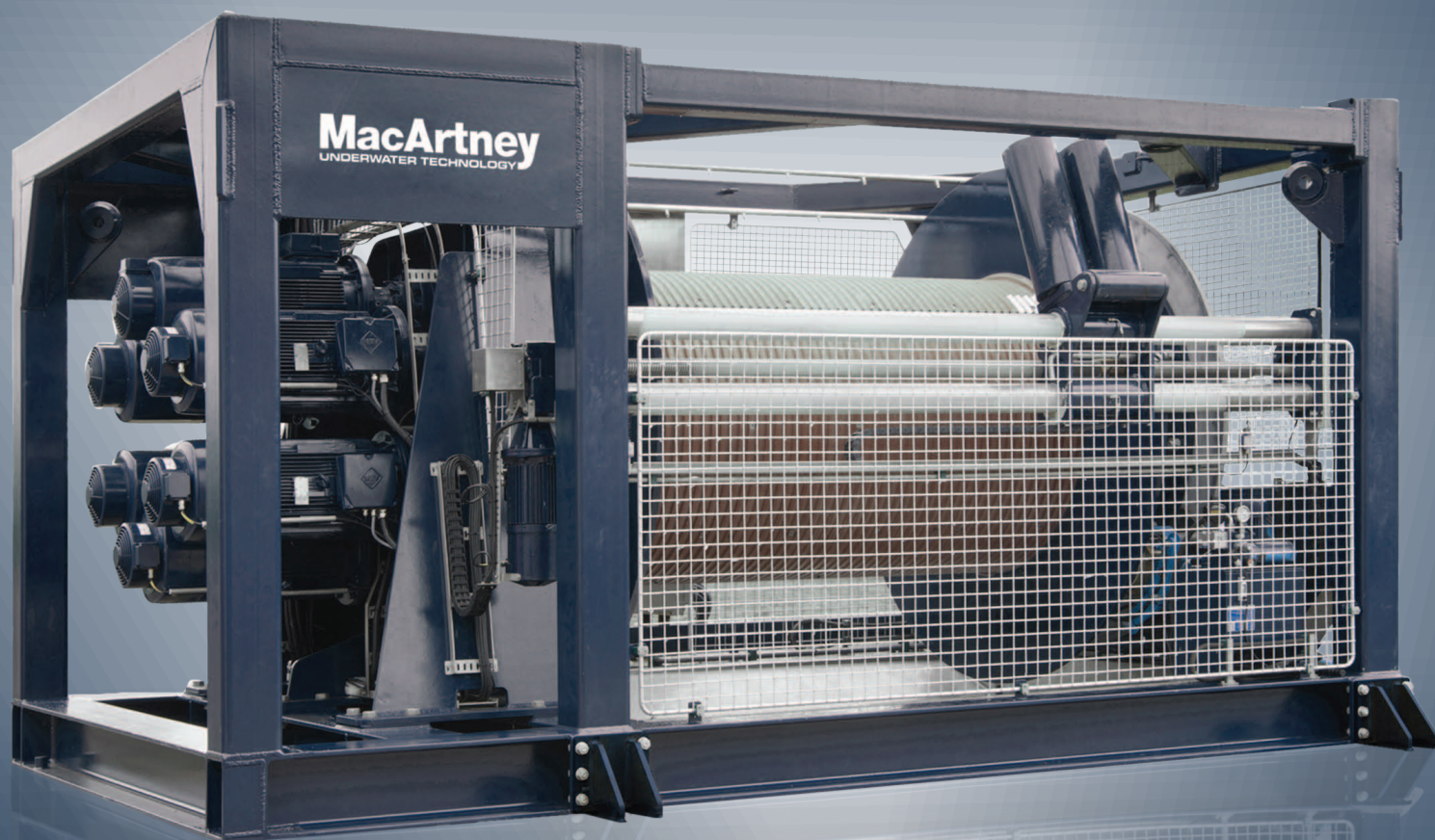


In Depth

Online at www.macartney.com/in-depth

Issue 2, 2013



MacArtney Winch and Handling Solutions

Theme: The world of MacArtney LARS systems, MERMAC and CORMAC winches (pages 5-11)



Editorial

Having recently implemented and launched significant upgrades across our entire range of winches and LARS systems, MacArtney is looking to further strengthen its position as a global supplier of world class winch and handling solutions.

MacArtney winch and handling systems are some of the most advanced solutions available and have been trusted by customers and operators for decades. Our dedicated focus on improving existing designs and developing new solutions ensures that we always offer high quality and dependable winch and A-frame systems for all needs. We specialise in electric winch systems and through the deployment of intelligent technology, we aim to extend windows of operation and provide improved working safety for customers taking on complex challenges under harsh maritime conditions.

With our upgraded standard winch portfolio, comprising the MERMAC and CORMAC series, MacArtney addresses the requirements of ROV operators, installation vessels, offshore platforms, survey companies, ocean science institutes, OEMs and defence contractors alike. However, MacArtney also holds an extensive track record when it comes to supplying customised or specially designed solutions.

Our total packages include integrated cable systems, slip rings, sheaves, commissioning, training and spares - along with full global service and support.

You can read much more about MacArtney Winch and Handling Solutions on page 5-11 in this issue of In Depth.

Niels Erik Hedeager, CEO

Featured products and solutions

MacArtney NEXUS MK VI

MacArtney is pleased to introduce the NEXUS MK VI - a new addition to the successful and long standing range of NEXUS multiplexers and telemetry solutions.

New MacArtney HD MUX

The MacArtney NEXUS MK VI is a HD video and multibeam sonar multiplexer that carries all signals over one single mode optical fibre via CWDM (Coarse Wavelength Division Multiplexing). The HD video interface is handled by a Focal 907-FLEX - a modular full HD media converter card.

A sea of applications

The NEXUS MK VI multiplexer is designed and built to be a rugged, efficient and versatile HD solution for interfacing a wealth of different sensors, equipment and subsea systems. Primary applications for the NEXUS MK VI include the interfacing of MB-sonar heads with appurtenant survey sensors (e.g. gyro, MRU, INS, SVS) and up to 3 HD-camera signals on ROVs, ROTVs, trenching vehicles, towed sledges and other kinds of underwater instrumentation platforms.

On the NEXUS MK VI, power switching is software controlled and can be installed on any computer with at least one real or USB COM port. The protocol is open and can be integrated into customer software for monitoring convenience. In order to secure optimal system control, factors such as sensor power status, leak alarm and telemetry link are continuously monitored by the software.

As standard, the subsea pressure housing is manufactured from hard anodised aluminium.

Flange mounted connectivity interfaces include SubConn® Anodised Aluminium Connectors and a MacArtney OptoLink Fibre Optic Connector. For depth ratings over 3000 metres of water, the subsea pressure housing is manufactured from titanium or high tensile Duplex steel.

