LCS Mission Modules

Surface Warfare (SUW)

Mine Countermeasures (MCM)

Anti-Submarine Warfare (ASW)
Mission Package Defined

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<th>MISSION MODULE</th>
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<td>LCS MM Program - PMS 420</td>
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- **Mission Systems**
  - RMMV
  - USV
  - 30MM Gun
  - AMNS
  - SSMM
  - ALMDS
  - AQS-20A
  - COBRA

- **Support Equipment**
  - Support Containers
  - Support Equipment
  - Standard Interfaces
  - MPCE/MVCS Software
  - MPCE/MVCS Hardware

- **CREW & SUPPORT AIRCRAFT**
  - VTUAV (Variant B)
  - Crew Detachments
    - Mission Modules
    - Aviation
  - MH-60S/R

- **Ship Hardware**

Mission System = Vehicles, Communications, Sensors, and Weapon Systems
Mission Modules = Mission Systems + Support Equipment + Software
Mission Package = Mission Modules + Crew Detachments + Support Aircraft

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LCS Mission Modules

Mission Systems

Support Equipment

Mission Package Computing Environment (MPCE)
Multi-Vehicle Communications System (MVCS)
Standard Support Containers & Cradles

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LCS Mission Modules Update

• **Surface Warfare (SUW) Mission Package (MP)**
  – Four (4) SUW MPs delivered (2008 / 2010 / 2012 / 2012)
    ▪ SUW MP #5: delivers in Q4 FY2014
  – Phase 1 of Developmental Testing on USS Freedom (LCS 1) completed in July 2012
  – Phase 2 of Developmental Testing on USS Fort Worth (LCS 3) completed in October 2013
    ▪ Tracking and live fire scenarios were successfully executed
  – Operational testing is on track to begin in March 2014

• **Mine Countermeasures (MCM) Mission Package (MP)**
    ▪ MCM MP #5: delivers Q4 FY2014
  – MCM mission systems proceeding through individual developmental and operational testing
  – MCM MP Developmental Testing has commenced (three of four phases complete)
  – MCM MP Operational Testing on track for FY2015

• **Anti Submarine Warfare (ASW) Mission Package (MP)**
  – ASW Mission Package demonstrated excellent performance during at-sea testing
  – USS Freedom (LCS 1) will conduct at sea testing of ASW MP this year
  – Design integration with seaframe ongoing; On track to begin operational testing in FY2016

*Distribution Statement A: Approved for Public Release; Distribution is unlimited.*
Interface Management

• Mission System and Ship Integration Team (MSSIT) manages mission package to seaframe interfaces through enforcement of the Interface Control Document (ICD) and the Interface Design Specification (IDS)
  • Interfaces are tracked via a verification and validation processes which include ship visits, trial card tracking, problem report tracking and test reports
  • Non-compliant interfaces discovered are resolved through statement of work development, engineering change proposals to seaframe and mission packages, or risk assessment and acceptance, or requests for deviation acceptance
• ICD invokes use of modular standard interfaces (e.g., IEEE, ISO, MILSPEC, and other commercial standards)
• IDS invokes use of software standard interfaces (e.g., CORBA and IDL)
• MSSIT comprised of joint industry and government teams

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Interface Control Document (ICD)

- The ICD defines the standard interfaces between the seaframes and the mission packages
  - Hardware oriented; mechanical and electrical requirements
  - Sea, aviation, weapon, and support type modules and stations
  - Invokes Interface Design Spec (IDS) covering software data interface
- Requirements for total mission package loadout, e.g.,
  - Max electrical power = 200 kW
  - Max heat rejection load = 59 tons
  - Max fresh water = 600 gals/day
  - Max hazmat storage = 2 m³
- Requirements for individual modules and stations, e.g., for Support Type 1
  - Module max length × width × height = 6.1m × 2.44m × 2.44 m
  - Module max mass = 7000 kg
  - Station max 440 VAC 60 Hz 3Ø power = 30kW

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SUW MP Capabilities

Increment 1 – FY2014

Counter against Fast Inshore Attack Craft (FIAC) / Fast Attack Craft (FAC)

- Gun Mission Module (GMM)
  - 30 MM Gun

Maritime Interdiction

- Maritime Security Module (MSM)
  - ISI, Surveillance & Reconnaissance (ISR)
  - Aviation Module
  - MH-60R

Increment 2 – FY2014

IOT&E
March 2014

- Maritime Interdiction
  - Maritime Security Module (MSM)

NOTE: Increment I included a prototype version of the MSM Module for use on LCS 1 early deployment. Production version will be delivered as Increment II capability.

