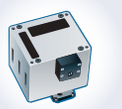
Multibeam Echosounder Specifications

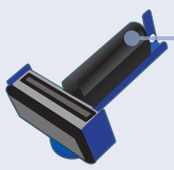
We apply our technical expertise and experience as surveyors to serve you: Our portfolio is elegantly simple while technologically advanced and user-friendly. **Beamwidth** and **depth range** are the 2 main characteristics that differentiate each of those MultiBeam EchoSounders (MBES). All options can be implemented on all products, except for the option to operate at 90kHz/100kHz that is exclusive to the Sonic 2026 (at the expense of the UHR option). This provides **high flexibility** to end-users to upgrade their equipment **remotely**. These options go beyond just opting for a longer cable; they all bring extra capabilities and functionalities, allowing even the entry level sonar to benefit from advanced operating modes. **Additionally, the firmware of all 4 MBES can be upgraded remotely.**

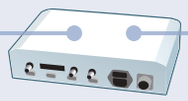
Standard Features for all R2Sonic MBES

SONIC 2020



Extra Light & Compact!





Ethernet

User-friendly, simple and easy to learn controller interface

Clean and small data files which require minimum data processing time

- Power supplied to sonar head
- Synchronization of multiple heads

- Ultra High Density (UHD): 1024 soundings per ping
- Selectable operating frequencies 'on-the-fly' in steps of 1Hz
- Ability to rotate the swath sector 'on-the-fly'
- Free firmware updates can be done remotely by end users
- Low power consumption for the performance delivered
- Light & compact
- Training delivered by experts
- Options upgradable remotely
- Embedded processor / controller in the sonar head that enables fast and powerful computation at low power (no separate topside processor)
- 3-year warranty
- All R2Sonic MBES exceed IHO-S44 Special Order, when installed following the instructions from the Manual and used with the I2NS and the Sound Velocity Sensor offered by R2Sonic

Only R2Sonic does it...

- Multispectral mode: survey with up to 5 frequencies in 1 pass and with 1 MBES. **Saves Time & Money!**
- Increased true sounding density with UHD → **It Provides Accurate and Truthful Resolution***
- **Smallest Beamwidth Available!** Down to **0.3° x 0.6°**
- Clean and small data files which reduces processing time and **Saves Time & Money!**
- Ability to upgrade options remotely
- Free firmware updates
- Optional 6-year warranty, which **minimizes risk** on investment
- 24/7 technical support via email and phone wherever you are in the world
- Express and high quality repairs, performed by the team that engineered the systems

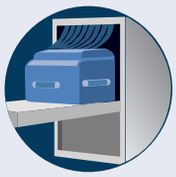
Options

- Ultra High Resolution (UHR): beamwidth down to 0.3° x 0.6°
- Multimode
  - o Pipeline mode: 2 frequencies, requiring UHR (700kHz)
  - o Multispectral mode: ability to survey with up to 5 different frequencies in one pass and with one system
- TruePix™: provides highly compact water column imagery and backscatter
- Raw water column data output
- Robo automated operation
- On-site training (theory class & hands-on demo)
- 6-year warranty
- 4000m and 6000m immersion depth rating
- Mounting hardware & assemblies, including Dual Head for Sonic 2020
- Antifouling coating protection
- Switchable Forward Looking Sonar Imagery
- I2NS™ (Integrated Inertial Navigation System): 3 types available that provide different accuracy for roll / pitch and heading
  Please consult specification sheet for more information on the I2NS™
- Software available: HYPACK®, QINSy™, SonarWiz 7, Fledermaus GeoCoder
- Sound Velocity Sensors available

Quick Mobilization

Easy to Pack

Easy to Maneuver



Easy to Check-In

Sonic Series store easily in Peli™ Case, for increased mobility

US Patent 10,132,924

*Please consult the "Making Concepts Simple" booklet for clarification on technical terms / concepts.

5307 Industrial Oaks Blvd. Suite 120. Austin, Texas 78735 USA r2sales@r2sonic.com | +1.512.891.0000 | r2sonic.com

Technical Specifications

Multibeam Echosounders




	Sonic 2020	Sonic 2022	Sonic 2024	Sonic 2026
Applications	Entry level hydrography Very small vessels Small ASV and AUV	Construction Dredging Autonomous Surface Vehicle (ASV) Offshore O&G (pipeline)	Autonomous Surface Vehicle (ASV) Construction Dredging Offshore O&G (pipeline) Offshore WindFarm (cable, towers)	Advanced hydrography Research Seafloor characterization Autonomous Underwater Vehicle (AUV) Remote Operated underwater Vehicle (ROV)
Selectable Frequencies	200kHz - 450kHz. Optional 700kHz	170 - 450kHz. Optional 700kHz		170 - 450kHz. Optional 90kHz and 100kHz
Minimum frequency increase	1Hz			
Beamwidth, across track and along track	1° x 1° at 700kHz (optional) 1.8° x 1.8° at 450kHz 4° x 4° at 200kHz	0.6° x 0.6° at 700kHz (optional) 0.9° x 0.9° at 450kHz 2° x 2° at 200kHz	0.3° x 0.6° at 700kHz (optional) 0.45° x 0.9° at 450kHz 1° x 2° at 200kHz	0.45° x 0.45° at 450kHz 1° x 1° at 200kHz 2° x 2° at 90kHz & 100kHz (optional)
Number of soundings	Up to 1024 soundings per ping			
Max speed (vessel)	11.1 knots for full coverage (*)			
Near-field focusing*	Yes			
Roll stabilized beams	Yes			
Pitch stabilized beams	Yes	No		Yes
ROBO™ Automated Operation	Yes Auto Power, pulse width, rangeTrac™, GateTrac™, SlopeTrac™			
Saturation monitor	Yes			
Selectable Swath Sector *(also referred as Max Coverage)*	10° to 130° User selectable in real-time	10° to 160° User selectable in real-time		
Sounding Patterns	Equiangular Equidistant single / double / quad modes Ultra High Density (UHD)			
Sounding Depth	up to 200m+	up to 400m+		up to 800m+
Pulse Length	15µs - 1ms			15µs - 2ms
Pulse Type	Shaped CW			
Ping rate	up to 60Hz			
Bandwidth	up to 60kHz			
Immersion Depth	100m Optional 4000m		100m Optional 4000m & 6000m	100m Optional 4000m
	FLS projectors are rated 4000m	FLS projectors are rated 3000m		FLS projectors are rated 4000m
Bottom Detect Resolution	3mm			
Operating Temperature	-10°C to 40°C	-10°C to 50°C		
Storage Temperature	-30°C to 55°C			

