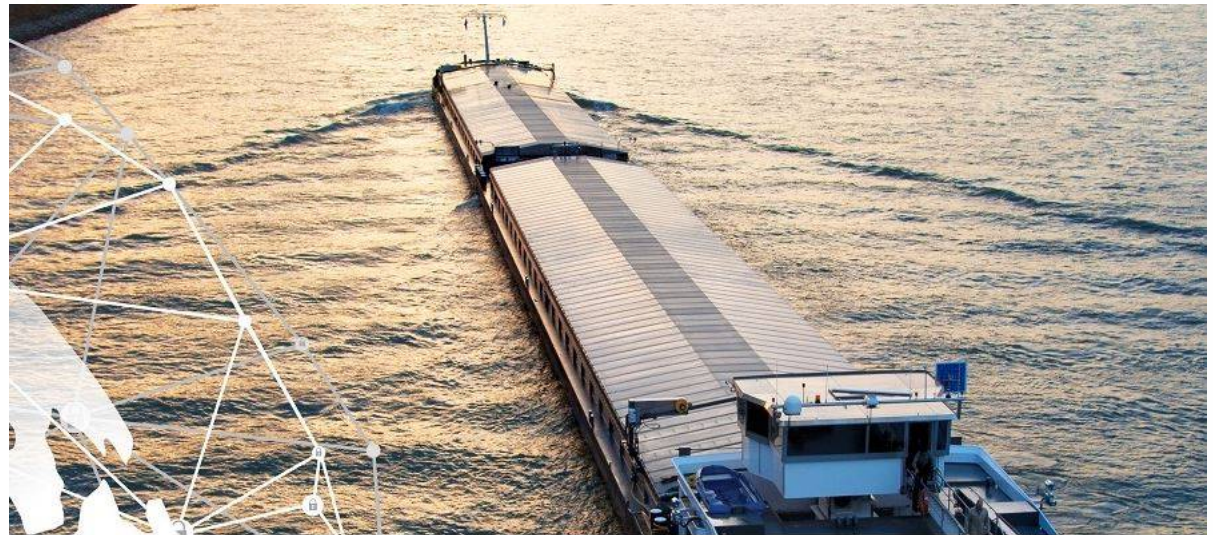


# Cybersecurity onboard ships : state of play and challenges

Workshop on cybersecurity in inland navigation  
Bonn, 5 September 2019



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Ministère de la Transition Écologique et Solidaire

