

Wave Glider USV2

Solar-Powered Uncrewed Surface Vehicle (USV)

Overview

To date, the company has completed the mass production and delivery of **over 280 wave glider systems**, providing **ocean observation, monitoring, and sensing services** to **more than 100 scientists from over 20 marine research institutions**.

These wave gliders have successfully endured **17 typhoon events** in the **Northwest Pacific Ocean and the South China Sea**, accumulating a **total effective operational distance exceeding 200,000 km**. Their survivability under **extreme sea-state conditions** has been fully validated.

The successful development of the **USV2 platform** represents a **revolutionary technological upgrade** to the wave glider system, significantly enhancing overall **platform performance, payload capability, and mission functionality**.



Operating Principle

The **USV2 Wave Glider** is capable of carrying various types of **acoustic, electro-optical, and magnetic sensors**, and can operate either as a **standalone platform** or in **networked formations** to perform a wide range of **marine scientific observation and maritime security missions**.

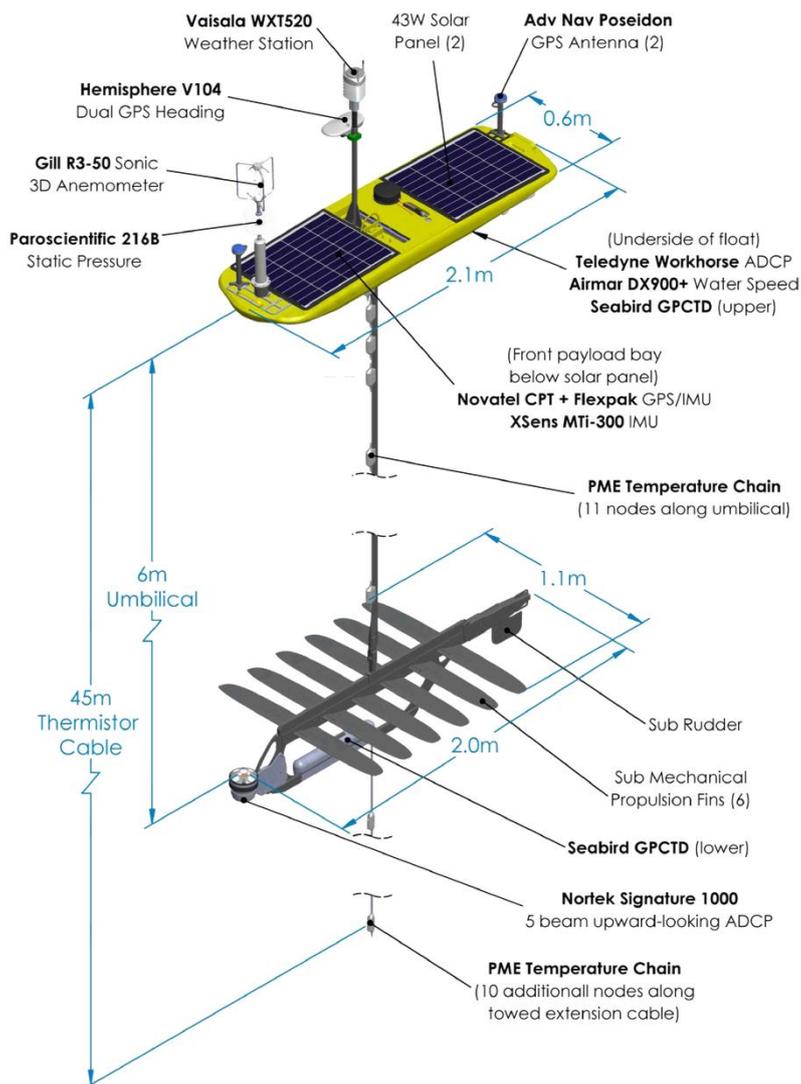
Leveraging its **renewable energy supply, high integrated payload capacity, excellent low-noise and low-signature characteristics, precise navigation and station-keeping capability, and reliable real-time communications**, the **USV2 Wave Glider** is increasingly becoming a **preferred platform for ocean observation and sensing applications**.

