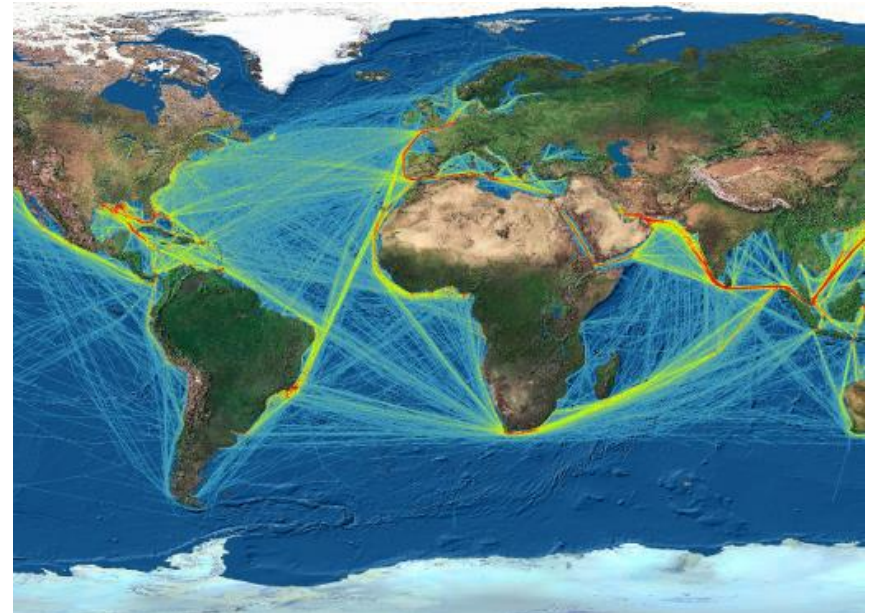




# THE FUTURE OF NAVAL MINE WARFARE

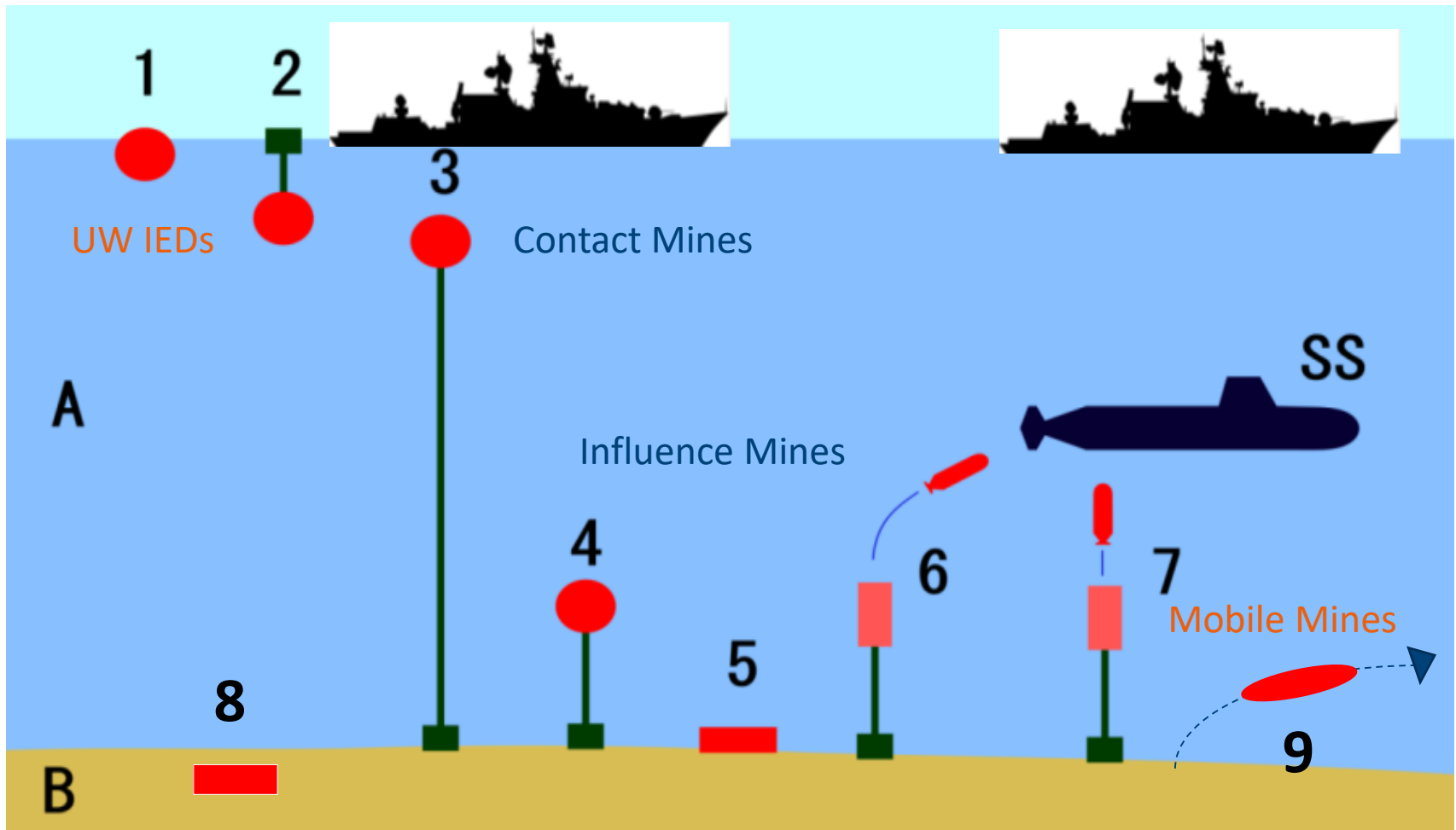


- **VULNERABILITY FOR THE ECONOMY:**
  - ~ 80% of world trade is made by sea
- **A CHEAP WEAPON:**
  - For terrorist organisations
  - Low price but wide impact
- **USED IN CASE OF A MAJOR CONFLICT:**
  - OFFENSIVE mining
  - DEFENSIVE mining
  - Supply routes BLOCAGE



