



Mine Warfare Update

NDIA Expeditionary Warfare

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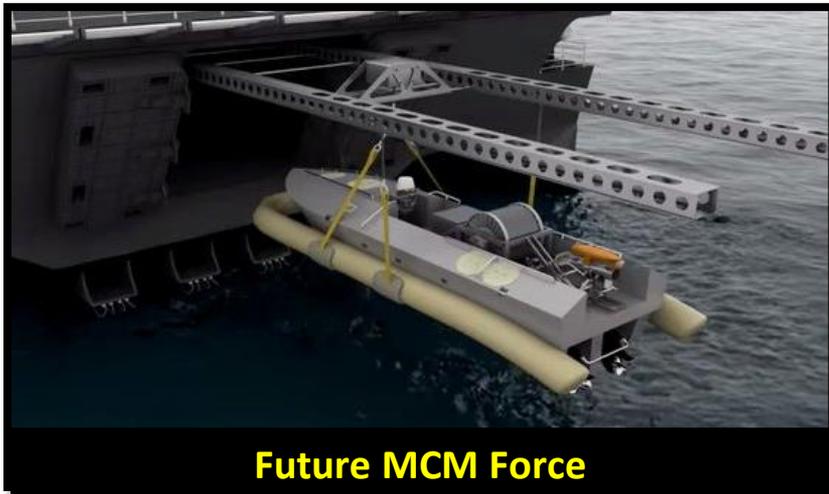
MIW Operational and Fleet Support



- Global Mine Warfare Commander
 - Deployable Battle Staff
 - Theater Operations and Plans
 - Intelligence analysis
- MCM Force training / certification
- MIW capability / capacity assessments
- IPCL and State of MIW reports
- Doctrine and tactics



