



N852

MINE WARFARE BRANCH

CAPT Mark Rios
Branch Head



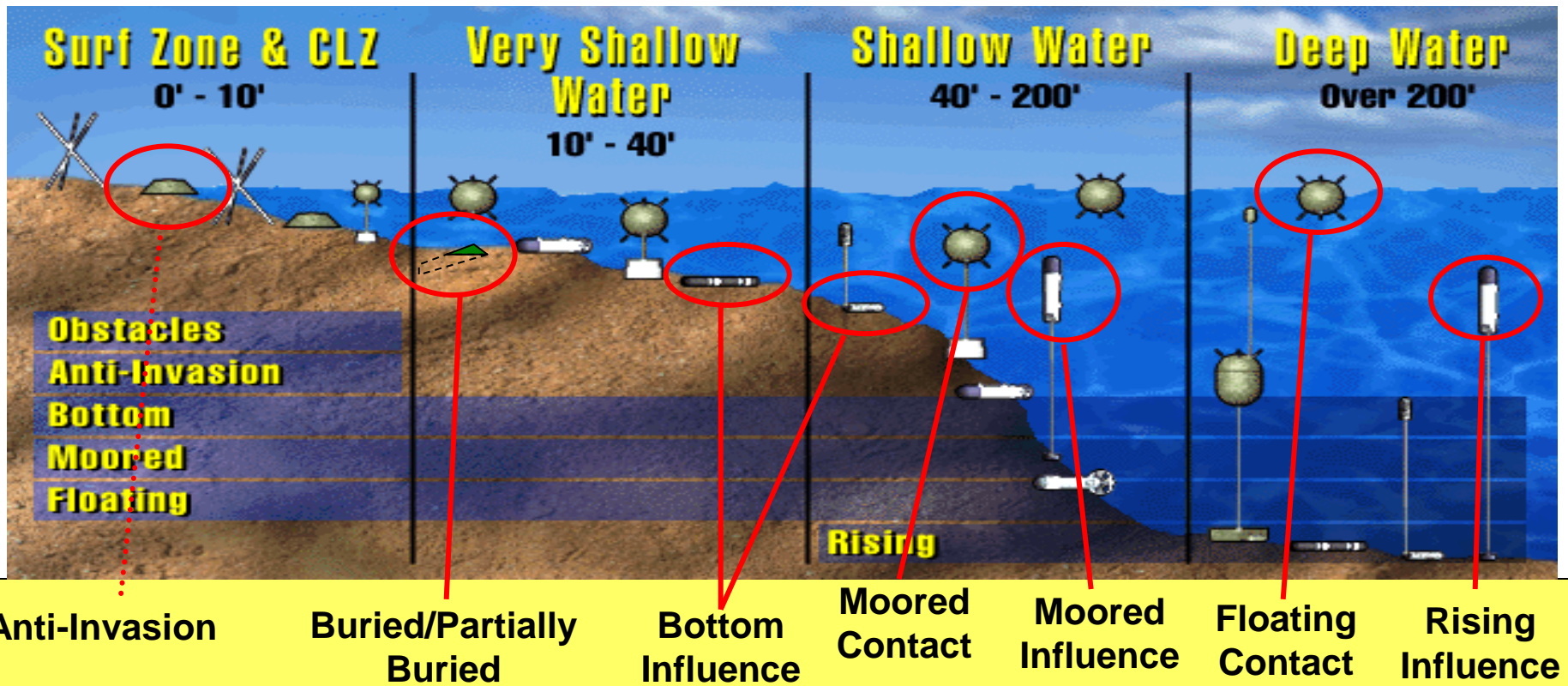
Agenda



- **Mine Threat to Access and Maneuver**
- **The Transition from Dedicated to LCS-based MCM**
- **MCM Mission Package Program Overview**
- **Near Future Challenges**
- **Summary**



The Threat to Assured Access



- 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 ₃





Surface Mine Countermeasures (SMCM)

TODAY



1987

Current Force:

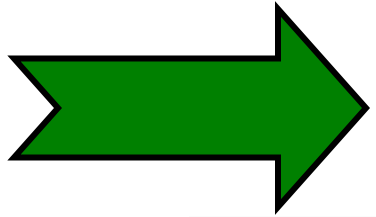
- 14 MCM-1
 - 4 in Manama, Bahrain
 - 4 in Sasebo, Japan*
 - 6 in San Diego, CA
- All MHC-51 decomm'd/FMS
- Single Mission (MCM)



