



## Distributed Surveillance System

### Building Block in Counter-Piracy Operations

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## Maritime Protection comprises

- Asset protection e.g.:
  - ✓ Oil/gas rig
  - ✓ Navy ship
  - ✓ Harbour
- Area control e.g.:
  - ✓ Anti-intruder defence
  - ✓ protection against terrorism, smuggling
- Shipping protection e.g.:
  - ✓ Oil/LNG tanker
  - ✓ Cruise ship
  - ✓ merchant shipping

} High Value Unit

Focus on  
HVU-protection





# explaining DSS

**Box** is an atomic entity which does:

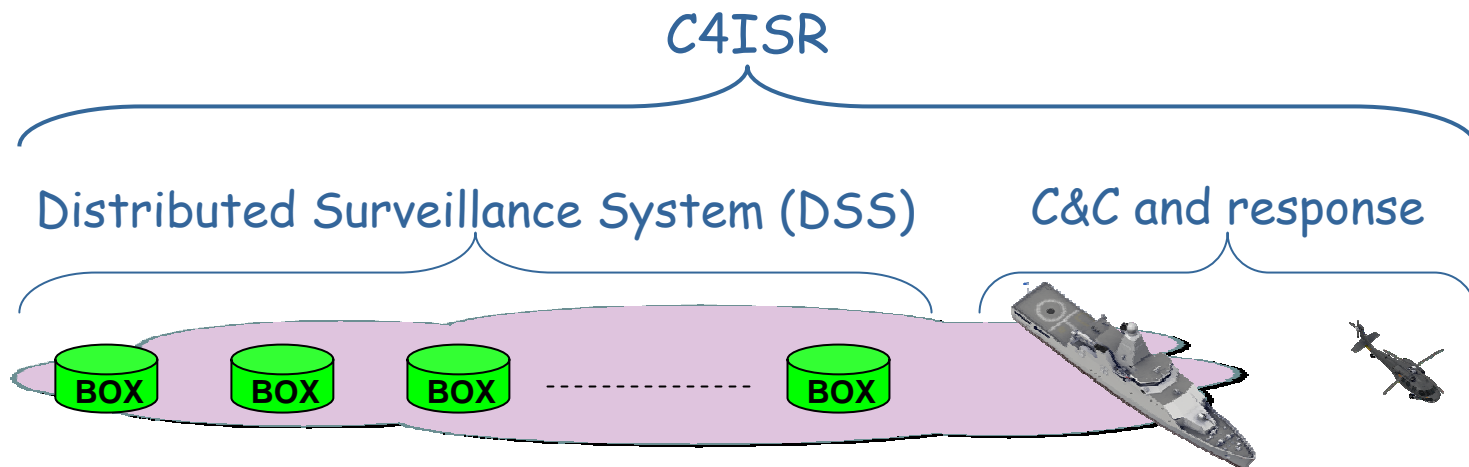
- Sensing, communication & fusion

**DSS** is a **Group** of networked **Boxes**

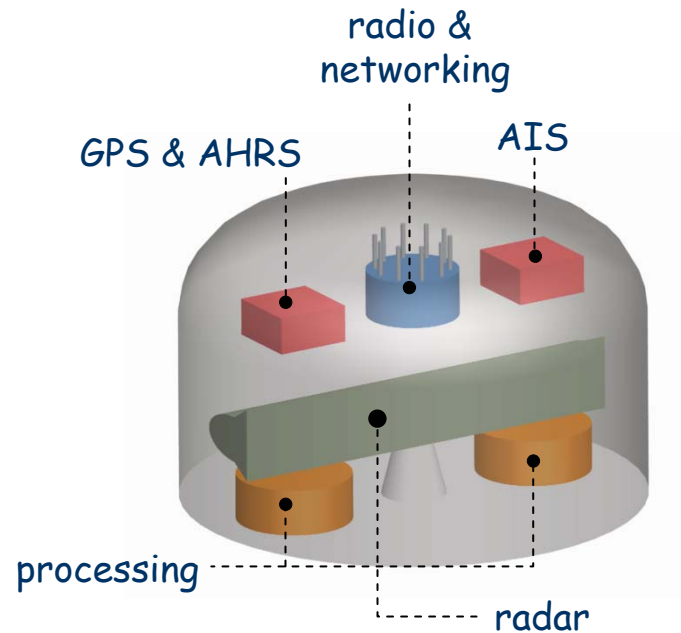
- Exchanging surveillance data

**DSS** forms a **C4ISR** with

- Connected C&C capabilities
- Response resources

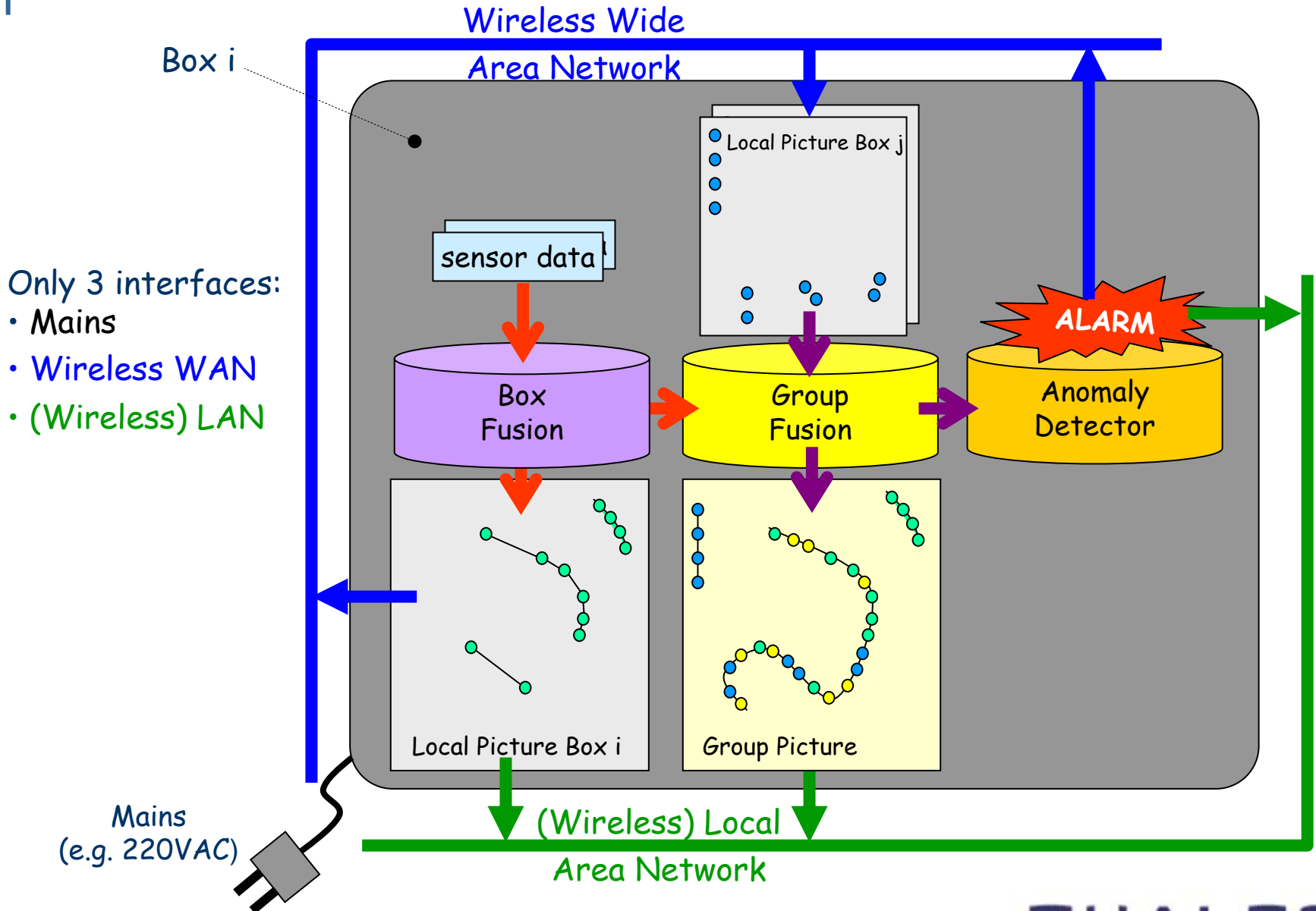


Box sub-systems include:



