Teardown: How Pelagix AUV Scales Navigation, Pressure Hulls and Underwater Comms Across Depth Classes

A Technical Look at Navigation Systems, Pressure-Resistant Structures and Communication Technologies Across AUV Depth Classes



Logo for Pelagix AUV

CALIFORNIA, CA, UNITED STATES, September 29, 2026 / EINPresswire.com/ -- China, September 29, 2026 — Sanya Poseidon Ocean Technology Co., Ltd., a deep-sea intelligent equipment manufacturer based in Sanya, Hainan, has published specifications for its Pelagix autonomous underwater vehicle (AUV) range, covering platforms from a 20 kg, 100 m portable vehicle to a 2,000 kg platform configurable for operations down to 6,000 m.

Across the range, the architecture combines inertial navigation, DVL and GNSS, with USBL added on larger platforms and modular payload interfaces used across the product line. As depth increases, the main engineering changes shift to pressure-hull construction, buoyancy, propulsion and battery allocation. Published applications include dam inspection, offshore oil and gas survey, deep-sea mapping, environmental monitoring and subsea intervention.

Why depth class, not product name, defines the architecture

The commercial centre of gravity in the AUV category remains shallow and mid-depth survey work, but investment is moving deeper. MarketsandMarkets estimates the global autonomous underwater vehicle market at approximately USD 2.0–2.57 billion for 2024/2025. Fortune

Business Insights projects the large/deep AUV segment — platforms rated deeper than 1,000 m — at a compound annual growth rate of 12.0% across its forecast period. An assessment accompanying the same dataset notes a structural gap between standard commercial depth ratings, commonly in the 300 m to 1,000 m band, and deep-sea industrial requirements above 6,000 m.

A 2025 analysis of AUV internal architecture published by Market.us puts energy storage at roughly 40% of a vehicle's internal volume for missions typically lasting up to 24 hours. That figure frames the central design tension in the category: inside a fixed hull envelope, battery volume, payload bay and buoyancy material compete for the same space, and the resolution of that competition is what separates one depth class from another.

Trade classification matters to importers as well as engineers. A US Customs and Border Protection ruling (NY N159975) classifies ROV and AUV units under HS Code 901580, covering oceanographic and hydrological instruments, with 890690 listed as an alternative heading.

The line, class by class

Poseidon Ocean Technology's published specifications place its platforms into five working classes, with vehicle mass rising from 20 kg to 2,000 kg across the range.

• Portable micro: AUV-150 (150 mm × 1.8 m; 20 kg; 3 kg payload; 0–100 m; 1–8 knots; ≥8 h at 3 knots) and AUV-160 (160 mm × 1.8 m; 35 kg; 5 kg payload; 0–100 m; 1–5 knots; ≥8 h at 3 knots), both designed for shore launch, small-boat deployment and net recovery.

• Nearshore survey: AUV-210 (210 mm × 2.1 m; 70 kg; 10 kg payload; 0–200 m; 1–5 knots standard with a 1–15 knot custom option; ≥10 h at 3 knots) and AUV-260 (260 mm × 2.5 m; 100 kg; 20 kg payload; 0–500 m; 1–6 knots; ≥12 h at 3 knots).

• Mid-depth survey: AUV-324 (324 mm × 4 m; 300 kg; 30 kg payload; 600 m or 2,000 m; 1–6 knots; ≥20 h at 3 knots, extendable to 50 h / 300 km) and the streamlined AUV-480 (480 mm × 6.5 m; 700 kg; 300 m operation; 1–5 knots; ≥20 h at 3 knots).

• Deep-sea: AUV-533 (533 mm × 5 m; 1,200 kg; 150 kg payload; 2,000 m or 6,000 m; 1–6 knots; ≥90 h at 3 knots, extendable to 180 h / 1,000 km), AUV-600 (600 mm × 6 m; 1,200 kg; 1,000 m / 3,000 m / 6,000 m; 1–6 knots; ≥24 h at 3 knots) and AUV-900 (900 mm × 6 m; 2,000 kg; 250 kg payload; 3,000 m / 4,500 m / 6,000 m; 1–6 knots; ≥90 h at 3 knots, extendable to 270 h / 1,500 km).

• Intervention: AUV-F760 (3,850 × 760 × 420 mm; 600 kg with a 60 kg payload and 500 kg displacement; 600 m or 1,200 m; 0–4.5 knots; ≥20 h at 3 knots, extendable to 400 h / 100–200 km; 6–8 thrusters; dual manipulator arms).

Depth rating is a configuration decision rather than a fixed attribute at platform level. The AUV-533 is offered at 2,000 m or 6,000 m; the AUV-600 at 1,000 m, 3,000 m or 6,000 m; the AUV-900 at 3,000 m, 4,500 m or 6,000 m; the AUV-324 at 600 m or 2,000 m; and the AUV-F760 at 600 m or 1,200 m.

