Spotlight

Hitching a Ride

The first comet lander may reveal secrets of the solar system

BY EMILY BARONE AND LON TWEETEN

THE SPACE COMMUNITY HAS HAD things rough of late. The explosion of an unmanned Antares rocket and the fatal crash of Richard Branson's SpaceShipTwo serve as painful reminders of what can go wrong when you take on the cosmos.

But things can go quietly, elegantly right too. On Nov. 12, the European Space Agency plans to land a research vessel on a comet in a first-of-its-kind maneuver. The mission, 10 years in the making, has already provided unprecedented insights into the chemistry of these cosmic iceballs. The lander could offer clues to the origins of the solar system.

Comets are thought of as the bones of the ancient solar system, with their makeup preserved in a deep freeze because they spend so much time far from the sun. Comet Churyumov-Gerasimenko, or 67P, comes from the Kuiper Belt, a vast band of icy objects beyond the orbit of Neptune.

The ESA's Rosetta spacecraft, which is flying alongside 67P, has already taken several readings of its gases, but the fun will start when the ship ejects the lander, called Philae, which will fall gently to the comet because of its light gravity. Once on the surface, Philae will take measurements that could reveal the conditions that prevailed in the universe not long after the Big Bang.

Philae will operate at full capacity for just a few days. But for the next year, Rosetta will continue its tandem flight with 67P, radioing back what it can before the tiny world returns to the distant solar system.

1 THE ORBITER
Rosetta will orbit 67P for a year, observing changes on its surface and in its atmosphere as the comet approaches the sun. Even at the speed of light, a transmission to Earth takes about 30 minutes to arrive.

The 46-ft. solar pane always fac the sun

Lander detaches, drops 14 miles to comet surface

2 THE LANDER
Philae carries 10 research tools and a transmitter that can communicate data to Rosetta to be relayed home. Philae can swivel on its base to sample different areas.

A monitor studies the magnetic field and solar win

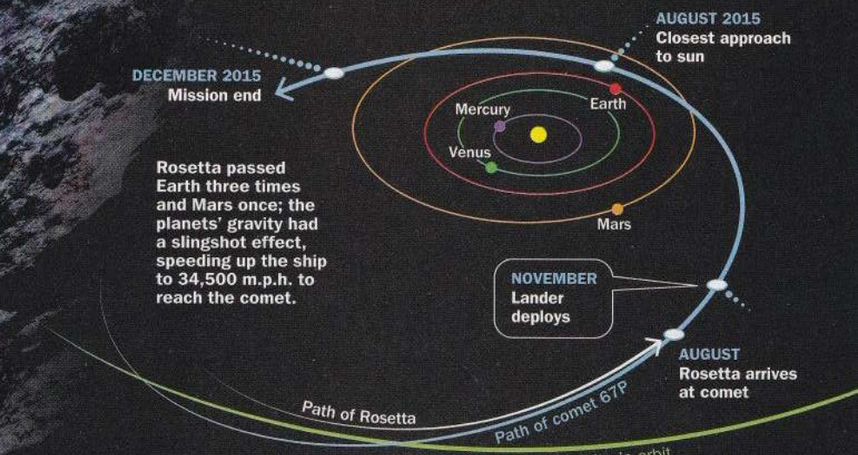
Ovens analyze comet material

When they're on opposite sides of the comet, Rosetta and Philae send each other radio signals to map 67P's internal structure

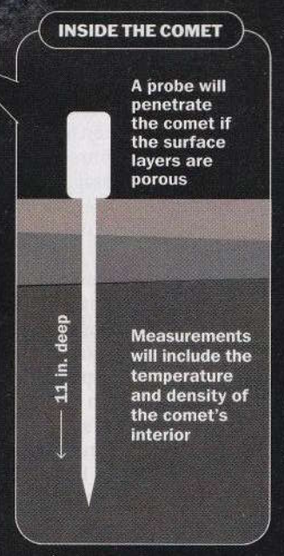
Solar cells gather weak sunlight to power the craft after the main battery dies

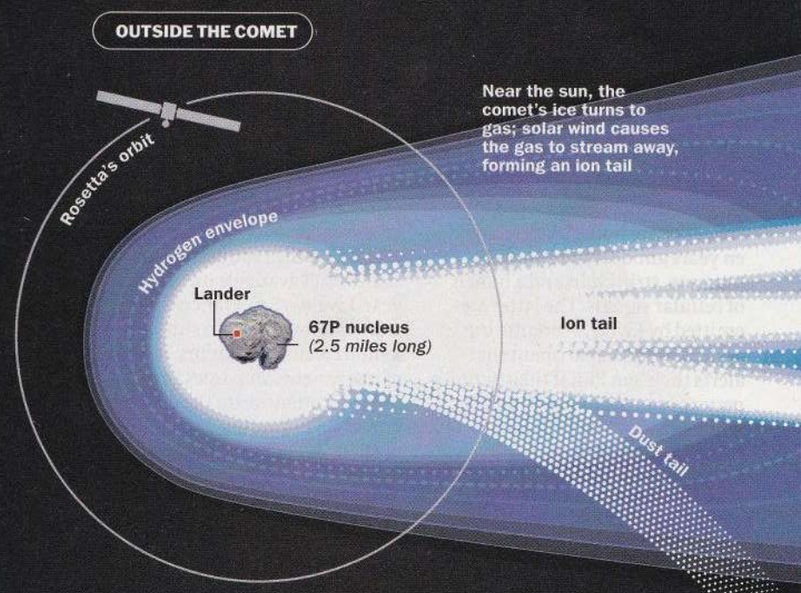
Seismographs in Philae's feet detect activity in 67P's core as gas escapes

The little lander is smaller than a person



3 WHAT WE HOPE TO LEARN
In addition to what the mission can reveal about the ancient solar system, it could tell us something about life on Earth. Comets may have carried water, ice and organic chemicals to our planet; analyses of 67P's ice might help strengthen that theory.





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