

Product Guide

Outstanding Performance in Underwater Technology



Introduction to Trittech

Trittech International Limited [Trittech], A Moog Inc. Company, is a high-technology business dedicated to providing the most reliable imaging and ancillary equipment for use in underwater applications.

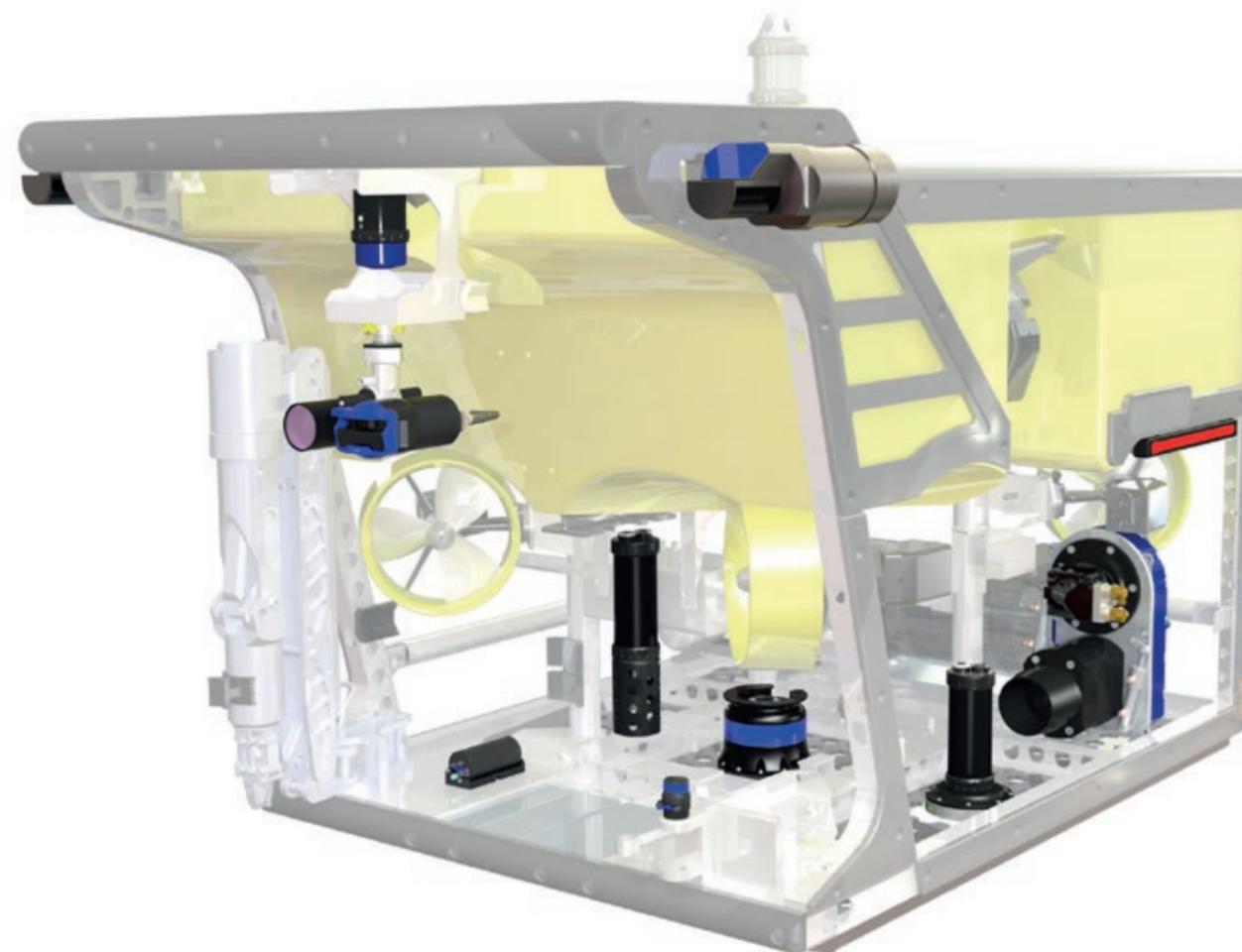
With over 25 years' service to the oil and gas and defence industries and now to emerging markets such as the renewables industry, Trittech's products offer users real operational solutions in the field, particularly in challenging and low-visibility conditions.

Trittech is a respected leader of ROV and AUV sensors and tools, as demonstrated by industry-standard products such as the Super SeaKing mechanically scanning sonar: the obstacle avoidance sonar of choice for global ROV fleets. For real-time high quality underwater vision, the Gemini multibeam sonar is the ideal solution for clear sonar imaging.

To support data collection, Trittech supplies, at no additional cost, a complete data acquisition and display program, Seagnet Pro, to enable the network of multiple Trittech sensors. The Gemini multibeam range of sonars is also provided with a tailored control and display software package, allowing operators to run all Trittech multibeam sensors on one user-friendly software platform.



