New navigation system for port traffic

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The DockingAssist system is a precise, high-speed port navigation system developed in a European research project. DockingAssist has the potential to improve port-area safety and increase overall throughput in port traffic, thereby increasing overall port efficiency and reducing fuel consumption. This autumn, a prototype of DockingAssist was successfully tested at the Port of Cork in Ireland. Due to its WiMAX-based wireless network solution designed by VTT, the system can serve hundreds of vessels in the proximity of major ports.

Current on-board vessel navigation in port areas is based on pilotage that is supported by different kind of expensive systems. DockingAssist offers a cost-effective alternative which enables the use of other features alongside the system's positioning functionality. This new solution provides pilots with more-comprehensive real-time information from a number of harbour services. Pilots can also use it to monitor the movements of port traffic.

DockingAssist includes a base station located in the port area and a lightweight portable navigation tool, which provides pilots with timely information on the location, speed and heading of the vessel. There is no necessary need to deploy expensive additional control systems in quays.

A WiMAX broadband network and RTK enhanced GNSS positioning technology combine to enable positioning, navigation and speed measurement accurate to within the nearest few centimetres. VTT designed and deployed the WiMAX network used by the system.

"The WiMAX network has a significantly higher capacity than the solutions currently in use, which are mainly based on UHF radio modems with very low bit rates. Using this network, a single port area system can support hundreds of vessels simultaneously," explains Esa Piri, a Research Scientist at VTT. In principal, it's also possible to use, e.g. an LTE network instead of a WiMAX network in the port system.

Thanks to the WiMAX network's reliability and high capacity, its usage is not restricted to only navigation features. Vessels can contact harbour services, e.g. for weather and tidal information, warnings and updates on the movements of other vessels. In ports, the ability to handle several tasks through a single network can provide major savings through easier network maintenance.

A demo of DockingAssist was performed at the Port of Cork, on the Irish coast, at the beginning of October.

"The prototype system was perceived as very satisfying, and the companies are giving thought to how to use the system as part of their own products. They are particularly interested in the additional possibilities the WiMAX technology can provide for the management of port operations," comments Piri..

The research institutions participating in the two-year EU Docking Assist project were Ateknea Solutions (project coordinator, Spain), VTT and ASCAMM-CTAE (Spain). Marimatech (Denmark), Net Technology (Greece), Prodevelop (Spain), Runcom Technologies (Israel) and the Port of Cork (Ireland) represented the private sector.

VTT's expertise in the design of port-area wireless networks is exploited also in Asia. VTT was recently selected to develop an advanced wireless network for PSA, the company responsible for port operations in Singapore. The aim is to employ technology to improve the throughput

and efficiency of port operations.

Provided by VTT Technical Research Centre of Finland

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