Global Mission Support Solution

Ground Systems VHMS Enterprise application in the CBM + operational environment

DoD Maintenance Symposium
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VISION

“To develop a global enterprise support solution that provides decision support capabilities to achieve the operational effectiveness combatant commanders need in a net-centric environment.”
Global Mission Support Solution

Linking the Warfighter & Sustainment

CFLCC Command Center

Tactical (UA)

Health Management

Course of Action

“Can I logistically support the fight?”

Allows the user to project supply consumption for a given COA by event or across time. This feature assists in training, planning, and execution.

In-Transit Visibility

“Where are my parts?”

Provides a map-centric view to track inbound vehicles/cargo that are equipped with movement tracking devices.

Combat Power

“What can I put into the fight and when?”

Gives the commander the latest available status of critical weapon systems, fuel, ammunition, and personnel.

Health Management

“What is my Operational Availability?”

Health Management provides systems the latest available Real Time platform health status of fuel, ammunition, diagnostics and personnel.
The Mission

• BAE Systems, as an OEM, System Integrator, and Vehicle Health Monitoring System (VHMS) Lead Technology Integrator (LTI) is working with PMHBCT to extend vehicle condition monitoring to achieve Condition Based Maintenance (+) and vehicle health management goals for all directed platforms.

• Leveraging OEM systems engineering expertise to integrate on-vehicle data collection and processing into both on and off-vehicle decision support systems:
  - Support mission capability visibility and management
  – Reduce labor and false removals by maintenance task optimization
  – Increase velocity in supply support and reset / overhaul

• Working to create the collaborative environment where our lessons learned from contractor logistics support can reduce customer risk and cost while increasing capability in operational support of Condition Based Maintenance (+) goals.

BAE Systems' Global Mission Support Solution is an enterprise application of CBM+ and a Mission Capability Support Integration process for the HBCT operational environment.
Vehicle Health Monitoring System (VHMS)
# BAE Systems platforms in the HBCT

## BAE Systems: OEM/systems integrator for most of the armored combat vehicles in the Heavy BCT

- (5 of 6 armored vehicle families; 15 of 16 armored vehicle mission roles; 297 of 357 armored assets)
- *Plus* planned partnerships with GDLS, and Anniston & Red River Army overhaul/repair facilities.

<table>
<thead>
<tr>
<th>Roles/Families</th>
<th>Bradley Family</th>
<th>M113 Family</th>
<th>M109 Family</th>
<th>M88</th>
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<th>Abrams</th>
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<td><strong>TOTAL</strong></td>
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### Heavy Brigade Combat Team

- 3756 Soldiers

![Diagram of Heavy Brigade Combat Team](image)
Operational Support Building Blocks

Design Engineering
- VHMS
- CBM +

Data Transmission
- GCCS
- GCSS

Real Time Response

Sense
Communicate (Product)

Interpret
Data Transmission

Interrogate

Respond
Technical & Supply Chain

On-equipment

Off site In-service Support Center (ISC) (Operational 24/7)
Subject Matter Experts
- Industry & Government
- Engineering & Logistics
- Technical & Supply Data

Timely, accurate, and actionable operational decision support

Mission Capability Support Integration
- Support System Mgmt
- Product Data Management
- Supply Chain Mgmt.
- Sustaining Engineering
- Maintenance Support
- Configuration Mgmt.
- Tech Insertion
- DMSMS/Obsolescence

In-service Support Center (ISC) 24/7
- Industry/Government Team
- Engineering & Logistics

HBCT Global Mission Support Solution
Operational Support Vision

- Embedded Sensors
- Integrated Data Bus
- On-Board Diagnostics and Prognostics
- Interactive Training & Tech Support
- Integrated Logistics Information
- Configuration Management
- UID/SIM
- Maintenance History
- Configuration Control
- Battlespace Network
- Reliability Analysis
- Condition Monitoring
- Predictive Maintenance
- Anticipatory Material
- Reduced Footprints
- Integrated Data Bus
- Maintenance
- CBM+
- Total Asset Visibility (RFID)
- RCM Data Analysis
- Data Transfer
- Interactive Training & Tech Support
- Portable Maintenance Aids