Trittech's manufacturing floor, Ulverston, Cumbria.



Trittech sensors as installed on a WROV.

Global Reach

Trittech's customers have continued to grow through representation spanning five continents, providing global sales channels and in some instances, service and support capabilities for Trittech's underwater technologies.

Sales, Rental and Customer Support Offices

The site in Westhill, Aberdeenshire, Scotland focusses on sales and customer support, a local sales office is also located in the Houston area (Katy, Texas).



Design, Manufacturing and Service Facilities

Trittech's purpose-built facility in the north-west of England (Ulverston, Cumbria) is home to the company's design, manufacturing and service operations, with a further facility in Edinburgh, Scotland, providing additional product design support. Trittech holds the BS EN ISO 9001:2008 certification, a respected international standard for quality management systems. This accreditation applies to the company's Westhill, Edinburgh and Ulverston sites.

Imaging Sonars



Super SeaKing



Super SeaPrince



Micron Sonar



SeaKing Hammerhead

Mechanical Imaging

The SeaKing range utilises Digital Sonar Technology (DST), composite transducer and Compressed High Intensity Radar Pulse (CHIRP) technology. The **SeaKing** range generates images of exceptional clarity and resolution and the industry-standard sonar, as fitted to global WROV fleets, is the dual-frequency **Super SeaKing**. The Super SeaKing sonar is ideal for ROV navigation and obstacle avoidance and now offers software-selectable communications. The single-frequency **Super SeaPrince** is specifically designed for deployment in survey, observation and light WROVs.

The **Micron Sonar** is ideal for use by small ROVs and AUVs and it is the smallest digital CHIRP sonar in the world. The **SeaKing Hammerhead** is a dual-frequency high-resolution, 360° mechanical scanning sonar suitable for a variety of detailed survey tasks such as underwater engineering projects (bridge or pier inspections), ROV deployment (for mattress lay and debris clearance), or static seabed deployment.

Multibeam Imaging

The Tritech **Gemini 720is** is the latest generation of multibeam imaging sonars from Tritech, superseding the highly successful **720i** and **720id** models.

Gemini 720is is a real-time, high resolution alternative to mechanical scanning sonars; particularly useful where there is poor visibility due to increased turbidity.

The imaging multibeam range also includes the **Gemini NBI** (Narrow Beam Imager) for higher resolution in low visibility conditions and it is especially suited to excavation and dredging operations.



Gemini 720is (4000m)

RAMS® is an ATEX-compliant 360° mooring line and riser integrity monitoring system for Floating Production Storage and Offloading Units (FPSOs) and Floating Liquid Natural Gas vessels (FLNGs). Deployed through the FPSO turret, the RAMS® sonar provides simultaneous real-time feedback on the status of all the targets as viewed throughout the full 360° window.

Side Scan Imaging

Tritech has a range of deep and shallow-water side scan sonars with a choice of frequencies starting at 150 kHz. Each towfish offers digital CHIRP signal processing techniques in portable high-resolution and high-frequency plug and play solutions. Side scan imaging sonars are ideal for Search And Rescue (SAR), port and harbour surveys and wreck hunting.



SK150 Side Scan Sonar

Profiling Sonars



Super SeaKing DFP



SeaKing Sub-Bottom Profiler



Gemini 620pd



Gemini Hub

Mechanical Profiling

Tritech's **SeaKing** range of sensors includes a high-specification dual-frequency profiling (DFP) sonar which gives an accurate profile of the seabed and a dual-frequency Sub-Bottom Profiler. The **Super SeaKing DFP** utilises side lobe suppression techniques for improved signal/ noise ratios and a reduced beamwidth. Operating at 0.6MHz and 1.1MHz, the Super SeaKing DFP profiler has a hard boot design for increased protection and it is operable from a single Tritech **Surface Control Unit** (SCU), along with other Tritech profiling products.

Multibeam Profiling

Tritech's **Gemini** multibeam profiling range includes the **Gemini 620pd** which benefits from the latest technological advances in signal processing to produce high-performance bathymetry data. The **Gemini Hub** provides accurately timestamped data, in a single or multiple Gemini head configuration, which is then output in a number of industry recognised survey formats. The Gemini 620pd is depth-rated to 4000m and can easily be installed on an ROV or vessel.

Bathymetry and Attitude Sensors



SeaKing Bathymetric Sensor



PA500 Altimeter



Micron Echosounder

Tritech's industry recognised integrated bathymetric sensors, SeaKing 700 Series, are available in two forms:

- The **701 Series**, comprises a depth sensor complete with altimeter
- The **704 Series**, includes temperature and conductivity sensors to provide a calculated speed of sound for high-accuracy bathymetry measurements

In addition to the 500kHz **PA500** altimeter supplied with the 700 Series bathy, Tritech offers a 200kHz **PA200** altimeter and a long-range digital precision altimeter, **LRPA200** which is specifically designed for applications where long-range, high-accuracy echosounding is required.

