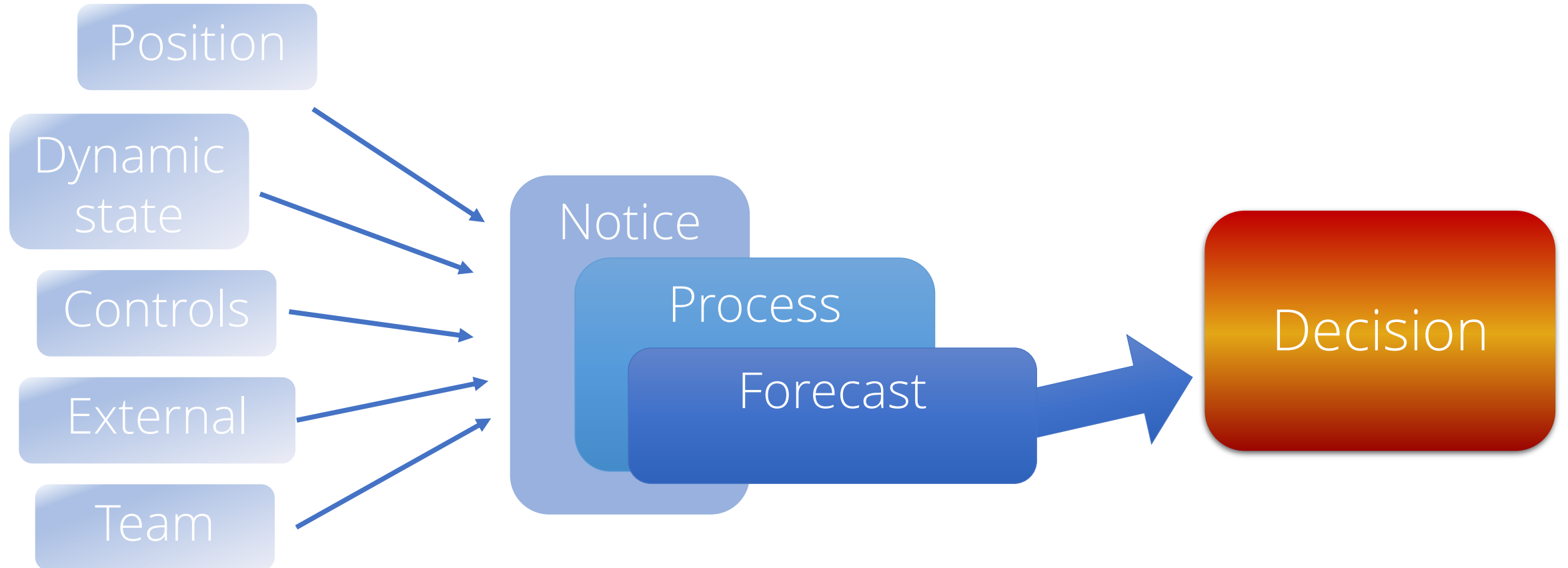


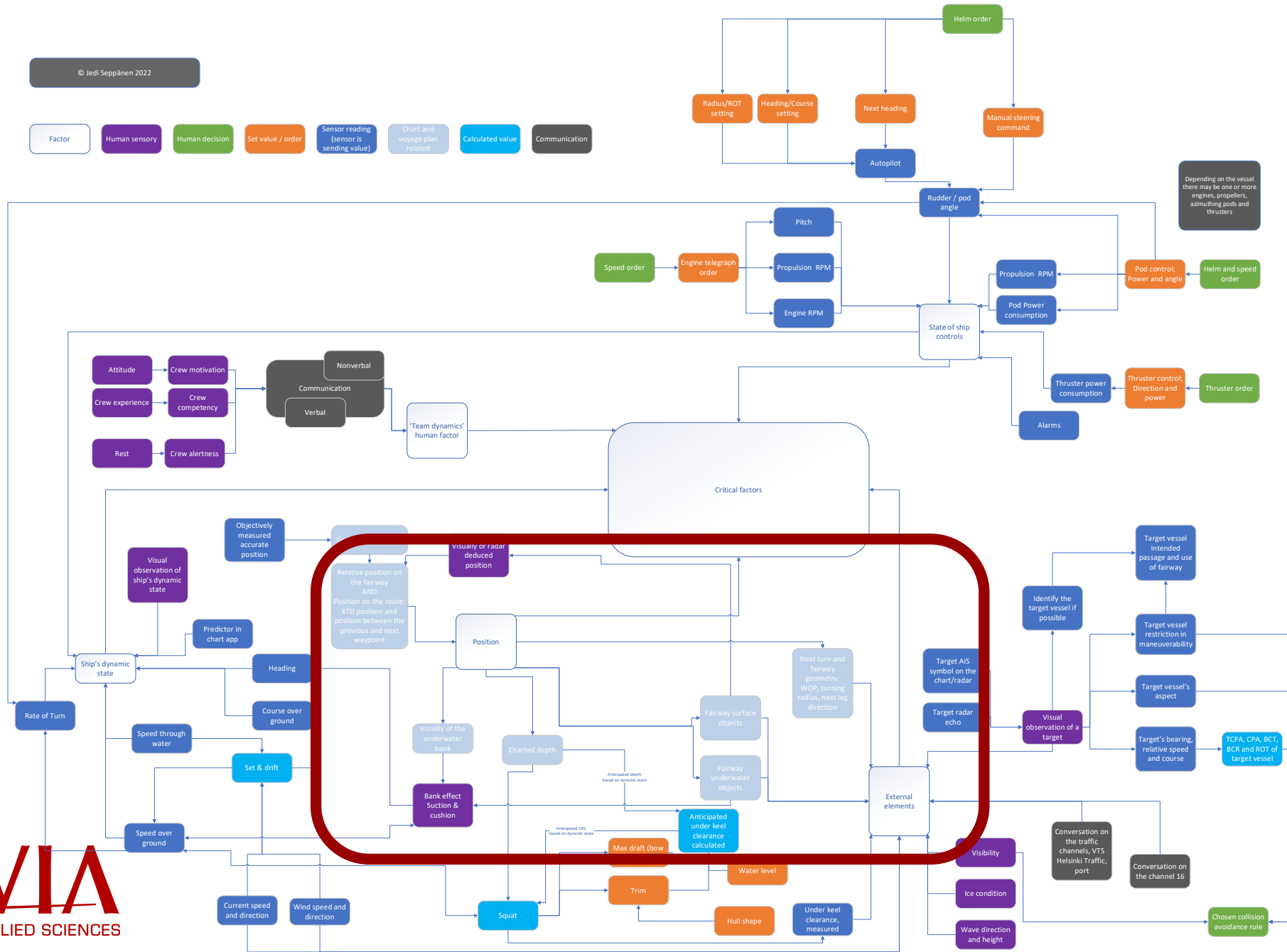
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# Critical ship data in remote pilotage