- Sense & Respond Logistics
- BAE SYSTEMS

- Real-time status of Equipment Material Condition
- Integrated Supply/Maintenance viaSerialized Item Management
- Total Asset Visibility
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<thead>
<tr>
<th>Analyze</th>
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<tbody>
<tr>
<td>Define Support Strategy</td>
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<tr>
<td>Analysis of Requirements</td>
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<td>Mission / Failure Modes</td>
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<tr>
<td>Analysis of CONOPS</td>
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<th>Procure</th>
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<td>Select / Design</td>
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<td>Acquire / Integrate</td>
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<td>Diagnostics / Prognostics</td>
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<td>Model Based Performance</td>
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<tr>
<td>Optimize Support Process</td>
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<th>Deliver</th>
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<tr>
<td>Provide Support, Logistics, &amp; Training</td>
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<tr>
<td>Asset Condition / S/N Track</td>
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<tr>
<td>Material Visibility &amp; Dynamic Positioning</td>
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<tr>
<td>Integrated Data Management</td>
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<tr>
<td>Enterprise Fleet Management</td>
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<th>Support</th>
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<tr>
<td>Manage Health and Performance Outcomes</td>
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<tr>
<td>Reliability Centered Maintenance</td>
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<td>Mission Performance Metrics</td>
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<td>Performance Based Contracting</td>
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<td>Reduced Cost &amp; Risk</td>
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Condition Based Maintenance (+) Mission Capability Support Integration

- Fleet Management
- Agile Support Infrastructure
- Performance Based Logistics
- Condition Based Logistics
- Prognostics
- Performance Driven Outcomes
- CBM (+) Data Architecture
- Reliability Centered Maintenance
- Mission Capability
- Concept of Operations
- Fielded Usage
- VHMS

HBCT Global Mission Support Solution Framework
Condition Based Maintenance (+)  
Mission Capability Support Integration

Systems Engineering Approach

• Operations / Mission Analysis  
  - Supportability Analysis  
  - CONOPS Analysis

• Capability Gap Analysis  
  - Targeted VHMS implementation  
  - Vehicle Specific Requirements
Condition Based Maintenance (+)  
Mission Capability Support Integration

Vehicle Health Monitoring

- Sensors applied to mission functions
- Modeling enables gap analysis
- Data collection related to function
Performance Based Logistics

• Utilizing
  • Condition based maintenance
  • Condition based logistics
  • Reliability Centered Maintenance
  • Performance Based Support

• Achieve
  • Reduced Cost
  • Reduced Risk
  • Increased Reliability & Availability
Enterprise Information Technology Integration

Modeling & Prognostics

Fleet Maintenance Planning & Resources (ERP & MRP)

Integration – Not Invention!
Global Mission Support Solution Overview

Multiple, Integrated Technologies Increase Maintenance and Information Capabilities in the Field

Centralized Capability
- Remote Maintenance Monitor
- Interactive Electronic TMs
- Remote TMDE Access/Control
- Audio/Video Teleconferencing
- Automated Data Collection
- Diagnostic Support Systems
- Prognostics

Portable Capability
- Telemaintenance
- Computer-Aided TMDE
- Electronic TMS

In-service Support Center Capability
- Help Desk Operation
- Interactive Electronic TMs
- Remote TMDE Access/Control
- Audio/Video Teleconferencing
- Automated Data Collection
- Diagnostic Support Systems
- Remote Diagnosis
- Access to Technical Databases
- Prognostics Database

Digitizing the Army Maintainers’ Slice of the Battlefield
- Supports Army Transformation Initiative
- Rapid Support for Force Projection, Contingency Operations
- Knowledge-Based Maintenance

Portable Capability Enables enlightened self-care or expert intervention anytime, anywhere

... And, Real-Time Links to Remote Sites Provide a “Safety Net” for Tough Problems ...

... As Well As an Effective Way to Collect Data and Return Updated Information

Technology exists
Significant impact for the users
Real-time cost effective operational effectiveness
Global Mission Support Solution

Achieves Performance Delivered Outcomes for mission capability through \textit{integrated} support:

- Utilizing a value stream that consists of:
  - Analysis of support and support equipment requirements,
  - Procurement of support products,
  - Delivery of equipment and services,
  - Support for the delivered equipment and services, &
  - Management of the performance & support of delivered equipment to performance requirements.

- Leveraging unique support knowledge of: platform, mission systems and logistics; MCSITM tools for planning; scheduling; providing asset & inventory visibility and monitoring performance metrics are utilized to integrate support & mission capability to achieve performance delivered outcomes.

- Enables systems integrators, users, buyers & maintenance, repair & overhaul, and fleet managers to achieve Mission Capability Support Integration.

Safe - Mission Capable - Affordable - Systems
BACK-UP
BAE Systems’ Global Mission Support Solution is an enterprise application of CBM+ and Mission Capability Support Integration (MCSI) in the HBCT operational environment

- Implement and maintain the most innovative CBM+ engineering and logistics approaches, tools and technologies to enhance sustainment capability
- Achieve near real time and accurate visibility into asset performance status
- Provide enhanced predictive capabilities based on knowledge of asset condition
- Provide more automated, timely and proactive solutions to address operational performance issues
- Create and leverage wide-ranging partnerships

Safe - Mission Capable - Affordable - Systems
Mission Capability Support Integration – MCSI™

Users want mission performance
Customers want health management systems
Functional testing enables health management

Functional testing techniques are our discriminator
Simulating functional failure results reduces PBL risk
PBL’s open new markets through customer partnering