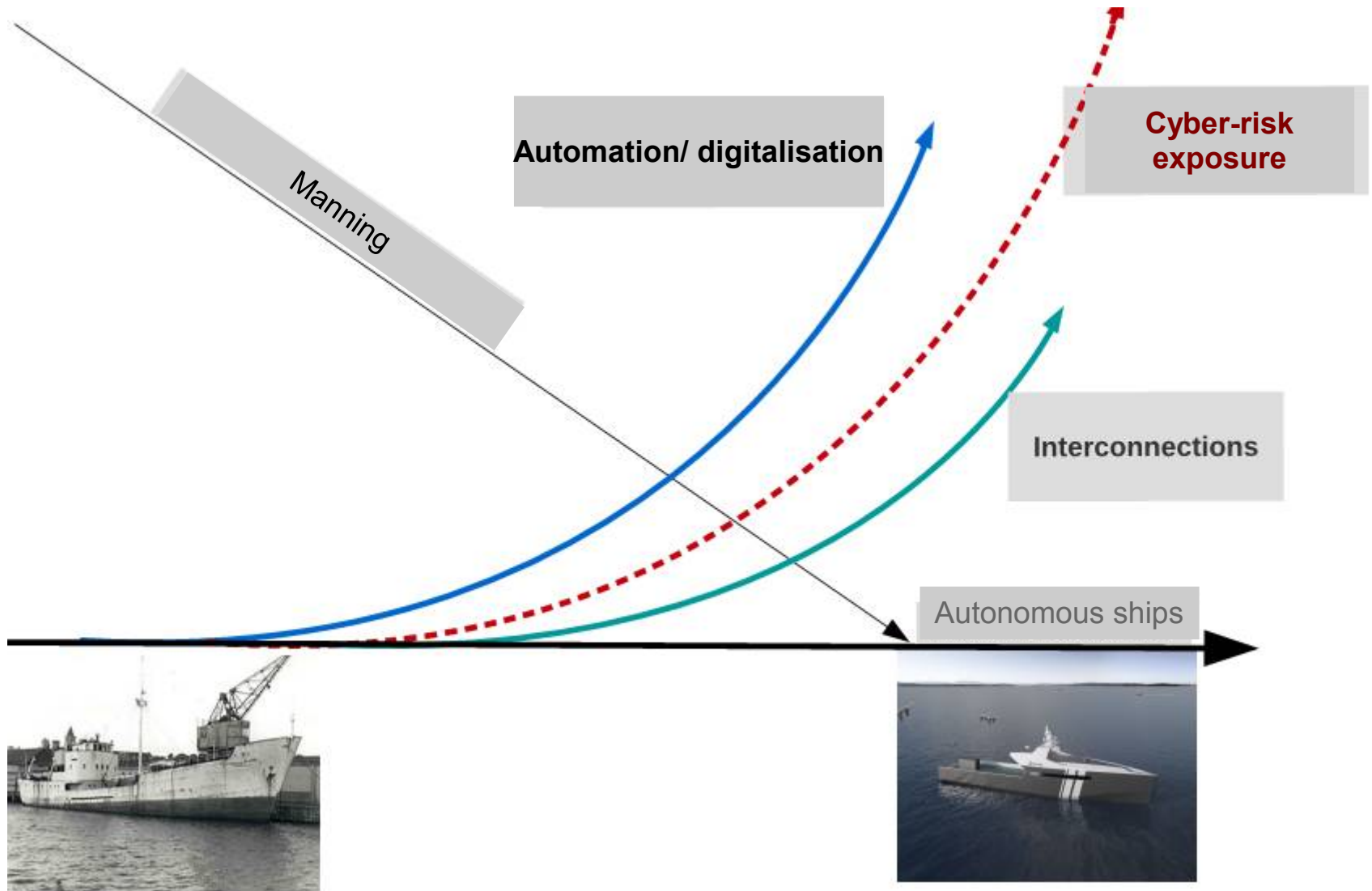
# Cybersecurity onboard ships

## Key issues



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# Overall evolution

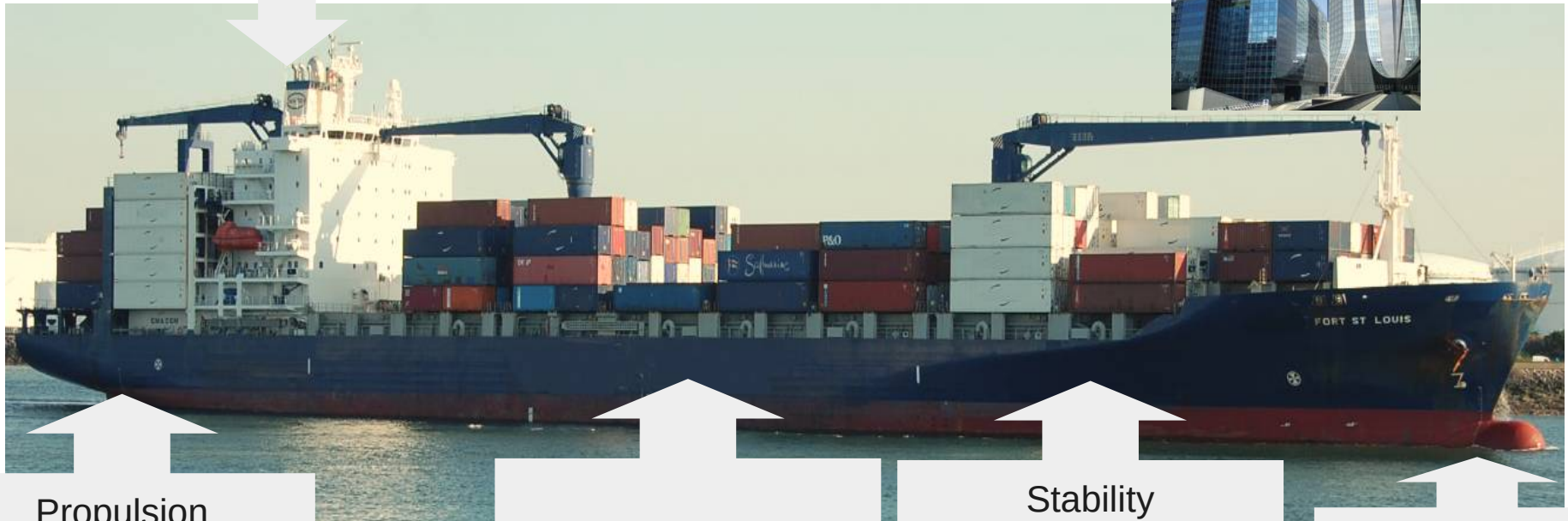


# Key systems at risk

**Bridge systems**  
Navigation, manoeuvre,  