Electrical Interface

Mains	90-260VAC, 45-65Hz			
Power consumption	20W avg	35W avg	50W avg	100W avg
Uplink/downlink	10/100/1000Base-T Ethernet			
Sync in, Sync out	TTL			
Deck cable length	15m, optional 25m and 50m			

Mechanical

Sonar Dimension (Sonic 2020)	140 x 161 x 133.5 mm			
Sonar Mass (Sonic 2020)	4.4kg			
Receiver Dim (LWD)		276 x 109 x 190 mm	480 x 109 x 190 mm	
Receiver Mass		7.7kg	12.9kg	
Projector Dim (LWD)		273 x 108 x 86 mm		480 x 109 x 196 mm
Projector Mass		3.3kg		13.4kg
Sonar Interface Module Dim (LWH)	280 x 170 x 60 mm			
Sonar Interface Module Mass	2.4kg			

(*) The speed of the survey is primarily limited by the installation of the MBES.

5307 Industrial Oaks Blvd. Suite 120. Austin, Texas 78735 USA r2sales@r2sonic.com | +1.512.891.0000 | r2sonic.com

Integrated Solution: Multibeam Echosounder & IMU & SV Probe

Integrated multibeam solution with IMU and SV probe

Sonic 2020

IMU: Integrated Inertial Navigation System (I2NS)

SV probe from Valeport or AML

Integrated solution packages in one Pelican™ case

Sonar Interface Module (SIM)

US Patent 10,132,924

This fully integrated solution includes:

- Wideband multibeam echosounder, the Sonic 2020
- Inertial Measurement Unit (IMU), the Integrated Inertial Navigation System (I2NS)
- Sound Velocity (SV) Probe, either from Valeport or from AML

This compact solution has everything you need in a 20x30 (cm) mount, making it easy to transport, mobilize and install.

The Sonic 2020 is a highly flexible and versatile multibeam sonar that can be upgraded remotely and anytime with a wide variety of options, such as Ultra High Resolution (UHR) and TruePix™.

The I2NS is an industry proven solution for vessel roll, pitch, heave, heading, position and velocity. It is easy to set up with the Applanix POSView, and can be operated and controlled through the monitoring window built in the Graphical User Interface (GUI). The I2NS provides continuous positioning information, even in areas where GPS reception is compromised by multipath effects and signal loss, making it ideal for vessels operating around structures and in high multipath environments such as ports and harbors.

All Sonic 2020 and I2NS data flow through a single Ethernet port, eliminating the need for additional processing modules and cabling, which makes for a neat, single cable interfacing solution.

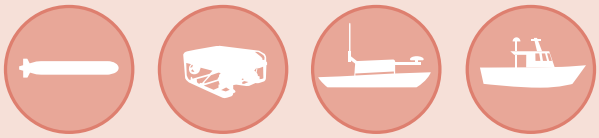
The integrated Sonic 2020 solution exceeds IHO-S44 Special Order when installed following the instructions from the R2Sonic Manual.

Highly portable, for quick mobilization

Modular

- Easy to uninstall the IMU for maintenance and troubleshooting

Easy to Integrate on any platform



Easy to set up

- No need to measure offsets between the multibeam sonar and the IMU between mobilizations
  - *Fast*
  - *Less room for error*

Features of the Sonic 2020

- Ultra High Density (UHD) up to 1024 soundings per ping, resulting in greater resolution, particularly on the outer beams
- Selectable operating frequencies 'on-the fly' in steps of 1Hz so you can choose the best frequency for the job, while ensuring:
  - ***Constant ping rate***
  - ***No along-track data loss***
- Dynamic focusing, which is essential to ensure high resolution in very shallow waters
- ROBO mode

Features of the I2NS

- Seamless integration with the Sonic 2020
- Selectable accuracy configurations
- Inertial aided RTK (Real Time Kinematic) positioning
- High immunity to GNSS outages

5307 Industrial Oaks Blvd. Suite 120. Austin, TX 78735 USA | r2sales@r2sonic.com | +1.512.891.0000 | r2sonic.com

Integrated Multibeam Echosounder: Sonic 2020 & IMU & SV probe

Services

- Technical Support 24/7/365 wherever you are in the world
- Quick and high quality repairs performed by the team that engineered the multibeam sonar and the IMU
- 3-year warranty

