Teledyne BlueView

Delivering Underwater Vision, Measurement, and Automation Solutions

Since 2005, Teledyne BlueView Technologies, Inc. has delivered state-of-the-art, compact acoustic solutions for defense, energy, civil engineering, transportation, and port security applications worldwide. Teledyne BlueView’s proprietary acoustic technology has been adopted by leading manufacturers and service providers to support mission-critical underwater operations. Today, Teledyne BlueView systems are integrated onto a wide variety of underwater platforms, including:

- ROVs
- AUVs
- Surface Vessels
- Fixed Mounts
- Portable Tripods
- Diver Hand Held Systems

Teledyne BlueView customers enjoy a low cost of ownership with reliable operation, exceptional service, on-site training, extensive online information, and worldwide after-sale support.
Faster, Smarter, Tougher

Since its founding, Teledyne BlueView has pioneered new technologies in high-resolution underwater acoustic imaging, measurement, and automation. Teledyne BlueView’s patented solutions have grown into standard instruments for underwater navigation, monitoring, survey, and detection. Teledyne BlueView systems are easy to use and enable safe, secure, and efficient underwater operations.

Drawing inspiration from the daily challenges faced by underwater operators, Teledyne BlueView strives to deliver solutions that make impossible jobs possible. To meet emerging customer needs, we continue to expand our products and services with new, easier to use underwater acoustic imaging, measurement, and automation solutions.

Teledyne BlueView Imaging Technologies

Proprietary high-resolution underwater acoustic imaging, measurement, and automation systems for a wide variety of applications.

3D Multibeam Scanners

Teledyne BlueView’s 3D Multibeam Scanners create high-resolution, fully interactive 3D information, capturing accurate measurements of underwater structures, objects, and sites providing detailed surveys.

AUV Sensors

Today, AUVs play an increasing role in underwater surveying, mapping, and navigating. Teledyne BlueView provides the most compact, lowest-power, configurable systems for real-time navigation, obstacle avoidance, and high-resolution 3D “gap-fill” mapping solutions.

2D Multibeam Imaging Sonar

Teledyne BlueView’s comprehensive family of compact 2D Multibeam Imaging Sonar provides real-time streaming video-like imagery to aid navigation, inspection, monitoring, tracking, and detection for a wide variety of underwater operations.
Making Impossible Jobs Possible

Spool Piece Metrology

The Challenge
On the UK’s continental shelf in the North Sea Talisman Energy (UK) Ltd worked with Star Net Geomatics, Seatronics Ltd, and Teledyne BlueView to conduct a spool piece metrology connecting the existing and new Auk North 4th well manifolds. Due to the nature of the existing manifold the flange location was not available for access at the time of the metrology. This was a challenge since the location, angle, size, and distance were critical to deliver accurate geometries and range measurements to manufacture and install the 12 meter spool piece.

The Solution
A BV5000 was deployed on a heavy tripod through the moon pool of a survey vessel, monitored by an ROV. Over an 8 hour period 14 individual scans were made on and around the manifolds. The Teledyne BlueView survey was enhanced with terrestrial laser data on each of the manifolds. The terrestrial laser data provided accurate locations of the flanges, while the Teledyne BlueView data provided accurate position and alignment.

The Result
Using the combined data the manufactured spool piece was installed with a perfect fit.

ROV Navigation

The Challenge
Culverts make up a large portions of a city’s waterway infrastructure to prevent flooding that could cause significant property damage and loss of life. Inspecting and maintaining culverts is a challenging task—small passages prone to trapping large amounts of debris coupled with poor visibility conditions and turbulent water flows create extremely hazardous conditions for divers. This culvert in Florida had severely restricted water flow and visibility was less than 3 feet.

The Solution
Today’s modern ROVs combined with a Teledyne BlueView 2D Multibeam Imaging Sonar are lightweight, highly portable solutions. These highly maneuverable, integrated systems enable fast, easy, and safe inspections of culverts and other tight waterways. Additionally, the 2D sonar enables navigation and inspections in low and zero-visibility conditions.

The Result
Using the Teledyne BlueView 2D Multibeam Imaging Sonar the operator was able to locate the blockage and navigate the ROV to within 2 feet of the obstruction. The operator was then able to identify pieces of lumber as being the source of the blockage.
Around the globe Teledyne BlueView delivers reliable results as a standalone tool or part of a combined solution...in any conditions.

