

# In Depth

Q2 2010

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# Behind the scenes at MacArtney - where innovation and reliability go hand in hand



## How being close helps us all

Being close to our customers has been a primary aim of MacArtney since the company began.

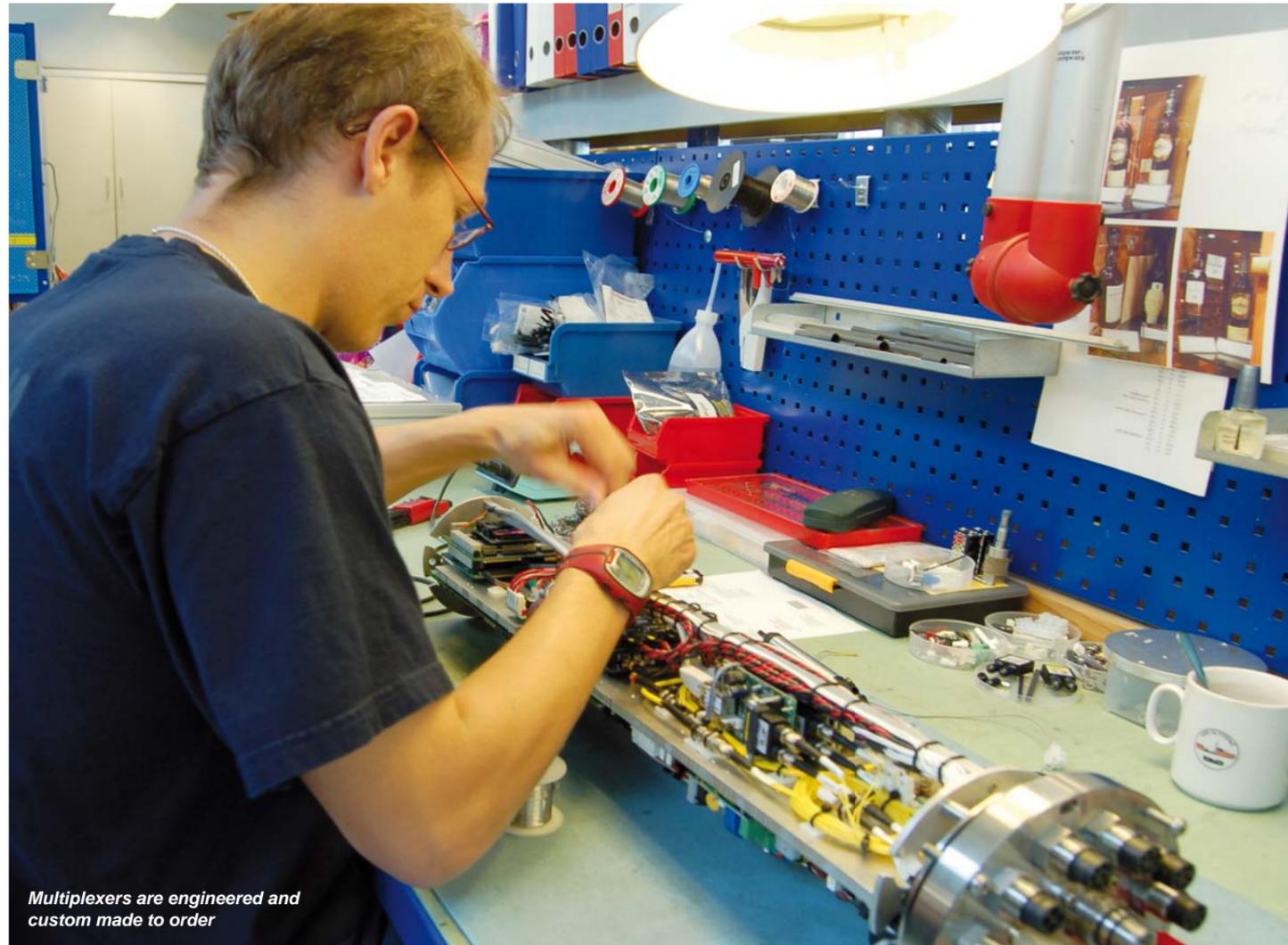
This aim encompasses many ways of being close. We work hard to be physically near to our customers by opening new offices and workshops where we are needed, most recently in Brazil.