The range of altimeters includes the **Micron Echosounder** which complements the Micron sonar, the smallest mechanical imaging sonar. The Micron Echosounder is a stand-alone altimeter for accurate height off the seabed and other subsea distance measurements.

Navigation and Data Transfer Systems



Micron Data Modem



Micron INS



AquaTrak™ CVL

Tritech designed the **MicronNav USBL Tracking System** for small ROVs/ AUVs to complement the Trittech **Micron** range of products. The USBL transducer (with integral magnetic compass and pitch/roll sensors) communicates with the subsea transponder to provide relative positioning information, which is plotted in real-time using the Seanet software package. This allows the user to monitor the position information on one system alongside other Trittech sensor data, such as that from an imaging sonar.

The **Micron Data Modem** enables a robust spread spectrum data transmission from an extremely compact unit. Trittech designed the **Micron Data Modem** for use as a telemetry sensor for ROVs and AUVs and it is also the basis of the transponder for Trittech's **MicronNav USBL** tracking system.

The latest products to the range include the **AquaTrak™ Correlation Velocity Log (CVL)** and **Micron Inertial Navigation System (INS)**.

The **AquaTrak™ CVL** offers long-range navigation and high-resolution accuracy from a compact, low power sensor and offers significant

advantages over a conventional piston DVL (Doppler Velocity Log) and phased array DVLs. It is suitable for all underwater vehicle applications; providing class-leading precision and accuracy at low velocities.

Developed to allow small subsea vehicles (ROVs and AUVs) the ability to obtain previously unattainable position stability, Trittech's **Micron INS** works seamlessly with Trittech's **MicronNav USBL** to bring fully automated ROV control one step closer.

The **iGC** (intelligent gyro compass) combines three angular rate gyros with three orthogonal DC accelerometers and three orthogonal magnetometers to provide heading and movement data, which is unattainable from widely used Magnetically Slaved Gyro and Flux Gate compasses. By interfacing the optional **iFG** (intelligent fibre-optic gyro), to the **iGC**, the system offers additional heading stability, utilising a single-axis FOG sensor and can typically reduce heading drift errors to <1 degree per hour.



MicronNav USBL Tracking System



iGC

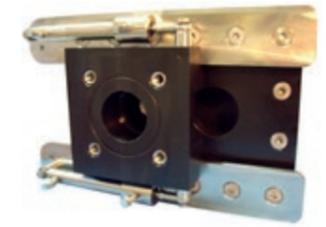
Mechanical and Hydraulic



Super Zip Jet



Merlin



AnchorZip 10

Tritech's mechanical range comprises the **Super ZipJet**, **Merlin** and **AnchorZip 10** and a **PT3636-HD** hydraulic pan and tilt unit.

The **Super ZipJet** is for installation on WROVs to provide reliable excavating and jetting. For increased efficiency, on systems with the required hydraulic capacity, the **Merlin** provides increased performance and can easily be switched from suction to jetting mode.

For a quick and cost-effective way of installing and removing suction anchors, operators can select Trittech's **AnchorZip 10**, a heavy-duty suction anchor pump.

The Trittech **PT3636-HD** is a compact, heavy-duty, hydraulic pan and tilt unit which works efficiently and reliably when mounted in a restricted area, thus, it is ideal for installation on WROVs and trenchers.

Control Units



Seanet SCU



SeaHub

Tritech's range includes the popular **Seanet SCU (V5)**, a robust 19" rack mount unit with floated shock mount sub-assemblies for maximum reliability.

The **Seanet SCU** hosts a high-speed 156kBits/sec communication system to enable operation of a full suite of Trittech sensors over a single twisted pair. Each device runs in real-time on its own onscreen window. By utilising the Trittech **Multicomm**, sensors can also be operated over an RS232/ fibre-optic interface.

The **SeaHub** is a highly versatile product that allows a customer to interface Trittech or third-party survey equipment via a USB 1.1/ 2.0 connection on their own PC or laptop computer. Remodelled in a rugged stainless steel housing, it is also available as a desktop or 19" rack mount configuration.

Video Imaging



Super SeaSpy

Tritech's cameras are built for harsh underwater environments making them ideal for ROV inspection work.

The **Typhoon** camera is ideal for WROV survey, inspection, security and surveillance work and it is typically installed as the main high-resolution colour zoom camera.

The **Tornado** is a high-performance monochrome underwater video camera which is ideal for low-light situations.

The **Super SeaSpy** is ideal for ROV inspection work as it is a high-resolution, full-colour camera with integral low-voltage lighting, through a ring of white LEDs for uniform illumination.



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