Legacy Force



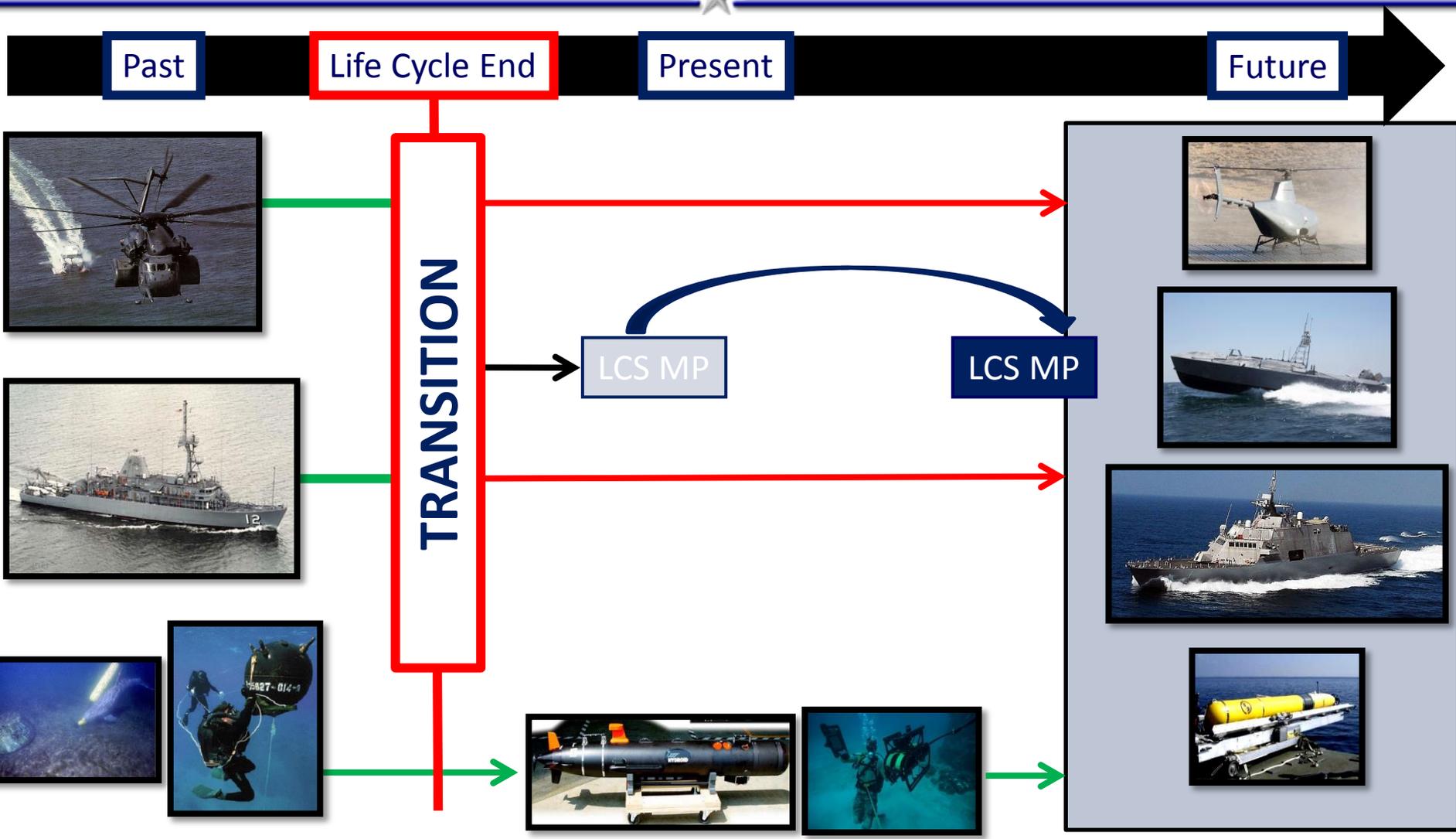
Future MCM Force

Fleet Testing and Experimentation

- FLEX (Fleet Experimentation)
- Wargame Support
- Tactical System Integration Doctrine
- UONS System Testing
- Joint Capability Technology Demo's
- Wargaming
- MIW Readiness and Effectiveness Measuring (*MIREM*)



Transition to LCS-MCM

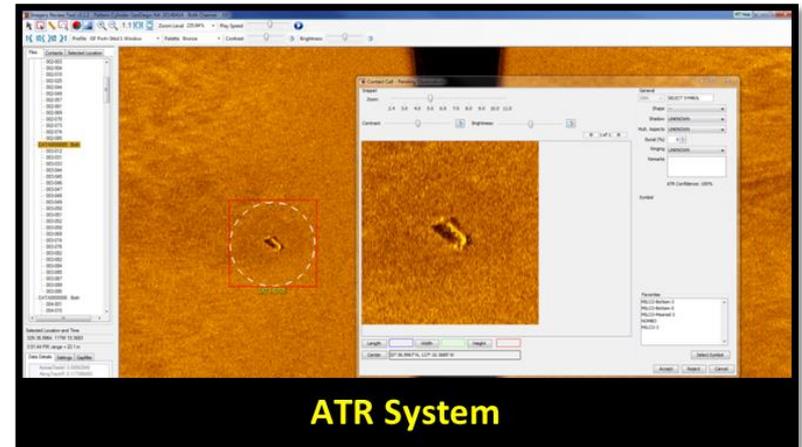


Retaining Legacy Forces until LCS is Ready



Where Can Industry Help?

- **MCM ISO Amphibious Operations**
 - VSW, SZ, and BZ environments
 - Interoperability between USMC and USN systems and equipment
- **MCM Timeline Reduction**
 - In-stride communication
 - Automatic Target Recognition (ATR)
 - Single sortie DTE
- **Expeditionary MCM**
 - Self contained capabilities hosted on multiple platforms
 - Networked from multiple platforms
 - Integrated into LCS
 - Address asymmetric threats





Where Can Industry Help?

- **UUVs / ROVs**
 - Improved Sensors
 - Reduced Signatures
 - Networked Autonomy
 - Power and Portability
 - Remote Launch, Recovery and Charging
 - Full DTE
 - Modular/Upgradable
- **GPS-Denied Environments**
 - Secondary Positioning
- **Interoperability**
 - Improved Data Transfer
 - Interoperable Planning Tools
 - Coalition Interoperable





Vision

Revolutionary operational concepts must be explored, underpinned by the latest in technological advances, creating a paradigm shift in warfighting, training and resourcing.

