



R2SONIC

Pioneers of Wideband
High Resolution
Multibeam Systems

www.R2sonic.com



Company Profile

R2Sonic was founded in February 2006 by three veteran underwater acoustical engineers; Jens R. Steenstrup, Mark Chun and Kirk Hobart; with the mission to utilize their experience to bring high quality, leading edge underwater acoustic products to the private and public sectors, with focus on customer needs.

R2Sonic founders and personnel bring over 30 years of market driven quality engineering design and manufacturing experience, utilizing “best practice” design and manufacturing process.

R2Sonic brings pioneering values to the industry. With the launch of the innovative Sonic 2026, 2024, 2022 and 2020 Broadband / Wideband Multibeam Systems, R2Sonic has redefined the Multibeam market with unparalleled performance with unique system features and application growth capabilities.



Facilities

The R2Sonic Headquarters are conveniently located 10 minutes from Austin city center, 10 minutes from Lake Travis and 15 minutes from the International airport, in the high technology corridor. The facilities are well equipped with modern instrumentation and software tools necessary for the efficient modeling, development and test of underwater acoustical equipment.



Systems Overview

The R2Sonic – Sonic Series are the world's first true wideband high resolution shallow water multibeam echo sounder systems. With proven results and unmatched performance, R2Sonic systems produce reliable and remarkably clean data with maximum user flexibility.

R2Sonic is the pioneer innovator of wideband real-time frequency selections for commercial multibeam echosounder systems. With thousands of selectable operating frequency possibilities to choose from between 170 - 450 kHz to 1 Hz resolution, along with optional ultra-high resolution (UHR™) 700 kHz and 90/100 kHz for select systems, the Sonic system user has much more operational flexibility to optimize to the application, depths or environment.

In addition to pioneering selectable operating frequencies in real-time on the fly, R2Sonic also pioneered variable swath coverage capability, with ability to electronically steer beams to a selectable user defined sector. When a narrow sector is selected, all soundings are concentrated within the swath for increased resolution over small scale bottom features. Wide swath sectors are typically used for general mapping or when surveying vertical surfaces such as quays, breakwaters, dams, pilings or bridge abutments as the increased opening angles can eliminate need to rotate the sonar head.

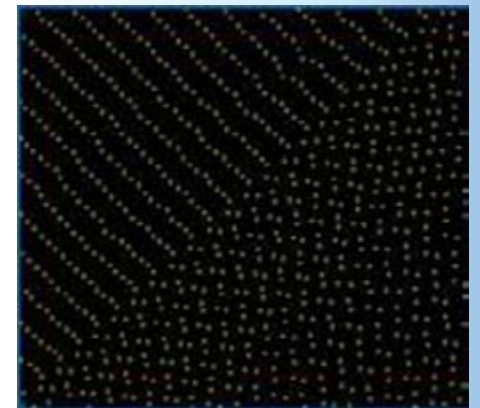
Equidistant beam spacing, roll stabilization, pitch stabilization (on select products), dual/quad density modes, saturation monitor and our unique ROBO™ automatic sonar operation are incorporated in Sonic systems, increasing system overall efficiency.

Advanced optional functions including Ultra-High Resolution (UHR™) 700 kHz for Sonic 2024, 2022 and 2020 systems providing unprecedented narrow beam widths, 90/100 kHz operation for Sonic 2026 with sounding depth capabilities to 800m or more, TruePix™ Backscatter output, Raw Water Column and Switchable Forward Looking Sonar output are also provided.

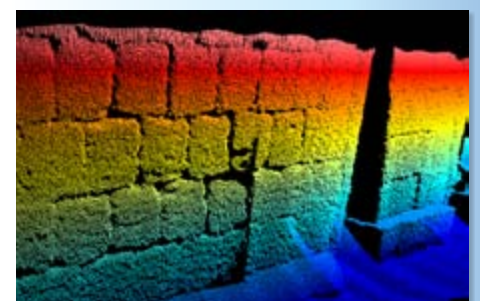
R2Sonic systems are supplied in depth ratings of 100m, or optional 4000m or 6000m for ROV/AUV operations.



