



KONGSBERG

Kongsberg Maritime Ltd

Underwater Noise Impact Assessment Services

The value of the seas and the seabed as a natural resource has increased greatly over recent years, with the number and scale of marine activities increasing in proportion. Many of man's offshore activities cause underwater noise. This may include noise from sources such as ship movement, to the extreme levels of underwater noise generated during the use of explosives underwater.

There is increasing recognition that underwater noise associated with construction, operation and decommissioning of activities has the potential to disrupt the hearing and communications of marine animals. To ensure compliance with the environmental regulatory framework, it is necessary to implement procedures to mitigate any aspects arising from the activities. A key component of this is the requirement to measure noise levels at sea in order to facilitate comparisons with threshold levels that are known to induce trauma or behavioural changes in marine animals.

As a consequence, Kongsberg Maritime has developed very high data rate, underwater noise recording systems. The systems use calibrated hydrophones, traceable to international standards, together with signal conditioning amplifiers and a digital data acquisition system.

Kongsberg Maritime also has teams of engineers and scientists experienced in working in the offshore environment, and in measuring and assessing underwater noise to stringent standards.



Kongsberg Maritime's Remote Underwater Noise Evaluation System (RUNES) - shown with battery housings



Deployment of hand portable equipment

Kongsberg Maritime's underwater noise recording systems have been specifically developed for the monitoring and measurement of underwater noise in and around offshore installations and activities. Single point hydrophone systems for rapid deployment at incremental ranges from undersea noise sources (transect method) allow for the propagation of the underwater noise to be measured. In addition, long-term deployment systems situated on the seabed allow for the time-varying characteristics of the noise field to be monitored.



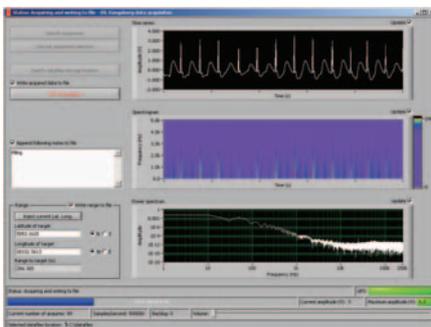
Image reproduced courtesy of Elsam



Deployment of RUNES

In support of underwater noise assessment activities, Kongsberg Maritime is able to undertake the following activities:

- Calibrated measurements of background levels of underwater noise.
- Measurement of operational noise from offshore construction activities including pile-driving, drilling, seismic surveys, wellhead severance, cable trenching and pipeline laying, underwater blasting, marine aggregate dredging and boat movements and shipping.
- Underwater noise monitoring, recording and analysis activities using specialist high speed, low noise equipment.
- Modelling of underwater sound propagation using narrowband and broadband acoustic propagation models and site-specific oceanographic, bathymetric and geoaoustic data.
- Modelling and estimation of acoustic impact zones for marine mammals, fish and human divers. Modelling is based on broadband peak, or peak to peak level, RMS Sound Pressure Level and Sound Exposure Level, and weighting scales such as the M-Weighting and dBht for species of marine mammal, fish and human divers.



Screenshot of data acquisition software