MHC-51

1993

NEAR FUTURE



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



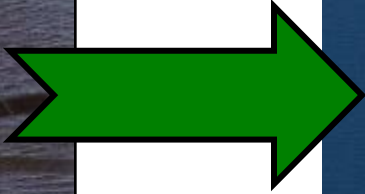


Airborne Mine Countermeasures (AMCM)

TODAY



MH-53E



NEAR FUTURE



MH-60S



BLOCK 2B

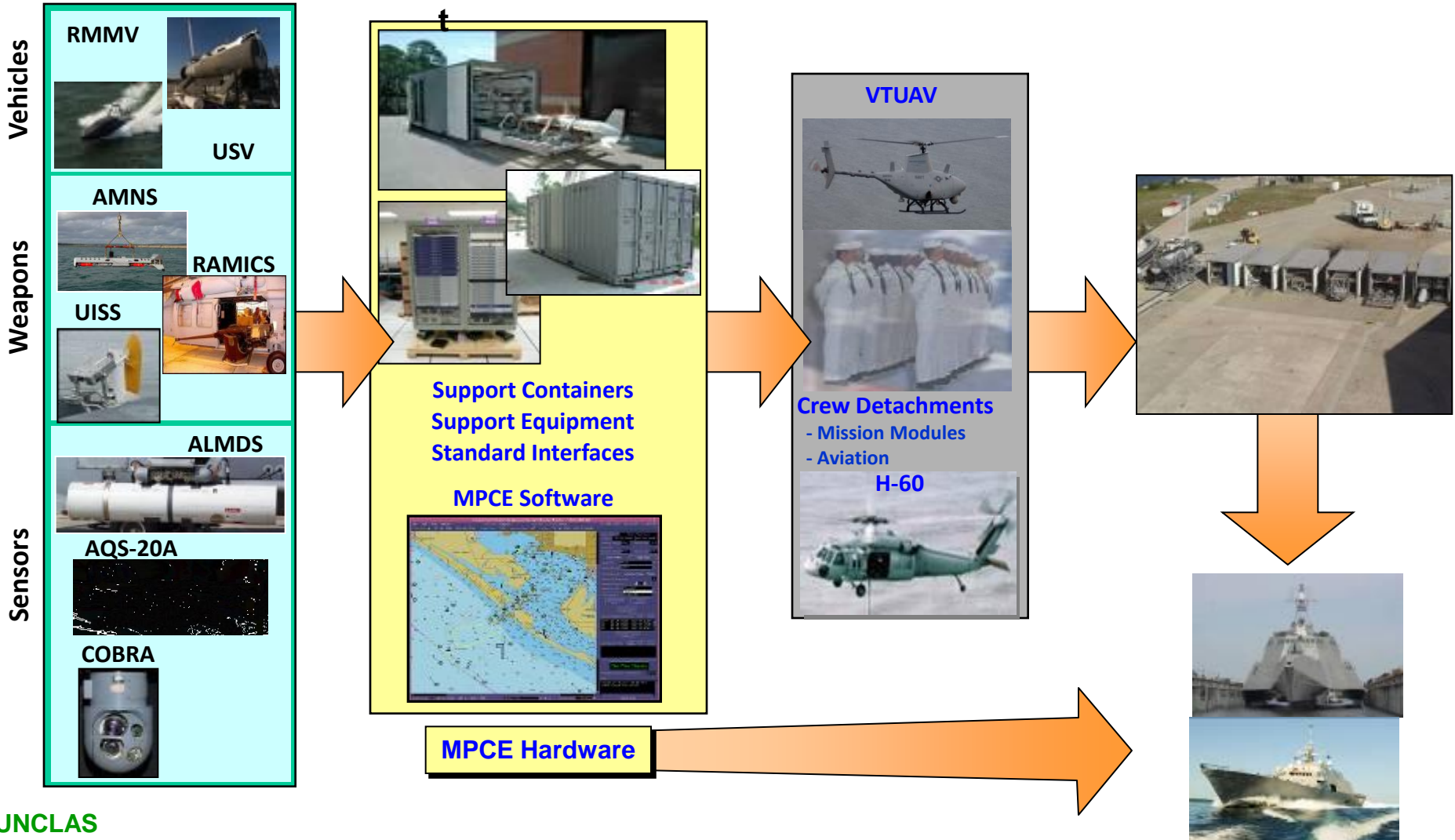
- Current Force:**
- 2 HM Squadrons
 - HM-14 in Norfolk, VA
 - HM-15 in Norfolk, VA
 - 28 MH-53E Aircraft
 - 11 in HM-14
 - 2 Korea
 - 10 in HM-15
 - 4 Bahrain
 - 3 in Fleet Readiness Sqdn
 - 4 RDTE / Pipeline