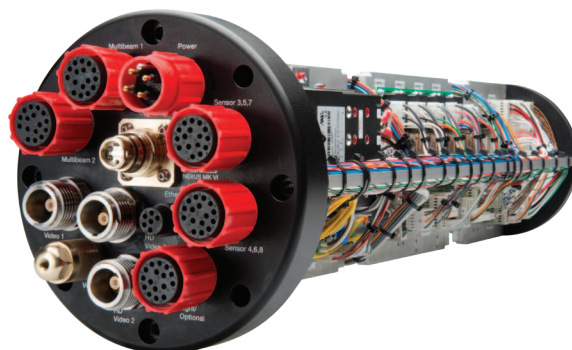
The topside multiplexer unit comes in a 19" rack mountable casing with LEDs for system status indication.

NEXUS MK VI for advanced ROVs and subsea equipment

The NEXUS MK VI is already attracting interest and attention from players within different underwater technology related industries and several enquiries have been received by MacArtney offices across the world. For instance, the NEXUS MK VI has recently been acquired by UK based MODUS Seabed Intervention, to provide the telemetry interface on a new state-of-the-art subsea construction support ROV system. Supported by its three HD multiplexer channels, the NEXUS MK VI will allow the new ROV to carry HD cameras, providing optimal results during close-visual-inspection jobs and other ROV inspections tasks. Another confirmed user of the NEXUS MK VI system is the leading international subsea rental company and equipment specialist, Ashtead Technology, who will make the NEXUS MK VI multiplexer available to rental clients worldwide.

MacArtney NEXUS

Over more than 15 years, MacArtney has built up a long and versatile track record, supplying NEXUS multiplexers and complete NEXUS based telemetry solutions to OEMs, system providers and operators on a global scale. Besides the NEXUS MK VI, the MacArtney NEXUS range includes off-the-shelf NEXUS MK III, MK IV and MK V fibre optical multiplexers, the NEXUS MK E electrical (coax cable) multiplexer and made-to-order NEXUS MK C multiplexers.



▲ The new MacArtney NEXUS MK VI HD MUX

MacArtney Inline Termination connects tidal power to the grid for Andritz Hydro Hammerfest



▲ Offshore Orkney: The MacArtney Inline Termination is taken onboard for assembly. The entire process takes less than two hours

MacArtney is pleased to announce that leading tidal power array developer and supplier, Andritz Hydro Hammerfest, has recently taken delivery of a MacArtney Medium Voltage Inline Termination.

Connecting tidal power to the grid with Andritz Hydro Hammerfest

Due to the link with the lunar cycle, tidal currents can be predicted in advance and with stable energy flow and fixed maintenance windows, there are reasons to believe that tidal power will become a significant part of the future renewable energy mix.

One of the frontrunners in the race to effectively harness the power generated by tidal currents is Andritz Hydro Hammerfest. In 2011, Andritz Hydro Hammerfest installed a 1MW tidal power turbine, named HS1000, at the European Marine Energy Centre (EMEC) located near the Orkney Islands, UK. After overseeing a positive initial testing period, the tidal turbine has been effectively producing electricity to the onshore grid.

Optimising turbine to grid connectivity

All power generated by the HS1000

turbine is taken to shore by means of a 11 kV subsea electrical and fibre optical export cable. Fully installed and tested by MacArtney offshore technicians, the inline termination is deployed to enable connectivity between the subsea export cable and the turbine, hereby facilitating the flow of power to the onshore grid.

MacArtney Medium Voltage Inline Terminations

MacArtney Medium Voltage Inline Terminations are engineered to make offshore inline connections faster, easier and more effective. Cables can be terminated on site or ahead of cable laying and the actual mechanical connection of the two halves takes less than two hours, making it a good solution for applications with limited time windows, such as tidal energy units. The short connection time also means that valuable ship and downtime is reduced.

Proven and dependable, MacArtney Medium Voltage Inline Termination solutions are often used to connect dynamic cables from offshore renewable wind, tidal and wave energy converters to static export cables. They are also used to interconnect subsea units.

New SubConn® 13 Pin Low Profile Ethernet Connector

Building on the successful SubConn® Ethernet Connector programme - known as the first high speed underwater connector to offer true Ethernet type performance - the new SubConn® Low Profile 13 Pin Power and Ethernet Connector offers a unique set of benefits for operators of underwater systems and equipment.

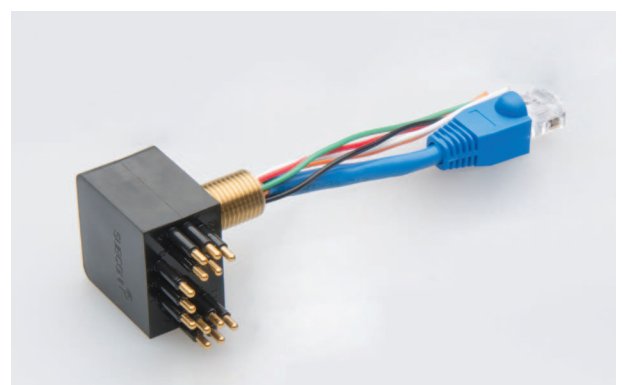
Connectivity for optimised underwater systems

In a world where underwater industry operators and developers are continuously pushing the boundaries of what remotely operated and autonomous systems can do underwater - technology advancements and design optimisations in materials, control systems, sensors and not least data and power transmission are the order of the day. Such advances allow, for instance, smaller and more compact ROVs to become increasingly capable and effective at tasks that would previously require much larger vehicles. At the heart of the development of these

compact and capable underwater systems is an accelerating demand for evenly compact, yet still effective and reliable connectivity solutions. The new SubConn® 13 Pin Low Profile Power and Ethernet Connector is developed and manufactured specifically to accommodate these increasing demands.

The new 13 Pin Low Profile version provides Gigabit data speed, signal and power transfer for underwater instruments in one high performance connector. Moreover, the connector comes with a purpose designed SubConn® Combined Power and Ethernet Cable.

While allowing ROVs and other underwater systems and equipment to receive power through the same cable



▲ The new SubConn® 13 Pin Low Profile Ethernet Connector

and connector as used for data transfer, the entire solution works to make data and power transmissions faster and less expensive. When one adds the design optimisation capacity provided by the low profile layout of the new SubConn® connector - operators will gain the opportunity to assemble more streamlined and effective underwater systems, with sensors, sonar heads and other types of equipment producing less drag.



MacArtney LUXUS gears up

MacArtney has recently added two new powerful cameras and a dedicated range of brackets and accessories to the MacArtney LUXUS range.



▲ LUXUS High Definition Ethernet Camera

New LUXUS HD Ethernet Camera

The new LUXUS HD Ethernet Camera is designed for use with ROVs, trenchers, towed benthic vehicles, environmental inspection and ocean science sensor platforms. Through its cutting-edge Ethernet interface, the new LUXUS HD Ethernet Camera ensures that high definition camera data and footage is made available to surface operators. Beyond providing a stable interface, the MacArtney LUXUS HD Ethernet Camera is very easy to integrate with existing underwater vehicles, systems and sensor platforms - as most underwater telemetry units, including MacArtney NEXUS multiplexers, feature one or more Ethernet connectivity options. In addition, adjustment of the bandwidth used allows operators of the LUXUS HD Ethernet Camera to perform plug-and-play integration of more than one camera on the same network, without experiencing a marked effect on data transfer speed.