**Surveys and Inspections**

*The Challenge*
Bauland-TP, a leading engineering services company in France sought to expand their underwater inspection and monitoring services. Traditional equipment was limited by water clarity levels, access, and the intrusion of surrounding structures. Bauland sought a new technology solution that would address these issues, provide versatility, and deliver accurate results.

*The Solution*
Bauland engineers and surveyors found the compact size, deployment ease, and straight-forward operation of the BV5000 compelling. An added advantage was the industrial-grade acoustic technology, making the system impervious to harsh, turbid environments. Further, the “eye-level” perspective provided the unique, distinctive profile data the engineers sought for their clients.

*The Result*
Bauland and their clients now enjoy the high-resolution 3D information delivered by the BV5000. Since acquiring the BV5000 Bauland expanded their underwater survey services to include dams, harbors, waterways, and other confined areas.

**Measuring Scour**

*The Challenge*
Scour, caused by swift moving water can scoop out holes along and under bulkheads engineered to reinforce natural river banks, compromising the integrity of the structure. Such was the case on the Susobanagawa river in Japan. The remote location, shallow water level, and low visibility conditions made quantifying the extent of scour difficult.

*The Solution*
OPT Technologies Co. Ltd., a leading 3D laser scanner consulting and manufacturing company in Japan and Canada saw the BV5000 as the perfect solution. Deploying the BV5000 in three different positions on the river, including two close to shore, OPT captured high resolution underwater imagery and measurement data of the entire bulkhead. Further, the low angle of view ensured that any scour damage would be captured.

*The Result*
The inspection revealed a deep scour hole under the bulkhead, extending more than 1.7 meters back and across more than half the length of the structure, severely undermining its integrity. The findings were provided to officials for renovation planning.
Accurate Measurements and Crisp Imagery in an Integrated and Versatile Package

Teledyne BlueView uses new high-resolution profiling sonar technology to create an easy-to-use underwater 3D multibeam scanner, the BV5000. The compact, lightweight BV5000 works much like a topographic laser scanner, using high frequency sound beams instead of lasers to create extremely detailed 3D imagery and collect measurement data with centimeter level accuracy. Designed for high portability and easy integration, the BV5000 system can be deployed on a tripod, ROV, or fixed mount. Operating from a stationary position, the BV5000 creates full 360° rotational scans in 6 minutes. Multiple overlapping scans can be registered with or without navigation data to create mosaic images of large structures or areas.

All BV5000 3D Multibeam Scanning Systems include Teledyne BlueView’s ProScan® software and 3D viewer. The BV5000 data is stored in both raw format for post processing, and a standard .xyz point cloud format for easy import to multiple 3D viewing programs. Teledyne BlueView is an authorized Leica Geosystems distributor, providing access to its powerful Cyclone software to create 3D mosaic imagery and model standard components for CAD export.
Typical 3D Multibeam Scanning Applications:
- 3D Site Survey
- 3D Structure Survey
- 3D Structure Inspection
- Structure Decommissioning
- Bridge Inspections
- Dam Inspections
- Seawall and Pier Inspections
- Condition Monitoring
- Scour and Erosion Monitoring
- Jumper and Spool Piece Metrology
- Archeological Site/Structure Mapping
- Ship Hull Inspections and Mapping

3D Multibeam Scanning Systems

Teledyne BlueView 3D Multibeam Scanning Systems are highly portable instruments that create high-resolution 3D imagery and capture accurate measurement data of underwater structures, objects, and sites.

BV5000-1350

The perfect balance between range and resolution. The BV5000-1350 is specifically designed for imaging complex underwater structures and areas with an operating frequency of 1.35 MHz and a range of 1 – 30 m (3.2 – 98 ft).

BV5000-2250

Engineered for ultra-high 3D resolution, the BV5000-2250 delivers unprecedented imagery and detail at close range. The 2.25 MHz operating frequency enables ultra-high resolution 3D scans with ranges of 0.5 – 10 m (1.6 – 32 ft).

