U.S. Navy Mine Countermeasures

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Agenda

• Mine Threat
• Vision, Concept and Missions
• Present and Future Capabilities
  • Littoral Combat Ship (LCS) and MIW Mission Modules
  • Organic Mine Countermeasures (OMCM)
  • Unmanned Systems
  • Assault Breaching System
  • Mine Warfare Environmental Decision Aids Library (MEDAL)
• Summary
• The real goal of the minefield is Sea Denial, NOT the damage or destruction of a specific ship.

• Navy goal is Assured Access to defeat the minefield, NOT counter every mine.
Sea Mines: The Unique Weapon

- Over 300 Types
- Over 50 Countries Possess
- Over 30 Countries Produce
- More than 20 Countries Export
- Low Cost
- Simple to Deploy
- Increasing Sophistication
- Lots of Bang for the Bucks
MCM Vision

**Concept of Operations**

**Unmanned Operations**

**Distributed and Netted**

**Cooperative Behavior**

**Common Operational Picture (COP)**

**Sea Warrior Transformation**

**MCM VISION:**

*Field a Common Set of Unmanned, Modular MCM Systems Employable from a Variety of Host Platforms or Shore Sites that can Quickly Counter the Spectrum of Mines to Enable Assured Access with Minimum Risk from Mines*

**VISION -------> ROADMAP -------> MCM PLAN**

**Dedicated**
- Slow
- Heavy
- Large footprint
- Stovepiped
- Primarily CONUS-based
- Manpower Training Intensive

**Organic**
- Fast and Agile
- Precise
- Lethal
- Modular
- Organic
- Optimized Manpower Requirements

**UNCLASSIFIED**

- Remove Sailor/Marine From the Minefield
- Accelerate the MCM Timeline

- Dedicated
- Organic
CONOPS

• National Defense Strategy
  – Secure strategic access and retain global freedom of action

• MIW is an enabling capability throughout the range of military operations (ROMO)
  – MIW assures;
    • the ability of joint and naval forces to achieve strategic access and global freedom of action in areas of U.S. strategic interest
    • Protect U.S. and multinational forces, Sea Line of Communications (SLOCs), and commercial shipping.
  – MIW requires;
    • the ability to operate in complex oceanographic environments against a variety of high-tech and improvised weapons
    • C5ISR from strategic through tactical level enabling support to the decision makers, planners and warfighters
U.S. Navy MCM Forces ensure: SPEED, ACCESS, and PERSISTENCE to our Defense Forces by providing a maritime sea shield around our global and vital homeland operating areas.

- Ranging in size: 100 to 900+ NM²
- Covering the water column: 200+ ft of mineable waters to the beach exit zone in support of Joint Force Entry Operations
Wide area surveillance of the nearshore battlespace for IPE
Target: LRS

Tactical Reconnaissance of the SZ/BZ for mines/obstacles
Target: COBRA

Advanced Sonars and Processing for detection of buried mines
Target: LFBB

Cooperative, netted UUVs for mine hunting
Target: SMCM UUV

JDAM delivered Assault Breaching Sys for Mine & Obstacle Destruction, Countermine System
Target: ABS, CMS

LCS-based MIW Mission Modules using unmanned vehicle technologies
Target: OMCM Systems

MCM Science and Technology
Addressing Capability Gaps in Maneuver and Capacity
Present Fleet Capability

Airborne Mine Countermeasures (MH-53E Sea Dragon) (20 total)
Acoustic Mine Detection and Mine Sweeping

Naval Special Clearance Team ONE
Acoustic Minehunting, Neutralization, and Mine Sweeping

Mine Countermeasures Ships (MCM-1 Avenger Class Ship) (14 total)
Acoustic Minehunting and Neutralization

Coastal Mine Hunters (MHC-51 Osprey Class Ship) (4 total)
Acoustic Minehunting, Neutralization, and Mine Sweeping

Naval Special Warfare
Acoustic Mine Detection and Mine Sweeping

Explosive Ordnance Disposal Mine Countermeasures Detachments
Acoustic Minehunting, Neutralization, and Mine Sweeping

Limited Mine Identification and Neutralization
Acoustic Minehunting and Neutralization

Obstacles
Anti-Invasion
Bottom
Moored
Floating

Surf Zone & CLZ
0' - 10'

Very Shallow Water
10' - 40'

Shallow Water
40' - 200'

Deep Water
Over 200'

JDAM Assault Breaching System
Delivering Future Force

Minefield Detection and Neutralization

Assault Breaching System

Naval Special Clearance Team ONE

Airborne Laser Mine Detection System

Rapid Airborne Mine Clearance System

Littoral Combat Ship

Surf Zone & CLZ

0' - 10'

Obstacles

Anti-Invasion

Bottom

Moored

Floating

Very Shallow Water

10' - 40'

Remote Minehunting System – AN/AQS-20A

Airborne Mine Neutralization System

Self propelled explosive charges

(Kill)

Sonar (Hunt)

Unmanned Surface Vehicle / Organic
Airborne and Surface Influence Sweep

Shallow Water

40' - 200'

Buried Mine – Promising Potential
with Low Frequency Broad Band

Deep Water

Over 200'

Unmanned Underwater Vehicle

Surface Mine Countermeasures

Buried Mine Detection

Magnetic Acoustic Influence Sweep
Littoral Combat Ship (LCS) & Mine Countermeasures Mission Package

