CLOUDERA

THE RISE OF THE MODERNIZED MILITARY BASE

Military installations are a key element of the United States defense apparatus, housing many thousands of military personnel, employees and their families. These critical facilities can be a focal point for modernization.

The Army is embracing the idea of a technological approach to installation management. In 2019 for example Army's Engineering Research and Development Center posted a request for information, seeking off-the-shelf solutions to modernize infrastructure, security and facility operations at its military installations. It followed up with an "Installations of the Future" industry day.

Military bases already have in place much of the computer and IT technology needed to support a modernization effort, but with the rise of sensors on base and across the battlefield, the move to data-driven solutions presents a new set of challenges.

Just as municipalities struggle to store, share and secure the volumes of data pouring in from "smart city" sensors, defense must look to a future in which military bases can support the data deluge from biometrics at the gate house, drones overhead and even soldier-worn sensors delivering information from the tactical edge. The cloud offers infrastructure solutions that deliver both the scalability and the security needed to meet that challenge.

DATA DRIVES THE FUTURE INSTALLATION

Just as in Smart Cities at the municipal level, military bases are being reshaped by the Internet of Things (IoT), a world of interconnected devices and sensors that monitor systems and assets 24 hours a day — from heating and cooling systems to vehicle fleet management, maintenance of equipment and even soldier health. The military push for Artificial Intelligence only magnifies the trend: Autonomous combat vehicles and surveillance aircraft for instance may generate terabytes of data every day. This mass influx of new data is both disrupting and revolutionizing the way military installations are run.

800
The number of U.S. military bases in **more than 70 countries** and territories abroad

$33.2 BILLION
Size of the **military sensors market** by 2025

$104.3 BILLION
Amount the **Pentagon** is investing in **technology R&D**

THE DATA-DRIVEN VISION

The military has much to gain by a transition to a sensor-driven military base, supported by AI capabilities. In this data rich environment, commanders can:

1 Analyze the relationships between multiple large data sets, for instance when a surge in social media chatter may precede an attack on a base

2 Produce actionable insights from the data in order to better organize and manage personnel and other resources

3 Add context by combining sensor data with intel from other data sources, either on base or at the tactical edge, such as using solder-worn sensors to direct drone ops

4 Leverage analytics to predict equipment usage, take preventive action around maintenance, and drive logistics for a more efficient supply chain

WHAT THE FUTURE HOLDS

The military is embracing IoT, AI and other data-based solutions today, and looking to build on that investment for the future, in order to:

More closely monitor, in real time, the status and condition of distributed assets

Drive efficiencies throughout the installation and lower operational costs

Dramatically improve base safety and security through increased real-time monitoring and surveillance

COLLECTING, MANAGING AND ANALYZING DATA IS CORE TO BASE MODERNIZATION

The average military base already has to deal with terabytes of data produced by sensors and cameras. That volume and variety of data — comprising telemetry, video/still picture and audio — will increase exponentially as IoT adoption and AI-informed implementations continue to accelerate. To garner value from all that structured and unstructured data, military IT infrastructure will need to:

COLLECT, process, and store the data as it lands in real time

SCALE easily in order to match the growth in data

SUPPORT multiple data types and data structures

PROCESS and analyze data to derive real-time operational insights

ENABLE machine learning and intelligence to detect anomalies and predict outcomes

DATA SILOS POSE A CHALLENGE TO MODERNIZATION...

Military bases may be hindered by the limits of legacy systems that to do not make data readily available. As the DoD Cloud Strategy aptly puts it: "An environment where data is stored in a multitude of disparate and disjointed stove pipes reduces the efficiency and tempo of the Department." To meet the data-driven future, systems must enable commanders to integrate data that has been collected in multiple silos and spread across hundreds of systems, such as:

Cameras and surveillance systems that cover base perimeters, including an emerging generation of biometric-based identity systems for access control

Logical security that makes sure the right person is using the right digital device, and is accessing information they are allowed to access

Autonomous and semi-autonomous systems, from surveillance drones to next-generation combat vehicles

AI-informed maintenance systems that use predictive analytics to track the status of vehicles and equipment

Solar energy plants that are independent of the local power grid, and can be used in case of power outages, to scale power supplies according to need, and to offset energy costs

Building systems and Heating, Ventilation and Air Conditioning (HVAC) systems, which often comprise the biggest part of ongoing facilities costs

Digital printing systems that are increasingly being used to manufacture replacement parts, cutting down on logistics and storage requirements

All of these data sources, which today may operate independently, will in the future need to mesh cohesively. The best solution is to adopt a unified stack approach that can operate anywhere, either on-premise or in the cloud to avoid vendor lock-in. As bases adopt a data-based approach to key management challenges, those that fail to consider where the data will land and be analyzed will not solve their data silo problems.

...AS DO SECURITY AND DATA GOVERNANCE

Data security, compliance, and governance — particularly governance — are essential to making effective use of the rising wave of data. As a military installation adds more devices and systems, and the sensors to go along with them, additional opportunities will arise to use data in new and more interesting ways. But potential vulnerabilities will also increase. With that comes the risk of increased liability, particularly if the data is sensitive in nature. Going forward, military installations will need to enforce well-defined rules about what data can be handled, by whom, when, and in what ways. Good data governance and the controls that go along with that are the essential table stakes for military installations seeking the benefits of modernization.

