The Challenge
Create a unified system across all defense services to perform industrial plant facility and capital equipment planning and maintenance management; increase efficiency and effectiveness of operations; reduce material purchases and maintenance labor; facilitate preventive and corrective maintenance management.

The Solution
IBM Maximo, a strategic facility and equipment maintenance system.

Key Benefits
Eliminated five stovepipe legacy systems; improved decision making because of better visibility and data access for users and customers; significant reduction in overall costs.

Overview

Robins Air Force base is the home of Warner Robins-Air Logistics Center (WR-ALC) and more than 60 other units that comprise a vital part of the United States Air Force war fighting team. Located on 8,722 acres, WR-ALC is the largest industrial complex in Georgia. It employs a workforce of more than 25,584 civilian, contractor and military members, with approximately US$3.3 billion replacement value of facilities, 3.8 million square feet of maintenance shops, 3.5 million square feet of storage space and 1.7 million square feet of administrative space. WR-ALC, one of three Air Force Air Logistics Centers, has worldwide

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management and engineering responsibility for the repair, modification and overhaul of the F-15 Eagle, C-130 Hercules, C-5 Galaxy, C-17 Globemaster, all Air Force helicopters, and all special operations aircraft and their avionics systems.

In 1995, as part of an initial Joint Logistics Systems Center (JLSC) initiative, the Assistant Secretary of Defense for Command, Control, Communications and Intelligence selected IBM® Maximo® software (formerly MRO Software’s Maximo) as its facility and equipment maintenance (FEM) system. The Navy Systems Support Group (NSSG) was designated as the overall project manager for the FEM program.

In turn, NSSG contracted General Dynamics IT (formerly Anteon Corporation) to implement Maximo for any Department of Defense (DoD) agency wanting an automated maintenance management system (MMS). The goal of Maximo was to provide a unified system across all defense services to perform industrial plant facility and capital equipment planning and maintenance management.

As the initial operating site, WR-ALC assumed the operational risk associated with changing no less than three different incumbent systems. Using a measured process and a business case analysis, WR-ALC undertook the necessary steps to make Maximo a reality. General Dynamics IT, the contractor that performed the configuration, also played a critical role in the overall success of the Maximo implementation.

Maximo was selected to provide depots with an automated tracking and control system to manage facility and equipment maintenance, equipment calibration, equipment maintenance contracts, inventory control, asset costs, preventive and corrective maintenance and capacity data. Maximo has now grown to include tools management, a graphical interface system (GIS) and radio-frequency (RF) tagging.

Maximo, designed to address superior acquisition and sustainment challenges, is responsible for maintaining and restoring the support assets for the Air Force fighter and cargo planes, helicopters and other key weapon systems. Currently, WR-ALC is using Maximo in four major areas: industrial plant and equipment (IPE), precision measurement equipment laboratory (PMEL), ground support equipment (GSE) and tools management.

**Preventative maintenance improves productivity for IPE**

The Plant Management organization manages all the IPE located on WR-ALC. It is responsible for 4,926 pieces of equipment, ranging from X-ray machines to hoists and torque wrenches to pneumatic equipment. More than 1,250 pieces of equipment are established in the system for scheduled preventive maintenance, and over
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500 pieces of equipment are established on a repair on-call basis. Plant Management accomplishes all necessary actions required to establish and maintain support effectiveness of assigned equipment.

Plant Management initiates the scope of maintenance, repair, tests or calibration to be performed by in-house mechanics/technicians or contractors on assigned equipment. Once established, they investigate, analyze and recommend corrective action on repair and support problems on a continuing basis to enhance repair policies and procedures. Through coordination with Production Directorates, Plant Management determines the mission essentiality, reliability, maintainability, safety implications, use of standard and interchangeable parts, speed and safety of operations, accessibility of components for replacements and repairs, life cycle and compatibility with associated equipment. It also provides technical input to procurement packages.

The new technology enables the Plant Management organization to realize labor productivity and material improvements. In addition to productivity gains, the IT infrastructure costs for maintaining Maximo were comparatively less than the replaced legacy systems.

Using Maximo, the number of PMs being completed on or before required due dates substantially increased. Resource utilization improvements occurred through increased visibility of equipment status, improved PM scheduling based on known equipment downtime periods and an increased PM scheduling lead-time from one week to 2.5 weeks. Maximo also enabled the Plant Management organization to implement an automated work-order priority system based on criticality of the asset followed by criticality of the location. This priority system, combined with improvements in PM and CM visibility and lead times, has had significant impact on workforce productivity and material utilization.

