



# Reaching autonomous control in vessel operation (Conditional Automation Level 3)

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## DANAOS and Research

- ✓ Fleet of 71 container ships
- ✓ Ranking among the top in the Greek shipping business.
- ✓ Strong invest in research and innovation
- ✓ Best-of-breed maritime software
- ✓ Participation in a number of EU projects (40+), funded under different EU research programs, with a strong motivation to apply innovation and creative thinking across all aspects of maritime operation.
- ✓ Member of FRANZ EDELMAN academy and winner of the homonymous award in 2012 (the highest worldwide distinction in applied operation Research).

### Websites:

- <https://danaosrc.com/>
- <https://www.danaosshipping.gr/>
- <https://www.danaos.gr/>

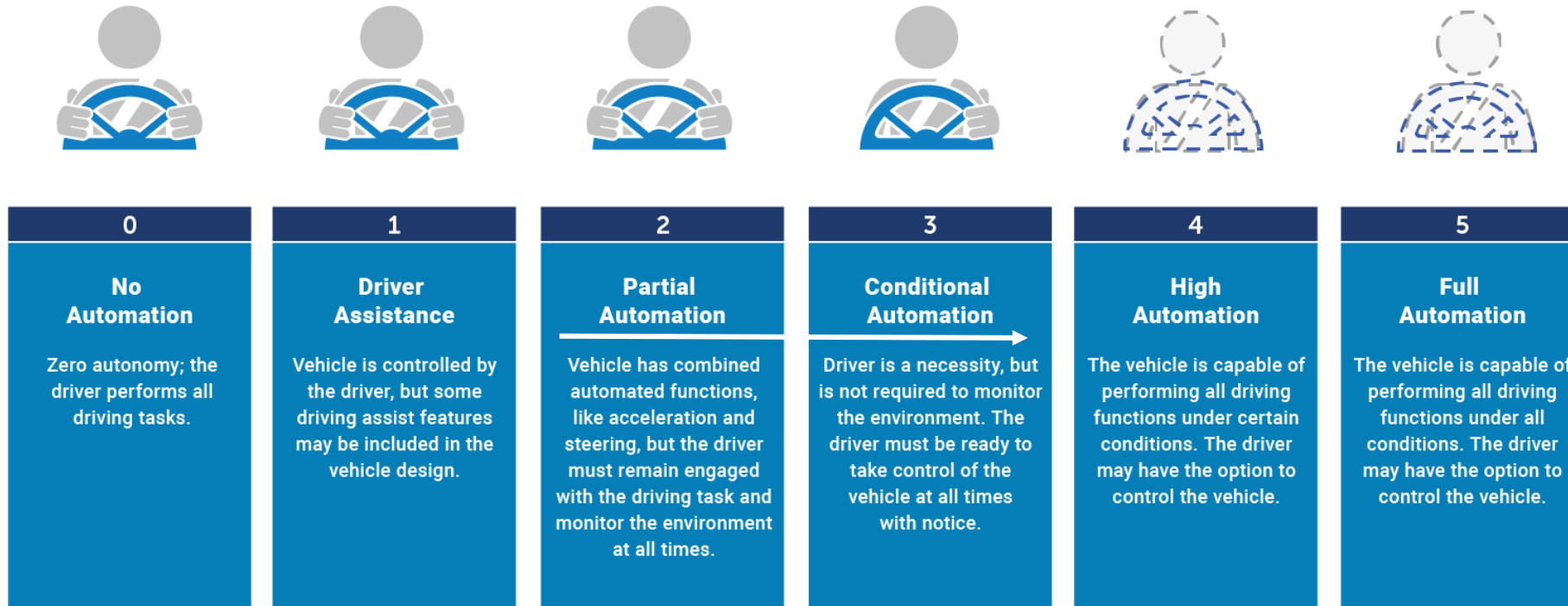