Standard Technical Features

- Pipeline mode that enables users to survey alternatively at 400kHz and 700kHz, in one pass and using only one multibeam echosounder. This provides granular high resolution information on the pipeline or cable, as well as around the pipeline/cable
- Multispectral backscatter
- Multifrequency bathymetry designed for better bottom detect resolution

Options

- Upgradable with 4 technical modes:
  - Ultra High Resolution (UHR) that provides narrow beamwidth of 1°x1° at 700kHz
  - TruePix™ Compressed Water Column that simultaneously reports backscatter and water column imagery
    - *Snippets is included with the TruePix™ option*
  - Forward Looking Sonar (FLS) allows users to easily switch from bathymetric profiling mode, which projects a narrow 1° along-track beam, to an imaging mode which projects a wide 22° vertical beam
  - Multispectral TruePix™ Compressed Water Column that consists of combining the capabilities of TruePix™ with R2Sonic's proprietary multifrequency mode
- Raw water column data
- 6-year warranty so you can mitigate your long-term risks
- 4000m immersion depth rated
- Theory & hands-on comprehensive and personalized training
- Software available: HYPACK®, QINSy™, SonarWiz 7, Fledermaus GeoCoder

TRUSTED WORLDWIDE

Technical Specifications of the Sonic 2020

Selectable Frequencies	200kHz - 450kHz. Optional 700kHz
Minimum frequency increase	1Hz
Beamwidth, across track and along track	1° x 1° at 700kHz (optional) 1.8° x 1.8° at 450kHz 4° x 4° at 200kHz
Number of soundings	Up to 1024 soundings per ping
Max speed (vessel)	11.1 knots for full coverage (*)
Near-field focusing	Yes
Roll stabilized beams	Yes
Pitch stabilized beams	Yes
ROBO™ Automated Operation	Auto Power, pulse width, rangeTrac™, GateTrac™, SlopeTrac™
Saturation monitor	Yes
Selectable Swath Sector (also referred as Max Coverage)	10° to 130° User selectable in real-time
Sounding Patterns	Equiangular Equidistant single / double / quad modes Ultra High Density (UHD)
Sounding Depth	up to 200m+
Pulse Length	15µs - 1ms
Pulse Type	Shaped CW
Ping rate	up to 60Hz
Bandwidth	up to 60kHz
Immersion Depth	100m Optional 4000m FLS projectors are rated 4000m
Bottom Detect Resolution	3mm
Electrical Interface	
Mains	90-260VAC, 45-65Hz
Power consumption	20W avg
Uplink/downlink	10/100/1000Base-T Ethernet
Sync in, Sync out	TTL
Deck cable length	15m, optional 25m and 50m

Technical Specifications of the I2NS Type III

	DGPS	RTK	Accuracy During GNSS Outages
Position	0.5-2m depending on quality of differential corrections	Horizontal: 1cm or better Vertical: 1.5cm or better	-6m for 30 s total outages (RTK) -3m for 30 s total outages (IAPPK)
Roll & Pitch	0.04°	0.03°	0.05°
Heading	0.06° w/4m baseline 0.08° w/2m baseline	Same	0.2° (IAPPK, 60 s outages) 0.3° (RTK, 60 s outages)
Heave	5cm or 5% 2cm or 2% TrueHeave™	5cm or 5% 2cm or 2% TrueHeave™	5cm or 5% 2cm or 2% TrueHeave™

Inputs/Outputs

Ethernet Input Output	1000Base-T
Serial RS232	1 COM Ports bi-directional, user assignable to NMEA output 1 COM Ports connected directly to the internal GNSS receiver (for supplying corrections or firmware upgrades)
Base GNSS Correction Output	RTCM V2.x, RTCM V3.x, CMR and CMR+

The integrated solution is also available with the I2NS type II.
Please contact us or visit **r2sonic.com/products/i2ns/** for more information

Mechanical Specifications

Dimensions Integrated Solution (LWH)	200 x 200 x 300 (mm)
Weight integrated solution (in air)	10.8kg
Dimensions Sonar Interface Module (LWH)	280 x 170 x 60 mm
Weight Sonar Interface Module	2.4kg

(*) The speed of the survey is primarily limited by the installation of the multibeam echosounder.

Specification Sheet 2021 version 1.2 subject to change without notice

5307 Industrial Oaks Blvd. Suite 120. Austin, TX 78735 USA | r2sales@r2sonic.com | +1.512.891.0000 | r2sonic.com

R2SONIC

OUR VISION IS SOUND™

r2sonic.com

WIIFY

What's In It For You

R2Sonic Value Proposition in 10 points

Why we do what we do.

Surveying is at the origin of so many activities that drive economic prosperity, help us understand our history, enhance safety and strengthen security of the country. Backscatter and water column information are critical to scientific research in understanding the ecosystems we live in. Archaeological hydrographic surveys give us access to our past, sometimes forgotten at sea. Bathymetry and backscatter are critical in connecting the world with telecommunications and power cables.. Traditional energy developments such as Oil&Gas platforms, as well as new renewable offshore wind farms require bathymetry and backscatter survey. A lot of what we do starts with a multibeam echosounder (MBES) survey. It is critical to our nations' economic, social, technical, historical and scientific development.

This is our contribution to our society, to our nation and to the World.

How do we do what we do.

We are inventors.

Because we see technology as the most powerful tool to improve lives.

We continuously re-think and re-invent the way underwater mapping is done.

We disrupt and challenge the status-quo to make sea mapping easier, faster and better.