Since the inception of Maximo, WR-ALC has experienced a major C-141 program elimination balanced by a major C-5 program acquisition. Over a five-year period equipment increased 88 percent. Similar to this equipment increase, IPE unique materials have increased 183 percent. Maximo has helped Plant Management absorb these increases without additional personnel.

Data access and reporting improves decision making for PMEL
The Precision Measurement Equipment Laboratory (PMEL) helps ensure that all customers are provided test measurement and diagnostics equipment (TMDE) that meets mission requirements with accuracy traceable to the National Institute of Standards and Technology (NIST) or other nationally recognized standards.
Depending on the nature of the TMDE, out-of-calibration conditions could potentially cause serious “unsafe conditions” for deployed weapons systems. Similarly, mission-critical weapon systems may be made unavailable because of similar out-of-calibration conditions. Whenever a suspect standard appears, PMEL can quickly alert all installations of a potential problem and mitigate any unforeseeable risk. Clearly one accident can cost the Air Force millions of dollars in equipment, and more profoundly, can result in the loss of human life due to out-of-calibration equipment.

Maximo offers much better visibility to both users and customers for reviewing/querying their data, both on and off the base. It tracks the history on all PMEL work, whereas the previous legacy system did not. It also allows multiple status changes, the use of value lists, quality random selections for work orders, tables/screens to set up customer information and hyperlinks between screens. Maximo ties all work to the equipment for easy reporting access. By printing weekly reports and work orders, PMEL can save about three weeks waiting for the products to come in the mail.

Contractor performance tracking, previously unavailable, is provided through Maximo, thus improving contract adherence. Penalties are assessed for non-compliance to flow days—the time equipment is received until the time it is shipped. Maximo enables PMEL management to track such improvements and, if necessary, apply flow-day penalties.

Using Maximo has also enabled PMEL to quickly construct equipment histories to identify bad actors. These bad actors increase the number of calibrations required, ultimately driving up the cost of ownership. With equipment history information in hand, PMEL can make recommendations for continued calibration activities, equipment overhaul and equipment replacement decisions.

**Quicker reporting helps reduce personnel costs for GSE**

The Plant Management organization also manages the ground support equipment (GSE) at WR-ALC. It provides technical guidance to ensure the maintenance contract is written to give maximum support of serviceable equipment to the product divisions within the Maintenance Directorates and other base organizations. The program contract for GSE provides the repair/maintenance for 1,000–1,200 pieces of powered equipment, 5,000–6,000 pieces of non-powered equipment, 312 golf carts and 220 chain hoists.

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Using Maximo, maintenance personnel and supervisors can track history information on GSE work and equipment moves. They have the capability to tie scheduled and unscheduled work to a specific piece of equipment, track purchasing information and keep track of the contract dollars expended by each customer’s contract line item (CLIN). The aircraft supervisors can also open tickets via the Web for equipment moves.

The previous legacy system could take up to a week to get a purchase order through the sourcing and approval process. With Maximo, purchase orders can be routed electronically, reducing routing time from 45–60 minutes to 5–10 minutes. This helps to reduce the number of GSE clerks required to perform these functions from four to one—accounting for an annual total savings of $89,232.

GSE reported increases in labor hours per work order and decreases in material dollars per work order. In 2001, GSE experienced a 3,331 increase in pieces of equipment (due primarily to winning the C-5 support contract), yet remarkably held labor per work order constant.

**Streamlined operations improve tools management**

Using Maximo, multiple divisions support tools management. Under tools management, divisions support inventory management—the stocking and restocking of bulk, special, unique, consumable and safety tools; support operations of tool cribs (issuing, exchanging, tracking and others). The divisions also provide kitting functionality (templates and tool kits) and are integrated with metrology, which ensures that TMDE tools are tracked and calibrated on schedule.

Tools management at WR-ALC has more than 5,000 kits, each containing an average of 300+ tools per kit. From an inventory standpoint, WR-ALC has 30,000 item records and manages 3.5 million tools in tools management. WR-ALC has over 20 tool rooms and makes 2,000–3,000 transactions a day. Maximo has enabled WR-ALC to streamline operations from accounting to check-in/check-out capabilities in multiple tool rooms.

Overall, Maximo has greatly improved the efficiency and effectiveness of operations at WR-ALC and helped to eliminate five stovepipe legacy systems. The reusability of Maximo has significantly reduced overall cost, and the system’s flexibility facilitates out-of-the-box thinking, while providing credible data to manage asset requirements. Because of the team effort of the project office (NSSG), the contractor (General Dynamics IT) and user teams, Maximo continues to meet the evolving requirements of WR-ALC by keeping pace with advancing technology.
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