SEAMLESS

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Navigating the Future: SEAMLESS and the Next Autonomous and Smart Shipping Frontier

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Achieving sustainable transport in supply chains is often hindered by the balance between performance expectations and available resources, including delays due to congested land infrastructures and the inability of supporting infrastructure to serve increasing freight flows. SEAMLESS is a Horizon Europe R&I project which unites 26 partners from 12 countries to address this challenge by leveraging the state of the art of autonomous and smart shipping and port operations, advancing technologies and redesigning the logistics system.

The development of autonomous shipping is still in its initial stages, but there have been some notable advancements in recent years and the industry is taking momentum. Several companies, including Wartsila, DNV GL, Kongsberg Maritime AS (which has merged with Rolls-Royce Commercial Marine as of 2018) are investing in the development of autonomous ships.

As the industry thrives and the first demonstrations at relevant scale take place (as most recently happened in the AUTOSHIP project) it becomes clear that the lack of infrastructure for highly automated and autonomous ships poses a significant challenge for the realization of autonomous shipping.

One crucial aspect is the absence of adequate communication and navigation systems that can support autonomous ship operations. Highly automated ships and ports are expected to address efficiency, environmental performance, and safety challenges while promoting supply chain integration and modal shift to waterborne transport. Besides, to make autonomy and automation a reality, the business side must be included, requiring a comprehensive solution along the value-chain.

It is here that the SEAMLESS project comes into the game, to complement and exploit the advancements made in three EU-funded autonomous shipping-related projects, namely MOSES and AEGIS, related to smart ports and automated cargo handling onboard and ashore, and AUTOSHIP, bringing to TRL 7 autonomous vessels and their Remote Control Centers.

The project aims to develop a fully automated, cost-effective, and economically viable **waterborne freight service for Short Sea Shipping and Inland Waterways Transport. With 24/7 operations and human oversight from RCCs**, the project prioritizes safety, efficiency, resilience, and environmental sustainability in autonomous operations.

By facilitating seamless freight flows, SEAMLESS **overcomes congestion and supports resilient logistics. A digital "bird's eye" view** of the supply chain enables **real-time planning optimization and reconfiguration**. The project will conduct full-scale demonstrations **in real-world scenarios**, combining **physical and digital assets** developed in the project. It will also demonstrate the transferability of its solutions in selected use cases across different regions in Europe.

Finally, SEAMLESS is dedicated to **developing novel business models** and overcoming regulatory challenges in autonomous vessel operations. The aim is to **identify gaps and challenges in the current regulatory framework** related to autonomous vessel operation and provide **recommendations for policymakers** to ensure the smooth and safe deployment of fully automated services in the waterborne freight industry.

CiaoTech – part of the PNO Group - has a broad knowledge of the trends and innovation related to autonomy and smart logistics. In SEAMLESS we will further expand on previous results to assess the business replication potential, and lead the Cost Benefit Analysis, also using our own advanced IT tools and methodologies. ●