Our global network makes us accessible on a local level while benefitting from global company support.

Technicians and engineers who repair and refurbish equipment are in constant close contact with the conditions that underwater equipment faces, often installing and repairing equipment on site. Their feedback combined with the expertise and engineering background of the technical department ensures that the entire MacArtney team – from sales to repair – are always mindful of the particular challenges of the underwater environment.

Closeness for us also means supplying the systems, products and services that our customers need. We have always provided tailor made systems for our customers for specific needs and conditions, and our research and development teams are continually working on developing new products and systems that make working underwater faster, easier and safer. Their visionary, innovative and creative approach keeps MacArtney at the forefront of underwater technology development and close to our customers.

Niels Erik Hedeager, CEO



Multiplexers are engineered and custom made to order

This week, the workshop at the Denmark headquarters of underwater technology group, MacArtney, completed and shipped another custom made product.

Every day of every week, engineers and technicians work on systems and products that have been designed and made specifically for a customer or project. Sometimes these totally new products continue into production and fill a need in the underwater technology market, other times they remain a one-off, completely tailor made for just one project.

Common to all these new products,

however, is the task of producing quality systems and products that can withstand use in some of the harshest conditions our planet can offer.

Customers need to be sure that the product, although it has never been made before, will work as expected in the field.

Ensuring reliability in innovation requires a combination of experience, engineering capability, skill and quality control.

Experts in the engineering and workshop departments work together with quality assurance to make sure a product does exactly what it is designed to do.

ROVs to customer order, performs cable terminations and refurbishes and repairs customer equipment.

### Centres of expertise

While workshops in other locations in the MacArtney group specialise in producing standard MacArtney products to a consistent high quality level, the Danish workshop primarily works on development, special orders and new termination types. The international network allows the department to specialise and optimise production and delivery times.

The four skills centres – fibre optic, ROV/ROTV, electronic and cable termination consist of experts in their own field who work together to produce complete systems, all contributing with particular skills to produce systems, such as oceanographic systems, or products – including Optolink connectors and FITA terminations.

All departments across the network work



in close cooperation with technicians and engineers in the workshop. From here, they gain invaluable information from products or systems that come in for repair as well as specific customer requirements. This chain of information sharing means that the research and development teams are always in touch with the equipment being used and how this equipment fares in the testing underwater environment.

### Quality assurance underpins every activity

Underwater equipment is deployed in testing conditions and sometimes subjected to enormous pressures and

strains. The technology needs to be proven to be able to withstand such forces in the field. New and repaired products need to be able to withstand such working conditions – and their readiness must be assured before they are deployed.

Quality assurance is an essential element in all activities within the workshop. In fact, work performed



MacArtney has upgraded to the ISO 9001:2008 certificate

here by highly trained technicians and mechanics is the final stage in a chain of quality controlled procedures. Rigorous calculations and tests are performed before a product even enters production. Once the product



is ready it can be thoroughly tested in-house in pressure tanks and the test pool. Refurbishment and repair work can also be tested in house.

### Dependable innovation

The combination of innovation and reliability is only possible when engineers, expert technicians and quality assurance systems work together. We strive to eliminate any errors and the workshop and engineering departments combine skills and quality control to ensure continual high standards, ensuring that all products do exactly what they are designed to do.

# Sidescan survey in record time with FOCUS-2

MacArtney has recently delivered two FOCUS-2 vehicles to DOF Subsea. This FOCUS-2 system is another dual system and was built and delivered in record time. The very tight time schedule demanded good co-operation between engineering, project management and workshop. And thanks to enthusiasm and hard work throughout the chain it all came together in time.

Håvard K. Berge, Survey Department Manager told MacArtney, "I would on behalf of DOF Subsea Norway express my appreciation of how well the delivery, FAT and SAT have been performed and the timely delivery of the system and personnel. It has been a very positive experience. The system is currently functioning well on the Mærsk project and, to our great satisfaction; we have already completed the survey much faster than anticipated."

The system was delivered to DOF Subsea onboard the vessel Geosund at the end of March 2010 where the Sea Acceptance Test (SAT) was being carried out. A pipeline inspection project was planned to start right after completion of the SAT, making it extremely critical time-wise. Lars Jørgensen, Head of Project Management and Henrik Mathiesen, Electronics Engineer, participated in both the Acceptance Test and part of the survey project, training the newly appointed ROTV pilots at the same time.

