CASE STUDY

Sky's the Limit for NASA's Kennedy Space Center

When NASA decided to create a fully digital solution for launch video capture and delivery systems at Kennedy Space Center — a 21st-century workflow for the post-Space Shuttle era — key priorities were performance, automation, and scalability. After an arduous request for proposal (RFP) process and a grueling acceptance test, the team installed a CHESA - recommended solution based on Quantum StorNext and IPV Curator.

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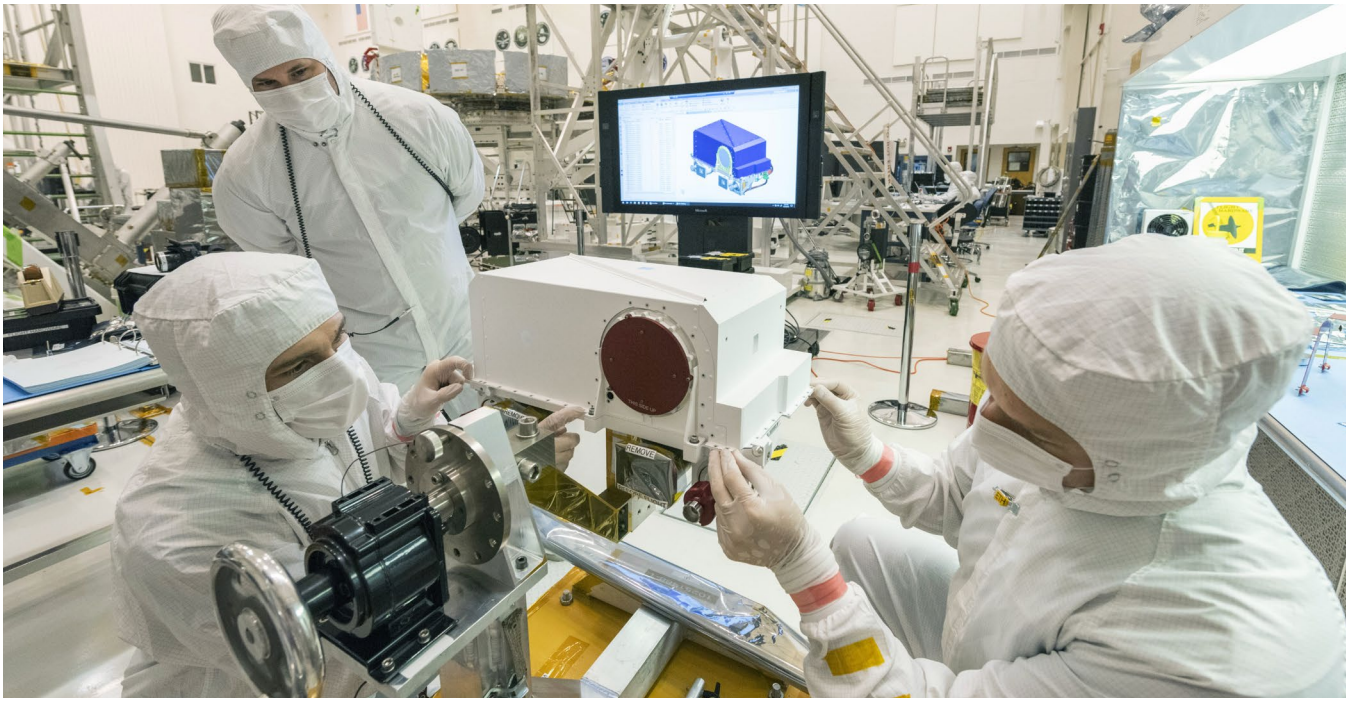
ABOUT NASA

There are not very many imaging environments more challenging — or more critical — than the one that supports launches at NASA's Kennedy Space Center. Artemis I, formerly Exploration Mission-1, is the first in a series of increasingly complex missions that will enable human exploration to the Moon and Mars. Artemis 1 is the first integrated test of NASA's deep space exploration systems and planned for liftoff November 2021. 80 to 100 cameras will capture the event from every possible angle, and keep tracking the rocket and its payload until it is out of sight. The data—which includes images and video taken with motion picture film and high-resolution video cameras at speeds of up to 1,000 frames per second—weigh in at around 200TB per mission. This information must be available to engineers and flight specialists in several different NASA centers as rapidly as possible.

