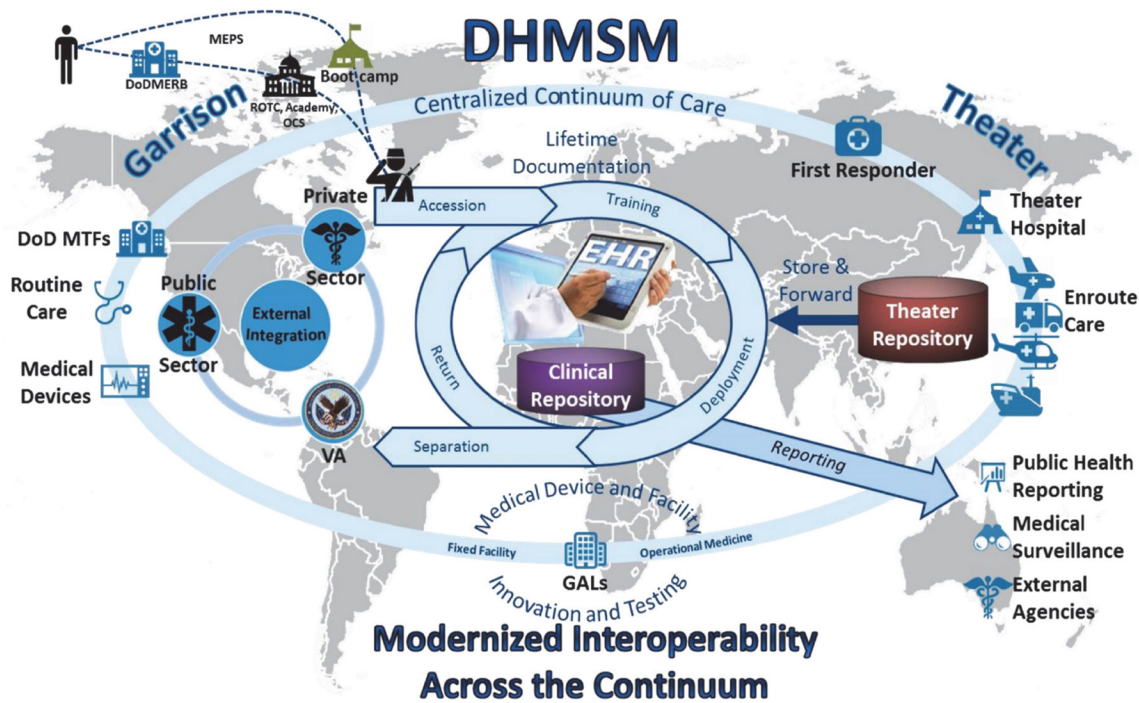


DOD Healthcare Management System Modernization (DHMSM)



LEGEND:			
DHMSM	DoD Healthcare Management Systems Modernization	MERB	Medical Examination Review Board
DoD	Department of Defense	MTF	Military Treatment Facility
EHR	Electronic Health Record	OCS	Officer Candidate School
GAL	Government Authorized Laboratory	ROTC	Reserve Officers' Training Corps
MEPS	Military Entrance Processing Station	VA	Veterans Affairs

Executive Summary

- The Leidos Partnership for Defense Health (LPDH) began functional Contractor Integration Testing (CIT) of Military Health System (MHS) GENESIS at Leidos in Vienna, Virginia, on July 25, 2016. Over the succeeding 3 months, LPDH experienced a higher rate of functional and interface defects than expected.
- As of November 8, 2016, LPDH had successfully completed 70 percent (1,008 of 1,437) of the CIT test cases with 4 open Severity 1 and 75 open Severity 2 defects. At that time, LPDH had fixed and successfully retested 42 Severity 1 and 352 Severity 2 defects. A Severity 1 defect prevents the accomplishment of an essential capability and a Severity 2 defect adversely affects the accomplishment of an essential capability with no known workaround.
- Interface development has proved difficult for LPDH and legacy system owners, with the highest defect rates in the MHS GENESIS interfaces with the Defense Enrollment Eligibility Reporting System (DEERS) and Defense Medical Information Exchange (DMIX) system. Both of these interfaces are critical for MHS GENESIS to function correctly.
- The Defense Health Agency (DHA) Cybersecurity Division conducted a Risk Assessment of commercial services shared with the DOD at the Cerner Technology Center in Kansas City, Missouri, identifying over 8,000 cybersecurity vulnerabilities of varying severity. LPDH committed to have all mitigations for the highest severity vulnerabilities completed by December 31, 2016.
- The DHA Cybersecurity Division conducted an Independent Verification and Validation of DOD Specific Infrastructure at the Cerner Technology Center – Kansas City, identifying over 3,000 cybersecurity vulnerabilities of varying severity. The number of vulnerabilities identified by the DHA during the Risk Assessment and Independent Verification and Validation was larger than the program manager and LPDH expected.
- On October 7, 2016, USD(AT&L) approved a modified MHS GENESIS program schedule to allow the program manager additional time to finalize system interfaces, implement clinical capabilities, complete cybersecurity risk management, and provide time to test these capabilities prior to initial deployment. The new schedule delays go-live by 2 months, to

