THE ROV/AUV EQUIPMENT & PARTS DIRECTORY 2019
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**STRENGTHEN YOUR CONNECTIONS**

To safely and cost-effectively solve your deepwater challenges in these dynamic market conditions, choose from our portfolio of advanced technologies and innovative subsea tieback solutions. As your trusted field-development partner, our unmatched experience and advanced engineering enable us to adapt and evolve to safely meet the current and future demands of the oil and gas industry.

By working together, we will safely and reliably re-shape the future of the oil and gas industry.

Connect with what’s next at Oceaneering.com
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Website</th>
<th>Location</th>
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<td>Lian</td>
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<td><a href="http://www.teledyne-marine.com">www.teledyne-marine.com</a></td>
<td>Cypress, TX, USA</td>
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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

DeepSea Power & Light is a privately held design and manufacturing company serving the subsea industry. They design and manufacture durable products for subsea applications, including video cameras, lights, lasers, power modules, and pressure relief valves. Uses range from industrial applications and research to cinematography. Their philosophy is to continually advance technology for use in the harshest environments with ease of service, reliability, high performance, and cost effectiveness as important design criteria. DeepSea Power & Light values innovation, collaboration, and the shared success of their employees, customers, suppliers, representatives, and partners.

Contact
sales@deepsea.com
+1 858 576 1261

DeepSea Power & Light’s SeaBattery Power Module has been a tried and true veteran of deep ocean systems for more than 30 years. Get the power you need with the SeaBattery Power Module.

Please check out our website on:
www.deepsea.com

Please check out our website on:
www.ROVPlanet.com

THE MOST ROV FOCUSED MAGAZINE
FOR SUBSEA CONSTRUCTION & ROV PROFESSIONALS!
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

SOUTHWEST ELECTRONIC ENERGY CORPORATION (SWE)

HQ Location: P.O. Box 31340, Houston, TX 77231, USA
823 Buffalo Run, Missouri City, TX 77489, USA

Company Intro
Since 1964, SWE has been a pioneer in innovative energy solutions serving the needs of original equipment manufacturers in diverse fields such as oil and gas, oceanographic, military and remote. SWE has changed the game in subsea and oceanographic applications with SWE SeaSafe, SeaSafe II and SeaSafe-Direct, lithium-ion battery solutions that power subsea vehicles, control systems and oceanographic equipment safer and longer with four times the energy of a sealed lead acid battery. SWE leads downhole battery solutions with superior quality engineered Lithium primary battery packs for high temperature Measurement While Drilling (MWD) and Logging While Drilling (LWD) applications. SWE also provides custom battery solutions for the exploration of the earth’s oceans by powering the infrastructure, vehicles and buoys that collect needed data.

Contact
Leon Adams
Email: Info2@SWE.com
Phone Number: +1.281.240.4000

The future of subsea operations is all-electric and Southwest Electronic Energy (SWE) is committed to providing reliable subsea battery solutions to “untether” data acquisition and monitoring equipment. SWE’s American Bureau of Shipping (ABS) and International Electrical Code (IEC) certified lithium Ion polymer battery modules can make that future a reality.

With a goal of providing safe light-weight solutions, SWE designed and introduced the cost-effective SeaSafe-Direct, which can go immediately into the water leaving the pressure vessel and oil case behind. The battery is enclosed in flame-retardant urethane, designed for complete water submersion. It has built-in subsea connectors for power and communications. With the need to generate reliable power subsea, this battery can power AUVs, ROV sleds, and provide power for sensors to determine equipment conditions and send needed data to determine maintenance needs.

Pressure tolerant to 6000m depth, SeaSafe batteries include SWE’s patented battery management system (BMS). The BMS has the brainpower to assure safe operation, protect the module’s cells from damage, allow reliable distributed battery system architecture and prolong battery life. Rechargeable with a standard power supply, SeaSafe Smart modules are easy to use battery building blocks. The original SeaSafe and SeaSafe II can be used in oil-filled pressure equalization enclosures, while the SeaSafe Direct can be used directly in the water. Modules can be connected in series or parallel to meet voltage and capacity (Ah) needs. Each smart module is autonomous with its own BMS containing advanced algorithms for automatic and continuous safety protection, charge control and balancing.

Additional components to support SWE SeaSafe include the Parallel Integrator Isolator and the SWE SeaSafe Observer Support Software, which allows the user to monitor the health of the battery in real time. The Woods Hole Oceanographic Institution has partnered with SWE in the development of SeaSafe, utilizing it in various Nereid AUV and Hybrid ROVs. The SeaSafe II and SeaSafe-Direct received a Certificate of Design Assessment from ABS in December 2017.
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<tr>
<th>Component Supplier</th>
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<td><a href="http://www.bluerobotics.com">www.bluerobotics.com</a></td>
<td>Torrance, CA, USA</td>
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<td>BMTI (Alseamar)</td>
<td><a href="http://www.bmti-alseamar.com">www.bmti-alseamar.com</a></td>
<td>Six Fours, France</td>
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<td>Engineered Syntactic Systems (ESS)</td>
<td><a href="http://www.esyntactic.com">www.esyntactic.com</a></td>
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<td>Evonik</td>
<td><a href="http://www.evonik.com">www.evonik.com</a></td>
<td>Essen, Germany</td>
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<td>Forum Energy Technologies – Syntech</td>
<td><a href="http://www.f-e-t.com">www.f-e-t.com</a></td>
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<td>SynFoam</td>
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<td>Trelleborg</td>
<td><a href="http://www.trelleborg.com">www.trelleborg.com</a></td>
<td>Randolph, MA, USA</td>
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</table>
FlexLink™ was developed to meet the needs of large, tracked, trenched vehicles that operate on the sea bed. To prevent such vehicles damaging their control lines, FlexLink is installed at the tether point to provide a continuous, articulate buoyant section above the vehicle, thereby ensuring the umbilical remains out of the vehicle work zone at all times. FlexLink is used as a permanent installation which is designed to pass through the sheave wheels of launch and recovery systems (LARS). It is supplied for installation onto umbilicals ranging in size 2575mm OD while the buoyancy can be specified to suit project requirements. Typical uplift ranges from 612kg/m in design operating depths of 06000msw.

UMBILICAL FLOTATION

BOE provides a range of floats to suit most control umbilicals. These floats comprise a pair of symmetrical half shells which are profiled to permit the line to flex within its specified bend radius. Each float is manufactured using a low density composite foam core covered in a high performance impact and abrasion resistant polyethylene shell. BOE’s umbilical floats are hinged using two stainless steel latches. The floats are designed to grip the umbilical by means of a natural rubber internal grommet. Balmoral umbilical floats are designed to suit umbilical diameters ranging from 25mm50mm OD. Umbilical floats can be supplied to suit larger diameter umbilicals if required.

UMBILICAL FLOAT VALUES

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<th>Operating depth (msw)</th>
<th>Weight in air (kg)</th>
<th>Nominal buoyancy (kg)</th>
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<td>3000</td>
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</tbody>
</table>

BUOYANCY REPAIR

It is vital that repair and refurbishment is carried out by fully qualified teams that understand the materials, procedures and environments to which marine buoyancy is exposed. It is vital that repair and refurbishment is carried out by fully qualified teams that understand the materials, procedures and environments to which marine buoyancy is exposed. Balmoral benefits from many years’ design, manufacture and materials experience and has dedicated teams of experienced repair personnel travelling the world on a regular basis.
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

COMPANY INTRO

BMTI is a leading manufacturer of engineered pure syntactic foam subsea buoyancy products for the Oil & Gas, Oceanography and Defense industries. Using innovative and advanced own-formulation syntactic foam materials technology and manufacturing processes, BMTI delivers optimal performance in subsea products for deepwater applications.

We offer the smartest buoyancy solutions: own formulations and associated manufacturing processes, testing throughout the production chain, low densities for maximum buoyancy, long-term operational performance, deepwater & very deepwater buoyancy.

Contact
Alexia Ballatore
aballatore@alseamar-alcen.com
+33 (0)4948 70777

ROV/AUV BUOYANCY

BMTI® offers a state-of-the-art ROV buoyancy manufacturing process to ensure the best possible quality. We select the best foam grade for you on the basis of your specifications (depth rating and uplift are generally required). We are different from other buoyancy providers because we have the largest range of off-the-shelf blocks, densities and grades, so we can quickly take care of any application. Buoyancy assemblies are then machined to the exact shape before being finished with our own-formulation protective PUR and painting, including the positioning of inserts for which we offer premium strengths. We carry out quality controls and testing to a high standard throughout the manufacturing process, so as to guarantee the best product performance.

- BMTI® combines materials technology and design experience to manufacture highly sophisticated ROV/AUV buoyancy modules
- BMTI® offers the lowest pure syntactic foam densities on the market for depths from 1 000 to 10 000 m, for maximum vehicle buoyancy.
- BMTI® also has extensive experience in the positioning and incorporation of metal inserts, and in protective skins and coatings.
- BMTI® can provide both standard blocks (large size means limited bonding) or finished buoyancy modules.

BUOYANCY REPAIR

BMTI® offers a repair and refurbishment service for damaged or worn subsea buoyancy modules. We are experienced in the repair of complete module breakages or the replacement of missing sections, ensuring you get maximum usage from your subsea buoyancy assets by extending their lifespan.

SYNTACTIC FOAM BLOCKS

Lightweight and strong: BMTI® syntactic foam blocks offer the best performance for all your buoyancy requirements, if you prefer to shape locally. The blocks are ready to use for assembly or cut-to-fit applications and can also be bonded together to form larger structures.

We have an important stock policy, of various densities and depths, as to deliver quickly worldwide.

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<th>Reference</th>
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TRELLEBORG AUPLIED TECHNOLOGIES

I.02.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

USA regional office: 24 Teed Drive, Randolph, MA 02368, USA
Europe & rest of world regional office: Eagle Way, Off Queensway, Rochdale, Lancashire, OL11 1TQ, UK

Company Intro
Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative engineered solutions accelerate performance for customers in a sustainable way. Trelleborg Applied Technologies specializes in the development and production of polymers and syntactic foam. Our goal is to perform at every level to deliver innovative and reliable solutions that maximize business performance to meet our customers needs.

Remote Operated Vehicle (ROV), Autonomous Underwater Vehicle (AUV) and Human Occupied Vehicle (HOV) Buoyancy Systems are being used at increasingly deeper water depths, creating the need for low density materials with high buoyancy and reduced volumes. We develop, design and manufacture these buoyancy systems to be used in oceanographic, marine and offshore applications. Trelleborg Applied Technologies is ISO 9001 certified.

EOCOFLOAT® SYNTACTIC FOAM

Trelleborg Applied Technologies manufactures a range of high performance, low density syntactic foam for deep sea buoyancy applications called Eccofloat®. These composite foams provide ultra-low densities by selecting only the highest specification hollow glass microspheres, called Eccospheres® and combining them within a rigid, high strength resin system. The syntactic foam is typically cast into standard blocks.

Oceanographers also depend on syntactic foams to suspend instrumentation in deep ocean studies. For these applications, the syntactic foam is used in either block form or custom molded shapes for installation in manned and unmanned subsurfaces such as the legendary Alvin and Jason vehicles that were used to discover and explore the Titanic.

Eccofloat® TG Grade syntactic foams are lightweight for building manned and remote operating vehicles. The foams are also used to manufacture mine neutralization systems because of their zero magnetic and sea-water comparable acoustic signatures. Applications include hydroplanes, rudders, trim adjustment modules for submarines and specialized applications such as acoustic windows due to the material profile and ability to significantly improve sonar functions.

Eccofloat® DS Grade syntactic foams combine lightweight glass Eccospheres® with multifunctional epoxy resin to produce ultra-high strength-to-weight materials for high-performance, deep sea applications including manned and unmanned subsurfaces.

Eccofloat® SG Grade syntactic foams offer a more economical solution which is also castable. They are available at all depths and are suitable for all subsea equipment.

ROV/AUV BUOYANCY

BUOYANCY

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LINKSYN™ UMBILICAL BEND CONTROL

Linksyn™ provides an even distribution of buoyancy along an umbilical due to its interlocking and articulated design. It prevents the umbilical from bending below its minimum bend radius and provides mechanical support in the event load is applied to the umbilical. Two new additions to the range are the Linksyn™ SD and Linksyn™ HD systems. Linksyn™ key benefits are:

- Flexible positioning
- Re-usable buoyancy elements
- Bend protection
- Provides support

UMBILICAL BUOYANCY

Our range of UF-series umbilical buoyancy is constructed using a polyethylene outer shell filled with a high performance syntactic foam core. Umbilical buoyancy is used in conjunction with ROVs to keep the required length of umbilical buoyant underwater. They can also be used in a number of general cable or hose buoyancy applications where the diameter of the cable or hose does not exceed 90mm.

- Quick installation – incorporates two quick release, double locking latch mechanisms.
- Changeable grommet – interchangeable inter-

MINING & EXCAVATION BUOYANCY

Mineral rich deposits are found in deep water environments and machines capable of operating in deep and ultra-deep water require high performance composite materials that can provide buoyancy with long term performance. Trelleborg Eccofloat™ can be custom built into buoyancy modules for just such applications. The reduced density of Eccofloat™ enables smaller more compact buoyancy modules, which provide increased uplift (buoyancy) with reduced in air weight, thereby enabling smaller handling systems. With many of the mining vehicles being controlled with umbilicals, the requirement to support the weight of the umbilical and keep it clear of the vehicle track system requires Linksyn® and Linksyn® HD. Eccofloat™ is also used in Umbilical and Recovery Hose Floatation.
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<tr>
<th>Company</th>
<th>Website</th>
<th>Location</th>
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<tbody>
<tr>
<td>Cortland</td>
<td><a href="http://www.cortlandcompany.com">www.cortlandcompany.com</a></td>
<td>Cortland, NY, USA</td>
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<tr>
<td>DeRegt Marine Cables</td>
<td><a href="http://www.deregtcables.com">www.deregtcables.com</a></td>
<td>Krimpen aan de Lek, The Netherlands</td>
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<td>Brighton, England, UK</td>
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<td><a href="http://www.falmat.com">www.falmat.com</a></td>
<td>Falmouth, MA, USA</td>
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<tr>
<td>Hydro Group</td>
<td><a href="http://www.hydrogroupplc.com">www.hydrogroupplc.com</a></td>
<td>Aberdeen, Scotland, UK</td>
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<td>JDR Cables</td>
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<td>Paris, France</td>
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<td>NOVACAVI</td>
<td><a href="http://www.novacavi.it">www.novacavi.it</a></td>
<td>Milan, Italy</td>
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<tr>
<td>Oceaneering</td>
<td><a href="http://www.oceaneering.com">www.oceaneering.com</a></td>
<td>Rosyth, Scotland, UK</td>
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<tr>
<td>Prysmian Group</td>
<td><a href="http://www.prysmiangroup.com">www.prysmiangroup.com</a></td>
<td>Milan, Italy</td>
</tr>
<tr>
<td>Seanamic Group – Umbilicals International</td>
<td><a href="http://www.umbilicals.com">www.umbilicals.com</a></td>
<td>Stafford, TX, USA</td>
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<tr>
<td>TE Connectivity – Rochester Cables</td>
<td><a href="http://www.te.com">www.te.com</a></td>
<td>Schaffhausen, Switzerland</td>
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**COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS**

**CABLES, TETHERS & UMBILICALS**

- **20** DeRegt
- **22** Hydro Group Plc.
- **24** Novacavi
The race to reach greater depths is in full swing

ROV manufacturers are continuously searching for new, innovative ways that will allow existing and new ROV models to dive deeper. As a supplier of ROV cables, we have an unrivalled understanding of the challenges facing ROV manufacturers. Interested in finding out how you, as an ROV manufacturer, can benefit from the latest cable technology?

Meet us
Zaag 2-4, 2931 LD Krimpen aan de Lek, The Netherlands
+31 180 66 88 52 | deregcables.com

Connect
Stay tuned, keep in touch with DeRegt. Scan the QR code and be the first to know about our updates.

Middle weight ROV class cable
- Two layer armour package
- High temperature resistant materials
- Optical fiber communication
- 4km waterdepth

Fall pipe cable
- Triple layer high tensile steel
- Combination of High power, auxiliary power and communication
- Up to 3.5km waterdepth

Trenching umbilical
- High tensile steel package to support cable weight
- High power consumption – 1.5mW power
- Combination of main power, auxiliary and communication pairs
- 750 meter length

Lightweight tether cable
- Light weight design
- Aramid strength member
- Designed for deep water application
HYDRO GROUP PLC.

HQ Location: Hydro House, Claymore Avenue, Aberdeen Energy Park, Bridge of Don, AB23 8GW, Scotland, UK

Contact
The Hydro Group Plc. sales team
sales@hydrogroupplc.uk
+44 (0)1224 825 050

PRODUCTS

Hydro Group has over three decades of experience in the creation of bespoke and ex-stock cables, tethers and umbilicals and is certified to ISO 9001:2015 and 14001:2015 quality standards. The company is a proud recipient of the 2018 Queen’s Award for Enterprise: International Trade, recognising the success of its exports around the world.