Box capabilities include:

- Compilation of Local Picture using own sensors
- Distribution of Local Picture to other Boxes
- Compilation of Group Picture using received Local Pictures
- Detection of 'simple anomalies'



Only 3 interfaces:

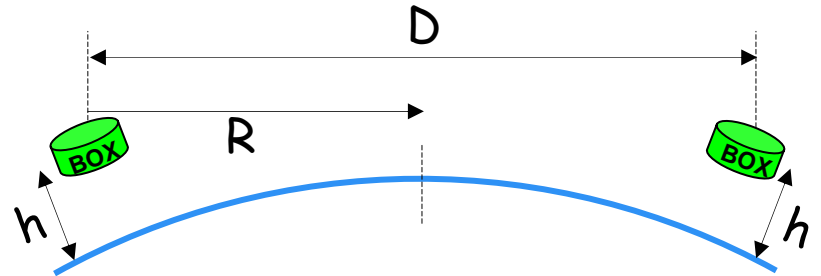
- Mains
- Wireless WAN
- (Wireless) LAN



# using DSS

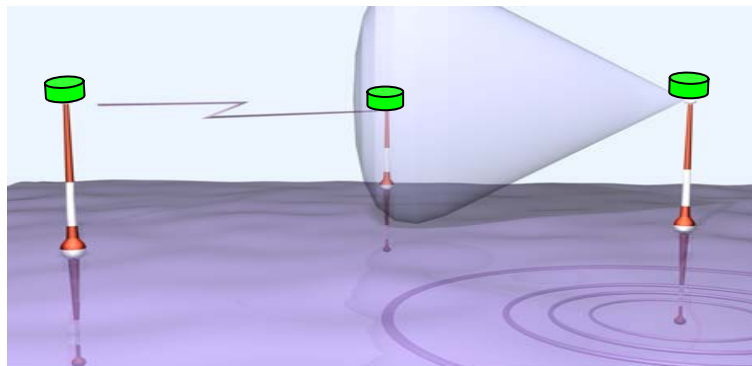
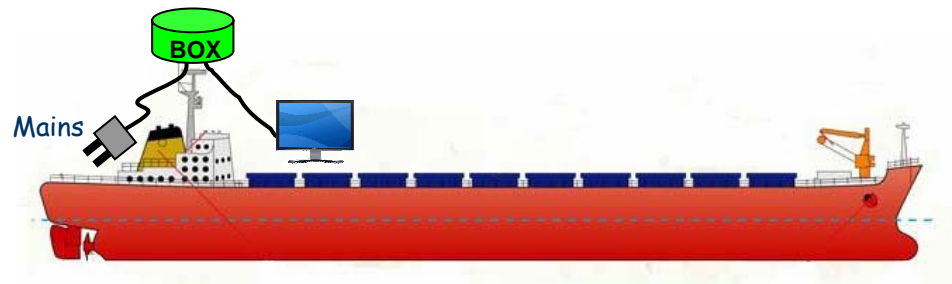
## Box positioning

- $h$  determines  $R$  (horizon)
- $D$  determines coverage
  - $D < 2R$ : overlap
  - $D > 2R$ : sparse

