

# EM 2040C Multibeam for Dutch Inland Waterway Surveys

The Dutch Ministry of Infrastructure and Environment (Rijkswaterstaat Survey department IGA) has selected the Kongsberg Maritime EM 2040C very high resolution, shallow water multibeam system to spearhead its inland waterway survey operations. For starters, in 2015 the Ministry ordered five [EM 2040C dual head](#) and dual swath systems and the contract provides the option for additional systems up to a maximum of 11 within the next 10 years. In addition, Kongsberg Maritime was awarded a 10 plus 5 year maintenance and management contract to be serviced and coordinated from the Kongsberg Maritime Holland office.

The Dutch Ministry of Infrastructure and Environment is responsible for 2,137km of canals and rivers with 5,472km of waterways throughout the Netherlands, which must be surveyed on a regular basis to ensure safety of navigation. For the bathymetry workload that is not outsourced, Rijkswaterstaat will use the EM 2040C systems as the primary tool to survey these waters on an ongoing basis. The first five systems were delivered at the end of 2015 with remaining units ordered to be delivered on demand when the vessels are available.

Based on the Kongsberg Maritime EM 2040 multibeam, the EM 2040C is a development in acoustic technology that makes highly detailed surveys of shallow water possible using small boats and launches.

## Reduced Post-processing Requirements

The EM 2040C ensures that highly accurate data is available in real-time. This makes it possible to conduct very cost-effective surveys with reduced requirements for post-processing, due to the high quality of data available. In addition to inland waterway surveys, applications include port and harbour surveys, post-dredging surveys, shipwreck exploration, habitat mapping, pipeline inspection and hydrographic surveys to a standard that exceeds IHO S44 Special Order and LINZ performance requirements.

The EM 2040C features high resolution and a wide frequency range from 200 to 400kHz, with frequency selection in steps of 10kHz. It uses Frequency Modulated (FM) chirp to extend range and offers a maximum depth of 490m with a beam width of 1x1° at 400kHz. As a dual head system, with two sonar heads tilted to each side, 200° coverage can be achieved, which enables surveying to the water surface or up to 10 times water depth on flat bottoms.