



IVER2

Affordable Next Generation Autonomous Underwater Vehicle (AUV)

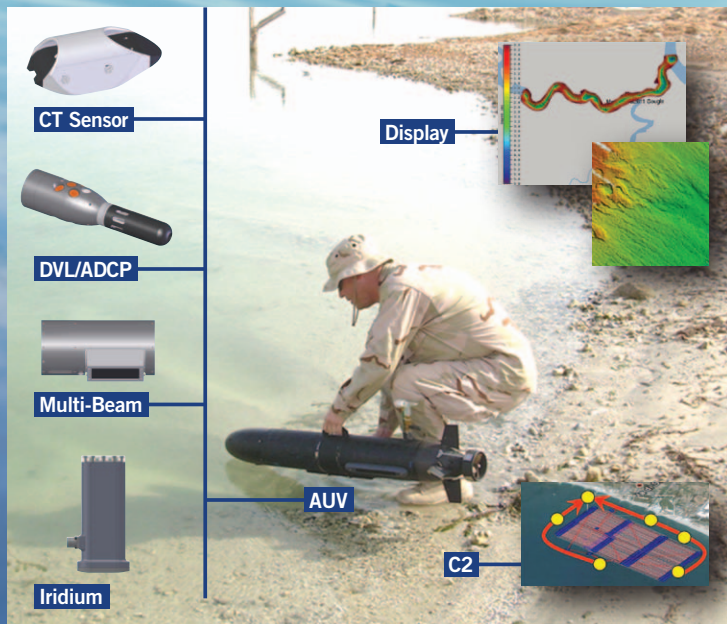
Easy to Operate, SINGLE PERSON Launch & Recovery

Commercial OPEN SYSTEM Architecture

INTUITIVE Mission Planner



Navy Special Warfare (NSW) Lightweight AUV



ONR Technology Transfer Program

CUSTOMIZE an Iver2 AUV for Your Application

Commercial and academic users around the world rely on the Iver2 family of low-cost AUVs for a variety of missions in maritime environments including lakes, reservoirs, rivers, and estuaries. With a proven track record over thousands of missions, it is ideal for imaging and environmental surveys, including research, development, and OEM based applications. As a commercially developed vehicle, it's available worldwide today.

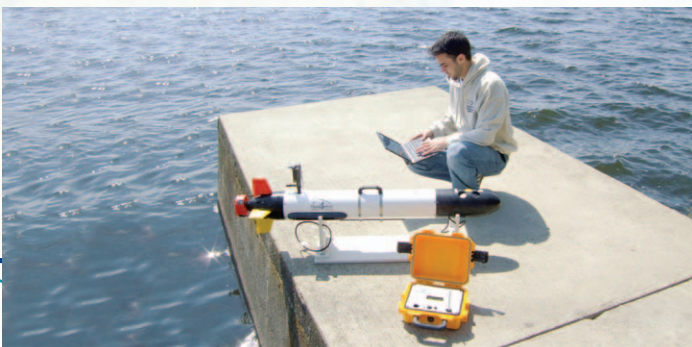
CONFIGURE Your Iver2 AUV

Iver2 is the first commercially available AUV system starting at \$50,000 USD. Instantly develop a quote for your system using our online pricing tool. Build a single quote or a series of quotes for different vehicles in just minutes. Most system configurations are available in 8-12 weeks. Add a rugged battery operated WiFi box to transfer mission files between an operator's notebook and the Iver2 AUV for a complete system.



Above: A variety of Iver2 AUV configurations ready for operational surveys

Below: Lightweight and easy to use, Iver2 AUV system can be launched and recovered by a single person