## Running Projects

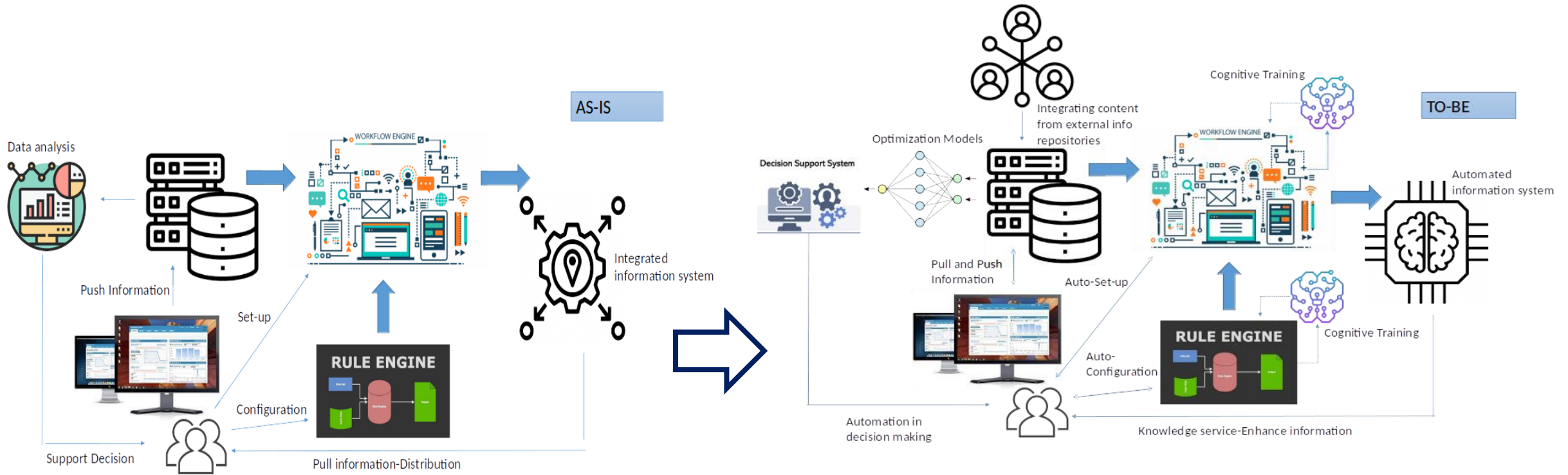




SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

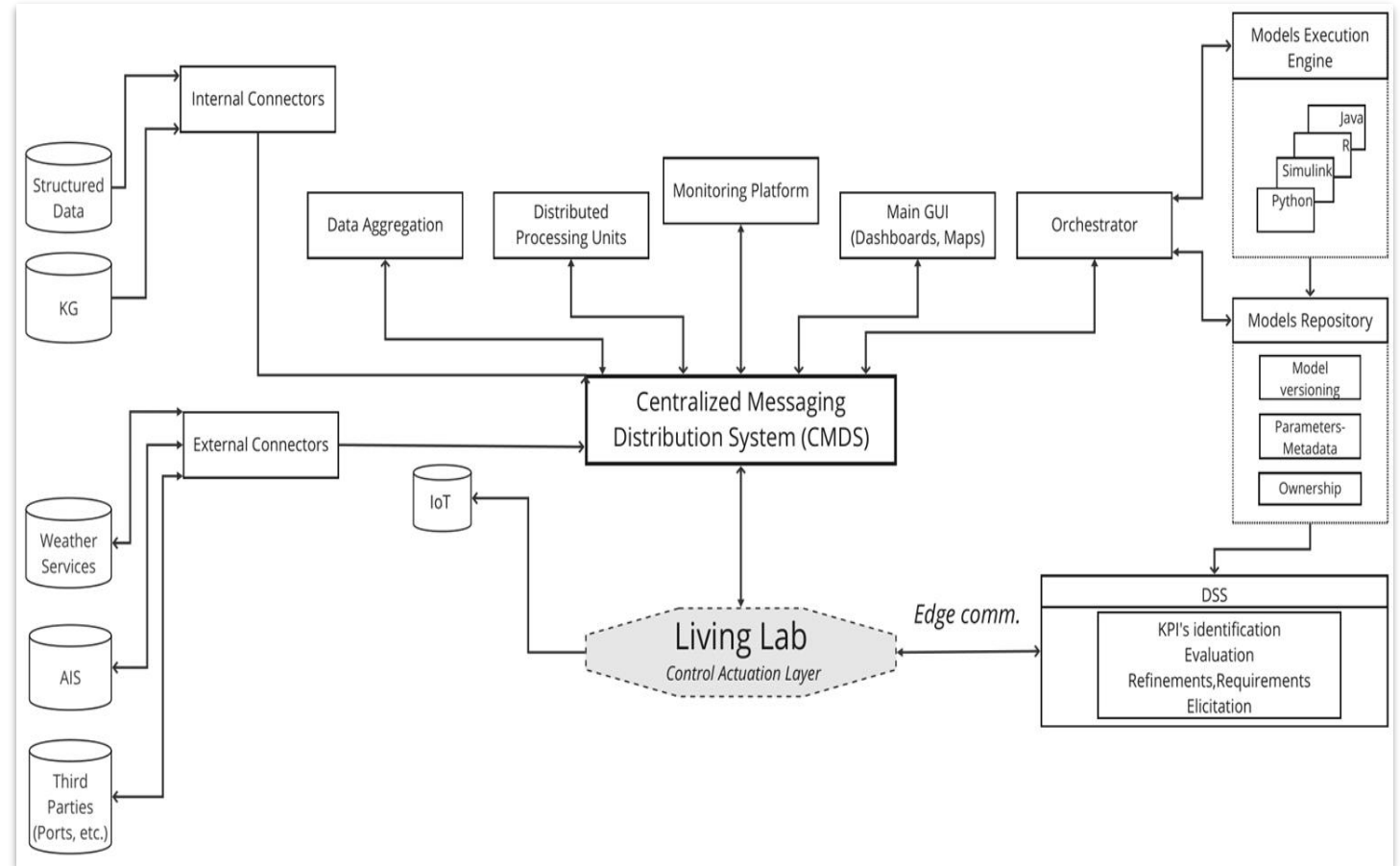
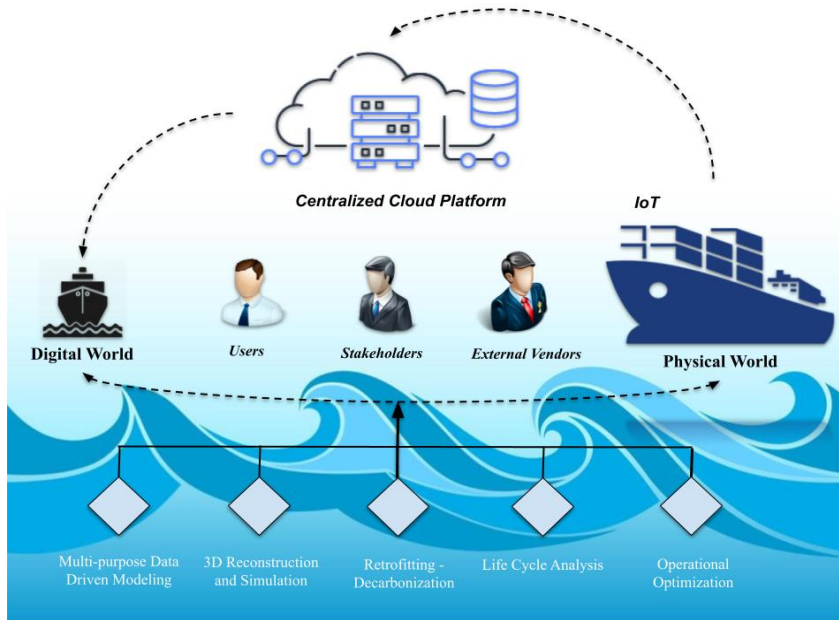
Full Automation



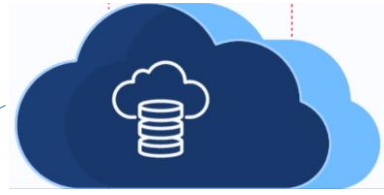
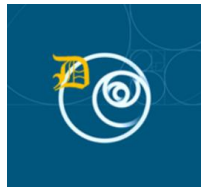


# Autonomy in Information Systems





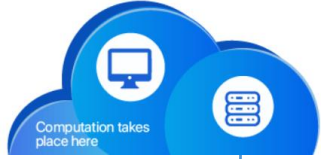
**Forward the Autonomy  
Cognitive DT Framework**



