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ABSTRACT / RESUME:

Driving Assistance Systems for Inland Vessels based on High Precision DGNSS

(Research project LAESSI)

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Inland shipping is an important pillar of the German transport system; however the challenges of inland navigation due to dense traffic, increasing ship dimension, reduced manoeuvre space and visibility are multifaceted and increasing. About 20 to 30 collisions per year, partially caused by carelessness, demonstrate the necessity of driving assistance systems for inland waterway applications.

The project LAESSI (Guiding and assistance systems to improve safety of navigation on inland waterways) aims to develop efficient navigation assistance functions for inland waterway transport. Therefore, nautical information like position, height and heading has to be determined. One main task of the project is the development of a bridge collision warning system, which could provide a timely alert to the skipper, whenever the vessel, particularly the wheelhouse or radar mast, will not safely pass the bridge.

A feasibility study has identified Global Navigation Satellite System (GNSS) technologies as basis for the reliable height determination for such a bridge collision warning system. This approach requires information about the vertical clearance of the bridge superstructure as well as precise height information at least 300 m before the vessel will pass the bridge. The high accuracy level of less than 10 cm in the vertical position requires the use of high precision DGNSS.

The paper will present the derived requirements for inland waterway assistance functions as well as an overview about the overall system architecture. In addition the paper provides information about the high accuracy positioning system, which is based on RTK technology including integrity information. The correction and integrity data together with other waterway information will be broadcasted using the new frequency bands offered from VDES (VHF Data Exchange System). Finally the paper will describe first results gained in demonstration areas at the rivers Rhine and Main.

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