A United Launch Alliance Atlas V 541 rocket lifts off from Space Launch Complex 41 at Cape Canaveral Air Force Station in Florida on July 30, 2020, at 7:50 a.m. EDT, carrying NASA's Mars Perseverance rover and Ingenuity helicopter.



Engineers re-install the cover to the remote sensing mast (RSM) head after integration of two Mastcam-Z high-definition cameras that will go on the Mars 2020 rover.

UPGRADING PERFORMANCE, ACCESS, AND CAPACITY

Defining requirements for, selecting, testing, and installing its first fully digital workflow system for launch videos was a major task for NASA and the contractors overseeing the transition. The original system, which dates back to the days of the Space Shuttle program, started with analog tape or as photographic film that had to be rushed to an out- of-state processing center after each takeoff for development and digitization.

"It would take two days to get the film processed and available as a file, so the NASA team could analyze the high-res slow-motion footage," explains Jeff Wolfe, Communications System Engineer at Abacus Technology, the NASA contractor for imaging services. "The asset management system we had at Kennedy could not handle the complete process because it was really more suited to documents than to video and image data. It meant that access to the image data was delayed."

The still images and video files collected within NASA serve multiple purposes and need to be available to different audiences in different formats and resolutions. Scientists use them to assess effectiveness of equipment, systems, and procedures. The security team uses them as part of its surveillance procedures. And the public affairs department uses them to communicate the agency's mission to its internal audience and to provide images to the general public. At the same time, the list of organizations using Kennedy Space Center for launches is expanding, including Boeing, SpaceX, and Blue Origin.

"The video footage we collect is an irreplaceable asset that must be protected and retained, as well as being made available to a wide range of different users at different locations, which makes the management task particularly challenging."

SELECTING A DIGITAL WORKFLOW SOLUTION FOR NASA

NASA's key requirements for a 21st-century workflow solution were high performance, automation, and scalability. Perhaps one of the most critical was the capability to download all the data from the cameras within 24 hours of a launch. The new system would also need to easily scale to support future missions and higher resolution formats. And it would need to work with existing media asset management and workflow solutions used by other offices, including Apple Xsan. NASA needed to easily share data in an automated workflow, so it needed an integrated asset management foundation. NASA's data is irreplaceable—making thorough testing and evaluation of the entire system prior to installation at Kennedy Space Center a key priority. And NASA needed a cost-effective solution with a strong return on investment.

"We wanted to be absolutely sure it could handle the load we were going to throw at it," says Wolfe, "and we wanted help and support during the installation phase to make sure that any issues that might come up could get resolved quickly."

A full-scale mockup of NASA's Mars 2020 Perseverance rover is on display at the News Center at the agency's Kennedy Space Center in Florida on July 29, 2020

