

## SONOBOT 5

### Autonomous Hydrographic Survey Vehicle



- **Hydrographic surveys**
  - Bathymetry and seafloor imaging in ports, harbours and inland waters
- **Search and recovery**
  - Locating objects, such as archaeological artifacts, wrecks, missing persons etc
- **Survey missions**
  - Exploring shallow waters, natural reserves, flooded, restricted or hard-to-reach areas
- **Monitoring**
  - Regular examinations of underwater infrastructure
- **Security**
  - Special versions for maritime and seaside security missions available upon request



#### High-precision measurements and recordings

- Different GNSS-options available (DGPS, RTK, laser tracking over a total station)
- Single-beam echosounder, multibeam echosounder, side-scan sonar, front-looking sonar
- HD camera for navigation support, still and video
- Thermal camera, stereo camera

#### Flexibility

- Modular Design for a Wide Range of Applications
- Rapid deployment, excellent manoeuvrability and coverage thanks to powerful motors
- Special system software for planning, execution and evaluation of the survey
- Communication over a redundant mesh network enables work with/without a WLAN station, including integration of additional modules (laser tracking) without any configuration effort.

#### Versatility

- Autonomous and radio controlled modes
- Direct Wi-Fi communication with redundant link or GPRS/UMTS
- Mission planning includes sonar parameters
- Configurable data output

#### Robustness

- Built from robust seawater-resistant materials
- Suitable for operations in industrial waste waters
- PC for field operations
- On-board data logging and telemetry
- Transport case, suitable for air transport

#### Easy handling

- Tool-less assembly
- Can be handled by a single person
- Fits into a car trunk compartment for transport

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<b>DESIGN AND DIMENSIONS</b>	
<b>Vehicle type</b>	Catamaran
<b>Dimensions</b>	Height: 805 mm, width: 920 mm, length: 1300 mm
<b>Draft</b>	120 mm (propeller over keel line) with weed guard
<b>Weight</b>	< 27 kg, depending on configuration
<b>Transport</b>	Complete system in one transport case, fold-out assembly without tools.
<b>IP rating</b>	IP 68 for all system components
<b>System components</b>	Sonobot USV, field PC, software, remote control, WLAN station with tripod and antenna
<b>OPERATION</b>	
<b>Communication</b>	Mesh network 2,4 GHz WLAN and 868 MHz redundant (915 MHz available) enable permanent control for real-time navigation and measurement data collection
<b>WLAN range</b>	< 1.5 km (omnidirectional antenna), < 2.5 km (directional antenna), long range option
<b>Operating range</b>	>30 km at 1 m/s speed in water, depending on configuration
<b>Survey speed</b>	0.5 to 1.5 m/s, maximum speed 5 m/s, depending on configuration
<b>Operating time</b>	<9 hours with one battery pack, depending on configuration; extra battery packs available
<b>Wind/ waves</b>	up to 5 bft without breaking waves
<b>Control</b>	Manual control and map-based navigation, autopilot for autonomous operation
<b>SONARS</b>	
<b>Echosounder</b>	EvoLogics broadband single beam 200 kHz standard; 80 kHz and 400 kHz options available
<b>Side-scan sonars</b>	EvoLogics 500 kHz with integrated 200 kHz echosounder standard, other options available
<b>Multibeam echosounder</b>	EvoLogics Multibeam (Norbit inside): dual GNSS and INS positioning and motion control, up to 130° swath, 256 beams at 1.45° x 1°, over 200 m range, up to 50 Hz ping rate, compatible with Norbit data collection tools
<b>Forward looking sonar</b>	700 kHz: up to 25Hz update rate, 256 beams, opening angle 120° x 20°
<b>POSITIONING</b>	
<b>GNSS</b>	1408 channels, frequency bands: GPS L1C/A, L2C, L2P(Y), L5; BDS B1I, B2I, B3I; GLONASS G1, G2; Galileo E1, E5a, E5b; QZSS L1C/A, L2C, L5; SBAS L1C/A, RTK position accuracy: horizontal 0.8cm + 1ppm, vertical: 1.5cm + 1ppm
<b>RTK</b>	Reference service over GSM/LTE or Base/Rover, EGNOS
<b>Total station</b>	Mirror reflector and total station for positioning without GNSS optionally available
<b>FIELD PC / SOFTWARE</b>	
<b>Rugged laptop</b>	Robust, bright, IP65 and MILSTD810G rated, with preconfigured software, LTE option available
<b>Software</b>	Software and GUI are designed for working with the Sonobot and are also available without a PC
<b>CAMERA</b>	
<b>Front view camera</b>	Fully integrated HDTV network camera with data storage for photo and video recordings. Underwater camera option available
<b>Stereo camera</b>	1920x1200, max. 60 FPS, colour sensor AR0234, DFOV 120°, HFOV 82°, VFOV 56°
<b>Thermal camera</b>	30 Hz 640x512, measured temperature range: -40°C to +550°C
<b>TRANSPORT</b>	
<b>Case</b>	Robust case for long term industrial use 1532 x 585 x 514 mm, depending on configuration appr. 60 kg, depending on configuration

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