Increment 3 – FY2016

Counter against FIAC / FAC

- Surface-to-Surface Missile Module (SSMM) Increment I

Increment 4 – FY2020

Counter against FIAC / FAC

- SSMM Increment II

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SUW MP Increment 1 and 2 Test Status

- **Phase I and II of Developmental Testing (DT) accomplished in July 2012 and August 2013**
  - Verified correction of deficiencies from previous developmental tests
  - Tracking and live fire scenarios against FIAC/FAC targets were successfully executed
  - 30mm Guns demonstrated lethality against target set
  - Successfully demonstrated launch, recovery and control of 11 meter RHIB in support of Visit, Board, Search, and Seizure (VBSS) mission

- **On track to begin Operational Testing in March 2014 on USS Fort Worth (LCS 3)**
MCM MP Capabilities

Increment 1 – FY2015

Rapid Minehunting & Clearing
- Organic Airborne Mine Countermeasures Module
  - ALMDS
  - MH-60s
  - AMNS

Sustained Minehunting
- Remote Minehunting Module
  - RMMV
  - AQS-20As
  - RMMV

RMS = RMMV + AN/AQS-20A

IOT&E Q3 FY15

Increment 2 – FY2016

Beach Zone Detection
- Coastal Mine Reconnaissance Module
  - VTUAV
  - COBRA Block I

Near Surface Neutralization
- Organic Airborne Mine Countermeasures Module
  - TBD

Sustained Influence Sweep
- Influence Mine Sweep Module
  - USV
  - USSS

UISS = USV + USSS

Increment 3 – FY2017

Increment 4 – FY2019

Buried Mine Detection
- Unmanned Undersea Module
  - Knifefish Unmanned Undersea Vehicle (UUV)

Surf Zone Detection
- Coastal Mine Reconnaissance Module
  - COBRA Block II

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MCM MP Increment 1 Test Status

- MCM mission systems proceeding through individual developmental and operational test (DT/OT)
- MCM MP DT has commenced on USS Independence (LCS 2) (three of four phases complete)
  - Phase 1 on LCS 2 completed October 2011
  - Phase 2 on LCS 2 completed March 2012
    - Successfully demonstrated all steps in the detect-to-engage sequence as well as simultaneous MH-60S helicopter and RMS off board operations
  - Phase 3 on LCS 2 completed August 2012
    - Additional launch, handling, and recovery testing completed to evaluate improved processes/equipment
  - Phase 4 (two periods) on LCS 2 will be completed in FY2014
    - Period 1 completed August 2013 and demonstrated improved Launch Handling and Recovery and RMMV operations
    - Period 2 scheduled for Q4 FY2014
- MCM MP OT on track for FY2015

RMS launch while underway
RMS Operations
RMS Recovery

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ASW MP Capabilities

FY2016

Torpedo Defense & Countermeasures

Torpedo Defense & Countermeasures Module

Light Weight Tow

ASW Escort / Large Area Clearance

ASW Escort Module

MFTA

LCS VDS

Localization & Engage

Aviation Module

MH-60R

VTUAV

Distribution Statement A: Approved for Public Release; Distribution is unlimited.
ASW MP Planned Testing

- **Q4 FY2014: LCS Mission Modules Integration**
  - ASW MP integration and testing on USS Freedom (LCS 1)

- **FY2016: TECHEVAL and Operational Testing**
SUMMARY

- SUW MP successfully deployed on USS Freedom in FY2013 and operational test and evaluation on USS Fort Worth on track to begin in March 2014
- MCM MP operational testing on track for FY2015
- ASW MP demonstrated excellent performance during at-sea testing in FY2012, and is on track for at-sea testing this year and to begin operational test and evaluation in FY2016
- Will continue to incrementally field additional capabilities to the Fleet as approved in the budget, and in phase with seaframe deliveries
- Executing a phased delivery of matured mission systems
  - Four (4) MCM and four (4) SUW Mission Packages delivered to date
  - At-sea testing progressing for all MPs
  - Deployed SUW Mission Package and Prototype Maritime Security Module

Focused For The Fight: Any Ship, Any Package, Any Time
Questions?