The LUXUS HD Ethernet Camera is ideal for use in combination with LUXUS Power LED or LUXUS High Power LED Lights. It is equipped with a zoom function and can be adjusted for focus, white balance, iris and a number of other settings. The camera can be supplied with various output types and can be controlled with the software supplied or hard wired.



▲ LUXUS Compact Low Light Camera

New LUXUS Compact Low Light Camera

In appreciation of the continuous development of ever more compact ROVs and underwater equipment - along with an emerging demand for a low light, diver inspection option, MacArtney has introduced the new LUXUS Compact Low Light Camera.

Like the original MacArtney LUXUS Low Light Camera, the new and considerably lighter compact version is designed especially for use in harsh and turbid conditions, where light is limited or artificial. Within such environments, the black and white sensor offers high light sensitivity, image quality and viewing performance. Featuring the same dimensions as the widely used LUXUS Compact Camera, the LUXUS Compact Low Light Camera is designed to function perfectly in combination with other LUXUS products. This makes the LUXUS Low Light Camera a versatile and flexible choice, ideal for use in diving applications and as mounted on small inspection ROVs, diver habitats and other underwater vehicles and systems.

According to Managing Director of MacArtney Benelux, Ron Voerman: "Professional operators who currently use the LUXUS Compact Camera will benefit greatly from adding the compact low light version to their toolkit. However, the new camera is also very relevant for OEMs and ROV operators looking to exploit the advantages of design optimisation and system weight reduction."

Rugged design

Both new cameras are robustly designed and rigorously tested to perform in demanding underwater environments. As with all other cameras and lights within the MacArtney LUXUS range, the housing is made from sandblasted titanium and features a depth rating of 4000 metres.



▲ Diver helmet fitted with a LUXUS dovetail bracket and a LUXUS Compact Low Light Camera and LUXUS Compact LED configuration

New range of LUXUS brackets and accessories

For use with diver helmets, MacArtney now holds a wide range of LUXUS brackets in stock. This includes bracket types that are fully compatible with professional diver helmet brands, including industry standard Kirby Morgan models. The range of MacArtney LUXUS diver helmet brackets includes a special click-on dovetail configuration, which is very easy to mount and demount. What is more, this dovetail bracket can also be used to swiftly install LUXUS equipment on small ROVs. For the larger and more powerful LUXUS camera and light variants, MacArtney holds a range of lightweight, yet robust and practical brackets in stock. These brackets come in three sizes and aid users to obtain perfect alignment of cameras and lights, when mounted on subsea vehicles and equipment.

LUXUS Pistol Grip

In terms of accessories, an important addition to the LUXUS family is marked by the rugged and handy LUXUS Pistol Grip, which is widely used for diver inspection work. The LUXUS Pistol Grip allows divers to have a close and flexible look at objects in abstruse, narrow and harsh underwater environments - while maintaining full disposal of the other hand to perform relevant tasks. The LUXUS Pistol Grip is readily compatible with all LUXUS compact camera and light models.

MacArtney Winch and Handling Solutions

MacArtney winch and handling solutions incorporate some of the most advanced and rugged systems available and have been trusted by customers and operators for decades.

MacArtney supplies winches and A-frames for all types of requirements and with more than 500 solutions delivered since 1989, MacArtney systems are continuously involved in the launch and recovery of ROVs, towed systems, corers, ploughs, pumps, diving systems and many other equipment types, under demanding conditions, across the world.

Made in Denmark

All MacArtney systems are designed, manufactured and tested in Denmark. Facilitating design, production, system integration and testing, MacArtney holds the capacity to control the entire value chain - from draft to delivery.

In addition, MacArtney solutions are backed by a worldwide network of MacArtney operations providing local access to global support.

Standard or custom systems

Most MacArtney systems are based on proven MacArtney MERMAC and CORMAC standard designs. This offers many advantages to customers including reduced delivery time, cost and spare part standardisation. While standard winch and handling systems are suitable for most applications, certain jobs always call for customised or even tailor made systems. MacArtney has supplied a broad range of such systems and offers professional design and engineering support for all kinds of customer projects. Many of these projects involve close cooperation between MacArtney engineers and the customer to identify technical needs and expectations. MacArtney offers expertise in mechanics, electrics, hydraulics, materials, hydrodynamics, fibre optics, electronics and software; all fully supported by extensive testing facilities. MacArtney custom systems are often used in offshore, scientific, civil engineering, seismic and military projects. Some examples of specially designed MacArtney winch and handling



▲ MacArtney has access to state-of-the-art production and testing facilities

solutions include articulating A-frames, underwater winches, arctic winches, military specification winches and complete vessel moon pool handling systems.

MacArtney standard electric winch systems



▲ CORMAC M



▲ CORMAC



▲ MERMAC S



▲ MERMAC R

CORMAC M series

- Compact stainless steel winches
- Ultra compact 'micro' versions available
- Winch speed: Up to 85 m/min
- Winch pull: Up to 10 kN
- Cable length: 600 - 4000 m
- Cable diameter: 3,1 - 8,2 mm

CORMAC series

- Versatile stainless steel winches in protective frames
- High Speed (HS) versions available
- Winch speed: Up to 130 m/min
- Winch pull: Up to 12 kN
- Cable length: 1500 - 3900 m
- Cable diameter: 4,7 - 10 mm

MERMAC S series

- Scientific (oceanographic) winch systems
- Purpose dedicated features and options
- Winch speed: Up to 80 m/min
- Winch pull: Up to 55 kN
- Cable length: 1000 - 10000 m
- Cable diameter: 8,2 - 17,3 mm

MERMAC R series

- ROV winch systems
- Active Heave Compensation
- Winch speed: Up to 120 m/min
- Winch pull: Up to 195 kN
- Cable length: 2500 - 4500 m
- Cable diameter: 25,4 - 40 mm



MERMAC

Recently upgraded, the MacArtney MERMAC range of standard winches comprises the 'R' (ROV) and 'S' (Scientific) series, each offering unique capabilities and features to operators of several types of underwater vehicles, equipment and instrumentation platforms.

All MERMAC winches are designed to be highly dependable and modular systems. Several components are standardised, making it easy for the customer to specify the required performance and capacity. Moreover, the modularity of MERMAC winches make them easy to upgrade if their services are eventually required for handling other types of equipment. Another feature of the upgraded MERMAC range is the dedicated focus on 'intelligent compactness' which is incorporated into all winch designs. While taking up less deck space, the compact design still allows for easy maintenance.

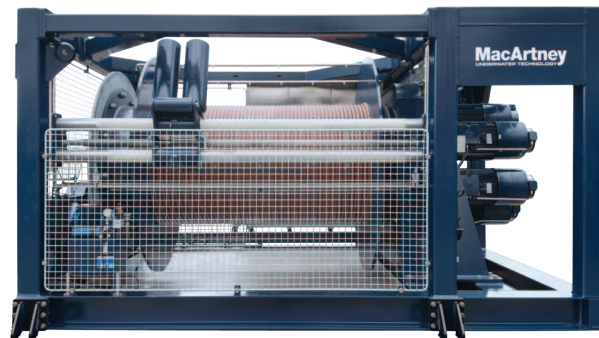
MERMAC R-SERIES

MacArtney MERMAC R winches are advanced vehicle handling systems that safely control ROV launch, operation

and recovery. MacArtney MERMAC R winches are designed to be reliable, offer high performance and be easy to use. Employed for work class and inspection ROVs, they are available in various standard and custom configurations. The MERMAC R range is available with Active Heave Compensation (AHC) which reduces weather-related down time and makes launch and recovery of tethered equipment easier and safer. With a cutting-edge motion reference unit and advanced algorithms, the MERMAC Active Heave Compensated winches immediately compensate for vessel movement caused by waves - even in heavy seas.