Constantly challenging the status-quo to provide better and new type of data and improve user experience

Simplicity

One system. One Survey. Multiple frequencies.

Enjoy the boat ride.

1 Save time & money.

- All Sonic series MBES have the capability to survey at different frequencies using one single system and in one pass. Indeed, the MBES can ping sequentially at up to 5 different frequencies, allowing you to do more with less, and therefore help you gain time and save money. As of now, the two main applications are the **pipeline mode** and the **multispectral mode.**

- The **pipeline mode** combines the operating frequency of 700kHz with the smallest beamwidth available (down to 0.3° x 0.6°) with the operating frequency of 400kHz, providing high resolution on the cable or pipeline path and critical information on the surrounding of the cable or pipeline.

- The **multispectral mode** is currently used by Universities around the world for bottom classification. It uses the different acoustics responses of a same point at different frequencies.

- Finally, thanks to the high resolution and accurate bottom detect, R2Sonic MBES deliver clean and reliable data, which reduces the time you spend on data processing and helps you be more productive and efficient.

2 Push the boundaries of resolution.

- The Sonic series equipped with Ultra High Resolution (UHR) gives you an extremely small beamwidth of 0.3° x 0.6° at 700kHz, which is an invaluable option when you conduct detailed offshore sites surveys such as pipeline inspections, cable laying operations and high-resolution micro bathymetry applications.

- All Sonic series MBES are equipped with the Ultra High Density (UHD) feature, which is a novel technique, independent from the classical bottom detect. It provides you with an increased number of independent soundings which translates into an increased bottom resolution. In fact, with UHD, **the number of independent bottom detect increases by a factor of 4!**

Clean Data

Don't waste time processing.

Use real, accurate, high resolution data.

Spend time on what's important.

3 Optimize your results thanks to high flexibility of operation.

- The flexibility that you have when selecting operating frequencies is second-to-none. You can select any operating frequency between 170kHz and 450kHz in increments of 1Hz, along with the optional UHR at 700kHz that is available with all Sonic series except the Sonic 2026. On the other hand, the Sonic 2026 has the capability to operate at 90/100kHz. This unique flexibility allows you to finetune and optimize the operating frequency to your type of application, depth and environment. In addition, you can select the frequency on the fly and in real time, with absolutely no data lost.

- R2Sonic also pioneered the variable swath coverage capability, which gives you the ability to electronically steer beams to the sector you defined. When you select a narrow sector, the sampling density increases which can be valuable when surveying small scale bottom features. If you are conducting general mapping or if you are surveying vertical surfaces such as quays, break-waters or pilings, you can select wide swath sectors, as the increased opening angles can eliminate the need to rotate the sonar head.

> *"The attribute that made the difference was mainly the "user friendly" aspect. We are not specialized hydrographers, and, once the multi beam is properly interfaced with the ship, the R2Sonic is the most easy to use for non skilled people."*
>
> **Denis DEGEZ, DRASSM**
> (French Ministry of Culture)

image courtesy of C4R

Sonic 2020

Light. Compact.

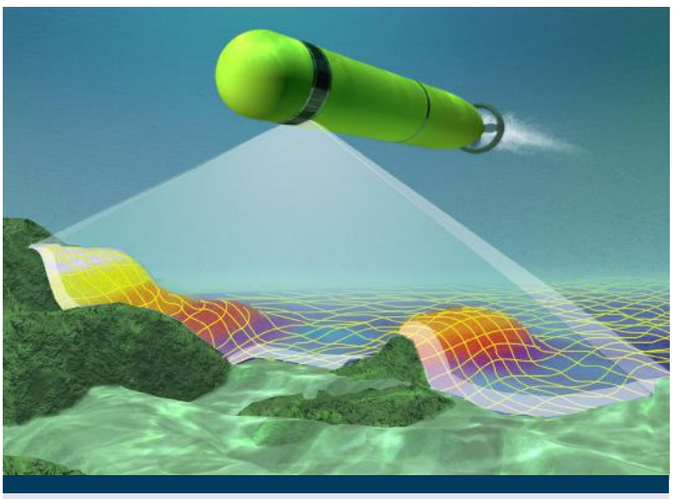
4 Take advantage of integrated & efficient system for remote operation.

- The sonar processing is embedded in the receiver, dramatically increasing system efficiency and reducing the size and weight of the topside: the Sonar Interface Module (SIM). The compact size, low weight, low power consumption and elimination of separate topside processors make the Sonic series very well suited for ROV/AUV operations.

5 Be ahead of the curve; use the latest and newest innovative functions.

R2Sonic has a tradition to be the First (10 times!):

1. 1st to provide 60 kHz Broadband Processing 1.25cm pulse range
2. 1st to provide Wideband: 200-400kHz
3. 1st to provide 700kHz option
4. 1st to provide narrow beamwidth: 0.3° x 0.6°
5. 1st to Embed Sonar processing leading to lowest power, lowest weight and lowest volume
6. 1st to provide Scalable Sector Swath
7. 1st digital MBES to provide Switchable FLS output
8. 1st to provide Integrated INS
9. 1st with Standard 3-year warranty
10. 1st with extended 6-year warranty option



Integrated Systems

Innovative. Efficient.

6 Get trained on the Sonic series in few hours.

- The sonar operation is controlled from a user-friendly Graphical User Interface (GUI) on a PC or laptop. A few hours are generally sufficient for you to learn how to navigate the controller program. You have to follow a few straight-forward steps to set up the MBES: you set the sonar parameters in the sonar control window, while depth, imagery and other sensor data are captured and displayed by the application software.

