

CASE STUDY

Facility Control Systems Integration Unlocks Hidden Value for U.S. Marine Corps

An integrated facility-related controls system is serving as a proof of concept to deliver better situational awareness, operational efficiency, planning and budgetary forecasting.



Challenge

The U.S. Marine Corps Logistics Base Albany fulfills an essential mission for warfighters deployed across theaters around the world. Located on a remote 3,300-acre campus near Albany, Georgia, the base repairs and rebuilds ground combat and combat support equipment.

While the base has myriad building automation controls and other sensors installed to collect data on energy use and performance of heating, ventilation and air conditioning (HVAC) equipment, none of those systems were linked across the nine buildings on campus. This lack of integration prevented holistic analysis of how these systems were performing and made it difficult to verify the base was meeting U.S. Department of Defense directives to reduce intensity of energy usage and limit greenhouse gas emissions at all military and civilian installations.

Project Stats

Client

U.S. Marine Corps

Location

Albany, Georgia

580

HVAC ASSETS ANALYZED

5.5K

SENSORS ANALYZED

6.5M

SQUARE FEET ACROSS
NINE BUILDINGS

In addition, as control systems were installed, they had evolved to become siloed. The data provided only limited situational awareness of critical equipment that might be on the verge of failure.

The lack of data visibility also carried implications for executive-level reporting to command staff at the Pentagon. These senior commanders lacked the data needed for insight on base operations to make well-reasoned judgments on planning and budgetary decisions. These judgments also were essential for confirming ongoing expenditures of funding appropriated by Congress for current and future budget cycles.

These three challenges — lack of integrated systems, siloed data and lack of data visibility — were the drivers for development of a Facility Related Control System (FRCS) pilot project implemented at Logistics Base Albany.

Solution

A monitoring-based control system was installed as a comprehensive proof of concept, utilizing OSIsoft PI, a renowned operations data management infrastructure platform. The initial task was to integrate building control systems, advanced metering infrastructure (AMI) and various SCADA systems in the operational technology (OT) network with the OSIsoft PI system. This had to be done while maintaining DOD cybersecurity best practices for control systems and the existing ATO.

The initial project scope was to create an operations data management infrastructure for monitoring a broad range of data — from temperature changes of components and systems to valve status, pressure readings and many more indicators. Data from numerous sensors that had already been installed on HVAC equipment was fed to a centralized display system, giving operators status reports in real time.

The PI system interfaces with the Marines' open platform communications (OPC) server to collect this information and feed it to a centralized data historian and display system capable of capturing and managing data from hundreds of endpoints. These endpoints, also called tags, read data from sensors that serve as the foundation for the Corps' rules-based analytics system to identify equipment faults and provide diagnostics.

The next phase was to install systems at the enterprise level to connect the monitoring system at Albany with the Marine Corps Enterprise Data Center (EDC) in

Kansas City, Missouri. Functioning as the Marine Corps' information technology hub, the data center also hosts an Enterprise ArcGIS environment and SkySpark, another sophisticated monitoring technology system that now serves as the core platform for IBM's on-premise Watson offering. Both the PI and SkySpark systems work similarly to feed system analytics data to centralized dashboards, giving operators visibility into any patterns that deviate from optimal performance for any component of piece of equipment.

This usable and accessible data serves as a foundation for a system of artificial intelligence (AI) — the end goal for defining how information will be used throughout the Marine Corps global operations to improve and enhance resiliency.

The first step of this AI enablement was to break down data silos wherever they existed. The PI System flows data out of these isolated control systems into a centralized repository for cleansing, standardization and archiving for easy retrieval. The scope evolved to integrate all these systems at the enterprise level, utilizing a secure wide area network (WAN) between Albany and the EDC in Kansas City.

Results

This pilot is providing evidence of success that will be needed for implementation of this foundational AI system across many other Marine Corps installations. This ecosystem of integrated capabilities is demonstrating the potential to transform how information is gathered, analyzed and displayed.

At the Kansas City EDC, systems are now collecting and consolidating sensor data from thousands of points and uploading it to dashboards that automate a number of reports that previously required manual assembly before they were routed to Marine Corps commanders. The system will provide the opportunity to automate, track and analyze maintenance alerts, an essential step as the Corps moves toward full predictive maintenance that makes the previous system of break/fix a relic of the past.

The project addressed these challenges:

- Compliance with federal directives to reduce energy usage at all military and civilian government facilities.
- Improved resiliency of equipment and systems through predictive analytics to head off catastrophic failures.
- Actionable data communicated in real time to Marine Corps Command.

Benefits

The proof of concept is the basis for a business case for large scale implementation and funding.

The analysis of historical data at Albany revealed:

- 231 opportunities for energy/cost savings.
- 587 sensors offline or malfunctioning.
- 400 missing data points limiting analytics that could be run.
- Numerous equipment anomalies indicating imminent failure.

With completion of the last phase of installation, a business case analysis is being developed that will support a request for additional funding for a scaled rollout. This larger scope, to be reviewed by senior command staff at the Pentagon, builds a case for the funding needed to push out the program to several more installations throughout the country.

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