Portable Tripod and ROV Systems

The BV5000 can be deployed on ROVs or with Teledyne BlueView’s portable lightweight tripod. Operating from a stationary position on the tripod the BV5000 will capture 360° spherical scans, and from a surface vessel produce 3D scans of tight, hard-to-reach areas. From an ROV the BV5000 can be maneuvered into or around complex structures capturing imagery and measurement data of structures and areas previously not accessible with traditional mapping and measurement tools.
### TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>BV5000-1350</th>
<th></th>
<th>BV5000-2250</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tripod</td>
<td>Standard Unit</td>
<td>Tripod</td>
<td>Standard Unit</td>
</tr>
<tr>
<td><strong>Sonar</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Max Range</td>
<td>30m (98 ft.)</td>
<td>30m (98 ft.)</td>
<td>10m (32 ft.)</td>
<td>10m (32 ft.)</td>
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<td>1 - 20m (5.2 - 65 ft.)</td>
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<td>0.5 - 7m (1.6 - 13 ft.)</td>
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<td>1° x 1°</td>
<td>1° x 1°</td>
<td>1° x 1°</td>
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<td>Beam Spacing</td>
<td>0.18°</td>
<td>0.18°</td>
<td>0.18°</td>
<td>0.18°</td>
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<td>0.015m (0.59&quot;)</td>
<td>0.015m (0.59&quot;)</td>
<td>0.010m (0.39&quot;)</td>
<td>0.010m (0.39&quot;)</td>
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<td>1.35MHz</td>
<td>2.25MHz</td>
<td>2.25MHz</td>
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<tr>
<td><strong>Interface</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>Supply Voltage</td>
<td>120 - 240VAC</td>
<td>24VDC</td>
<td>120 - 240VAC</td>
<td>24VDC</td>
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<td>45W max.</td>
<td>45W max.</td>
<td>45W max.</td>
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<td>Ethernet/RS485</td>
<td>Ethernet/USB</td>
<td>Ethernet/RS485</td>
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<td><strong>Mechanical</strong></td>
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<td>40.2 lbs.</td>
<td>21.7 lbs.</td>
<td>37.6 lbs.</td>
<td>19.1 lbs.</td>
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<td>Weight in Water</td>
<td>17.5 lbs.</td>
<td>8.2 lbs.</td>
<td>15.3 lbs.</td>
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<td>To 5000m (9,842 ft.)</td>
<td>3000m (10,000 ft.)</td>
<td>To 3000m (9,842 ft.)</td>
</tr>
<tr>
<td>Sonar, Pan &amp; Tilt (L x W x H)</td>
<td>10.5&quot; x 9.2&quot; x 15.4&quot;</td>
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<td>8.9 x 8.6 x 15.4&quot;</td>
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<td>Tripod (H x W, extended)</td>
<td>40 x 47&quot;</td>
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<td>40 x 47&quot;</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 3D SYSTEM SELECTION GUIDE

The BV5000 Systems are engineered to cover a wide range of applications and are adaptable to varied operational conditions. Below is a list of basic applications and common operating conditions with the recommended system solution. See back cover for ordering details.

- Best
- Better
- Good
- Not recommended

<table>
<thead>
<tr>
<th>Operating Conditions/Applications</th>
<th>BV5000-1350</th>
<th>BV5000-2250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low/Zero Visibility</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Large Structures and/or Sites</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Spool Piece Metrology</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ultra–High 3D Image Resolution</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>3D Object Modeling</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>3D Structure Modeling</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Change Detection</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>
Detailed 3D Structure and Site Inspections

The BV5000-1350 is the perfectly suited instrument for detailed inspections of underwater structures and sites providing engineers with fully interactive 3D imagery and critical measurement data for as-found condition monitoring. This imagery example shows four dam draft tubes from the outflow exit back to the control doors over 25 meters deep into the structure. From this kind of accurate, high-resolution image, engineers can identify blocking debris, structure damage, or bottom changes to determine a course of action. Similar studies can be done on almost any underwater structure.

As-Built/Found 3D Site and Structure Surveys

Underwater structures subjected to harsh environments and potential threats require regular monitoring to determine changes over time. The BV5000 is uniquely suited for this underwater task, delivering high-resolution as-built/as-found surveys, even in zero visibility conditions. From stationary vantage points on the sea floor the BV5000 captures eye-level morphology for unmatched side elevation detail and improved mapping of the entire work site. The final deliverable, a fully interactive 3D as-built/as-found, improves geometry and range measurement capabilities while providing a detailed 3D visual for comparative analysis.