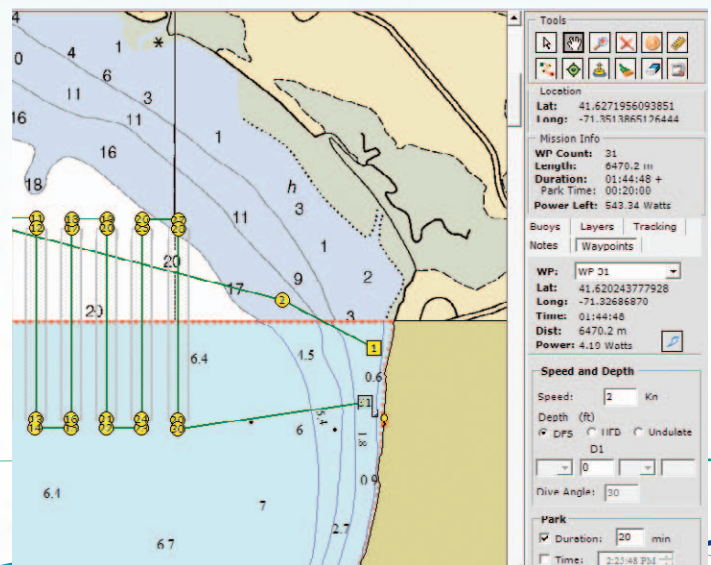


DEVELOP Your Iver2 Mission

VectorMap is an intuitive and powerful GUI-based mission planner that lets the operator set parameters for each leg to a waypoint, including speed, depth and sensor configuration. Download readily available charts, maps, photos, or satellite images then point and click to position mission waypoints. VectorMap creates an ASCII file that transfers to an Iver2 AUV, and in less than a minute, you're ready to go.

Users can plan multiple vehicle missions on the same map or overlay, and store the information until mission execution. Then download mission data via industry standard protocols to a variety of post-processing programs while the vehicle is parked on the surface or after the project is complete.

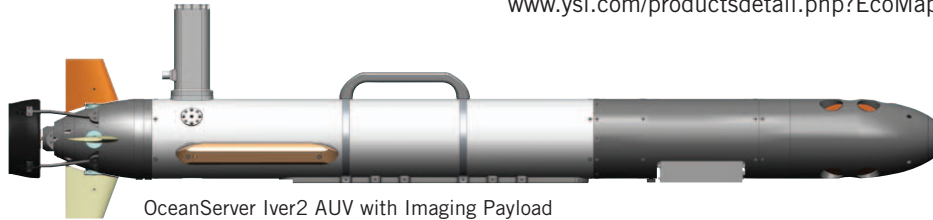
Below: VectorMap geo-referenced mission overlaid on raster and vector chart source



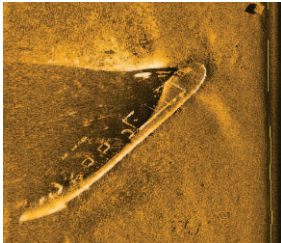
STANDARD Survey Models

OceanServer offers standard vehicle models with user-selected sensor payloads that address imaging survey needs. These include side scan or multi-beam sonar, acoustic current profiling and video imaging.

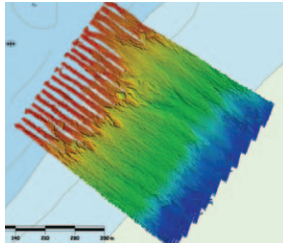
We have partnered with YSI Environmental in development of the EcoMapper, a novel approach to high resolution water quality monitoring and mapping. More information can be found at: www.ysi.com/productsdetail.php?EcoMapper41.



OceanServer Iver2 AUV with Imaging Payload



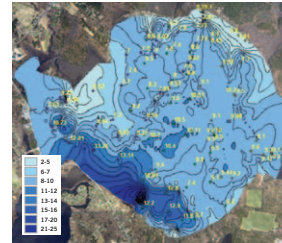
Side Scan Sonar



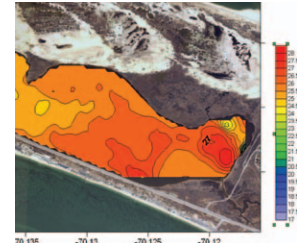
Multi-Beam Sonar



Still or Video



Bathymetry



Environmental



YSI EcoMapper with Environmental Payload

EXPANDABLE Payload Models

Iver2 AUVs with Expandable Payload Options are Ideal for Researchers and Developers

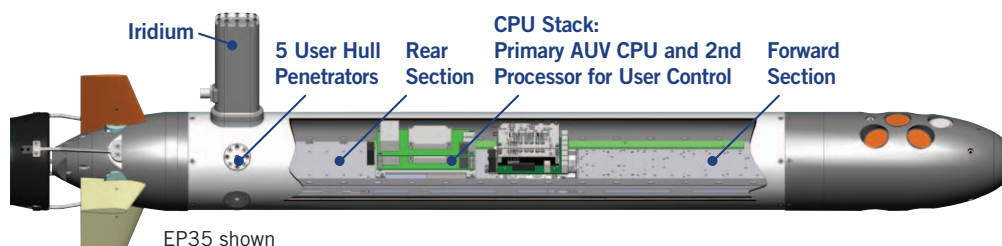
The Expandable Payload (EP) model delivers a flexible, robust open system architecture for smart system design. Use the functionality of the base vehicle or add any number of acoustic, environmental or imaging sensors.

