EUROPEAN SPACE AGENCY | PROBLEM SOLVED

The European Space Agency fuels space exploration with a massively scalable global storage solution.

European Space Agency: Fueling Data-Driven Exploration

Creating a 3D map of 1 billion stars in our galaxy is no small feat. It takes decades of hard work by the world's brightest scientific minds. And it takes data. Lots of data. Whether they are mapping the Milky Way, landing on a comet, or searching for life on Mars, the scientists at the European Space Agency (ESA) depend on reliable access to massive quantities of data to explore the universe and share their discoveries with the world.

1 BILLION STARS
MAPPED BY GAIA

2PB
OF DATA

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On September 30, 2016, the world watched via livestream as ESA's Rosetta spacecraft successfully landed on the surface of a comet. For more than two years, the spacecraft had traveled with the comet along its orbit gathering data. But with the comet speeding away from the sun at 120,000km/h, *Rosetta* would soon lose solar power. Scientists seized the opportunity to attempt what no one had ever tried before—to gather unique observations through a controlled impact with the comet.

Despite blistering speeds and countless unknowns, the spacecraft landed just 33m from its target point, sending invaluable high-resolution images and measurements back to Earth.

THE QUESTIONS OF THE COSMOS

Rosetta is just one of the many missions of ESA's scientific program, which seeks to explore and deepen our understanding of the universe. How were galaxies formed in the early universe? Was there ever life on Mars? Could humans inhabit Jupiter's icy moons? Which asteroids pose threats to Earth?

Today, ESA is focused on what may be its most ambitious mission yet: *Gaia*. With the *Gaia* spacecraft, ESA is charting the world's most accurate 3D map of the Milky Way galaxy. Ultimately, *Gaia* will catalog 1 billion of the 100 billion stars in our galaxy. In the process, it will produce 10,000 times more data than previous missions, processing an average of 70 billion observations daily. The full *Gaia* catalog is expected to hold more than 2PB of data.

MISSION-CRITICAL RELIABILITY AND SCALABILITY

To support *Gaia* and all of its scientific missions, ESA requires absolute reliability from its data storage. It demands scalability to support the massive data requirements of past, present, and future missions. To meet these needs, ESA chose NetApp® storage and data management solutions.

Every day, ESA receives massive volumes of raw telemetry data from its spacecraft and observatories. That data must be stored and processed before it can be archived or shared. Scientists across Europe depend on ESA's daily

▶ WATCH THE VIDEO

See how the Gaia mission creates a 3D map of our galaxy by managing data of 1 billion stars with a scalable NetApp solution.

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observations, so the reliability of that data is critical. NetApp's high availability means data is available to scientists around the clock.

"We have a commitment to deliver data to different institutes in Europe on a daily basis," explains Ruben Alvarez, IT Manager at ESA. "NetApp has given us the confidence that we will meet those requirements."

Adding to the challenge, data from every mission must be accessible indefinitely. Everything must be stored and managed so that future scientists can continue their exploration of the universe using historical data. With NetApp, that's no longer the problem it once was.

"In the coming years, we will be launching new missions that will demand huge amounts of data," says Alvarez. "NetApp provided us with solutions that were scalable, even if we didn't know in advance how much disk storage we were going to need. Now we always have a solution ready."

ESA expects to publish the full *Gaia* catalog in 2020, making it available online to professional astronomers and the general public. Interactive, graphical interfaces will make it easy for anyone, anywhere to access the full catalog and explore our galaxy in 3D.

"It's all about the data," says Alvarez, IT Manager at ESA. "We call our site the Library of the Universe because we keep the science archive of all of our scientific missions. This is how we allow people to really investigate the universe."

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