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Autonomous Inland
& Short Sea Shipping

Development of an advanced, efficient and green intermodal system with autonomous inland and short sea shipping - AEGIS

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Abstract

Waterborne transport has a great potential to reduce road congestion and emissions by providing green and efficient transport solutions as key elements for sustainable growth. A major objective is to transfer more than 75% of road transport to rail or waterway until 2050 [1]. To achieve this objective, AEGIS will develop a new waterborne transport system for Europe which includes autonomous ships and shore support, as well as autonomous port infrastructure, and decrease administrative burdens by applying digital information exchange in the whole supply chain.

Figure 1 AEGIS use cases (left [2]) and use case A area of Tondheimfjord (right)

The AEGIS concepts are based on autonomous short sea shipping as well as inland shipping and hinterland transportation solutions. A key objective in the project is to meet the goals for reducing greenhouse gas emissions set by European Union [3] and IMO [4]. This includes design of new autonomous ship types powered by low or zero emission propulsion systems and on-board cargo handling systems as well as automated ports and transhipment systems. An international consortium will develop and design possible solutions based on three selected use cases (see Figure 1) for short sea and inland waterway transportation in North and West Europe.

The AEGIS use cases represent typical short sea transportation that needs to be linked efficient to local distribution systems, like hinterland transportation via fjord or inland waterways. An innovative system using a mother daughter vessel concept (see Figure 2), linking coastal container ships from Rotterdam with loading capacity of about 200 TEU to rural and urban destinations within the Trondheim Fjord will be developed in case A. The approach is to use smaller shuttle designs with about 20-50 TEU capacity to distribute cargo to terminals within the region

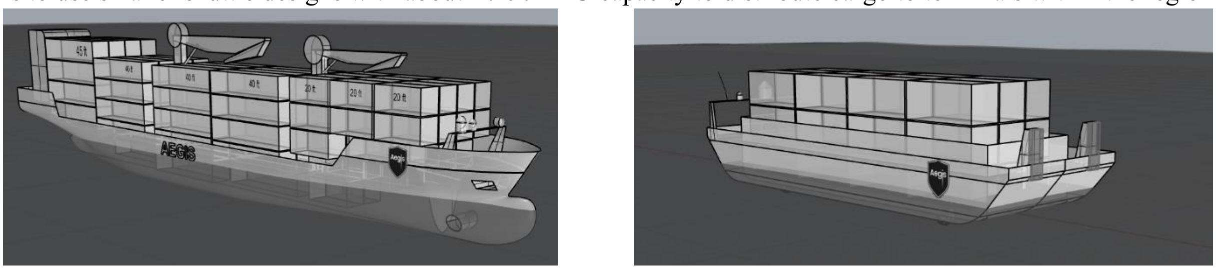

Figure 2 Vessel concept use case A: Mother vessel (left) and Daughter vessel (right)

and therefore increase the flexibility and resilience of the system. Those smaller and autonomous operating ships can decongest roads, reduce pollution from noise and dust, while operating on batteries or other non-carbon fuels. Another approach is to use unmanned and self-propelled barges with modular design for different cargo like 45' containers used by the aqua industry or general/bulk cargo as examples. In Case B new solutions for waterborne hinterland transportation in the area of Rotterdam, Zeebrugge and Antwerp will be designed. The objective is to bring cargo as close to the end destination as possible with smaller zero emission RoRo vessels utilizing the benefits of more automation in the developed concepts. The considered area restricts the development of different vessels due to the waterway/canal measurements leading to designs comparable to CEMT (European Conference of Ministers of Transport) class II and IV. Case C will demonstrate how existing ports can use autonomous systems to facilitate the transfer of cargo from trucks and increase their shifted cargo. Therefore, vessels with capacity about 120-150 TEU and on-board handling systems will be designed.

To be competitive with road transport all three use cases need to increase efficiency with a high degree of automation corresponding with new and smaller ship types to reduce costs and secure higher frequency by feeders and provide multimodal green logistics solutions combining short-sea shipping with rail and road transport.

Literature

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