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## The Significance of the Rosetta Mission to Comet 67P



Imagine embarking on a thrilling journey through space, chasing after a distant celestial object with a fascinating history. That's precisely what the Rosetta spacecraft did when it embarked on its incredible mission to Comet 67P/Churyumov-Gerasimenko (Comet 67P). In this passage, we will explore the significance of the Rosetta mission, the comet itself, and the groundbreaking discoveries it made during its extraordinary adventure.

### Meet Comet 67P/Churyumov-Gerasimenko

Comet 67P, for short, is a remarkable icy body that orbits the Sun. It was discovered in 1969 by astronomers Klim Churyumov and Svetlana Gerasimenko, and it has a peculiar, irregular shape resembling a rubber duck. The comet's orbit takes it from the outer fringes of our solar system to closer to the Sun and back again, a journey that lasts about 6.5 years.

### Why Rosetta?

The Rosetta mission, led by the European Space Agency (ESA), was launched in 2004 with the primary goal of studying Comet 67P up close and personal. The mission aimed to answer fundamental questions about the origins of our solar system, the formation of comets, and the role they might have played in delivering water and organic molecules to Earth. But that's not all—Rosetta had an even more ambitious objective: to deploy a lander, Philae, onto the comet's surface.

### Journey to the Comet

Rosetta's journey to Comet 67P was no small feat. It took the spacecraft over ten years to travel through space and reach its target. During its long voyage, Rosetta performed a series of gravity-assist maneuvers, which used the gravitational pull of Earth and Mars to increase its speed and adjust its trajectory. These maneuvers allowed the spacecraft to save precious fuel and arrive at the comet with pinpoint accuracy.

### Philae's Historic Landing

One of the most iconic moments of the Rosetta mission was the historic landing of Philae, the lander, onto the surface of Comet 67P in November 2014. This



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achievement marked the first time in history that a spacecraft had successfully landed on a comet. Philae was equipped with scientific instruments to analyze the comet's composition and gather vital data.

### **Unraveling Comet Mysteries**

The data collected by both Rosetta and Philae provided invaluable insights into the nature and composition of Comet 67P. Scientists discovered that comets like 67P contain complex organic molecules, including amino acids, which are essential building blocks of life. This finding raised intriguing questions about the role comets might have played in delivering the ingredients for life to Earth billions of years ago.

Rosetta also observed the comet's activity as it approached the Sun. Comets are known to develop tails and jets of gas and dust when they heat up, and Rosetta's observations helped scientists understand the mechanisms behind these phenomena.

### **A Fond Farewell**

The Rosetta mission came to an end in September 2016 when the spacecraft was deliberately crashed onto the surface of Comet 67P. This final maneuver allowed Rosetta to continue collecting data until the very last moments of its mission. It was a bittersweet farewell to a mission that had exceeded expectations and reshaped our understanding of comets and our solar system.

### **The Legacy of Rosetta**

The Rosetta mission's significance lies in its groundbreaking discoveries about the composition, activity, and history of Comet 67P. It revolutionized our understanding of comets and their potential role in the origin of life on Earth. Rosetta's mission also demonstrated the incredible achievements of international collaboration in space exploration, as it involved scientists and engineers from around the world working together to achieve a common goal.