Faster Results, Fewer Steps, Reduces Risk

Understanding the surrounding assets, seabed conditions, and potential obstacles reduces both risk and cost for subsea jumper and spool piece metrology. As a stand-alone tool or part of a combined solution, the BV5000 provides accurate findings as fully interactive 3D surveys for subsea jumper and spool piece metrology. Simultaneously capture multiple flanges, pipes, structures, and the surrounding area without complex navigation, heading, or positioning data. The centimeter-level accuracy of the BV5000 combined with its unique range capabilities make for a powerful mapping system.
Advanced Surveying Technology

Teledyne BlueView is recognized as the leading manufacturer of integrated AUV sonar systems for real-time control and surveying applications. Our unique technology allows us to offer some of the most technologically advanced, lightweight, low-power systems for AUV manufacturers and operators. Component modules for AUV integration include 2D and 3D sensors for:

- Obstacle Avoidance
- Gap Fill
- Navigation
- Target Homing
- Confined Area Search
- Mine Hunting
- Area Mapping
- Object Identification
- Pipeline Tracking & Inspection

Specialized applications and new frontiers in AUV underwater imaging solutions are the hallmark of Teledyne BlueView research and development projects. Teledyne BlueView streamlines the process of taking new, cutting-edge concepts and creating deployment-ready solutions that meet the specialized needs and demands of AUV manufacturers and operators worldwide.
Component AUV Modules

Currently deployed on most major AUV platforms, Teledyne BlueView AUV component modules are compact, lightweight, low-power, and fully customizable.

2D Forward Looking Solutions

We offer the most comprehensive family of compact, high-resolution 2D systems for new and existing AUV platforms. These systems are available with Teledyne BlueView’s ProViewer® Software Development Kit (SDK), customized housings, and unparalleled integration support.

3D Gap Fill Solutions

Our unique 3D gap-filling microbathymetry solution provides high-resolution imagery for side scan gap-filling and target identification in the area below an AUV typically associated with side scan coverage gaps. This enables faster, more effective coverage and significantly reduce mission times.

Modular Solutions

Teledyne BlueView’s modular AUV sonar development services are employed worldwide by leading AUV manufacturers and operators. We specialize in taking challenging ideas from proof-of-concept to deployment-ready solutions.
**TECHNICAL SPECIFICATIONS**

Teledyne BlueView’s AUV systems are engineered to cover a wide range of applications and are available in 2D Forward Looking and 3D Microbathymetry platforms. Both platforms are highly configurable and can be customized to fit new or existing AUV platforms. Below is a list of basic specifications and general applications.

### 2D FORWARD LOOKING SYSTEMS

<table>
<thead>
<tr>
<th></th>
<th>FL900X</th>
<th>FL450X</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sonar</strong></td>
<td>Field-of-View</td>
<td>130° x 15°</td>
</tr>
<tr>
<td></td>
<td>45° x 20°</td>
<td>45° x 15°</td>
</tr>
<tr>
<td><strong>Max Range</strong></td>
<td>100m (328 ft.)</td>
<td>280m (918 ft.)</td>
</tr>
<tr>
<td><strong>Optimum Range</strong></td>
<td>4 - 60m (13 - 196 ft.)</td>
<td>5 - 100m (16.4 - 328 ft.)</td>
</tr>
<tr>
<td><strong>Update Rate</strong></td>
<td>Up to 15Hz</td>
<td>Up to 15Hz</td>
</tr>
<tr>
<td><strong>Operating Frequency</strong></td>
<td>900kHz</td>
<td>450kHz</td>
</tr>
<tr>
<td><strong>Depth Rating</strong></td>
<td>300m (1,000 ft.)</td>
<td>300m (1,000 ft.)</td>
</tr>
<tr>
<td></td>
<td>3,000m (9,842 ft.)</td>
<td>3,000m (9,842 ft.)</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>Supply Voltage</td>
<td>12 - 48 VDC</td>
</tr>
<tr>
<td></td>
<td>Power Consumption</td>
<td>28 W/38W max.</td>
</tr>
<tr>
<td></td>
<td>Connectivity</td>
<td>Ethernet</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Target Detection &amp; Tracking</td>
<td>Obstacle Avoidance</td>
</tr>
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</table>

