BlueComm is a through-water wireless optical communication system, developed to transmit subsea data, stream video and perform tetherless vehicle control at very high speeds. The BlueComm modem family is currently made up of three variants. BlueComm 100 is optimised for shallow water ‘high ambient light’ operating environments and offers a good balance between data rate and range. BlueComm 200 sends data at up to 12.5 Mbps and is suitable for deep or night time operations. The dual laser configuration of BlueComm 5000 supports data transfer rates of up to 500 Mbps.

**TECHNOLOGY OVERVIEW**

BlueComm uses the electromagnetic spectrum rather than acoustic pressure waves to transmit high volumes of data. Typically operating in the 450nm Blue Light region of the spectrum, BlueComm can achieve data rates of greater than 500 Mbps. Optical data transmission is highly efficient, enabling 1 Gb of data to be transmitted with the energy contained within a single lithium D-sized cell over distances greater than 150 metres.

As a high speed communication platform, BlueComm is an Ethernet connected device allowing plug-and-play connectivity to clients’ own subsea networks. As such, this allows for easy expansion of pre-existing networks, increasing productivity by increasing speed. Its flexible system architecture, means that BlueComm can be integrated with Sonardyne’s comprehensive array of acoustic navigation, control and monitoring devices.

Complementary Sonardyne acoustics communications provide long range (>4 km), low bandwidth command and control. This capability enables functions such as data recording to be turned ‘on’ and ‘off’ remotely from the surface, and health or QC information to be transmitted.

BlueComm 100 uses an array of high power light emitting diodes (LEDs) that are rapidly modulated to transmit data. The receiver uses photodiodes allowing peak performance in all lighting conditions, including very shallow ‘high ambient light’ conditions. Both the receivers and emitters are packaged into a small 5 kg unit rated to 4,000 metres. Delivering 5 Mbps at 10 metres range, BlueComm 100 is a short range, highly reliable solution.

**WHAT YOU NEED TO KNOW**

- 1-500 Mbps rates achievable
- Up to 150 metre operating range
- Depth ratings to 4,000 metres
- Enables fast and efficient data recovery via AUV, ROV or surface deployed dunking system
- Integrated long range acoustic communications and positioning
- Highly energy efficient communications provides long battery life
- Compatible with standard subsea Ethernet networks
- Can be integrated with long range acoustic communications and positioning systems
BlueComm 200 also uses an array of rapidly modulated LEDs but has a separate photomultiplier tube as its receiving element. The photomultiplier tube allows a much more sensitive receive capability allowing communication ranges of up to 150 metres. Due to the sensitivity of the photomultiplier receiver, the emitter is packaged separately to prevent interference. BlueComm 200 is excellent as a long range remote to ROVs.

BlueComm 5000 uses two rapidly modulated off frequency lasers to produce simultaneous bi-directional communications. The equipment is optimised for peak data transfer performance with transfer speeds of 500 Mbps being achievable. BlueComm 5000 is excellent at large data offloads from deployed sea bed nodes or fast ‘fly-by’ data collections by field resident AUVs.

**BLUECOMM SUMMARY SPECIFICATIONS**

**BlueComm 100**
- **Light Source**: LED, integrated Transmitter and Receiver
- **Range**: 10 metres maximum
- **Bandwidth**: 1-5 Mbps data transfer rates
- **Operating Scenario**: Optimised for all lighting conditions
- **Optics**: Custom beam patterns and wave lengths
- **Communications**: Ethernet connected

**BlueComm 200**
- **Light Source**: LED, separate Transmitter and Receiver
- **Range**: 150 metres maximum
- **Bandwidth**: 1-2.5 Mbps data transfer rates
- **Operating Scenario**: Optimised for maximum range
- **Optics**: Custom beam patterns and wave lengths, White light emitters to prevent ROV lights from interfering with transmission
- **Communications**: Ethernet connected

**BlueComm 5000**
- **Light Source**: Dual laser based
- **Range**: 7 metres maximum
- **Bandwidth**: Up to 500 Mbps data transfer rates
- **Operating Scenario**: Optimised for fastest data transfer
- **Optics**: Focused beam pattern
- **Communications**: Ethernet connected

**Options and Accessories**
- Subsea network cameras
- In-sync light sources
- Subsea networks switches
- External battery packs
- Integrated acoustic positioning and telemetry
- Data loggers

BlueComm is a wireless, high speed optical communications technology that can transfer data underwater at broadband speeds. Data rates of 500 Mbps can be achieved.

System monitoring: Diagnostic software allows the status of a BlueComm communications link to be monitored and optimised in real-time.
AvTrak Modem
USBL Acoustic Tracking System
AvTrak Modem
BlueComm Modem
Lowered AvTrak Modem
Acoustic Comms
Bidirectional Optical Comms
Seabed Structure
Inspection ROV
Seabed Lander
Remote Camera and Lighting
Remote 'eyeball'
BlueComm can be used to provide a remote ‘eyeball’ on specific subsea operations removing the need for a second ROV. Complementary acoustic positioning and communications provides long range command and control of the camera and optical link including wake-up, pan, tilt, zoom, lighting and sleep mode control functions.

Dual Perspective Video Inspection and Monitoring
A BlueComm based video lander system allows a cost-effective second video perspective providing HD video streams and lighting to aid complex well intervention procedures.

Data harvesting and control
High speed wireless communications are not just useful for controlling ROVs and AUVs. Wherever there is a subsea application requiring control, monitoring or the point-to-point transmission of data, ‘going wireless’ is now a credible alternative.

Cutting the tether
As water depths increase, conventional ROVs and their associated tether, launch and recovery systems need to be larger and heavier, requiring larger and more expensive vessels. BlueComm can eliminate the need for such tether cables, offering a new degree of freedom in underwater robotics.

AUV Data Collection
BlueComm allows autonomous vehicles to wirelessly communicate with seabed structures retrieving high volumes of data while still maintaining an acceptable safety stand-off distance.

Tetherless Vehicle Command and Control
BlueComm allows a high bandwidth link to an untethered vehicle making difficult ROV manoeuvres simpler. The link is capable of returning all control data as well as multiple video streams across an area of over 7 million cubic metres.

EXAMPLE BLUECOMM APPLICATIONS

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