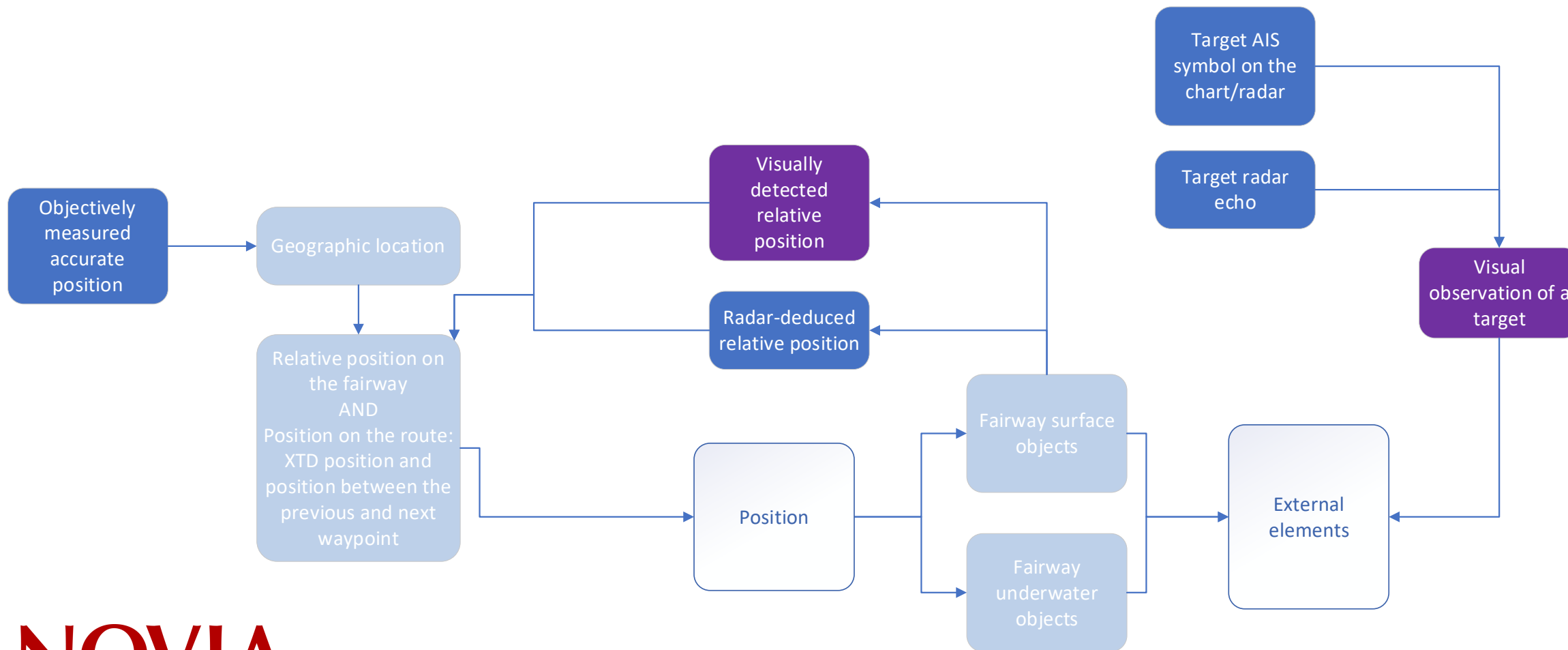
Jedi Seppänen