### 3D MICROBATHYMETRY & GAP FILL SYSTEMS

<table>
<thead>
<tr>
<th></th>
<th>MB2250</th>
<th>MB1350</th>
<th>MB900</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sonar</strong></td>
<td>45° or 90°</td>
<td>45° or 90°</td>
<td>45°</td>
</tr>
<tr>
<td><strong>Max Range</strong></td>
<td>10m (33 ft.)</td>
<td>30 m (98 ft.)</td>
<td>100m (328 ft.)</td>
</tr>
<tr>
<td><strong>Optimum Range</strong></td>
<td>0.5 - 7m (1.6 - 22 ft.)</td>
<td>1 - 30m (3.2 - 63 ft.)</td>
<td>2 - 50m (6.5 - 164 ft.)</td>
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<tr>
<td><strong>Time Resolution</strong></td>
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<td>0.023m (0.89 in.)</td>
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<td>Up to 40Hz</td>
<td>Up to 40Hz</td>
</tr>
<tr>
<td><strong>Operating Frequency</strong></td>
<td>2.25MHz</td>
<td>1.35MHz</td>
<td>900kHz</td>
</tr>
<tr>
<td><strong>Depth Rating</strong></td>
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<td>300m (1,000 ft.)</td>
<td>300m (1,000 ft.)</td>
</tr>
<tr>
<td></td>
<td>3,000m (9,842 ft.)</td>
<td>3,000m (9,842 ft.)</td>
<td>3,000m (9,842 ft.)</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>Supply Voltage</td>
<td>12 - 48 VDC</td>
<td>12 - 48 VDC</td>
</tr>
<tr>
<td></td>
<td>Power Consumption</td>
<td>10 W/12W max. (45°)</td>
<td>10 W/12W max. (45°)</td>
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<tr>
<td></td>
<td>Connectivity</td>
<td>Ethernet</td>
<td>Ethernet</td>
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<tr>
<td><strong>Application</strong></td>
<td>Low Altitude (&lt;7m) Target Identification and UUV Gap Fill</td>
<td>Medium Altitude (&lt;25m) Target Identification and UUV Gap Fill</td>
<td>High Altitude (&lt;50m) Target Identification and UUV Gap Fill</td>
</tr>
</tbody>
</table>

*With barium-136g pressure*
Real-Time Navigation and Obstacle Avoidance

Teledyne BlueView’s compact 2D Forward-Looking Imaging Systems deliver the leading edge in imaging sonar technology. Commonly referred to as acoustic cameras, Teledyne BlueView expanded the field of ready-to-deploy systems with multiple options that include ultra wide field-of-view, fast update rate, high-resolution imagery, and accurate data. Teledyne BlueView also combines horizontal and vertical fields-of-view into a system that delivers unmatched real-time imagery and target data feedback.

Faster, Easier Wide Area Mapping Without the Gaps

AUV manufacturers can now offer operators significantly reduced mission times when mapping large bottom areas. Teledyne BlueView engineered the first 3D Downward-Looking Microbathymetry System to fill the data gap directly below an AUV commonly associated with traditional side-scan systems. The new compact Teledyne BlueView gap-fill system captures ultra-high resolution imagery and data while providing seamless swath coverage, significantly reducing the number of overlapping passes required.

Object ID, Even in Low and Zero-Visibility Conditions

Teledyne BlueView’s compact, low-power 3D Microbathymetry systems create extremely detailed 3D renderings of complex underwater objects and the sea bottom. Operating at higher frequencies than traditional bathymetric sonar, our 3D Microbathymetry systems capture high-resolution data and enable easy integration onto new or existing AUV platforms. The illustration shows the level of detail captured using the MB2250 when three common cinder blocks were imaged at a distance of 1 m.
Near-Infinite Possibilities

Teledyne BlueView 2D Imaging Sonar delivers real-time, high-resolution video-like imagery, even in low and zero visibility conditions. Fast update rates, high acoustic frequencies, compact size, and industry leading target tracking make our products the preferred choice in leading-edge multibeam sonar. With the widest range of models available, we offer you the most choices in field-of-view, range, and depth.