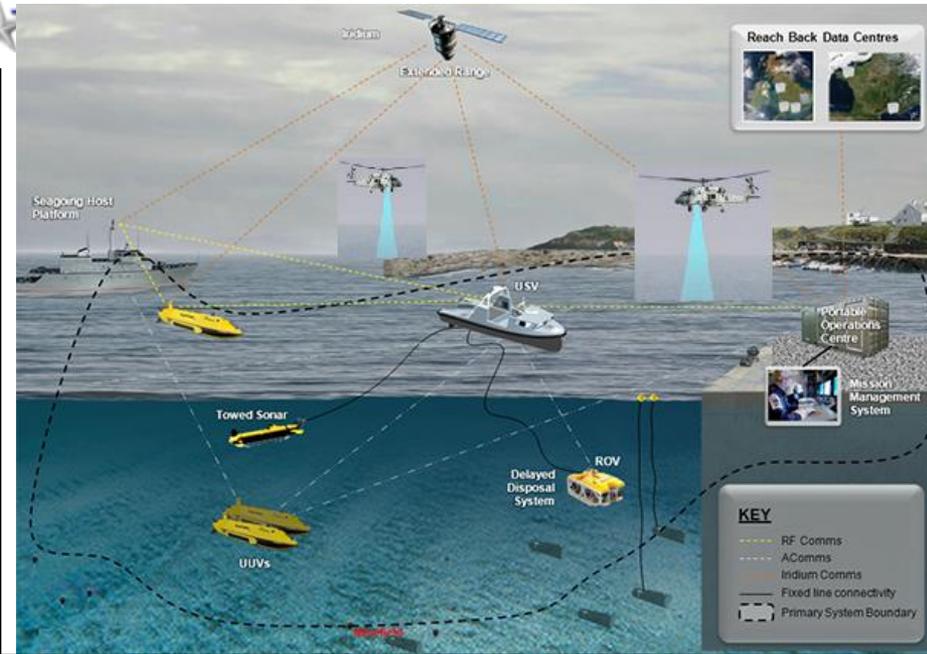
Background

- Mines affordable asymmetric equalizers
- MCM not getting easier for the US and allies
- Legacy MCM forces *approaching sundown*; LCS will provide near-legacy MCM approach.
- LCS/ESB modular design enables rapid integration of system-level innovation
- MCM conducted in a similar manner for 50+ years. Advances in tech must be explored to tip equation in our favor.

Approach

MCM^{next} to:

- 1) Establish a dialogue with leaders in industry, academia, government, and national labs
- 2) Leverage NPS
- 3) Advocate for S&T investment
- 4) Synthesize revolutionary concepts and enable existing and future technologies





Questions?





MCM Force in Transition



- Must Sustain the Legacy Force throughout Transition
- C5F
 - MK 18 Mod 2 UUV with SSAM and ATLAS
 - Minehunting USV Towing AQS-24B Sonar
 - Expeditionary MCM Company Units of Action
- C7F
 - MCM Assessment Events
 - Increase ExMCM Capacity
- LCS MCM Mission Package System Integration
 - ALMDS/AMNS/COBRA IOC'd
 - MCM USV Minehunting / Sweeping
 - Knifefish UUV for Buried Minehunting
- Fleet Wide Expeditionary Integration
 - ExMCM Company



Mk18 MOD II UUV



KNIFEFISH



MCM USV



AMNS



USV w/ AQS-24 SONAR



COBRA



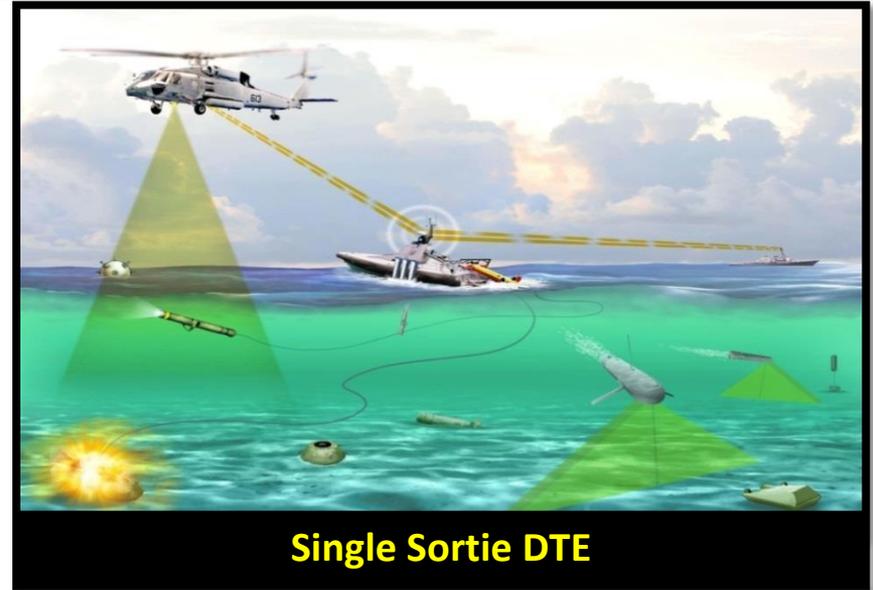
ESB

MCM IS EVOLVING WITH EXPEDITIONARY ASSETS



Future Capabilities

- Detection/Neutralization of Near-Surface Drifting/Oscillating Mines
- Single Sortie Detect-to-Engage (DTE)
- Buried Mine Neutralization
- Automation for UxV-Based MCM
- Advanced Mining Concepts



Single Sortie DTE



XLUUV Prototype