

# TETHYS ONE

Last year, Zurich-based Tethys Robotics launched its Tethys One underwater robotic vehicle as an advanced compact solution for automated investigations, particularly in challenging environments.

At 35kg, the Tethys One is designed for rapid deployment, requiring just ten minutes to be operational without the need for additional equipment. This compact form, however, belies a robust construction, allowing it to operate at depths reaching 300 meters.

“One of the main features of the Tethys One is its dual-mode functionality,” said CEO Jonas Wüst. It can seamlessly transition between remote-operated vehicle (ROV) mode, where a pilot exercises control, and autonomous underwater vehicle (AUV) mode, enabling it to conduct missions independently. This versatility ensures that the Tethys One can adapt to a wide array of underwater tasks, from detailed inspections to extensive explorations.”

“Navigating the often unpredictable

underwater currents is a formidable challenge for many submersible devices. The Tethys One, however, is adept at maintaining its position even in currents up to 3.5 kts. This capability is crucial for stationary inspections in dynamic aquatic environments, ensuring stability and precision during operations.

“The drone’s propulsion system facilitates omnidirectional movement, granting it unparalleled manoeuvrability in confined or complex underwater terrains.”

The vehicle is equipped with advanced georeferenced localisation technology, and thus offers precise navigation and mapping capabilities. Its suite of sensors provides 360-degree terrain awareness, incorporating Doppler Velocity Logs (DVL), side- and front-facing sonar systems, and obstacle avoidance mechanisms. This comprehensive sensory array ensures that the drone can effectively navigate and map areas with poor visibility, a common challenge in underwater operations



Modularity is at the core of the Tethys One's design philosophy," said Wüst. "It supports a diverse range of payloads, including high-definition cameras, acoustic sensors, metal detectors, and various environmental sensors.

"This adaptability allows operators to customise the drone for specific missions, whether it's environmental monitoring, industrial inspection, or search and rescue operations. The inclusion of a 4-axis manipulator enhances the drone's capability to interact with its environment, enabling tasks such as object retrieval or infrastructure manipulation."

Data collection and reporting are streamlined through the Tethys One's integrated systems. It supports live recording and reporting during missions, facilitating real-time decision-making. Post-mission, the data can be processed to create detailed 3D models through photogrammetry and acoustic mapping techniques.

This level of detail is invaluable for assessments in industries such as offshore oil and gas, where precise structural

analyses are paramount.

"The Tethys One's applications span multiple sectors," said Wüst. "In the offshore wind industry, it can perform autonomous inspections of submerged structures, ensuring the integrity and longevity of installations. In search and rescue missions, its ability to operate in turbid waters and maintain stability in strong currents makes it an indispensable tool for locating

and identifying objects or individuals.

"The drone's capacity to integrate environmental sensors also positions it as a vital instrument for scientific research, allowing for the collection of data on water quality, temperature, and other critical parameters.

"Safety and efficiency are paramount in underwater operations, and the Tethys One addresses these concerns

adeptly. By automating inspections and reducing the reliance on human divers, it minimises exposure to hazardous conditions. Its rapid deployment capability ensures that time-sensitive missions can commence without delay, a critical factor in scenarios like search and rescue or emergency infrastructure assessments.

"Tethys One's user interface is designed for intuitive operation. A user-friendly control system, complete with a mini-map and the ability to place points of interest, allows operators to manage missions effectively.

"The drone's autonomous features, such as position and orientation hold, depth and distance lock, and repeatable area coverage, further simplify the operational process, reducing the learning curve for new operators. In terms of endurance, the Tethys One boasts a runtime of up to four hours, supported by hot-swappable batteries that allow for extended missions without significant downtime. Its wired operating range extends up to 2km, with options for extension, providing ample reach for various underwater tasks.

"The launch of the Tethys One marks a significant milestone in underwater robotics. Its combination of advanced features, modular design, and operational versatility positions it as a leading solution for underwater inspections and explorations. As industries continue to seek efficient and safe methods for subaqueous operations, the Tethys One offers a compelling answer, embodying the future of underwater drone technology," said Wüst.



Tethys One

Depth rating	300 m
Weight in air (buoyancy)	35 kg, (neutral buoyancy)
Dimensions	60.5 x 59 x 33.5 cm
Setup time	10 min
Vehicle Power	
Speed	3.5 knots
Runtime	4h
Batteries	Hot swappable
Thrust	480 N
Lift capacity	Fully equipped diver
Orientation	360° roll, pitch & yaw
Turning rate	180°
Safety	Low voltage
GNSS	Yes
Waypoint follow	Autonomous
Spatial aware	360° (acoustic)
Topography	Real time
Communication	Fiber Optics Tether
Tether length	2000 m
Diameter	3.5 mm
Breaking strength	750 lb / 340 kg
Management	Manual cable reel
Buoyancy	Neutral
Cameras	
Resolution	1080p (full HD)
Sensitivity	0.01 Lux
View angle	150°
Tilt range	160°
Lighting	
Brightness	Up to 16'000 lm
Nr. of light LEDs	4 pcs (dimnable)
Pressure, Temperature Sensing	
Range	30 bar, -10 - 80 °C
Sensitivity	0.15%, 1%
IMU & Magnetometer	
Roll / pitch	0.5° RMS
Yaw / heading	2° RMS
Gyro bias stability	40 ug
Op frequency	1.2 MHz / 2.1 MHz
DVL (Doppler Velocity Log)	
Acoustic frequency	500 kHz.
Range (bottom track)	0.3m - 175 m
Current profiling	Yes
Grabber	Nr. of axes 4 DoF