmer than predicted for a comet at that distance covered exclusively in ice. Other comets such as 1P/Halley are known to have very dark surfaces owing to a covering of dust, and Rosetta's comet was already known to have a low reflectance from ground-based observations, excluding an entirely 'clean' icy surface. **The temperature measurements provide direct confirmation that much of 67P's surface must be dusty, because darker material heats up and emits heat more readily than ice when it is exposed to sunlight.**



As Rosetta approaches and later orbits the comet, the sensor will study the variation of daily surface temperatures in order to understand how quickly the surface reacts to solar illumination. In turn, this will provide insight into the thermal conductivity, density and porosity of the top tens of centimetres of the surface--important data to help select a target site for Rosetta's lander, Philae.

Philae is a robotic European Space Agency lander that accompanies the Rosetta spacecraft. It is designed to land on the comet shortly after arrival. **The lander will achieve the first controlled touchdown on a comet nucleus**. The lander's instruments will obtain the first images from a comet's surface and make the first in situ analysis to find out what it is made of. **The lander is named after Philae island in the Nile, where an obelisk was found that was used along with the Rosetta Stone to decipher Egyptian hieroglyphics.**

The lander is designed to touch down on the comet's surface after detaching itself from the main spacecraft body and "falling" towards the comet along a ballistic trajectory. **It also will deploy harpoons to anchor itself to the surface**, and the legs are designed to dampen the initial impact to avoid bouncing. Communications with Earth will use the orbiter spacecraft as a relay station to reduce the electrical power needed. The mission duration on the surface is planned to be at least one week, but an extended mission lasting months is possible. The main structure of the lander is made from carbon fiber, shaped into a plate maintaining mechanical stability, a platform for the science instruments, and a hexagonal "sandwich" to connect all the parts. The total mass is about 100 kilograms. **Its "hood" is covered with solar cells for power generation**. It will also measure the changes in temperature as the comet flies closer to the Sun along its orbit, providing substantially more heating of the surface. With only a few days until we arrive at just 100 km distance from the comet, astronomers are excited to start analysing this fascinating little world in more detail. AK from NASA Notes