Standard Configuration

Category	Item	Specifications
General	System Configuration	Surface float, subsurface glider, armored tether (7 m)
	Dimensions	Surface float: 210 cm × 60 cm; Subsurface glider: 190 cm × 110 cm; Hydrofoil span: 120 cm
	Weight	Approx. 100 kg
	Endurance	Multi-year offshore operation (recommended maintenance every 3–4 months)
	Speed	1.0–2.0 knots (Sea State 1–4)
	Pressure Resistance	Resistant to continuous wave impact; Short-term submersion (max depth 1 m)
	Visibility	Mast with flag and strobe light
	Transportation	Aviation case packaging; Deployment and recovery trolley
Energy	Propulsion	Wave energy converted into propulsion
	Battery	980 Wh rechargeable lithium-ion battery
	Solar Power	120 W (peak)
Payload	Architecture	Standardized modular mechanical, electrical, and software payload architecture for easy integration
	Basic Configuration	AIS receiver; LED warning light and flag
	Continuous Output Power	Voltage: 12 – 28 V; Current: 5 A (max)
	Payload Interfaces	Surface float: 3 ports; Subsurface glider: 1 port; Miniature 5/8-pin wet-mate connectors 12 – 28 V, 4 A (max)
	Max Effective Discrete Payload (Surface Float)	Max payload mass: 35 kg; Max payload volume: 20 L; Peak available power: 40 W
Navigation	Path Tracking Accuracy	40 m (CEP80); Sea State 3, current < 0.5 knots
	Station-Keeping Accuracy	Radius 100 m (CEP80); Sea State 3, current < 0.5 knots
	Heading	Electronic compass
	Positioning	GPSBeiDou (optional)
Control	Mission Control	Multi-platform display based on electronic nautical charts; Automatic waypoint and route generation
	Status Monitoring	Textual and visual status display; SMS and email alerts; Programmable geofencing
	Autonomous Navigation	Straight-line path following; Circular trajectory tracking; Virtual anchoring; Target heading keeping

Category	Item	Specifications
Safety	Emergency Positioning	Redundant satellite beacon
	Compartment Health Monitoring	Dry compartment pressure, humidity, and water ingress detection
	Battery Protection	Independent battery installation; Automatic charge/discharge switching; Over-temperature and over-voltage protection
Communications	Beyond-Line-of-Sight (BLOS)	Iridium 9602; BeiDou short message (optional); Tiantong dial-up (optional); Iridium dial-up (optional)
	Line-of-Sight (LOS)	ZigBee wireless

Product Schematic



Scientific Payloads

The **Wave Glider** can be equipped with a wide range of **scientific payloads**, including **meteorological stations, laser Doppler wind lidar, atmospheric duct sensors, wave sensors, CTD (Conductivity–Temperature–Depth) sensors, temperature and salinity winches, ADCP (Acoustic Doppler Current Profilers), multi-parameter water quality sensors, hydrophones, magnetometers, vision-based recognition systems, and AIS receivers.**

These payloads enable missions such as **marine meteorological observation, tsunami and earthquake monitoring, marine mammal and biological monitoring, and offshore energy exploration.** In addition, the Wave Glider can carry **underwater acoustic communication modems** to perform **surface-to-underwater data relay and communication gateway** missions.

Unique Capabilities

The **Wave Glider** features **self-sustaining energy supply, global positioning, satellite communications, and autonomous navigation.** It is capable of **autonomous navigation along predefined routes or virtual anchoring around designated locations,** enabling **long-duration, wide-area unmanned continuous survey operations** (up to **10,000 km per year**).

In addition, the platform supports **virtual station-keeping at fixed sea-surface locations,** providing **data relay and communication gateway services** for **underwater and surface-based systems,** as well as **long-range real-time data transmission** to shore-based control centers.

Applications

- **Marine Meteorological Observation**
Continuous measurement of wind speed, wind direction, air temperature, atmospheric pressure, and humidity, supporting offshore weather monitoring, forecasting, and climate research.
- **Sea Surface and Upper-Ocean Hydrological Observation**
Real-time observation of wave height, wave direction, current speed, current direction, sea surface temperature, and salinity, enabling long-term monitoring of ocean surface dynamics and air–sea interactions.
- **Coastal Security and Maritime Patrol**
Persistent coastal and nearshore surveillance using video, optical imagery, and radar data, supporting maritime domain awareness and coastal security operations.
- **Underwater Acoustic Measurement**

Measurement of ambient underwater noise and direction finding and localization of underwater targets, supporting ocean acoustic research and maritime safety applications.

- **Ocean Dynamics and Profiling Observation**

Acquisition of vertical profiles of current velocity and direction, as well as water temperature and salinity profiles, enabling studies of ocean circulation and water column structure.

- **Marine Water Quality and Ecosystem Monitoring**

Long-term monitoring of pH, dissolved oxygen, turbidity, chlorophyll, partial pressure of carbon dioxide ($p\text{CO}_2$), radioactivity, and other key indicators, supporting marine environmental protection and ecosystem assessment.