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



MCM Mission Package

{ Mission Systems + Support Equipmen = Mission Modules } + Crew & Support Aircraft = Mission Package

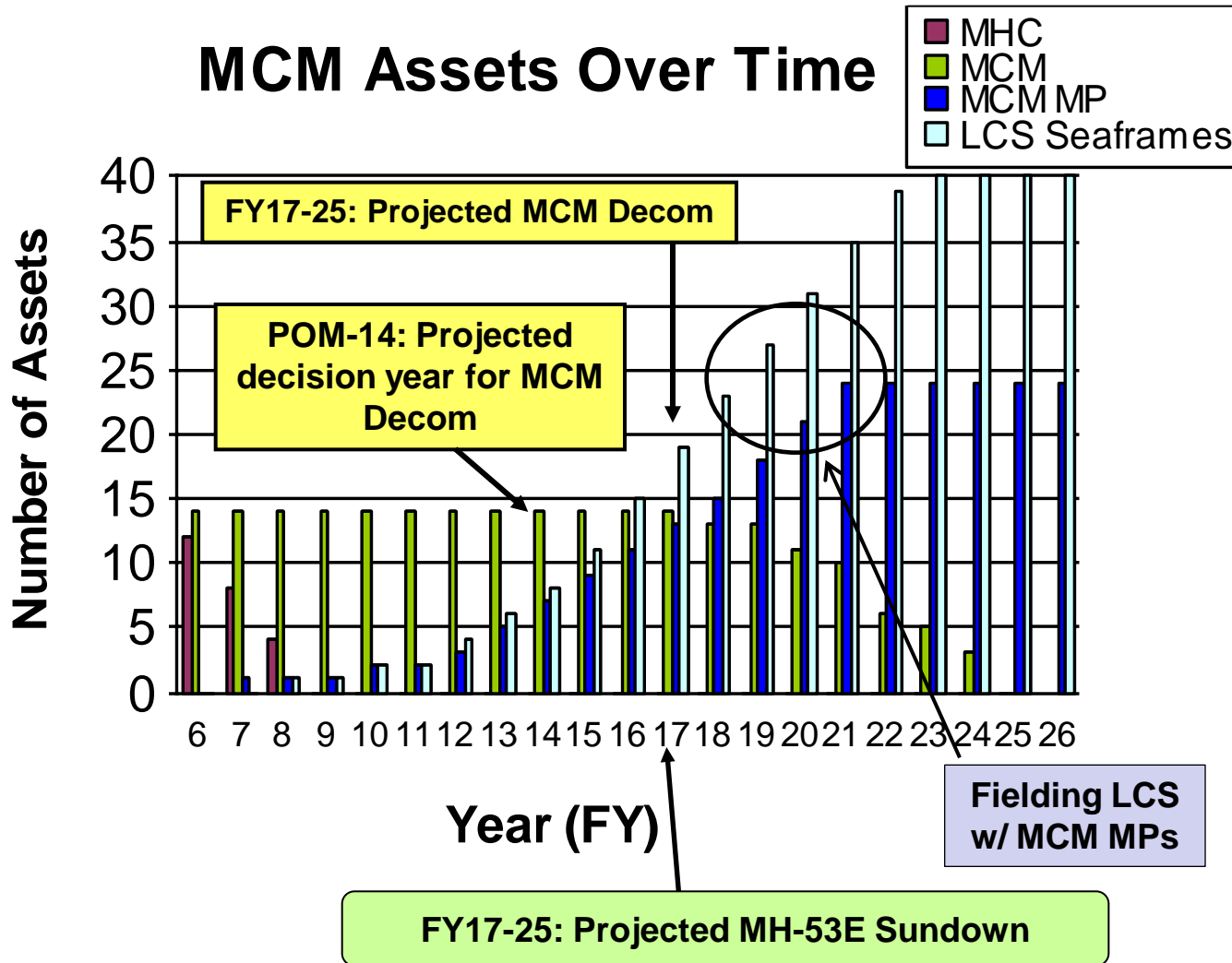




Transition to LCS-based MCM



MCM Assets Over Time





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



MCM Package Program	ACAT	Programmatics	Testing	Contractor	IOC
 AQS-20A	2	In Low Rate Initial Production	<ul style="list-style-type: none"> ✓ TECHEVAL on MH-60S completed • OPEVAL w/ MH-60S Jun 10 – Aug 10 	Raytheon	2011
 AMNS	2	In Low Rate Initial Production	<ul style="list-style-type: none"> ✓ MS C Approval Jan 08 • DT Live Fire Ground Testing Jul 09 	Raytheon	2011
 ALMDS	2	In Low Rate Initial Production	<ul style="list-style-type: none"> ✓ Commenced WSIT CT on MH-60S Apr 08 • Commenced TECHEVAL 1st Qtr Fy11 	Northrop Grumman	2012
 COBRA	3	Milestone C: Jan 09	<ul style="list-style-type: none"> ✓ Started Performance Validation (MH-53E) • Integration flight tests on VTUAV Dec 09 	Northrop Grumman	2012
 OASIS	2	Milestone C: 3QFY10	<ul style="list-style-type: none"> ✓ Re-design PDR 12 Jun 08 • MH-53E OA 3rd Qtr FY10 	ITT Corp	2013
 RMS	1C	In Low Rate Initial Production	<ul style="list-style-type: none"> ✓ OP assessment completed on DDG-96 Sep 08 • Reliability Growth Program Ongoing 	Lockheed Martin	2013
 US3	3	Milestone B: 4QFY11	<ul style="list-style-type: none"> ✓ Sweep Gear integration test on USV Jul 08 • End to End US3/USV/MP test Oct 08 	TBD	2015