The Group’s subsidiaries, Hydro Bond Engineering and Hydro Cable Systems, manufacture a wide range of subsea connectivity solutions including armoured cables, tow cables, fibre optic hybrid cables and ROV tethers. Over 6000 configurations of cable design are available, with a large choice of armour and sheath materials to choose from to suit your specific application.

ARMOURED CABLES

- Subsea armoured cables can withstand higher stresses with superior crush resistance, corrosion resistance and better cold impact bend performance, ideal for harsh underwater environments.
- Hydro Group offers multi-core power and data cables with single layer, contra-helical and high tensile armouring.
- Our in-house armouring facilities can include armoured wire sizes between 0.5 – 2.5mm diameters for cables up to 80mm in diameter.
- Protection options include Aramid, Kevlar, Vectran, galvanised or stainless steel (including steel wire rope or steel wire armour).

TOW CABLES

- Range of applications including in defence industry e.g. anti-submarine warfare and reconnaissance.
- Experienced in creating heavy and light tow cables for several international defence forces.
- Previous example of 600m long steel wire armour heavy tow body sonar cable with hairy fairing on the umbilical to increase coefficients while towed at 20 knots.
- Extensive and gruelling testing process – example operational weight of 5 tons, pull weight 40 tons, destruction at 48 tons.

UMBILICALS

- Hydraulic umbilicals can include different components including thermoplastic hoses, medium voltage power cores, low voltage electrical power cables, electrical signal cables, fibre optic cables.
- Bundled assemblies protected by layers of steel wire/Vectran armour and inner and outer sheaths of thermoplastic material, either as extrusions or helically-wrapped roving.
- Electrical and Electro-Hydraulic umbilicals also available.
- Neutral buoyancy increases safety for divers and machinery operating in close contact with umbilicals.
- Hydro Group experienced in manufacturing hydraulic umbilical hose bundles for subsea diving, BOP control, topside control umbilicals and Intervention Workover Control Systems (IWOC) ratings available upon request.

FIBRE OPTIC/HYBRID CABLES

- Our fibre optic cables can be supplied in multiple numbers within a gel-filled stainless steel tube, or as individual fibres within a jacket.
- 9/125 Single mode, 50/125 and 62.5/125 Multimode Fibre Optics can be supplied as a standalone cable or as part of a bigger bundle.
- www.hydrogroupplc.com
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

NOVACAVI SRL.

HQ Location: 1 via Martiri di Cefalonia, Peschiera Borromeo-Milano, 20068, Italy

Company Intro
Italian privately owned company established in 1975, Novacavi provides custom development and manufacturing of extra performance electrical cables for specialized application including harsh and demanding environments. Specialties are material expertise, engineering versatility & production flexibility to match customers’ exact requirements; custom reliable cables in fit for purpose quantity, lengths and packaging. ISO 9001 certified design and production process since 1995.

Contact
Francesca Faverio
ff@novacavi.it
(+39) 02 5538321

AQUANCABLE® – CABLES FOR UNDERWATER TECHNOLOGIES

Novacavi’s wide range of bespoke cables for maritime and underwater technologies feasible on any conceivable configuration. High performance ROV cables, Fiber Optic hybrid cables, Umbilicals, Armoured cables, as well as Subsea detection and instrumentation cables. Among them: water blocked cables engineered to provide hydrostatic transversal and/or longitudinal water tightness and lightweight, neutral, positively or negatively buoyant cables for underwater environment.

ROV CABLES (12GAX64)
- Special mechanically hybrid neutrally buoyant cable with flexible subsea CAT 6 cable. Designed to guarantee longer distance data transmission from a specific ROV to its operator station.
- Bespoke neutrally buoyant cable for micro and mini ROV used as diver alternative inspection. A small sized and light cable designed and manufactured with foam polyurethane sheath to guarantee the required buoyancy.
- Customized robust and long lasting cable to be used in heavy-duty work ROV. Produced with a slippery durable sheathing material especially suitable against abrasion and erosion due to its application in harsh environments.

FIBER OPTIC HYBRID CABLES (14AZS433)
- Or Subsea fiber optics composite instrumentation cable for work class ROVs. Principal elements of this customized composed cable are: single mode fiber optics in metal tube, side scan sonar coaxial cables together with power, communication and other coaxial cables.
- Bespoke 7 Km one single length neutrally buoyant ROV F.O. hybrid cable. Load-bearing cable with 7000 Kg breaking strength thought to be used in a peculiar underwater inspection system. This tether cable has to be connected to a long range ROV let down to inspect an underground gallery with shallow water inside.
- Specially designed fiber optics composite tether cable for light work class ROV. Its construction made of a perfect balance between aluminium and copper elements, was thought to satisfy and guarantee the exact required subsea performance.

UMBILICALS (160MB11)
- Or Neutrally buoyant diver umbilical cable designed, developed and manufactured strictly according to customer’s specific latest underwater equipments. Its peculiar construction guarantees light weight in sea water and maintains neutral buoyancy improving diver’s efficiency and safety while working in harsh situations.
- Specially designed umbilical cable to be part of a high efficiency cutting subsea system used to remove decommissioned offshore structures.

Bespoke integrated to suit customer’s needs.
- Customized intervention and maintenance umbilical cable for a wide range of subsea services. Specially designed and manufactured with durable materials to guarantee operational strength and dynamic requirements.

SUBSEA ARMOURDE CABLES (12SSA11)
- Heavy sinking cable with a significant specific weight and high breaking load used to survey the depth. Launched and dragged on the seabed, it has to quickly sink and to maintain a high capacity against tightness and abrasion in severe operating environments while performing without rising from the seabed.
- Customized composed tow cable with coaxial, power and signal conductors laid up together with an overall torque balanced armour of a special austenitic stainless steel. Load-bearing cable with 38 tons breaking strength and a peculiar non-magnetic and mechanic protection which provides an outstanding combination of strength, toughness and corrosion resistance to the entire cable.
- Bespoke subsea armoured cable for electro-acoustic instruments. Used for detection in aquatic environments, its watertight and flexible construction makes it perfect for underwater use.

SUBSEA DETECTION AND INSTRUMENTATION CABLES (21MC451)
- Heavy Customized composed cable with micro wave coaxial for special subsea equipments. This cable guarantees high speed data transmission accuracy thanks to its integrated high performance ultra low loss coaxial cable.
- Customized Custom design cable to be partially used in water environments and partially outside where fire resistance is a required special feature.
- Bespoke subsea detection and instrumentation cable for a special innovative equipment extracting energy from ocean waves.

EXTRA PERFORMANCE CUSTOM CABLES FOR

HARSH ENVIRONMENTS

Custom-engineered cables to overcome the toughest challenges of high demanding applications such as Defence & Security, Extreme Temperatures, Geo-survey & Seismology, Oceanography, Subsea Telecommunications & Research, Oil & Gas Exploration and Production.
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CAMERAS & LIGHTS

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CAMERAS:

APEX™ SEACAM®

DeepSea Power&Light has elevated its HD camera offerings with the new 4K UHD capable Apex SeaCam. This camera incorporates proprietary corrector optics for superior imaging performance. Rigorously tested with over 10,000 pressure cycles to 10,000 psi during the design and qualification process, the titanium housing and optically polished dome are depth rated to 6,000 m.

- 4K UHD and multiple HD formats
- Superior performance with proprietary corrector optics
- 70° horizontal FOV
- 12× optical zoom
- 24× combined lossless digital zoom in HD output formats
- 4K UHD resolution ver FleXlink™, fiber, and coax options

SUPER WIDE-I SEACAM®

The Super Wide-i SeaCam features an extreme wide angle field of view in a compact housing, ideal for observation tasks, exploration, and other work environments that benefit from a broad field of view.

- 150° horizontal FOV
- Available with aluminum or titanium housing
- Up to 11,000 m depth rating

LED MICRO SEACAM®

The small and durable LED Micro SeaCam is ideal for manipulator arms and the inspection of wells, pipes, and other confined applications. The flexible integrated cable between the camera and connector allows the LED Micro SeaCam to maneuver through tight locations, while integrated LED lights provide clear imaging.

- Ultra small 22 mm diameter
- 55° horizontal FOV
- Sapphire port
- Up to 6,000 m depth rated titanium housing

LIGHTS:

LED SEALITE®

Specifically developed to exceed current market demands, the LED SeaLite delivers a high-performance, field serviceable, and affordable subsea light. Versatile configuration options allow the LED SeaLite to meet specific performance requirements.

- Up to 10,000 lumens
- Spot, flood, or wide beam configurations
- 4,000 m, 6,000 m, and 11,000 depth rated
- Digital and analog dimming interfaces supported
- User configurable power limit
- Customer serviceable

MULTIRAY™ LED SEALITE®

The Multiray™ LED SeaLite combines the function of two fixtures in a single light. This enables operators to expand vehicle capability while saving space, avoiding downtime for switching luminaires, and lowering costs compared to the multiple luminaires it replaces.

- Operate two sets of LED sources in a single fixture
- Choose from whites, colors, ultraviolet, and infrared
- Choose from a combination of optics that range from a 115° wide flood to a 28° narrow spot
NETmc MARINE

HQ Location: Turfhill, New Deer, Turriff, AB53 6TL, Scotland, UK

Company Intro
NETmc Marine has been at the cutting edge of digital video solutions since the beginning of the millennium. With market knowledge drawn on over 40 years accumulative field experience, we are the perfect partner to provide solutions for your digital video acquisition projects. Since the beginning, our innovative products have been favourites for ROV fleet managers and inspection engineers alike. In recent years our DVCi range of over Ethernet/Copper cameras have added HD video acquisition capabilities to ROVs without the requirement to upgrade the umbilical or transmission system; thus expanding the capability of the ROV at a modest cost.

And now we are changing the shape of DVRs. By using years of technological innovation we have developed a single adaptive and expandable video recorder. Start with the basic unit and add multi-channel operations or overlay or a number of other options simply by buying a code. Or rent an upgrade for a specific job. And tying the cameras and the DVR together is our E-Inspect software, a low cost easy to use integrity reporting package.

With our background in a wide range of offshore projects, including all aspects of diving and ROV video inspections, we will make sure you select right configuration for your application and that the product we sell you is fit for purpose.

Contact
Raymond Ruth
sales.uk@netmcmarine.co.uk
+44 (0)1771 644001
www.netmcmarine.co.uk

FEATURED PRODUCTS: CAMERAS

DVCi-R
With the ability to work over a twisted pair or an Ethernet link and with a 10 times optical zoom ability, the DVCiR is the ideal inspection camera for your IRM or Decommissioning projects. The camera uses intelligent light compensation so additional lighting is generally not required. The DVCiR also supports IR lighting when used in conjunction with our IR lamp.

The camera video uses H264 compression and encodes the video subsea thus reducing the required bandwidth to transmit the signal over the ROVs own Ethernet or twisted pair. There are three different depth ratings (1000, 3000 and 6000m).

The DVCi R is supported in E-Inspect and Coabis Ver 11 and above.

DVCi-D
The first HD over Ethernet camera for divers for either surface or bell operations. Use your existing umbilical and improve your video capability with this small camera system. With its intelligent light compensation the supervisor will now be able to watch welding operations during the welding rather than after the event. The cameras are made of a plastic that is durable and hard wearing but more importantly light in weight. The system allows the operator to use their existing lamps and comms systems. The DVCiD also supports IR lighting when used in conjunction with our IR lamp.

The DVCi D is supported in E-Inspect and Coabis Ver 11 and above.

DVCi-SR
Designed to fit smaller ROVs, the DVCiR uses the vehicles copper conductors to bring HD to many vehicles that do not generally support HD video thus allowing access to more difficult areas. On the VideoRay it connects to the Auxiliary connector. The topside unit is a ruggedised cased version of the new DVR.

The DVCi D is supported in E-Inspect and Coabis Ver ??? and above.

DVCi-P
Set to revolutionise the pipeline inspection market, the DVCi P is the only multi-channel camera system, working over Ethernet, designed specifically for the pipeline market. With ease of installation and integration to survey software the DVCi P is a cost effective solution to upgrading your pipeline video acquisition system whilst giving your clients the clearest image of the pipe.

IR LAMP
Extend your visual inspections in difficult visibility scenarios with our IR lamp. Either ROV or hand held the IR lamp will allow the DVCi range of cameras to see further in difficult conditions. Just switch the DVCi camera to black and white operations and see into the depth beyond.

DIVER CAMERA AND LAMP
A lightweight but high resolution camera with separate LED lamp, these units are low cost but rugged products. The lamp is available as a wide angle flood or a spot light and the camera has 1/3” 650TVL module. The cameras and lamps can be sold separately or as part of a diver spread with rack or portable case controller.

Innovative • Flexible • Adaptable

Introducing the evolutionary
NETmc Marine
A single flexible, modular marine video recording unit, that can be adapted and updated as your business changes or expands.

For more information
+44 (0)1771 644001
sales.uk@NETmcMarine.co.uk
www.NETmcMarine.co.uk

INNOVATIVE MARINE RECORDING TECHNOLOGY
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

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CAMERAS & LIGHTS

FEATURED PRODUCTS: CAMERAS / PAN & TILTS / LIGHTS

HIGH DEFINITION CAMERAS (SS446 / SS465 / SS474 / SS490)

SS446 offers stunning full 1080i/720p HD-SDI features a 1/3" CMOS HD sensor, 10X optical zoom with auto focus and is rated to 3000m.

SS465 series, offers HD – IP and POE convenience from 3000m to full ocean depth.

SS474 series, compact HD-SDI fixed focal length optical corrected lens and compact size. 3000m

SS490 series, offers 4K UHD (ultra high definition) with a number of streams and outputs including IP, HDMI, SDI, Fibre Optic. 300m, 3000m, 7000m and full ocean depth upon request.

Pan and Tilt and single axis positioners for cameras lights sonars lydars and more...

SS109 series: 10 pound-force foot, 13.6 Newton Metre torque

SS250MK2 series: 65 pound-force foot, 88 Newton Metre torque

SS260 absolute encoder high degree of accuracy .001°

LOW LIGHT B&W CAMERAS (SS408 / SS425 / SS426 / SS435)

Sidus Solutions' SS408 B&W cameras are lightweight and robust inspection tools. Designed for high sensitivity in low light, this camera employs a 420 TVL black & white module that has a 1/3" Sony ExView HAD CCD imaging sensor. The video output is provided in EIA or CCIR formats, with a standard 2.97 mm lens that offers 98° FOV in air. The durable acetal housing is corrosion resistant, and will provide years of quality service. The camera is available as part of a complete system or as a low cost replacement for the camera you now use.

COLOUR ZOOM CAMERAS (SS420 / SS449 / SS427)

SS420 Series: 36x optical zoom automatic and manual control of focus and exposure settings ¼ inch ExView HAD depth of 10,000 feet.

SS449 Series: high definition 1080i or 720p HD-SDI (2,000,000 pixels) CMOS Up to 20,000 ft (6000 m) Titanium

SS481 Series: high definition IP-POE color zoom, customizable internal red & white LED's and lasers internal in one housing stainless steel 3000m

LIGHTS

SS182 (SS181 COMPACT)

HIGH OUTPUT LED LIGHT WITH DIMMING

Sidus Solutions’ SS182 high output LED underwater light offers the perfect illumination solution for a vast number of applications were high vibration and impact shock could be an issue or low power consumption is desired. An optimized, micro-controlled LED array provides more light than a standard 250W halogen lamp.

The SS182 provides outstanding brightness and luminaire for underwater video and photography. The SS182 has an illumination life of 50,000 hours.

The SS186 OceanLink units are the latest generation of Li-Fi optical communication using free space optics, utilizing the latest technology in a handheld package. The eye-safe blue light LED used by OceanLink allows communications between units at distances up to 100 meters*. The units function as a transparent Ethernet link to a remote computing device or to another system via a standard 10/100mHz Ethernet connection. In addition to data communication, OceanLink provides full-duplex voice communication over a separate channel. OceanLink will provide 3 mbps at self selecting brightness as a function of range to optimize transmission while conserving power*. In situations where a hardware connection is unavailable or undesirable, OceanLink is a perfect deep water alternative to cables.
SONAVISION
HQ Location: Unit 13, Robert Leonard Centre, Howe Moss Drive, Kirkhill Industrial Estate, Dyce, AB21 0GG, Aberdeen, UK

Company Intro
Sonavision Limited are world leaders in the fields of seabed mapping, imaging sonar and acoustic communications and specialise in design, development and production of acoustic sonar and video technologies for underwater data acquisition. We are industry leaders with many years of experience in underwater technology and pride ourselves on customer service which is why our clients, who range from small companies to local authorities and plcs, highly recommend us.

