

Image courtesy of ESA

CASE STUDY

ACRI-ST Advances the Understanding of Earth With Satellite Data and StorNext Scale-out Storage

For more than 25 years, ACRI-ST has been working with the European Space Agency (ESA) and other organizations to archive and process valuable, irreplaceable satellite data. ACRI-ST and its Luxembourg subsidiary adwäisEO deployed a Quantum StorNext tiered storage solution to preserve a growing amount of satellite data while helping scientists accelerate research.

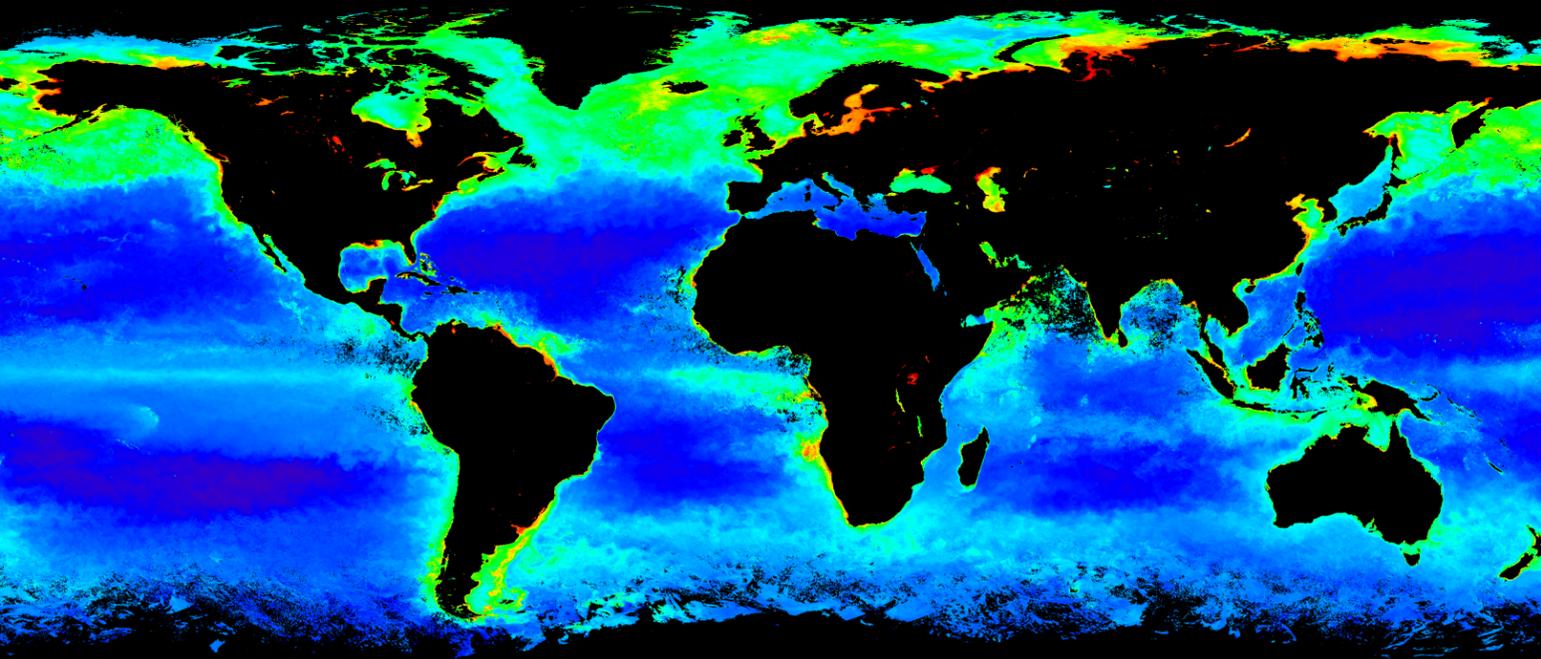


FEATURED PRODUCTS



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Gilbert Barrot
CIO, ACRI-ST



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Gilbert Barrot - CIO, ACRI-ST



SOLUTION OVERVIEW

- Quantum StorNext® scale-out storage
- Quantum StorNext QX-1200 disk storage
- StorNext AEL6000 Archive
- Quantum Xcellis™ workflow storage
- Scalar® LTFS

KEY BENEFITS

- **Protects irreplaceable satellite data** with integrated, policy-based tiering
- **Optimizes storage costs** with intelligent policy-based management
- **Scales to support petabytes of data** to easily accommodate new projects
- **Accelerates scientific workflows** by providing rapid access to data
- **Provides seamless access to all data** with a single namespace for all storage tiers
- **Supports a full range of operating systems** to accommodate a broad user base

Today, there are nearly 200 observation satellites above the Earth, some fixed over a single location and others orbiting the planet. These satellites continuously capture data that is vital for predicting the path of newly formed hurricanes, anticipating the effects of climate change, maintaining national security, and more.