communications

Satellite communications

Onshore-sea communications



Propulsion  
Steering  
Oil, fluids

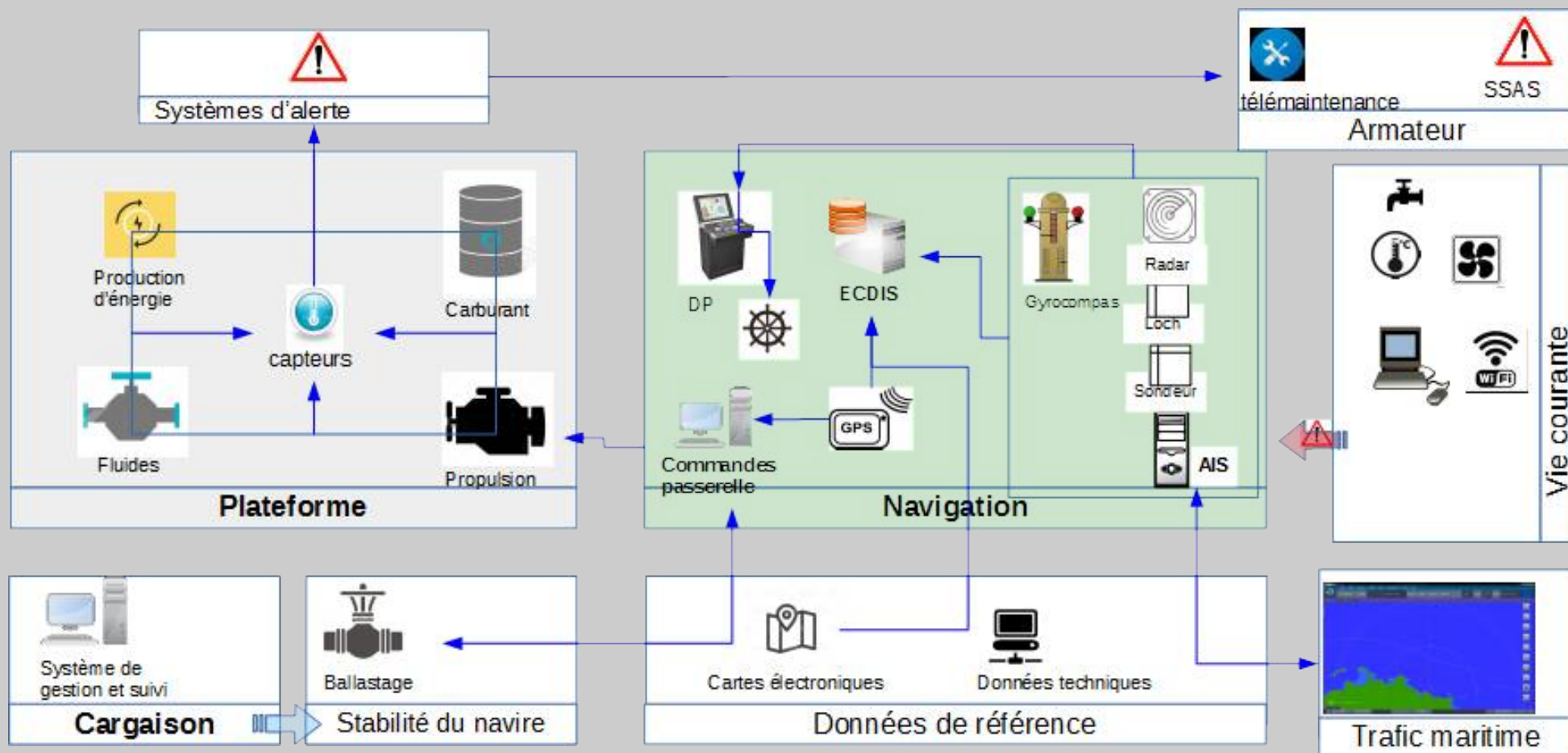
Cargo management

Stability  
Fire detection  
Water ingress alarms

