

Underwater Acoustic Noise Measurement, Monitoring, Data Modelling & Impact Assessment



KONGSBERG

System description

The RUNES System

Kongsberg Maritime has specifically designed and developed the Remote Underwater Noise Evaluation System (RUNES) to comprehensively measure underwater background noise levels over extended periods of time.

As all offshore activities, including renewable energy development projects, develop companies are under increasing regulatory pressure to understand and reduce the risk to the environment from a wide range of activities that have the potential to generate harmful levels of sound.

The RUNES system will establish baseline underwater noise levels prior to any development or activity taking place and can be used in support of EIA and MMO/PAM operations.

Rapid deployment and easy operation

RUNES is an autonomous recording unit which can be easily configured and deployed to allow for ease of use during underwater acoustic operations. The modular design also enables the system to be easily transported and assembled.

The system removes the need for surface support vessels and personnel during the main operation, helping to reduce costs and increase operational efficiency. The absence of trailing hydrophones & ambient vessel noise means that the data acquired is of significantly higher quality and provides the basis for clearer interpretation & analysis, upon which important & costly decisions may be made.

Typical applications

RUNES can be deployed to monitor real time acoustic activity during many offshore operations including:

- Offshore wind farm installation
- Seabed piling operations
- Drilling and platform decommissioning
- IRM of offshore structures
- Acoustic baseline surveys
- Seismic exploration activities
- Cable and pipeline trenching



Long-term recording

Powered by rechargeable batteries, RUNES can operate for 30 days, passively recording acoustic activity while resting on the seabed. The sampling rate and duty cycle are variable and can be adapted to the user requirements.

Offering a long-term solution for noise evaluation allows time-varying characteristics of the underwater study area to be monitored, providing a fuller picture to those analysing the data.

Once the deployment period is complete and RUNES has been retrieved, the data stored on the 256Gbyte hard drive is downloaded. The batteries can then be recharged and the unit re-deployed.

Defined frequency range, quality data

The RUNES system has a broadband frequency range of 20Hz to 170kHz for background noise measurement. Any unwanted background noise sources are minimised to produce high quality, accurate data.

Recordings are stored as raw data to allow the user flexibility of format; data can be used in its original form or converted to a user-preferred format for use in external programs.

Quality data is essential in completing an effective acoustic impact assessment. The RUNES software interface has been developed to ensure that all data is checked before it is converted.

RUNES rental

RUNES is also available on a rental basis to support customers' underwater acoustic studies. Additional technical support for the system can be included if required.

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Technical Specifications

System

Frequency range	100Hz to 250kHz
Directivity pattern	Horizontal – Omnidirectional Vertical – Cardioid
Maximum deployment period	Duty cycle dependant Nominally: 30 days with lead acid batteries Greater with lithium batteries
Operating temperature	-2°C to +35°C
Sampling rate	500 kS/s
Cycle period & sampling period	User selectable
Data resolution	16 Bit stored in packed binary form
Data conversion	.txt or .csv format
Data storage	256 Gbytes - solid state drive
Amplitude range	50 dB to 180 dB re 1µPa

User Interface

Permits setting of sampling duration and period between sampling bursts	
Calculates and shows predicted battery duration and memory use based on user settings	
Conversion of the recorded data	Broadband Sound Exposure Level Broadband Peak Level Broadband RMS Level
1/3 octave band levels	RMS over the analysed period Peak level over the analysed period Power spectrum density levels
Weighted sound for selected species (dB _{ht})	Peak & RMS dB _{ht} level over 1 second
Also permits the addition of hearing threshold curve data based on specific species or M-weightings	

Mechanical

Physical Dimensions	Height 500 mm Diameter 1070 mm
Maximum Operating Depth	500 m
Ready for deployment weight (in air)	100 kg

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