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- Jeff Wolfe
Communications System Engineer
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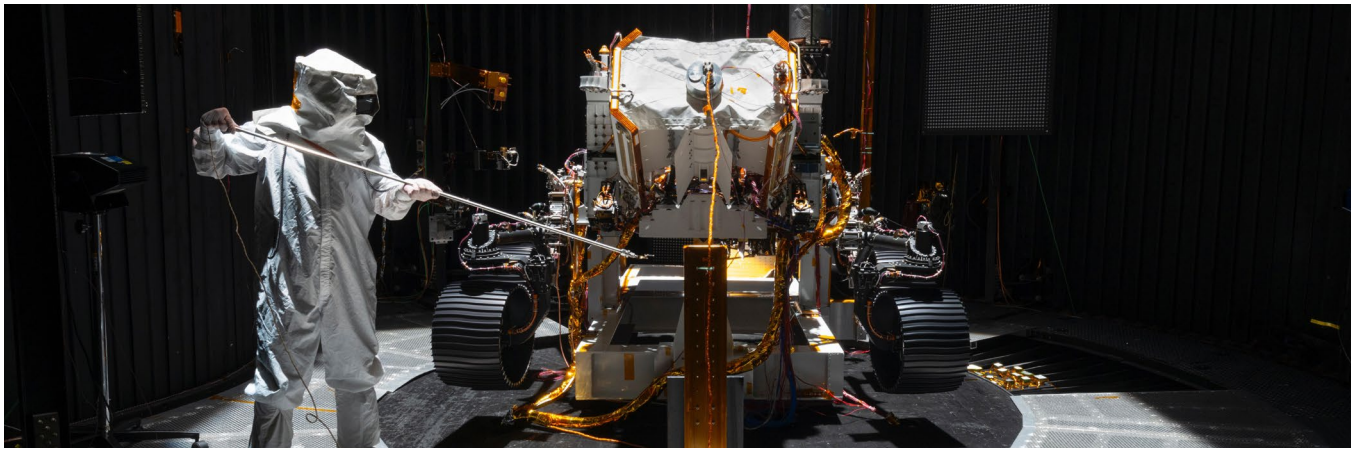


An engineer working on NASA's Mars 2020 mission uses a solar intensity probe to measure and compare the amount of artificial sunlight that reaches different portions of the rover.

CHESA DESIGNS A STORNEXT, IPV, AND TELESTREAM AUTOMATED WORKFLOW, PROTECTION, AND RETENTION SYSTEM

A key partner on the project was veteran content and workflow integrator, CHESA, the designer and supplier for the NASA solution. "We wanted to give NASA a state-of-the-art video workflow system based on best-of-breed solutions that we knew would work well together and provide optimal value based on our own experience," says Kurt Clawson, Lead Solutions Architect, at CHESA.

CHESA recommended a solution that used Quantum StorNext as the storage foundation and IPV Curator as the media asset manager. StorNext offers an end-to-end workflow solution built with high-performance disk storage and an LTO-based StorNext archive-enabled tape library archive, which includes StorNext Storage Manager for data management. IPV Curator provides an end-to- end asset management layer that coordinates media production, editing, and content management. Also included in the final system were Telestream Vantage for transcoding and a Brocade fabric switch.

With the new StorNext solution, all the cameras record the launch events digitally, and the content is downloaded to the StorNext QXS high-performance RAID storage. As soon as the content is ingested, metadata is created and it is logged into the IPV media asset manager, and two copies are created in the Fibre Channel- attached StorNext AEL500 archive on LTO media. The primary disk copy is accessed by users directly while the files are active. As content ages and becomes inactive, it is removed from the disk, but a copy remains available in the archive for users to access. With StorNext, files and metadata are visible through the media asset manager for all content, whether they are located on disk or in the archive. For long-term retention, the second tape copy is removed from the library and stored in a secure, off-line location.

"With StorNext, video files get into the system at high speed. Everything is protected immediately so the data is safe and secure, and all the assets are available immediately to users using a single IPV management interface," says Wolfe.

"StorNext is designed to give everyone faster access to the data, to make content searches and retrieval quick and easy, and to reduce the amount of administration time. It's a win on every count."