 UUV LFBB	TBD	Milestone B: 2QFY10	<ul style="list-style-type: none"> • CDD pending N8 approval 	TBD	2015
 CMS	3	Milestone C: FY14 Neutralizer final decision Fy12	<ul style="list-style-type: none"> ✓ SD&D Contract awarded 24 Jul 08 • Preliminary Design Review Oct 2009 	Boeing	2017
 MH-60S	2	Milestone C: 4QFY10	<ul style="list-style-type: none"> ✓ MH-60 S Captive Carriage & Jettison Oct 08 • MH-605 Gun fire test 3rd QTR FY10 	Northrop Grumman	2017



MCM Coverage in 2018

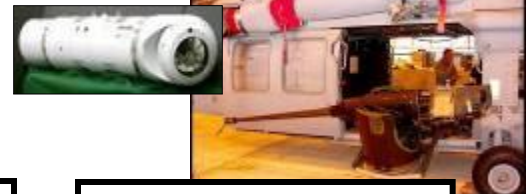
Minefield Detection and Neutralization



Laser (Hunt)



Super-cavitating Projectiles (Kill)



Assault Breaching System

EOD Mobile Unit ONE

Airborne Laser Mine Detection System

Rapid Airborne Mine Clearance System

Surf Zone & CLZ
0' - 10'

Very Shallow Water
10' - 40'

Shallow Water
40' - 200'

Deep Water
Over 200'

Obstacles
Anti-Invasion
Bottom
Moored
Floating

Rising

Surface MCM UUV and Low Frequency Broadband

Remote Minehunting System & MH-60S AN/AQS20A

Airborne Mine Neutralization System

Unmanned Surface Vehicle / Organic Airborne and Surface Influence Sweep



Buried Mine Detection



Sonar (Hunt)



Propelled explosive charges (Kill)



Magnetic Acoustic Influence Sweep



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





MCM + Mining = Mine Warfare



- 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.