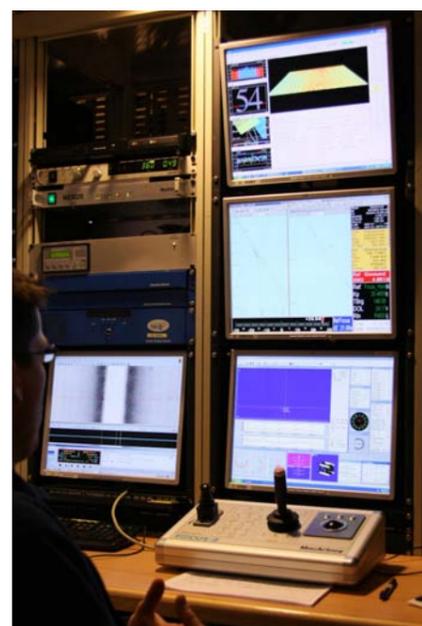
"It has been a pleasure working with the highly skilled crew onboard, whose professional attitude has made the delivery of the Focus system uncomplicated," commented Lars Jørgensen. One of the vehicles was delivered fully equipped for survey use. It was mounted with Edgetech side scan sonars, Ring Laser Gyro, Digiquarts and Doppler. The other vehicle delivered as a spare but prepared ready to take over after a few hours of sensor integration. The SAT was successfully completed after a few days. Hours after the SAT was completed, DOF started their survey project.

Approximately 800km of pipeline was to be surveyed with side scan sonars on both sides to assess out-of-burial spans, rock dump integrity and possible damage. The areas close to the platforms were to be surveyed at a later date using



Jesper Madsen, Geologist at DOF Subsea: "The sidescan data we are getting from the FOCUS-2 vehicle is at least as good as what we get from our UHD ROV. Furthermore it seems that the vehicle is less inclined to create reflections." ▲

Trond Monsvold, ROTV Supervisor at DOF Subsea: "The FOCUS-2 vehicle handles well and it is easy to keep on track using the vertical and horizontal autopilot." ►



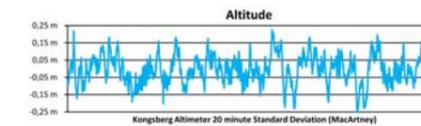
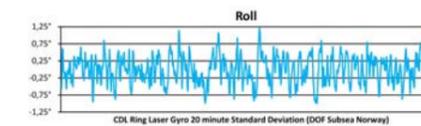
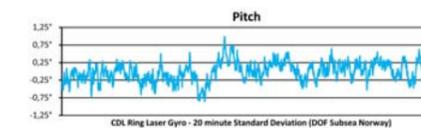
reference, giving a very consistent placement on the planned survey line. Being a relatively light system, the FOCUS-2 can be safely launched from almost any vessel. Onboard the Geosund, a dedicated crane was mounted in the stern that allowed for good reach for both launch and recovery.

With the FOCUS-2 vehicle as platform, the survey speed can get as high as 8-10 knots still maintaining vehicle stability and the equipped sonar system can be used up to 6 knots without degrading the data quality. This is nearly five times faster than an ROV survey.

### A very stable platform

Vehicle movements are kept to a minimum when the FOCUS-2 ROTV is run on both vertical and horizontal autopilot. The vehicle is specified to maintain a stability of +/- 2 metres on both axes but in practise, stability reaches +/- 0.3 metres vertically and +/- 1.5 metres horizontally. This high level of accuracy and stability would be very hard to achieve with a non-steered towfish.

The graphs below show the variations in pitch, roll, altitude and horizontal offset:



an ROV. The ROTV crew was assembled from current ROV pilots and Survey Technicians, all of which had experience from ROV systems. It was very helpful for the system integration that they had done this kind of work many times before. As Henrik Mathiesen said, "The ROTV pilots were fast at picking up flying skills and were able to move onto the actual job after only a few days of training".