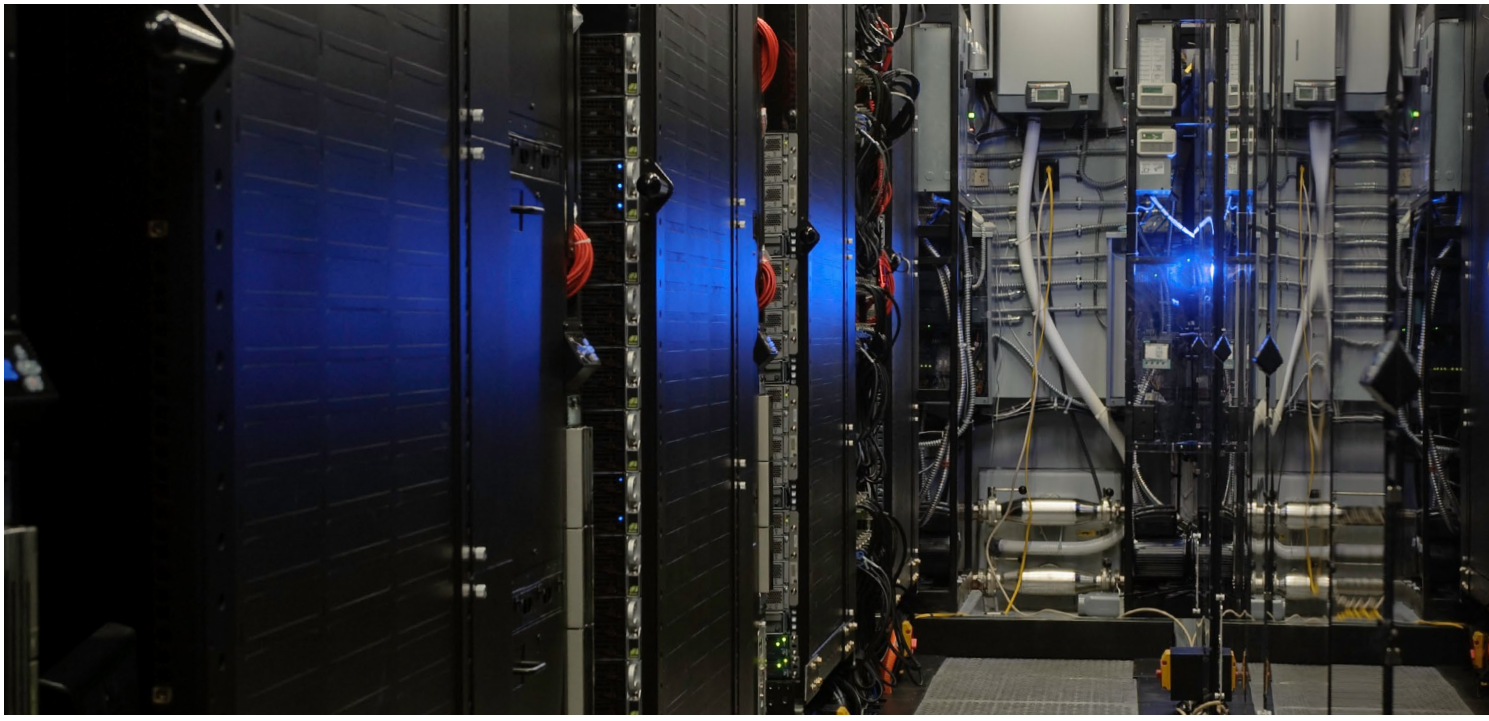
PRE-STAGING SIMPLIFIES SYSTEM ACCEPTANCE TESTING

The key to making the testing and evaluation process run smoothly was the collaboration between Quantum and CHESA. Both companies worked together to pre-stage the entire system for acceptance prior to installation—validating the storage system, and identifying and solving potential issues at the final installation site.