Contact
Ravi Chandu
sales@sonavision.co.uk
+44 1224 707737

CAMERAS & LIGHTS

Sonavision’s Hawkeye Cameras and Lights are simple, compact, and easy to use and maintain. Using the latest camera modules, a wide range of cameras and lights are available in a variety of materials to suit varying water depths. These range from acetal, aluminium and steel to titanium for extreme applications. Choices for cameras include colour or low light black and white, transmission of signal can either be balanced line or composite video. There is also a choice of connectors and power supply. Sonavision’s balanced line driver overcomes the losses of a composite video signal over a long cable and can drive several hundreds of meters of twisted pair, depending on the condition of the cable. A small adapter converts the balanced line output to composite video for display/recording. This is particularly useful on ROVs and in diving operations where there are noisy or old cables in the system.

Sonavision’s cameras are:

- manufactured from stainless steel, aluminium, titanium or acetal.
- rated for use at a wide range of water depths: 300m, 600m, 1000m, 3000m or 6000m.
- used on a drop frame, a dive helmet or an ROV.
- can have either balanced line or composite output.
- colour or black & white.
- small, well designed and manufactured to exacting standards.
- use the most up to date CCD modules (and will continue to use the most up to date components!).
- supplied with bleed screw for pressurising in a helium environment.
- all modular, and can be mixed and matched.
- easy to maintain and service.

www.sonavision.co.uk
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CAMERAS & LIGHTS

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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

SUBC IMAGING

HQ Location: 317 Memorial Drive, Clarenville, NL, A5A 1R8, Canada

Company Intro

SubC Imaging’s mission is to continuously create the most technologically advanced and capable video equipment for the offshore and subsea markets. Its products are used in remote vehicle operations including deep sea mining, marine research, archaeology, and in offshore oil and gas service work. SubC has made revolutionary changes in the way subsea imaging is conducted with Remote Operated Vehicles (ROVs). The company has developed a client list that reaches around the world. Currently its clients are based in over 20 countries including the United States, Brazil, China, Italy, Australia, Saudi Arabia, and Singapore to name a few.

Contact

Carlos Sanyer
info@subcimaging.com
+1 709 702 0395

CAMERAS:

RAYFIN™

Autonomy is the future of underwater systems. SubC has developed plug and play equipment with the goal of simplifying autonomous image and video collection. The Rayfin is the center of this development. Designed as an autonomous or controlled science payload with 21 megapixel digital stills, 4K and HD recording to internal storage.

At its core, a smart Ethernet camera with autonomous dive interval programming. Built in sensor fusion will simplify advanced computer vision applications such as image mosaics, object detection and 3D model creation.

- Autonomous operation to reduce cost and complexity
- Internal 4K UHD recording and 21 megapixel digital stills
- Hybrid LED strobe/lamp and external laser sync direct from camera
- Dive interval programming (automated stills, recording, hibernate)
- Live video and image file transfer over Gigabit Ethernet
- Sensor fusion: built in IMU data logged with images/video
- Video, stills and data storage in SubC Dive Log format for easy review
- 512GB of solid state storage for video, stills and data
- Control via Ethernet, RS232 and RS485

1CAM™ MK6

The Mk6 is built upon SubC’s time proven 1Cam product line. It is the sixth generation of Smart Camera and has models and options to suit any underwater application. All models include built in 4K UHD and HD Video recording, 6.2 16.6 megapixel stills and 512GB of storage. Except the Mk6 Lite, which is a low cost option for live video only. We recognize that no two projects are the same. That is why we have various options such as Ethernet downloading and control, SD video long line driver, 100% Titanium housing, auxiliary I/O pins for custom events and triggers and more. SubC excels at building reliable custom equipment.

- Live 4K UHD via Fiber
- Live HD via Coax

DVRO™

The DVRO is an all-in-one video management system. It includes many features previously requiring multiple systems into a single 19” 3U rack unit. Designed for ease of operation and reliability it includes smart data monitoring to let users know immediately if operations have been interrupted during.

- Input up to six channels of 4K, HD, SD, 3D and IP video
- Record and Blackbox on all channels
- Overlay and Dive Event Log
- Stream video over the internet or local area network.
- Remote login for tech support

LIGHTS:

AQUOREA™ LED MK2

The Aquorea Mk2 is a hybrid strobe/lamp that synchronizes with SubC cameras. The LED driver synchronizes the camera exposure time with its activation time while strobing. This freezes the stills taken so objects photographed can be captured in the highest detail. The built in charge control allows it to strobe while limiting the current draw from the system’s power supply. The Mk2 LED can also operate as a stand-alone product with serial control.

- Output: 12,500 lumen lamp / 25,000 lumen strobe
- Color: 5000K white or 725nm far-red
- Beam angle: 80° wide angle beam
- Protection: power monitoring, charge control, temperature, voltage and current
- Material/Depth: 6000m Grade 5 Titanium
- Includes: 10’ cable when bought with a SubC camera
SULIS SUBSEA CORPORATION

HQ Location: 17 Dundee Ave, Mt. Pearl, NL, Canada

Company Intro
SULIS Subsea Corporation is a Canadian company that develops and produces ultra-high-resolution camera technology for a range of aquatic environments, from shallow coastal and freshwater bodies to the deepest depths of the world’s oceans. Through partnerships with leading scientists, explorers, and filmmakers, SULIS helps create the awe-inspiring footage found in IMAX films, world-class scientific laboratories, and Remotely Operated Vehicle (ROV) control rooms, often streaming to millions of online viewers. Some of our current partners include James Cameron’s DEEPSEA CHALLENGE, Schmidt Ocean Institute, Schmidt Family Foundation, Woods Hole Oceanographic Institution, Black Sea Maritime Archeology Project, and Parks Canada. Our mission is to enable advancements in exploration, discovery and knowledge, across all aquatic environments through the lens of SULIS’s ever-advancing imaging products. In addition, SULIS is committed to providing outstanding product quality and global support for your demanding application.

Contact
info@sulissubsea.com
+1 709 745 5080

SULIS Z70 4K UHD CAMERA
The SULIS Z70 provides high-end remote underwater imaging for science, exploration, broadcast, and digital cinema.
- The finest image quality available in a deep-sea camera
- Live 4K UHD video transmission via fiber or Ethernet, or internally recorded
- 12x optical zoom with ultra-wide-angle field of view
- Unparalleled multi-group aquatic optical corrector with corner-to-corner 4K resolution
- 6,000m depth rating
- 20-megapixel stills capture
- Full manual controls

SULIS CB1 CAMERA CONTROL UNIT
The SULIS CB1 provides the same level of control you would expect from the world’s top terrestrial cameras, at its deepest depths.
- Precision 3-axis joystick for zooming and pan/tilt control.
- Dials for fine-tuned adjustment of focus, iris, and other settings
- 7” touchscreen for camera status monitoring and full control of all settings
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CAMERAS & LIGHTS

I. 04.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CAMERAS & LIGHTS

I. 04.

TRITECH INTERNATIONAL

HQ Location: Peregrine Road, Westhill Business Park, Westhill, Aberdeenshire, AB32 6JL, Scotland, UK
Design & Manufacture: Oubas Hill, Next Ness Lane, Ulverston, Cumbria, England. LA12 7LB, UK
US Sales & Support: 1323 Price Plaza Drive, Katy, Texas 77449, USA

Company Intro
Tritech International Limited [Tritech], a Moog Inc. company is a high-technology business dedicated to providing the most reliable imaging and ancillary equipment for use in underwater applications. Tritech operates in many professional underwater markets, including Defence, Energy, Engineering, Survey and Underwater Vehicles and remains an industry leader in the provision of sensors and tools for ROVs and AUVs, a reputation achieved from over 25 years of delivering expertise through key products.

Contact
sales@tritech.co.uk
+44 (0)9224 744111
+44 (0) 7801 151 833 (24 hour on call support)

www.tritech.co.uk

SUPER SEASYP – COLOUR CCD UNDERWATER CAMERA

The Tritech Super SeaSpy underwater video camera is a compact, high resolution, full colour camera with integral low voltage lighting. Built to survive the harsh underwater inspection environment, the Super SeaSpy has been designed to be compact and rugged whilst providing high quality colour video.

The Super SeaSpy incorporates a ring of white LEDs which provide uniform illumination over the field of view. The LED Engine utilises Dynamic Light Control (DLC) which automatically adjusts the lighting level to optimise video image quality, regardless of the reflectivity of work surface. This feature also helps enhance picture quality by reducing the amount of backscatter from suspended particles in the water column.

The Super SeaSpy is fitted with a water corrected lens system which optimises the picture quality by reducing radial distortion and reducing chromatic aberration.

TYPHOON – COLOUR UNDERWATER VIDEO CAMERA WITH ZOOM

The Tritech Typhoon is a robust, high resolution colour underwater video camera with an auto-focus zoom lens, which maintains focus throughout x23 Optical and additional x12 Digital Zoom ranges. Both PAL and NTSC Broadcast Standards are supported.

The Typhoon combines the latest CCD with numerous digital enhancements and the camera’s wide dynamic range technology compensates for bright backgrounds and low light conditions; providing clear, low noise video with good contrast. The auto white balance maintains natural colours under wide ambient lighting conditions and also the Digital Slow Shutter and IR Cut Filter options deliver higher sensitivity at low levels of illumination.

All optical and digital functions can be controlled via a user-friendly GUI, or integrated within an ROV control system via a RS232 Command Protocol. The GUI provides default system settings or user-specific configurations. Alternatively, focus and zoom can be controlled by analogue signal inputs. Digital Slow Shutter and Back Light Compensation functions can be optionally ‘hard-wired’. An ‘Ivanoff Corrected’ lens system optimises picture quality by reducing radial distortion and chromatic aberration. In benchmark tests, the Typhoon delivered sharper definition and better colour rendering than similar cameras.

Typhoon can be supplied with an integral overvoltage protected Video Line Driver, which with selectable gain, this can compensate for video signal attenuation through longer umbilicals.

TORNADO – LOW LIGHT UNDERWATER VIDEO CAMERA

The Tritech Tornado underwater video camera is a high quality low light camera system using the very latest CCD technology.

A ½” Interline CCD sensor provides a high-resolution 570 horizontal line monochrome picture. The camera module has a light sensitivity of 3x10-4 lux. The Tornado camera is contained within a new 4000m compact stainless steel housing fitted with a high quality water corrected acrylic view port.

The importance of the view port is often underestimated in underwater cameras. The acrylic view ports used on all Tritech cameras have similar refractive properties to that of water providing the optimum solution for deep water lenses. This ensures a clear and sharp picture during close proximity viewing in all water conditions.

The Tornado underwater video camera is supplied with a switchable high frequency boost amplifier making it suitable for use with short or long umbilicals.
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**NEXT » CONNECTORS & PENETRATORS**

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46 Glenair
48 Hydro Group Plc.
ANEKONNECT

HQ Location: 19849 Nordhoff St. Northridge, CA 91324, USA

Company Intro
Anekonnect is a software developer that focuses on streamlining the communication process in the Subsea Cables & Connectors Industry. It provides an online platform for designing, collaborating and sharing subsea cable assemblies with various stakeholders. Picking the right connectors for a marine application can make all the difference in system efficiency. However, the absence of consolidated connector data and difficulty in deciphering multi-page PDF catalogs has made this a challenging task. This often results in compromised system productivity or higher lead times.

Anekonnect offers a first-of-its-kind centralized data repository for harsh environment underwater connectors and cables. The online library provides technical specifications for each connector, along with 3D models and manufacturer specific part numbers. With these tools, Anekonnect aims to aide in lower process lead times and lower costs.

Contact
contact@anekonnect.io
b.shah@anekonnect.io

CABLE ASSEMBLY DESIGN
Anekonnect’s application eliminates the need for complex and expensive CAD software and per user licensing. Built on Web 2.0 technologies, user can use any web browser to create the needed cable assembly design, with a simple process of selecting connectors and cables from the online library, creating wiring diagram using a drag-and-drop interface, and specifying any additional details. The application also allows users to collaborate and share designs with colleagues, vendors, distributors, etc. Once completed, users can request engineering drawing files and 3D model of the final design. These files are available to download and can be used in personal or commercial projects.

CABLE STRUCTURE AND DATA MANAGEMENT
During assembly design, users have the ability to create and use custom cables and connectors for their assembly designs. They can also bookmark frequently used elements to avoid searching for them again. Anekonnect’s data management features make it easy to organize and share assemblies and their components.

BOM AND MATERIAL PRICE QUOTES
On completion of assembly design, Anekonnect also generates a high-level BOM to facilitate cost calculations. Subsequently users can use the Anekonnect platform to request material price quotes from manufacturers. This entire process of assembly design and ordering helps improve efficiency and organization. The price quote tool is also an excellent opportunity for cable/connector manufacturers to enhance sales by connecting with buyers online – an avenue not yet fully explored by most sales teams in the Subsea Industry.

CUSTOM SAAS APPLICATION FOR MANUFACTURERS & DISTRIBUTORS
Corporations can chose to integrate Anekonnect’s application with their company website and provide a seamless communication channel between their Sales, Engineering and Operations teams. For example, Anekonnect can provide a custom instance of it’s application (companyname.cable.design) as a plugin for their existing website of connector manufacturers and cable assembly manufacturers.

For a small subscription fee, corporations can use the private instance as a locked internal tool accessible only by its employees. The instance provides superior cataloging of the company’s connectors.

CABLE & CONNECTOR FORUM
Community forums are another feature on the Anekonnect website that allow for discussion on all matters related to connectors and cable assemblies. Forums aim to facilitate open discussions on topics ranging from user experience with connectors/assemblies, issue resolution, new product discovery, etc. Users can connect with industry experts using forums or use their experience and knowledge to answer open questions.

Anekonnect’s drafting and other services can be tried for free on anekonnect.io. These services prove to be practical for companies that cannot afford to have CAD drafters on-site. For others, they can augment engineering capabilities by taking care of routine assembly design tasks, thus letting engineering teams focus on high value custom projects. Anekonnect’s application also makes it easier for teams to maintain service levels for legacy products without the need for adding full-time resources to it.

For further details, or to request a demonstration, kindly send an email to support@anekonnect.io.
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

The SeaKing is a high density, glass sealed connector that utilizes resistant stainless steel shells and other material choices maximize durability and reliability. Goldplated terminations including Anodized aluminium, Titanium, and Aluminium Bronze. Glenair is also able to supply Super G55 interconnects in composite thermoplastic (PEEK) to meet application requirements for reduced cathodic corrosion as well as weight reduction without affecting connector performance.

HIGH-SPEED ETHERNET: The Super G55 Ethernet option is available in the 1508, 2013 and 2021 contact configurations and provides both high speed (Up to 1GB) and power (600Volts) in a full subsea environment (10,000 psi). Gigabit speed data transfer up to a distance of 75 meters.

Contact
sales@glenair.com
+1 818 247 6000

DEEP UNDERWATER SUBSEA, HIGH-PRESSURE CONNECTORS

The SeaKing Fiber Optic connector offers the 10,000 psi rating in both Open Face and Mated conditions. They are offered in a variety of shell sizes and configurations, and can be terminated with molded cable or PBOF. When used as a PBOF, Glenair uses the same seals to the individual conductors so that the connector will continue to operate in the event of a catastrophic hose flood. As a vertically integrated company, Glenair performs all fiber termination and manufacturing in-house.

The SeaKing Power connector is currently offered in a 4 pin configuration (with other configurations upon request) which is designed for operation at 5kV. This connector too, has incorporated many valuable features in the standard Seaking. The connector includes API O-ring test ports which allow the user to certify the integrity of the dual O-rings. The interchangeable inserts make it easy to swap genders without having to use different shells, and the aft loaded inserts are secured with a threaded retaining ring to accommodate high pressure in both directions. A detached flange allows the bulkhead to be mounted in a position to reduce stress on the cable and ease of clocking. Additionally, the SeaKing Power connector incorporates an accessory porch very similar to the standard SeaKing which facilitates over-molding, PBOF backshells or other termination accessories.

SUPER G55 CONNECTOR

The Super G55 family of dry-mate underwater connectors is a revolutionary new design of the popular industry-standard marine interconnection used in countless ROV, underwater camera, diver communications, lights, pan and tilts, and other subsea applications. Available in 3 shell sizes, the Super G55 is manufactured from 316L Stainless Steel with insert molded contact assemblies designed for pressure-sealed applications up to 10,000 psi mated and unmated. Intermateable and intermountable with other “55” series connectors, the Glenair solution introduces a long list of product innovations designed to improve performance and durability. Our PBOF versions, for example, utilize easy-to-assemble threaded fittings which deliver both superior sealing performance while reducing installation time. Other innovations include full-mate inspection windows, improved solder cup contact design, improved routing and sealing, and more. Cable plugs and receptacles are available in attachable (user-terminable) versions or factory overmolded single-ended whips.