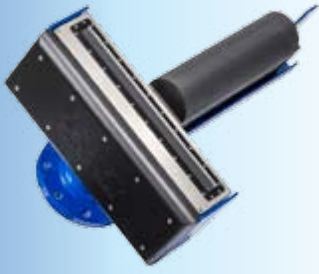
30°-45° coverage, for increased resolution over bottom features



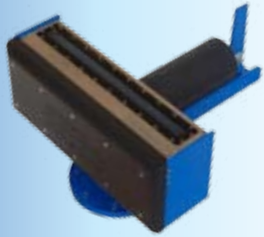
Quad density for efficient beam distribution in smaller bin sizes



160° coverage, for mapping high up vertical surfaces



Sonic 2026



Sonic 2024



Sonic 2022



Sonic 2020



Sonar Interface Module (SIM)

Components

Sonic Wideband Multibeam systems represent new modern design and architecture, unencumbered by legacy designs.

The heavy, bulky and power consuming topside electronic components that characterize old multibeam echo sounder technology have been eliminated.

The sonar consists of three major components: a compact projector, a receiver and a small dry side Sonar Interface Module (SIM). The extremely low power draw of 75W (2026), 50W (2024), 35W (2022) and 20W (2020) makes it possible to operate the systems on vessel battery power.

Unlike other commercial shallow water multibeam echo sounder systems, sonar processing is embedded in the receiver, dramatically increasing system efficiency and simplicity in integration

Third party auxiliary sensors are connected to the Sonar Interface Module (SIM). The sonar data is tagged with GPS time. The compact size, low weight, low power consumption and elimination of separate topside processors make Sonic Wideband Multibeam systems very well suited for small survey vessel or ROV/AUV operations.

R2Sonic Wideband Multibeam Systems were specifically designed for use on AUV's, with its low power consumption, and elimination of the topside processor for more compact size and weight. AUV integration requires only an interface board the size of a PC/104, Ethernet ports, and the provision of isolated 48V DC power.

Operation

The sonar operation is controlled from a graphical user interface (GUI) on a PC or laptop, which is typically equipped with navigation, data collection and storage application software. The operator sets the sonar parameters in the sonar control window, while depth, imagery and other sensor data are captured and displayed by the application software. Commands are transmitted through an Ethernet interface to the Sonar Interface Module (SIM). The SIM supplies power to the sonar heads, synchronizes, time tags sensor data, and relays data to the application workstation and commands to the sonar head.

The receiver head decodes the sonar commands, triggers the transmit pulse, receives, amplifies, beamforms, bottom detects, packages and transmits the data through the SIM via Ethernet to the control PC.

Sonar Options

The Sonic Series Wideband Multibeam Echo Sounders represent the latest in advanced modern system design and architecture, providing unprecedented system versatility, productivity and performance.

The Sonic system sonar processing is embedded at point of reception inside the sonar receiver, dramatically increasing efficiency and simplicity in integration. The streamlined architecture provides unmatched system modularity, whereby current hardware components are interchangeable and new hardware, firmware and options are easily upgradeable from the field.

Ultra High Resolution (UHR™)

The Sonic 2024, Sonic 2022 and 2020 systems can be upgraded to provide extremely narrow beam widths at 700kHz operation. The narrow beam widths at 700 kHz make this option invaluable for detail offshore site surveys such as pipeline inspections, cable laying operations, archeological wreck surveys or other micro bathymetry applications. When UHR™ is selected, the beam width is $0.3^\circ \times 0.6^\circ$ (2024), $0.6^\circ \times 0.6^\circ$ (2022) and $1^\circ \times 1^\circ$ (2020), providing unprecedented small bottom footprints.