ACRI-ST, headquartered in southeastern France, plays a key role in processing and archiving critical satellite data, and facilitating breakthrough scientific research that draws on the data. "ACRI-ST began as a small research and development organization that helped ESA produce a range of simulations and conduct mission analysis for its satellites and sensors," says Gilbert Barrot, CIO of ACRI-ST. "Gradually, we also began to offer services for archiving, reprocessing, and managing satellite data. Now, we operate data centers for preserving and providing access to the information from several different satellites: EUCLYDE based in Sophia Antipolis as hosting DC for ACRI-ST (EUMETSAT archive) and EBRC based in Luxembourg, as hosting DC for adwaisEO (EODAS archive)."

ENABLING CUTTING-EDGE SCIENTIFIC RESEARCH

ACRI-ST enables scientists, university researchers, government agencies, and other organizations worldwide to draw from more than 20 years of data for a broad array of projects. In addition, ACRI-ST offers processing services to help streamline research. For example, ACRI-ST can clean the raw—level 0— data, producing level 1 data. The organization can then conduct analysis processes, generating level 2 data that helps researchers answer scientific questions.

"Beginning with raw satellite data would be very time-consuming for researchers," says Barrot. "They would need to sort through a huge number of large images before conducting analysis. For example, if they want to evaluate chlorophyll levels around Hawaii, they would first need to wade through roughly 10,000 images covering thousands of miles in the Pacific Ocean. They would then have to download the full images, then extract and reprocess relevant information to compute daily, then monthly averages of chlorophyll levels. As part of our value-added services, ACRI-ST servers automatically process

the raw images of a researcher's region of interest, and then directly deliver the numerical products that researchers need."

PROVIDING AN EASY-TO-USE WORKFLOW FOR EXTRACTING SATELLITE IMAGES

ACRI-ST provides a simple workflow for external researchers to request and receive data. "Researchers specify the data they need through a web interface," says Barrot. "Our automated system moves data to our compute nodes for processing. The system then places the results in a temporary repository that researchers can access through an FTP connection. Our goal is to deliver the products quickly and efficiently."

PREPARING FOR PETASCALE DATA GROWTH WITH INTELLIGENT TIERED STORAGE

To prepare for the launch of a new ESA satellite, Sentinel-3, the ACRI-ST team needed a new storage environment—one that could handle petabytes of data. "With previous satellites, we needed to manage tens of terabytes of data. But, we knew that the Sentinel-3 satellite would require us to store several petabytes of data," says Barrot. "We needed a solution that would accommodate our immediate needs and would scale—cost-effectively—as we collected more and more satellite data."

At the same time, the ACRI-ST team had to ensure that data was readily accessible for in-house scientists as well as the hundreds of external researchers that the organization supports. On average, ACRI-ST receives up to five data extraction requests per day from external researchers. "The data is only valuable if researchers can use it," says Barrot. "We have to make sure that they can access the data they need, when they need it."

DEPLOYING STORNEXT FOR THE OPTIMAL COMBINATION OF SPEED AND SCALE

The ACRI-ST team selected a Quantum StorNext tiered storage solution to archive satellite data, enable data access for external researchers, and support the ACRI-ST value-added data processing workflows. StorNext offers a tiered environment that provides the right combination of scale and high-speed access. "The mix of tape and disk in a single environment gives us the best of both worlds," says Barrot. "We can keep a cache of data immediately available on disk while storing most of the repository

on more economical tape. With StorNext, we knew we could meet our immediate need to store 400 TB of satellite data while gaining the ability to expand to several petabytes over the next decade."

OFFERING COMPATIBILITY WITH ALL THE MAJOR OPERATING ENVIRONMENTS

By supporting a broad array of operating systems, StorNext enables ACRI-ST researchers to flexibly access and analyze data, without requiring them to modify their systems or software. "Most of the computations are performed on Linux servers, but some users have Windows systems," says Barrot. "With StorNext, researchers can work with data no matter what type of server they are using."