Bow thrust



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# Critical systems



ECDIS



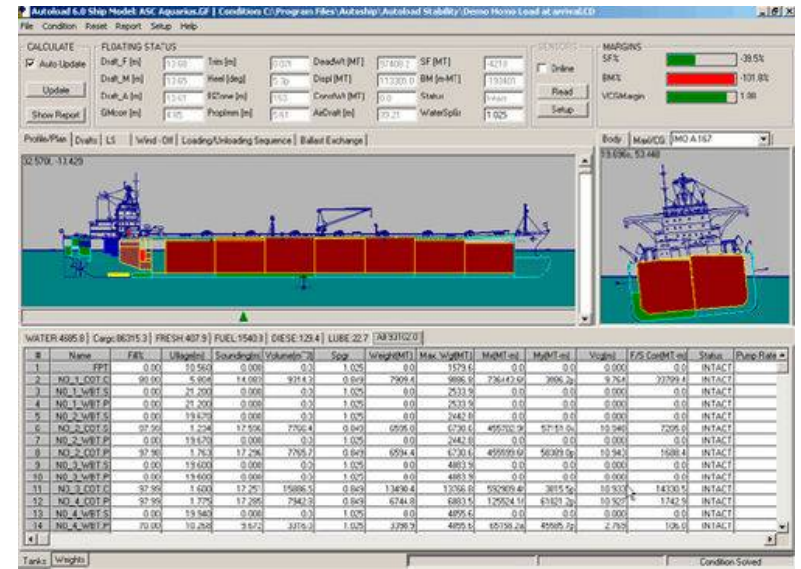
GNSS



AIS



SCADA

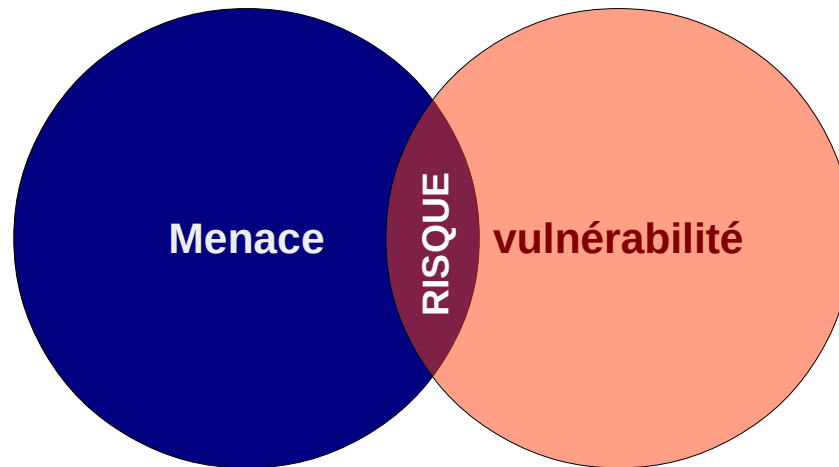
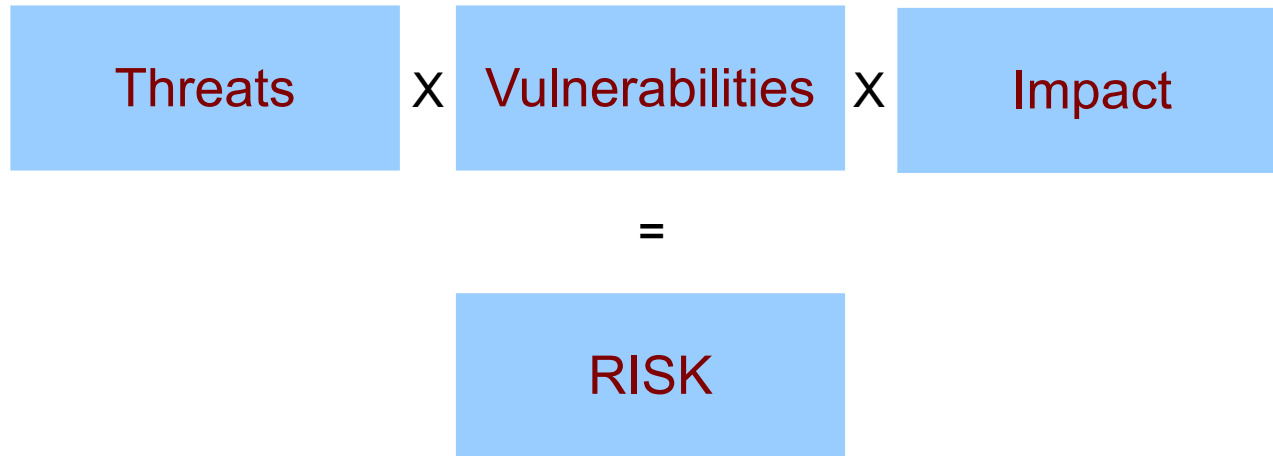