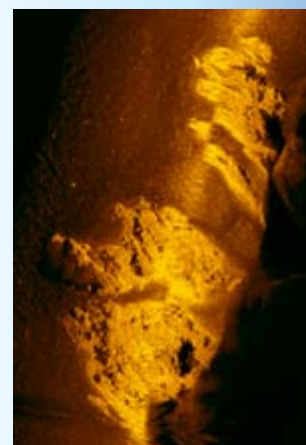
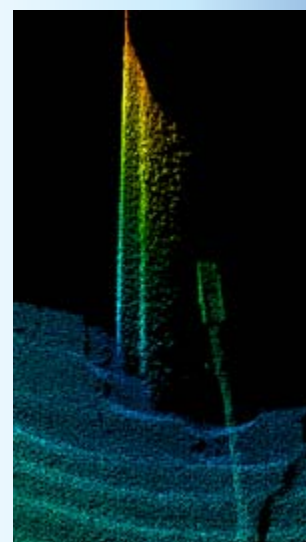
The Ultra-High Resolution option is embedded in UHR™ capable projectors and can be easily enabled from the field with option purchase.

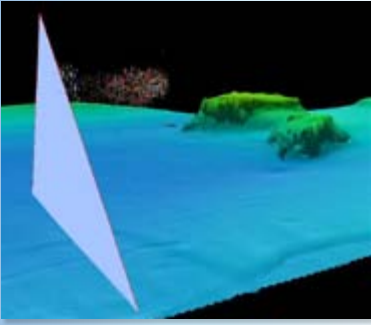
TruePix™

TruePix™ is a process that is independent from the bottom detection, and like Digital Side scan, can be used in data editing to determine whether the data points are outliers or real. Unlike Snippets, TruePix™ assembles the imagery record with one sample per range bin per side, so file sizes are smaller and there is no overlapping data pieces to be merged and reduced into a single record, producing uniform quality data.

TruePix™ outputs angles associated with each imagery point in contrast to Snippets that only report the angle of the center point of each snippet. This increases the number of angular measurements by an order of magnitude or more. In addition, TruePix™ provides highly compact water column imagery which can be used to map targets in the water column and to assist in least depth determinations.

TruePix™ option is embedded in all R2Sonic systems and can be easily enabled from the field with option purchase.

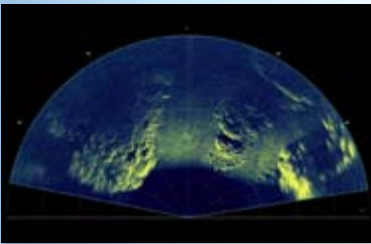




Raw Water Column Data

Raw beam formed water column data output provides increased functionality for Sonic Wideband Multibeam Echo Sounders with the ability to collect simultaneous and co-registered bathymetry, backscatter and water column backscatter data for variety of applications including pelagic fisheries habitat mapping, methane seep investigation and more.

The raw display image is available as part of the operator interface and optional software may be provided for logging as well as 2D and 3D data analysis. Raw Water Column option is embedded in all R2Sonic Systems and can be easily enabled from the field with option purchase.



Switchable Forward Looking Sonar

The Switchable Forward Looking Sonar (FLS) Imaging Option is available for all R2Sonic Wideband Multibeam Echo Sounders.

When enabled, the option allows the user to easily switch from operating the Sonic system in a bathymetric mode to a forward looking imaging mode which can either project a wide 20°, or narrow vertical beam. In imaging mode the operator will see a plan view ahead of the sonar in real time. Switchable Forward Looking Sonar option is embedded in FLS capable projectors and can be easily enabled from the field with option purchase.



Integrated Inertial Navigation System (I2NS™)

R2Sonic offers three levels of accuracy and price options: Type I, II and III. All types are based on the Trimble Applanix line of industry standard INS systems and use the same I2NS™ waterproof 15m submersible IMU housing enclosure exceeding IP68 standards, SIM system architecture and Applanix POSView™ software interface, providing the customer maximum flexibility and choice of systems to suit job requirements and budget:

I2NS™ Type I: 0.01° roll/pitch accuracy with RTK. Based on Trimble Applanix: OceanMaster™

I2NS™ Type II: 0.02° roll/pitch accuracy with RTK. Based on Trimble Applanix: WaveMaster™

I2NS™ Type III: 0.03° roll/pitch accuracy with RTK. Based on Trimble Applanix: SurfMaster™