PROTECTING CRITICAL SATELLITE DATA WITH AN INTELLIGENT ARCHIVE

Intelligent, policy-driven tiering capabilities make it simple to protect the raw data captured by satellites. "If we lose the raw satellite data, it's gone," says Barrot. "StorNext policy-driven tiering enables us to generate copies of data, so we can protect irreplaceable information."

The team also stores the data created by ACRI-ST's in-house scientists. "We could reproduce the results of our data processing and analyses if necessary, but it might take weeks," says Barrot. "With StorNext, we have the capacity to keep the processed data on the system, so it's readily accessible."

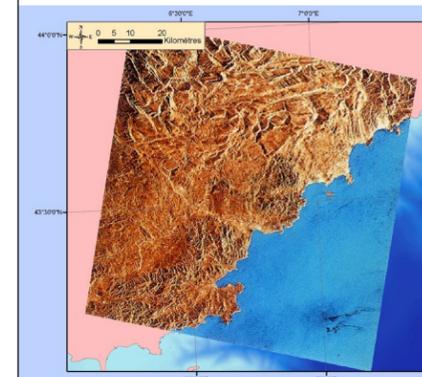
Strong system reliability helps ensure data remains available whenever researchers need it. "The StorNext solution just works," says Barrot. "We have had to do no maintenance, and we've experienced very few issues that required assistance from Quantum. When small problems have come up, Quantum support resolved them rapidly."

PROVIDING SELF-SERVICE ACCESS TO SCIENTIFIC DATA IN THE ACRI-ST ARCHIVE

Even though ACRI-ST in-house researchers often need a huge number of images, they expect fast access to their data. The StorNext File System accelerates access to archived data by using a single namespace for the entire tiered storage environment. Files appear to be in their original file system location online—even if the files have been archived to cost-effective tape storage.

"ESA wanted a robust archive that could provide bulk data retrieval and distribution. The Quantum archive solution was perfect."

Gilbert Barrot, CIO, ACRI-ST



ABOUT ACRI-ST

ACRI-ST specializes in remote sensing and modeling of physical and environmental phenomena. The organization offers solutions for satellite mission simulations and environmental forecast prototyping, provides decision-making support to public agencies and local authorities, and operates environmental data centers. ACRI-ST activities extend to spatial observation techniques beyond the ocean and land, including the development and industrialization of data processing chains, the design of data fusion and assimilation schemes, as well as the design and operation of data distribution systems.

“With other tape-based storage solutions, it could take several days for the IT staff to manually locate the correct data, retrieve a tape, and deliver the data requested by researchers,” says Barrot. “The StorNext solution enables self-service. Our in-house researchers can access the files they need on their own, even when data resides on tape. Our scientists are very happy with the faster response time.”

EXPANDING THE ARCHIVE TO SUPPORT AN ADDITIONAL ESA SERVICE

ACRI-ST is already capitalizing on the StorNext platform’s scalability. In 2016, the organization won a bid to support ESA’s Earth Observation Data Archiving Service (EODAS), which archives all satellite data for past and current ESA missions (except the Sentinel satellites) as well as third-party missions. ACRI-ST needed to provide 8 PB of capacity—6 PB for historical data plus 2 PB for live missions.

To meet the new capacity requirements, the ACRI-ST team decided to expand its Quantum tape archive solution. “ESA wanted a robust archive that could provide bulk data retrieval and distribution. The Quantum archive solution was perfect,” says Barrot. “We added capacity easily

and inexpensively while still maintaining a small data-center footprint.”

ACRI-ST scaled its existing archive environment in France and built a nearly identical environment in Luxembourg through its subsidiary adwaisEO, which serves as the main archive site. The Luxembourg system, like the one in France, combines a tape library plus Quantum Xcellis workflow storage, which facilitates high-performance data ingest and retrieval while providing integrated protection and archive data management. Once data is ingested in Luxembourg, backup copies of tapes are shipped to the French site for off-site, disaster-recovery protection.

PROTECTING VALUABLE SATELLITE DATA FOR THE LONG TERM

In France, ACRI-ST uses an active vault configuration to enhance data accessibility and durability for minimal cost. “The client was happy to know that all tapes stay inside the library—even tapes that are offline,” says Barrot. “There is no human intervention.”