- 10,000 psi mated/ unmated (approx. 22,500ft/7000m)
- Recessed plug socket contacts for safety
- Intermateable and intermountable with other “55” series connectors
- 3 shell sizes — 15, 20 and 24, with 3 to 21 contacts
- PBOF versions available
- 600 VDC, 5 to 18 Amps (dependent on conductor and cable size and make-up)
- Retractable, anti-galling coupling nuts prevent mis-mating and improve durability

NON-STANDARD MATERIALS: Other material options are available as part of our non-catalog offerings including Anodized aluminum, Titanium, and Aluminium Bronze. Glenair is also able to supply Super G55 interconnects in composite thermoplastic (PEEK) to meet application requirements for reduced cathodic corrosion as well as weight reduction without affecting connector performance.

Contact
sales@glenair.com
+1 818 247 6000

Glenair has been the leading manufacturer and supplier of commercial and Mil-Spec connector accessories since 1956. Building on that foundation, we now offer a dozen, full-spectrum product lines designed to meet your every interconnect requirement. From hermetic connectors to fiber optics, from conduit systems to Micro-D assemblies, from composite enclosures to assembly tooling — Glenair does it all. And throughout the years, we’ve made outstanding customer service our approach to earning your trust, and to maintaining our position as the industry’s best-value interconnect supplier:

- By designing quality into every part we ship.
- By delivering the fastest turnaround on quotes and custom orders.
- By establishing an unsurpassed sales, support and engineering presence in every major market in the world.
- By building the largest capacity, broadest capability factory in the interconnect accessory industry.
- By avoiding cumbersome business practices such as minimum orders and expediting charges, and...
- By maintaining the world’s largest “Same-Day Shipment” inventory.

Regional Offices:
40 Lower Oakham Way, Oakham Business Park, Mansfield, Notts, NG18 5BY, UK
40 Lower Oakham Way, Glendale, CA 91201, USA
HQ Location:
HQ Location:

Contact
sales@glenair.com
+1 818 247 6000
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

HYDRO GROUP PLC.

HQ Location: Hydro House, Claymore Avenue, Aberdeen Energy Park, Bridge of Don, AB23 8GW, Scotland, UK

Company Intro
With over 35 years of international experience, Hydro Group designs, manufactures and installs bespoke subsea electrical and optical connectivity solutions for use in harsh environments in the international oil and gas, defence and renewable energy sectors. Headquartered in Aberdeen, United Kingdom, Hydro Group’s regional subsidiaries Hydro Group Asia Pte and Hydro Group Systems, Inc offer support and aftersales service from Singapore and Florida, USA. A network of Hydro Group business partners are also on hand to support your product from initial quotation to final installation around the globe.

Contact
The Hydro Group Plc. sales team
sales@hydrogroup.plc.uk
+44 (0)1224 825 050

www.hydrogroupplc.com

PRODUCTS

Hydro Group is a reliable provider of high-quality connectors and penetrators and is certified to ISO 9001:2015 and 14001:2015 quality standards. With products tailored to the exact demands of your project regardless of location, the company is a proud recipient of the 2018 Queen’s Award for Enterprise: International Trade.

The Group’s subsidiaries, Hydro Bond Engineering and Hydro Cable Systems, manufacture a wide range of subsea connectivity solutions including its durable range of HRS, HRM and HDM connectors. Hydro Group also manufactures manned and unmanned penetrators suited for electrical, coaxial, optical or hybrid applications.

HRS CONNECTORS
- Hydro Rubber Sealing (HRS) ideal for harsh subsea uses
- Underwater mateable; available in moulded or unmoulded configurations with up to 70 pins
- Rated up to 3.3kV, depth-rated to 2440 MSW
- Bulkhead, panel mount or cable mount options available

HDM CONNECTORS
- Hydro Deck Mate (HDM) are robust and designed for continuous mate/de-mate cycles
- Deck mateable, up to 110 pins density
- Rated to 6900 MSW and up to 3300 Volts RMS
- Ideal for fibre optic connectivity (Multimode 62.5/125 and 50/125, Single mode 9/125)
- Submarine Deck Mate (SDM) connectors available for defence applications upon request

HRM CONNECTORS
- Hydro Rubber Moulded (HRM) connectors are versatile and reliable
- Surface mateable, durable rubberised connectors with precision-engineered and reliable injection moulding fitment
- Offered with bulkhead, attachable, inline, dummy plug and overmould options
- Connectors available in Standard Circular, Micro Series and Low Profile connectivity
- Rated to 600 VDC (configuration dependent) and between 10 and 60 Amps/pin for SC configurations

MANNED/UNMANNED PENETRATORS
- Penetrators are suited to applications including diving bell and deck decompression chamber systems
- Lloyd’s Register-certified manned submersible electrical penetrators type approved for use at a depth of up to 650 MSW
- Broad operating window of -40°C to 60°C and working voltages of up to 500V
- Fully pressure-blocked with right-angled/in line designs and mono/bi-directional pressure design options
- Rated up to 3,000 Volts RMS, available in stainless steel, titanium, aluminium silicon bronze
- Current ratings up to 140 Amps with higher ratings available upon request
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

I.06. DIGITAL VIDEO RECORDING

52 Digital Edge Subsea
54 NETmc Marine
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

DIGITAL EDGE SUBSEA

HQ Location: Doubletree Court, Cavendish Street, Ulverston, Cumbria, LA12 7AD, UK

Company Intro
Digital Edge Subsea is a specialist company working primarily in the oil and gas industry based in Ulverston, UK. Our goal is to deliver easy to use but extremely capable digital video recording systems to the remote operated vehicle (ROV) and diving industry. Digital Edge Subsea started by producing the original EdgeDVR in 2009, a single channel SD digital video recorder and inspection system. The EdgeDVR was born out of the frustrations of the founders experience offshore, using systems that were complex, not intuitive and prone to failure. Digital Edge Subsea now produces a range of products and supplies systems to many of the major offshore operators worldwide. Digital Edge Subsea is a trusted brand with a reputation for excellent support.

Contact
John Benson
john@digitaledgesubsea.com
+44 (0)1229 206456

EDGE DVR HD

The EdgeDVR-HD-4SD is our top of the range model, it is a quad channel digital video recorder (DVR) which can record 1 channel of high definition (HD) video and up to 3 channels of standard definition (SD) video or 4 channels of SD video. The EdgeDVR is primarily for use in the offshore oil and gas subsea market. It is generally used for daily ROV operations, both eyeball and work class or diving. Being quad channel it can display and record up to four video channels simultaneously, which is ideal for multiple divers or an ROV with multiple cameras and sonar. The EdgeDVR can be switched between 1, 2, 3 or 4 channel mode. In 3 channel recording mode the EdgeDVR is an ideal pipeline inspection video recording system. The EdgeDVR includes a built in video switcher, so the operator can easily switch between video inputs when in 1 or 2 channel recording mode. Switching can even be done within a video recording.

There is a quad channel black box recorder integrated into the EdgeDVR, so whenever a dive is open, all channels of video are recording be they HD or SD. Taking multi-channel videos, video clips or stills is extremely easy and the whole user interface is designed for ease of use by the operator by experienced ROV pilots and 3.4u inspectors.

The EdgeDVR includes HD and SD drag and drop quad independent channel overlay and can take in up to 4 survey or serial data feeds. Built in eventing and automatic generation of dive, anomaly, video and photo logs.

EDGE DVR

The EdgeDVR-4SD is a quad channel standard definition (SD) digital video recorder (DVR). The EdgeDVR is primarily for use in the offshore oil and gas subsea market. It is generally used for daily ROV operations, both eyeball and work class or diving. Being quad channel it can display and record up to four video channels simultaneously, which is ideal for multiple divers or an ROV with multiple cameras and sonar. The EdgeDVR can be switched between 1, 2, 3 or 4 channel mode. In 3 channel recording mode the EdgeDVR is an ideal pipeline inspection video recording system. The EdgeDVR includes a built in video switcher, so the operator can easily switch between video inputs when in 1 or 2 channel recording mode. Switching can even be done within a video recording.

EDGEDVRSUBSEA – 1U RACKMOUNTED 40TB NAS DRIVE

1U Rackmounted 40TB NAS Drive – Raid 5 Configured 30TB Storage Available. It connects to the EdgeDVR Via USB or LAN. 30TB Local storage with optional Auto Backup to Cloud Storage.

EDGINSPECT

The EdgeInspect has been designed for use with the EdgeDVR range of inspection systems. It allows the safe transportation of all hard drives within the EdgeDVR and provides a Sata to USB dock, to enable connection to an external PC.

EDGESTORE

The EdgeStore has been designed for use with the EdgeDVR range of inspection systems. It allows the safe transportation of all hard drives within the EdgeDVR and provides a Sata to USB dock, to enable connection to an external PC.
NETmc MARINE

HQ Location: Turfhill, New Deer, Turriff, AB53 6TL, Scotland, UK

Company Intro
NETmc Marine has been at the cutting edge of digital video solutions since the beginning of the millennium. With market knowledge drawn on over 40 years accumulative field experience, we are the perfect partner to provide solutions for your digital video acquisition projects. Since the beginning, our innovative products have been favourites for ROV fleet managers and inspection engineers alike. In recent years our DVR range of over Ethernet/Copper cameras have added HD video acquisition capabilities to ROVs without the requirement to upgrade the umbilical or transmission system; thus expanding the capability of the ROV at a modest cost.

And now we are changing the shape of DVRs. By using years of technological innovation we have developed a single adaptive and expandable video recorder. Start with the basic unit and add multi-channel operations or overlay or a number of other options simply by buying a code. Or rent an upgrade for a specific job. And tying the cameras and the DVR together is our E-Inspect software, a low cost easy to use integrity reporting package.

With our background in a wide range of offshore projects, including all aspects of diving and ROV video inspections, we will make sure you select right configuration for your application and that the product we sell you is fit for purpose.

Contact
Raymond Ruth
sales.uk@netmcmarine.co.uk
+44 (0)1771 644001
www.netmcmarine.co.uk

FEATURED PRODUCTS

DVR

The NETmc Marine DVR is a new concept in video acquisition: a single unit that can be upgraded in the field simply by adding a new code. It replaces all previous DVRs in our product range.

The basic configuration is a single composite channel recorder, but up to three more channels can be added as well as overlay, black box functionality and compatibility with third party softwares. Imagine being able to covert a single channel unit to a full pipeline spread as easily as adding a USB device.

Other options include HD recording, compatibility with the DVCi range of cameras and recording IR feeds on Coastal and Border Patrol vessels. The system can also be installed in ruggedised cases for portatbility e.g. to work with the DVCi SR.

N.B future options may require hardware upgrades.

SYSTEM OPTIONS

Some of the upgrades available:
- Multi channels
- Hi-Def input
- Video overlay
- Blackbox recording
- Integrity Software Control (Coabis/EIVA)

DIGITAL DIVE LOG

The Digital Dive Log (DDL) is an interactive electronic dive log for use with the NETmc Marine DVR Inspector or X-Ops DVR. The software can run on the DVR itself or on a separate PC and automates the input of data normally recorded during ROV and diving operations.

E-INSPECT

Stand-alone workpack driven inspection / video acquisition package – for each workpack a list of Inspection Points or groups of associated Inspection Points can be created, to which Tasks are allocated e.g. take CP.

Chassis options:

1U Rack Mount
- Base model
- Configurable 1-4 channels
- Composite video or single channel

Hi-Def
- 4U Rack Mount
- Configurable for mixed input types – Hi-Def and composite
- Supports extra storage

Peli Case version
- Ruggedised construction
- IP rated keyboard and connectors

Innovative • Flexible • Adaptable

Introducing the revolutionary DVCi Camera Systems

Complete high definition recording systems featuring cameras, topside and software. Available for use over twisted pair or ethernet.

For more information
+44 (0)1771 644001
sales.uk@netmcmarine.co.uk
www.NETmcMarine.co.uk
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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS
LASER SCANNING & 3D IMAGING

I.07.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

VLS™ (VIDEO LASER SCAN)

Dimensional Eye offers revolutionary optical 3D measurement with VLS™ (Video Laser Scan). VLS™ is the result of a joint development between Dimensional Eye and BP America. VLS™ was developed to overcome specific measurement challenges in the subsea environment, and has proven to be an extremely versatile and highly accurate 3D metrology tool in multiple industries.

VLS™ is a unique combination of photogrammetry and laser technique which provides the advantages of both technologies without the disadvantages. VLS™ provides high-definition visual inspection, as-built 3D CAD modeling, 3D high density point cloud and mapping of deformations and anomalies (for example: cracks, dents, bulges).

VLS™ is a high accuracy metrology tool linked to NIST (National Institute of Standards and Technology) that provides high-redundancy through the volume of data collected (1000’s of still images can be captured from HD video in seconds rather than individual photos taken manually at each location). VLS™ provides reliable accuracy estimates (thanks to advanced processing and self-calibration algorithms developed by Dimensional Eye after years of industry experience in multiple measurement environments and scenarios).

VLS™ is deployed by ROV or divers for subsea applications and by drone for applications in air.

VLS OFFSHORE APPLICATIONS

VLS™ (Video Laser Scan™) is deployed by ROV or by divers to gather the data used to create high accuracy 3D measurements and models. If you can fly it, we can model it. The ROV simply flies by the structure in order to gather the data required for modeling. The VLS is designed to work with most ROV systems, contact us for more information on how we can put VLS™ to work on your 3D Measurement and As-Built CAD Modeling challenges.

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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LAUNCH & RECOVERY SYSTEMS (LARS)

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62 All Oceans Engineering Ltd
64 Soil Machine Dynamics Ltd (SMD)
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LAUNCH & RECOVERY SYSTEMS (LARS)

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COMPANY INTRO

All Oceans Engineering Limited was established in December 1985. The business is based on the provision of specialist engineering services to the diving and underwater industries. In 1988 the service was expanded to include ROV, underwater construction, and general marine industry support. All Oceans work extensively in Oil and Gas markets, and more so as operations go deeper. Experience is applied across the increasing market, alternative industries and to a growing customer base. An extensive market driven product portfolio has been developed since the mid-nineties. Products range from simple compensators, through Underwater Winches, Tether Management Systems (TMS) and deep-ocean Launch and Recovery Systems (LARS). In all cases, product sales are fully supported by an experienced and knowledgeable team. The company has developed excellent goodwill over the years and a reputation for the good service it provides. The company is now recognised as a world leader in underwater mechanical handling technology and is at the forefront of underwater winch and cable management technologies.

CONTACT

Brian Abel
admin@alloceans.co.uk
+44 (0)1224 791001

www.alloceans.co.uk

FEATURED PRODUCTS:

LAUNCH & RECOVERY SYSTEMS (LARS)

Handling system design has been a big part of All Oceans’ business since their start-up in 1985, and the TMS product range is at the forefront of underwater mechanical handling technology as a sophisticated underwater winch / cable handling device. 2006 saw All Oceans deliver the first 6000m ROV LARS designed and manufactured in the UK. This complemented the delivery of a 6500m depth rated TMS in 2004 which puts All Oceans well and truly at the leading edge of underwater mechanical handling technology and is at the forefront of underwater winch and cable management technologies.

TETHER MANAGEMENT SYSTEMS (TMS)

- Top-Hat or Garage configuration
- Tether capacity 3-55mm dia to 1000m
- Choose from 8 standard winch modules
- User friendly mechanical solution
- Easily adjustable for different tether diameters
- Long life, low maintenance
- Full ocean depth rated

UNDERWATER WINCHES

- Pulling, lifting, storage
- Pull-down & Pull-in docking winch tool systems
- Total cable management systems
- Electric, hydraulic, mechanical or manual drives
- Diver and ROV friendly systems
- Low maintenance designs
- Deep ocean operations

REMOTE OPERATED VEHICLES (ROVS)

- AC-ROV 100; 150mm cube, hand carry, single operator systems rated to 100m. 5 degrees of freedom using 6 centreless and foul proof thrusters.
- MAC-ROV; 500mm cube available for any depth up to 6000m as a fly-out package or as a surface deployed system. 6 degrees of freedom using 8 twin prop centreless and magnetically coupled thrusters. Foul proof and suitable for operation in aggressive environments such as subsea mining. 4k camera and 3 x HD cameras as standard.
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LAUNCH & RECOVERY SYSTEMS (LARS)

SOIL MACHINE DYNAMICS LTD (SMD)

Location: Turbina Works, Davy Bank, Wallsend, Newcastle upon Tyne, NE28 6UZ, United Kingdom
Other Locations: No. 321, Feizhou Road, Lingang New Town, Pudong, Shanghai, 201306, China
33 Ubi Avenue 3, #01-59 Vertex, 408868, Singapore

Company Intro
Founded in 1971 in Newcastle upon Tyne, Soil Machine Dynamics Ltd (SMD) began as a small family-owned business and over the last 46 years has grown to be one of the largest subsea manufacturers in the world. Our two production facilities in Wallsend and North Shields are home to expert engineering and production teams with a fully fitted workshop housing the facilities to design and manufacture all of our products in house. Over the last decade we have added three sales and support offices in Singapore, Brazil and Houston and will soon add SMD China to our global network. This will be a 7200m² facility in the heart of Shanghai offering both expert engineering and production staff and will bring additional focus to the region as we continue our expansion.