MERMAC S-SERIES

MERMAC S winches are electric driven, advanced and robust oceanographic systems ideal for use with side scan sonars, oceanographic instrumentation



▲ MERMAC R winch with Active Heave Compensation

solutions, towed vehicles and other underwater applications. MERMAC S winches combine robustness with controllability and are supplied with variable speed, tension read-out and control via an integrated load cell. Optional PC software offers computer control and fully automated profiling capabilities.

What is more, the winches can be adapted to suit various cable diameters and are available with exchangeable drums. MERMAC S winches are often part of comprehensive turn-key winch and handling solutions for research vessels.

MacArtney global winch service programme

MacArtney service programme

MacArtney offers a comprehensive service and maintenance programme to all winch and handling solution customers. The ultimate objective of this service programme is to extend system lifetime and minimise downtime.

Global support

As a programme cornerstone, MacArtney offers worldwide 24 hour phone and email service. Supported by several strategic MacArtney locations across the globe, this service ensures that onsite technical assistance can be rapidly mobilised.

Remote diagnostics

For further empowering MacArtney service capabilities, all MERMAC winches

can now be delivered with a 'remote diagnostics tool'. Uniquely offered by MacArtney, this tool allows MacArtney technicians to remotely monitor and troubleshoot several winch functions in real time. By eliminating unnecessary offshore engineering support, this unique feature potentially offers great cost savings to customers and operators.

Maintenance, repair and service

Beyond remote services, the MacArtney service programme embraces hands on onshore and offshore support. This includes periodic inspection, maintenance and overhaul, spare part management and storage, consignment stock, onsite repair and service, training, tension cable spooling, ocean depth pressure testing, system installation and integration, testing, commissioning and system certification.

When signing a service agreement with MacArtney, customers can also enjoy benefits such as extended warranty periods and full predictability of costs over the entire system lifespan, making it possible to focus entirely on the core business.

Global Spares

MacArtney offers a full range of minimum, extended or customer specified spare part packages.

Spares are held in standing stock and can be rapidly distributed worldwide, hereby keeping equipment downtime at a minimum.

Auxiliary winch products

MacArtney supplies a comprehensive range of auxiliary products for winch and handling systems. Common to these products, is their dedicated focus to provide increased value and flexibility to customers and to those who operate winch and handling systems on a daily basis.

- Dynamic cable and umbilical systems with terminations
- Slip rings and rotary joints
- Subsea stress terminations
- Certified junction boxes
- Cable sheaves and tension wheels
- Control panels and displays
- Cabled and wireless remotes
- Cable storage winches



▲ MacArtney remote diagnostics tool

MERMAC winch to handle moorings for MBARI

MBARI (Monterey Bay Aquarium Research Institute) has recently selected a MERMAC S winch to deploy and recover scientific moorings off the R/V Rachel Carson. The new mooring winch will become the second MacArtney winch system onboard the R/V Rachel Carson, adding to a MacArtney ROV tether management winch already in operation.

Monterey Bay Aquarium Research Institute

MBARI was founded in 1987 by David Packard and is located in Moss Landing, California, where its research ships and remotely operated vehicles are berthed. As a private, non-profit research centre, MBARI is funded by The David and Lucile Packard Foundation and employs approximately 220 scientists, engineers, operations and administrative staff. MBARI ocean scientists propose and execute innovative studies, both experimental and theoretical - while engineers and operations staff develop

and adapt supporting technology.

Ocean Science in Monterey Bay

Monterey Bay is one of the most biologically diverse bodies of waters in the world, and the underlying submarine canyon is one of the deepest along the continental United States.

This environment allows scientists to perform studies that are relevant to the bulk of the world's marine environments.

In its toolbox for performing such studies, MBARI operates three research vessels, hereunder the recently acquired coastal vessel R/V Rachel Carson, which is able to deploy several remotely operated and autonomous underwater vehicles and offshore moorings, equipped with ocean-monitoring instruments.



▲ The R/V Rachel Carson (MBARI)

Mooring Winch Applications

The new MacArtney MERMAC winch is designed as a powerful self contained steel construction with protection frame, replaceable drum, level wind, gear box, electric motor and remote control unit.

Installed onboard the R/V Rachel Carson, the winch will be used to effectively deploy and recover the moorings mentioned above - offering a significant upgrade in terms of speed and performance when compared to the current system.

Complete MacArtney winch solution for new JAMSTEC research vessel

MacArtney has recently supplied a major consignment of high performance oceanographic winches to JAMSTEC, the Japanese Agency of Marine-Earth-Science and Technology. The total of eight winch systems and appurtenant equipment were delivered to Mitsubishi Heavy Industries who, in cooperation with specialist MacArtney winch and handling technicians, installed them onboard the brand new JAMSTEC research vessel, the R/V Shinsei Maru.

JAMSTEC R/V Shinsei Maru

Built at the Mitsubishi Heavy Industries Shimonoseki Shipyard and Machinery Works, the R/V Shinsei Maru was completed and delivered to JAMSTEC in June 2013, hereby marking the latest addition to the extensive JAMSTEC fleet of modern research vessels.

In the hands of the JAMSTEC scientists and empowered by state-of-the-art functions and equipment, R/V Shinsei Maru is bound to offer an invaluable contribution to the recovery of marine ecosystems and fisheries in post earthquake disaster coastal Japan. This will be achieved through comprehensive studies, hereunder efficient marine

environmental observation, bathymetric survey and ocean atmosphere research.

Total winch solution by MacArtney

In order to effectively carry out these kinds of oceanographic surveying, the R/V Shinsei Maru is equipped with a wide variety of on board observation systems, portable research equipment and a remote controlled unmanned probe. For launching and recovering this multitude of surveying systems and equipment, the R/V Shinsei Maru is outfitted with a cutting-edge total MacArtney winch solution comprising a general survey winch, 3 wire winches, a CTD winch, a deep-tow winch, a water sampling winch and a mooring survey winch.

Adding to the overall system performance, six of the MacArtney winches onboard the R/V Shinsei Maru benefit from Active Heave Compensation



▲ The R/V Shinsei Maru (JAMSTEC)

(AHC). AHC reduces unwanted undulation, cable slack, pull and equipment instability by compensating for the motion caused by heavy seas. This way, AHC works to dramatically decrease weather related downtime.

From initial contact to final delivery, the order was facilitated by trusted MacArtney Japan representative, the Nishiyama Corporation. At the time of writing, the R/V Shinsei Maru is conducting training missions and undergoing equipment sea acceptance tests to prepare for actual operations.