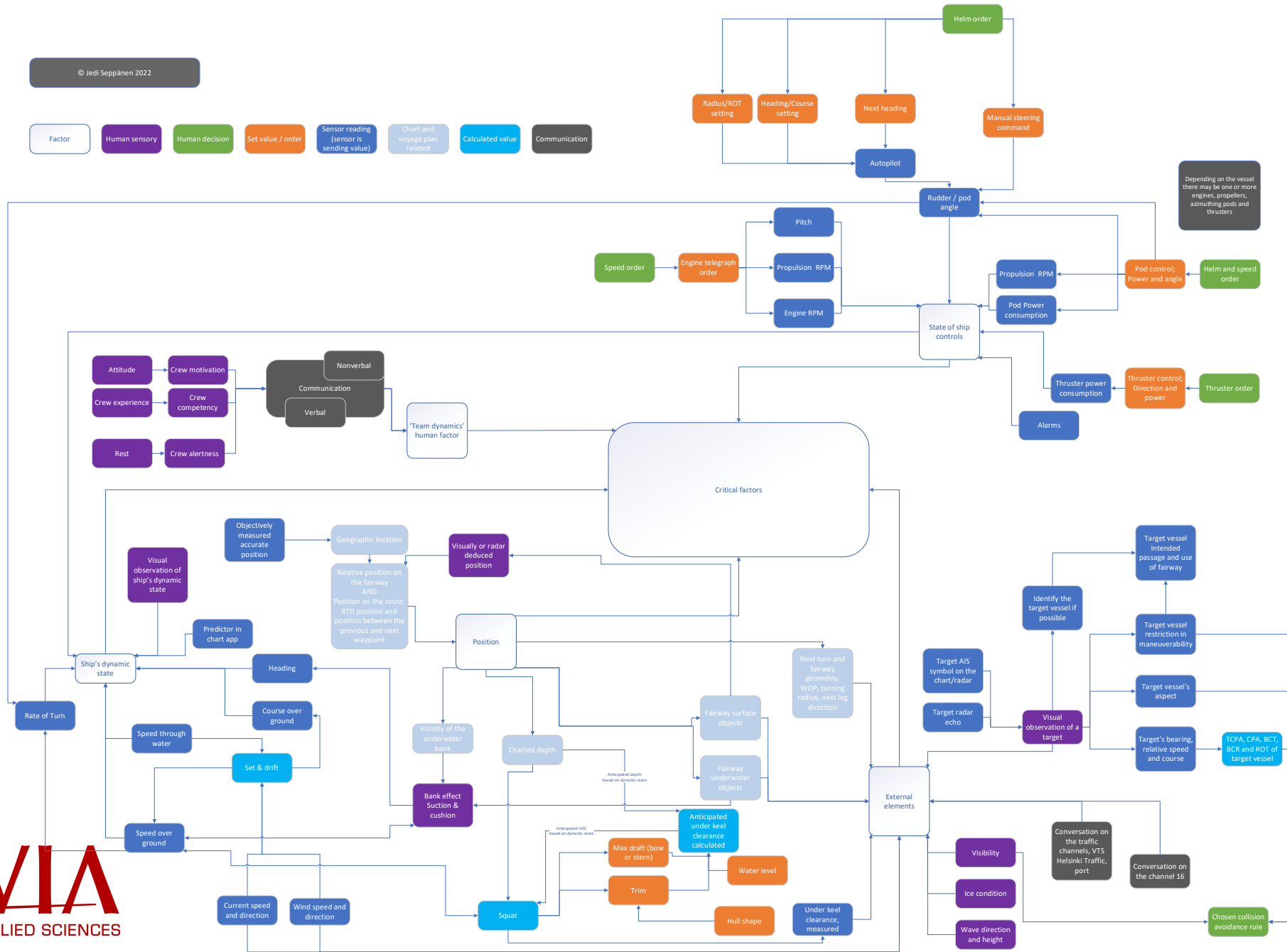
# Five critical factors form situational awareness





