

EXPERIENCES WITH SMART SHIPPING: RESULTS FROM THE NETHERLANDS

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Introduction

With a contribution of 3.3% to the GDP, the inland shipping sector is an important part of the Dutch economy (Rijkswaterstaat, 2018). In 2015, Dutch inland ships transported 360 million tons of goods, accounting for more than 25% of the continental transport in Europe (Topsector Logistiek, 2016). With more than 8250 vessels, the Dutch fleet is the biggest in Europe. The Dutch policy strives to make maximum use of the capacity of the inland waterways to reduce congestion on the roads and the CO₂ emissions. However this isn't the case yet. Smart Shipping is one of the solutions that can contribute to this goal. While, at the same time, it contributes to the overall goal of the Ministry of Infrastructure and Water Management (IenW): 'smooth sailing in a clean and safe environment'.

This abstract gives an update on what is done in the Netherlands. It discusses the first results from the Smart Shipping project. Showing that a broad definition on the subject is needed, that smart shipping can contribute to the above mentioned goals, but that cooperation between parties is needed, nationally and internationally. Our believe is that we can not sit back and wait for what is going to change. Infrastructure providers and traffic managers should be pro-active.

Introducing Smart Shipping

Early on it was recognized that while Smart Shipping technology underwent a rapid development, research regarding the impact of this developments on the physical infrastructure and on traffic management seem to receive less attention. This caught the attention of Rijkswaterstaat (the Dutch infrastructure provider and traffic manager on the main waterway network). At the beginning of 2017, Rijkswaterstaat and the Ministry of IenW started the Smart Shipping project. Focusing not only on the developments of autonomous ships itself but viewing the developments in a broader context. This allows for the following definition: Smart Shipping is defined as highly automated sailing on sea and inland waterways and accommodating these ships, which contributes to the competitiveness, safety and sustainability of the sector (Ministry of Infrastructure and Water Management, 2018). As Smart shipping is viewed as more than only autonomous ships. The definition consist of smart ships, smart traffic, smart travel and transport and smart facilitation and regulation.

Effects of Smart Shipping

Developments on smart ship(ping) are widespread and diffuse. Therefore the possible impact of smart shipping on for example safety, sustainability and competitiveness of the sector are still discussed. Nevertheless some recent studies on the general effects of smart shipping, conducted in the Netherlands, show that it is expected that smart shipping could have a positive influence on the competitiveness, safety and sustainability. Although it should be said that these results are strongly depending on the level of autonomy that is reached. Efficient sailing on inland waterways could lead to a reduction of CO₂ emission by 5 till 7% in 2030 (Rijkswaterstaat, 2017). Other research showed that up to 80% of incidents on the Inland waterways is the consequence of human actions. In the long term expert within Rijkswaterstaat estimated that Smart Shipping should be able to reduce this number with more than 50%. Besides that, operating costs of smart ships may reduce, due to less crew members, more efficient use of loading space, and optimization of navigation task (Rijkswaterstaat, 2017; Port of Rotterdam, 2018). Although some positive effects of smart shipping can be foreseen in the future, this doesn't mean that smart shipping is already viable from a business case perspective. Just 3% of the Dutch inland waterway fleet has integrated networks on board of the ship (Rijkwaterstaat, 2017). These integrated networks are a minimum requirement for gathering and sharing data. The capital costs are still too high to compete with existing transport systems (Port of Rotterdam, 2018).

Building a community

The developments on Smart Shipping in the Netherlands were fragmented throughout the sector (Rijkswaterstaat, 2017). There where many (small) developments on parts of the functional areas of

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shipping (e.g. propulsion, navigation and communication) but system integrators⁴ were missing (Rijkswaterstaat, 2017). Therefore, it was decided to organize a couple of events to bring together all interested parties within the inland shipping sector, to build communities to strengthen innovation possibilities. This commitment led to the Smart Shipping Challenge on the 30th of November 2017. Participants of 65 different organizations came together, showcased possibilities and built new partnerships. Results are promising. Several parties took the lead in developing integrated concepts. Collaboration between infrastructure managers was strengthened and the government was seen by all the parties as transparent and accessible. The Dutch government has also decided to make its entire main waterway network (with the exception of areas covered by international regulations) available for testing autonomous applications. A policy rule will be drawn up for this, which allows testing.

Changing legislation

One of the issues raised by different parties is the need for changing rules and regulations. It is expected that, staff regulations and traffic rules need to be changed. This issue is recognized by the Dutch government. To inquire what is needed and how legislation could support the developments in the best way, an online counter has been set up. Entrepreneurs who want to test autonomous solutions can register their test. One of the conditions for testing is that the results of the test become available for the policymakers, so they can use the results to see where the legislation needs to be adapted and how this can be done as effectively as possible. Result of the counter is a single point of access for all parties. The first applications are already received. Results from testing will be input for future research.

International cooperation is needed

Many organizations are facing questions about the effects of smart shipping, effects on rules and regulations and questions about the conditions under which tests could be carried out. Now it is time to start sharing experience and knowledge with all parties that take part in these developments. Results from best practices can be used to determine which factors are essential to further development of smart shipping, with attention being paid to aspects that are important to waterway managers and authorities. Based on these findings, important common issues can be determined and consideration should be given to the roles different parties can have within the development.

Ongoing research

Ongoing research conducted is concentrating on the impact of these developments on the network and traffic managers. The main research question is: what impact will Smart Shipping have on the infrastructure itself and on the operations of an infrastructure provider and traffic manager? Sub-questions raise attention to the impact Smart Shipping has on the infrastructure, safety and role of all the parties.

Conclusion

The goal of this abstract was to give an update what is done in the Netherlands in the Smart Shipping project. It is shown that Smart Shipping could reduce CO₂ emission and improve safety although there are still some challenges from a business case perspective. Building a community and establishing a counter has increased the collaboration between different parties and has increased the accessibility of the government. Future efforts should focus on the impact on infrastructure, international collaboration and changing legislation.

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⁴ Definition system integrator: ‘a company that brings subsystems together and ensures that those subsystems function together’.