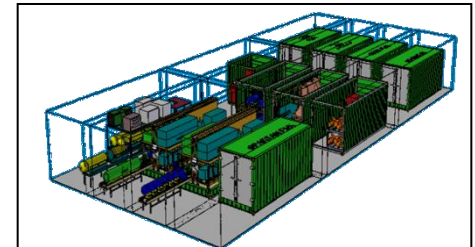




Summary



- 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?

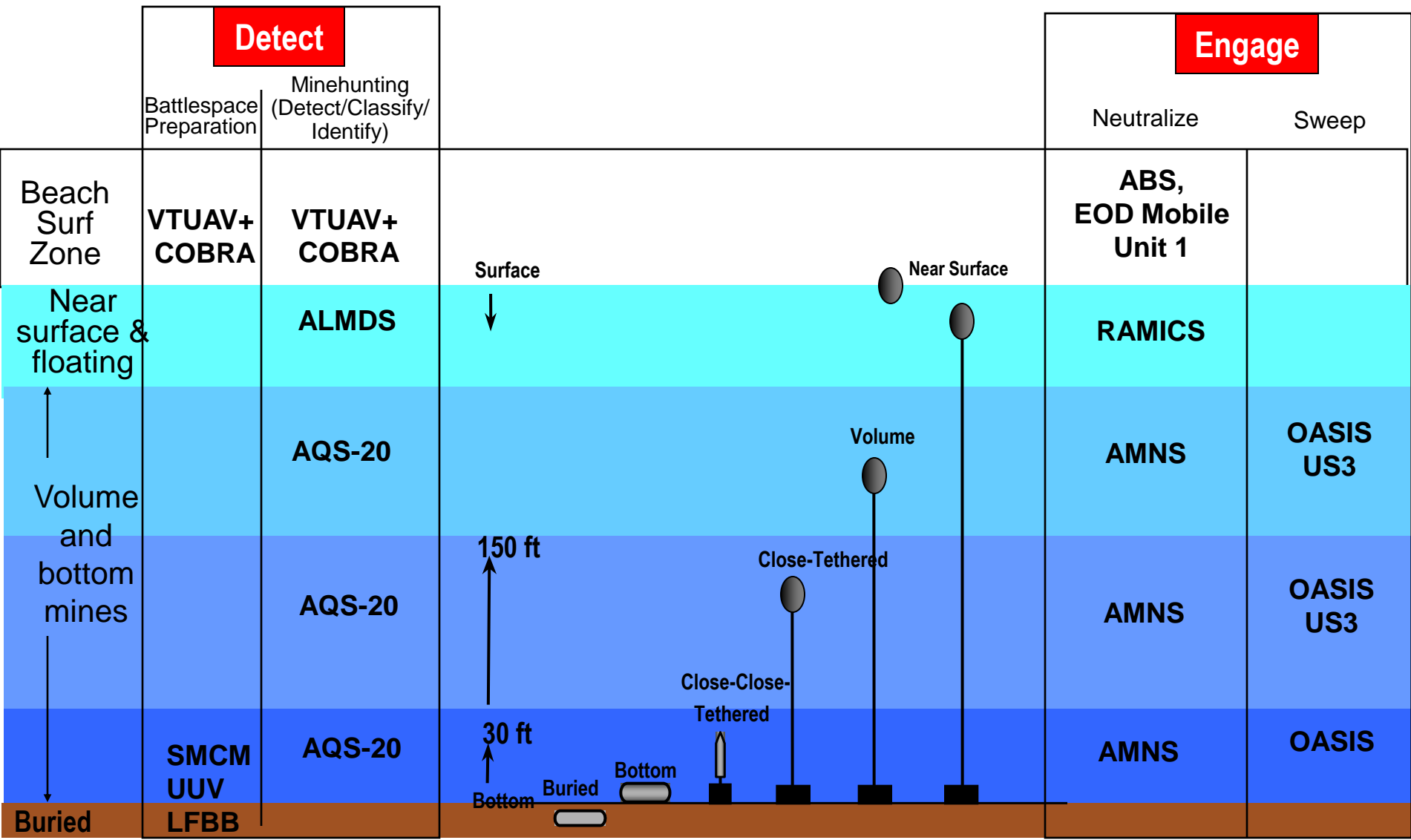
Contact CAPT Rios at mark.rios@navy.mil or LtCol Greeno at michael.greeno@navy.mil



Questions



LCS MCM Mission Package System Coverage



* 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?