# Some components of 'position' and 'external element'





# Takeaway 1

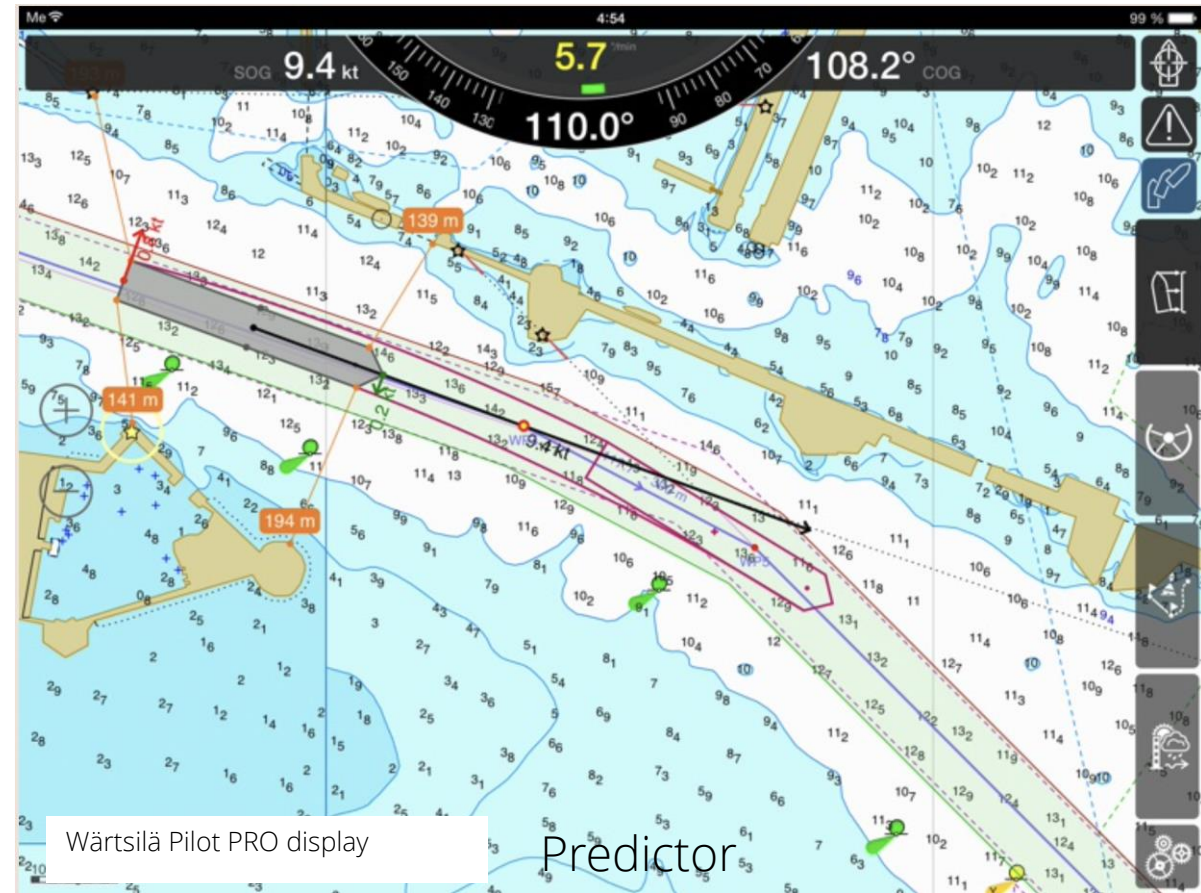
## Positioning

- Position evaluation is challenging
- GPS & AIS vulnerability
- Onboard, there are alternatives
- Electronic navigation is based on GPS positioning

# Takeaways 2

## Dynamic state

- ROT = heading change
  - degrees/min
- Predictor
  - Shows future path
  - Depends on ROT and speed over ground
  - Must be correct to navigate electronically

