

Improving nautical risk modelling with the help of AIS

AIS has proven to be a valuable data source in vessel tracking for all kinds of applications, ranging from cargo tracking to detecting piracy. MARIN makes extensive use of this data source in the modelling of nautical risks.

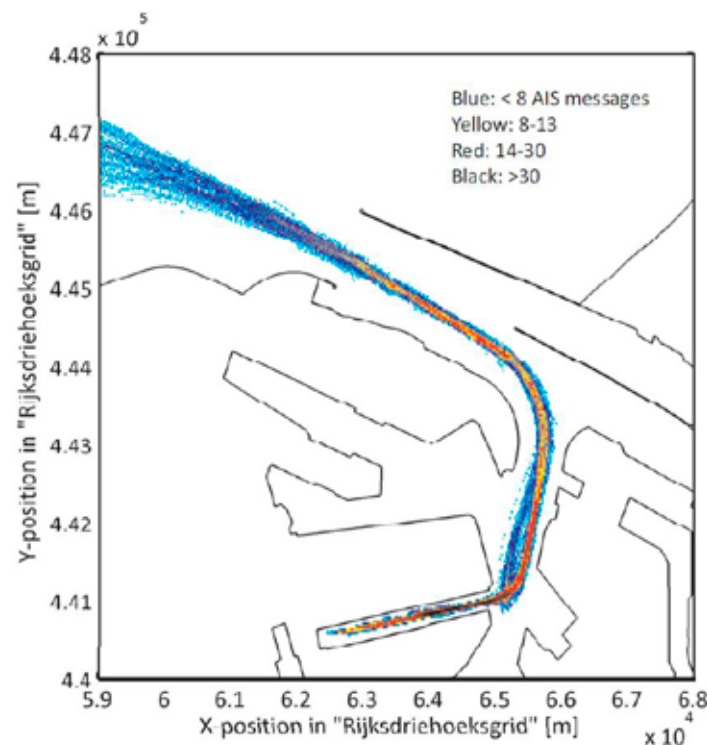
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Most of the safety studies performed by MARIN provide an answer to the question: what is the nautical risk at this specific location? Crucial information is therefore the traffic situation and its composition. AIS data provides a good overview of where ships have sailed, which type of ships sailed and which areas were avoided. AIS also provides important information about the speed and distribution of traffic. This all helps to create a good traffic database which is one of the most important input factors for any risk assessment model.

Currently, MARIN is using AIS data to improve the knowledge of traffic situations in ports; for instance which part of the available width of the channel is used by ships and how the traffic is distributed over that width. Results of the analysis can be used to improve the modelling of ship traffic in narrow waterways.

Detecting abnormal behaviour A second application of AIS data is to gain insight into the actual behaviour of ships. How do ships react to each other and to extreme weather conditions? What is “normal” behaviour and what could have been the cause of any deviation? Insight into behaviour helps to improve assumptions made in risk modelling and proactively helps to avoid dangerous situations.

MARIN has started several research projects concerning this topic. In close cooperation with Rijkswaterstaat and the Netherlands Coastguard, a study investigating near-



Overview of all AIS messages for large container vessels entering the Amazonehaven.

collisions at sea is currently underway. Potentially, results can be used to detect dangerous situations in busy traffic lanes.

Another example is a study done by a master's student who analysed the tracks of container vessels sailing to the Amazonehaven in the Port of Rotterdam. He established the “normal” track and speed and then researched deviations in the case of strong wind and currents.

Future applications In the near future risk modelling and AIS are expected to be combined so an individual risk profile can be determined based on the actual situation around a ship. A first step in the development of the “Risk Index” was already taken within the EU project MarNIS in which MARIN participated. Currently MARIN is exploring opportunities to implement the concept of the “Risk Index” into its VTS software. ▢

Acknowledgment: MARIN receives AIS data for research purposes for the Dutch part of the North Sea from the Netherlands Coastguard.