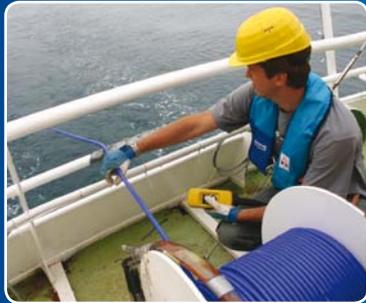




MITIGATION SERVICES

MITIGATION SERVICES OVERVIEW



Regulatory requirements for effective noise mitigation have increased – particularly for the protection of whales and dolphins. It has become standard practice across several industry sectors for Passive Acoustic Monitoring (PAM) to detect vocalising marine mammals – in real-time – to ensure none are within close vicinity of an active sound source.

OUR APPROACH

Seiche is the leading worldwide supplier of Passive Acoustic Monitoring (PAM) equipment. We provide a range of solutions from simple over-the-side hydrophones to state of the art low-noise digital arrays.

Since leading development of the technology in the 1990s we have completed a wide range of projects around the world. Seiche has supplied PAM to all industry sectors, including: oil and gas, renewables, defence and civil engineering.

WORLDWIDE LOGISTICS

Our dedicated logistics department ensures the right equipment is in the right place at the right time. We have bases in USA, South Africa and Australia with vast experience of transporting equipment to all over the globe.

OPERATIONAL SUPPORT

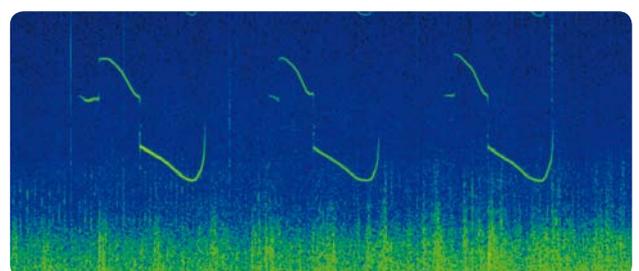
Seiche is committed to support all its equipment in the field and provides 24/7 rapid response to all queries. The support team has earned an outstanding reputation for its in-depth knowledge of PAM and PAMGuard – gained from years of using the equipment in the field themselves. Expert support is also on hand for IT and camera systems.

SYSTEM INSTALLATION

Our technicians install equipment worldwide and provide on-site training on the hardware and software. They have expertise in passive acoustic systems, drift buoys, wireless transmission, satellite communication and camera systems technology.

OFFSHORE TECHNICIAN/OPERATOR

Seiche offshore technicians hold offshore certification and are capable of installation, maintenance and operation of all systems. Our personnel are also knowledgeable in mitigation protocols, skilled in PAMGuard software and have extensive offshore PAM survey experience.



MITIGATION OPTIONS

Seiche offers a range of technology for real-time mitigation monitoring.

The best approach will be closely tailored to the project and specific marine environment.

TOWED PAM SYSTEM



Our most extensively used PAM system is robust, reliable and available at short notice. The system is available in a number of configurations and is supported by PAMGuard software.

VERTICAL PAM



The vertically deployed system provides a simple and flexible approach suited to static operations such as oil rig VSP and civil engineering works. It is designed to be lightweight and easy to transport, including by helicopter.

FIXED BUOY



A fixed buoy enables mitigation of an offset source and can be positioned in single or multiple configurations. Our Wireless PAM transmission system is fitted for true real-time mitigation monitoring. It operates in harsh marine environments and can be manually handled by two crewmen.

UNMANNED SURFACE VEHICLES (USVs)



USVs offer complete manoeuvrability to cover a mitigation zone at offset or scope ahead for sensitive species (e.g. baleen whales). Our Wireless PAM transmission system is fitted for true real-time mitigation monitoring.

PAM-CAT



The PAM-CAT was specially designed for operations in challenging environments such as very shallow transition zones and complex lagoon waterways. The rafts can be moored on a long term basis or towed behind a vessel. Our Wireless PAM transmission system is fitted for true real-time mitigation monitoring.

SOURCE-TOW PAM SYSTEM



Hydrophone sensors are deployed directly behind the seismic source thereby removing deployment complications. A significant additional benefit is their placement at the centre of the mitigation zone.

REMOTELY MONITORED PAM



Seiche has pioneered the use of satellite technology to transmit PAM signals from a vessel anywhere in the world to a shore-base. Highly trained operators listen to the live audio feed from Seiche HQ. Complete 24/7 flexibility allows mitigation support to on-board operators.

MULTI VESSEL LINK



A Multi Vessel Link (MVL) system enables a PAM HUB station on one vessel to monitor PAM systems installed across the fleet within several kilometres' range. The ability to simultaneously monitor multiple PAM systems gives flexibility to personnel requirements.

DIGITAL HYDROPHONE



This new generation of digital hydrophones improves signal to noise ratio and enables advanced array control through real-time configuration of gain and filters.

CAMERA MONITORING SYSTEM



The dual system (Thermal Imaging and High Definition) enables real-time monitoring for marine mammals, small vessels, debris, ice and marine obstacles, both day and night with 360° coverage.

RADES

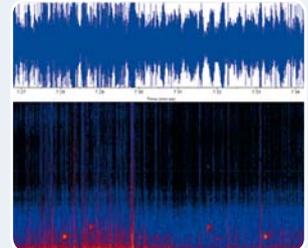
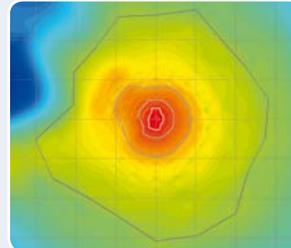


Real-time Automated Distance Estimation at Sea (RADES) is Seiche proprietary software. RADES provides accurate ranging information and overlays a mitigation zone live on screen. Our software is also capable of automated detection of marine mammals. This enables robust mitigation decision making that is both objective and recordable.

ACOUSTIC DETERRENT DEVICE



In partnership with Lofitech, this ADD is recognised as the most effective way to warn away seals, porpoises and dolphins from industrial marine operations.



TRAINING

Seiche provides highly regarded training for individuals and companies in the UK and around the globe. The courses cover all aspects of Marine Mammal Monitoring (visual and acoustic) as well as the practicalities of mitigation in the field and include:

- JNCC Accredited MMO course
- BOEM/BSEE Accredited PSO course
- PAM Operator – Level 1
- PAM Operator Level 2



MODELLING

In partnership with Plymouth University and ZCAT Science, Seiche combine an in-depth knowledge of computational algorithms with practical knowledge of the marine environment. Our collaborative team provides a comprehensive range of services in underwater acoustic modelling:

- Predictive sound source modelling
- Sound Source Verification (SSV)
- Propagation modelling
- Mitigation zone determination

MEASUREMENT

In partnership with Bath University and ZCAT Science, Seiche hold expertise in the equipment, operation and analysis involved in underwater sound measurement. Regulatory requirements have increased and the assessment of ambient and anthropogenic sound levels must now meet exacting standards. Our collaborative team can complete measurement tasks through the entire process to the highest quality.