### System integration

The FOCUS-2 vehicle was integrated into the extensive survey setup onboard Geosund, receiving vessel information and subsea vehicle positioning from the online system. The positioning system consisted of high precision differential GPS, HiPAP subsea positioning and a complete Inertial Navigation System (INS) integrated as payload on the FOCUS-2 vehicle. This allowed the vehicle to receive a very precise position

The data clearly demonstrates that the FOCUS-2 vehicle is a very stable platform which will benefit both sidescan and multibeam data quality. Survey speed is also high - even at up to sea state 6, allowing the customer to complete their survey more precisely in less time.

## Advanced IKM Merlin ROV with MacArtney instrumentation



On Wednesday the 14th of April, IKM Subsea AS invited customers and other interested parties to view the sea acceptance test of their new Merlin WR200 work class ROV. The event was an enormous success with plenty of guests and a very successful sea test.

The Merlin ROV system represents a new generation electrical work class ROV with extreme performance and increased reliability. The vehicle is based on hardwired electrical propulsion system, composite material frame and intuitive man-machine interface.

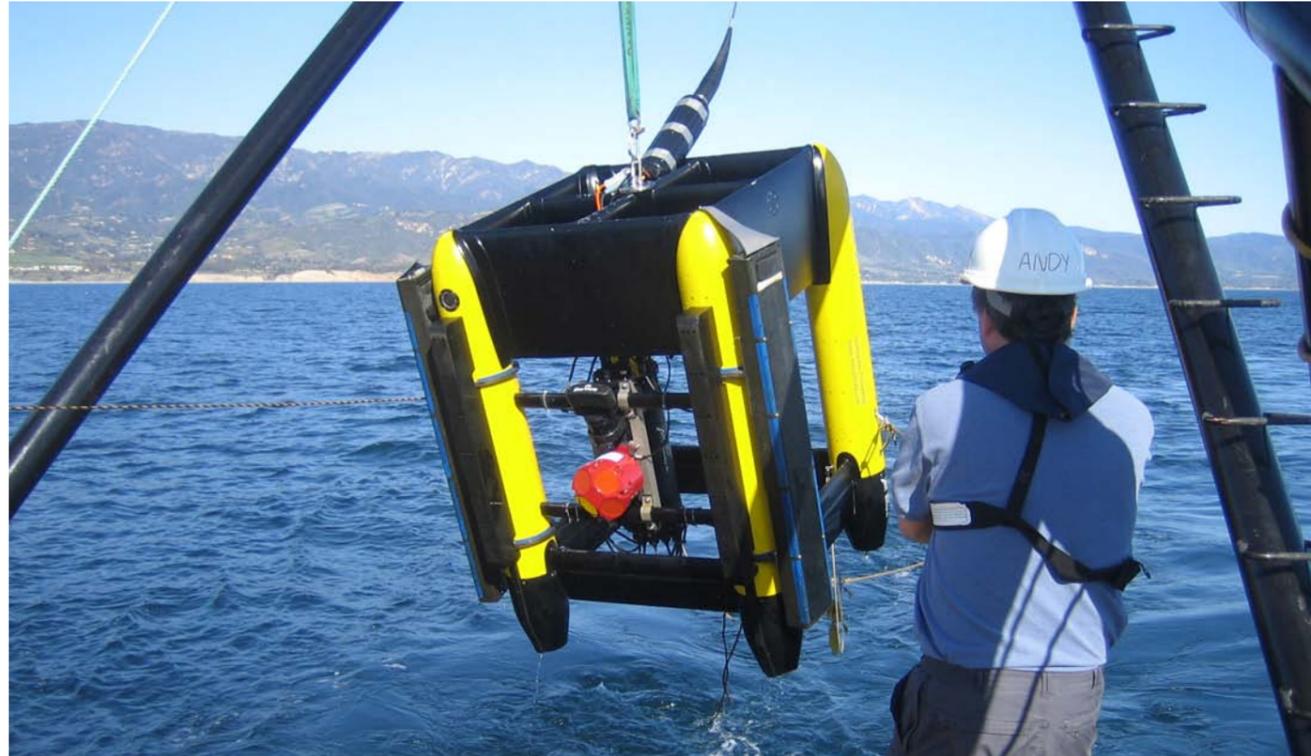
One of these ROV systems is currently being installed on Solstad Offshore's new vessel, the NORMAND PROSPER, which will be operating in Norwegian waters. This agreement was signed on the 23rd of March and IKM Subsea quickly tailored the topside equipment to suit the vessel.

