OWME project makes technological breakthrough

Ship motions are often critical for offshore operation. Rather than "waiting on weather", a new system is now available that predicts quiescent motion periods.

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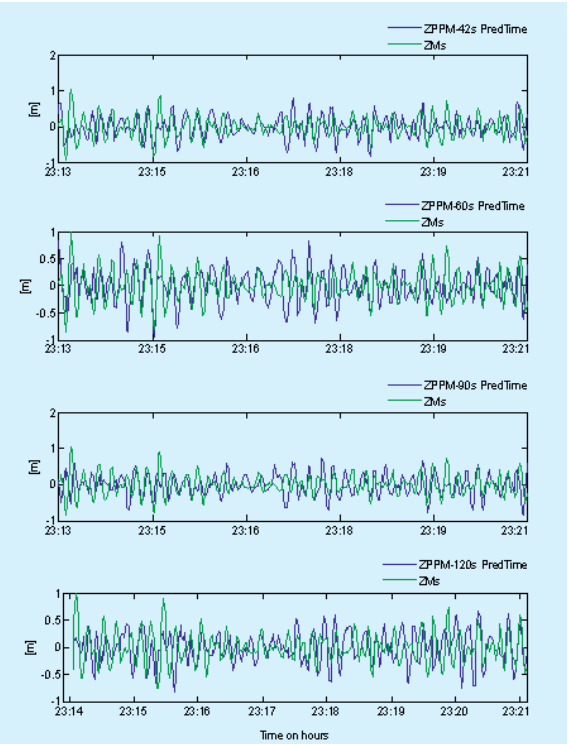
Offshore operations such as float-over-installation, LNG-loading connection and helicopter landing only need a short quiescent period in vessel motions. To predict such quiescent periods, the Onboard Wave and Motion Estimator (OWME) Joint Industry Project developed an onboard system capable of determining vessel motions some two minutes in advance.

The system measures the waves at a distance of 1 mile from the vessel into the wave direction. X-band radar images are processed to derive the full, 3-D wave elevations based on the existing WAMOS-II system. These wave elevations are then used as input for a numerical model that propagates the waves to the vessel's location. Applying ship motion theory on these waves, the vessel motions in all six modes are then computed.

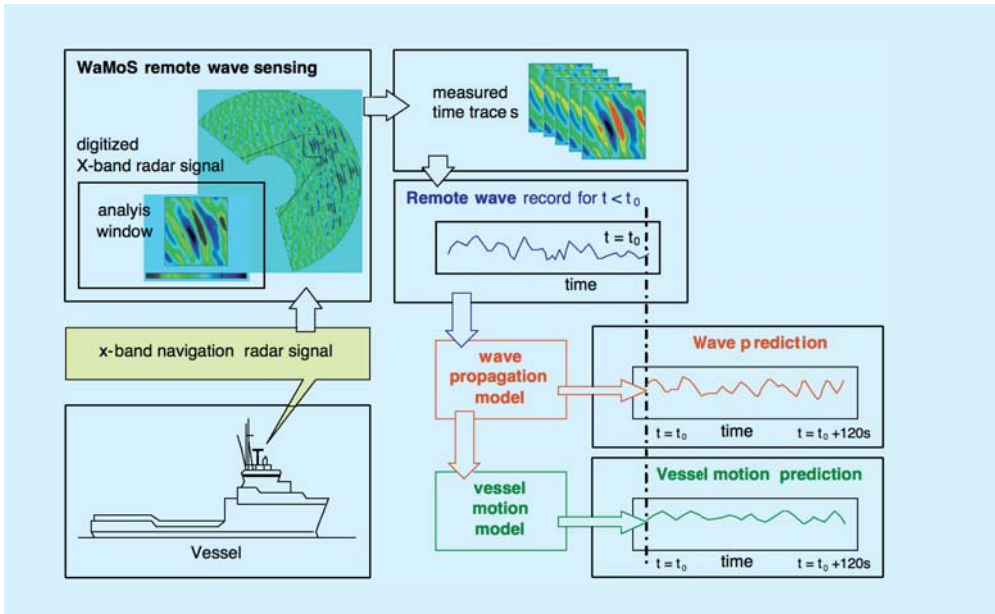
The OWME system is basically data processing of standard navigation radar signals. Special attention was paid to the minimum computational time as this time decreases the advance prediction time.

Partnership For development and testing MARIN formed a partnership with OceanWaveS and Delft University of Technology, which was assisted by the University of Oslo. The three-year Eureka project was supported by StatoilHydro, Total, SBM, Gusto, Seaflex and Sirehna, as well as the Dutch Ministry of Economic Affairs.
After extensive laboratory testing of the individual components such as the wave propagation model in short crested seas, September last year the system was installed onboard a light well intervention vessel operating at the Gulfaks field, offshore Norway. The vessel was further equipped with a down-looking wave radar on the bow and with accurate motion sensors. A compact wave buoy was moored in the WAMOS II window for direct comparisons.

The results illustrated show that the OWME system is capable of predicting quiescent periods of vessel motion up to two minutes in advance and can thus, contribute to the workability of offshore operation in otherwise limiting sea states.



Vessel heave motion measured versus predicted 42, 60 , 90 and 120 sec. ahead



OWME real time motion prediction system