Loading software



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# Risks characteristics



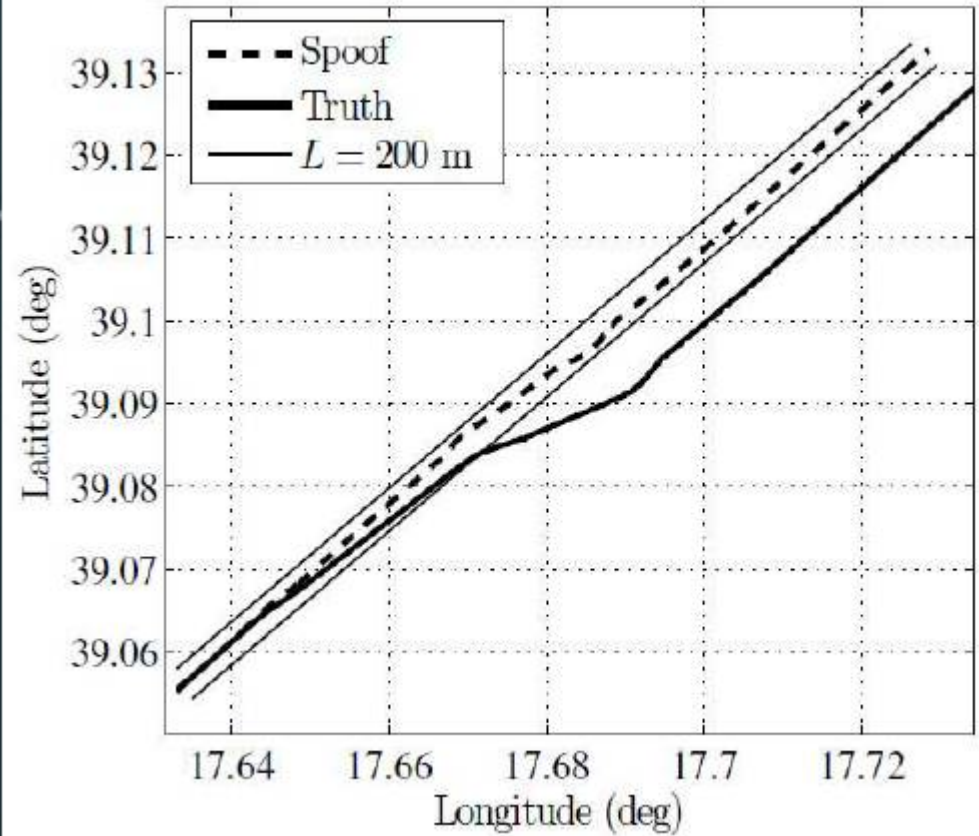
# REAL CASES

- STUXNET, 2009
- MAERSK massive cyberattack of June 2017 (NotPetya ransomware)
- Cyber attacks on ports : Anvers (2011), Barcelona and San Diego
- AIS deception (to circumvent embargos), AIS data use for piracy purposes
- GPS spoofing and jamming in the Black Sea (2017)





# GPS spoofing



Texas University-GPS spoofing of a 213 ft. yacht (2013)