All integration work is due to be completed by the 4th of May - just one month after the contract was signed, which shows IKM Subsea's ability to respond quickly to customer needs and requirements.

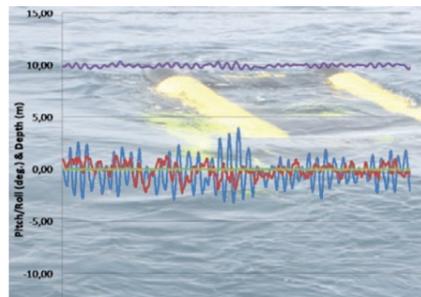
The first system has already been delivered to China and the next will soon be ready for delivery. Interest in the system has been brisk and Anders Dirdal, Manager for IKM Subsea, is optimistic about the future and is immediately starting a serial production of 4 additional systems.

MacArtney has delivered a large proportion of the instrumentation for these ROV systems, including multiplexer, camera and light systems, sonar equipment, slip ring and umbilical. MacArtney is proud to be part of this leap in ROV technology and will cooperate with IKM on future systems.

# Stable SAS sonar platform



The precision of sonar survey results depends as much on the stability of the vehicle as it does on the quality of the sonar systems mounted on it.



Towing stability at 10 metres auto depth at a speed of 3 knots. Pitch is shown in blue and roll is shown in red. The purple line shows the preciseness of the maintained depth. ▲

The stable vehicle platform allows for highly accurate sonar images. ▼



AUVs are normally used to provide the stability required but recent surveys in the Gulf of Mexico using Applied Signal Technology's PROSAS Surveyor based on the MacArtney FOCUS-2 platform proved that the stability necessary for excellent precision and resolution can also be provided by the MacArtney FOCUS-2 ROTV.

### Accuracy is essential

Surveys by sonar systems are excellent methods for tracking underwater pipelines and objects, checking pipeline and underwater equipment condition and integrity and for locating unwanted objects on the sea floor, such as mines.

Such surveys are reliant on precision and high resolution to provide accurate and reliable results.

### Engineered stability

Pinpointing and identifying objects lying on the sea bed require a combination of quality equipment and a stable platform.

Unlike other SAS Sonar systems, the PROSAS Surveyor is based on an ROTV

platform rather than an AUV. AST chose the FOCUS-2 ROTV by MacArtney because of its excellent stability in the water.

It provides that positioning precision needed to locate objects just inches in size across the entire sonar sweep and can be programmed to precisely follow the seabed or a pre-set path.

Dr. John Pesaturo, Vice President of AST's Sensor Systems Division, said, "We were very pleased to successfully introduce our PROSAS Surveyor synthetic aperture sonar (SAS) system into the pipeline inspection application using MacArtney's FOCUS-2 ROTV.

In the past, SAS was thought of as a tool that required the stability that only an AUV could offer. MacArtney has proven that this is no longer the case.

The reliability, stability, and ease of use of the dynamically controlled FOCUS-2 has allowed us to establish our high definition sonar capability as tool of great value to survey companies and their clients."

# MacArtney Group news



**MacArtney UK**  
David Buchan  
Managing Director  
United Kingdom

The first quarter of 2010 has shown a dramatic improvement in business activity in the UK and it looks like we will see that continue. March 2010 was our best order entry month for over 1 year (roughly double our target) and reflects the increased activity in the ROV and renewable energy sectors.

We welcome some new members of staff since the last issue, Catherine Wilson Drawing Technician, Yasmeen Ali QHSE Supervisor, Barrie Hay Item Sales Supervisor, Martin Buchan Trainee Fibre Optic Technician and Daniel Cook Pressure Test Technician.



**EurOceanique**  
David Mazzochi  
Managing Director  
France

The defence and renewable energy markets look very promising for EurOceanique this year, with interesting potentials for complete and complex cable systems.

The workshop is busy as ever and we are now offering new services: fibre optics (testing, assemblies and repair) as well as the mounting of stress terminations.

We are also pleased to announce the recent delivery of a fully integrated ROV system dedicated to dam inspections in France and Switzerland. The ROV delivery also included integration of a DIDSON and MS1000 sonars.