Connector to External information

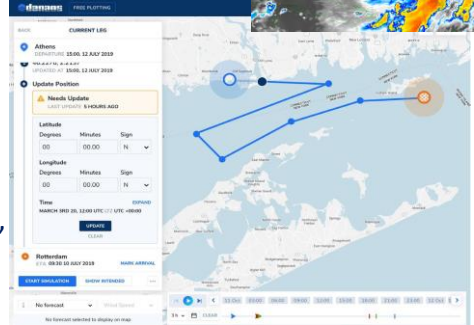


Behavioral modelling in DSS



Computation takes place here

Decision Optimization "at the edge"

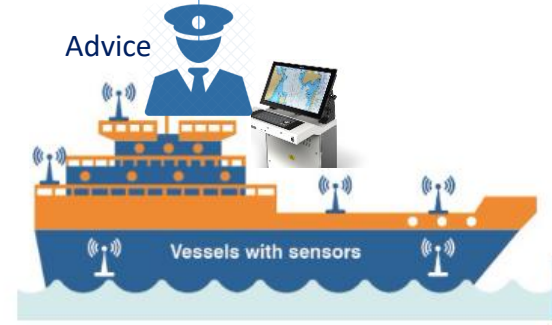


Approve

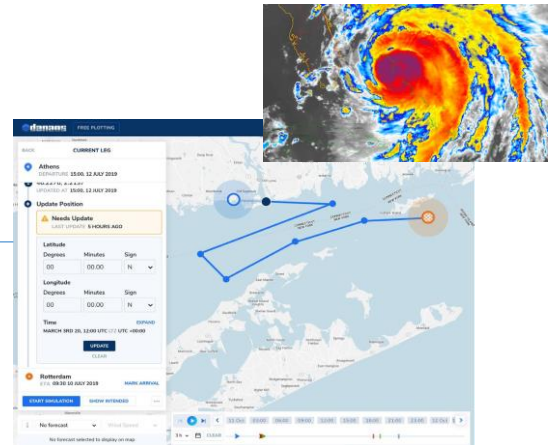


Vessels with sensors

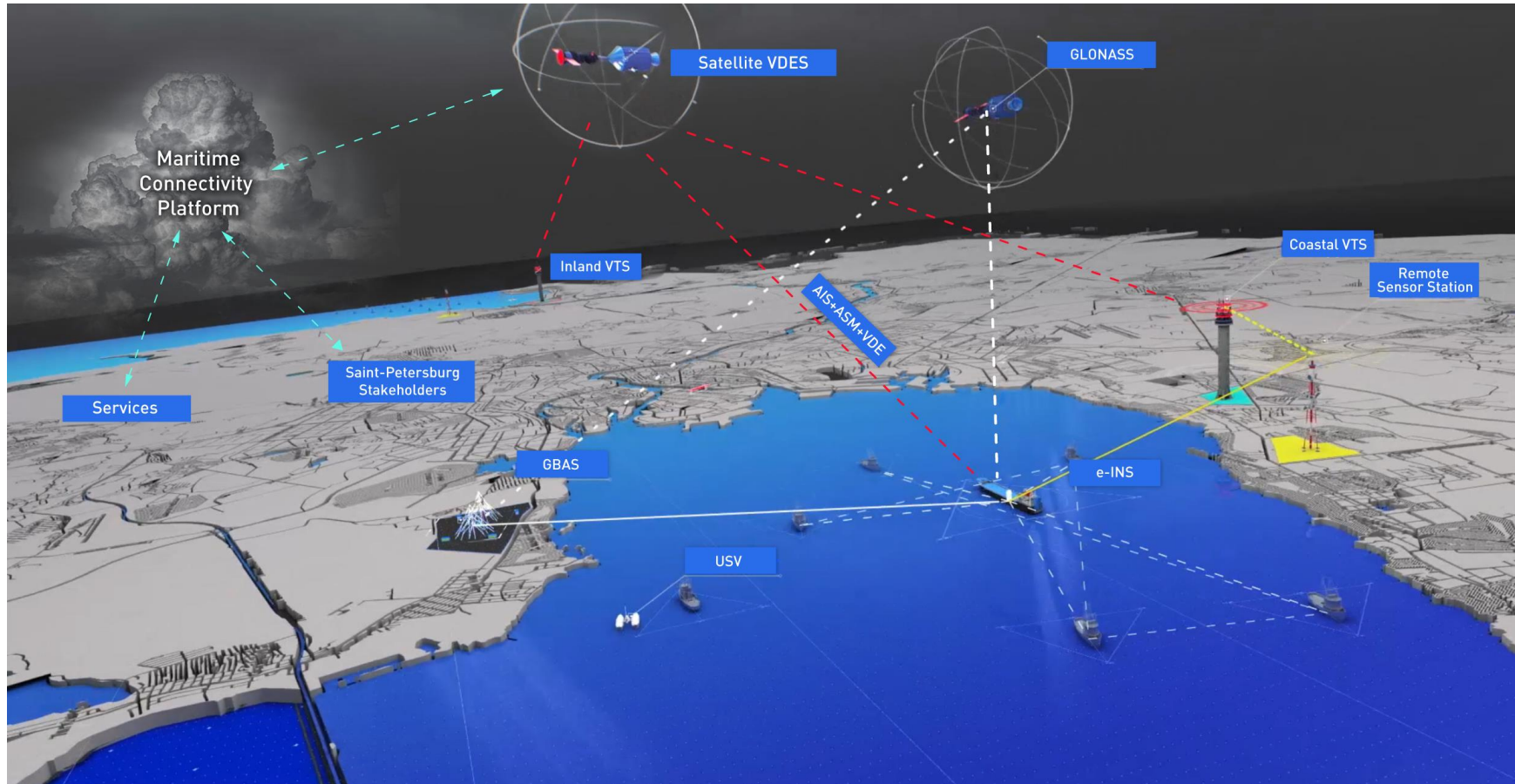
