# Free PAM software to improve marine mammal detection

To monitor marine mammals during oil and gas activities offshore, we need to detect them even when visibility is poor. Passive acoustic monitoring (PAM) helps do this, by detecting the sounds that vocal marine animals make and trying to track them.

It's a promising tool. But PAM technology has yet to live up to initial expectations as a reliable means of monitoring, because overall performance is highly variable. Two reasons for this are the use of different equipment and limited availability of experienced personnel.

PAMGuard helps get round these problems. It's software that translates the sounds picked up in the water onto a user interface that's easy to read.

We believe PAMGuard takes passive acoustic monitoring a step closer to providing what regulators and industry need: a common tool for monitoring marine mammals at sea during poor visibility conditions, and a community of experienced users.

## Software that's free and open source

PAMGuard is free and open source. We want everyone to have access to it. In fact, the more that people use it, the better it gets. We aim to help developers take PAMGuard forward. That's why the PAMGuard website offers plenty of support for users and developers, with tutorials and detailed developer training notes.

We see a future where a researcher sitting on a boat in the Bering Sea can start writing algorithms for detecting whale calls, then share the work with the research community. Everyone wins from this technology – including the whales. Only free, open-source software can tap into such shared creativity that benefits everyone.

PAMGuard is transparent. It allows full access to source codes and the assumptions behind them.

## Consistency across different hardware

The industry has invested four years and approximately $3 million in PAMGuard's development. From the start, we wanted PAMGuard to benefit the marine environment. That's why we designed it to work for the research community as well as industry. We know how useful it would be if data from different activities could be presented in a consistent form that's easy to compare.

This means PAMGuard needs to work with many different hardware systems and have the look and feel of existing free software. And it does. A research student with a laptop computer in a small boat can still use PAMGuard software. It's not bundled together with a particular type of hardware for commercial purposes.

## Consistency for users

This flexibility means that once users have mastered PAMGuard, they can use the same interface again in different situations with different hardware; no more hopping from system to system. This consistency should mean user experience grows quickly, instead of being spread across a variety of commercial software.

PAM systems are only as good as their users. Regulators need to be sure that software operators have good training and enough experience of PAM to use it reliably. With PAMGuard, there's no commercial confidentiality, so training doesn't need to happen behind closed doors.

We want to see the widest possible uptake of PAMGuard. That way, we can achieve a large pool of trained, experienced PAMGuard operators. Everyone benefits from PAMGuard's consistency.

## Dealing with glitches

Like all new software, PAMGuard has had initial glitches. We've completed some critical fixes and PAMGuard's better than it's ever been. Of course it's not perfect; but we believe PAMGuard is the best solution out there for many marine mammal monitoring challenges. And the more people that use it, the better it gets.

Users' feedback helps to improve PAMGuard. The industry is currently funding basic support, and our researchers work to sort out glitches as soon as we hear about them. We can only fix the things we know about, though. That's why we really need people to use PAMGuard and provide feedback.

## Next steps

We ask you to:
- become familiar with PAMGuard: visit www.pamguard.org, where you can also register for updates
- encourage the use of PAMGuard where appropriate
- provide feedback on glitches and suggest improvements.

Thank you for reading about PAMGuard.

For further details, please contact john.campbell@ogp.org.uk.