

Waterborne Platooning: Cost and Logistic Analysis of Vessel Trains

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Abstract : Recent years have seen extensive technological advancement in truck platooning, as reflected in the literature. Its main benefits are the improvement of traffic stability and the reduction of air drag, resulting in less fuel consumption, in comparison to using individual trucks. Platooning is now being adapted to the waterborne transport sector in the NOVIMAR project through the development of a Vessel Train (VT) concept. The main focus of VT's, as opposed to the truck platoons, is the decrease in manning on board, ultimately working towards autonomous vessel operations. This crew reduction can prove to be an important selling point in achieving economic competitiveness of the waterborne approach when compared to alternative modes of transport. This paper discusses the expected benefits and drawbacks of the VT concept, in terms of the technical logistic performance and generalized costs. More specifically, VT's can provide flexibility in destination choices for shippers but also add complexity when performing special manoeuvres in VT formation. In order to quantify the cost and performances, a model is developed and simulations are carried out for various case studies. These compare the application of VT's in the short sea and inland water transport, with specific sailing regimes and technologies installed on board to allow different levels of autonomy. The results enable the identification of the most important boundary conditions for the successful operation of the waterborne platooning concept. These findings serve as a framework for future business applications of the VT.

Keywords : autonomous vessels, NOVIMAR, vessel trains, waterborne platooning

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