Advice



Vessels with sensors



Vessel "Self-Control": Voyage Optimization "at the edge"



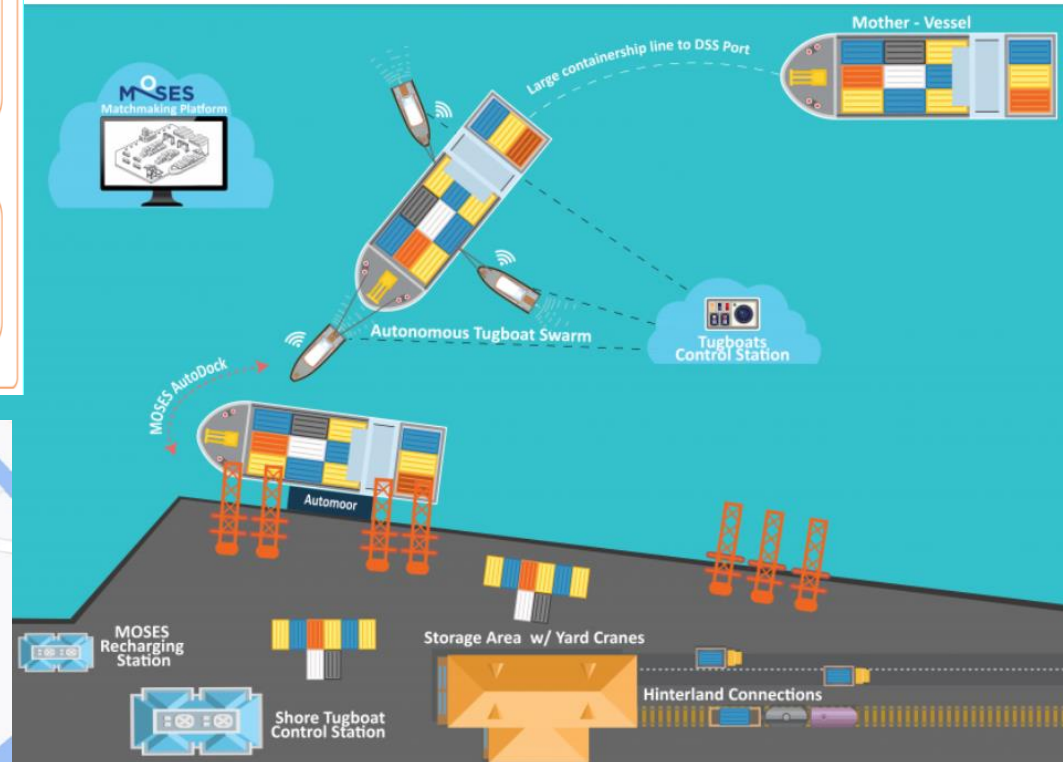
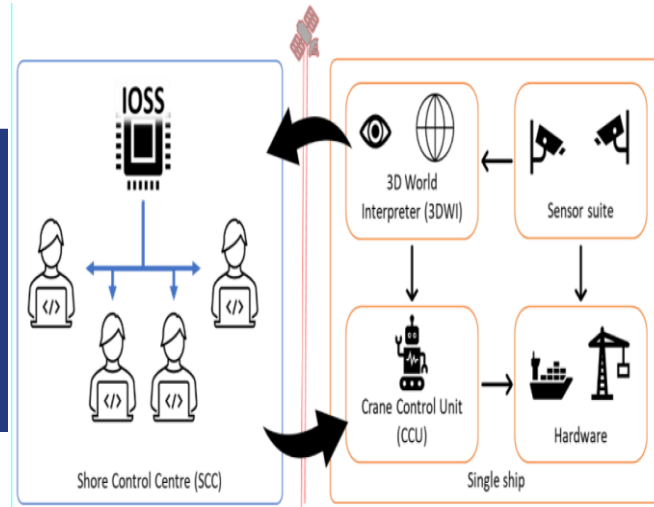
- ✓ Data Sharing Models
- ✓ Move Global traffic control to Shore
- ✓ Enhance global navigational awareness and safety
- ✓ Just-in-Time Arrival