Teledyne BlueView makes using your 2D Multibeam Imaging Sonar easy with "plug-and-go" operation and multiple deployment options, including:

- ROV systems
- Diver hand held systems
- Boat mounted systems
- AUV systems
- Portable tripod systems
- Fixed position systems

All Teledyne BlueView 2D Multibeam Imaging Sonar systems include our ProViewer® and ProViewer® Plus operating software, accessories and one year warranty. We also offers an advanced Software Development Kit (SDK) that enables access to raw data files and sonar controls to make integration into complex monitoring systems easy.
Typical Real-Time Applications:

- ROV Navigation
- Operations Monitoring
- Search & Recovery
- Target Tracking
- Structure Inspection
- Area Survey
- Damage Survey
- Material & Equipment Placement
- Pipeline Tracking & Inspection
- Object Detection
- Obstacle Avoidance
- Target Homing

2D Multibeam Imaging Sonar Systems

Teledyne BlueView has the widest selection of high-resolution multibeam imaging sonar available. Each model features fast update rates that deliver detailed imagery, and include record/play-back features for post-analysis work.

M Series

The most compact, full-featured 2D Multibeam Imaging Sonar available. Engineered to fit into tight spaces the new M Series is 30% smaller than the popular P Series, and delivers the same crisp, real-time sonar imagery. Choose from 45°, 90°, or 135° field-of-view options. An all new split-head option separates the sonar array from the electronics package for an even smaller footprint.

P Series

A complete family of high performance 2D Multibeam Imaging Sonar engineered for multi-tasking applications and flexible deployment options. Choose from a variety of range capabilities (up to 300 m) and field-of-view options including the ultra-wide 135°. All P Series sonar feature compact, lightweight, low-power designs and fast update rates.

P Series Deepwater

Teledyne BlueView re-engineered the P Series to create the smallest deepwater solutions that meet the stringent requirements for ROV operations. Able to operate at depths of 4,000 m (13,123 ft) the deepwater imaging sonar delivers unparalleled real-time imagery to enhance ROV operations.

Dual Frequency

Teledyne BlueView’s Dual-Frequency 2D Imaging Sonar combines the power of a medium-range navigation and inspection sonar with the identification capabilities of an ultra-high frequency sonar in one unit. The dual-purpose acoustic camera allows switching between both frequencies while in operation and in post-analysis.
## Technical Specifications

<table>
<thead>
<tr>
<th></th>
<th>M Series</th>
<th>P Series</th>
<th>Dual Frequency</th>
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<tbody>
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<td>900 &amp; 1250kHz</td>
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<td>45°, 90°, 130°</td>
<td>45°</td>
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<td>300m (984 ft.)</td>
<td>100m (328 ft.)</td>
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<td>2° x 20°</td>
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<td>No. of Beams</td>
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<td>256, 512, 768</td>
<td>256</td>
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<td>0.18°</td>
<td>0.18°</td>
<td>0.18°</td>
</tr>
<tr>
<td>Range Resolution</td>
<td>1.0 in</td>
<td>2.0 in</td>
<td>1.0 in</td>
</tr>
<tr>
<td></td>
<td>1.0 &amp; 0.4 in</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>12 - 48 VDC</td>
<td>12 - 48 VDC</td>
<td>12 - 48 VDC</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>19W max.</td>
<td>8.5W/9.5W max (45°)</td>
<td>9.0W/9.5W max (45°)</td>
</tr>
<tr>
<td>Connectivitly</td>
<td>Ethernet/VDSL²</td>
<td>Ethernet/VDSL²</td>
<td>Ethernet/VDSL²</td>
</tr>
<tr>
<td></td>
<td>20W/24W max (90°, 130°)</td>
<td>19W/23W max (130°)</td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight in Air</td>
<td>5.0 lbs</td>
<td>5.7 lbs (45°), 9.8 lbs (90°, 130°)</td>
<td>5.3 lbs (45°), 5.7 lbs (90°, 130°)</td>
</tr>
<tr>
<td>Weight in Water</td>
<td>11.0 lbs</td>
<td>1.4 lbs (45°), 4.9 lbs (90°, 130°)</td>
<td>1.3 lbs (45°), 1.4 lbs (90°, 130°)</td>
</tr>
<tr>
<td>Depth Rating</td>
<td>1,000m (3,281 ft.)</td>
<td>1,000m (3,281 ft.), 4,000m (13,123 ft.)</td>
<td>1,000m (3,281 ft.), 4,000m (13,123 ft.)</td>
</tr>
<tr>
<td>Size L x W (Max OD)</td>
<td>19.20 x 10.16cm³</td>
<td>24.58 x 17.52 (9.6 x 6.9 in) (45°)</td>
<td>28.70 x 12.70 cm (11.3 x 5.0 in) (130°)</td>
</tr>
</tbody>
</table>

1. VDSL - Some with the onboard VDSL option will have increased length and weight specifications, consult Telmarine Bulletin for details.
2. Deepwater models available with 90°, 130° field of view options, and some with increased length and weight specifications, consult Telmarine Bulletin for details.
3. M Series also available in mesh polar head configurations, consult Telmarine Bulletin for details.

