Geophysical Research Abstracts
Vol. 20, EGU2018-8211-1, 2018
EGU General Assembly 2018

Linking operational hydrological forecasts with a route guidance system to support inland navigation

Dennis Meißner (1), Hanno Schellenberg (2), Gerald Tretter (3), and Elena Matta (4)

(1) Federal Institute of Hydrology (BfG), Water Balance, Forecasting and Predictions, Koblenz, Germany (meissner@bafg.de), (2) BearingPoint GmbH, Berlin, Germany, (3) BearingPoint Technology GmbH, Premstätten, Austria, (4) Technische Universität Berlin, Chair of Water Resources Management and Modeling of Hydrosystems, Berlin, Germany

Economic models predict a significant increase in inland waterway traffic volume along the German waterway network over the coming decades (above 20 % until 2030). With the given waterway infrastructure an efficient use of the waterways is becoming even more essential to cope with the increased demand (e.g. to avoid congestions, to minimize navigation's carbon footprint etc.). As fairway conditions along substantial parts of the European inland waterway network are prone to hydro-meteorological impacts (low flows / droughts, floods, river ice), operational hydrological forecasts are an essential requirement for efficient, reliable and safe navigation. Today hydrological measurements and navigation-related hydrological forecasts are already part of River Information Services (RIS), which provide the bulk of information to support waterway traffic and transport management operationally. Which opportunities do exist to further improve the use and – even more important – the value of hydrological forecasts for inland waterway transport?

As a follow-up of last year's PICO-presentation "Supporting inland waterway transport on German waterways by operational forecasting services – water-levels, discharges, river ice" (https://presentations.copernicus.org/EGU2017-9707_presentation.pdf), we will present an innovative route guidance system for inland navigation, called DSA (Digital Shipping Assistance). The DSA is implemented as an event-driven, cloud-based service with mobile web user interface, which is designed as a complementary device to the existing RIS offering additional functionality to merge various data sources relevant for individual vessel trips. The core feature of the DSA-application is the link of waterway-related routing algorithms with multiple hydrological forecast information ranging from short-term (deterministic), via medium-range (probabilistic) up to seasonal (categorical) forecast products at different locations. The forecasts are based on conceptual hydrological and hydrodynamic models as well as data-driven approaches. As usually inland navigation vessels cross different waterway systems along their journeys (free-flowing rivers, impounded stretches, and canals), the DSA has to cope with quite diverse conditions regarding routing parameters as well as hydro-meteorological conditions and corresponding impacts in order to support the inland waterway user in real-time. So far, no such comprehensive route guidance system for inland navigation exists in Europe.

We will present the technical concepts of the initial implementation of the DSA, which will be launched for pre-operational beta-testing in the summer 2018: (i) interactive analysis of relevant deterministic and probabilistic forecast(s) in order to optimize the vessel load as well as to consider vertical bridge clearance, (ii) estimation of the time of arrival taking into account current and future fairway conditions and (iii) reduction of queue time at harbors and locks by considering current traffic volume and by fostering digital administrative procedures.

The DSA-project is funded by the mFUND-initiative of the German Federal Ministry of Transport and Digital Infrastructure.