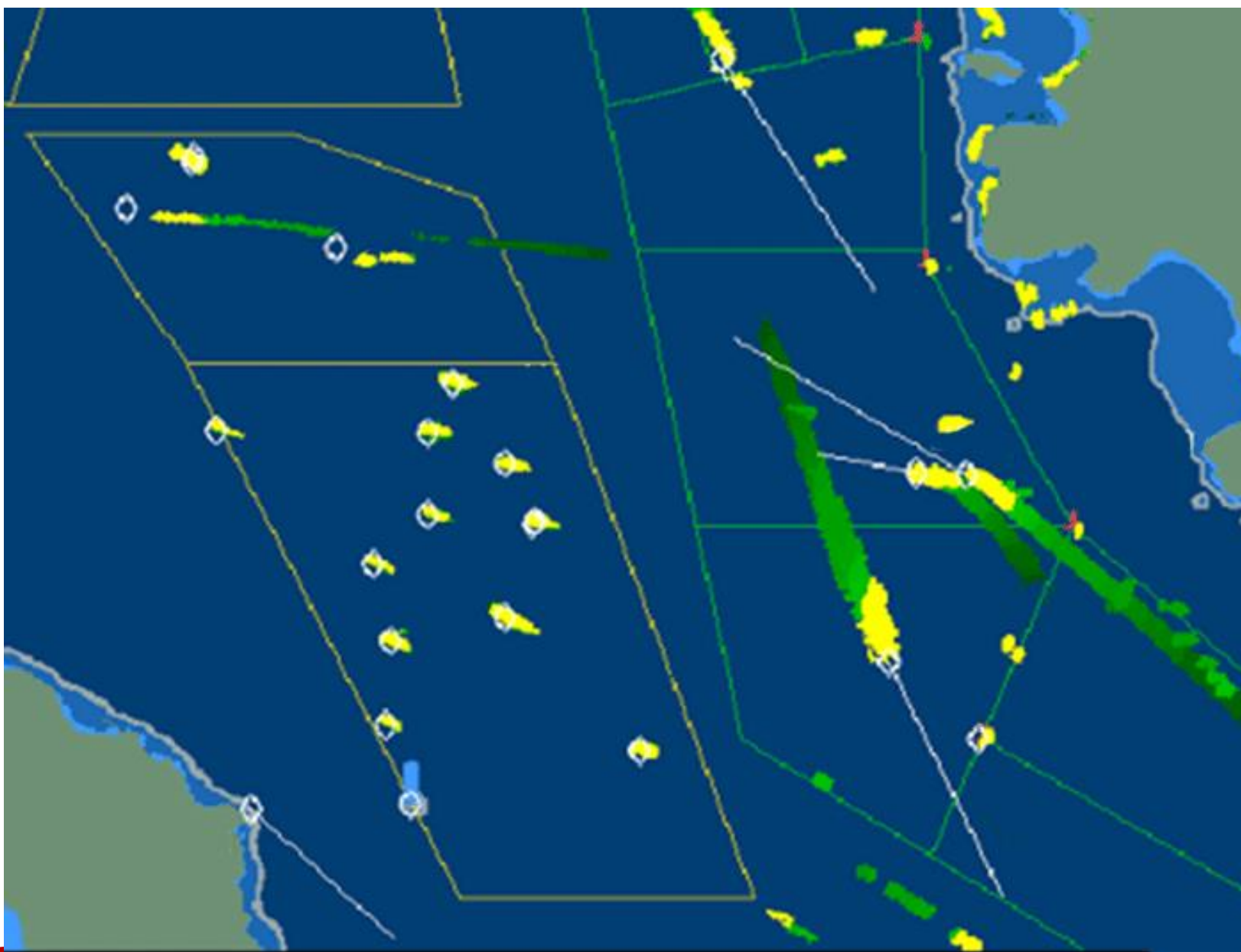


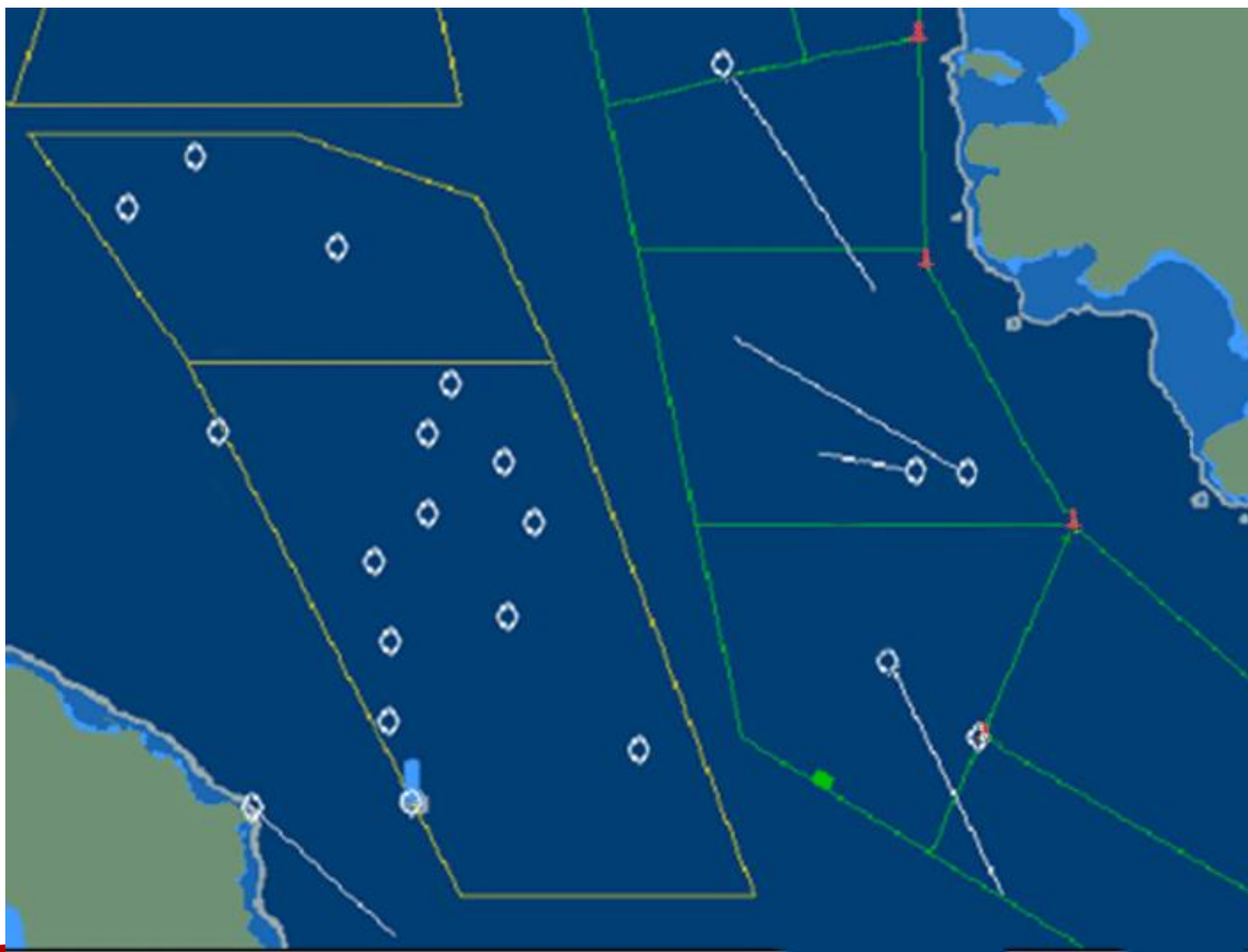


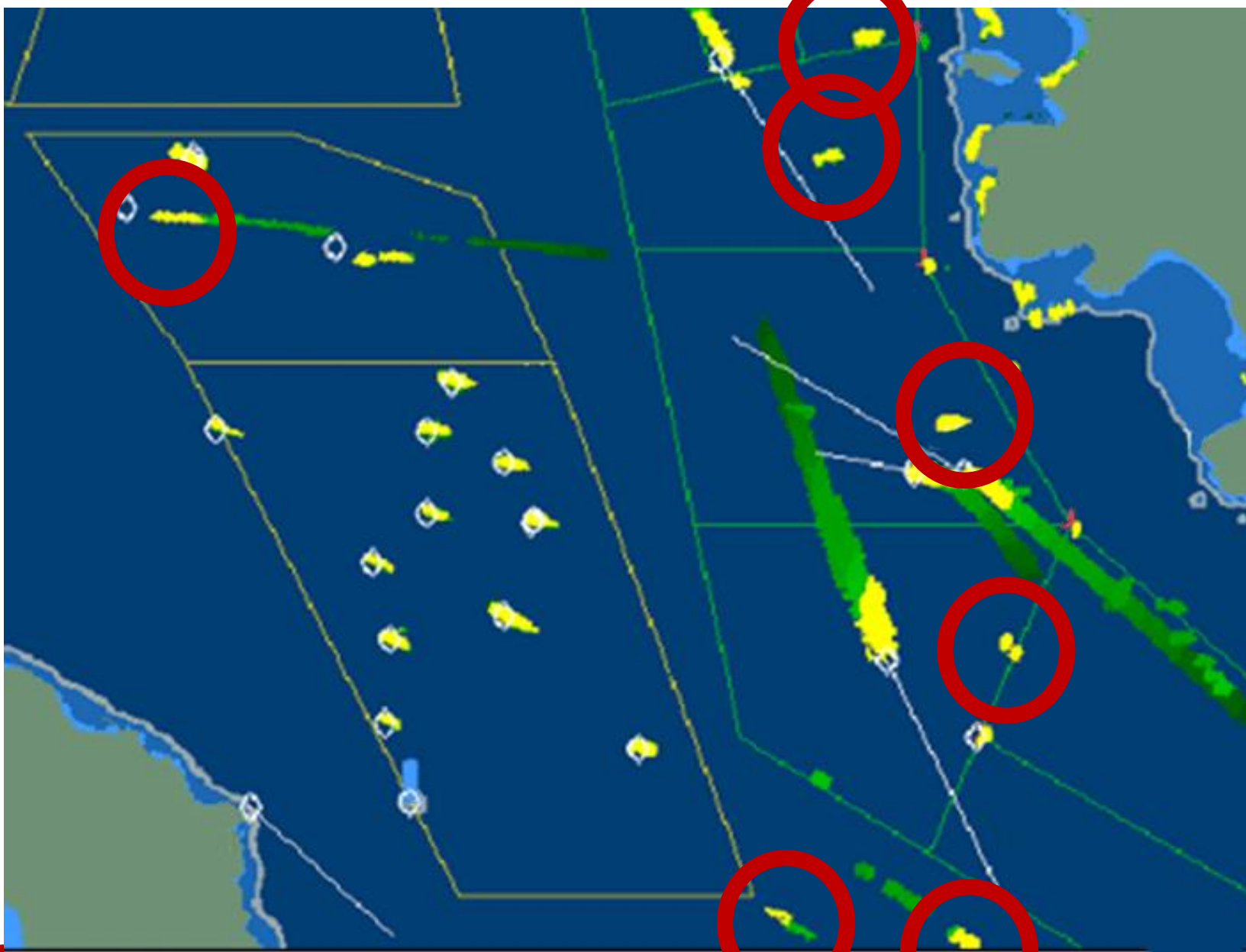
# Takeaway 3

## External elements

- How to detect all traffic?







# Future work for remote pilotage

- Standardizing ship-remote center communication
- Positioning
- Recognizing all traffic

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