

NOVIMAR Vessel Train Full-Scale Trial: Results and Conclusions

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Abstract

The European research project NOVIMAR aims at developing vessel trains for inland and short-sea shipping. A vessel train consists of a fully-manned leader vessel which is automatically followed by a number of follower vessels at controlled distances. In road transportation this concept is known as platooning. The NOVIMAR project is taking a wholistic approach by covering many different aspects such as business models, technical developments, legal implications etc.

In March 2021 the technical developments of NOVIMAR were presented during a two-day full-scale trial. The 135m container vessel Oxford served as leader vessel while the 135m passenger vessel Viva Moments was used as follower vessel. Both vessels were equipped with communication devices in order to exchange data at sufficient data rates while focusing on reliable connectivity. The existing control and sensor equipment onboard of the vessels was extended into the so-called NOVIMAR vessel train command and control system. During the trial procedures to couple and decouple the vessel train were demonstrated. Numerous scenarios consisting of different navigational tasks were also performed and successfully presented.



Figure 1 Viva Moments automatically following leader vessel Oxford

This contribution first introduces the technical systems described above which were installed on board of the demonstrator vessels. The performance of the communication link between the two vessels during the sea trial is presented. The control system of the vessel train is based on existing products for automatic track-keeping as well as speed control. The integration of these systems and the adaption to NOVIMAR is explained. The performance of the control system during the trial is evaluated based on the following scenarios:

- Sailing in automatic guidance mode
- Sailing in assisted guidance mode
- Demonstrating safety contours
- Varying lateral offsets
- Varying distance setpoints between leader and follower



- Passing bridges

The in-depth discussion of performance results is concluded by elaborating on the experienced challenges and lessons learned from this two-day sea trial. An outlook touches upon the potential future market uptake and practical realizations of such vessel train systems.