SUT Society for Underwater Technology

SUBSEA INSPECTION SUPPORTED BY AI-DRIVEN COMPUTER VISION
ANDREW MILLS, WOOD

This presentation will summarise the development and validation of a Human-in-the-Loop (HITL) AI system designed to support subsea pipeline inspection by automating the initial screening of underwater imagery. Traditional inspection methods are labour-intensive and susceptible to human error due to fatigue.

The proposed solution leverages deep learning, specifically, a fine-tuned MobileNetV2 architecture- trained on a domain-expert-annotated dataset to triage images, deprioritising healthy assets and flagging potential anomalies for focused human review. The methodology addresses severe class imbalance through class weighting, a two-phase training strategy, and robust validation, ensuring reliable generalisation.

Operational flexibility is a core strength: the AI's sensitivity can be tuned to meet specific risk profiles, from "Maximum Safety" mode (100% anomaly recall) to balanced configurations that reduce manual workload by up to 75%. The system's impact includes drastically reduced inspection cycle times, improved consistency, and enhanced safety assurance, all while preserving essential human judgment. The HITL workflow enables continuous improvement through inspector feedback, laying the groundwork for scalable deployment and future evolution toward multi-class classification and real-time anomaly detection.

This work demonstrates a practical, scalable pathway for APAC operators to incorporate AI into their subsea equipment integrity management processes to achieve better outcomes - faster performance with lower risk profiles.

DATA AND VISUAL ANALYTICS IN SUBSEA ASSET MANAGEMENT
TIM STUART, OCEANEERING

Modern subsea asset management increasingly relies on advanced data and visual analytics to drive safer, more efficient decision-making. Vision Subsea, built on the proven success of Vision Topside, uses engineering-grade point cloud data generated using information gathered during ROV operations to give engineers a measurable, contextual view of subsea asset integrity. This enables precise anomaly location identification, dimensional checks, and intervention planning.

At the core of this capability is ASVM (Advanced Subsea Visual Metrology), which captures high-quality images and 3D models that feed into Vision Subsea's contextual platform. The proposed discussion will showcase real-world case studies to demonstrate how ASVM delivers exceptional accuracy and reliability in subsea inspections.

Once collected, this data addresses common integrity challenges such as fragmented drawings, static reports, and video lacking spatial context by consolidating inspection evidence into a single, measurable digital record. Delivered as a cloud application, Vision Subsea supports collaboration across integrity, inspection, and planning teams, reducing the need for repeat mobilizations, improving operational efficiency and ensuring decisions are made using accurate, up-to-date information.

VIBRATION SENSOR DATA ANALYSIS AND VISUALISATION FOR ASSET MANAGEMENT OF SUBSEA PIPELINES
MARGO ST QUINTIN, SEA GLOBAL

Advances in subsea survey and monitoring technology have resulted in the ability to capture and store large volumes of data for subsea assets. The wealth of available data is not an end in itself; true benefits are realised when the data can be analysed and visualised to identify trends and patterns and used for improved integrity analysis and decision making.

For assets with large data sets, for example from vibration monitors (accelerometers) or installed UT arrays, the data types and volumes present a challenge for traditional methods of input data handling, analysis and reporting. The presentation will share data analytics and visualisation solutions for a subsea pipeline with vibration monitoring in place, showing the improvement in understanding of submarine pipeline behaviour and improved integrity analysis.

The examples demonstrate how visualisation techniques are used by engineers to better understand data, noise and trends, as well as for communication and to support confident decision making for integrity management.

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Single ticket: Non-Members	$60	$70	$75
Students	$25	$25	$25
Group Booking: 5pax - Corporate Members	$160	$230	-
Group Booking: 10pax - Corporate Members	$290	$440	-
Season Pass: 5 tickets - Members	$175		
Season Pass: 5 tickets - Non-Members	$290		

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