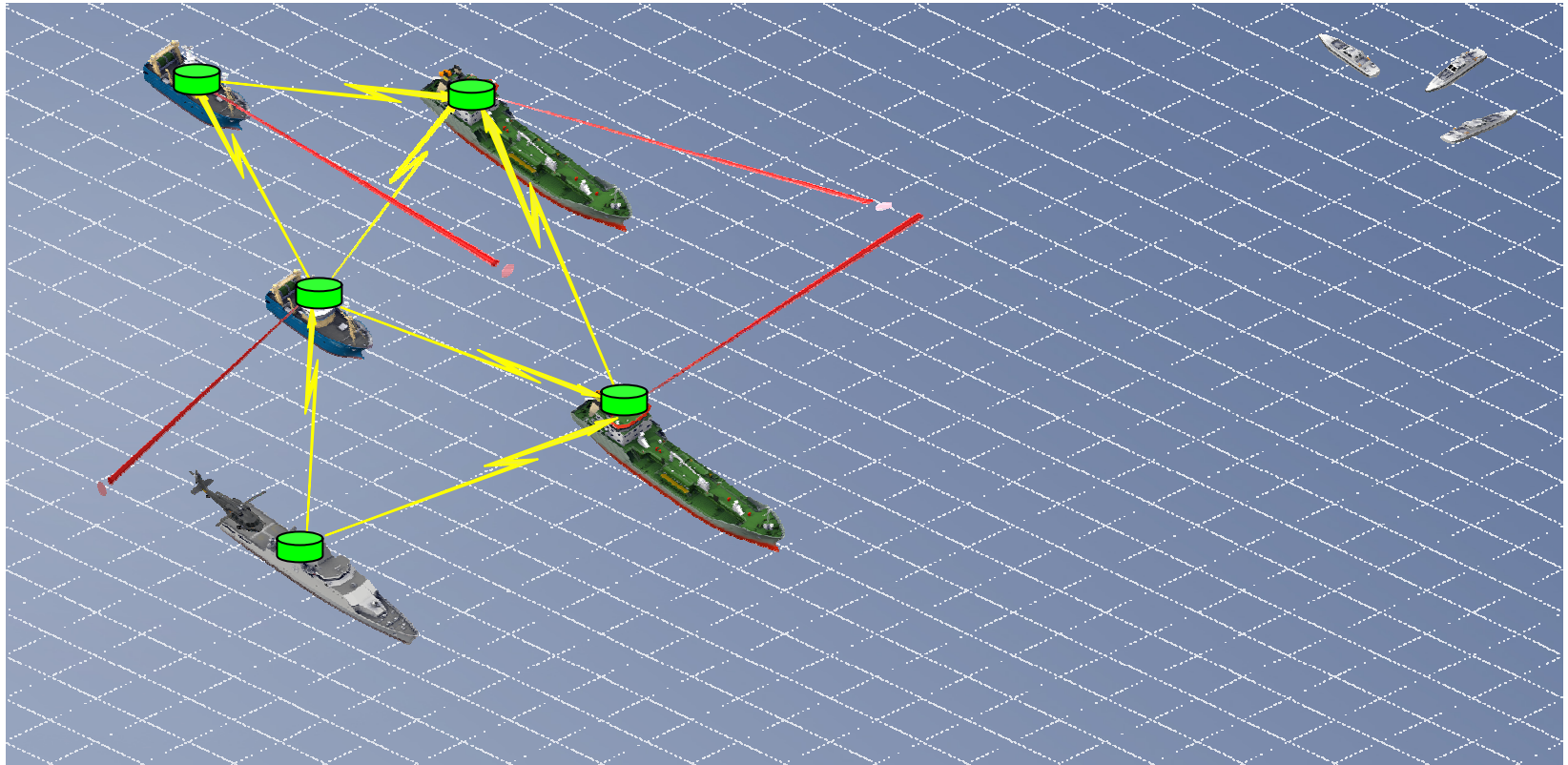


## Platform types

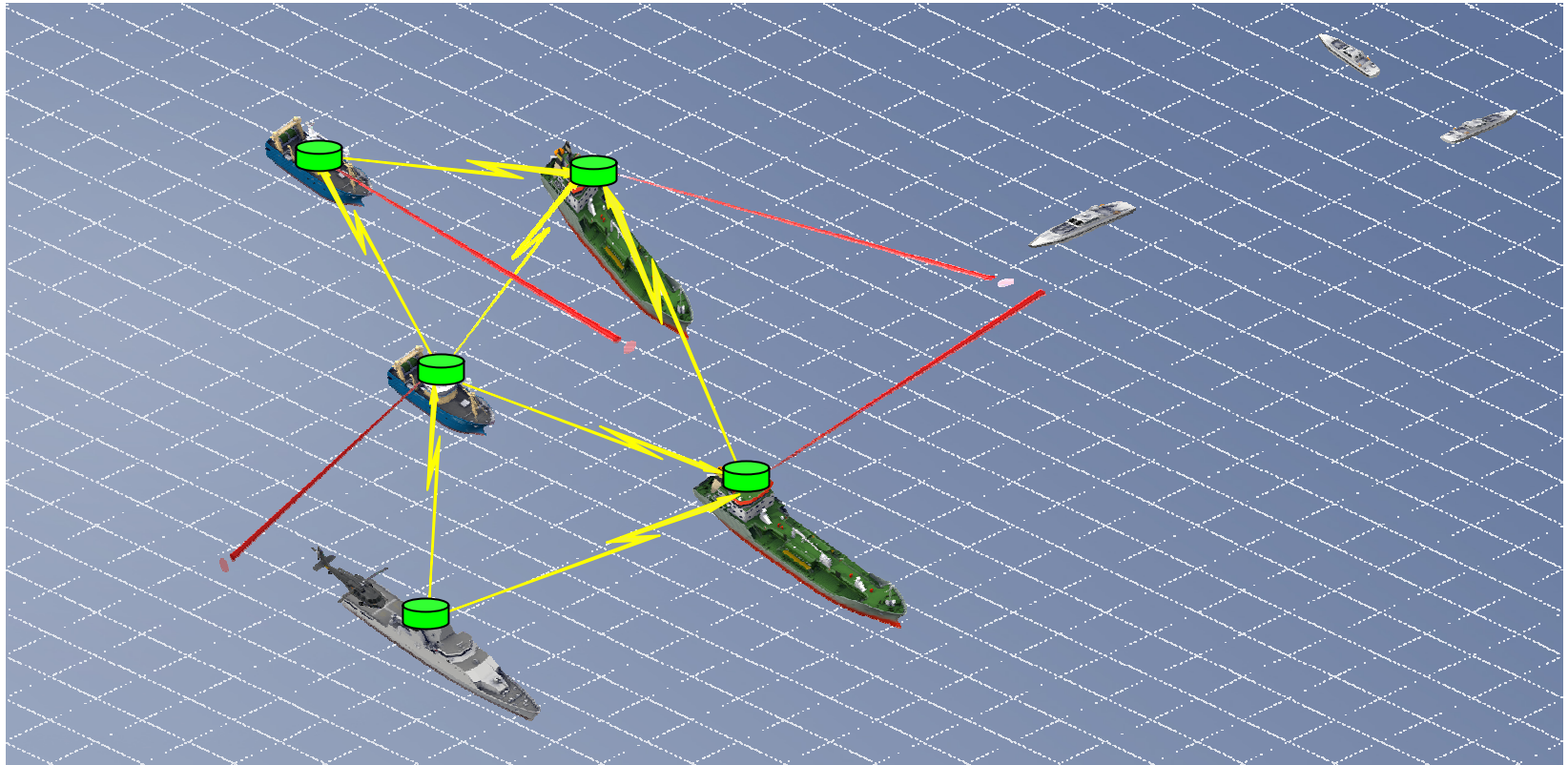
- Opportunity platforms
  - e.g., High Value Unit
- Dedicated platforms
  - e.g., spar-type buoy





