BEST PRACTICES IN ENTERPRISE ASSET MANAGEMENT:

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Purpose

Review EAM best practices developed by STS International over the past five (5) years in order to maintain Non-Intrusive Inspection Systems (NIIS) at a high operational availability rate with reduced costs.

Background

In 2013, STS International assumed the contractual maintenance responsibilities of roughly 250 non-intrusive inspection systems encompassing vehicle/container, personnel, and baggage scanners located across the CENTCOM and AFRICOM areas of responsibility. These systems are operated by U.S. Military personnel, NATO teammates, and other contractors, mainly



in austere environments and combat zones. Because these systems are an integral part of force protection for Entry Control Points (ECPs), a high operational availability (>90%) is a contract requirement and essential for the safety of deployed personnel.

Objectives

The sustainment program for these systems includes these goals and objectives:

- Prevent failures before they happen through proactive, Reliability Centered Maintenance-based strategies
- Maximize operational readiness at optimal costs through an advantageous balance of supply availability and maintenance availability
- Mitigate obsolescence and restore reliability to aging systems by strategically sourcing or re-engineering alternative parts at equal or better performance
- Apply accumulated program data and knowledge to make condition-based maintenance decisions and innovative sustainment improvements
- Reduce long-term costs by evaluating which maintenance decisions and engineering alternatives provide the best return to the Government

Challenges

Sustaining hundreds of these highly complex, technical systems in disperse locations around the world involved several challenges:

- System complexity the integrated complexity of these systems means that when one part is not working correctly, it can affect the functioning of several other parts or even the entire system. Identifying appropriate maintenance actions, therefore, requires rigorous analyses and advanced technical knowledge.
- System age & obsolescence Many of the systems experienced deterioration and the loss of some functioning which comes with age and frequent use. Additionally, many components of the systems had become obsolete or had diminishing vendor sources.
- System location the location of these systems in extreme environments had many implications for operations and sustainment. Moreover, system locations in active conflict zones posed a variety of challenges for transporting supplies and moving personnel to sustain the systems.
- Total asset visibility & system compatibility sustaining critical Government assets requires logistics information systems that can interface with Government systems and provide total asset visibility.

Scope

To achieve the target operational availability (Ao) metric, STS combines the following tools into the overall EAM approach supporting the systems:

An asset logistics and reliability database (ALRD)

A Reliability Centered Maintenance (RCM) Process

Integration of supply chain management and transportation systems



Sophisticated analytics of reliability data via tailored business analytics software

A secure, powerful, customeraccessible Logistics Information System

These tools combine to create and manage optimal maintenance strategies with balanced predictive, preventive, and corrective maintenance actions.

Asset Logistics and Reliability Database

STS compiled a comprehensive and accurate maintenance database for all customers' assets. STS also collected and classified reliability data for a complete variety of assets and components. STS has cataloged tens of thousands of components and the associated reliability data, using manufacturers' part numbers, Federal Supply Classifications, and a more detailed custom set of sub-classifications to record reliability data. Some of the key data input for our analytics are: Asset Hierarchy of components, Component Failure Modes, and Mission Capability status (FMC, NMC, and PMC). STS analyzes reliability data in the ALRD to output data for use in developing our maintenance strategies during the RCM process. The analytical results include:

- Mean Time Between Faults MTBF (OEM)
- MTBF (Field actual)
- Mean Time to Repair MTTR
- Demand Rates
- Asset Worst Offender Report (Failure Modes by Asset Class)
- Duty Station Location to Asset Location Leadtime
- Storeroom Location to Asset Location Leadtime

Reliability Centered Maintenance

STS uses the analytics of the reliability data to provide a maintenance strategy using our RCM processes based on the SAE JA1011 standard, which DoD adopts. STS uses the analytical results of MTBF and MTTR along with supply chain data as inputs to the RCM process to predict the correct combination of resources. For assets that STS has not maintained, STS has a rapid approach to develop a maintenance strategy with our engineering teams using our RCM data in conjunction with partners with comprehensive and accurate reliability data for all the customers' systems and components.





Integration of Supply Chain Management and Transportation of Systems

An important aspect of asset maintenance and RCM is the impact of the supply chain including transportation systems and delays. Using the data from the RCM analysis, STS stocks critical parts at select hubs to decrease the impact of supply and transportation delays without incurring the added costs of redundant inventory. Small, inexpensive items are maintained via bench stock and often pre-positioned forward with remote assets. STS also conducts innovative procurement strategies for items with long lead times, such as researching alternate sources for parts using a "form, fit, function" approach in lieu of strictly using OEM parts. These practices decreased order-ship time (OST) and often saved the government procurement costs (on average, 67%). Finally, to preclude the impact of obsolete parts, STS instituted a proactive obsolescence management program to find alternate, acceptable parts, re-engineer or fabricate the parts, or re-condition available spares.

Strategic approaches to managing, transporting, and locating parts enabled STS to decrease supply chain delays for critical Government assets.





STS provides a customized version of Maximo which meets DoD best practices. It is important that the LIS system can be further configured to interface with government systems via exports. Reporting is extremely flexible and powerful using IBM Cognos Business Analytics software. Furthermore, we provide a secure environment to host the government's data, meeting all the cybersecurity standards including the NIST 800-53 standard to protect Controlled Unclassified Information ("CUI"). An important aspect of the LIS is that both the contractor and the client can access the same data to ensure a common operating picture of equipment status, repair parts, and key RCM data that drive the maintenance management process.

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Key Performance Metric: Operational Availability

The key performance metric for a professional organization providing enterprise asset management services is Operational Availability (Ao). The metric is the foundation for the monitoring and performance of the assets. STS uses well-recognized, formulaicbased methods to create optimal maintenance strategies for our customers' assets. STS can maintain to the Ao metric by individual asset, model/system variant fleet, location, or project-wide, as requested by the customer. STS rigorously conducted an Ao performance metric breakdown to show the relationship between all the parameters that are inputs to the forecasted Ao. We did this so we could show real-world, tangible mitigation strategies to achieve Ao targets.

Understanding Operational Availability

Operational Availability - the amount of time a system is able to operate

These systems are critical to the safety of US soldiers, so the objective is to maximize the time they are able to operate (green) as much as possible.



Fully Mission Capable - system is fully capable and available to operate

Preventive Maintenance - system is partially/ fully unavailable while routine maintenance is performed to prevent failures. STS aims to perform PM actions while systems are "off-duty" to decrease down time as much as possible.

Non-Mission Capable - system has failed and requires corrective maintenance. This time lowers Ao rates.

Corrective Maintenance - system has failed and STS must now perform corrective maintenance to make the system operational again.

When possible, our technicians will perform preventive maintenance at the same time as corrective maintenance to decrease overall down time as much as possible.

About STS International, Inc.

Founded in 1992, STS International, Inc. is a U.S. Veteran-Owned Business with over twenty-five years of experience providing integrated secure solutions and services to the federal government in the areas of Engineering, Enterprise Asset and Logistics Management, Training and Simulation, and Professional Support. We have focused our efforts in the domains of Command, Control, Communications, Computers, Cyber-Defense, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C6ISR), IT, Robotics and Unmanned Systems, Medical, and other Emerging Markets. Our goal at STS is to achieve mission-success for our clients in Defense, Homeland, and National Security by dedicating ourselves to the principles of innovation, agility, and excellence. What makes STS unique is our ability to swiftly meet our client's needs while sustaining global operations and a mature infrastructure. Our solutions maximize best value, mitigate risks, and optimize operational efficiency.