- R2Sonic technical experts provide in-class theory and hands-on demonstrations to help you come up to speed on the operation of the MBES using the software of your choice. Experience shows that a couple of days are sufficient.

7 Stay reassured, we stay by your side even when things go wrong

We realize that problems can happen and systems can fail, and we understand how disruptive these situations are on your professional activity. For that reason, we have a robust and efficient process for Repairs & Maintenance: performed by the same engineers who designed and manufactured the MBES. Our commitment is to minimize the non-operational time of your system.

> *"Of the excellent R2Sonic product range the Sonic 2024 offers the highest resolution of any multi beam without diminishing any of the other features – it is a truly remarkable piece of kit!"*

Andy Sherrell
SOS Engineering

Training

Hands-on Demonstrations.
Use the Software of your choice.

8 Upgrade remotely as your needs evolve.

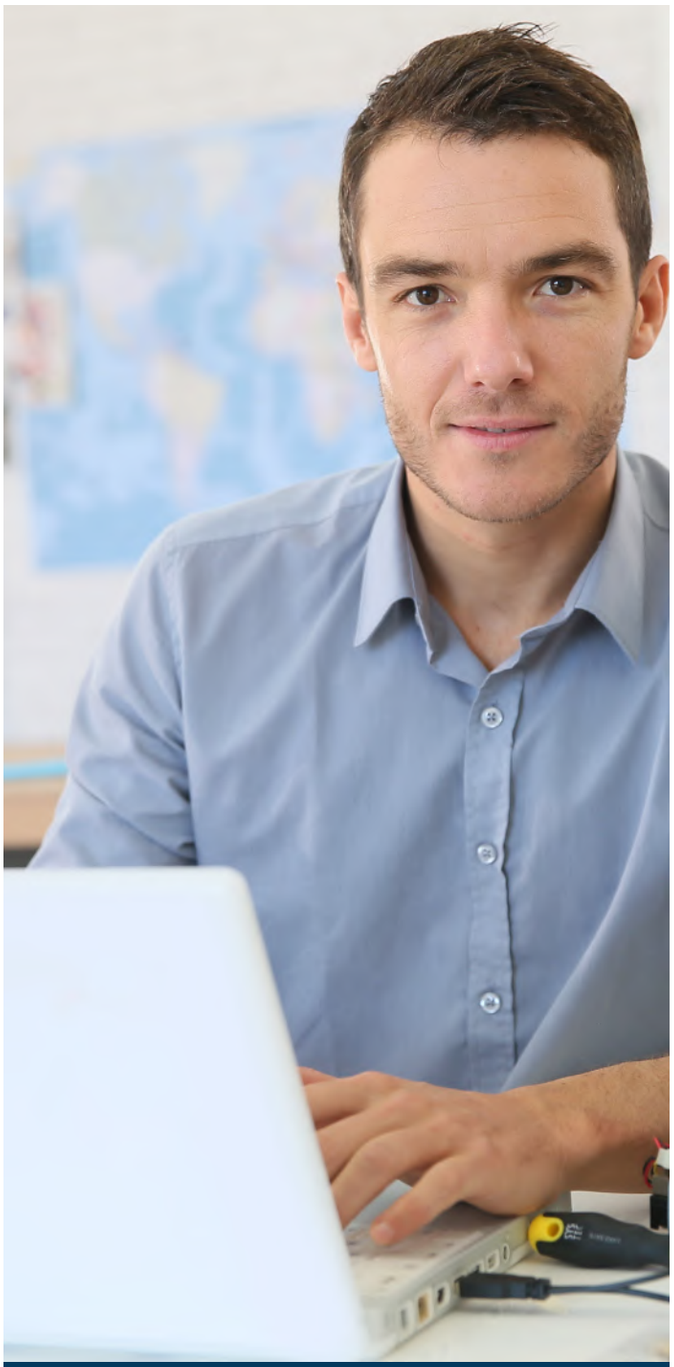
All options can be implemented on all products, except for the option to operate at 90kHz/100kHz that is exclusive to the Sonic 2026 (at the expense of the UHR option). This provides you high flexibility to upgrade your equipment remotely, allowing even the entry level sonar to benefit from advanced operating modes.

9 Receive personalized assistance anytime, wherever you are: No generic number or email.

We are a small company, which means that when you have a problem and need assistance, the email you send or the number you call goes to our Chief Hydrography Officer. Equipped with years of experience as a surveyor, he's almost seen it all. That's how we assist our users, all day, every day.

10 Minimize your risk.

All Sonic series are covered under a 3-year warranty which can be upgraded to 6 years. This engagement speaks to the trust that we have in our systems and the high level of service that we want to ensure to you. Ultimately, it minimizes the risk you incur when you invest in an MBES.



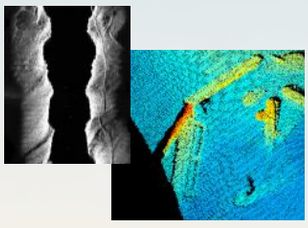
Support

If things go wrong... with your sonar

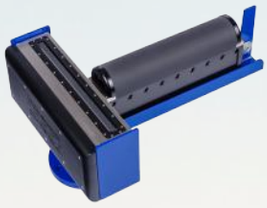
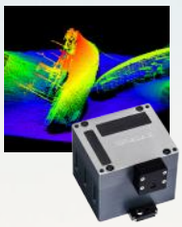
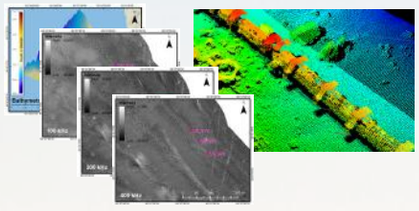
Call us. We're there for you!

