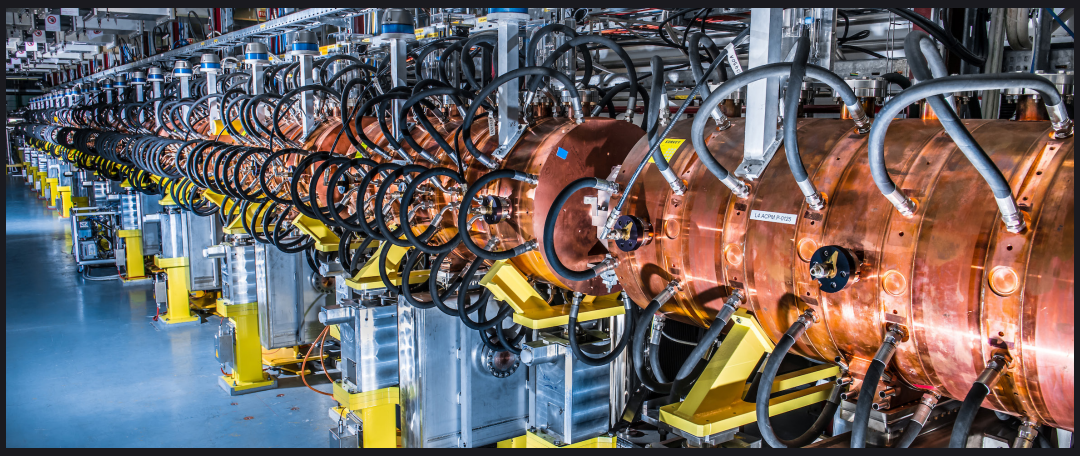
CASE STUDY

CERN maximizes uptime of the world's largest and most complex machine with Octave Attune EAM



Key facts:

Company: CERN

Website: www.home.cern

Industry: Public Sector

Country: Switzerland

Octave products used: Attune EAM *(HxGN EAM)*

Accelerating science

With 23 member states, the European Organization for Nuclear Research (CERN), is the world's largest research center for particle physics. The organization's goal is to provide the 12,000 visiting scientists from top universities around the world with the tools to study the fundamental particles of the universe. It turns out that the tools, built and housed at CERN and needed by the scientists to prove theories about the origins of the universe, are some of the most complex machines ever built by man.

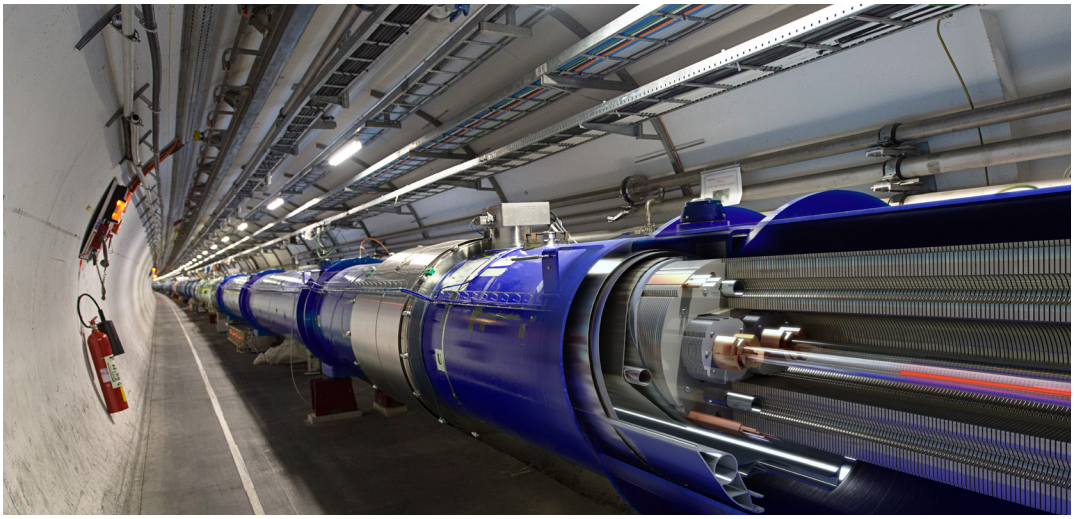
There's nowhere like CERN

The Large Hadron Collider at CERN is the largest and best-known collider in the accelerator complex and consists of millions of high-tech components installed in a circular tunnel that is 16.7 miles (27km) long and situated 330 feet (100m) beneath the border between France and Switzerland. Getting the equipment up and running was no small task; the total cost of the project was approximately US $9 billion.