Main Advantages

- Seamless integration with R2Sonic MBES
- Compact IMU in waterproof housing
- Variable accuracy and price configurations
- Inertial aided RTK positioning
- High immunity to GNSS outages
- Export license not required to most countries

Immersion Depth Rating

Sonic Wideband Multibeam Echo Sounders are 100m immersion depth rated as standard. 4000m and 6000m immersion depth rated options for ROV/AUV applications are available. For 4000m and 6000m rated systems, extensive pressure testing is performed and supplied with pass rating certificate to ensure performance to specified depth. Systems are typically pressure tested at time of order, but can also be upgraded at any time with return of unit to R2Sonic facility.

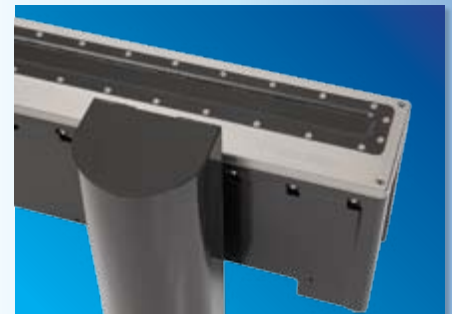
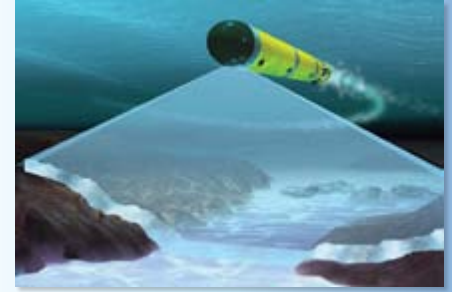
Mounting Hardware & Assemblies

Basic mounting hardware is supplied as standard with each system. A lightweight and easy to assemble mounting bracket and fairing is supplied as an option for all systems. Dual head mounting brackets are also supplied. The Sonic mount bracket & fairing is designed to reduce cavitation around the receiver array and includes protection for the system. Mount brackets include circular zinc anodes which can be replaced over time. A built-in delrin bracket for a sound velocity probe is included which secures the probe in ideal position for water flow over sensor. All cables including the receiver, transmit projector and sound velocity probe are conveniently fitted either inside the flange for protection or outside of flange.

Antifouling Coating Protection

Barnacle build up is a bane to many customers who incorporate high value acoustic sensors to vessel hull. In some environments build up can be severe, blocking the active sensor components effecting performance and requiring expensive dry docking and labor hours to clean.

R2Sonic offers a unique non-ablative, non-toxic, antifouling coating protection option for Sonic Wideband Multibeam Systems. Antifouling is traditionally an opaque primer applied on the sensors during sensor installation process. These traditional antifouling primers may be toxic and degrade over time, requiring reapplication. The optional antifouling coating protection offered for Sonic Wideband Multibeam Systems is clear, with non-stick, non-toxic properties and designed to last over life of the sensor without degradation to system performance. The coating is applied to the array face and active elements during manufacturing in a controlled process, ensuring professional application and quality assurance.