- **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





- Cheap device
- Important damage



## TODAY

- ✓ **MINE SWEEPERS**
  - ✓ **MINE HUNTERS**
  - ✓ Specialized ships
  - ✓ Have to enter the mine field
- Dangerous for the ship and its crew**

## TOMORROW

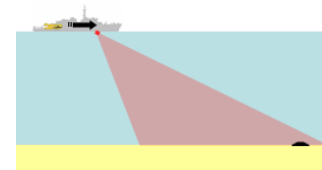
- ✓ **ROBOTIC SYSTEMS: AUV, USV, UAV**
  - ✓ Deployed from outside of the minefield:
    - By non-specialized ships
    - Directly from the shore
- Safe for the crew and the ship**



**Need to be IN the MINEFIELD**



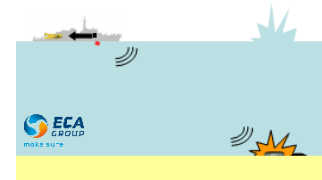
**Price : \$\$\$\$\$**



**DETECTION  
CLASSIFICATION**



**IDENTIFICATION  
NEUTRALISATION**



**Robots used since mid 70's for  
identification and neutralization**

Remain OUTSIDE the MINEFIELD



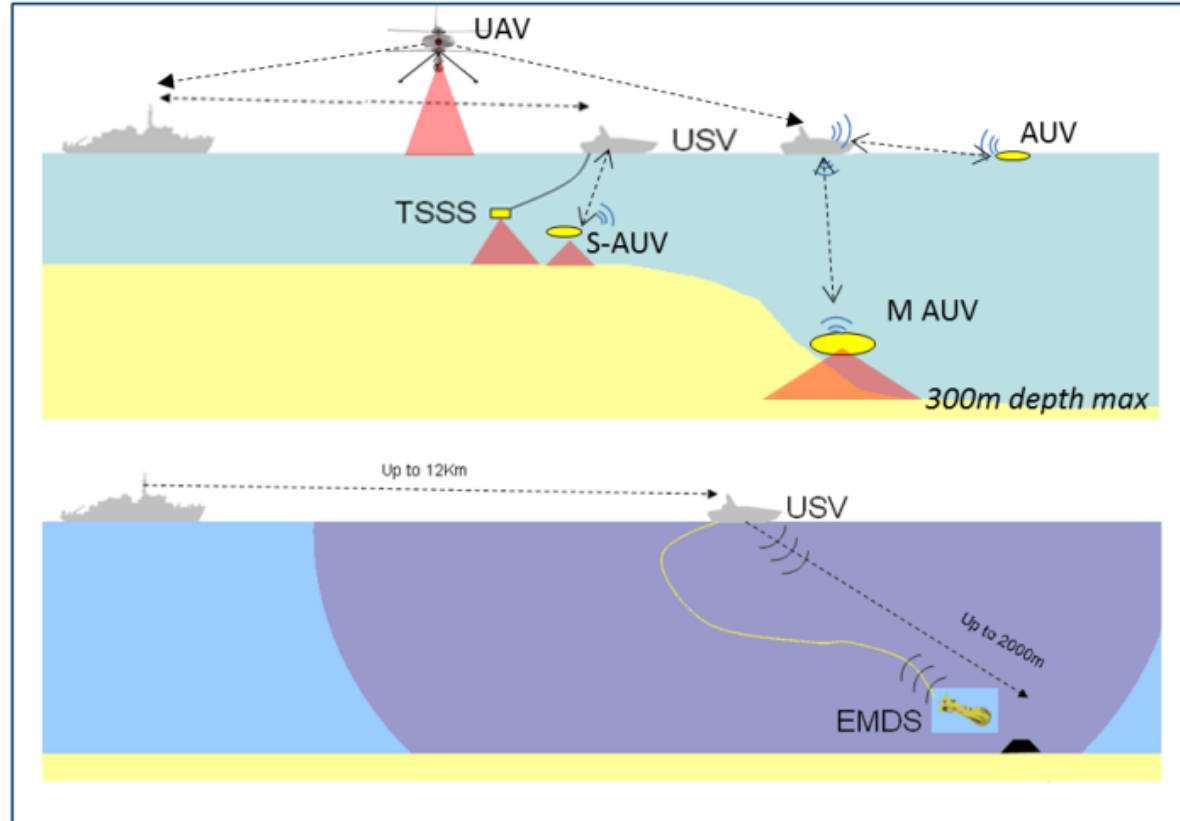
**HUNTING**

DETECTION

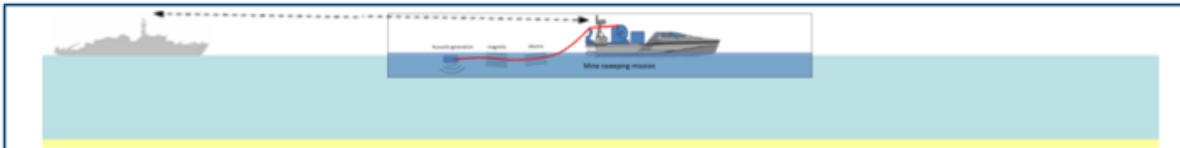
CLASSIFICATION

IDENTIFICATION

NEUTRALIZATION



**SWEEPING**



- 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

🇧🇪 🇳🇱 🇩🇪

**ECA**  
GROUP



- ■ **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.



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