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
Transition to LCS-based MCM

MCM Assets Over Time

- FY17-25: Projected MCM Decom
- POM-12: Projected decision year for MCM Decom
- FY17-25: Projected MH-53E Sundown

Number of Assets

Year (FY)
Changes Since Last ExWar Conference

- New MIW systems installed in USS SENTRY
  - HF Wide Band Sonar successfully installed and tested in USS SENTRY
  - Expendable Mine Neutralization System (EMNS) installed also.

- COBRA Blk I Milestone C
  - Integrated in VTUAV

- Downselect of ABS Counter Mine System from 3 to 2 designs

- Tested RAMICS from a tower. Helo testing early next year.

- ALMNDS Contractor Testing

- ARVCOP, which is a part of ABS, successfully tested in AAV
# MCM Package System Status

<table>
<thead>
<tr>
<th>MCM Package Program</th>
<th>ACAT</th>
<th>Programmatics</th>
<th>Testing</th>
<th>Contractor</th>
<th>IOC</th>
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<tbody>
<tr>
<td>AQS-20A</td>
<td>2</td>
<td>In Low Rate Initial Production</td>
<td>• OPEVAL w/ MH-60S Jun 10 – Aug 10</td>
<td>Raytheon</td>
<td>2011</td>
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<td>✓ TECHEVAL on MH-60S completed</td>
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<td>AMNS</td>
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<td>In Low Rate Initial Production</td>
<td>• DT Live Fire Ground Testing Jul 09</td>
<td>Raytheon</td>
<td>2011</td>
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<td>✓ MS C Approval Jan 08</td>
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<tr>
<td>ALMDS</td>
<td>2</td>
<td>In Low Rate Initial Production</td>
<td>• Commenced TECHEVAL 1st Qtr FY11</td>
<td>Northrop Grumman</td>
<td>2012</td>
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<td>✓ Commenced WSIT CT on MH-60S Apr 08</td>
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<td>COBRA</td>
<td>3</td>
<td>Milestone C: Jan 09</td>
<td>• Integration flight tests on VTUAV Dec 09</td>
<td>Northrop Grumman</td>
<td>2012</td>
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<td>✓ Started Performance Validation (MH-53E)</td>
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<td>OASIS</td>
<td>2</td>
<td>Milestone C: 3QFY10</td>
<td>• MH-53E OA 3rd Qtr FY10</td>
<td>ITT Corp</td>
<td>2013</td>
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<td>✓ Re-design PDR 12 Jun 08</td>
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<td>RMS</td>
<td>1C</td>
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<td>• Reliability Growth Program Ongoing</td>
<td>Lockheed Martin</td>
<td>2013</td>
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<td>✓ OP assessment completed on DDG-96 Sep 08</td>
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<td>✓ Sweep Gear integration test on USV Jul 08</td>
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<td>UUV LFBB</td>
<td>TBD</td>
<td>Milestone B: 2QFY10</td>
<td>• CDD pending N8 approval</td>
<td>TBD</td>
<td>2015</td>
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</table>
| CMS                 | 3    | Milestone C: FY14 Neutralizer final decision Fy12 | • SD&D Contract awarded 24 Jul 08  
• Preliminary Design Review Oct 2009 | Boeing          | 2017  |
|                     |      |                                | ✓ MH-60 S Captive Carriage & Jettison Oct 08                                                         | Northrop Grumman| 2017  |
|                     |      |                                | • MH-605 Gun fire test 3rd QTR FY10                                                                  |                 |       |
MCM Coverage in 2018

- **Minefield Detection and Neutralization**
- **Surf Zone & CLZ 0' - 10'**
  - Obstacles
  - Anti-Invasion
  - Bottom
  - Moored Floating
  - Surface MCM UUV and Low Frequency Broadband
- **Very Shallow Water 10' - 40'**
  - Remote Minehunting System & MH-60S AN/AQS20A
  - Sonar (Hunt)
  - Buried Mine Detection
- **Shallow Water 40' - 200'**
  - Airborne Mine Neutralization System
  - Airborne Laser Mine Detection System
  - Laser (Hunt)
  - Assault Breaching System
  - EOD Mobile Unit ONE
- **Deep Water Over 200'**
  - Rapid Airborne Mine Clearance System
  - Super-cavitating Projectiles (Kill)
  - Magnetic Acoustic Influence Sweep
  - Unmanned Surface Vehicle / Organic Airborne and Surface Influence Sweep

- **Propelled explosive charges (Kill)**
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 OAMCM Common Console
  - Fast and accurate CAD/CAC capability needed on OPMA

- **Reliability**
  - System Reliability needs to meet requirements
    - Operational Availability (Ao)
    - Mean Time Between Operational Mission Failure (MTBOMF)
  - All Subsystem Components (CSTRS, Common Console, Tow Cable, etc.) need improvement

- **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 threat is **real** and **not** getting easier.

The transition to LCS-based MCM is challenging.

MCM Mission Package programs making steady progress and in the hands of Sailors now.

Making wise investments to reduce false alarms, manpower demand, and improve reliability.

Need solutions from Industry to meet system Initial Operational Capability of future systems.
BACK-UP
Shallow Water to Beach Zone

Developing Solutions to Support OMFTS and STOM

Assault Breaching System
- Assault Breaching System
- MK-84

JABS & CMS

COBRA

EOD Mobile Unit One
- EOD Mobile Unit (One)

LCS MCM Mission Package
- LCS Water Jet Propulsion
- LCS (LM) 13 ft Draft
- 1 H-60 and 1 VTUAV

LCS MCM Mission Package
- LCS MCM Mission Package
- RAMICS
- ALMDS
- RMS

UUV LFBB
- UUV LFBB

BEACH

SURF

SW

40ft

10ft

VSW
### LCS MCM Mission Package System Coverage

**Detect**

- **Beach Surf Zone**
  - Near surface & floating
    - VTUAV+ COBRA
    - ALMDS
    - AQS-20

- Volume and bottom mines
  - VTUAV+ COBRA
  - AQS-20
  - SMCM UUV LFBB

**Engage**

- **Neutralize**
  - ABS, EOD Mobile Unit 1
  - RAMICS
  - AMNS
  - OASIS US3

- **Sweep**
  - AMNS
  - OASIS

*NOTE*: Depth Coverages Vary with System and Mine Type
False Alarms Lengthen Kill Chain

Develop Search Mission Plan
- MEDAL
- MPS

MH-60S
- ALMDS
- RMS
- AQS-20A
- UUV LFBB
- COBRA

Sortie Data Collection

Post Mission Analysis

False Alarms

False Classification

False Calls

Contact List

Develop Neutralization Mission Plan

MH-60S
- AMNS
- RAMICS
- ABS

False Calls in Mission Plan

Neutralization

Sweep

MH-60S
- OASIS
- US3

NMLOs
All MCO timelines are driven by required MTBF, so we must improve upon reliability to meet the requirements and increase useful life!