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February 7, 2017, and changes the initial fielding site from the Naval Hospital Oak Harbor, Washington, to the 92nd Medical Group at Fairchild AFB, Washington. The program manager plans to go live at Naval Hospital Oak Harbor, Washington in May 2017, Naval Hospital Bremerton, Washington in June 2017, and Madigan Army Medical Center, Washington, in July 2017.

- Although the modified program schedule removes most of the overlap in testing, significant technical and schedule risks remain due to the large number of high severity defects and cybersecurity vulnerabilities that the program manager still needs to address.

System

- The DOD Healthcare Management System Modernization (DHMSM) program will acquire and field MHS GENESIS, a modernized Electronic Health Records (EHR) System, to 153,000 Military Health System personnel, providing care for 9.4 million DOD beneficiaries worldwide.
- MHS GENESIS comprises three major elements: 1) the Millennium suite of applications, developed by Cerner, which provides clinical capabilities; 2) Dentrix Enterprise, developed by Henry Schein Inc., which provides dental capabilities; and 3) Orion Rhapsody, the framework that enables the majority of the external information exchanges.
- The DHMSM program established two program segments to support deployment of the DHMSM EHR System to the DOD enterprise:
 - Fixed Facility (Segment 1) supports all medical and dental services delivered by permanent inpatient hospitals and medical centers, ambulatory care clinics, and dental clinics.

- Operational Medicine (Segment 2) supports theater hospitals, hospital ships, forward resuscitative sites, naval surface ships, and submarines. The EHR System will be configured to work on the Operational Medicine infrastructure. The DHMSM program will provide MHS GENESIS to the Joint Operational Medicine Information System Program Office for implementation.
- DHMSM is intended to transition the DOD to a state-of-the-market EHR. It will replace legacy healthcare systems including the Armed Forces Health Longitudinal Technology Application (AHLTA), Composite Health Care System (CHCS), and Essentris inpatient system. DHMSM will replace legacy Operational Medicine components of the Theater Medical Information Program – Joint software suite including AHLTA-Theater, TMIP CHCS Caché, and AHLTA-Mobile.

Mission

DOD medical staff will use the EHR to deliver enroute care, dentistry, emergency department, health, immunization, laboratory, radiology, operating room, pharmacy, vision, audiology, and inpatient/outpatient services. DOD medical staff will also use the EHR to perform administrative support, front desk operations, logistics, and business intelligence.

Major Contractors

- Leidos – Reston, Virginia
- Cerner – Kansas City, Missouri
- Accenture Federal Services – Arlington, Virginia
- Henry Schein Inc. – Melville, New York

Activity

- On July 25, 2016, the LPDH began functional CIT for DHMSM at Leidos in Vienna, Virginia.
- From July 18 – 29, 2016, the DHA Cybersecurity Division conducted a Risk Assessment of shared commercial services at the Cerner Technology Center – Kansas City.
- From August 1 – 12, 2016, the DHA Cybersecurity Division conducted an Independent Verification and Validation on DOD-specific infrastructure at the Cerner Technology Center – Kansas City.
- On August 15, 2016, the DHA provided Program Executive Officer, Defense Healthcare Management Systems (PEO DHMS) a list of MHS GENESIS minimum essential capability showstoppers that must be resolved prior to go-live at the IOC sites.
- On September 1, 2016, PEO DHMS announced that the DHMSM program schedule would be modified.
- On October 7, 2016 the Program Manager presented LPDH's plan to adjudicate, retest, and close all high severity defects to USD(AT&L), who subsequently approved a modified program schedule for MHS GENESIS. The new schedule

delays go-live by 2 months, to February 7, 2017, and changes the initial fielding site from the Naval Hospital Oak Harbor, Washington to the 92nd Medical Group at Fairchild AFB, Washington.