Features	Sonic 2026	Sonic 2024	Sonic 2022	Sonic 2020
Selectable Frequencies	170 - 450kHz to 1Hz resolution Optional 90/100kHz	170 - 450kHz to 1Hz resolution Optional 700kHz	170 - 450kHz to 1Hz resolution Optional 700kHz	200 - 400kHz to 1Hz resolution Optional 700kHz
Bandwidth	Up to 60kHz	Up to 60kHz	Up to 60kHz	Up to 60kHz
Beamwidth	0.45° x 0.45° at 450kHz 1° x 1° at 200kHz 2° x 2° at 90/100kHz (Optional)	0.3° x 0.6° at 700kHz (Optional) 0.45° x 0.9° at 450kHz 1° x 2° at 200kHz	0.6° x 0.6° at 700kHz (Optional) 0.9° x 0.9° at 450kHz 2° x 2° at 200kHz	1° x 1° at 700kHz (Optional) 2° x 2° at 400kHz 4° x 4° at 200kHz
Swath Sector	10° to 160° User selectable in real-time	10° to 160° User selectable in real-time	10° to 160° User selectable in real-time	10° to 130° User selectable in real-time
Sounding Depth*	800m+	400m+	400m+	100m+
Ping Rate	Up to 60 Hz	Up to 60 Hz	Up to 60 Hz	Up to 60 Hz
Range Resolution	Down to 1.25cm	Down to 1.25cm	Down to 1.25cm	Down to 1.25cm
Pulse Lengths	15µsec-2ms	15µsec-1ms	15µsec-1ms	15µsec-1ms
Number of Soundings	Up to 1024 soundings per swath (per head)	Up to 1024 soundings per swath (per head)	Up to 1024 soundings per swath (per head)	Up to 1024 soundings per swath (per head)
Operating Modes	Normal, Dual, Quad	Normal, Dual, Quad	Normal, Dual, Quad	Normal, Dual, Quad
Near-field Focusing	Yes	Yes	Yes	Yes
Equiangular or Equidistant Beams	Yes	Yes	Yes	Yes
Roll stabilization	Yes	Yes	Yes	Yes
Pitch stabilization	Yes	No	No	Yes
ROBO™ Automated Operation	Yes, Auto Power, Pulse Width, RangeTrac™, GateTrac™, SlopeTrac™	Yes, Auto Power, Pulse Width, RangeTrac™, GateTrac™, SlopeTrac™	Yes, Auto Power, Pulse Width, RangeTrac™, GateTrac™, SlopeTrac™	Yes, Auto Power, Pulse Width, RangeTrac™, GateTrac™, SlopeTrac™
Saturation Monitor	Yes	Yes	Yes	Yes
Depth Rating	100m Optional 4000m**, 6000m**	100m Optional 4000m**, 6000m**	100m Optional 4000m**, 6000m**	100m Optional 4000m**
Operating Temp	-10°C to 50° C	-10°C to 50° C	-10°C to 50° C	-10°C to 50° C
Storage Temp	-30°C to 55° C	-30°C to 55° C	-30°C to 55° C	-30°C to 55° C
Mains	90-260 VAC, 45-65Hz	90-260 VAC, 45-65Hz	90-260 VAC, 45-65Hz	90-260 VAC, 45-65Hz
Power Consumption	75W avg.	50W avg.	35W avg.	20W avg.
Uplink/Downlink	10/100/1000Base-T Ethernet	10/100/1000Base-T Ethernet	10/100/1000Base-T Ethernet	10/100/1000Base-T Ethernet
Deck Cable Length	15m, optional 25m, 50m	15m, optional 25m, 50m	15m, optional 25m, 50m	15m, optional 25m, 50m
Receiver Dim (LWD)	480 x 109 x 190mm	480 x 109 x 190mm	276 x 109 x 190mm	140 x 161 x 133.5mm
Receiver Mass (Air)	12.9 kg	12.9 kg	7.7 kg	4.4 kg
Projector Dim (LWD)	480 x 109 x 196mm	273 x 108 x 86mm	273 x 108 x 86mm	N/A
Projector Mass (Air)	13.4 kg	3.3 kg	3.3 kg	N/A
SIM (LWD)	280 x 170 x 60mm	280 x 170 x 60mm	280 x 170 x 60mm	280 x 170 x 60mm
SIM Mass	2.4 kg	2.4 kg	2.4 kg	2.4 kg

Cover image produced by Sonic 2026 Arctic Shoal and Iceberg Scouring Image Courtesy of: Parks Canada.

Sonar Options

- Snippets & TruePix™ Backscatter Imagery
- Raw Water Column Data
- Switchable Forward Looking Sonar
- Ultra High Resolution (UHR™) 700 kHz (2024,2022, 2020)
- 90/100 kHz Frequency (2026)
- 4000m & 6000m Immersion Depth Rating
- Integrated Inertial Navigation System (I2NS)
- Mounting Hardware & Assemblies
- Antifouling Coating Protection

*Depending on environmental conditions

**Range setting limited to 200m at immersion depths >100m

**Optional no range limiter at immersion depths > 100m

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