- Remote Mine Hunting System & AN/AQS-20A
- Airborne Laser Mine Detection System
- Coastal Battlefield Reconnaissance & Analysis System
- SWORDFISH Unmanned Underwater Vehicle
- Battlespace Preparation Autonomous Underwater Vehicle
- Unmanned Surface Vehicle & Organic Airborne and Surface Influence Sweep
- Full MIW Package: FY11
- Mission Package
- Mission Module
- Rapid Airborne Mine Clearance System
- Airborne Mine Neutralization System
Organic Mine Countermeasures Systems

Distributed Expeditionary Mine Countermeasures Capabilities

MH-60S Based Systems:
- Rapid Airborne Mine Clearance System (RAMICS) - (FY10)
- Airborne Laser Mine Detection System (ALMDS) - (FY09)
- Organic Airborne and Surface Influence Sweep (OASIS) - (FY10)
- Airborne Mine Neutralization System (AMNS) - (FY09)
- AQS-20A Minehunting Sonar - (FY07)

DDG based system:
- Remote Minehunting System (RMS) - (FY07)

SSN Based System
- Mission Reconfigurable Unmanned Undersea Vehicle (MRUUV) - (FY16)
Mine Countermeasures Unmanned Vehicles

Leading the Way towards MIW Vision

- Unmanned Surface Vehicle Influence Sweep Program
- Remote Minehunting System
- Surface Mine Countermeasures Unmanned Underwater Vehicle and Low Frequency Broadband
- SWORDFISH Unmanned Underwater Vehicle
- Submarine Launched Mission Reconfigurable Unmanned Underwater Vehicle
- Battlespace Preparation Autonomous Underwater Vehicle
- FY06 USV-based Minesweeping Acoustic Sweep Device
- FY11 Magnetic sweep cable
- FY07
- FY12
ASSAULT BREACHING SYSTEM (ABS)

Intelligence, Surveillance and Reconnaissance

Coastal Battlefield Reconnaissance and Analysis (COBRA)
and Littoral Remote Sensing (LRS)

Countermine-Counterobstacle (CMCO)

Joint Direct Attack Munition (JDAM)
Assault Breaching System

Pre Test Land Test Post Test

Mk-80 Series Bomb Tests Offers Near Term Capability

Pre Test Water Test Post Test

ASSAULT BREACHING SYSTEM (ABS)

Precision Navigation and Marking

Electronic Chart Display and Information System-Navy (ECDIS-N) / LCAC Auto-Pilot

Countermine System

Standoff Deployment

6000 Darts

Beach

Area to be cleared

Water <10 ft
MEDAL:
MIW Common Operational Tactical Picture
Summary

• Provide Strategic Access
• Protect National Interests and Commerce
• Enable Joint and Coalition Forces
• Leverage Near and Far Term Future Technology
  • Field mutually supportive systems to provide full threat coverage
  • Remove Man from the Minefield
• Reduce the Detection to Engagement Timeline
  • Single Pass Detection and Classification (via PMA/CAD-CAC)
  • Rapid Reacquisition and Neutralization
U.S. Navy Mine Countermeasures Capabilities

Questions?
Lessons of War – WW II

World War II – 1942 – 1945

- U.S. able to adapt to changing circumstances to conduct MCM ops
  - Organic MCM ships and forward bases for non-organic ships
- Massive MCM numbers vs. determined resistance
  - 65 Ships Lost to mines
- Okinawa – 75 Minesweepers, 45 assisting ships swept 3,000 nm²
  - Largest MCM task force in U.S. Navy History
- Post War Downsizing
  - 500 Mine craft (33,000 men) at the end of the war
  - Majority decommissioned
Lessons of War - Korea

Korean War – 1950 – 1953

- Only 22 Minesweepers in the Pacific Fleet
- Threat underestimated – little mining during early hostilities
- Navy unprepared to conduct MCM operations early in the war
  - Too few MCM assets
- 5 U.S. Navy ships sunk – 5 destroyers damaged – 43 KIA
- Enemy use of influence mines delayed effective sweeping ops

In 1950, North Korea laid a **400 square mile minefield** during a **3 week** period consisting of **3,000 mines** of various types (using fishing boats with simple navigational instruments and working only at night) delaying the amphibious assault of Wonsan (250 US ships and 50,000 men) six days.

“**The U.S. Navy has lost control** of the seas to a nation without a navy, using **pre-World War I weapons**, laid by vessels that were utilized at the time of the birth of Christ”

Admiral Allan E. Smith’s message to the CNO, 1950
Lessons of War – Modern Era

**Cold War 1954 – 1990**

- MCM capabilities largely outsourced to Allies – NATO
- Minesweepers could not operate organically with battle force
- Operation Earnest Will – 1987
  - Escort of tankers with no organic MCM forces
  - USS SAMUEL B ROBERTS (FFG 58) and 3 tankers struck by mines
  - Minesweepers Forward Deployed (1987-1990)

**Persian Gulf War 1990 – 1991**

- Navy not prepared to conduct MCM operations
  - No coordination with CTF’s
  - 6 Active minesweepers
- MCM Force ill-equipped
  - Lack of Readiness
  - Lack of operational expertise
- 2 Mine Casualties
  - USS PRINCETON (CG)
  - USS TRIPOLI (LPH)