THE FUTURE OF NAVAL MINE WARFARE
WHY FEAR THIS THREAT

- **VULNERABILITY FOR THE ECONOMY:**
  - ~80% of world trade is made by sea

- **A CHEAP WEAPON:**
  - For terrorist organisations
  - Low price but wide impact

- **USED IN CASE OF A MAJOR CONFLICT:**
  - OFFENSIVE mining
  - DEFENSIVE mining
  - Supply routes BLOCKAGE

- Hundreds of thousands/millions of mines in stock worldwide

- 400,000 historic mines estimated in the English Channel and both North and Baltic seas
Mines are evolving as well as minelaying techniques

1. UW IEDs
2. Mobile Mines
3. Contact Mines
4. Influence Mines
5. Mobile Mines
6. Influence Mines
7. Mobile Mines
8. Contact Mines
9. Mobile Mines
Cheap device

Important damage
**MINE SWEEPERS**

- Specialized ships
- Have to enter the minefield

Dangerous for the ship and its crew

**MINE HUNTERS**

**TODAY**

**TOMORROW**

- **ROBOTIC SYSTEMS:** AUV, USV, UAV
- Deployed from outside of the minefield:
  - By non-specialized ships
  - Directly from the shore

Safe for the crew and the ship
TODAY: MINE HUNTERS

Need to be IN the MINEFIELD

Robots used since mid 70’s for identification and neutralization

Price: $$$$$
Remain OUTSIDE the MINEFIELD
ROBOTIC SYSTEMS ADVANTAGES

1. CREW AND SHIPS REMAIN OUTSIDE OF THE MINEFIELD: SAFE

2. SIMULTANEOUS TASKS HANDLING: FAST

3. ROBOTS ARE INDEPENDENT FROM SHIPS: FLEXIBLE

UMIS™ MCM TURNKEY SOLUTIONS

CHosen by the belgian & netherlands navies
THE FUTURE OF NAVAL MINE WARFARE

EXTENSIVE USE of SYSTEMS OF ROBOTS:
- KEEP CREW and SHIP SAFE OUTSIDE the DANGER AREA
- USVs, AUVs DIRECTLY FROM THE SHORE

SYSTEMS WILL BECOME INCREASINGLY:
- AUTONOMOUS - UNDER HUMAN SUPERVISION
- CYBER SECURE

WITH THE USE OF:
- ARTIFICIAL INTELLIGENCE
- SWARMING
- ETC.