Program Executive Office (PEO) Littoral Combat Ship (LCS)

Responsible for the acquisition and life cycle support of the Littoral Combat Ship (LCS) and all associated Mission Modules

Work Efficiently, Keep Focused, Remember the Objective
PMS 406 Mission Statement

Mission: Develop, acquire, deliver, and maintain operationally effective Unmanned Maritime Systems (UMS)

Joining Traditional Acquisition with Advanced Development
Current PMS 406
Major Product Lines

- **Unmanned Surface Vehicles**
  - Unmanned Influence Sweep System (UISS)
    - Part of LCS MCM Mission Package

- **Unmanned Underwater Vehicles**
  - Surface MCM System (SMCM UUV)
    - Planned for LCS MCM Mission Package (Incr 4)
  - Large Diameter UUV
    - Modular, Open Architecture
    - Planned POM13/14 POR start
Unmanned Influence Sweep (System) Update

- **Requirements**
  - Provide LCS with stand-off, long endurance, semi-autonomous minesweeping capability to counter acoustic and/or magnetic influence mine threats
  - LCS Flight 0+ CDD Area Clearance Rate, Sustained
  - LCS ICD
  - 1 system per 24 MCM package, 45 total

- **System, 2 part**
  - Unmanned Surface Sweep System (US3)
    - Magnetic & acoustic influence minesweeping systems
  - Unmanned Surface Vehicle (USV)

- **Improved system currently under test (Jun-Sept 11)**

- **ACRS Analysis/Trade Study nearing completion**
  - Inform requirements for production systems

- **Pre-MS B acquisition activities underway**
UISS Development Plan

- Anticipate Industry Day with Q&A
- FY2012: RFP release target
- Contract Award target
  - Goal: 12-18 month lead time + 6-8 months testing
  - Estimated total procurement quantity – 45 units

GOAL: Modular USV for a variety of LCS Missions & Navy Customers
SMCM UUV Status

● Increment 1 User Operational Evaluation System (UOES)
  – One 12.75” lightweight & two 7.5” man-portable vehicles
  – Deployed & operational since 2006; participated in 24 Fleet Exercises and harbor surveys
  – Used to mature technology, tactics, techniques & procedures for MCM UUVs

● UOES Increment 2
  – Sea Functional Testing (SFT) completes Aug 2011
  – Acceptance Testing Aug-Sep 2011
  – Fleet delivery late FY11
  – Two sys each w/ two 12.75” lightweight vehicles with advanced synthetic aperture sonar
  – Increased ACR, high resolution imagery, improved environmental sensor suite, & limited buried mine detection

● SMCM UUV Acquisition Program
  – Milestone B planned for August 2011
  – E&MD contract award planned for Sept 2011
Large Displacement UUV (LDUUV)

- **Capabilities**
  - During USDG, Missions agreed to:
    - IPOE/Below Water ISR / Offensive (MIW)
    - Up to 60 days endurance
    - Launch & Recovery from LCS, SSGN, VA SSN

- **System**
  - Open & Modular for a variety of payloads
  - Nominal 48 inch Diameter

- **Customer**
  - Truck/ISR Payloads: N2N6
  - ASW Payloads: N87
  - MCM Payloads: N85

- **Resource Sponsor**
  - ONR and N2/N6
LDUUUV Strategic Objectives

- The Navy will employ Unmanned Undersea Vehicles (UUVs) to:
  - Close warfighting capability gaps in cost-effective manner
    - (e.g. IPOE, ISR, ASW)
  - Gain access to places manned platforms cannot
    - (e.g. minefields, shallow water, seafloor)
  - Improve operational speed and efficiency
    - (e.g. area surveys, persistent ocean sensing)
  - Act as a force multiplier
    - (e.g. expanded sensor coverage, decoy operations)
  - Defend Critical Undersea Infrastructure
    - "UUV Role in Undersea Critical Infrastructure" NRAC Study 2009

- UUVs within a Navy system of systems will serve:
  - As an independent sensor or in independent role
  - As an extension of manned platforms
  - As surrogates for platforms => new roles

Consistent with Navy’s unmanned systems approach
Advanced Development (Pre- Acquisition)

- LCS ICD enables technology / requirements adaptability in MPs
  - Enabling Seaframe block buys & multiyears
- USVs & UUVs are rapidly developing, explosive growth - PMS406 is the focal point for capability transition to Fleet
  - Multiple vendors / Non-traditional Navy sources / Commercial
  - Significant S&T / R&D investments
  - Customer requirements evolving
- PMS 406 poised to pursue promising technologies to match capability needs
  - Connectivity w/ ONR, DARPA, Warfare Center Labs, & leading edge vendors
  - Support / Enable MP spiral development
- Opportunity for PEO LCS to lead/drive Navy development
  - LDUUV poised to become early Advance Development Team success
Persistent Littoral Undersea Surveillance (PLUS)