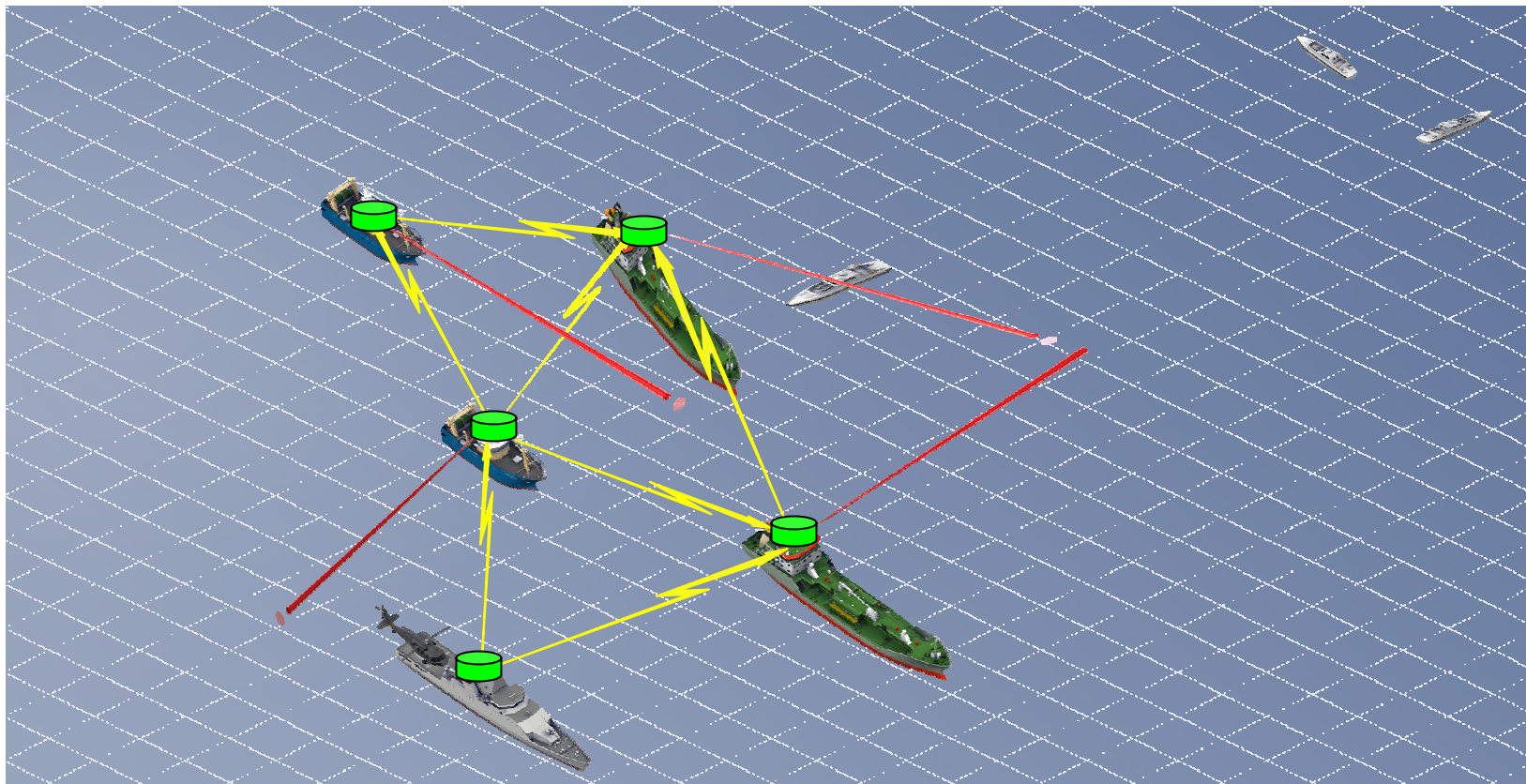


- Convoy of HVU plus Navy vessel for protection
- All ships equipped with a Box and interconnected
  - HVU sense local environment
  - Navy ship produces Group picture
- Set of fishing ships at ~10km