Contact
Matthew Woodward
matthew.woodward@smd.co.uk
+44 (0) 7794901896

LAUNCH SOLUTIONS FOR WORK CLASS ROVs

A-FRAMES
We supply a large range of fixed and mobile systems from 6Te to more than 300Te SWL. All of our systems are tailored to our customers’ requirements and are capable of handling vehicles, quadrants, scientific instruments, subsea modules and amongst other tools. Our A-Frame systems can be suited to a variety of vessels such as PSV, survey, dive support, construction and specialised lay vessels. All of our A-Frames are certified to Lloyds and DNV rules.

WINCHES
We offer a range of umbilical lift, storage winches and wire rope towing and lifting winch packages. We are able to tailor our winch systems to incorporate features such as constant tension, active heave compensation, electric / hydraulic drive, safe area or zone 2 operation for operations down to 6000m water depth. Our versatile fleeting systems allow maximum flexibility on winch location and high strength steel reduces weight. Our lifting umbilical winches are capable of handling loads up to 25Te operating in up to sea state 7. The umbilical cables are double armoured and operate at voltages from 3300 to 4500 volts. Lifting umbilical winches are primarily used to power Q-Trencher ROVs, such as the QT600 and lightweight tractor systems. Tow winches are primarily used in conjunction with cable ploughing systems, with tow capacities from 35Te to 200Te tow load. The tow winches incorporate fleeting systems in conjunction with render functions for various towing speeds.

DECK HYDRAULIC POWER UNITS
Our standard deck Hydraulic Power Units (HPUs) are manufactured to interface with SMD A-Frames and Umbilical Winches to minimise deck space, forming a complete equipment handling system. SMD standalone HPUs include dual motors for redundancy and a lightweight open frame design suitable for road transportation. All our HPUs are designed for easy integration with other SMD equipment and incorporate designs to enable long service life. All SMD built HPUs are available with DNV or Lloyds Design Approval. Ask us about Safe Area or Zone II.

LAUNCH SOLUTIONS FOR TRENCHING ROVs & TRACTORS

Heave Compensation Systems
- Passive heave compensation
- Designed to DNV or Lloyds rules up to sea state 6
- Suitable for a wide range of applications

Umbilical Winches
- Self-erecting designs
- Anti-crush mechanism
- Integrated Docking Head
- Pivoting sheave wheel
- Umbilical length out sensor
- Fail-safe docking head latch system
- Outboard safety gates
- Main gantry cylinders mounted in-line with legs to improve maintenance access

LAUNCH SOLUTIONS FOR PLoughs

Winch options to reduce deck space if required
- Slack arm winch option to prevent umbilical snatch loads
- Main gantry cylinders mounted in-line with legs to improve maintenance access

Other Locations:
- Singapore
- Brazil
- Houston

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LAUNCH & RECOVERY SYSTEMS (LARS)

LAUNCH & RECOVERY SYSTEMS (LARS)

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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LIFTING & RIGGING

RUD – RUD Ketten Rieger & Dietz GmbH
LIFTING & RIGGING

RUD – RUD KETTEN RIEGER & DIETZ GMBH

HQ Location: Friedensinsel, 73432 Aalen, Germany
Regional Offices: RUD Chains Ltd. Chestfield, Whitstable CT5 3QT, UK
RUD Chain Inc. 840 N. 20th Av., 52233 Hiawatha, Iowa, USA
RUD Chains Pty Ltd. Commerce Place 12, QLD 4110 Larapinta, Australia
RUD Correntes Industriais Ltd. Rua Andreas Florian Rieger 381, 08745-260 Mogi das Cruzes, São Paulo, Brazil

Company Intro

RUD Ketten, based in Aalen/Germany, is a leading manufacturer of round steel chains, producing top quality chain components and systems for a wide variety of markets and applications, including lifting and lashing means, conveyor systems, hoists and tyre protection. Operating for 140 years you can be confident in the quality and expertise of the RUD product portfolio. RUD is ISO 9001 certified and is renowned for its expertise in heat treatment methods for high tensile steel. RUD’s innovative lifting and lashing solutions ‘made in Germany’ guarantee ultimate safety when lifting, moving and securing heavy loads. Offering over 600 different tested and certified lifting and lashing points, for both bolting and welding, in conjunction with its high quality chains portfolio; VIP (Grade 100) and ICE (Grade 120) RUD provides standard and tailored applications to meet the highest demands in all areas of application of future-oriented lashing and lifting equipment from 80 kg to 200t WLL.

Contact
sling@rud.com +49 7361 504 1371

www.rud.com

RUD – RUD KETTEN RIEGER & DIETZ GMBH

RUD ROV HOOK

RUD’s latest innovation, the ROV HOOK, has been specially designed and engineered for the subsea industry. The new RUD ROV HOOK was developed in cooperation with one of the world-leading subsea construction and remote intervention companies, Subsea 7. The hook features a novel outwards moving safety latch, which closes and locks automatically. By providing the highest level of safety and reliability, combined with speed and ease of use, it ultimately reduces operational costs. A simple, but ingenious solution for lowering and lifting loads in harsh subsea applications.

The RUD ROV hook
- No shedding of loads
- No snagging due to its smooth shape
- Designed for harsh operational conditions
- Innovative mechanism saving time & costs

LIFTING AND LASHING PRODUCTS

RUD disposes of an impressive product portfolio for lifting and lashing means and have earned its global reputation as a leading manufacturer of high quality round steel link chains and associated components working across a vast array of industries, including mining, automotive, machinery manufacturing, construction, military, shipbuilding, maritime and offshore, just to name a few.

RUD lifting and lashing products can be used in a wide variety of demanding environments, helping to deliver solutions that are tailored to specific requirements, project aims and working conditions. In particular, RUD’s products have been increasing popular across the offshore industry, due to their heavy lift capabilities of up to 200 tonnes WLL, and their robust resistance to corrosion. RUD components are equipped with award winning RFID technology, enabling users to easily track, identify, inspect and trace their lifting and lashing equipment.

LIFTING/LASHING POINTS

Offering over 550 different tested and certified lifting and lashing points, for both bolting and welding, in conjunction with its premium quality chains portfolio; VIP (Grade 100) and ICE (Grade 120) RUD provides standard and tailored applications to meet the highest demands in all areas of application of future-oriented lashing and lifting from 80kg up to 200t WLL.

VIP CHAINS / SLING SYSTEMS

The VIP range of lifting means (Grade 100 chain) has been established since 1994, and is used in some of the toughest working environments. Although having the same chain diameter as grade 8 chain, the VIP range offers up to 30% increase in the WLL. The chain dimensions range from 4-28 mm (1/16’ to 1-1/8’), with a WLL from 0.6t to 31.5t (1386–69300 lbs) in single leg, and up to 56 t (123458 lbs.) in a 4 leg configuration with a balance.

VIP lifting means at a glance:
- Made from CrNiMo special steel, quenched and tempered
- VIP is less sensitive to notching and hydrogen embrittlement than quality Grade T, B or 80.
- Chains stamped with VIP are manufactured with tighter tolerances in the inner width (size B)
- VIP chain awarded via the BG German testing authority to stamp the chain with the following:
  - H1 stamp indicating manufacturer’s number. 1=RUD.
  - 8S means special quality, higher than quality grade 8
  - VIP is less sensitive to notching and hydrogen embrittlement than quality Grade T, 8 or 80.
  - VIP is less sensitive to notching and hydrogen embrittlement than quality Grade T, B or 80.
  - Chains stamped with VIP are manufactured with tighter tolerances in the inner width (size B)
  - VIP chain awarded via the BG German testing authority to stamp the chain with the following:
  - H1 stamp indicating manufacturer’s number. 1=RUD.
  - 8S means special quality, higher than quality grade 8

MASTER LINK CONNECTION

The chain connecting link VRG is attached to the corresponding master link in a permanent but flexible way. The fool-proof clevis connection always ensures that only the correct chain diameter can be fitted. The collection of master links range from the smallest VBK size for the high tensile hoist hooks up to crane hook No. 50 with Bi = 250mm in 1 to 4 leg assembly versions.

VIP COBRA HOOK
- Superior & safer than the common clevis sling hook
- Supplied complete with a forged and tempered safety latch
- Safety latch locks into hook tip to protect against lateral bending
- Safety latch supported by a triple coiled double leg
- Wear edges in both sides of hook protect against abrasion of the chain

VIP SHORTENING CLAW
- According to DIN 5692
- No reduction of WLL
- Thickened hook tip to avoid misuse
- Chain support facilitated by calibrated lugs
- The u-bend insertion slot protects against accidental chain disengagement
- Can be mounted at every position in chain strand or move
The page contains a list of companies related to navigation, positioning, and surveying equipment, including:

- Blueprint Subsea
- Coda Octopus
- Echologger
- EvoLogics
- Imagenex
- Impact Subsea
- iXblue
- Kongsberg Maritime
- Kraken Robotics
- Nordbit
- Nortek
- Silicon Sensing
- Sonardyne
- Teledyne Marine
- Tritech International
- Valeport
- Water Linked
- WFS

Each company is listed with their website and location, such as "Blueprint Subsea, Ulverston, England, UK" and "Coda Octopus, Edinburgh, Scotland, UK". The companies are categorized under "Component Suppliers and Equipment Manufacturers" and "Navigation, Positioning & Survey".
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS
NAVIGATION, POSITIONING & SURVEY

IMAGING SONAR – ISS360
The ISS360 is the world’s smallest imaging sonar which provides exceptionally clear imagery to a range up to 90 meters. Available in Delrin or Titanium and with optional integrated Heading, Pitch & Roll, the ISS360 is ideal for a large number of underwater imaging applications.

- World’s Smallest Imaging Sonar
- 90+ Meter Range
- No Slip Rings
- Optional Heading, Pitch & Roll
- 360° field of vision

ALTITUDE & DISTANCE – ISA500
The ISA500 underwater Altimeter & Echo Sounder provides exceptionally long-range measurement capability – in excess of 120 meters. In addition to providing exceptionally long-range capability, the unit has a 1mm accuracy – allowing precision underwater distance measurements to be made.

- 120+ Meter Range
- Millimeter Accuracy
- Optional Heading, Pitch & Roll
- Software to View, Log & Configure

DEPTH & TEMPERATURE – ISD4000
The ISD4000 is a compact, survey grade Depth & Temperature Sensor. Optionally, the unit can also be provided with an integrated Attitude and Heading Reference System (AHRS). This provides highly stable Heading, Pitch and Roll readings.

- 0.01% FS Depth Accuracy
- 0.01°C Temperature Accuracy
- Optional Heading, Pitch & Roll
- Software to View, Log & Configure

SEAVIEW SOFTWARE FOR IMPACT SUBSEA SENSORS
seaView is an easy to use software package comprised of multiple applications (Apps) for viewing, logging, calibrating and configuring all Impact Subsea sensors. Additional Apps within seaView allow specific tasks to be undertaken – such as Hydrographic Single Beam Echosounder Surveys or Flooded Member Detection.

- View Live Data
- Log Data to CSV File
- Connect to Multiple Sensors
- Configure & Calibrate Sensors

HEADING & MOTION – ISM3D
The ISM3D is a highly accurate underwater Attitude & Heading Reference System. The ISM3D utilises high grade MEMS based Accelerometers, Angular Rate Gyroscopes and Magnetometers all of which feed into an advanced fusion engine driven by a dual core micro-processor.

- ±0.5° Heading Accuracy
- ±0.07° Pitch & Roll Accuracy
- Software to View, Log & Configure
- Depth Rated to 6,000 Meters

FLOODED MEMBER DETECTION
The ISFMD system provides the latest in underwater ultrasonic Flooded Member Detection technology. Suitable for Diver or ROV deployment the ISFMD system provides the most advanced and reliable Flooded Member Detection system available today. Utilising an ultrasonic probe with a broadband composite transducer together with an advanced digital ultrasonic engine ensures the highest level of accuracy and reliability in readings. The ISFMD system does not use gamma ray or any other radioactive sources. The system is based entirely on the use of ultrasonics. This removes the logistical and health and safety difficulties associated with gamma ray based flooded member detection systems.

- Ultrasonic FMD System
- Visualise Acoustic Returns
- Automatic Report Generation

IMPACT SUBSEA LTD.
HQ Location: Unit 10, Castle Street. Castle Road Industrial Estate, Ellon, Aberdeenshire, AB41 9RF, UK

Company Intro
We are a global provider of underwater sonar, altitude, attitude, depth, heading and temperature sensors. In addition, we also provide ultrasonic flooded member detection systems and a bespoke subsea pressure housing design service. We design, manufacture and support all of our products directly and internationally through a global distributor network.

Want to know how we can help with your underwater sensor or system requirements? Contact us today to discuss further.

Contact
Ben Grant
sales@impactsubsea.co.uk
+44 (0)1224 460850
www.impactsubsea.co.uk

IMPACT SUBSEA LTD.
HQ Location: Unit 10, Castle Street. Castle Road Industrial Estate, Ellon, Aberdeenshire, AB41 9RF, UK

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SUBSEA GYROCOMPASSES AND INERTIAL NAVIGATION SYSTEMS

OCTANS (NANO / 3000)

Octans nano is the smallest and most adept state-of-the-art 4,000 m depth rated attitude and heading reference system (AHRS). It is built on iXblue’s renowned fiber-optic gyroscope (FOG) technology and offshore instrumentation expertise. Octans nano offers an outstanding price/performance solution, with rugged titanium housing, meeting the most challenging requirements of subsea applications.

Octans 3000 is a subsea survey-grade gyrocompass and complete motion sensor for water depths up to 3,000 m. Based on iXblue’s fiber-optic gyroscope (FOG) technology it outputs heading, roll, pitch, heave, rate of turn and acceleration. Octans 3000 can be easily upgraded to full INS mode (i.e. Rovins).

ROVINS (NANO / 3000)

Rovins nano merges the established high-grade iXblue inertial navigation system with our competitive IMU. It is built on iXblue’s renowned FOG truly solid state technology and offshore instrumentation expertise. Rovins nano offers the unbeatable stability and accuracy of the inertial position while simplifying the operation with its automatic and autonomous external sensor management. Rovins nano is the ROV navigation solution you can rely on, bringing an additional level of safety in case of deficient aiding sensors.

Rovins is a survey-grade full featured inertial navigation system for water depths up to 3,000 m. Designed specifically for offshore survey and construction works, Rovins, thanks to its advanced Kalman filter, improves the efficiency of all operations where accurate position, heading and attitude are key benefits. Rovins is offered in stand alone, «DVL ready», and Rovins 154 (for OEM integration) versions.

PHINS (6000)

Phins 6000 is a subsea inertial navigation system (INS) providing position, true heading, attitude, speed, depth, and heave for deep water operations. Its high-accuracy inertial measurement unit is coupled with an embedded digital signal processor that runs an advanced Kalman filter. PHINS DVL Ready is pre-assembled and pre-calibrated with a Doppler velocity log version making the system easy to install and ready to use for more precise navigation.

PHINS COMPACT

Phins Compact Series has been designed to offer the AUV industry players the ability to choose an inertial navigation system adapted to their vehicle, whatever their size and mission, from accurate navigation to survey grade. Phins Compact Series are fully scalable systems with a similar architecture and interface. The three products includes the same algorithm and software, which enables seamless re-use of the control system on any vehicles’ sizes or types, via modern interfaces such as Ethernet, helping to reduce integration and non-recurring costs.
**IXBLUE**

**Company Intro**

IXBlue is a global leader in the design and manufacturing of innovative solutions devoted to navigation, positioning and underwater imaging, as well as shipbuilding. Using its unique in-house technology, the company offers turnkey solutions to its Civil and Defense customers to carry out their sea, land and space operations with optimum efficiency and reliability. Employing a workforce of 600 people worldwide, IXBlue conducts its business with over 35 countries.

**Contact**

contact@ixblue.com
+33 1 30 08 88 88
+44 1224 355 160
+1 888 600 7573

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**USBL POSITIONING SYSTEMS**

**GAPS**

The IXblue fourth-generation pre-calibrated GAPS combines high performance ultra-short baseline (USBL) and a fiber-optic inertial navigation system (INS) in the same housing to provide accurate position of any subsea object, in diverse and challenging environments. Its performance ranges from extremely shallow water to deep sea. Its compact and all-in-one design allows both portable and permanent installations. One of GAPS key new features is support of dynamic positioning (DP).

