FUTURE NAVAL MINE WARFARE

Mine Counter Measures Concepts Against Increasing Sea Mine Capabilities
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1. NMW FAMILY TREE

- Naval Mine Warfare
  - Mining
  - Mine Counter Measures
    - Offensive MCM
      - Passive MCM
        - Localising the threat
        - Locating the Minefield
        - Reducing the Risk
      - Mine Sweeping
      - Minehunting
    - Defensive MCM
      - Active MCM
        - Explosive Ordnance Disposal
1. NMW FAMILY TREE (2)

MINE SWEEPING

MECHANICAL SWEEPING

INFLUENCE SWEEPING
1. NMW FAMILY TREE (3)

MINEHUNTING

Detect → Classify

Dispose

Identify
1. NMW FAMILY TREE (4)

EXPLOSIVE ORDNANCE DISPOSAL
1. NMW FAMILY TREE

- Naval Mine Warfare
  - Mining
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    - Offensive MCM
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        - Reducing the Risk
      - Mine Sweeping
      - Minehunting
    - Defensive MCM
      - Active MCM
        - Explosive Ordnance Disposal
2. STRATEGIC CONTEXT (1)
2. STRATEGIC CONTEXT (2)
2. STRATEGIC CONTEXT (3)
2. STRATEGIC CONTEXT (4)

CHOKE POINTS AND SHIPPING DENSITY
2. STRATEGIC CONTEXT (5)

SUBMARINE CABLES
2. STRATEGIC CONTEXT (6)

TRADITIONAL TARGETS

Maritime Forces

Naval Ports and Approaches

Merchant shipping

Commercial Ports and Approaches
2. STRATEGIC CONTEXT (7)

NEW WORLD TARGETS

Cruise ship in port

Mondial Events

HVU in convined waterspace

Naval Units
2. STRATEGIC CONTEXT (8)
2. STRATEGIC CONTEXT (9)

CRUDE OIL FLOW SOUTH CHINESE SEA (2011)
3. THE THREAT (1)
3. THE THREAT (2)

MINES ALL OVER THE WORLD..
3. THE THREAT (3)

MOORED MINES
3. THE THREAT (4)

GROUND MINES
3. THE THREAT (5)
3. THE THREAT (6)

MOBILE MINES (DRIFTING)
3. THE THREAT (7)

MOBILE MINES (VARIOUS)
3. THE THREAT (8)

MARITIME IED
4. PRESENT CAPABILITIES (1)
4. PRESENT CAPABILITIES (2)

OPERATIONAL SHORTFALLS

- Long transit
- MCM is slow
- Not covert
- MH MS is hazardous
4. PRESENT CAPABILITIES (3)

FUNCTIONAL SHORTFALLS

- MCM in VSW and SZ
- MCM in harbors
- MCM against deep-water short tethered (rising) mines at safe distance
- MCM against drifting mines
- MCM against buried/hidden mines
- MCM against intelligent mines

Self-protection against mine threat for ships of the fleet
5. FUTURE CONCEPTS (1)

EVOLUTION OF TECHNOLOGY
5. FUTURE CONCEPTS (2)

THREE THREAT SCENARIOS

Ports, Approaches and Inland Waterways

Operation areas in the Littorals

SLOCS and Choke Points
5. FUTURE CONCEPTS (3)

AUTONOMOUS UNDERWATER VEHICLES
5. FUTURE CONCEPTS (4)

SEMI SUBMERSIBLES/GLIDERS
5. FUTURE CONCEPTS (4)

UNMANNED SURFACE VEHICLES

HUNTING

SWEEPING

JAMMING
5. FUTURE CONCEPTS (5)

RROV

THE FUTURE IS ON USV TAXY
5. FUTURE CONCEPTS (6)

STAND-OFF NMCM

Non dedicated combatant
MCM dedicated ship
Ship of opportunity
Shore

Security

USSV
USV
Underwater positioning system
Sweeping System
UUV
Helo - UAV

TREATMENT
Detection
Classification
Localization

... At ...
Re-localization
Identification

... Or ...
Neutralization
Sweeping /
Jamming /
Deception

THREAT
Moored mines

ENVIRONMENT
Bottom mines
Drifting mines

Moored mines
... ∆t ...
5. FUTURE CONCEPTS (7)

LCS Mine Countermeasures Concept

Detect, Classify & Identify

Engage (Neutralize)

Engage (Sweep)

- LCS 2 (GD)
- MQ-8B Fire Scout V1 UAV
- LCS 1 (LM)
- MH-60S
- AH-60S
- ALMDS
- AQS-20A
- RMMV

- LCS 2 (GD)
- HH-60S
- MH-60S
- AMNS NEAR SURFACE UPGRADE
- AMNS
- OASIS

Keywords:
- OASIS: Organic Airborne and Surface Influence Sweep
- AMNS: Airborne Mine Neutralization System
- RMMV: Remote Multi Mission Vehicle
- UISS: Unmanned Influence Sweep System
- ALMDS: Airborne Laser Mine Detection System
5. FUTURE CONCEPTS (8)

FINISH CONCEPT KANTANPÄÄ-CLASS
5. FUTURE CONCEPTS (8)

ESPADON

Level 1:
Stand off operating ship

Level 2:
Unmanned operating platforms
- USV
- USSV
- AUV

Level 3:
Dedicated sensors and actuators
- Mine Sweeping
- TSAS
- Mine Disposal
- EOD
5. FUTURE CONCEPTS (9)

BEL – NLD IDEAS

To secure
Sweeping
Jamming

Mine searching
Detection
Classification

Mine treatment
Dispose
Divers

USV

SR DCL
AUV DCL (+ REA)
Buried mines

AUV/ ROV not expendable for I and D

Or

Influence
6. MY WORRIES