

# CASE STUDY

## LYNX Technik Explores the Ocean with Deep Sea Research

LYNX Technik was approached with an interesting application...to provide a fiber transmission and conversion AV solution from the sea floor to the sea surface. The technical request came from GEOMAR Helmholtz Centre for Ocean Research Kiel, one of the leading marine science institutions in Europe. GEOMAR investigates the chemical, physical, biological, and geological processes in the oceans, as well as their interactions with the seafloor and the atmosphere.

Fiber communications cable is an integral part of the control of deep diving robots that are being launched from a ship. Up to 10 km on single-mode fiber optic cable in the case of modern research vessels.

### The Challenge

One of GEOMAR's major challenges was to transport and carry the signals across several deep-sea connectors and sub-sea winch & slip ring systems. The situation even meant transporting signals through pressurized oil-filled compartments where the connectors were housed.



Images courtesy of GEOMAR

### Equipment List

#### yellobriks on the ship

**ODT 1540**  
RS232/422/485 and GPI Fiber Transceiver - CWDM

**OET 1540**  
Ethernet to Fiber Transceiver (Switch) - CWDM

**ORR 1802**  
Dual 3Gbit Fiber Optic to SDI Receiver

**OTR 1442**  
4K Fiber Transmission System

Rack frame and redundant power supplies

#### yellobriks underwater

**ODT 1540**  
RS232/422/485 and GPI Fiber Transceiver - CWDM

**OET 1540**  
Ethernet to Fiber Transceiver (Switch) - CWDM

**OTT 1842**  
Dual 3Gbit SDI to Fiber Optic Transmitter - (CWDM)

**OTX 1742**  
Analog Sync / Video Fiber Optic Transmitter (CWDM)

Rack frame and redundant power supplies

## The Solution

A key reason why GEOMAR opted for the LYNX Technik yellobrik fiber solutions was the large optical power budget of the equipment, which gave them the necessary leverage to transport the signals across great distances. A crucial aspect to optical network distance is Optical Power Budget: the amount of light provided to make a fiber optic connection work properly.

GEOMAR was also looking for a maximum amount of flexibility in the system since they use many different ships; each time they have to integrate the LYNX Technik equipment to the cable infrastructure during a short stay in port or even at sea.

GEOMAR is using the LYNX Technik solutions for deep-sea telemetry for connecting and monitoring a variety of content from various remotely operated underwater devices with cameras such as ROVs and towed instruments like video sleds. The underwater devices provide live video streaming and internal recording from commercial high definition and analog cameras as well as simultaneous data transmission from a suite of sensors.

Using this combination of equipment and the deep-sea vessels, GEOMAR has an automated communication process by which measurements and other data are collected at remote or inaccessible points and transmitted to receiving equipment for monitoring, live streaming, or recording.

The GEOMAR Media Technology team operates robotic deep-sea vessels equipped with HD and SD cameras, sensors, as well as a variety of LYNX Technik yellobrik fiber transmission solutions. The deep-sea footage and data is transmitted via the fiber optic cables to its ship-based research team for monitoring, analyzing, recording and streaming.

The transmission of video content from the deep-sea floor has been quite poor in the past, however GEOMAR's telemetry system now provides high quality video transmission due in part to readily-available and high quality network and broadcast quality components, such as those from LYNX Technik's yellobrik signal processing line. Accurate and high-quality, high-resolution video and data is a critical component to GEOMAR's applications and projects.



## 4K Ready



GEOMAR is using the yellobrik OTR 1442 self-contained fiber transmission kit for the transport of 4 discreet SDI signals (or 4K / 12G uncompressed) over a single fiber link. The kit includes the fiber transmitter, fiber receiver and power supplies. This solution is ideal for the transmission of multiple uncompressed SDI streams up to 20km with zero loss. This kit is 4K-ready, opening up a straight forward upgrade path to 4K that GEOMAR is currently preparing.

## yellobrik Fiber Solutions

GEOMAR opted for the yellobrik multi-function CWDM compatible fiber transceivers to extend RS232, RS422, RS485 and GPI signals over fiber. In addition, they use Ethernet to fiber transceiver switches with CWDM support for extending the reach of electrical Ethernet signals over long distances.

The SDI to Fiber Optic Transmitters and receivers send SDI signals from the remotely operated deep-sea devices over fiber and are received by the ship-based research control room. All yellobrik transmission solutions in this application support CWDM with up to 18 selectable CWDM wavelengths.



**“What we most appreciated about the LYNX approach was the clear description of product capabilities, detailed customer support and the ability to try out units even before purchase. We also received outstanding support during integration. The units really do what the label says.”**

*---Dr. Peter Linke, Scientific Head  
Technology & Logistics Centre (TLZ),  
GEOMAR*

LYNX Technik's partner and authorized dealer in Germany, LOGIC media solutions made the introduction between GEOMAR and LYNX Technik. The decision to move forward with LYNX Technik solutions for the deep-sea telemetry applications was based mostly on LYNX Technik's reputation of providing exceptionally high quality and rugged solutions with consistently solid customer service and support.

More information on the LYNX Technik signal processing solutions can be found at:

[www.lynx-technik.com](http://www.lynx-technik.com)  
[www.yellobrik.com](http://www.yellobrik.com)  
[www.green-machine.com](http://www.green-machine.com)