SO WHAT DOES
SMART
LOOK LIKE?

SMART SURVEILLANCE/
PERIMETER MONITORING
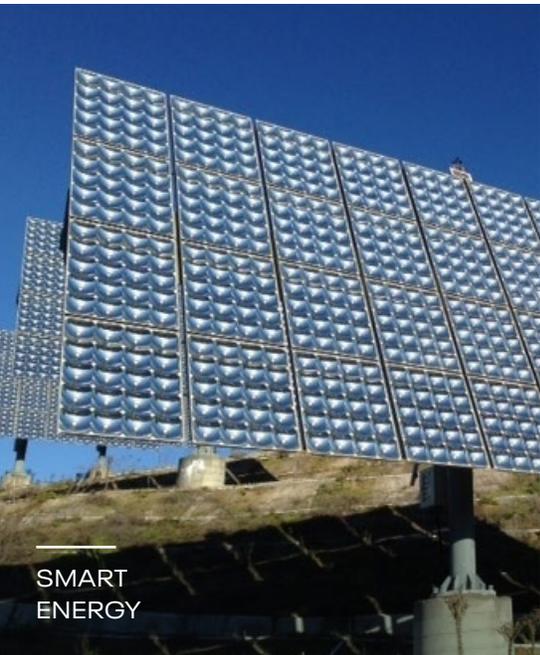
SMART
ENERGY

SMART
LIGHTING

SMART
TRANSPORTATION

SMART
MANUFACTURING
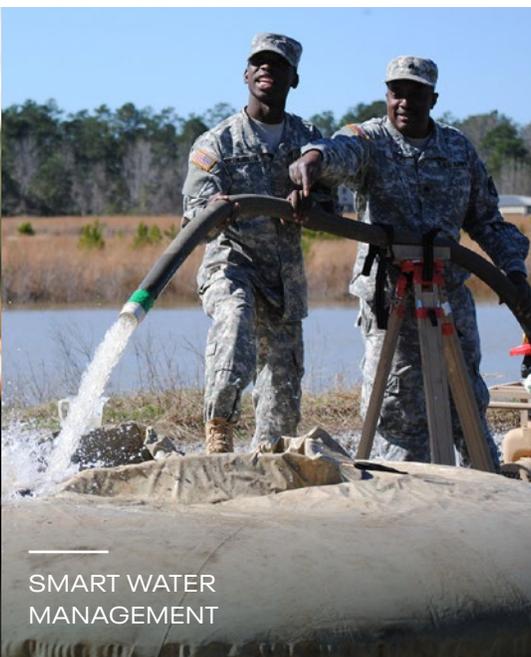
SMART WATER
MANAGEMENT

SMART
HEALTH CARE

IF YOU WANT TO BE DATA DRIVEN…

Data has enormous potential to make military installations more efficient and effective. To take best advantage of the opportunities presented by modernization, military leaders will need to…

1 Implement key technologies, especially the IoT devices and edge sensors that generate critical data. Many bases already are on the road to doing this.

2 Invest in analytics, working hand in glove with industry to leverage emerging tools that will help turn vast volumes of information into actionable intelligence.

3 Develop an infrastructure to support the ready accessibility and shareability of this new knowledge store. Given its intrinsic speed and scalability, cloud is a natural fit for this role.

…FOCUS ON DATA SHARING

Whether a modernized military installation will succeed or fail depends not just on the volume of new data generated, but also on commanders' ability to readily disseminate the resulting intelligence to all relevant stakeholders, from the quartermaster taking stock to the soldier on the cutting edge.

Lacking the ability to share key information in real time, military bases may put in place the mechanisms of a "smart city," without getting any smarter. Key infrastructure elements are required to ensure data does not get trapped in siloes or go overlooked at vital moments. Cloud offers the means to open up the data in a way that is at once readily accessible and securely controlled.

AN ENTERPRISE DATA CLOUD FOR ANY DATA, ANYWHERE, FROM THE EDGE TO AI

An enterprise data cloud unlocks the power of your data to serve customers better, operate with greater efficiency and strengthen security to protect your business. We use the cloud to make machine learning and analytics easier, faster and safer. With an enterprise data cloud you control your data and your future.

WHY CLOUDERA?

1

Hybrid and Multi-Cloud
Control, analyze and experiment with data wherever it lives. Run your analytics on the clouds you choose. Easily and securely move data and metadata between on-premises file systems and cloud object stores.

2

Analytics from Edge to AI
Solve demanding business use cases. Apply real-time stream processing, data warehousing, data science and iterative machine learning across shared data, securely, at scale on data anywhere from the Edge to AI.

3

Security and Governance
Simplify data privacy and compliance for diverse enterprise data. Use a common security model, role and attribute based access policies and sophisticated schema, lineage and provenance controls on any cloud.

4

100% Open
We empower customers with the freedom to choose — open source, open compute, open storage, open architecture and open clouds. Open for developers, partners, and open for business. No lock-in. Ever.

ABOUT CLOUDERA

At Cloudera, we believe that data can make what is impossible today, possible tomorrow. We empower people to transform complex data into clear and actionable insights. We deliver the modern platform for machine learning and analytics optimized for the cloud. The world's largest enterprises trust Cloudera to help solve their most challenging business problems.

Learn more at cloudera.com.

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