Innovation Timeline

Constantly challenging the status-quo to provide better a

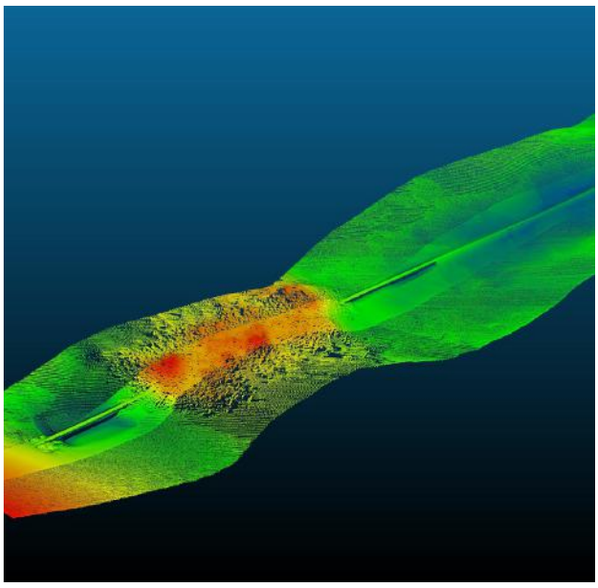
2009	2010	2012	2013
			
Sonic 2024 & SIM	Sonic 2022	TruePix™ & Water Column & UHR	Sonic 2020

r and new types of data and improve user experience

2014	2015	2016	2017
			
SIMINS & I2NS	Sonic 2026	UHR for Sonic 2020	UHD & Multimode

PIONEERS

of Wideband High Resolution
Multibeam Systems



Pipeline Image captured with UHD.
Image courtesy of Swathe Services

Ultra High Density (UHD)

Full bottom coverage.

Maximum sounding density up to 1024 soundings per ping.

With Ultra High Density (UHD), R2Sonic introduces a revolutionary new bottom sampling mode. The implementation of this novel proprietary orthogonal bottom detection process increases the number of independent bottom samples per ping from the standard 256 soundings up to 1024. This is an additional Bottom Sampling mode; the user can choose the classic 256 soundings in Equiangle or Equidistant distributions, Dual or Quad mode for improved bottom sample distribution, and now, UHD, which provides up to 1024 independent soundings per ping.

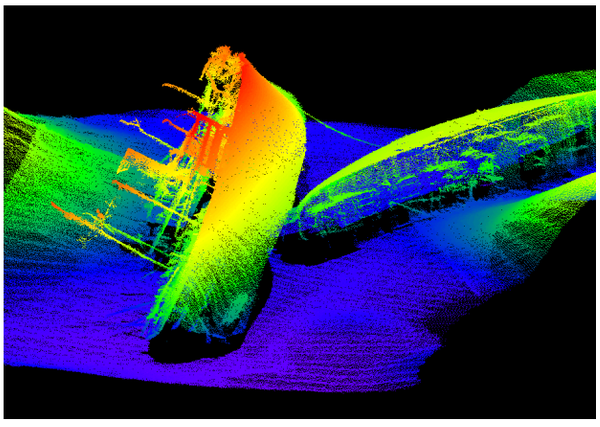


Image captured with UHR. Courtesy of Tim Shaw, CSA

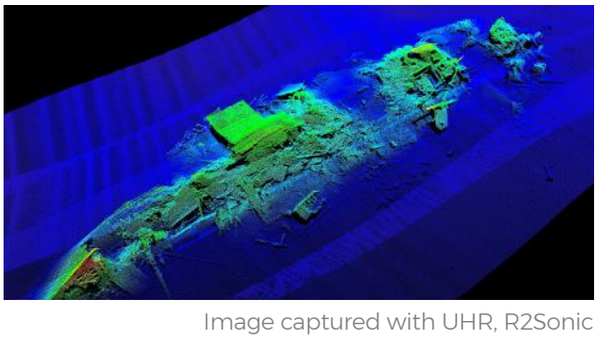


Image captured with UHR, R2Sonic

Ultra High Resolution (UHR)

The Sonic 2024, Sonic 2022 and Sonic 2020 systems can be upgraded to provide extremely narrow beamwidths at 700kHz operation. The narrow beamwidths 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 beamwidth is:

- **Sonic 2024: 0.3 x 0.6**
- **Sonic 2022: 0.6 x 0.6**
- **Sonic 2020: 1 x 1**

UHR provides 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.

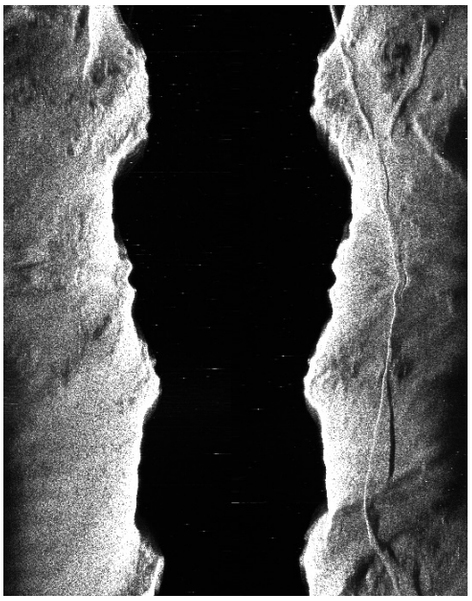


Image captured with TruePix™.
Courtesy of R2C

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 are 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.