SeaBotix chooses MERMAC winch solution for Containerized Delivery System (CDS™)



▲ The right angle MERMAC winch features Active Heave Compensation

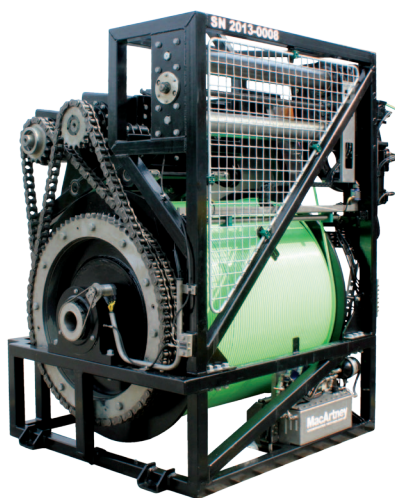
SeaBotix, San Diego based leading MiniROV manufacturer and supplier, has recently contracted the MacArtney Group to supply an electric MERMAC Remotely Operated Vehicle winch system for use with the innovative SeaBotix CDS™ Containerized Delivery System.

The SeaBotix Containerized Delivery System

Being the world's first 4000 meter capable, fully self-contained, rapid response, ROV system - the SeaBotix CDS™ solution represents a truly innovative approach to deepwater observation and light duty work. Traditionally, large and expensive Work Class ROV systems that take days to mobilise have been used for these missions. The CDS™ is a simple, flexible and cost-effective alternative, offering a single container integrated deepwater observation package, including customisable control room, workspace, winch, Launch and Recovery System (LARS), Tether Management System (TMS), and a versatile 4000 meter rated vectored SeaBotix ROV system (vLBV4000).

Easy deployment, operation and service

The CDS™ container with its single point lifting capability can be mobilised very quickly on vessels of opportunity. With only a small crew requirement, the CDS™ system is simple to deploy, operate and service. A host of features are included to comply with the demanding conditions which often form an inseparable part of the offshore subsea inspection, disaster



▲ The MERMAC winch is designed to be very compact, yet rugged and powerful

response and deepwater scientific research missions on which SeaBotix ROVs are often deployed. The included vLBV4000 is a stable, powerful, sensor rich ROV with the ability to inspect tight areas in complex structures at depth. However, in order to further empower this ROV, the CDS™ system features an integrated purpose developed MacArtney MERMAC R electric ROV winch. The winch features AHC, working to effectively filter out the effects of wave and vessel movement, allowing for deployment operation and retrieval in higher sea states, increasing equipment safety and reducing weather related downtime.

The MacArtney MERMAC winch

On several fronts, MacArtney MERMAC winches represent an ideal ROV handling solution for the SeaBotix CDS™ system. Like all the other elements that make up the CDS™, MERMAC winches are designed to be self-contained, modular and compact, however, yet easy to operate and service.

Besides the intelligent Active Heave Compensation capacity, the MERMAC winch used with the SeaBotix CDS™ systems incorporates several ingenious features which contributes to a very effective winch solution. These include a space saving right-angle winch configuration with the level wind sheave integrated within the protective frame, central grease points for easy system lubrication, a PC based and user friendly GUI (Graphical User Interface) for control and monitoring of the Tether Management System (TMS) deployment with speed and tension control. Finally, a wireless handheld controller is used for flexible tangle free operation.

According to MacArtney Launch and Recovery Sales Manager, Klaus Brix: "MacArtney is proud to see its MERMAC winch range contribute to the SeaBotix CDS™ system and is looking forward to continuously expanding the cooperation between MacArtney and SeaBotix."



▲ The SeaBotix Containerized ROV Delivery System (CDS™)

► Scan to watch the CDS™ in action



R/V Falkor employs advanced MacArtney LARS to handle WHOI HROV



▲ The R/V Falkor uses its MacArtney Articulating A-Frame and a MacArtney ROV winch to launch and recover the WHOI HROV Nereus

In June of 2013, a dedicated team of oceanographers and astrobiologists onboard the Schmidt Ocean Institute research vessel, R/V Falkor, set sail on the two-leg Oases 2013 cruise to explore the Mid Cayman Rise.

Widely recognised as one of the deepest and slowest spreading mid-ocean ridges on Earth and as one of the deepest points in the Caribbean Sea, the Mid Cayman Rise is home to a diverse and remarkably abundant hydrothermal venting phenomenon.

In-depth understanding

Empowered by the *Nereus* - a Woods Hole Oceanographic Institution (WHOI) hybrid remotely operated vehicle (HROV), scientists searched for life and geochemical phenomenon in this extreme seafloor environment. The one-of-a-kind *Nereus*, which in 2009 visited the deepest parts of the Mariana Trench, allowed scientists to extend their investigations throughout the very depths of the Mid Cayman Rise, which reaches to more than 6,500 metres.

Building on previous work in the region, scientists used *Nereus* to prospect for

new hydrothermal vent sites. They also sought to extend our understanding of the limits to which life can exist - and added to the understanding of how geologic processes might generate the prebiotic materials believed to have been an essential precursor to life on Earth, and to help prepare for future efforts to explore for life on other planets.

Deploying the Nereus

During the entire cruise, the crew of the R/V Falkor made good use of the powerful and versatile MacArtney Articulating A-frame to successfully launch and recover the *Nereus*. Mounted on the research vessel's stern, the MacArtney A-frame makes up a vital element of the launch and recovery capabilities of the R/V Falkor.

Using the A-frame and a MacArtney fibre optical ROV winch system from the UNOLS East Coast Winch Pool, the *Nereus* was effectively deployed on multiple dives during the cruise - in AUV as well as in ROV configuration. The articulating capacity of the A-frame made launch and recovery as well as on-deck maintenance and reconfiguration of the *Nereus* easier, more convenient and safer

for the Falkor ROV operator team. In essence, the articulating A-frame system provides easy access to the top of the frame, enabling operators to prepare the *Nereus* for launch, while working at deck level.

Multiple scientific operations

Beyond the deployment of the *Nereus*, R/V Falkor supported a broad variety of scientific operations during the cruise, including multibeam mapping, chemical and physical data collection at vent sites, interactive research at vent sites, observation and sampling of associated biological communities, satellite telepresence with shore-side scientists and multiple CTD casts. CTD casts performed during the Oases cruise were undertaken using a special MacArtney CTD winch system.

"The MacArtney A-frame and CTD winch have been reliable and versatile systems onboard," said Pete Zerr, Schmidt Ocean Institute's Deputy Director of Marine Engineering, "they are essential for overboarding a variety of scientific equipment and instrumentation critical to our mission to better study and understand ocean systems."



CORMAC

Having recently undergone a process of extensive upgrades, the MacArtney CORMAC range of stainless steel winches comprises the CORMAC and the CORMAC M series, each offering unique capabilities and features to operators of underwater equipment.

All CORMAC winches are constructed to be modular and self-contained and while standard CORMAC winches are known as rugged and versatile systems housed in protective stainless steel frames, the smaller and even more compact CORMAC M winches are often preferred when space is very limited. The modular outline of the CORMAC winch design entails that the winches can be easily modified to accommodate a variety of tasks. Furthermore, the winches are constructed from glass blasted stainless steel and require minimal maintenance.

CORMAC winches are designed to be easy to control - using either a frame mounted control panel or a remote.