## 2D Selection Guide

The 2D Multibeam Imaging Sonar covers an ever-expanding range of underwater applications. Below is a list of applications and recommended solutions.

- **Best**
- **Better**
- **Good**
- **Not recommended**

### Conditions/Applications

<table>
<thead>
<tr>
<th></th>
<th>M Series &amp; P Series</th>
<th>P Series Deepwater</th>
<th>Dual Frequency P900-2250-45 (45°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low/Zero Visibility</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Intro Level</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Long Range</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Deepwater</td>
<td>○</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Object ID</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Detect &amp; ID</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Wide Area</td>
<td>●</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Boat/Surface</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>ROV</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>
Real-Time Navigation

High-resolution imagery, fast update rate, and accurate measurement data characterize Teledyne BlueView 2D multibeam Imaging Sonar. With the widest selection of models available, Teledyne BlueView can help you choose the best model for your navigation needs. Need to go deep? Teledyne BlueView deepwater systems feature the most compact solutions available and easily fit next to a video camera. Teledyne BlueView deepwater systems are specifically designed for inspection and work-class ROVs that operate at depths up to 4,000m (13,123 ft). ROV manufacturers and operators worldwide depend on Teledyne BlueView to deliver reliable performance in harsh, demanding environments.

Faster, Easier, Safer Search and Recovery

Multi-tasking systems with “hot-swap” capabilities make Teledyne BlueView’s 2D Multibeam Imaging Sonar the perfect solution for critical search and recovery operations. Acting as acoustic cameras that penetrate low and zero visibility conditions, Teledyne BlueView 2D Multibeam Imaging Sonar can detect targets from surface vessels and guide divers directly to the target avoiding hazards and minimizing in-water search times. Portable ROVs outfitted with a Teledyne BlueView 2D Imaging Sonar System become powerful search and inspection tools that can access hazardous, hard to reach areas minimizing the risk for divers.

Real-Time Monitoring Even in Low/Zero-Visibility Conditions

The fast update rate, unmatched high-resolution imagery, and the industry’s most advanced target tracking result in the tool of choice to monitor underwater operations and activity. Able to penetrate low and zero-visibility conditions, Teledyne BlueView offers systems that can track moving objects up to 175m (574 ft.) away and see object details at 5m (16 ft.). With a wide variety of models available, we can help you select the right system to monitor divers, place equipment or materials, track targets, and monitor activity around or near sensitive underwater structures and access points.
ProScan® 3D Software
Teledyne BlueView offers a full suite of 3D software solutions for detailed, accurate 3D imagery and measurements. At the heart of the suite is Teledyne BlueView’s ProScan 3D Software that provides real-time scan control, monitoring, and data post processing. ProScan exports industry standard point clouds in .xyz file formats for seamless export to most 3D processing systems. Teledyne BlueView ProScan Software is included with all BV5000 systems, and can be installed on multiple PCs without additional licensing fees. Online updates available at www.blueview.com.

BV5000 3D Mechanical Scanning Software Solutions
Four (4) separate software packages that can run as stand-alone programs or integrated with the BV5000 3D Mechanical Scanner for a complete underwater 3D imaging system. Scan, view, register multiple 3D scans, and generate CAD compatible models using this integrated software system.

Leica GeoSystems’ Cyclone Software
Teledyne BlueView Technologies is a licensed distributor for Leica GeoSystems and offers two powerful software options for the BV5000 Mechanical Scanning Systems. Leica GeoSystems’ Cyclone software enables the creation of registered 3D images using two or more point cloud scans. Leica offers two licensing options for their Cyclone software: Node-locked which limits access to a single PC, or a floating license that enables usage on multiple PCs.