Navigation: one core, three tiers of instrumentation

Every platform in the Pelagix line carries an inertial navigation system combined with a Doppler velocity log and GNSS. USBL is added from the AUV-210 upward, which means the two shallowest micro vehicles operate on inertial, Doppler and satellite positioning alone, while every larger model layers in acoustic baseline positioning for tetherless underwater referencing.

SLAM appears on three platforms: the AUV-533, the AUV-900 and the intervention-class AUV-F760. For the AUV-533 the navigation suite is documented as INS+DVL+GNSS+USBL+SLAM; the AUV-F760 carries the same combination; and the AUV-900 pairs it with a stated positioning accuracy of 0.2% of range.

Accuracy is published as a percentage of slant range rather than as a fixed figure in metres, which is a meaningful distinction for survey planning: the stated error scales with distance from the acoustic reference instead of remaining constant across the mission. The AUV-480 is specified at 0.3% of range and the AUV-600 at 0.5%.

Autonomy above the navigation layer is documented in operational terms. The AUV-600 application record describes pre-planned acoustic waypoint navigation, monocular vision-guided docking and AI-assisted navigation with real-time data telemetry. The AUV-324 record describes autonomous SLAM mapping navigation and tetherless autonomous docking supported by monocular vision. Underwater positioning in GPS-denied conditions is a stated design target across the smaller models as well, including the AUV-150 and AUV-160.

Pressure hulls and buoyancy: where the metallurgy changes

Two construction families run through the line. The micro, nearshore and intervention platforms use a lightweight aluminium frame, a seawater-resistant polymer casing, corrosion-resistant components and a pressure-sealed electronic pod — the AUV-150, AUV-160, AUV-210, AUV-260 and AUV-F760 all follow this pattern. The mid-depth AUV-324 and AUV-480 move to high-strength anodized aluminium alloy or titanium housings on a corrosion-resistant composite frame.

The 6,000 m group changes the approach again. The AUV-533, AUV-600 and AUV-900 are built around aluminium frame or titanium alloy pressure housings paired with corrosion-resistant

syntactic foam buoyancy modules and seawater-resistant electronics. Their documented operating environments include extreme hydrostatic pressure, low temperature and zero-visibility dynamic currents at abyssal depths. Survey-grade mapping accuracy and research-institute documentation are listed as scenario requirements for this class, alongside CTD sensors and acoustic multibeam bathymetry sonar.

Propulsion and endurance: the battery-volume trade-off

Propulsion configuration tracks the mission, not the hull size. Survey platforms across the nearshore and deep-sea classes run at 1–6 knots, with the AUV-150 specified up to 8 knots and the intervention-class AUV-F760 at 0–4.5 knots. The F760 is the only platform in the line documented with 6–8 thrusters, which supports six-degree-of-freedom manoeuvring for inspection, maintenance and repair work rather than straight-line transit.

Standard endurance at 3 knots forms a clear ladder: ≥8 h for the AUV-150 and AUV-160, ≥10 h for the AUV-210, ≥12 h for the AUV-260, ≥20 h for the AUV-324, AUV-480 and AUV-F760, ≥24 h for the AUV-600, and ≥90 h for the AUV-533 and AUV-900. Custom configurations extend beyond those baselines: 50 h / 300 km on the AUV-324, 180 h / 1,000 km on the AUV-533, 270 h / 1,500 km on the AUV-900, and 400 h / 100–200 km on the AUV-F760.

Set against the Market.us estimate that energy storage occupies about 40% of internal volume on a typical AUV, the endurance figures are best read as a statement about allocation. A platform that claims long endurance is necessarily reserving hull volume for cells, which in turn constrains sensor bay size and buoyancy material — the reason payload capacity is quoted separately for every model in the line.

Underwater communication and data return

Data return is handled through acoustic and satellite telemetry depending on mission profile. The AUV-533 ocean exploration scenario documents satellite and acoustic telemetry updates as the operating mode, with an underwater combination antenna listed as a required item. The AUV-600 deep-sea scenario lists a deep-sea waterproof packet and an ocean electromagnetic coupling module as supporting hardware, alongside CTD sensors and acoustic multibeam bathymetry sonar.

Real-time data telemetry is a documented capability on both the AUV-324 and the AUV-600. In the dam inspection scenario, the architecture extends to a shore-based monitoring station (PX-S), reflecting a working environment where the vehicle operates in confined intake tunnels and zero-visibility turbulent flow rather than open water.

Payload integration and the modular bay

Payload capacity rises with depth class from 3 kg on the AUV-150 to 250 kg on the AUV-900: 5 kg on the AUV-160, 10 kg on the AUV-210, 20 kg on the AUV-260, 30 kg on the AUV-324 and 60 kg on the AUV-F760. The company's customisation documentation lists a modular payload bay as a configurable element, with sensor integration options spanning CCD, CTD, altimeter, obstacle avoidance sonar, side-scan sonar, multi-beam sonar, sub-bottom profiler sonar, USBL and hydrophones.