**POSIDONIA**

POSIDONIA II is an ultra-short baseline (USBL) acoustic positioning system for high-accuracy and ultra-long range tracking of subsea vehicles. It offers enhanced performance with a new electronic cabinet (USBL-Box) including the most recent IXblue acoustic signal processing and full compatibility with RAMSES 6000 synthetic baseline positioning system.

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**ACOUSTIC TRANSPONDERS**

**OCEANO LF/TR**

IXBlue provides a wide range of low frequency (LF) transponders to operate with RAMSES 6000 (LF) and POSIDONIA. Standard product range includes transponder and responder modes, internal batteries, and recoverable (RT) or expendable (ET) configuration. Optional configurations are available for many applications.

**OCEANO MF/TR**

IXBlue provides a wide range of medium frequency transponders to operate with RAMSES (medium frequency) and GAPS USBL systems. It includes transponders for shallow water application (export free) to full ocean depth versions, reduced size for small vehicles or full size with long battery life, reusable or expendable, and optional features for easier integration.

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**LBL POSITIONING SYSTEMS**

**RAMSES**

Ramses is an acoustic synthetic baseline positioning system with self-contained computing, for simple real-time sparse array subsea navigation. Tightly coupled with IXBlue inertial navigation system (INS), it delivers extreme precision and robustness in challenging acoustic operational environment. Available in MF and LF versions (medium frequency for most applications and low frequency for ultra-long range applications), RAMSES is part of IXBlue inertial-acoustic solutions for underwater positioning and navigation, thanks to the connection with IXBlue GAPS or POSIDONIA ultra-short baseline (USBL) positioning systems.

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**Comparison Table**

<table>
<thead>
<tr>
<th></th>
<th>OCEANO LF TRANSPONDERS</th>
<th>OCEANO MF TRANSPONDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depth rating</strong></td>
<td>3 000–6 000 m</td>
<td>3 000–6 000 m</td>
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<tr>
<td><strong>Operation with USBL systems</strong></td>
<td>RAMSES LF POSIDONIA</td>
<td>RAMSES MF GAPS</td>
</tr>
<tr>
<td><strong>Operating frequency</strong></td>
<td>8–16 kHz</td>
<td>20–30 kHz</td>
</tr>
<tr>
<td><strong>Batteries</strong></td>
<td>Off-the-shelf or rechargeable batteries</td>
<td>Off-the-shelf batteries</td>
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<tr>
<td><strong>Telecommand unit</strong></td>
<td>IXBlue OCEANO TT801</td>
<td>Through RAMSES MF or GAPS systems</td>
</tr>
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**4TH GENERATION GAPS**

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<thead>
<tr>
<th>Range (Typical)</th>
<th>Position Accuracy</th>
<th>Antenna Aperture</th>
<th>Operating Frequency</th>
<th>Integrated INS</th>
<th>Option</th>
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<tbody>
<tr>
<td>4 000 m</td>
<td>0.06 % of the slant range</td>
<td>200 degrees</td>
<td>20 kHz to 30 kHz</td>
<td>Yes (PHINS class)</td>
<td>Hoisting system</td>
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**POSIDONIA**

<table>
<thead>
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<th>Range (Typical)</th>
<th>Position Accuracy</th>
<th>Antenna Aperture</th>
<th>Operating Frequency</th>
<th>Integrated INS</th>
<th>Option</th>
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</thead>
<tbody>
<tr>
<td>10 000 m</td>
<td>0.2 % of the slant range</td>
<td>Deployable configuration: 100 degrees Flush configuration: 70 degrees</td>
<td>8 kHz to 18 kHz</td>
<td>No</td>
<td>Hoisting system</td>
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**RAMSES**

<table>
<thead>
<tr>
<th>Ramses 6000 (LF band)</th>
<th>Ramses (MF band)</th>
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<tbody>
<tr>
<td><strong>Operating frequency</strong></td>
<td>8–17.5 kHz</td>
</tr>
<tr>
<td><strong>Distance measurement accuracy (1)</strong></td>
<td>&lt; 0.05 m</td>
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<tr>
<td><strong>Position accuracy (INS aided, 2 transponders)</strong></td>
<td>&lt; 0.10 m</td>
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<tr>
<td><strong>Maximum range (1)</strong></td>
<td>8,000 m</td>
</tr>
<tr>
<td><strong>Depth rating</strong></td>
<td>6,000 m</td>
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</table>
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS
NAVIGATION, POSITIONING & SURVEY

I. 10.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS
NAVIGATION, POSITIONING & SURVEY

KONGSBERG

HQ Location: Kirkegårdsveien 45, NO-3616 Kongsberg, Norway

Company Intro
Kongsberg Maritime is a global marine technology company providing innovative and reliable technology solutions for all marine industry sectors including merchant, offshore, subsea and naval. Headquartered in Kongsberg, Norway, the company has manufacturing, sales and service facilities in 20 countries. Kongsberg Maritime systems for vessels cover all aspects of marine automation, safety, maneuvering, navigation, and dynamic positioning. Subsea solutions include single and multibeam echo sounders, sonars, AUV and USV, underwater navigation and communication systems.

Contact
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+1 888 464 1598
www.km.kongsberg.com

MULTIBEAM SONARS

M3 SONAR®
The innovative design of the M3 Sonar uses two sets of complementary transducers which allow it to generate both imaging and bathymetric data with the same head. Unique to the M3 Sonar is the patented eIQ mode of operation that generates multibeam images with unprecedented clarity.
- Up to 500 m and 4000 m water depth
- Portable, cost effective and light weight sonar
- Generates imaging and bathymetric datasets from one sonar head
- Produces single-beam image quality with the speed of multibeam sonar
- Provides GeoTIFF output and creates real-time mosaic using third-party software
- Compliant to IHO Special Order & 1A
- Uses Linear FM, CW and Doppler pulses

FLEXVIEW SONAR
The Flexview is designed specifically for small observation class ROVs where compact size and light weight are key selection criteria. Delivering superior image quality and coverage, the Flexview sonar reduces the time it takes to search for and locate targets.
- Frequency range: 950 kHz - 1.4 MHz
- Ideally suited for small observation class ROVs
- Distortion-free images at a high update rate
- 200m coverage over a 140° sector, reducing the time it takes to search for and locate targets
- Removable transducer for rapid field replacement
- User-friendly interface
- Low-profile wet mateable connector
- Applications: site inspection, underwater construction support, marine engineering, underwater science, search and recovery, and environmental monitoring

CLARISCAN
Clariscan is Kongsberg’s latest innovation in domed sonar technology. Clariscan combines the Company’s wide-bandwidth composite transducer with a patented acoustic lens to provide unprecedented image clarity from a domed sonar head.
- Patented acoustic lens technology
- Improved image resolution and sharpness
- Up to 4000 m operating depth
- Applications: obstacle avoidance, pipeline survey, target detection and underwater construction support

ALTIMETERS
Kongsberg’s underwater altimeters are primarily used to measure the altitude (height) of an object above the seafloor and are also suited to various other applications including positioning, berthing and below surface monitoring.
- Robust design
- Easily configurable analog/digital outputs
- Three depth ratings: 3000 m, 6000 m and 11,000 m
- Applications: ROV/AUV altitude, obstacle avoidance, positioning and below surface monitoring
SV1010 SONAR

The SV1010 is a frequency agile, high performance, compact mechanical scanning sonar. It introduces a faster scan rate and improved resolution building on the solid foundation set by the successful Mercury Scanning Sonar. At the heart of the sonar is a class leading 1:3 composite transducer providing an operating frequency range of 600kHz to 1.2MHz. This continues to provide excellent long range performance at the lower frequencies whilst giving extremely high resolution at 1.2MHz. Improvements to the hardware and internal firmware have provided a scan rate improvement of a factor of typically 2 over the existing Mercury unit. Coupled with the enhanced resolution, this truly sets the SV1010 as the essential sonar to use when quality, reliability and price are all at a premium.

- Compact and robust design
- Evolved from the successful Mercury Sonar
- 1:3 Piezo Composite transducer
- Frequency agile, tunable 600kHz to 1.2MHz
- True Acoustic Zoom
- Class leading resolution
- Improved, faster scan rate

SV2020 SONAR

The SV2020 is a frequency agile, high performance, mechanically scanning sonar. The SV2020 benefits from the use of similar upgraded hardware and firmware as the new SV1010, giving much improved scanning speeds and the capability of higher data transfer rates. At the heart of the sonar is a class leading 1:3 composite wideband transducer operating over a frequency band of 250kHz to 500kHz. This provides outstanding long range performance and resolution for its size. The unit is manufactured from Titanium with its high corrosion resistance and light weight. The motor assembly is oil filled and compensated and the shaft seal is fully pressure balanced and protected against damage from silt / sand ingress. The unit is provided for 3000m operation as standard.

- Compact and robust design
- Evolved from the successful Mercury Sonar
- 1:3 Piezo Composite wideband transducer
- Transducer in direct water contact for improved performance
- Frequency range 250kHz to 500kHz (1kHz steps)
- True acoustic zoom
- Class leading resolution
- Improved, faster scan rate
- Various display modes – PPI, A & B Scan and Sidescan
- Control from laptop or SCU
- 3000m depth rating
TRITECH INTERNATIONAL

Headquarters, Sales & Support HQ Location: Peregrine Road, Westhill Business Park, Westhill, Aberdeenshire, AB32 6LJ, Scotland, UK
Design & Manufacture & Service: Oubas Hill, Next Ness Lane, Ulverston, Cumbria, England, LA12 7LB, UK
US Sales & Support: 1323 Price Plaza Drive, Katy, Texas 77449, USA

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS
Tritech International Limited [Tritech], a Moog Inc. company is a high-technology business dedicated to providing the most reliable imaging and ancillary equipment for use in underwater applications.

Tritech operates in many professional underwater markets, including: Defence, Energy, Engineering, Survey and Underwater Vehicles and remains an industry leader in the provision of sensors and tools for ROVs and AUVs, a reputation achieved from over 25 years of delivering expertise through key products.

Tritech’s Super SeaKing sonar is the ultimate mechanical scanning sonar. Utilising Tritech’s Surface Control Unit (SCU) or a customer supplied PC or laptop.

Tritech’s range of mechanical imaging sonars comprises the Super SeaKing DST, Super SeaPrince DST, SeaKing Hammerhead and Micron sonar. All products in the SeaKing and SeaPrince family can be run simultaneously on the ARNET communication link, using the same processor and display; such as Tritech’s Surface Control Unit (SCU) or a customer supplied PC or laptop.

SUPER SEAKING (WORK CLASS ROV)
Tritech’s Super SeaKing sonar is the ultimate mechanical scanning sonar. Utilising Digital Sonar Technology (DST) composite transducer and Compressed High Intensity Radar Pulse (CHIRP) technology, the Tritech Super SeaKing offers exceptional clarity and resolution as a dual frequency mechanical scanning sonar.

The Super SeaKing Sonar is the industry-standard obstacle avoidance sonar for larger ROVs and is so popular it can be found fitted to work-class ROV fleets around the world. The Super SeaKing Sonar hosts two mechanically scanned imaging sonars in a single subsea pressure housing: a 325 kHz CHIRP sonar with a true operational range of up to 300 metres for long range target recognition and a 650 kHz CHIRP sonar for ultra-high definition images, other frequency options are available on request.

SUPER SEAPRINCE (WORK CLASS ROV)
The Super SeaPrince has been developed from the industry-standard Super SeaKing sonar. The Super SeaPrince utilises the same Digital Sonar Technology (DST) composite transducer and Compressed High Intensity Radar Pulse (CHIRP) technology, offering exceptional clarity and resolution as a dual frequency mechanical scanning sonar. Built to the highest quality standards, with a hard boot to protect the transducer, the Super SeaPrince is specifically designed for deployment on observation and light work-class ROVs.

SEAKING HAMMERHEAD (360°)
The SeaKing Hammerhead is at the forefront of sonar technology, offering high resolution, 360° mechanical scanning imaging. Utilising a wide transducer aperture, the SeaKing Hammerhead has a very fine mechanical step size and proven Digital Sonar Technology (DST), for outstanding image quality. The operational range of the SeaKing Hammerhead is increased with two frequencies; a high chirped 935 kHz frequency to enable high-resolution imagery and a second chirped frequency, 675 kHz to allow for long range capability. The unit also has an integrated three axis compass, to allow the sonar image bearing to be continually displayed and updated.

MULTIBEAM SONARS:

MICRON
The Micron Sonar is the smallest digital CHIRP sonar in the world and is ideal for use by small ROVs, as a first-rate obstacle avoidance sonar in miniature form. CHIRP technology dramatically improves the range resolution compared with conventional scanning sonars – it is a feature normally associated with much larger, more expensive systems. The sonar has a standard auxiliary port to allow it to interface with other Tiritic sensors.

GEMINI 720K
Tritech’s Gemini 720k multibeam imaging sonar provides users with real-time, crisp imagery for applications including obstacle avoidance, target detection and close-range inspection. With a 120 degree field of view, 30° vertical beam width (10° degree downward tilt) and a fast update rate of 30Hz, the Gemini 720k sonar is ideal for poor visibility environments.

The Gemini 720k features a 720 kHz operating frequency and an integrated sound velocity sensor to assist in providing the sharpest image possible, with accurate ranging. The Gemini 720k utilises Ethernet or VDSL communication allowing it to be installed on most installations. The sonar’s compact size means that it can also be deployed using a pole-mount assembly (customer supplied).

GEMINI 720IK
Tritech’s Gemini 720ik multibeam imaging sonar provides users with real-time, crisp imagery at the same performance level as the Gemini 720k but in a smaller shallower rated configuration. A real-time, high frequency imaging solution, the Gemini 720ik operates at 720kHz and combined with Tritech’s advanced processing electronics, it produces images of outstanding clarity, benefitting from 512 beams which results in a 0.25° effective angular resolution. The Gemini 720ik has been developed specifically for shallow water operations with low power consumption and Compressed High Intensity Radar Pulse (CHIRP) processing for greater definition at long range. The product also has an integrated Velocity of Sound (VoS) sensor to ensure extremely accurate imaging and measurement.

GEMINI NBI
The Gemini NBI offers a narrow vertical beam and 130° swath. The Gemini NBI produces an acoustic image, cutting through the water with a narrow acoustic beam and at the high refresh rate users can expect from the Gemini range of multibeam sonars. Based on the proven design of the Gemini 720i, the Gemini NBI uses a 1° vertical beam instead of the 20° vertical beam found on the 720i. This reduced beam width allows the user to more precisely identify the position of the acoustic targets than is possible with a wide beam imaging sonar which is commonly used for obstacle avoidance operations. Operating at 620kHz the Gemini NBI is able to produce images with 10mm range resolution while the 0.5° horizontal angular resolution results in an extremely sharp sonar image. Where monitoring your position relative to a known target is the objective and not general obstacle avoidance, then the Gemini NBI can help guide you safely to the desired target. The sonar uses a compressive beam design to improve its ability to detect the desired target. The sonar has been designed to work in the harshest of environments such as those typically found in subsea mining and excavation.
<table>
<thead>
<tr>
<th>Company</th>
<th>Website</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>Allspeeds</td>
<td><a href="http://www.allspeeds.co.uk">www.allspeeds.co.uk</a></td>
<td>Accrington, England, UK</td>
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<tr>
<td>J2 Subsea</td>
<td><a href="http://www.j2subsea.com">www.j2subsea.com</a></td>
<td>Aberdeen, Scotland, UK</td>
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<tr>
<td>Macfarlane Technology</td>
<td><a href="http://www.macfarlanetechnology.com">www.macfarlanetechnology.com</a></td>
<td>Aberdeen, Scotland, UK</td>
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<tr>
<td>Milko Marine</td>
<td><a href="http://www.milkomarine.com">www.milkomarine.com</a></td>
<td>Lysaker, Norway</td>
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<tr>
<td>ROVQUIP</td>
<td><a href="http://www.rovquip.com">www.rovquip.com</a></td>
<td>Aberdeenshire, Scotland, UK</td>
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<td>Seanic Ocean Systems</td>
<td><a href="http://www.seanicusa.com">www.seanicusa.com</a></td>
<td>Houston, TX, USA</td>
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<tr>
<td>Seatools</td>
<td><a href="http://www.seatools.com">www.seatools.com</a></td>
<td>Numandorp, The Netherlands</td>
</tr>
<tr>
<td>Songf – Pryne Group</td>
<td><a href="http://www.songf.org.uk">www.songf.org.uk</a></td>
<td>Aberdeen, Scotland, UK</td>
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<td>Shark Marine</td>
<td><a href="http://www.sharkmarine.com">www.sharkmarine.com</a></td>
<td>St. Catharines, Ontario, Canada</td>
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<tr>
<td>Subsea Americas</td>
<td><a href="http://www.subseaamericas.com">www.subseaamericas.com</a></td>
<td>Berwick, LA, USA</td>
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<tr>
<td>Subsea Tooling Services</td>
<td><a href="http://www.subseatoolingservices.com">www.subseatoolingservices.com</a></td>
<td>Aberdeenshire, Scotland, UK</td>
</tr>
<tr>
<td>The Blueprint Lab</td>
<td><a href="http://www.theblueprintlabs.com">www.theblueprintlabs.com</a></td>
<td>Sydney, NSW, Australia</td>
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<td>ToolTec</td>
<td><a href="http://www.tooltec">www.tooltec</a> ltd.co.uk</td>
<td>Aberdeen, Scotland, UK</td>
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<tr>
<td>Utility ROV</td>
<td><a href="http://www.urov.com">www.urov.com</a></td>
<td>Fife, Scotland, UK</td>
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<td>WeSubsea</td>
<td><a href="http://www.wesubsea.no">www.wesubsea.no</a></td>
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</tbody>
</table>

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

ROV TOOLING
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

ROVQUIP
HQ Location: South Fornet Business Centre, Westhill, Aberdeen, AB32 7BX, Scotland, UK

Company Intro
ROVQUIP was established in 2012 and founded on decades of experience in Subsea intervention. We aim to challenge conventional thinking – offering our clients responsive, efficient and fit for purpose subsea tooling solutions with flexible thinking. In addition to our range of tried and tested ROV tooling, we have the in-house capability to design and build custom ROV Tooling solutions based on your project requirements. We understand that in the harsh subsea environment “failure is not an option”. You need rugged, reliable equipment. ROVQUIP understand each project has its own unique requirements and all of our designs are flexible to make them fit for individual project needs. We specialise in concept design, prototype, fabrication and the testing of subsea tooling – either for purchase or rental worldwide.

