

# Sonardyne Navigation for Pipeline and Subsea Asset Inspection AUV



Kawasaki Heavy Industries (KHI) has chosen a suite of subsea navigation, positioning and communications technologies from marine energy, defence and science company Sonardyne to navigate, track and control its first commercial SPICE autonomous underwater vehicles (AUVs).

The SPICE (Subsea Precise Inspector with Close Eyes) AUV, complete with a submerged docking system and unique robotic arm for non-destructive testing, has been designed and built by KHI for intelligent and low-logistic pipeline and subsea asset inspection operations down to a water depth of 3,000m.

To support accurate and long-duration navigation on its missions, while minimising complexity and payload space consumption, the vehicle is fitted with Sonardyne's industry-leading hybrid navigator SPRINT-Nav.

For underwater positioning and communications, the SPICE AUV is using Sonardyne's AvTrak 6 – a combined transponder, modem and emergency relocater beacon all in one. KHI has also been using Sonardyne's Mini-Ranger 2 Ultra-Short Baseline (USBL) system with a Robotics Pack to support tracking and communications during development and testing.

Two SPICE (Subsea Precise Inspector with Close Eyes) AUVs have already been ordered by UK-based subsea services company Modus Subsea Services for cable and pipeline inspections, as well as more conventional surveys. One is due to be delivered to Modus this year.

## Reducing risk for crew

“Our goal with the SPICE AUV is to enable operational efficiency of inspection operations, to reduce costs and reduce the burden and risk experienced by crews working on support vessels offshore. We believe that Sonardyne's instruments will support the highly accurate navigation of the SPICE AUV, supporting our goals,” says Noriyuki Okaya, Development & Design section, AUV Department Kobe Shipyard, at KHI.

SPRINT-Nav combines Sonardyne's SPRINT INS sensor, Syrinx 600kHz DVL and a high accuracy intelligent pressure sensor into a single housing, making it one of the smallest combined inertial navigation instruments on the market. SPRINT-Nav's tight integration of raw sensor data at a low level provides unprecedented navigational performance and precision for subsea vehicles, consistently outperforming competing systems in customer trials. The SPRINT-Nav 700, selected by KHI, is equipped with the highest performance sensors available, including Honeywell ring laser gyros and accelerometers.

Built for simple integration on AUV platforms, AvTrak 6 combines the functions of transponder, transceiver and telemetry link in one low power unit, leaving more payload space and power for other instruments. It enables AUVs to undertake simultaneous LBL ranging, USBL tracking via a surface vessel and robust telemetry for AUV to vessel and AUV-to-AUV communications.

Mini-Ranger 2 is especially suited for use from smaller vessels, where survey-grade positioning performance is required. It can simultaneously track 10 targets at very fast update rates, is quick to install and has a standard operating range of 995 m, extendable to 4000 m. Sonardyne's Marine Robotics software pack unlocks valuable additional capability when used with a compatible subsea vehicle-mounted instrument such as AvTrak 6. This includes secure data exchange and remote control of multiple AUVs deployed in swarm scenarios.