N852
MINE WARFARE BRANCH

CAPT Mark Rios
Branch Head
Agenda

- Mine Threat to Access and Maneuver
- The Transition from Dedicated to LCS-based MCM
- MCM Mission Package Program Overview
- Near Future Challenges
- Summary
The real goal of a minefield is Sea Denial, NOT the damage or destruction of a specific ship.

The Sea is a maneuver area. Navy goal is to assure Access, support STOM/OMFTS, NOT counter every mine.

- Over 300 Mine Types
- Over 50 Countries Possess
- Low Cost but High effects
- Simple to Deploy
- Asymmetric

The Threat to Assured Access

- Over 300 Mine Types
- Over 50 Countries Possess
- Low Cost but High effects
- Simple to Deploy
- Asymmetric
Current Force:
- 14 MCM-1
  - 4 in Manama, Bahrain
  - 4 in Sasebo, Japan
  - 6 in San Diego, CA
- All MHC-51 decomm’d/FMS
- Single Mission (MCM)

TODAY

NEAR FUTURE

Littoral Combat Ship (LCS 1 and LCS 2)
  • Multi-Mission (MCM, ASW, ASUW)
Airborne Mine Countermeasures (AMCM)

**TODAY**

**MH-53E**

Current Force:
- 2 HM Squadrons
  - HM-14 in Norfolk, VA
  - HM-15 in Norfolk, VA
- 28 MH-53E Aircraft
  - 11 in HM-14
    - 2 Korea
  - 10 in HM-15
    - 4 Bahrain
  - 3 in Fleet Readiness Sqdn
  - 4 RDTE / Pipeline

**NEAR FUTURE**

MH-60S

Future Force:
- 6 Expeditionary Sqdns
  - Support ESG/LCS
- 2 USNR Expeditionary Sqdns
- Embarked in LCS

UNCLAS
MCM Mission Package

Mission Systems + Support Equipment = Mission Modules

Vehicles
- RMMV
- USV

Weapons
- AMNS
- RAMICS
- UISS
- ALMDS

Sensors
- AQS-20A
- COBRA

Support Containers
Support Equipment
Standard Interfaces

MPCE Software

Crew Detachments
- Mission Modules
- Aviation
- H-60

VTUAV

MPCE Hardware

Mission Package
Transition to LCS-based MCM

MCM Assets Over Time

**FY17-25: Projected MCM Decom**

**POM-14: Projected decision year for MCM Decom**

Fielding LCS w/ MCM MPs

FY17-25: Projected MH-53E Sundown
Changes Since Last ExWar Conference

- Remote Minehunting System (RMS) completed Nunn-McCurdy re-certification
  - Reliability Growth and program re-baseline

- COBRA Blk I Milestone C
  - Integration with VTUAV begins in Jan ‘11

- AQS-20A sonar to begin OPEVAL in Dec ‘10

- ALMDS completed Contractor Testing; now in Developmental Testing

- Expanding capabilities for mine neutralization
  - AMNS to Surface/Near-Surface portion of the water column
  - JABS in the Very Shallow Water (VSW) region

- SMCM UUV CDD approved Jul ‘10

- Women at Sea Modification completed on USS GUARDIAN and ongoing on USS GLADIATOR
# MCM Package System Status

<table>
<thead>
<tr>
<th>MCM Package Program</th>
<th>ACAT</th>
<th>Programmatic</th>
<th>Testing</th>
<th>Contractor</th>
<th>IOC</th>
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</thead>
</table>
| AQS-20A             | 2    | In Low Rate Initial Production | ☑ TECHEVAL on MH-60S completed  
• OPEVAL w/ MH-60S Jun 10 – Aug 10 | Raytheon | 2011 |
| AMNS                | 2    | In Low Rate Initial Production | ☑ MS C Approval Jan 08  
• DT Live Fire Ground Testing Jul 09 | Raytheon | 2011 |
| ALMDS               | 2    | In Low Rate Initial Production | ☑ Commenced WSIT CT on MH-60S Apr 08  
• Commenced TECHEVAL 1st Qtr FY11 | Northrop Grumman | 2012 |
| COBRA               | 3    | Milestone C: Jan 09 | ☑ Started Performance Validation (MH-53E)  
• Integration flight tests on VTUAV Dec 09 | Northrop Grumman | 2012 |
| OASIS               | 2    | Milestone C: 3QFY10 | ☑ Re-design PDR 12 Jun 08  
• MH-53E OA 3rd Qtr FY10 | ITT Corp | 2013 |
| RMS                 | 1C   | In Low Rate Initial Production | ☑ OP assessment completed on DDG-96 Sep 08  
• Reliability Growth Program Ongoing | Lockheed Martin | 2013 |
| US3                 | 3    | Milestone B: 4QFY11 | ☑ Sweep Gear integration test on USV Jul 08  
• End to End US3/USV/MP test Oct 08 | TBD | 2015 |
| TBD                 | 3    | Milestone C: FY14 Neutralizer final decision FY12 | ☑ SD&D Contract awarded 24 Jul 08  
• Preliminary Design Review Oct 2009 | Boeing | 2017 |
| CMS                 | 2    | Milestone C: 4QFY10 | ☑ MH-60 S Captive Carriage & Jettison Oct 08  
• MH-605 Gun fire test 3rd QTR FY10 | Northrop Grumman | 2017 |
MCM Coverage in 2018