# Vulnerabilities

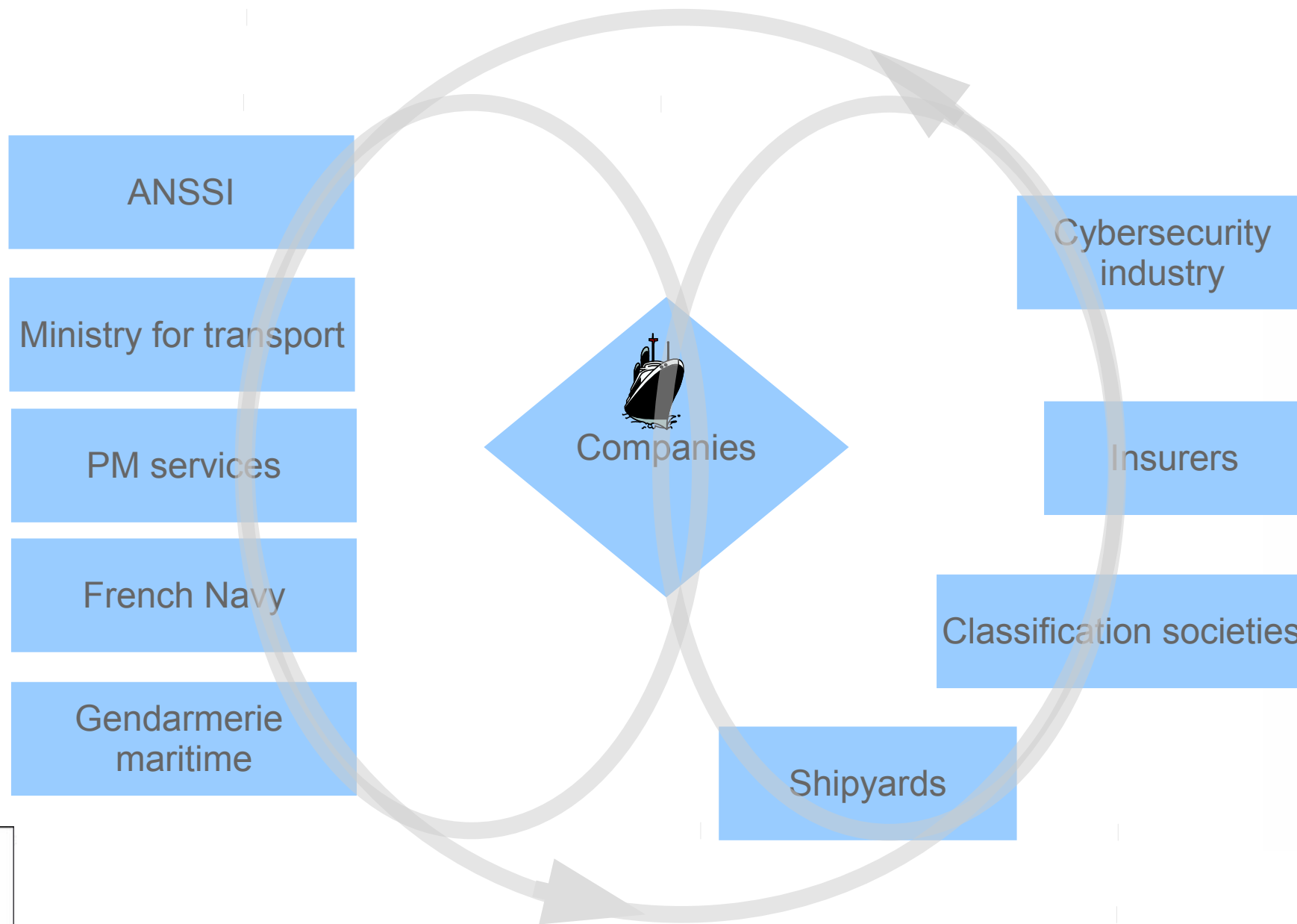
Organisational

Human

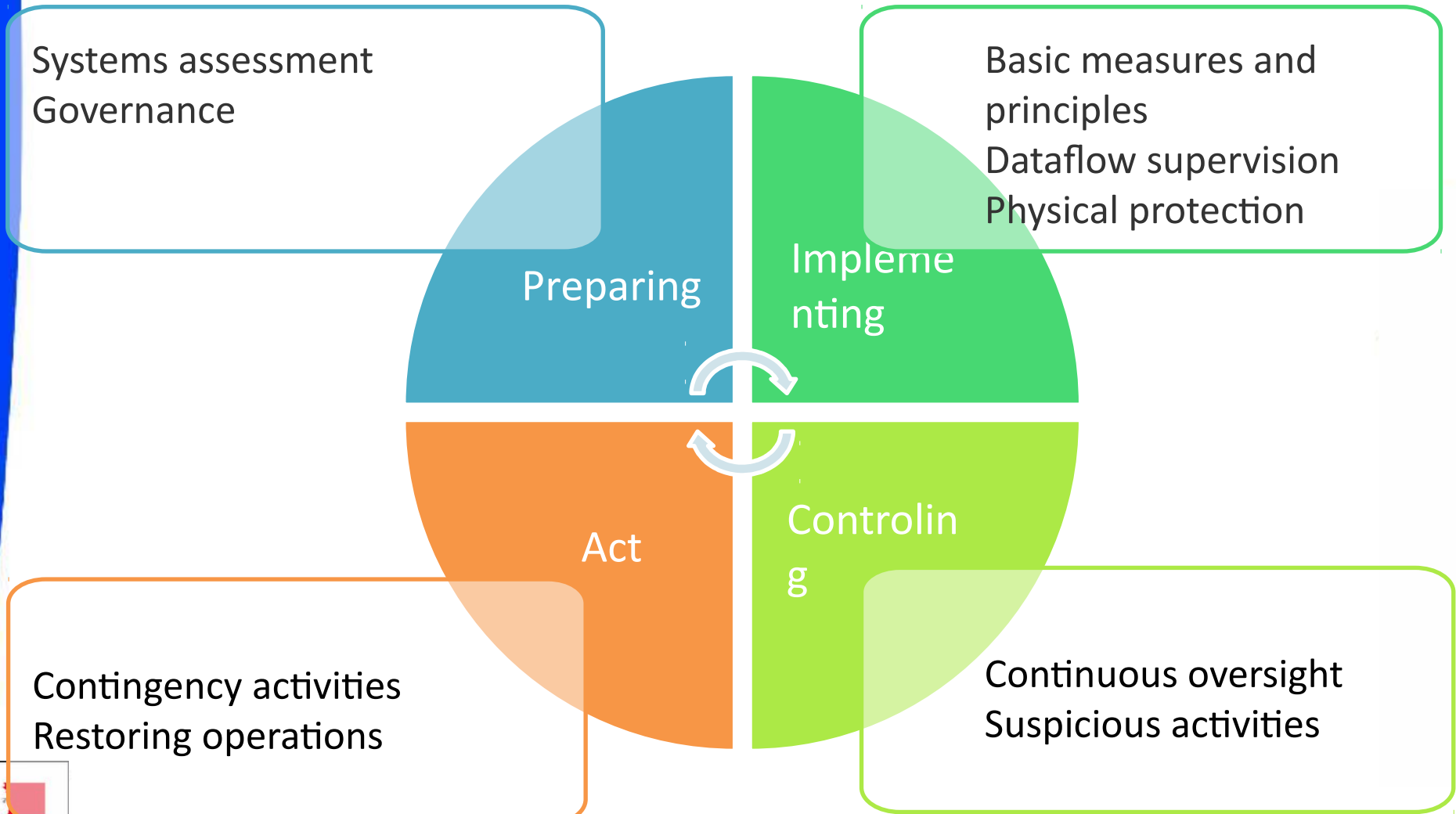
Technical



# Entities involved



# Setting up cybersecurity



# Cybersecurity in France

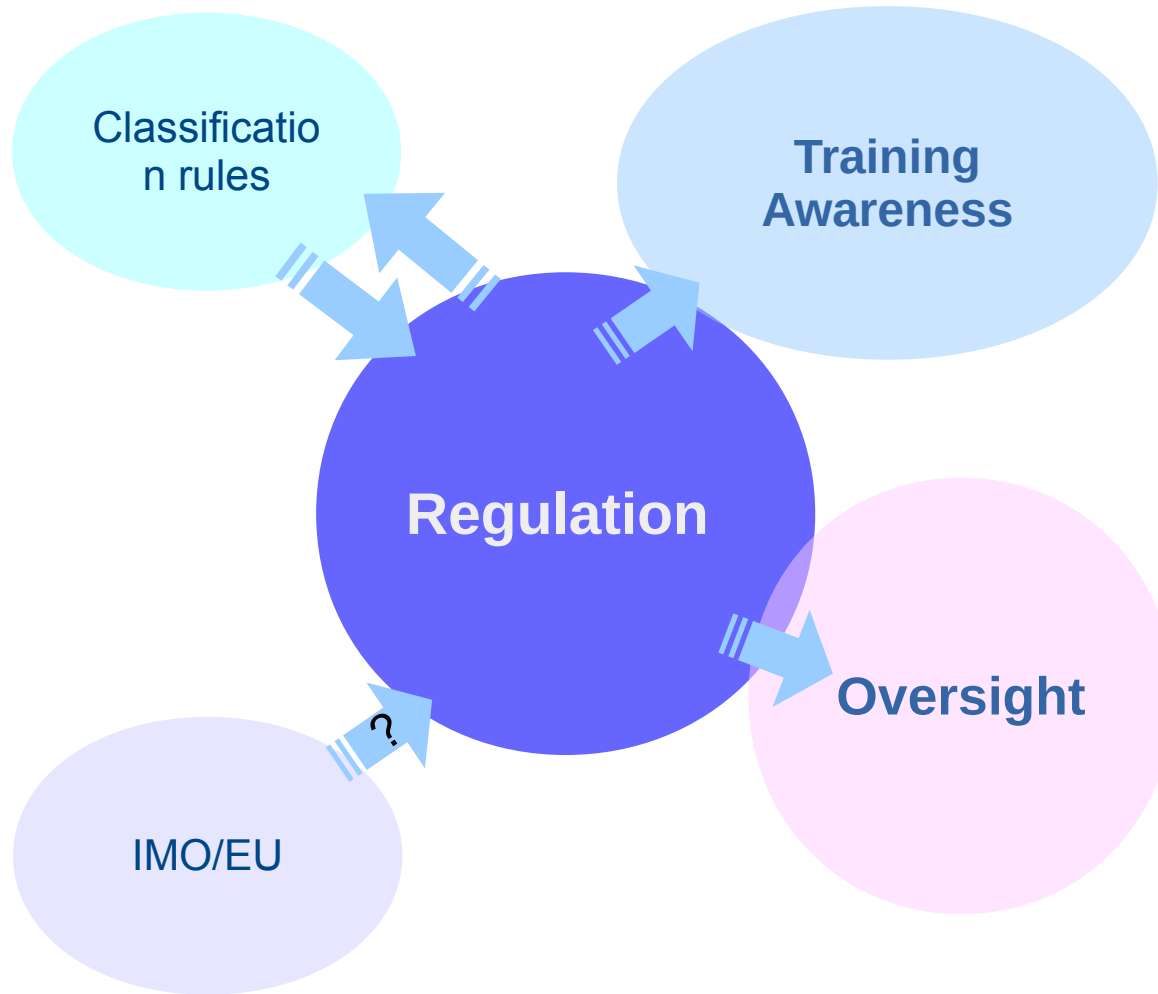
**State of play**

**Current actions**

**Next developments**



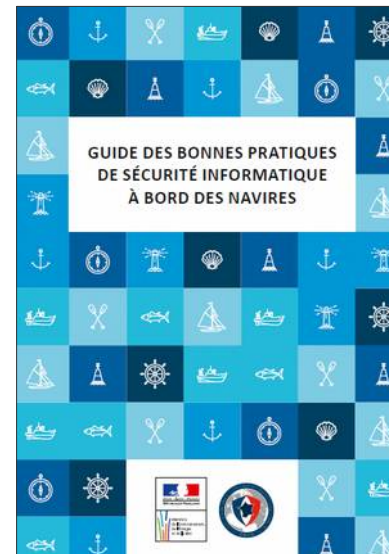
