

Rosetta comet comes alive

June 4 2014, by Dr. Tony Phillips



Close-up of comet 67P/C-G on 30 April 2014. Credit: ESA/ Rosetta/ MPS for OSIRIS Team MPS/ UPD / LAM/ IAA/ SSO/ INTA/ UPM/ DASP/ IDA

A spacecraft from Earth is about to do something no spacecraft has ever done before: orbit a comet and land on its surface.

Right now, the European Space Agency's Rosetta probe is hurtling toward Comet 67P/Churyumov-Gerasimenko. The spacecraft's mission is to study the comet at close-range as it transforms from a quiet nugget of ice and rock, frozen solid by years spent in deep space, to a sun-warmed dynamo spewing jets of gas and dust into a magnificently evolving tail.

News flash: The metamorphosis has begun.

"Comet 67P is coming alive," says Claudia Alexander, project scientist for the U.S. Rosetta Project at JPL. "And it is even more active than I expected."

Launched in 2004, Rosetta has spent the past few years in hibernation as it chased the comet across the Solar System. In January of 2014, with its destination in sight, Rosetta woke up and turned on its cameras. At first, the comet looked like a dimensionless pinprick, inactive except for its quiet motion through space. Then, on May 4th a bright cloud appeared around the nucleus.

"It's beginning to look like a real comet," says Holger Sierks of the Max Planck Institute for Solar System Research in Germany where Rosetta's OSIRIS science camera was built. "It is hard to believe," he says, "that only a few months from now, Rosetta will be deep inside this cloud of dust and en route to the origin of the comet's activity."

Spacecraft from NASA, ESA and other space agencies have flown by comets before. A whole armada of spacecraft visited Comet Halley in the mid-1980s, an international event which still serves as a touchstone of comet research. Other notable examples include NASA's Stardust

mission, which flew through the tail of Comet Wild in 2004 and returned the samples to Earth two years later; and the Deep Impact spacecraft, which in 2005 dropped a projectile into Comet 9P/Tempel, blowing a hole in its nucleus so that researchers could look inside.

Flybys are informative, but Rosetta will do much more.

"A flyby is just a tantalizing glimpse of a comet at one stage in its evolution," points out Alexander. "Rosetta is different. It will orbit 67P for 17 months. We'll see this comet evolve right before our eyes as we accompany it toward the sun and back out again."

The most exciting moment of the mission will likely come in November when a European-built lander descends from the spacecraft and touches down on the comet's surface. The lander's name is "Philae" after an island in the Nile, the site of an obelisk that helped decipher—you guessed it—the Rosetta Stone.

Because a comet has little gravity, the lander will anchor itself with harpoons. "The feet may drill into something crunchy like permafrost, or maybe into something rock solid," Alexander speculates.

Once it is fastened, the lander will commence an unprecedented first-hand study of a comet's nucleus while Rosetta continues to monitor developments overhead.

Although Rosetta is a European mission, NASA has contributed some important instruments to the spacecraft, and US scientists are just as eager as their European counterparts for Rosetta to arrive. The recent photos have helped mission controllers pinpoint 67P and start a series of maneuvers that will slowly bring the [spacecraft](#) in line with the [comet](#) in time for an August rendezvous.

"Our target is ahead," says Alexander, "and Rosetta is chasing it down!"

Provided by NASA

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