Operators are allowed to choose between a broad range of specifications including speed, pull, motor size, system weight and cable capacity. Moreover, all CORMAC winches are available in a HS (High Speed) version and can be CE marked if supplied with cable and termination.

Upgrades and new features

CORMAC winches incorporate several intelligent features which, while allowing for accurate and high speed equipment handling, make for very effective winch solutions. The standard 'soft start' function makes the winch easy to handle, improves equipment manoeuvrability and protects the winch motor and gear. As an upgraded feature, all CORMAC winches are now fitted with an electric driven level wind, allowing for significantly improved spooling performance, while making it possible to easily change cable diameter. As a frequently selected option, CORMAC winches are supplied with a wired or wireless remote control featuring



▲ MacArtney CORMAC M winch system

high precision joystick control and an optional display indicating the deployed cable length and pay in/out speed.

A long and versatile track record

CORMAC winches are engineered for optimal durability and dependability and are widely used by operators worldwide, to handle oceanographic instruments, side scan sonars and inspection class ROV systems. Over the past 25 years, MacArtney has gained a long and versatile track record, supplying CORMAC winches as well as complete CORMAC equipment handling systems.

STX chooses CORMAC system for sonar deployment on new Finnish Coast Guard vessel

MacArtney has recently supplied a customised CORMAC 5 stainless steel electric winch coupled with an EdgeTech 4200 Side Scan Sonar system to STX Finland.

Next generation winch for a next generation offshore patrol vessel

Back in December 2011, STX Finland and the Finnish Border Guard signed an agreement on the construction of a next generation offshore patrol vessel. The vessel, which was recently named

'Turva' at a festive naming and launching ceremony, is built at the STX Rauma Shipyard and will be handed over to the customer in the end of 2013. The highly advanced vessel will be 96 metres long and 17 metres wide and will be capable of serving a large variety of functions and purposes. The main duty of the offshore patrol vessel is to operate in open sea patrol. In addition to ensuring border safety and serving defense purposes, the vessel will be used for other functions such as prevention of environmental damage, search and rescue, and different underwater assignments - often performed under rough maritime conditions.

For several of these functions and purposes, the vessel is dependent on the effective deployment of leading edge sonar technology. To effectively handle vessel sonar deployment, STX Finland has selected a latest generation state-of-the-art MacArtney CORMAC 5 winch, which was acquired by STX Rauma Shipyard through long standing Finnish MacArtney

representative, Arwell-Tekniikka Oy. Primarily, the winch will be deployed to launch and recover a versatile and reliable EdgeTech 4200 Side Scan Sonar system that can be configured for almost any survey application from shallow to deep water.

The EdgeTech 4200 can be used for missions ranging from cable and pipeline surveys, channel conditioning and clearance surveys to geohazard, geological and geophysical surveys. EdgeTech's dual simultaneous frequency system operating with its proprietary Full Spectrum® CHIRP Processing provides the best in both short and long range resolutions through improved signal-to-noise ratios and provides successful results in even the most challenging environments. This way, for several mission types, the complete winch and sonar system will be a very valuable tool for the vessel and crew.

"MacArtney is very pleased to contribute to the capabilities of such an impressive and important vessel" - says MacArtney Launch and Recovery Sales Manager, Klaus Brix.



▲ This CORMAC 5 system will manage sonar deployment on the STX built patrol vessel 'Turva'

Portable CORMAC solution for multiple survey vessels



▲ Operating a fleet of multiple survey vessels, the portable CORMAC winch system provides a highly versatile and flexible sonar deployment solution for CAU and GEOMAR scientists

MacArtney has recently delivered a CORMAC 4 Stainless Steel Winch system to the Institute of Geosciences at the Christian Albrechts University of Kiel.

The winch system, which was acquired through German MacArtney Group operations, MBT GmbH, will be put to good use onboard various research vessels, hereunder the R/V Alkor, which is operated by the GEOMAR Helmholtz Centre for Ocean Research Kiel.

Rugged and flexible winch system

Housed within a self-contained and compact stainless steel structure, the CORMAC winch is rugged, easily portable and offers extensive flexibility to scientific operators such as the Christian Albrechts University of Kiel (CAU), who require the winch to be used on multiple different vessels. The winch is delivered as a plug-and-play system, spooled with 500 metres of Rochester coaxial cable and complete with termination, slip ring, wireless remote control, cable sheave and cable status indicator.

Future tasks

The CAU contributes to a better understanding of the processes and the development of strategies for a sustainable use and conservation of the ocean. Within the framework of the interdisciplinary Kiel Marine Science (KMS), CAU supports diverse activities of marine research projects with more than 25 research groups at seven different faculties. This includes expertise from areas such as climate research, coastal research, physical chemistry, botany, microbiology, economics, law and sociology. The close cooperation of the Kiel marine scientists is also shaped by joint activities in research and teaching at the CAU Institute for Geosciences and Research and Technology Centre in Büsum, and the GEOMAR Helmholtz Centre for Ocean Research in Kiel.

In the hands of scientists and scholars, the new CORMAC winch will be used to deploy oceanographic and acoustic equipment, hereunder, primarily, a Benthos C3D Side Scan Sonar.

Managing Director at MBT, Torsten Turla says that "MBT and MacArtney are very pleased to provide quality underwater technology to support the important scientific ocean exploration that is undertaken by the University of Kiel and its marine science partners."



▲ MacArtney CORMAC 4 winch system



Corporate news

MacArtney completes 40 FPSO swivel projects

In its capacity as Focal - MOOG Components Group representative in Scandinavia and Holland, the MacArtney Group has recently passed a momentous system delivery milestone.

Since the partnership was initiated, MacArtney has facilitated the sale and delivery of more than 40 Focal swivel solutions to offshore Floating Production Storage and Offloading (FPSO) vessels operating across the world.

FPSOs

FPSOs are offshore production facilities that house both processing equipment and storage for produced hydrocarbons. The basic design of most FPSOs encompasses a vessel shaped platform, with processing equipment aboard the vessel deck and hydrocarbon storage below in the hull. After processing, an FPSO stores oil and gas before periodically offloading to shuttle tankers or transmitting it onshore via pipelines.

FPSOs are viable development solutions for a number of different deepwater or ultra deepwater offshore field situations. Because an FPSO can be disconnected from its moorings, this type of offshore production vessel is optimal for areas that experience adverse weather conditions, such as cyclones and hurricanes. Additionally, they pose an excellent economical solutions for more marginal fields, in that the vessel can be moved and redeployed once the original field has been depleted. Adding to the economical advantages, existing tanker vessels can often be converted into FPSOs.



▲ Recently acquired by Statoil and operating offshore Brazil, the highly advanced FPSO Peregrino (formerly Maersk Peregrino) features Focal swivel technology



▲ Often comprising multiple electrical passes and fibre optical rotary joints Focal FPSO swivels can be rather sizeable systems

FPSO swivels

Moored to the seafloor and usually tied to multiple subsea wells, the FPSO gathers hydrocarbons from subsea production wells through a series of subsea structures and pipelines. Once tapped, hydrocarbons are transmitted through flowlines to risers, which transport the oil and gas to the FPSO on the surface.