- **Minefield Detection and Neutralization**
  - Unmanned Surface Vehicle / Organic Airborne and Surface Influence Sweep
  - Magnetic Acoustic Influence Sweep
  - EOD Mobile Unit ONE
  - Remote Minehunting System & MH-60S AN/AQS20A

- **Very Shallow Water (10'-40')**
  - Laser (Hunt)
  - Super-cavitating Projectiles (Kill)
  - Assault Breaching System

- **Shallow Water (40'-200')**
  - Airborne Mine Neutralization System

- **Deep Water (Over 200')**
  - Unmanned Surface Vehicle

- **Surf Zone & CLZ (0'-10')**
  - Surface MCM UUV and Low Frequency Broadband
  - Remote Minehunting System
  - Sonar (Hunt)

- **Obstacles**
  - Anti-Invasion Bottom
  - Moored Floating
Near Future MCM Challenges

All of our programs face inherent challenges:

- **Sensor and Processing False Alarms**
  - High False Alarms mean longer PMA & higher False Classification by PMA Operator

- **LIDAR Performance**
  - Environmental compensations difficult – affected by surface effects and water turbidity

- **Computer Aided Detection(CAD)/Classification(CAC) Improvements**
  - Potential for real-time algorithms in the MCM Community
  - Fast and accurate CAD/CAC capability needed for all PMA

- **Reliability**
  - System Reliability needs to meet requirements
    - Meet Operational Availability (Ao)
    - Improve Mean Time Between Operational Mission Failure (MTBOMF)

- **Plan for Obsolescence**
  - Require modular, open architecture systems that are supportable long term

- **Opportunities for Industry:**
  - UUV power generation / endurance
  - Not just Unmanned Systems but…Fully Autonomous Systems
  - Info Sharing and Cueing between Unmanned Systems
The Mine Warfare Branch is responsible for both Mine Countermeasures (MCM) and Mining.

- Responsible for maintaining the current maritime mines in the Navy’s inventory.

- Actively exploring future offensive mining concepts to use mines in offensive, protective, and defensive roles.
Summary

- Decreasing TOA makes TOTAL OWNERSHIP COST a key driver independent of system suitability and effectiveness
  - Systems must perform -- but also be cost-effective!
- Must make wise investments to reduce false alarms, manpower demand, and improve reliability.
- The mine threat is real and not getting easier.
- The transition to LCS-based MCM is challenging … and revolutionary.
- MCM Mission Package programs making steady progress and in the hands of Sailors now.

Got a solution?
Contact CAPT Rios at mark.rios@navy.mil or LtCol Greeno at michael.greeno@navy.mil
Questions
LCS MCM Mission Package
System Coverage

**Detect**

<table>
<thead>
<tr>
<th>Beach Surf Zone</th>
<th>VTUAV+ COBRA</th>
<th>VTUAV+ COBRA</th>
<th>ALMDS</th>
<th>AQS-20</th>
<th>AQS-20</th>
<th>SMCM UUV LFBB</th>
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<tr>
<td><strong>Near surface &amp; floating</strong></td>
<td>VTUAV+ COBRA</td>
<td>ALMDS</td>
<td>AQS-20</td>
<td>AQS-20</td>
<td>AQS-20</td>
<td>AQS-20</td>
</tr>
<tr>
<td><strong>Volume and bottom mines</strong></td>
<td>VTUAV+ COBRA</td>
<td>ALMDS</td>
<td>AQS-20</td>
<td>AQS-20</td>
<td>AQS-20</td>
<td>AQS-20</td>
</tr>
<tr>
<td><strong>Buried</strong></td>
<td>VTUAV+ COBRA</td>
<td>ALMDS</td>
<td>AQS-20</td>
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**Engage**

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<tr>
<th>ABS, EOD Mobile Unit 1</th>
<th>RAMICS</th>
<th>AMNS</th>
<th>OASIS US3</th>
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<tr>
<td>AMNS</td>
<td>OASIS US3</td>
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*NOTE: Depth Coverages Vary with System and Mine Type*
How Can Industry Help N852?

- Mine Clearance in the cluttered VSW environment
- Obstacle avoidance of unmanned, autonomous vehicles
- Develop Single Pass Detect-To-Engagement of Mines
- Modular UUV/USV—a smart, common design
- Labor Saving Ideas—to reduce manpower demand
- Innovative ideas on Offensive Maritime Mining

What COTS technologies can we leverage to improve our situation in the next 12 months?