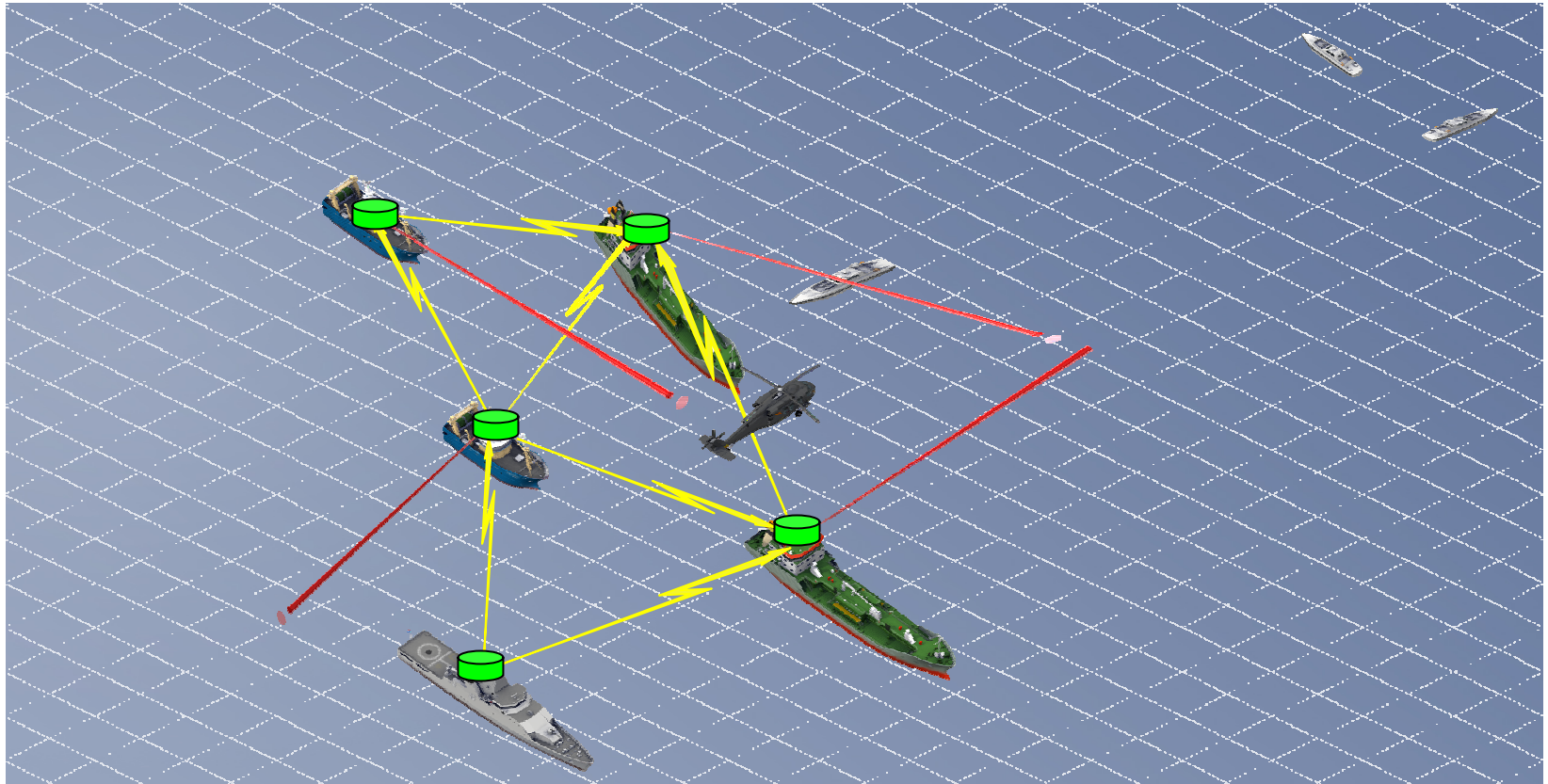


- A fast boat heads towards an HVU
- Box of this HVU detects approach
- HVU makes an evasive move
- Course of the fast boat is monitored

# Using DSS – HVU protection (3)



- Fast boat still heads to HVU
- Boat is considered a threat



- Fast boat still heads to HVU
- Boat is considered a threat
- Heli takes off for countermeasures



# DSS

# features



1. DSS enables build-up of collective situation awareness
  - by distributing local pictures
  - of all Boxes in a Group
2. DSS improves early warning
  - due to improved sensor performance in Box
  - and aggregate coverage of Group
3. DSS allows longer response times
  - As a consequence of 2
4. DSS is cost efficient through separation of
  - Surveillance – over as many as needed cheap platforms
  - and Response – over as few as possible expensive navy vessels