At the heart of the FPSO, the vital transfer of hydrocarbons, along with power, hydraulics and fibre optical signals between surface and seafloor is facilitated by an FPSO swivel. Typically comprised of electrical slip rings, hydraulic utility swivels and fiber optic rotary joints, swivels are used in a variety of FPSO configurations including buoy, turret mooring and offshore loading towers. Once installed, FPSO swivels permit the continuous flow of fluids, power and communication with unlimited freedom of the vessel to weathervane about its mooring point.

Focal and MacArtney FPSO track record

Focal - MOOG Components Group is a world leading supplier of swivels, slip rings, multiplexers and fluid rotary unions which are

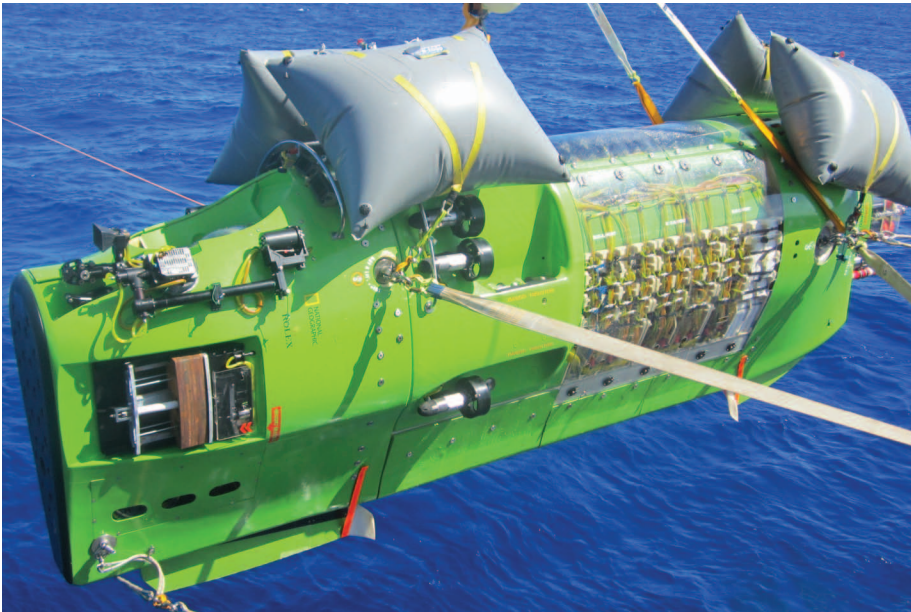
designed and tested to operate effectively in the harshest maritime environments. Since 1990, Focal has delivered a vast amount of FPSO swivel solutions, spanning from Hydraulic Utility Swivels, Low Voltage Swivels to large High Power Swivels (35 kV, 2000 A).

Through its participation in several projects, MacArtney has gained an extensive track record as a Focal FPSO swivel supplier and provider of specialist engineering support to FPSO operators and FPSO swivel stack, mooring and turret manufacturers across the entire offshore industry.

Notable MacArtney FPSO projects include the delivery of swivel solutions to APL/National Oilwell Varco, Framo Engineering and Bluewater. Beyond Focal swivels, the MacArtney scope of FPSO supply includes junction boxes, cables and connectors.

MacArtney Sales Manager, Jens Henrik Gadeberg, says that "MacArtney is fully committed to its partnership with Focal and dedicated to deliver state-of-the-art swivel solutions to the FPSOs of tomorrow." According to MacArtney Business Development Manager Anders Andersen; "one of the next exciting steps within FPSO swivel development and supply will comprise massive 145 kV swivels for facilitating the transfer of high power from land based sources."

James Cameron and WHOI use SubConn® connectors when taking on deepsea challenges



▲ The Deepsea Challenger is launched. SubConn® connectors with red locking sleeves can be seen interfacing the transparent oil filled battery array on the side of the underwater vehicle

Following a cross-country journey with stops at science institutions, museums and even Capitol Hill, filmmaker and explorer James Cameron recently handed over the Deepsea Challenger, the only human occupied vehicle currently able to access the very deepest parts of the ocean, to Woods Hole Oceanographic Institution (WHOI). Here, this impressive submersible system will be put to good use as a state-of-the-art scientific platform for future deep sea missions.

The Deepsea Challenger

Enabling James Cameron to make his nearly 11-kilometer descent to the deepest place on earth, exploring the ocean floor, conducting experiments, collecting samples, and returning safely to the surface, requires an underwater vehicle unlike any other. As with spaceships, deep-sea submersibles must be engineered to accommodate innumerable challenges, including extreme changes in pressure, temperature and the incessant absence of sunlight.

It took James Cameron and his team seven years to complete the Deepsea Challenger, and the challenges related to this process spanned the incorporation of several new technologies, designs and materials - along with extensive testing. From its unique vertical attitude to its purpose developed materials, including a highly sophisticated syntactic foam

developed specifically to withstand the immense pressure at the very bottom of the ocean, the vehicle represents a significant showcase of engineering innovation.



▲ SubConn® interfaced robotic landers descended to the abyss prior to the Deepsea Challenger

Standard connectors on a special mission

Almost everything on the Deepsea Challenger is custom designed and tailor-made for its specific purpose, as the vehicle can rely on only the most expertly engineered systems and components, designed to function unfailingly under enormous strain. Amongst these,

however, the many stainless steel PBOF and bulkhead SubConn® connectors, supplied by Ocean Innovations, mark an impressive exception to prove the rule.

Tested explicitly to work at this extreme depth, these industry standard connectors are used to interface the vehicle battery packs, the powerful spot and LED panel lighting arrays, HD and IMAX quality 3D cameras, along with other vital instruments and sensors used on the Deepsea Challenger. In addition, SubConn® connectors, including glass sphere modified units, were widely used to interface two unmanned robotic landers that descended to perform pre-programmed tasks in the abyss - prior to the arrival of the Deepsea Challenger.

James Cameron, WHOI and SubConn®

Easily recognisable by their characteristic red locking sleeves, SubConn® connectors are widely used by ocean professionals in offshore, ocean science, civil engineering and defence sectors across the world. James Cameron as well as WHOI maintain a long standing history and track record with regards to the use of SubConn® connectors for interfacing underwater technology and equipment. Since 1995, when the filming for 'Titanic' started, James Cameron has continuously selected SubConn® as the connectivity solution of choice for several of his underwater projects.

Likewise, WHOI has been using SubConn® connectors, along with other underwater technology products and solutions from MacArtney, for realising a vast variety of oceanographic applications, systems and technologies.



▲ Back on the surface: James Cameron exits the Deepsea Challenger after completing a successful dive



Instant Ocean Business

Through more than 70.000 kilometres of successfully completed ROTV (remotely operated towed vehicle) based pipeline inspection operations in the past decade, Fugro Survey Limited has always given priority to offering full compliance with customer requirements.

These include simultaneously carrying more than one operational ROTV systems on Fugro's Dynamic Positioning Survey Vessel, the M/V Fugro Discovery. This principle is set to enable operators to perform a hot-swap of vehicles, hereby minimising downtime, maximising system utilisation and effectively securing fast results for pipeline inspection clients.