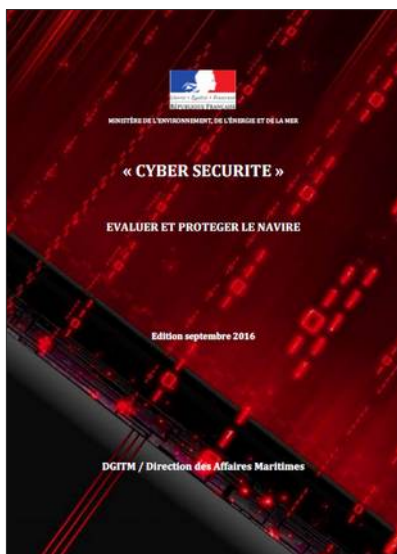
# Issues to address



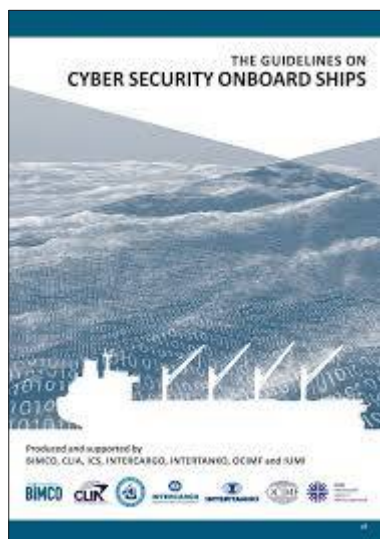
# Conclusions

- The cyber threat on the maritime sector is credible and persistent
- Digitalisation entails growing and emerging risks
- Three pillars :
  - Organisation and management
  - technical solutions tailored to ships' specific needs