- On October 24, 2016 the PEO DHMS provided the go-live dates for the remaining Initial Operational Capability (IOC) sites – Naval Hospital Oak Harbor, Washington in May 2017, Naval Hospital Bremerton, Washington in June 2017, and Madigan Army Medical Center, Washington in July 2017.
- On November 10, 2016 the program manager waived the Government Developmental Test (DT) entrance criteria and began the testing on November 14, 2016.
- The Joint Interoperability Test Command (JITC) is scheduled to conduct a scenario-based operational assessment (OA) with a Cooperative Vulnerability and Penetration Assessment (CVPA) in the Fixed Facility (FF) Government Approved Laboratory (GAL), Auburn, Washington, from February 13 through March 20, 2017.
- JITC plans to conduct IOT&E and a cybersecurity Adversarial Assessment in July and August 2017.

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Assessment

- LPDH began functional CIT of MHS GENESIS at Leidos in Vienna, Virginia, on July 25, 2016. Over the succeeding 3 months, LPDH experienced a higher rate of functional and interface defects than expected, slowing CIT test case execution.
- Interface development has proved difficult for LPDH and legacy system owners, with the highest defect rates in the MHS GENESIS interfaces with the DEERS and DMIX system. The program manager and LPDH are reviewing terminology mapping disparities discovered between legacy systems and MHS GENESIS, to determine if changes are required to the DMIX terminology mapping tables or in MHS GENESIS.
- The DHA Cybersecurity Division Risk Assessment identified 3,606 Category (CAT) I, 4,185 CAT II, and 626 CAT III vulnerabilities. The CAT I, II, and III codes rate the severity of vulnerabilities, with CAT I vulnerabilities being the most severe. Exploitation of a CAT I vulnerability directly leads to loss of confidentiality, availability, or integrity of data. LPDH committed to have all mitigations for the highest severity vulnerabilities completed by December 31, 2016.
- The DHA Cybersecurity Division Independent Verification and Validation of DOD-specific infrastructure identified 397 CAT I, 2,764 CAT II, and 328 CAT III vulnerabilities. The majority of these vulnerabilities were related to commercial software patches not installed on assessed assets. The number of vulnerabilities identified by the DHA during the Risk Assessment and Independent Verification and Validation was larger than the program manager and LPDH expected. The program manager developed a Plan of Action and Milestones with mitigations to address the highest severity findings.
- The program manager provided the functional and test communities' full access to CIT testing and has been receptive to members' concerns and advice.
- The modified MHS GENESIS program schedule allows the program manager additional time to finalize system interfaces, implement clinical capabilities, complete cybersecurity risk management, and provide time to test these capabilities prior to initial deployment. Although the modified program schedule removes most of the overlap in testing, significant technical and schedule risks remain.
 - The number of open high severity defects discovered by LPDH during the CIT peaked at 15 Severity 1 and 148 Severity 2 defects on October 18, 2016. As of November 8, 2016, LPDH was working to close 4 Severity 1 and 75 Severity 2 defects and already had fixed and successfully retested 42 Severity 1 and 352 Severity 2 defects. A Severity 1 defect prevents the accomplishment of an essential capability and a Severity 2 defect adversely affects the accomplishment of an essential capability with no known workaround.
- As of November 8, 2016, LPDH had successfully completed 70 percent (1,008 of 1,437) of planned CIT test. The program manager deferred or deleted 381 CIT test cases, reducing the total number planned from 1,818 to 1,437. LPDH is scheduled to complete CIT on November 25, 2016.
- On November 10, 2016, the program manager waived the DT entrance criteria and began the testing on November 14, 2016. DOT&E advised the program manager against entering DT because he may need to devote time during DT to resolve incomplete interfaces, cybersecurity vulnerabilities, open defects, and previously untested functionality. If the program manager experiences high defect discovery rates in DT like LPDH experienced in CIT, there will be insufficient time to ensure the system works prior to go-live on February 7, 2017.
- LPDH is scheduled to conduct two scenario-based integration and validation events in January 2017 to prepare the 92nd Medical Group for go-live at Fairchild AFB, Washington. JITC is scheduled to observe the integration and validation events and provide an independent observation memorandum to inform the go-live decision. The 92nd Medical Group go-live decision will be informed by developmental test results and integration and validation event observations, as no operational testing is scheduled prior to this decision date.
- After go-live, LPDH will be maintaining two separate baselines, an operational MHS GENESIS baseline to support live operations and a test baseline to support the OA and future development. Because the system will go-live one week prior to the JITC-lead OA, the baselines will likely not be frozen to allow LPDH to correct deficiencies that may be discovered by the 92nd Medical Group.

Recommendations

- Status of Previous Recommendations. This is the first annual report for this program.
- FY16 Recommendations. The program manager should:
 1. Ensure all high-severity defects are mitigated prior to go-live at Fairchild AFB and all workarounds are documented and available to operational users.
 2. Validate that high severity cyber vulnerabilities identified during the DHA Risk Assessment and Independent Verification and Validation have been fixed or mitigated prior to go-live at Fairchild AFB.

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