Oil and gas companies regularly carry out offshore monitoring at various stages of a project’s life cycle. Monitoring underpins our understanding of the environmental hazards to and impact from exploration and production activities. Monitoring is done through a traditional range of survey vessels, long-established sampling methods and techniques, and deployment of oceanographic buoys.

We now see technologies emerging that open up a new era in offshore monitoring. These technologies revolutionize data acquisition and management in many ways:

- Advances in remote sensing and computational power enable data collection at temporal and spatial resolutions that so far have not been realised
- *In situ* monitoring benefits from new types of sensors and sampling devices, as well as more efficient designs and prolonged battery life
- Developments in autonomous unmanned vehicles and robotics, operating underwater, at the surface or in air, offer wider and more flexible deployment opportunities, offering significant efficiency and safety benefits
- Data transfer infrastructure has improved, allowing greater reliability, autonomy and integration of remote systems
- Improved data assimilation techniques, predictive analytics and artificial intelligence facilitate interpretation of ever larger data streams.

A new IOGP report supports greater uptake of new technologies

The IOGP Task Force on New Technologies in Offshore Monitoring explored benefits of and impediments to the use of new technologies through a dedicated workshop held in conjunction with Oceanology International in 2014.

This work culminated in IOGP Report 546, *New technologies in offshore monitoring – A technology brief*, which supports greater uptake of new monitoring technologies by the oil and gas industry.

A key insight is that the technology is nearly there. The oil and gas industry should be more proactive in integrating these technologies into day-to-day operations.

Through a concerted effort at different levels, both within individual companies and through active partnerships, the industry will benefit more fully from the potential these new technologies hold.
Why adopt new technologies?

Different drivers are behind the adoption of the new technologies, ranging from the technology push as technologies mature and become available in other sectors, increased regulatory or operational requirements, to a need for more, timely and better data. These drivers vary from country to country, company to company, and between disciplines.

To further the adoption of new technologies, the industry could work on:

- A state of the art review of global monitoring technology/practices/requirements
- Documentation and articulation of the business case for sustained ocean monitoring and a clear plan to inform executive teams
- Development of the value proposition of sharing data versus keeping it in house (commercial benefit, synergy and safety)
- Demonstration of the benefits of cross-industry collaboration in technology development (cost, safety, more data, and increasing confidence in prediction and compliance).
What data and technologies to use and how?

Knowledge about what data to acquire, what technology to use, and how to plan and implement a monitoring campaign using these new technologies is a prerequisite for maximizing the benefit that these technologies offer.

The industry could:

- Understand **critical data and product needs** in different phases of an exploration or production project and share such insights for example via the different disciplines or IOGP committees.
- Develop **industry-wide specifications, standards and data models** for data acquisition technologies and management to enable consistency and fit-for-purpose applications.
- Share select data-sets (e.g. ice monitoring, metocean, marine mammal data) where there is a clear commercial, operational (i.e. risk reduction), scientific or strategic benefit.
- Develop a **Code of Practice** for the deployment of robotic systems (e.g. gliders) within **operational safety/exclusion zones**, so that developers can design and test against industry-wide specifications.
- Develop detailed **technology maturation plans** and **statements of requirements** for different areas of application (e.g. leak detection), to prioritize the future development including resource allocation.
- **Invest** into proof of concept and strategic R&D within the oil and gas industry, or in other sectors (e.g. science, government). Equally, invest in enabling technologies (e.g. two-way communication), that leads to improvements that benefit a number of instrument/service providers. The industry can accelerate developments that address priorities through direct funding or co-funding of research and development projects.
- Build **capacity within the oil and gas industry** to carry out data management and interpretation in light of the new, different and integrated data streams that these new monitoring technologies generate – including training or recruiting people from the right backgrounds.
Who should be involved?

This requires an effort on all fronts – there is no single entity that can deliver or lead on a more systematic uptake of new technologies. The industry could:

- Promote **cross-collaboration and alignment** among industry, service providers, across different project phases (e.g. production and exploration teams) or disciplines (geomatics, metocean and environmental practitioners), and across sectors (military, academia, oil and gas)
- **Advocate with regulators** globally on a rationalization of data needs, and adopting and testing new technologies. Regulators are familiar with existing monitoring and may therefore be reluctant to accept new approaches in monitoring and unwilling to modify long standing permit conditions
- Establish **industry partnerships** as required (e.g. Joint Industry Projects, academic collaboration, joint R&D between disciplines). Promote engagement and collaboration with R&D and technology developers. Partnerships can also be set up to share access to facilities, data and knowledge for mutual benefit
- Empower the committees in national or international **trade associations** to deliver on industry-wide activities such as this Task Force and increase participation of their Members