Beyond the bay itself, the customisation scope covers depth rating, battery capacity and endurance, software, AI recognition models, monocular vision docking algorithms, cut-and-clear tooling, and branding and documentation. Quality control across the line runs through five stages: incoming inspection, in-process inspection, hardware-in-the-loop simulation, final inspection and factory outgoing inspection.

Scenario fit: matching platform class to mission

Dam and hydroelectric infrastructure

The AUV-210 and AUV-260 are the platforms assigned to dam wall inspection, operating in reservoir water bodies and against hydraulic dam walls in zero-visibility turbulent conditions. Documented functions include wall-following defect identification and small-object recognition, executed in autonomous SLAM mapping and obstacle-avoidance cruising modes. The AUV-210 operates within a 0–200 m depth range in this scenario. Required supporting equipment includes a sound and light integration recognition system, high-precision CTD sensors, high-thrust thrusters and the PX-S shore-based monitoring station; special requirements include a modular payload bay and application-specific quality documentation.

Offshore oil and gas

The AUV-324 serves subsea pipeline and riser structural integrity work in deepwater subsea oilfields down to 2,000 m. Its documented role is subsea pipeline visual and acoustic scanning, entanglement identification and cut-and-clear system intervention, conducted through autonomous SLAM mapping navigation, tetherless autonomous docking and automatic small-object recognition. The specified hull is pressure-rated to 2,000 m, and the platform is configured with a high-payload modular bay.

Deep-sea exploration and oceanographic research

The AUV-600 is the abyssal bathymetric mapping platform, rated for 6,000 m water depth and documented for subsea geological survey and oceanographic research documentation programmes. Its functions include seabed mapping for bathymetry and CTD physical oceanography data collection on long-range surveys, using acoustic multibeam bathymetry sonar and CTD sensors among its supporting equipment.

Environmental monitoring and eddy tracking

The AUV-533 is documented for open-ocean mesoscale vortex tracking and long-distance hydrographic monitoring, running in multi-AUV swarm survey mode with long-endurance autonomous cruising up to 1,000 km and continuous multi-day operations. The company's OceanX-Eddy mesoscale vortex AI forecasting model and its multi-AUV cooperative survey capability are listed among the systems used in this scenario, alongside CTD sensors and the underwater combination antenna.

Offshore wind and pipeline intervention

The AUV-F760 is the six-degree-of-freedom intervention platform, built for inspection, maintenance and repair of offshore wind turbine foundations, subsea pipelines and underwater structures. Its dual manipulator arms support gripping, cutting and rotating functions, and its stated applications include underwater structure emergency repair and underwater search, rescue and salvage.

Field Records: From Specifications to Operational Use

In a reported offshore oil and gas deployment, four AUV-324 units operated for two years and covered about 1,200 km of pipeline inspection, identifying 18 critical structural anomalies or marine-growth entanglements without reported safety incidents. The configuration included a 2,000 m rating, modular payload bay, cut-and-clear capability and real-time telemetry.

In another reported deployment, a marine research institute operated three AUV-260 units for three years for seabed mapping, aquaculture monitoring and environmental measurement. CTD and side-scan sonar supported the surveys, while modular payloads enabled sensor changes between missions. The project reported a 45% reduction in field survey time and less reliance on divers.

Manufacturing, Customisation and Delivery

The company reports a monthly capacity of 8–10 custom AUV platforms or core components, MOQ 1, and lead times of 60–90 days for standard models or 120–180 days for customised 6,000 m systems. Support covers OEM, ODM, system integration and deep-sea engineering cooperation, with exports reported across Southeast Asia, the Middle East, South America, Europe and North America.

After-sales provisions include remote assistance, sea-trial commissioning, operator training, a two-year warranty for pressure hulls and electronics, and modular spares.

How the company positions the architecture

Poseidon Ocean Technology positions its technical focus around AI, deep-sea pressure resistance and underwater communication, with applications spanning marine research, ecological monitoring, offshore engineering O&M, underwater survey and exploration, and maritime training. Its stated capabilities cover AUV platforms, underwater operational systems, marine monitoring and navigation equipment, modular engineering and AI software.

What Operators Should Verify

The main technical point across the range is configuration continuity: a common INS+DVL+GNSS foundation, with USBL and SLAM added by platform class, supports different mission profiles while maintaining a broadly consistent navigation architecture.

For technical evaluation, five points warrant verification: configured depth rating, endurance speed, usable payload after sensor integration, the basis of navigation accuracy, and the completeness of technical documentation. Depth options should be checked against the actual configuration, while endurance figures should be compared at their stated 3-knot reference speed. Navigation accuracy should also be read according to its percentage-of-range basis rather than as a fixed metre value.

Closing outlook

The Pelagix range shows how a common autonomy and navigation architecture can be reconfigured across depth classes through changes in pressure hulls, buoyancy, propulsion, battery allocation and payload integration. For technical assessment, the relevant question is therefore not simply how many models are offered, but whether the configured depth, endurance, payload and positioning specifications can be verified against the requirements of a specific mission.

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