To maintain the highest integrity of data stored on tapes, ACRI-ST uses Quantum Extended Data Life Management (EDLM) capabilities. “EDLM helps us meet key EODAS requirements for data integrity,”

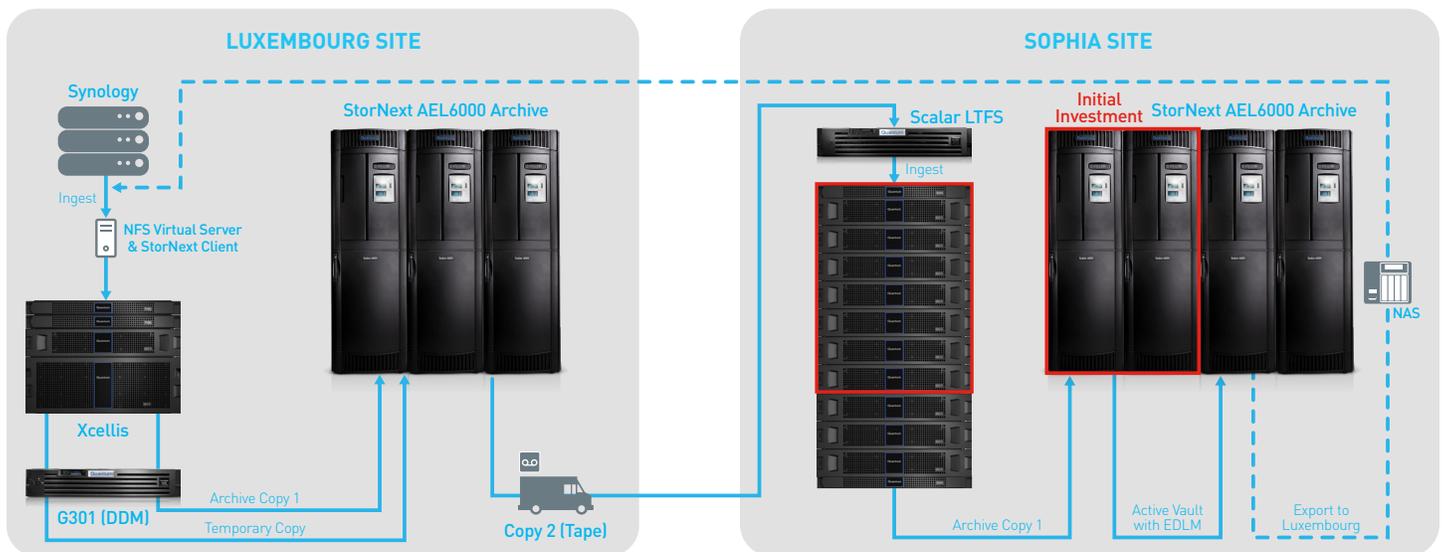
says Barrot. “The system automatically detects when a tape is becoming suspect for developing problems and moves data from that tape to another one. We can keep satellite data safe from loss—even over long periods of time.”

ACCOMMODATING DIVERSE USER REQUIREMENTS WITH OPEN TECHNOLOGY

Quantum support for the Linear Tape File System (LTFS) makes it easy to accommodate researchers with a broad array of technical needs. “Because LTFS is an open format, we can deliver data to researchers regardless of whether they are using a solution from Quantum or another vendor,” says Barrot.

LOOKING TO THE CLOUD AND BEYOND

With the StorNext platform, ACRI-ST and its subsidiary adwaisEO can continue to pursue new projects, whether a project requires further expanding capacity, implementing new capabilities, or connecting with cloud-based systems. “The StorNext platform gives us the flexibility to accommodate a wide variety of future requirements,” says Barrot. “We have the confidence that we can continue to win bids and deliver outstanding service with solutions based on StorNext.”



ABOUT QUANTUM

Quantum is a leading expert in scale-out tiered storage, archive, and data protection, providing solutions for capturing, sharing, and preserving digital assets over the entire data lifecycle. From small businesses to major enterprises, more than 100,000 customers have trusted Quantum to address their most demanding data workflow challenges. Quantum’s end-to-end, tiered storage foundation enables customers to maximize the value of their data by making it accessible whenever and wherever needed, retaining it indefinitely and reducing total cost and complexity. See how at www.quantum.com/customerstories.