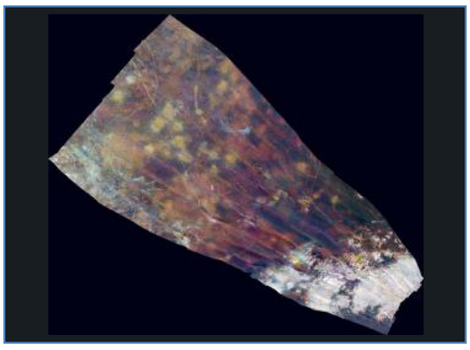


Image obtained with Multispectral mode.
Courtesy of Dr. Craig Brown, NSCC
and Dr. Jonathan Beaudoin, QPS

MultiSpectral Mode

A New Dimension for Acoustic Backscatter Data.

R2Sonic now takes Multispectral satellite imagery classification technology under water:

In MultiSpectral Mode, the survey is conducted with up to five frequencies with matching aspect angles, in a single survey run. This new technique is an active research domain and promises great results in bottom characterization and water column analysis.

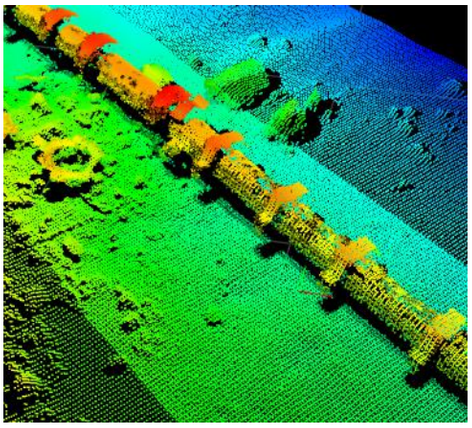


Image captured with Pipeline Mode
Courtesy of DOFSubsea

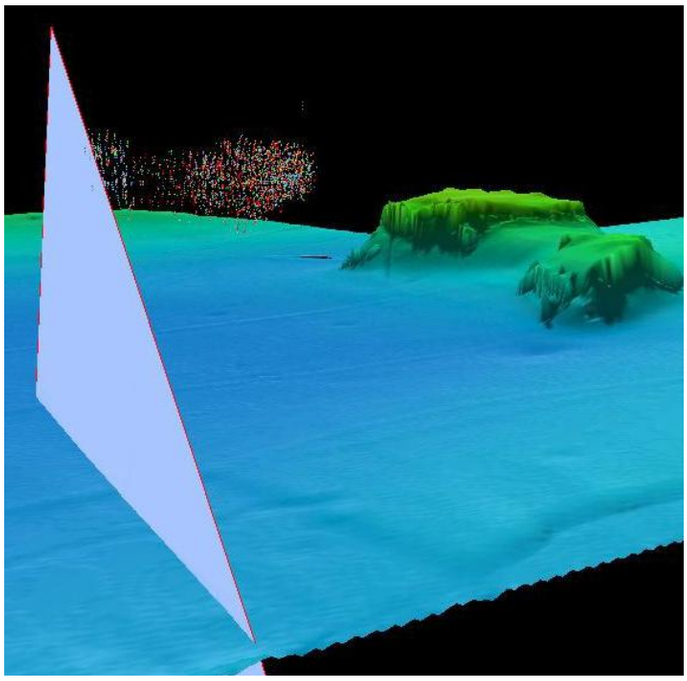
Pipeline Mode

Maximum coverage plus Ultra High Resolution

In Pipeline Mode, the R2Sonic MBES combines the incredibly detailed inspection capability of 700kHz Ultra High Resolution (UHR) data on the pipeline with the range and wide swath of a 400kHz survey on the surrounding seabed. The Pipeline Mode enables the surveyor to conduct a wide angle context survey in the same pass as an ultra-detailed inspection survey. This is in contrast to competing systems that essentially interpolates between data by adding more overlapping beams on the pipeline instead of increasing the actual footprint resolution. Pipeline Mode also works with dual-head systems.

Raw Water Column Data

Raw beam formed water column data output provides increased functionality for MBES 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 Systems.

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 available for Sonic 2022 and 2024 systems with FLS capable projectors and can be easily enabled in the field with option purchase. All Sonic 2020 and 2026 systems can also be upgraded with the FLS option and include Steerable / Adjustable Beamwidth functionality. This allows for more versatility with fixed sonar installations and increases operator control over the imaging area.