The experiments CERN conducts are highly complex: during experiments, particles are accelerated to 99.999999% the speed of light and reach temperatures as high as 10 quadrillion degrees Celsius. The Large Hadron Collider needs to be cooled through cryogenics to temperatures colder than outer space. To achieve the organization's goals, CERN needed a tool that could help minimize unscheduled accelerator downtime while maintaining the safety and convenience of all its employees and visitors.

"Attune EAM helps CERN manage a wide array of maintenance activities for many types of equipment from the Large Hadron Collider's magnets to everyday infrastructure like elevators and fire extinguishers."

David Widegren
Head of Engineering Information Management, CERN



More uptime means more physics

CERN has been an Attune EAM customer since 1989 and has tracked technical data and maintenance of key pieces of equipment in the accelerator complex since they were manufactured on the shop floor. At the CERN Control Center, which ensures the accelerators are operating as they should, Attune EAM provides a clear view of the maintenance history to control room operators.

Operators use that information to diagnose a malfunction and ensure that corrective maintenance occurs as quickly as possible. That same level of visibility into maintenance history helps the cryogenics group optimize when and how much preventative maintenance should be performed in relation to corrective maintenance; this, in conjunction with the replacement parts that are selected, can help CERN achieve the same level of performance from the equipment at a lower cost.

Maximizing uptime to maximize CERN's goals

The goal of CERN is to advance science. The organization has been tremendously successful at doing this, as evidenced by the multiple Nobel laureates who have conducted their research in collaboration with CERN. Much of that has to do with the brilliance of the individuals CERN attracts; however, these individuals must accumulate a large amount of experimental data before they can validate their theories. By maximizing the uptime of the equipment and the surrounding infrastructure, the operational support groups help maximize the organization's goals.

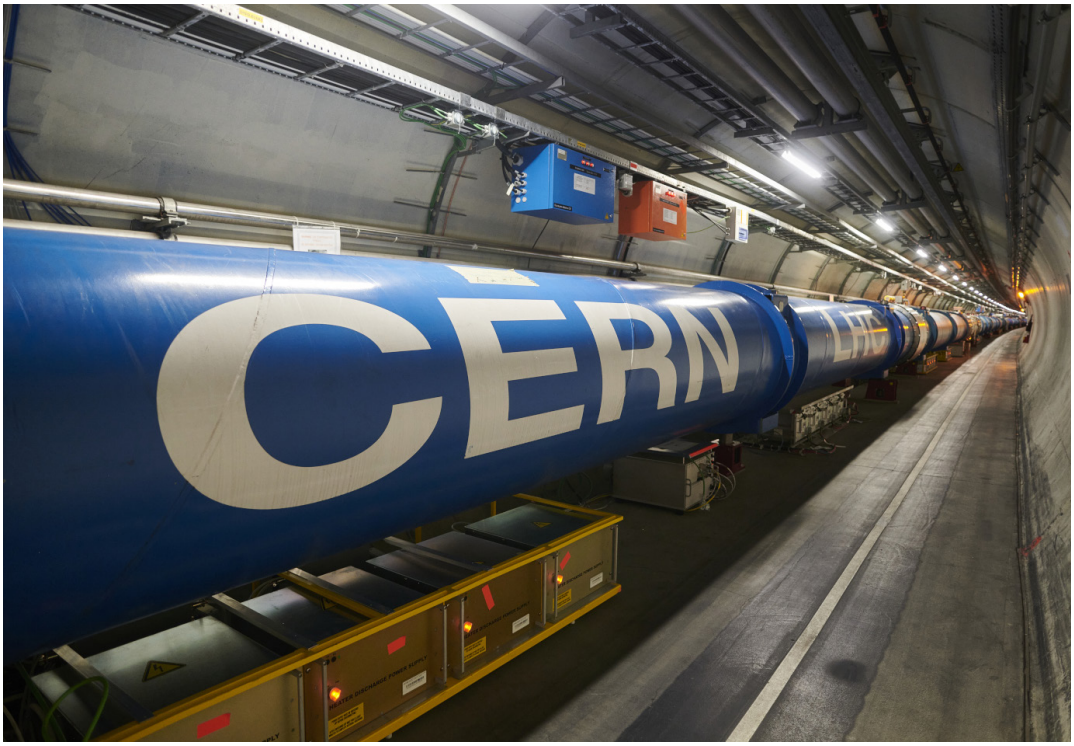
Attune EAM is used at CERN to organize and carry out corrective maintenance on pieces of equipment that break down, increase the efficiency and speed of scheduled maintenance and increase safety throughout the organization.

