i-Tech Services, one of the world’s leading fully integrated offshore service providers, in collaboration with SeeByte, a leading provider of smart software solutions for unmanned underwater vehicles, has developed the AIV. An intelligent inspection vehicle with the unique potential to revolutionise subsea inspection.

Key elements include:

- The AIV provides a cost effective inspection solution to aid field survey, integrity management and intervention activities
- To meet specific field requirements the AIV has a range of flexible operating scenarios. Its unique basket deployment feature, means it can operate directly from the deck of an FPSO, FLNG, platform or vessel. Additionally the AIV can be operated autonomously or in a piloted mode
- The AIV has no tether, allowing its on-board intelligent navigation to operate safely in congested areas. It autonomously docks back into its basket on mission completion
- The AIV’s on-board battery system supplies an array of navigation tools and sensors to provide up to 24 hours of autonomous inspection and potential intervention.
- Designed to accommodate a semi-autonomous mode via fibre optic cable and/or subsea acoustic modems, which also gives the option for pilot intervention where these links are introduced.
Mission

The industry-wide drive for improved efficiency and cost reduction has never been greater. The focus on technology to provide cost saving solutions is high. Whilst existing heavy Work Class ROV and Diver intervention tasks will remain with the current technology capability, the time has come for the next innovation in terms of subsea inspection vehicles and methods.

i-Tech Services has brought the AIV, a hover-capable autonomous and intelligent inspection vehicle to the market. The AIV combines the advanced software capabilities of SeeByte and the engineering and operational experience of i-Tech Services. The AIV can be deployed from a host platform, FLNG, FPSO, vessels of convenience or ROVSVs within the field, in single or multiple vehicle mode. Operated from and returning to the dedicated basket located on the seabed, the core technology is an enabler for a full seabed hosted option.

Base Case Deployment Scenarios

The AIV Mk1 is capable of undertaking General Visual Inspection (GVI) of subsea infrastructure, including facilities, pipelines and risers within offshore fields. The Mk1 system carries the latest sonars and cameras. A number of deployment scenarios are envisaged:

- A permanent deployment on a fixed platform or FPSO; ready to be deployed whenever a specific visual inspection or planned inspection campaign is required – all at the operator’s convenience without the need for a vessel
- Simultaneously deployed from a field support vessel in parallel with Intervention, Diving or other activities to optimise the effectiveness of the vessel schedule.

In each case, data will be recovered and sent ashore for processing; only minimal crew are required offshore. Intelligent processing allows rapid coverage, quality and discovery checks to be made immediately post-mission.

Data Products

The processed AIV data is compatible with existing industry standards, ensuring compliance with customer specific integrity management systems. The AIV’s core control and logging architecture is designed to enable customer specific sensor and communications requirements to be fitted without any adverse impact on its core behaviours or safety systems.

This flexibility ensures that the AIV service can take full advantage of developments in underwater sensors and communication made by the wider subsea community.

The AIV system is the key component in reducing the cost of inspections.

Technical specification

- Depth Rating: 3,000m
- Dimensions: 1,700mm (L) 800mm (H) 1,300mm (W)
- Inspection sensors: Forward looking Sonars & Colour UHD Stills Camera; Downward looking Multibeam Profiling Sonar & UHD Stills Camera
- Communications: Acoustic, Wi-Fi, Satellite; High Bandwidth Subsea Wireless enabled, Tethered Option
- Mission planning: 3D graphical automated planning tool
- Navigation:
  - Position and inspection sensor data fusion. Open water (1% distance travelled)
  - Pipeline tracking using profiling sonar to optimise video coverage at 1.5-3m range
  - Riser tracking using sonar to optimise video coverage at 1.5-3m range
  - Structure tracking using sonar to optimise video coverage at 1.5-3m range
  - Real time obstacle avoidance utilising sensor data and 3D field infrastructure model

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