Leica GeoSystems Cyclone Advantages:
- Exports 3D point clouds for CAD modeling
- Comprehensive set of tools for accurately modeling 3D point clouds

ProViewer® and ProViewer® Plus 2D Software
ProViewer works with Teledyne BlueView 2D Imaging Sonar to deliver high-resolution video-like imagery and point-to-point measurements. The intuitive Windows® based software captures and stores data files in .son and .xml formats for easy access, post processing, analysis, and reporting. ProViewer Plus adds the industry’s most advanced real-time target tracking capabilities with advanced tracking analytics from SeeByte. Both are included with all Teledyne BlueView 2D Imaging Sonar, and can be installed on multiple PCs without additional licensing fees. Online updates available at www.blueview.com.

ProViewer® Advantages:
- Intuitive, easy-to-use controls
- Point-to-point measurement
- No licensing fees
- Sonar and video synchronization
- .jpg and .avi file exports
- Online updates
Sonar Software Development Kit (SDK)

Teledyne BlueView offers a Software Development Kit that is engineered to enable sonar integration into complex platforms and/or customized systems. The SDK enables control of the sonar and provides access to the raw data files to control sonar operation and enable data flow-through. Customize sonar operations (start/stop, ping rate, image size, etc.), create custom data files, or create customized viewership of the sonar imagery with the SDK.

Features:
- Single, easy-to-use kit comes complete in a single.zip file
- Windows® and Linux versions available
- C/C++ libraries included
- Documentation to review software architecture and logic
- Easy reference manual and step-by-step guide included
- Example files show how to use each software component
- No licensing fees

Sonar Deployment Accessories

Engineered for quick and easy deployment of Teledyne BlueView 2D Imaging Sonar Systems.

**BV3100 Portable Boat Mount System**
Ideal for search and diver monitoring, and underwater inspections. Compatible with all Teledyne BlueView 2D Imaging Sonar to create a topside underwater viewing system. Includes: 2-piece 77.5" pole, digitally controlled pan & tilt, quick-release mounting clamp, carrying case, and accessories.

**BV4100 Portable Tripod with Digital Pan & Tilt**
For stationary positioning of Teledyne BlueView 2D & 3D imaging sonar systems. Digitally controlled pan & tilt controls the angle and rotation of the sonar head. Lightweight, one-man deployable system is engineered for rugged underwater environments. Includes: Portable tripod, pan & tilt, sonar mounting plate, and carry bag.

**EXC-300 Ethernet Extender**
Extends sonar communication distance up to 2,000 ft. for ROV systems. Depth rated to 500 m (1,000 ft.).

**Cables**
A wide variety of cables to test and operate its 2D and 3D systems. Available in the standard lengths:
- Sonar Cables
- Cable Whips
- Sonar, Pan & Tilt Cables
Standard connectors include: Titan, SeaNet, and MSSI.

**Sonar Clamp**
Engineered to fit all Teledyne BlueView 2D Imaging Sonar and enable quick on-and-off mounting onto an existing structure or platform. Rugged, lightweight clamp features two (2) heavy duty bolt mounting points for easy installation onto a flat surface.

Teledyne BlueView Extended Warranties

Protect your underwater vision investments with an extended warranty from Teledyne BlueView Technologies, Inc. Extended warranties are available for all imaging sonar systems and can be purchased in 1 year increments. Contact Teledyne BlueView Customer Support for details at +1(206) 812-3020 or via email at support@blueview.com.
Visit Us On The Web: www.blueview.com

Visit us online for the latest product news, stories and examples from our customers, and downloadable Teledyne BlueView software updates.

Case Study Videos

Operators, partner companies, and industry organizations often share their successes and unique applications with us and offer valuable information, insights, and operational tips. Check the “Videos” section on our website for these Case Studies.

Sonar Movies

Visit the “Videos” section of our website which features actual sonar “movies” captured with Teledyne BlueView equipment. If you prefer, download ProViewer® or ProScan® then view the associated sample data files to review data sets just as they would appear on your PC when using Teledyne BlueView imaging sonar systems. Visit the “Software Solutions” section of our website for quick and easy downloads.

Software and Information Downloads

Need detailed product specifications? Want to sample Teledyne BlueView’s 2D or 3D software? Teledyne BlueView online features extensive product information downloads – data sheets, technical drawings, user manuals, CAD STEP files, and more. Current software and example data sets are also available online, download Teledyne BlueView’s ProViewer® or ProScan® software and sample data sets for hands-on testing.