## Network Autonomy Cloud e-Navigation



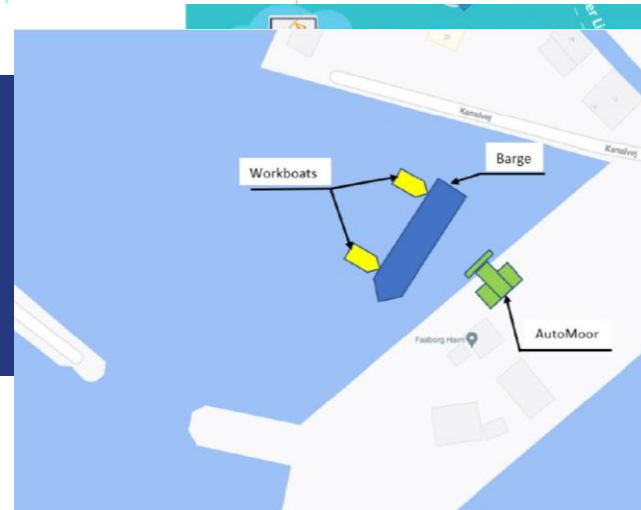
### Robotic container-handling system for feeder vessel

The MOSES robotic container-handling system designed as fully self-supporting system will be capable of safely loading and unloading containers on and from the quay side by side and will be fitted on the MOSES innovative feeder vessel.



### MOSES AutoDock

The MOSES AutoDock will constitute a mega-system consisting of autonomous tugboats that operate as a fully autonomous swarm and collaborate with automated docking infrastructure in order to automate the process of maneuvering, docking and mooring a large containership in a DSS port.



This project has received funding from the European Union's horizon 2020 research and innovation programme under grant agreement No. 861678.

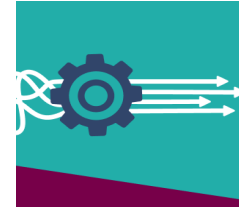




✓ Regulation, liability, claims



✓ Standardization in data sharing and communication protocols



✓ Interoperability and integration between autonomous and non-autonomous components



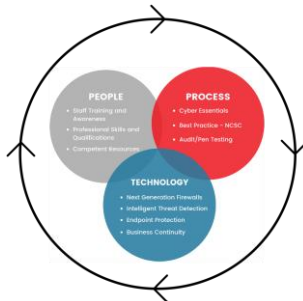
✓ Human Machine Interface



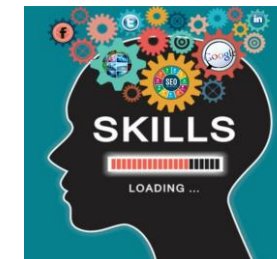
✓ Technology Maturity



✓ Cybersecurity



✓ Enforcement of new skills and competences in shipping



# Challenges



**Any Questions?**



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Danaos Research Center

**Autonomous Ship Reality**

Webinar 09/03/2023