  - Vigilance and training
- Room for improvement

# Worth reading



<https://www.ecologique-solidaire.gouv.fr/surete-maritime>



Guidelines on cybersecurity onboard ships

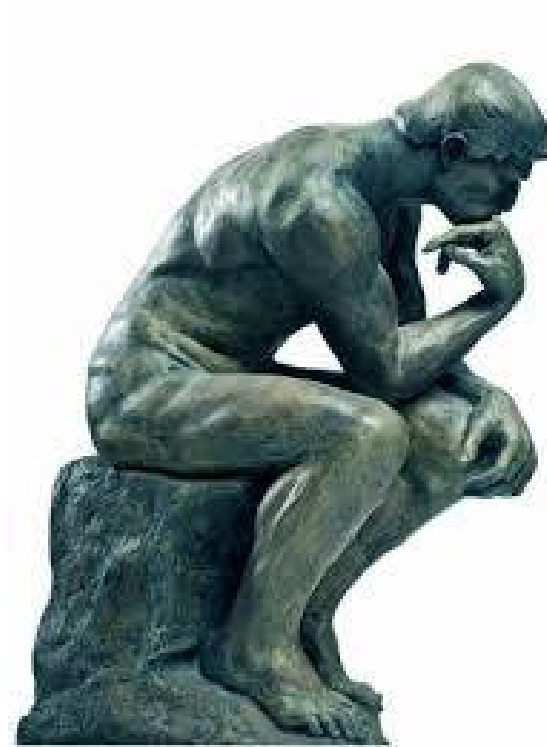


Code of practice:cybersecurity for ships



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Any questions ?...