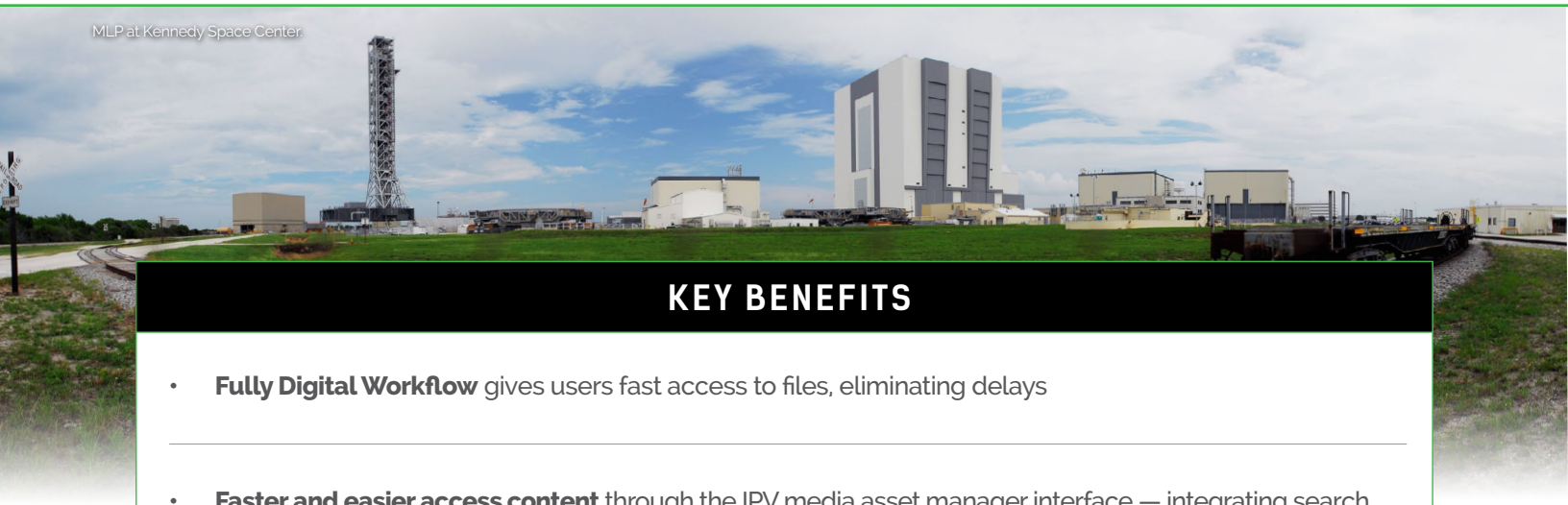
"Quantum gave us space in their Englewood, Colorado facility to set up and configure the exact system that we would be installing so that we could perform the factory acceptance testing without interrupting any of the operations at Kennedy—it really worked well for us," says Wolfe. "Since we had good test data from the system itself, when we saw performance differences at our site, it helped us identify issues that we needed to resolve."

Besides meeting the current requirements at Kennedy Space Center, the NASA team is looking ahead to the next generation of storage challenges.

"We know that we are going to see huge increases in our storage requirements in the future," Wolfe says, "with much higher resolution formats, more users needing access, and increased numbers of missions, which use even more cameras. One of the things that we like about StorNext is that it gives us lots of options for solving issues when they come up, including use of the cloud and object storage."



Nebula Containerized Server at the NASA Ames Research Center.


MLP at Kennedy Space Center

KEY BENEFITS

- **Fully Digital Workflow** gives users fast access to files, eliminating delays
- **Faster and easier access content** through the IPV media asset manager interface — integrating search, retrieval, and sharing of files into the workflow
- **Automated Protection Multiple storage tiers** ensures safety and availability of NASA's irreplaceable assets
- **Integrated Archiving** gives users access to content stored on high-capacity, economical LTO media
- **StorNext compatibility with other systems**, including Apple Xsan, makes it easy to share assets with public affairs editors
- **Scalability and support for cloud and object storage** provide options to support future growth
- **System pre-staging** simplified acceptance testing and helped streamline installation

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This case study demonstrates how CHESA can equip organizations with a successful, scalable solution and ongoing support that fits your needs.

Ready to discuss how we can bolster your organization?

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