



Inland Waterway Codes: Regulatory Obstacles and Opportunities for Autonomous Shipping

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Abstract

The study presented herein has been done within the framework of the ongoing project SAFEBin (Methoden zur sicheren Ausgestaltung der Automatisierung und Fernüberwachung in der Binnenschifffahrt; Methods for the safe design of automation and remote monitoring in inland navigation) funded by the German Federal Ministry of Digital Affairs and Transport. The study features a comprehensive analysis of the “European Code for Inland Waterways” (CEVNI) and German national inland waterways regulations “Binnenschifffahrtsstraßen-Ordnung” (BinSchStrO) which were scrutinized with respect to their impact on the prospects for deployment of autonomous inland ships.

Using the classification proposed in [1], the regulatory obstacles found in CEVNI and BinSchStrO were discriminated with respect to the targeted level of autonomy (whereby the vessel automation taxonomy given by the Central Commission for the Navigation of the Rhine [2] was used as the reference) and/or mode of autonomy (remotely-controlled or fully autonomous vessels) they hinder. The requirements for explicit involvement of human operators on board the ships are easily detectable, but the rules may also require an immediate human engagement implicitly, e.g. by imposing the use of a specific system which is either designed to be utilized by humans or its use is conditional to human presence. Such is the case with the CEVNI and BinSchStrO chapters on radio-telegraphy and the articles requiring the use of radar.

It was found that some of the fundamental concepts of the regulations, such as the definition of the boatmaster, have a major impact on the implementation of remotely operated, highly automated, or autonomous inland navigation. This finding is in line with the conclusions of the corresponding studies on the regulatory framework for maritime shipping, see [3]. However, it was also found that the regulations offer some opportunities for autonomous shipping. This primarily concerns the so-called “human-centered” ship operation requirements which are based on and adapted to fundamentally human physical and mental capabilities. The technology employed in autonomous ships can overcome the limitations inherent to human operators and lead to a wider societal acceptance of autonomous shipping on inland waterways. In turn, this renders obsolete the human-centered rules.

Instead of putting forward the development of a new code focused exclusively on autonomous shipping, the study explored the possibilities for amending the existing regulations. In specific, a more inclusive, futureproof definition of the boatmaster and crew was proposed. It is considered that formulating the requirements in terms of targeted performance, rather than specifying the systems and/or actors involved in a task execution, would make the regulations open to future technological developments, while keeping the level of rule modifications moderate. Finally, it was found that, as far as the examined waterway codes are concerned, it would be neither easier nor more difficult to deploy autonomous ships on smaller inland waterways. This conclusion, however, should not be regarded independently of other regulatory requirements (e.g. technical standards for vessels) which may implicitly impose additional constraints on autonomous inland vessels intended for smaller waterways.

Literature

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- [3] International Maritime Organization: MSC.1/Circ.1638 *Outcome of the Regulatory Scoping Exercise for the use of Maritime Autonomous Surface Ships (MASS)*. London, 2021.