**MacArtney Norway**  
Anders Andersen  
Managing Director  
Norway

With the spring and an oil price USD\$ 80+ projects that had been on hold for the last 12-18 months have been restarted. We recently delivered a Focus 2 system with new sonar technology to DOF, which completed the work in half the planned time with extremely good data. We see the Focus 2 as the best towed vehicle for data collection with high sensible sonar and sensor technique.

On the 1st of June, MacArtney Norway will commence building their new 2,500m<sup>2</sup> purpose designed facility, including workshop, fresh water tank and 3000 metre depth pressure tank.



**MacArtney Benelux**  
Ron Voerman  
Managing Director  
The Netherlands

After an extensive rebuild that has taken 4 months, MacArtney Benelux has moved into new facilities and is ready for the future.

Besides new offices and more space for our activities we also took the opportunity to install a new telephone system, servers and tools for the workshop.

There are still minor things that need to be finalised but I'm very pleased with the result and the extra space we now have.

Of course everybody is welcome to visit us in our new facility; Mandenmakerstraat 188, Hoogvliet.



**MacArtney Offshore**  
Chris Howerter  
Managing Director  
United States

Business has picked up this year as our products prove themselves in the Gulf Coast market, in particular our launch and recovery systems and subsea telemetry products.

We are pleased to see our new API certified line of connectors are already in use on two deepwater drilling rigs as part of the subsea BOP control system.

We will be welcoming a new sales engineer in May. He will manage our systems sales group.



**MBT GmbH**  
Torsten Turla  
Managing Director  
Germany

From 7th-10th May 2010 we will hold the first sea trial of the TRIAXUS for the Federal Institute of Fisheries on RV Walther Herwig.

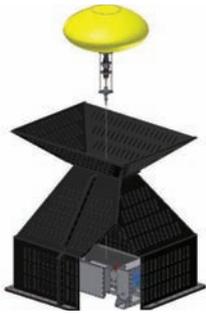
DIDSON has also been very successful – the Landesfischereiverband Westfalen recently purchased their second system with us. We have also sold our first deep water DIDSON system to the Alfred Wegener Institute investigating Antarctic krill populations.

We showed our demo ROV system at two exhibitions, the German Dam Symposium and the Underwater Technology Workshop The ROV system received great attention.

# Latest news in brief

Read the full story on [www.macartney.com](http://www.macartney.com) under the “news” section

## Underwater winches to ensure sonar data quality



A range of factors in a water column influences the accuracy of sonar readings. To ensure that they are as precise as possible, they need to be calibrated to suit the exact conditions. A new system of underwater winches equipped with CTDs from MacArtney

will measure conditions every 30 minutes, report those readings to computers based onshore in order to maintain the quality of sonar data.

## New ARIS sonar combines higher resolution and smaller size



The MacArtney Group is pleased to announce the European launch at Oceanology 2010 of the new Adaptive Resolution Imaging Sonar, ARIS, manufactured by Sound Metrics Corporation.

The ARIS is a new in the DIDSON sonar range and boasts better resolution, improved electronic capabilities, higher operating frequencies, lighter weight and lower power consumption.

## Hard Anodised Aluminium SubConn® connector now a stock item



In response to the continued success of MacArtney's recent addition to the range of SubConn® connectors, the Hard Anodised SubConn® Connector is now held as a stock item. Specially treated to resist cathodic de-bonding, the hard

anodised aluminium is stronger than other non-conductive materials and can have a longer life. They have extended the range to include versions of almost every connector type.

## New multiplexer handles multiple channels on existing copper cables



New multiplexer handles multiple channels on existing copper cables Handling online information from a large number of underwater instruments often requires fibre optic multiplexers and cables. MacArtney has

developed a new type of multiplexer. This new electrical multiplexer, the NEXUS MK E, transfers online data on existing coax type, side scan sonar and CTD cables.

## Meet us in person on our stands at these exhibitions



**All Energy 2010**  
Aberdeen, UK  
19<sup>th</sup> - 20<sup>th</sup> May 2010

Meet us on stand B40



**Energy Ocean 2010**  
Ft. Lauderdale, Florida  
8<sup>th</sup> - 10<sup>th</sup> June 2010

Meet us on stand 50