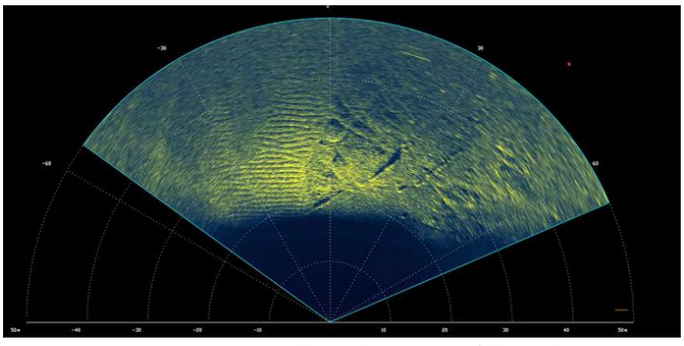


Image captured with FLS. Courtesy of Toyo Corporation

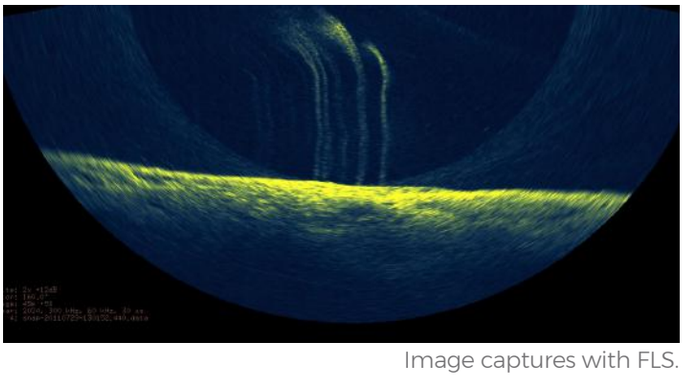


Image captures with FLS.
Courtesy of GEOMAR Helmotz Center for Ocean Research

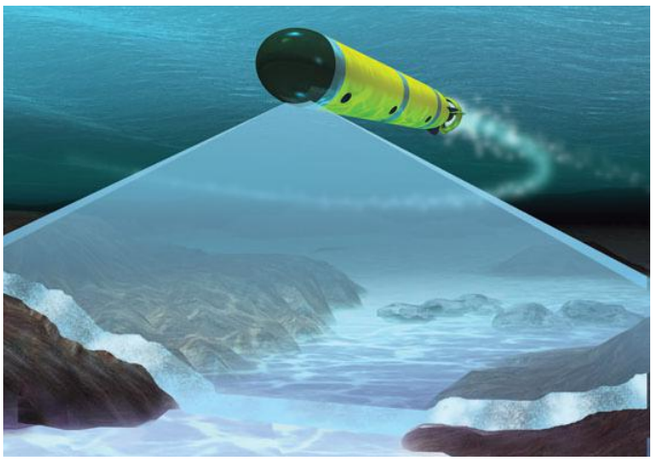
Integrated Inertial Navigation System (I2NS)

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: 0.01^0 roll/pitch accuracy with RTK.
Based on Trimble Applanix: OceanMaster

I2NS™ Type II: 0.02^0 roll/pitch accuracy with RTK.
Based on Trimble Applanix: WaveMaster

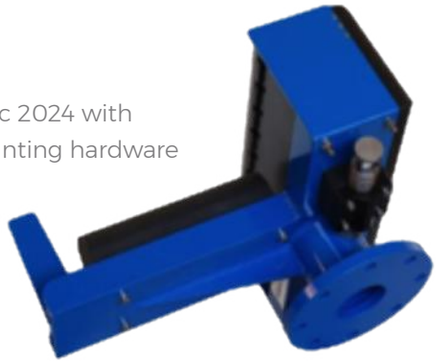
I2NS™ Type III: 0.03^0 roll/pitch accuracy with RTK.
Based on Trimble Applanix: SurfMaster



Immersion Depth Rating

R2Sonic MBES 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.

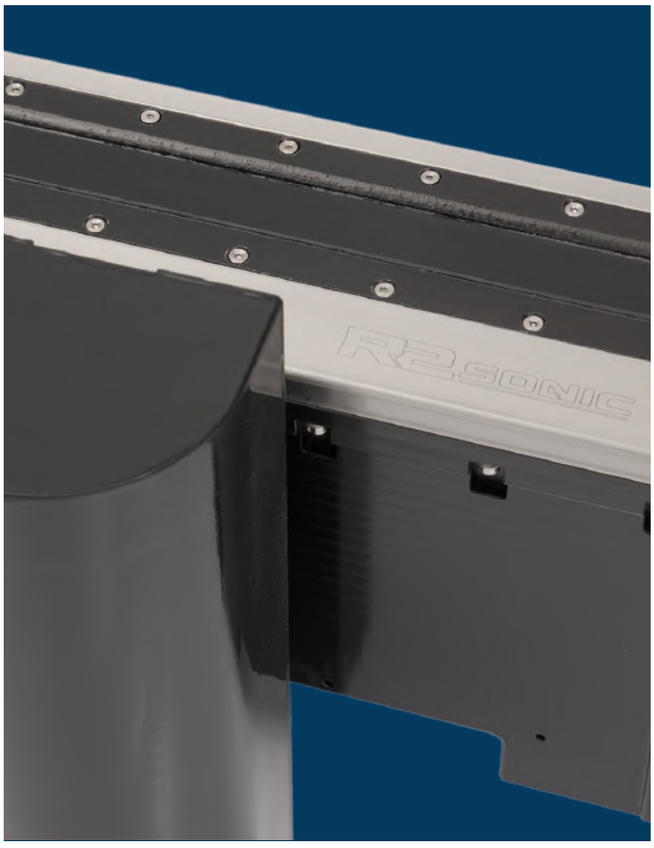
Double head Sonic 2020
with mounting hardware



Sonic 2024 with
mounting hardware

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 buildup is a bane to many of you who incorporate high value acoustic sensors to vessel hull. In some environments buildup 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 R2Sonic MBES. 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 is clear, with non-stick, non-toxic properties and designed to last over the 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.

PIONEERS

of Wideband High Resolution
Multibeam Systems

RE-INVENTING **SONAR** TECHNOLOGY

5307 Industrial Oaks Blvd. Suite 120 • Austin, Texas 78735 USA • r2sonic.com