At the beginning of the 2013 pipeline inspection season, client requirements led to Fugro needing to move fast to acquire a new ROTV vehicle.

Fugro, MacArtney and Edgetech move fast to supply ROTV

The approach of Fugro to resolve this matter would soon prove to be of a proactive nature - and when delegates from Fugro paid a visit to the MacArtney stand at Ocean Business 2013, they were out for more than merely catching

a glimpse of the latest developments in underwater technology.

As often before, MacArtney had brought a FOCUS-2 vehicle and lined it up for show as an eye catcher at the company's Ocean Business stand.

After a to-the-point talk with MacArtney, Fugro progressed to place an order for the actual on-display FOCUS-2 vehicle.

Dynamic teamwork makes for speedy delivery

Fugro would have been happy to take the FOCUS-2 home in direct continuation of the show. However, in order to comply with custom Fugro specifications, the vehicle needed to undergo a range of preparations and modifications. These needed to be accomplished and the vehicle delivered in record time, hereby challenging MacArtney technicians to perform on the edge of capacity. Since FOCUS-2 systems operated by Fugro are fitted with state-of-the-art EdgeTech 2200-M integrated side-scan sonar systems operating at 300 and 600 kHz to provide highly resolution data with much improved signal-to-noise ratios - the rapid expert involvement of EdgeTech sonar technicians was required as well. In just



▲ MacArtney FOCUS-2 vehicle on display at Ocean Business

three weeks, an impressive team effort lead the transformation of this display model ROTV into a fully equipped and operational FOCUS-2 system, ready to serve with Fugro to offer highly efficient, high definition acoustic pipeline inspection services in the North Sea.

MacArtney global highlights



United Kingdom MacArtney UK Ltd.

David Buchan
Managing Director
Aberdeen, UK



The MacArtney Groups UK operation is rapidly approaching the end of another financial year and it looks like this will be the second best year in company history on turnover and profit.

Staff numbers are currently at 45 and everyone is kept busy with various new and exciting projects. The month of August has been an outstanding month for new order bookings and we have seen considerable new interest in our range of API compliant connectors and in our range of MERMAC AHC winch systems.

I want to thank all members of the UK Operations staff for the splendid efforts they have all put in during the past summer holiday period, when it is always a challenge to keep things running with reduced numbers of people. Overall I think we managed.



North America MacArtney Inc.

Lars F. Hansen
President
Houston, USA



After a dedicated effort to consolidate and empower our new regional operations, we are starting to see our expansion paying off.

Through our local presence, we have recently secured significant orders for MacArtney MERMAC winch solutions for San Diego based ROV manufacturer SeaBotix and for a major defence contractor. The AHC capability of our winches, along with the responsiveness and support demonstrated by MacArtney sales and technical staff, proved to be the key determiner in both cases.

In the time to come, we will strive to step up business from new OEM customers, while building even stronger relations to existing OEMs. To be successful, we will focus on dialogue and customer requirements, while maintaining full readiness to provide local technical service and after sales support. Based on these goals, we have recently expanded on the administrative side of our operations, and we are in the process of hiring more sales staff.

New MacArtney agent in Poland



The MacArtney Group is pleased to announce the entry of a representative agreement with Escort Sp. z o.o. to function as official MacArtney agent in Poland. Escort will administer the promotion and sales of MacArtney systems and products on the promising and diverse Polish market for underwater technology.

Escort Sp. z o.o.

The company was founded in 1990, bringing together experienced people from various professions within the realm of marine electronics. Escort currently

employs approximately 25 people, with 20 based at the headquarters in Stettin, and the remaining 5 based in the bustling university city of Gdansk, where they are kept busy supplying and servicing the esteemed Gdansk Institute of Oceanography along with other local research institute clients.

Overall, within maritime sectors, major Escort clients encompass shipyards, fishery segments, yacht owners, oceanographic institutes and defence clients.

Providing complete solutions

Through the provision of access to key underwater technology segments, contacts, local knowledge and strategic locations, the appointment of Escort as a MacArtney representative, marks a significant strengthening of MacArtney's presence in Poland. In turn, Escort will gain access to the entire portfolio of globally established MacArtney systems and products. Examples of MacArtney systems and products that will be sold through Escort include MacArtney winch

and handling solutions, ROTVs and SubConn® connectors.

MacArtney Business Development Manager, Anders Andersen sees Escort as a strong and serious partner, especially when it comes to providing complete, high quality solutions for customers within diverse underwater technology markets. "Just like MacArtney, Escort possesses an inherent ability to think in complete solutions - and it definitely increases customer value to offer a fully integrated, turn-key package, rather than focusing solemnly on item sales", says Anders Andersen.

Mutual support

In order to provide full ongoing support and keep up with development and potential challenges, MacArtney is committed to work in close contact with Escort and offer the highest level of support. Marking the first step of commitment and mutual support between the two companies, MacArtney accompanied Escort at the recent BALTEXPO 2013 show in Gdansk.

MacArtney welcomes

MacArtney A/S: Heidi Enemark • Klavs Mathiasen • Jeppe D. Nielsen • **MacArtney UK:** Scott Davie • Charles Riddell • Simon Yates • Lesley Taylor • Rachel McBride • Martin Johnston • **MacArtney Inc.:** Maria D. Cordova • Ashlee A. Balderas • **MacArtney Benelux:** Elvedin Mrkajl • Ka-Kin Cheung • Agna M. Nobel • Darren Dommers • Roy du Pree



South East Asia
Singapore Pte. Ltd.
Steen Frejo
Sales Manager - Global
Representative Network
Singapore



Oceania
MacArtney Australia Pty. Ltd.
Cathie Lynette Barrett
Office Manager
Perth, Australia



Only half a year upon inauguration, MacArtney Singapore is on track to become a well established player on the South East Asian market for underwater technology.

This achievement primarily owes to a strong and dedicated effort made by the MacArtney Singapore staff.

From day one, MacArtney Singapore sales and technical colleagues have focused relentlessly on establishing and developing strong customer relations. In fact, MacArtney Singapore already handles many incoming orders and enquiries for underwater technology equipment and systems, while maintaining a fully operational workshop.

Coinciding with the release of this issue of In Depth, MacArtney Australia is just about to round off its first year as a MacArtney Group member. Since the opening, good progress has been made with regards to developing our customer base and gaining foothold on the exciting markets for underwater technology that exist here in Oceania.

At the moment, we work hard to maintain and further increase our sale of SubConn® connectors. These efforts are well aided by a well established standing stock, with products ready for immediate delivery.

Since the opening of the new MacArtney subsidiary in Singapore, we have been working closely with our South East Asian colleagues. Due to the geographical proximity of our two offices, a high degree of mutual support is enabled. For instance, MacArtney Singapore is able to provide competitive moulding and termination services for Oceanian customers.



Meet us in person at these exhibitions

Oceans 2013, San Diego, USA, 23rd - 26th September 2013 (stand no. 406)

Offshore Technology Days 2013, Stavanger, Norway, 23rd - 24th October 2013 (stand no. C 3401)

Europort 2013, Rotterdam, the Netherlands, 5th - 8th November 2013 (stand no. 3123)

The full list of exhibitions and conferences is available at www.macartney.com/exhibitions