Three Models Available

Model	Payload Space (inches)	AUV Power (watt hours)	Tube Length (inches)
EP32	10" Forward	6 Packs/570 WHrs	32"
EP35	5" Rear, 10" Forward	6 Packs/570 WHrs	35"
EP42	22" Forward	8 Packs/760 WHrs	42"

The Open System Platform Includes:

- Dedicated CPU and Disk for user OS, sensor drivers and behavioral software
- Serial Interface to the Primary Vehicle Controller provides real-time access to vehicle state and sensor output data
- Well-documented Application Protocol Interface (API) with select vehicle command options to permit backseat driver control of the Iver2 AUV
- Simulation utility (SubTester) to validate custom code
- Defined software Interface to public domain remote helming software such as MOOS-IvP



EP35 shown

IVER 2 AUV SPECIFICATIONS

STANDARD FEATURES (All Vehicle Models)

DIMENSIONS: Standard Length: 50-70 inches

TUBE DIAMETER: 5.8 inches

WEIGHT: 45-60 Lbs (standard vehicle)

DEPTH RATING: 100 meters

ENDURANCE: 8-14 hours at speed of 2.5 knots; configuration dependent

SPEED RANGE: 1-4 knots

COMMUNICATION: Wireless 802.11n Ethernet

POWER: 10 Pin Circular Connector DC Charge Voltage

NAVIGATION: Surface: GPS (WAAS corrected).

Subsurface: Bottom tracking to 40 m with DVL or dead reckoning with compass, depth sensors, and vehicle speed tables

TRACKING INTERNAL DATA LOG:

Programmable resolution

SOFTWARE VECTORMAP: Mission planning and data viewing

SONAR MOSAIC: Processes sonar records for overlay to VectorMap

UNDERWATER VEHICLE CONSOLE (UVC): Operation, run mission, remote control

ENERGY: 600-800 WHrs of rechargeable Lithium-Ion batteries, depending on vehicle configuration

ONBOARD ELECTRONICS: Intel 1.6 GHz ATOM processor with Windows XP embedded; Up to 128 GB solid state drive for data collection

PROPULSION SYSTEM: 24V Servo Controlled DC Motor with 3-blade cast bronze propeller

CONTROL: Four independent control planes (Pitch/Yaw Fins)

ADDITIONAL CPU: Low Power Intel 1.6 GHz ATOM based available in the Iver2 EP (Expandable Payload) research platforms only

OPTIONAL SENSORS & ACCESSORIES

SONAR SIDE SCAN

IMAGENEX YELLOWFIN: Triple frequency 260/330/770 kHz

MARINE SONIC SEA SCAN HDS: Dual frequency 600/1200 kHz or 900/1800 kHz

NEW – L3 KLEIN UUV-3500: Dual frequency 455/900 kHz

SONAR MULTIBEAM

260 kHz; Beams: 120, 240, 480; Beam width, transmit and receive: 120° x 3; Depth: 100 m

NEW – L3 KLEIN UUV-3500: Swath bathymetry 455 kHz

DOPPLER VELOCITY LOG (DVL Options)

4-BEAM: Single frequency, down-looking DVL for low-cost, bottom-track navigation

6-BEAM: Dual frequency, down-looking DVL for precise bottom-track navigation with Acoustic Current Profiling (ADCP). 4 velocity beams and 2 vertical beams (one up, one down)

10-BEAM: Dual frequency, up- and down-looking DVL for surface- (ice) and bottom-track navigation with full water Column Acoustic Current Profiling (ADCP). 4 velocity beams and 1 vertical beam (up) and 4 velocity and 1 vertical beam (down)

ALTIMETER: Dedicated 500 kHz vertical beam (height from bottom: depth from surface); Min. to Max. Range: 0.06 to 80 m (6 + 10 Beam DVL)

BOTTOM TRACKING AND CURRENT PROFILING:

1 MHz transducers; Min. to Max. Range: 0.06 to 35 m; Velocity: ± 10 m/s; Accuracy: $\pm 0.25\%$ of the reported Velocity, ± 0.25 cm/s; Resolution: 0.001 m/s

CT SENSOR: Conductivity & Temperature (NBOSI)

COMMUNICATIONS: Surface: 2.4 GHz telemetry radio or Iridium with Iver Track software. **Subsurface:** Acoustic Micro Modem

HANDHELD REMOTE CONTROLLER: Touch screen based 2.4 GHz telemetry radio remote with joystick surface control (300 meter + range)

CAMERA: Still and video imagery

SECURITY SYSTEM SAFETY TOW FLOAT: Emergency airbag recovery system

ACOUSTIC PINGER: Underwater locating and tracking

RUGGED TRANSIT CASE: With custom foam inserts for Iver2 includes collapsible AUV field stand