Contact
Gary McConnell
gary@aleron-group.com
+44(0)1330 861704

gary@aleron-group.com

MANIPULATOR MOUNTED SAW
The manipulator mounted cutter comes with a 14” Tungsten Carbide saw blade. The tool is designed for mounting onto a Rigmaster manipulator using the wrist bolts for quick installation.

During cutting operations, the manipulator saws are used to secure the ROV to the cut and once secure the motor starts by spinning the blade before actuating a hydraulic cylinder which pushes the blade through the cut.

Although the cutter has an optimum input of 50L/Min it can cut as low as 15L/min meaning it is also an ideal tool for smaller work class systems on IRM projects

MANIPULATOR MOUNTED DIAMOND WIRE CUTTER
Building on the idea behind the manipulator rotary saw the diamond wire version offers a better stroking distance with the same tooling size. During cutting operations, the manipulator Jaws are used to secure the ROV to the cut and once secure the motor starts by spinning the blade before actuating two threaded rods which push the blade through the cut.

CLEANING TOOLS
We have a range of cleaning tools from 10,000 PSI water Jetting systems to rotary cleaning brushes. Many of our brush heads have been customised for different subsea infrastructure.

IHPU’S AND DWP’S

10K IHPU
We have a number of IHPU’s and Dirty work packs to service a range of subsea tasks.

A commonly used tool is the 10,000psi IHPU, which is a versatile tool used for numerous subsea applications including: Operating BOP Tooling, Transferring Media and Pressure Testing.

The output pressure is directly proportional to the output pressure. This allows the output to be adjusted from 0–10,000 psi (~690 Bar).

The pump can be connected to any subsea reservoir by the suction port (12 JIC). We can supply various sizes of soft reservoir and piston reservoir with an electronic readout depending on requirements.

0–75LPM DWP
A commonly build Dirty Work Pack is our 0-75 LPM unit. Designed to protect the main hydraulic circuit of the ROV system from contamination during fluid transfer operations by providing an isolated circuit this tool is commonly used with higher flow tooling such as dredge pumps.

(COMPANY SUPPLIERS AND EQUIPMENT MANUFACTURERS)
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

ROV TOOLING

SEANIC PRODUCTS

Seanic's high-calibre engineering and development of custom intervention products will power the success of your ROV or diving operations as they face project challenges. Our real-world experience can help you merge cost effectiveness and efficiency into tooling packages that best suit your project needs. We also offer standard product lines that are immediately available for rent or purchase.

TORQUE TOOLS

Seanic’s array of various Torque Tools have been designed in our tradition of providing customers a Simple Rugged and Reliable product. Due to the high cost of downtime in the field, we recognised the industries need for a dependable tool and have built convenience and reliability into our torque tools ranging from Class 1-4, Class 5 and Class 6/7.

PUMPS

This unique pump has the ability to pump a multitude of fluids and can be used for methanol service with no risk of cross contaminating the ROV’s supply oil. These pumps can be delivered with a variety of different reservoirs and directional control valves rated for 10k and 15k service. The pump is rated for use in 10,000 FSW and is made of corrosion-resistant materials, making it robust and reliable for subsea use. The pump is ideally suited for hydrate remediation work, as it can draw a powerful 22 in HG vacuum.

INTERVENTION TOOLS

The LVOT and lockouts are designed to be deployed through ROV intervention. Custom lockout positions are available. In addition to the LVOT, three different size lockouts are supplied to lock the linearly actuated valve at the 2-inch, 5-inch and 7-inch positions. Seanic has also designed and manufactured an API 17H LVOT Type B for use in all standard API 17H Type B linear interfaces. This Tool is capable of 250,000 lbf for linear override, exceeding API 17H standard override force of 167,500 lbf.

STABS, MANIFOLDS & PANELS

Seanic can custom design and manufacture ROV Intervention Panels per customer requirements. All panels and components will be designed and built under API Guidance to ensure ROV friendliness. Our staff has years of experience designing and building this equipment, providing you the confidence it will be done right the first time, every time. Seanic can provide all components such as Hot Stabs/Receptacles, ROV Torque Receptacles, Ball Valve Actuators and Gauges.

CUTTING & DRILLING

Seanic’s hydraulic Core Drill is designed to make holes in jacket legs and other structures for lifting jig installation, flooding or inspection access. The drill is hydraulically actuated and attaches to the structure via sticky feet suction cups. Capable of being operated by any work class ROV of opportunity. Seanic can offer a variety of designs that includes a Mag Drill that allows an ROV to attach the drill to any metallic subsea surface to cut holes of varying diameters.

DECOMMISSIONING TOOLS

Seanic is known for providing robust products for decommissioning projects that includes hydraulic shear cutters, hydraulic grab tools, saws, ROV shackles of various types and sizes. When your planning your next project put Seanic on your list.

COMPANY INTRO

From initial concept development to the final Factory acceptance test, Seanic Ocean Systems engineers and delivers quality subsea products that last. Seanic Ocean Systems, a Centurion company, specialises in the supply of marine and subsea support equipment to the diving, ROV and decommissioning sectors within the offshore oil & gas and renewables industries. We can provide customers worldwide with a fully integrated service from our UK or US locations and international distribution centres, designed to support the needs of the major oil operators and service companies in complex subsea operations.

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www.seanicusa.com
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

TETHER MANAGEMENT SYSTEMS (TMS)

<table>
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<tr>
<th>Component Supplier/Equipment Manufacturer</th>
<th>Website</th>
<th>Location</th>
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<td>All Oceans</td>
<td><a href="http://www.alloceans.co.uk">www.alloceans.co.uk</a></td>
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<td>Newcastle, England, UK</td>
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<td>Sperre</td>
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<td>Subsea Innovation</td>
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COMPANY SUPPLIERS AND EQUIPMENT MANUFACTURERS

TETHER MANAGEMENT SYSTEMS (TMS)

Four standard sizes of tophat Tether Management Systems (TMS) are available to suit a wide variety of applications for subsea operations. SMD’s standard units utilise a unique fleeting drum arrangement, which offers a simple tether path for extended tether life. A variety of tether sizes can be accommodated with options. The ultra-long excursion (ULX) TMS can also accommodate vectored thrusters for better subsea positioning.

SMD also offer three sizes of garage tether management system (TMS) which are suitable for accommodating a wide variety of work class ROVs. All models include height adjustment and space for installation of tooling, and many parts are interchangeable with SMD’s ROV and tophat TMS range. The SMD Garage TMS can also be customised to include thrusters for subsea positioning for prolonged periods of time. This is achieved using a unique winding technique which ensures cooler operation. Built in sensors monitor winding temperature as opposed to oil temperature and all motors incorporate oversized bearings for smooth concentric running.

COMPACT TOPHAT TMS

<table>
<thead>
<tr>
<th>Suitable for use with</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth rating</td>
<td>4000 msw</td>
<td>13123 ft</td>
</tr>
<tr>
<td>Dimensions (Dia x H)</td>
<td>1775 x 2265 mm</td>
<td>69.9 x 90.4 in</td>
</tr>
<tr>
<td>Weight in air (base system)</td>
<td>2100 kg</td>
<td>4630 lb</td>
</tr>
<tr>
<td>main lift capacity</td>
<td>12000 kg</td>
<td>26456 lb</td>
</tr>
<tr>
<td>Latch capacity</td>
<td>9000 kg</td>
<td>19841 lb</td>
</tr>
<tr>
<td>Tether capacity</td>
<td>500 m (27 mm tether)</td>
<td>1640 ft</td>
</tr>
<tr>
<td>Tether speed</td>
<td>1 m/sec (variable)</td>
<td>3.28 ft/sec (variable)</td>
</tr>
</tbody>
</table>

EXTENDED TOPHAT TMS

<table>
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<tr>
<th>Suitable for use with</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth rating</td>
<td>4000 msw</td>
<td>13123 ft</td>
</tr>
<tr>
<td>Dimensions (Dia x H)</td>
<td>2175 x 2475 mm</td>
<td>85.7 x 97.5 in</td>
</tr>
<tr>
<td>Weight in air (base system)</td>
<td>2750 kg</td>
<td>6063 lb</td>
</tr>
<tr>
<td>main lift capacity</td>
<td>12000 kg</td>
<td>26456 lb</td>
</tr>
<tr>
<td>Latch capacity</td>
<td>9000 kg</td>
<td>19841 lb</td>
</tr>
<tr>
<td>Tether capacity</td>
<td>1000 m (27 mm tether)</td>
<td>3280 ft</td>
</tr>
<tr>
<td>Tether speed</td>
<td>1 m/sec (variable)</td>
<td>3.28 ft/sec (variable)</td>
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ULX TOPHAT TMS

<table>
<thead>
<tr>
<th>Suitable for use with</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth rating</td>
<td>4000 msw</td>
<td>13123 ft</td>
</tr>
<tr>
<td>Dimensions (Dia x H)</td>
<td>2435 x 2320 mm</td>
<td>95.9 x 91.4 in</td>
</tr>
<tr>
<td>Weight in air (base system)</td>
<td>4500 kg</td>
<td>9921 lb</td>
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<tr>
<td>main lift capacity</td>
<td>15000 kg</td>
<td>33069 lb</td>
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<tr>
<td>Latch capacity</td>
<td>9000 kg</td>
<td>19841 lb</td>
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<tr>
<td>Tether capacity</td>
<td>1500m (27mm tether)</td>
<td>4921 ft</td>
</tr>
<tr>
<td>Tether speed</td>
<td>1 m/sec (variable)</td>
<td>3.28 ft/sec (variable)</td>
</tr>
</tbody>
</table>
Blue Robotics  
www.bluerobotics.com  
Torrance, CA, USA

Copenhagen Subsea  
www.copenhagensubsea.com  
Copenhagen, Denmark

DWTEK  
www.dwtekmarine.com  
Taiwan

Forum Energy Technologies – Sub-Atlantic  
www.f-e-t.com  
Aberdeen, Scotland, UK

Hydromea  
www.hydromea.com  
Lausanne, Switzerland

Lian Innovative  
www.lianinnov.com  
Shenzhen, China

Marine Propulsion Solutions  
www.marinepropulsionsolutions.com  
Batam, Indonesia

maxon motor  
www.maxonmotor.com  
Sexau, Germany

SMD – Curvetech  
www.smd.co.uk  
Newcastle, England, UK

Tecnadyne  
www.tecnadyne.com  
San Diego, CA, USA

**THRUSTERS**

**COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS**

**THRUSTERS**

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98 maxon motor

100 Soil Machine Dynamics Ltd (SMD) – Curvetech

102 Tecnadyne
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

THRUSTERS

BLUE ROBOTICS
HQ Location: 4030 Spencer St., Suite 102, Torrance, CA 90503, USA

Company Intro
Launched in 2014 and based in Torrance, California, their mission is to provide low-cost, high-quality components to enable the future of marine robotics. Their first product, the T100 Thruster, was introduced in 2014 and since then, they have launched over 200 products including their flagship product, the BlueROV2.

Contact
sales@bluerobotics.com
+1 310 620 3080
www.bluerobotics.com/product-category/thrusters/

T100 THRUSTER

The T100 Thruster is a patent pending underwater thruster designed specifically for marine robotics. It’s high performing with over 5 pounds of thrust and durable enough for use in the open ocean at great depths. A variety of mounting options, simple control, and a low price tag make it the perfect thruster to use on your marine robot.

Application
The T100 was designed for various consumers and limitless applications. Students and Schools can use the T100 for educational projects or to compete in competitions such as the AUVSI RoboSub and RoboBoat competitions and the MATE ROV competition. It’s capable and affordable, making it perfect for Makers and Hobbyists, as well as Professional Users who want a high-quality thruster that performs better than many of the high-end (expensive) alternatives.

T200 THRUSTER

The T200 Thruster is a patent pending underwater thruster designed specifically for marine robotics. Versus the T100 Thruster, the T200 is better for larger vehicles and especially for human-carrying vehicles. They are the same physical size as the T100 Thrusters, but the internal components are larger.

Application
The T200 was designed for various consumers and limitless applications. Students and Schools can use the T200 for educational projects or to compete in competitions such as the AUVSI RoboSub and RoboBoat competitions and the MATE ROV competition. It’s capable and affordable, making it perfect for Makers and Hobbyists, as well as Professional Users who want a high-quality thruster that performs better than many of the high-end (expensive) alternatives.

Thruster Specifications

<table>
<thead>
<tr>
<th></th>
<th>T100</th>
<th>T200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Forward Thrust</td>
<td>2.36 kgf / 5.2 lbf (@16V)</td>
<td>5.1 kgf / 11.2 lbf (@16V)</td>
</tr>
<tr>
<td>Maximum Reverse Thrust</td>
<td>1.85 kgf / 4.1 lbf (@16V)</td>
<td>4.1 kgf / 9.0 lbf (@16V)</td>
</tr>
<tr>
<td>Minimum Thrust</td>
<td>0.01 kgf / 0.02 lbf</td>
<td>0.01 kgf / 0.02 lbf</td>
</tr>
<tr>
<td>Rotational Speed</td>
<td>300–4200 rev/min</td>
<td>300–3800 rev/min</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>6–16 V</td>
<td>6–20 V</td>
</tr>
<tr>
<td>Max Current</td>
<td>12.5 A</td>
<td>25 A</td>
</tr>
<tr>
<td>Max Power</td>
<td>135 W</td>
<td>350 W</td>
</tr>
<tr>
<td>Phase Resistance</td>
<td>0.24 +/- 0.01 Ohm</td>
<td>0.18 +/- 0.01 Ohm</td>
</tr>
<tr>
<td>Phase Inductance</td>
<td>0.120 +/- 0.008 mH</td>
<td>0.077 +/- 0.008 mH</td>
</tr>
<tr>
<td>Length (without BlueESC)</td>
<td>102 mm / 4.0 in</td>
<td>113 mm / 4.45 in</td>
</tr>
<tr>
<td>Length (with BlueESC)</td>
<td>113 mm / 4.45 in</td>
<td>131 mm / 5.16 in</td>
</tr>
<tr>
<td>Diameter</td>
<td>100 mm / 3.9 in</td>
<td>100 mm / 3.9 in</td>
</tr>
<tr>
<td>Weight in Air (with 1m cable &amp; without BlueESC)</td>
<td>0.65 lb / 295 g</td>
<td>0.76 lb / 344 g</td>
</tr>
<tr>
<td>Weight in Air (with 1m cable &amp; with BlueESC)</td>
<td>0.84 lb / 378 g</td>
<td>0.93 lb / 422 g</td>
</tr>
<tr>
<td>Weight in Water (with 1m cable &amp; without BlueESC)</td>
<td>0.26 lb / 120 g</td>
<td>0.34 lb / 156 g</td>
</tr>
<tr>
<td>Weight in Water (with 1m cable &amp; with BlueESC)</td>
<td>0.37 lb / 167 g</td>
<td>0.46 lb / 210 g</td>
</tr>
<tr>
<td>Propeller Diameter</td>
<td>76 mm / 3.0 in</td>
<td>76 mm / 3.0 in</td>
</tr>
<tr>
<td>Mounting Hole Threads</td>
<td>M3 × 0.5</td>
<td>M3 × 0.5</td>
</tr>
<tr>
<td>Mounting Hole Spacing</td>
<td>19 mm / 0.75 in</td>
<td>19 mm / 0.75 in</td>
</tr>
<tr>
<td>Cable Length</td>
<td>1.0 m / 39 in</td>
<td>1.0 m / 39 in</td>
</tr>
<tr>
<td>Cable Diameter</td>
<td>6.3 mm / 0.25 in</td>
<td>6.3 mm / 0.25 in</td>
</tr>
</tbody>
</table>

BASIC 30A ESC

A simple electronic speed controller for the T100 and T200 Thrusters.
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

MAXON MOTOR

Location: Untere Ziel 1, 79350 Sexau, Germany

Maxon motor, the worldwide leading provider of high-precision drive technology, draws on more than 50 years of experience and innovation to design underwater propulsion systems. Our motor-gear combinations are developed using DC brushless motors and planetary gearheads.