- Transitioning ONR effort
- Launch & recovery from LCS and a variety of platforms of opportunity
- Transition S&T developments into a User Operational Evaluation System (UOES) project to deploy PLUS system ASW capability

Finalizing transition plans & schedules:
- Technology Transition Agreement (TTA)
- N2N6 Requirements Letter (UOES)
- Memo of Agreement (MOA) between PMS406 & Fleet
- Requirements Matrix
- High-level Concept of Employment (CONOE)
- System Description (with Interfaces)
Persistent Autonomous Maritime Surveillance (PAMS)

- Collaborative demonstration program to reduce risk for both LDUUV (PMS 406) & DNS (PMS 485) program areas
- Demonstrate:
  - LDUUV extended transit, delivery, and deployment of DNS payload
  - Autonomous Burial Vehicle (ABV) installation & burial
- Collect:
  - Acoustic data
  - Performance metrics
  - Insight on requirements, CONOPS, & training requirements
- Status:
  - Sub-system testing of UUV and ABV complete
  - First System Level Test scheduled for AUG 2011
  - Second System Level Test scheduled for MAR 2012
  - Final Demonstration scheduled for AUG 2012
Summary

- PMS 406 preparing to acquire and field unmanned mine countermeasure systems for LCS Mission Modules
  - SMCM UUV to detect, classify bottom and buried mines approaching MS B & contract award
  - UISS to clear minefield of magnetic/acoustic influence mines at pre-MS B

- LDUUV provides large “truck” capability for a variety of payloads from a variety of platforms

- Advanced Development Systems provides opportunities for PEO LCS to lead the way in developing & fielding new technologies
Unmanned Influence Sweep System (UISS) Overview

Host Ship Software
- Multi-Operator Control Unit
- Core System Controller
- Payload Control Interfaces
- Video, Mission Planning

Support Equipment
- Support Module, Spares
- Tools, Handling Equipment
- Slings, Cradle

Launch & Recovery
- Remote Operational Pack
- LCS Interfaces

Radios/Comms
- Multi-Vehicle Communication System
- VRC-99 (Future RT/1499) Radio
- Iridium Radio (Back-up), Antennas

Comms Range
8 to 12 NM

MCM Unmanned Surface Vehicle (USV)
- NSWC CCD Design
- built for LCS Compatibility

Unmanned Surface Sweep System (US3)
- Acoustic and Magnetic Influence Sweep

USV Command & Control (C2)
- Boat Control System

Acoustically/magnetically sweep underwater mines using an LCS deployed unmanned watercraft which follows preplanned routes
Surface Mine Countermeasure (SMCM)
Unmanned Undersea Vehicle (UUV)

**Requirements**
- SMCM UUV CDD approved Jul 2010
  - Includes Craft of Opportunity
- Hunt buried mines and mines in high clutter environments
- LCS CDD update to include buried and proud mines addressing current capability gap excluded from Flight 0+ CDD
- Pre-Planned Product Improvement (P3I)
  - Increased sensor range, endurance, comms update

**System**
- 21” diameter vehicle w/Low Frequency Broadband (LFBB) sonar

**Customer**
- LCS ships (MCM MP Increment 4)

**Resource Sponsor**
- N85 funds development & training systems
- N86 funds LCS integration & tactical systems
2 Heavyweight Class Unmanned Undersea Vehicles
Launch and Recovery Device (LRD)
Vehicle Maintenance Cradle (VMC)
Base Pallet for Vehicles, LRD, VMC
20’ ISO Van

Note: Blue font indicates deliverable units used for Craft of Opportunity operations.
The LCS Detachment preps the SMCM UUV, uploads mission plans, and launches the vehicle.

Mission progress is monitored from the LCS Mission Control Center. After recovery, data is processed and loaded into MEDAL.

SMCM UUV with low frequency broadband sensor detects, classifies, and identifies bottom and volume mine threats.

LCS communicates with SMCM UUV via Iridium SATCOM link when the UUV is surfaced. UUV status is transmitted during GPS fixes. The host ship may command a mission abort or change the mission plan.

Environmental sensors report water clarity, current, conductivity, temperature, and bathymetry for Intelligence Preparation of the Environment.

Distribution A: Approved for public release; distribution is unlimited
Large Displacement UUV Challenges

- **Power and Energy:**
  - Capable of greater than 60 days Endurance

- **Vehicles**
  - System Endurance and reliability beyond 3 months
  - Covert and reliable Communications with high data rate transfer (Acoustic, RF, Laser)
  - Low power, high density, affordable Data storage
  - Information Assurance/Anti-Tamper Capability

- **Autonomous Operations**
  - Extended Fully Autonomous operations in GPS/Comms denied environment
  - Contact avoidance with high traffic density
  - Network/Data Exfiltration (covert and reliable)
  - Threat detection, sense and avoid

- **Weapons/Deployable Payloads**