Challenges

- Minimize unscheduled accelerator downtime by optimally maintaining high tech equipment, including supra-conducting magnets, cryogenics, radiation monitoring, controls equipment, electronics and other equipment.
- Maintain technical infrastructure, including tunnels, caverns, roads, parking lots, electricity, water, cooling and ventilation systems, access control, machine tools, lifting equipment and more.
- Centralize detailed records of a wide range of maintenance activities executed by both CERN staff and contractors for machines with more than 50-year useful lives.
- Centralize procurement processes across an organization the size of a small town, including retail, and employee-centric stores, hotels and restaurants.

"What we do at CERN is something quite unique, we collide particles at very high energies to recreate the universe like it was like just a fraction of a second after the big bang and by doing so we see particles and phenomena we wouldn't see otherwise."

David Widegren
Head of Engineering Information Management, CERN



Business results

- Accelerated response time to equipment failure alarms by linking Attune EAM codes to information about the department and individual responsible for the maintenance of each item.
- Increased operating efficiency of radiation protection group responsible for the traceability of potentially radiation equipment and eliminated paper-based processes.
- Provided simple, intuitive self-service functionality to eliminate the need to train end users such as visiting scientists, students, contractors, and new hires.
- Reduced the time it takes to process the departure of temperature-sensing electronic cryogenics cards leaving the accelerator complex from 30 minutes to 2 minutes per card, resulting in a reduction of a full-time employee's workload by 15.2 weeks.

Business Impact

200% Increase in assets with IoT sensors used for predictive maintenance

99% Reduction of paper checklists in all new maintenance projects and processes

50% Reduction of measurement required for the TREC program through enhanced coordination via Attune EAM

10x Faster dispatching of corrective work orders thanks to control room integration

Value realized

Attune EAM is used at CERN to trace potentially radioactive equipment, ensuring that all equipment exiting the accelerator complex is properly measured for radiation and handled appropriately. Once an easy-to-use airport kiosk-like interface was introduced, Attune EAM adoption by scientists and technicians skyrocketed. This provided CERN with the data required to comply with regulators and optimize the efficiency of the radiation protection group and the outside contractors who transport equipment to the appropriate locations. The centralization of information through Attune EAM allows the radiation protection group to increase its efficiency by making scheduled pickups, rather than sporadically visiting each exit point where equipment can leave the accelerator complex. Ultimately, this helps reduce the cost associated with subcontractors in this process and gets the equipment back to end users faster, maximizing the amount of science that gets done.

Attune EAM and Infor LN work together

Attune EAM and Infor LN impact CERN in countless areas, including both complex and simple processes. Infor LN takes care of supply chain operations and the purchases of all of the infrastructure inputs that allow the CERN community to thrive. This includes much of what is needed within the 700+ building campus, from the food in the restaurants to the merchandise in the stores for scientists and tourists alike. There are a number of instances where CERN procures products and takes responsibility for their maintenance, such as personal safety equipment and car and electronic equipment rentals. In these cases, Infor LN and Attune EAM work together to take care of the full equipment life cyclefrom purchase to retirement.

Expanding and integrating for additional benefits

Going forward, CERN expects to expand its strategy to use homogenous and streamlined maintenance processes throughout the organization for both maintenance management and asset management. There are currently 3 million physical assets managed by Attune EAM; the goal is to extend the usage to include the whole accelerator complex and a larger portion of CERN's infrastructure, which could mean doubling both the current amount of work orders and managed assets during the coming three to five years. This is an ambitious yet realistic goal, these numbers already doubled ones in Attune EAM during the last 60 months.

CERN also will focus on further increasing the integration between Infor LN and Attune EAM. Centralization of information through Attune EAM could help reduce costs in everyday activities. For example, monitoring the trends associated with indoor lighting replacement across the organization could enable centralized purchasing (buying in larger quantities), which would increase their buying power and allow more favorable contracts to be negotiated with suppliers. Given CERN's size, this type of strategic initiative applied across the organization could create significant benefits.

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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