Maxon drives are used wherever reliability and precision are essential. Our underwater drives with brushless DC motors are pressure compensated, compact and energy efficient. They are perfectly suited to ROVs and AUVs. Having new components at our disposal that are lighter and more powerful is opening up new opportunities. Our specially developed underwater drive, for example, is able to penetrate depths of up to 6000 m and can work in over 95% of the world’s oceans.

Maxon motor, the worldwide leading provider of high-precision drive technology, draws on more than 50 years of experience and innovation to design underwater propulsion systems. Our motor-gear combinations are developed using DC brushless motors and planetary gearheads.

Contact
Marketing
aquatic.solutions@maxonmotor.com
+49 7641 / 9114 - 0 | +49 7641 / 9114 - 0

www.maxonmotor.com/maxon/view/content/aquatic-solutions

MAXON THRUSTER SERIES (MT20 / MT30 / MT40 / MT70)

Maxons thrusters are reliable drive solutions for manned and unmanned underwater vehicles such as ROVs (Remote operated Vehicles) and AUVs (Autonomous Unmanned Vehicles). Our underwater propulsions have a maximum depth limit of up to 6,000 meters. Maxon thrusters extend the operation time of underwater vehicles and they achieve longer distances with the same battery capacity. Our engineers focused on an optimal thrust/weight ratio during the development of our maxon thruster. The result is an underwater propulsion which is compact, lightweight and highly efficient. Maxon thrusters are available in sizes ranging from Ø20 mm to Ø70 mm.

<table>
<thead>
<tr>
<th>Thruster Specifications</th>
<th>MT20</th>
<th>MT30</th>
<th>MT40</th>
<th>MT70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight in air (g)</td>
<td>210</td>
<td>450</td>
<td>960</td>
<td>4361</td>
</tr>
<tr>
<td>Weight in water (g)</td>
<td>130</td>
<td>262</td>
<td>540</td>
<td>2830</td>
</tr>
<tr>
<td>Prop. diameter (mm)</td>
<td>50</td>
<td>80</td>
<td>110</td>
<td>200</td>
</tr>
<tr>
<td>Number of blades</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Depth rating (m)</td>
<td>6000</td>
<td>6000</td>
<td>6000</td>
<td>6000</td>
</tr>
<tr>
<td>Oil filling</td>
<td>Panolin HLP5yn15</td>
<td>Panolin HLP5yn15</td>
<td>Panolin HLP5yn15</td>
<td>Panolin HLP5yn15</td>
</tr>
<tr>
<td>Pressure compensation</td>
<td>0.1 to 0.7 bar</td>
<td>0.1 to 0.7 bar</td>
<td>0.1 to 0.7 bar</td>
<td>0.1 to 0.7 bar</td>
</tr>
<tr>
<td>Max. forward bollard thrust (kg)</td>
<td>2.2</td>
<td>6</td>
<td>10.7</td>
<td></td>
</tr>
<tr>
<td>Cont. forward bollard thrust (kg)</td>
<td>1.2</td>
<td>3.7</td>
<td>7</td>
<td>16.8</td>
</tr>
<tr>
<td>Max. reverse bollard thrust (kg)</td>
<td>1.7</td>
<td>4.4</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Cont. reverse bollard thrust (kg)</td>
<td>1</td>
<td>2.6</td>
<td>5.5</td>
<td>11.2</td>
</tr>
<tr>
<td>Max. efficiency (%)</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Connector</td>
<td>MCBH8M Ti</td>
<td>MCBH8M Ti</td>
<td>MCBH16M Ti</td>
<td>BH16M Ti</td>
</tr>
<tr>
<td>Nominal Voltage (V)</td>
<td>36</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Max. current (A)</td>
<td>8</td>
<td>16</td>
<td>29</td>
<td>17.6</td>
</tr>
<tr>
<td>No load current @5000rpm (A)</td>
<td>0.12</td>
<td>1</td>
<td>1.8</td>
<td>1 (@2500rpm)</td>
</tr>
<tr>
<td>Max. stall current @nominal voltage</td>
<td>78.1 (@36V)</td>
<td>140</td>
<td>470</td>
<td>139</td>
</tr>
<tr>
<td>Cont. current (A)</td>
<td>4.7</td>
<td>10.3</td>
<td>20</td>
<td>17</td>
</tr>
</tbody>
</table>

The maxon thruster.
Pressure compensated | Compact | Energy Efficient

Max. depth limit of up to 6000 meters
High energy efficient of minimum 80 percent
Long service life of up to 1000 operation hours
FOR ALL YOUR SUBSEA COMPONENT NEEDS

With over 20 years knowledge and experience of providing integrated solutions for subsea and marine applications, Curvetech® subsea component products provide cost-effective, rugged and reliable solutions for use with marine and subsea equipment integrators and Original Equipment Manufacturers (OEMs). We have a dedicated team of engineers who specialise in the design and testing of SMD’s Curvetech® components to deliver world-leading products that enable customers to maximise on remote subsea operations. As well as direct selling of Curvetech components to OEM’s, we also have the ability within the Sales team to provide dedicated technical advice to help ensure that the components are all correctly specified for the end users application based on knowledge from our own use of the range on our vehicles.

Contact
Andy Hey
Head of Sales, SMD Services
andy.hey@smd.co.uk
+44 (0) 191 234 8593

SUBSEA POWER UNITS

SMD offer a range of oil filled submersible power packs suitable for hydraulic power generation or running a variety of water pumps. The units are designed for work class ROVs, trenchers, ploughs, dredge systems and other customer design applications which demand long term reliability and high performance subsea. Aluminium or stainless steel versions are available and customers can choose from a range of electrical connector options. Curvetech® Power Units are dual-ended and can interface with a range of industry standard pumps mounted on one or both ends of the unit. Each unit is tested and certified to run at full power for prolonged periods of time. This is achieved using a unique winding technique which ensures cooler operation. Built in sensors monitor winding temperature as opposed to oil temperature and all motors incorporate oversized bearings for smooth concentric running.

COMPENSATORS

With over 20 years of subsea manufacturing experience SMD can offer a range of Curvetech® compensators from a wide range of field proven reliable configurations. All Curvetech® compensators are designed for long-term reliability, simplicity and ease of use.

Monitoring vehicle oil condition is crucial during operations to ensure that the vehicle is functioning correctly. Entrained air, milky looking oil or even small items of debris within the oil are early warning signs that something is amiss with the machine and needs assessment. Capturing these issues early can significantly reduce consequential damage to other hydraulic components within the system. Curvetech® compensators (2.75, 3I & 6I) have been designed with 100% visually clear windows allowing operators to easily view the oil condition. Industry standard and high reliability Rota transducers are also available and are retrofitable to all compatible units. Integrated relief valves and air bleed points are included on the majority of Curvetech® compensator units and rolling diaphragms ensure no sliding seal surfaces for ultimate system integrity. Curvetech® compensators are compatible with mineral oils and HEES oils as standard – for other oil types please enquire. Optional mounting kits are also available which allow reduced swap-out time – quick mounting and replacement of compensators is achievable via a single bolt whilst keeping them rigidly mounted to the vehicle for operations.

HYDRAULIC VALVE PACKS

Curvetech® Hydraulic Valve Packs from SMD are available equipped with solenoid, or servo controlled valves. A varying number of functions, flow rates and pressures can be offered by these lightweight and compact components. All packs include internal valve drive electronics addressed using a RS485 communication protocol (details available). Diagnostic LEDs are visible through the clear polycarbonate valve manifold cover.

CURVETECH POWER AND CONTROL SYSTEM (PACS)

Curvetech PACS systems is an integrated package of Curvetech components designed to work together seamlessly to deliver hydraulic and electric power and control to any subsea machine. In this manner field proven reliability coupled with the power of Curvetech control technology can be simply integrated to any subsea unit. By supplying the units in a turnkey manner significantly improves engineering integration, reducing equipment interfaces and improving productivity allowing the end client to concentrate on their machines USP whilst SMD concentrate on providing an efficient power delivery system. Curvetech PACS systems can tie-in to various other hydraulic and control systems utilising our well proven DVECCS II control platform. Curvetech PACS can be engineered to suit any customer application including new builds or upgrades and refurbishments to current assets.
TECNADYNE

HQ Location: Suite A, 9770 Carroll Centre Rd, San Diego, CA 92126, USA

Company Intro
For over 30 years Tecnadyne has been a leader in the worldwide subsea robotics industry, manufacturing underwater brushless DC propulsion systems, rotary & linear actuators, pan & tilt positioners, hydraulic power units, position sensors, and pressure compensators for use on Remotely Operated Vehicles, Autonomous Underwater Vehicles, manned subservibles and other subsea platforms. Many leading subsea vehicle manufacturers (Deep Ocean Engineering, ECA Robotics, Outland Technology, Shark Marine, Triton, and Uboat Worx to name a few) use Tecnadyne products on their vehicles. These companies value Tecnadyne’s commitment to workmanship, quality and absolute reliability and recognize that this results in the most dependable and longest lasting products in the industry. Tecnadyne products are presently being used on thousands of vehicles throughout the world, operated by many leading offshore oil service companies, universities and research institutions.

Contact
sales@tecnadyne.com
+1 858 586 9660

www.tecnadyne.com

DC BRUSHLESS THRUSTERS

Product Features:
- Magnetically coupled propellers eliminate shaft seals
- Self-contained electronics up to 1500m (24 to 330VDC)
- Full ocean depth available with remote electronics
- Available with RS485 or analog speed control
- Thrust range 2.1 kgf – 230 kgf

<table>
<thead>
<tr>
<th>Model</th>
<th>Thrust</th>
<th>Input Power</th>
<th>Weight</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>2.1kgf Forward 1.1kgf Reverse</td>
<td>125Watts</td>
<td>0.7kg in air 0.5kg in water</td>
<td>Ø7.9cm nozzle 22.6cm length</td>
</tr>
<tr>
<td>260</td>
<td>5.4kgf Forward 1.8kgf Reverse</td>
<td>325–350Watts 24–330VDC</td>
<td>0.9kg in air 0.7kg in water</td>
<td>Ø9.5cm nozzle 22.6cm length</td>
</tr>
<tr>
<td>280</td>
<td>5.4kgf Forward 1.8kgf Reverse</td>
<td>315–350Watts 24–330VDC</td>
<td>1kg in air 0.8kg in water</td>
<td>Ø11.1cm nozzle 22.6cm length</td>
</tr>
<tr>
<td>300</td>
<td>8.2kgf Forward 3.6kgf Reverse</td>
<td>450–500Watts 24–330VDC</td>
<td>1kg in air 0.7kg in water</td>
<td>Ø11.5cm nozzle 22.6cm length</td>
</tr>
<tr>
<td>521</td>
<td>10.4kgf Forward 5.9kgf Reverse</td>
<td>450–500Watts 24–330VDC</td>
<td>1.8kg in air 1.4kg in water</td>
<td>Ø15.2cm nozzle 25.4cm length</td>
</tr>
<tr>
<td>540</td>
<td>10kgf Forward 10kgf Reverse</td>
<td>350–400Watts 12–24 or 48VDC</td>
<td>1.7kg in air 1.4kg in water</td>
<td>Ø15.2cm nozzle 25.4cm length</td>
</tr>
<tr>
<td>560</td>
<td>13.7kgf Forward 10kgf Reverse</td>
<td>925–975Watts 48–330VDC</td>
<td>1.9kg in air 1.4kg in water</td>
<td>Ø15.8cm nozzle 23.7cm length</td>
</tr>
<tr>
<td>580</td>
<td>17.3kgf Forward 10kgf Reverse</td>
<td>925–975Watts 48–330VDC</td>
<td>1.9kg in air 1.4kg in water</td>
<td>Ø15.8cm nozzle 23.7cm length</td>
</tr>
</tbody>
</table>

AUV THRUSTERS

Tecnadyne’s brushless DC AUV thrusters use the same reliable features but with a focus on high efficiency. Each design has an option for direct drive motors to produce less noise.

Product Features:
- Brushless DC motor for maximum performance and longevity
- Magnetically coupled propeller drive eliminates all rotating shaft seals for optimum reliability
- Compound planetary gearbox and high rpm motor allows for a compact design
- Propeller designed for increased efficiency at various speeds
- Voltage options between 48 and 330vdc
- Self-contained electronics up to 1500m
- Full ocean depth available with remote electronics
- Available with RS485 or analog speed control

<table>
<thead>
<tr>
<th>Model</th>
<th>Thrust</th>
<th>Input Power</th>
<th>Weight</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>550</td>
<td>10kgf Forward @10knots 12kgf Forward @3knots</td>
<td>525Watts 48–330VDC</td>
<td>1.8–2.7kg in air 1.4–2.3kg in water</td>
<td>Ø15cm propeller 24.6cm length</td>
</tr>
<tr>
<td>1050</td>
<td>13kgf Forward @10knots 20kgf Forward @5knots</td>
<td>1.2Kilowatts 48–330VDC</td>
<td>2.7–4.8kg in air 1.6–3.2kg in water</td>
<td>Ø20cm propeller 24.6cm length</td>
</tr>
<tr>
<td>2050</td>
<td>63kgf Forward @10knots 113kgf Forward @5knots</td>
<td>6.4Kilowatts 150–330VDC</td>
<td>10.2–14.5kg in air 7.7–11kg in water</td>
<td>Ø38cm propeller 38.1cm length</td>
</tr>
<tr>
<td>8050</td>
<td>182kgf Forward @10knots 109kgf Forward @6knots</td>
<td>8.7Kilowatts 150–330VDC</td>
<td>40–47.6kg in air 30.8–40.4kg in water</td>
<td>Ø50cm propeller 74cm length</td>
</tr>
</tbody>
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COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

UNDERWATER COMMUNICATIONS
COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS
UNDERWATER COMMUNICATIONS

HYDROMEA SA

HQ Location: EPFL Innovation Park, Bâtiment C, 1015 Lausanne, Switzerland

Company Intro

Founded in December 2014, Hydromea SA is a new start-up from the École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland, with the goal to bring the latest advanced technology from microengineering and robotics to the environmental market. The Hydromea technology is the result of over 10 years of experience gained through research of the founders in underwater communication, localization, propulsion and distributed systems. By leveraging automation and multi-robot systems Hydromea aims to provide high-resolution in-situ data (which to date cannot be obtained by other means), cost-effectively and fast.

Contact

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LUMA 250LP – ULTRA-EFFICIENT OPTICAL MODEM

The Hydromea LUMA 250LP optical modem combines outstanding performance and energy efficiency in a very compact form factor. Optical communication offers superior data rates, low latency and lower power requirements compared to acoustic modems. This makes it the perfect choice for applications such as data download from submerged sensor platforms (landers), as well as wireless interfacing between ROVs/AUVs and deep sea infrastructure.

The LUMA 250LP is very energy efficient, which makes it ideal for battery-powered applications. It can be configured to enter a sleep mode after a specified time of inactivity, and optically woken up from sleep by another modem when the link is re-established.

The software-configurable serial cable interface can be set to RS232 or RS485, which makes the LUMA 250LP the ideal drop-in replacement for cabled connections in many existing systems.

Features

- Ultra-compact and low weight, ideal for small ROVs/AUVs
- Four transmission power levels: 2–5 W
- Wide supply voltage range
- Ultra-low power sleep mode with optical wake-up
- Encryption of data link, ad-hoc networking (optional, on request)

Applications

- Wireless readout of landers and subsea infrastructure with ROV/AUV
- Low power communication for battery powered underwater devices
- Wireless video streaming for mini ROVs
- Subsea networks at deep sea sites

Specifications

- Dimensions: 100 × 50 × 30 mm
- Weight in air: 250 g
- Weight in water: 50 g
- Data rate: 250 Kbit/sec (up to 600 kbps at reduced range)
- Software features: Error detection, FEC, auto-wakeup (upgradeable for additional features)
- Range: up to 7 m
- Supply voltage: 12–36 V
- Power consumption:
  - sleep mode: < 10 mW
  - active, receiving: 0.5 W
  - transmitting: 2–5 W (typ.)
- Beam pattern: 120 deg. cone
- Interface: RS232 / RS485
- Depth rating: 6000 m
- Connector: SubConn MCIL6M or as requested