

Department of the Navy SBIR/STTR Transition Program

Statement A: Approved for Release. Distribution is unlimited.

Topic # N131-060

Subsea Long Haul Optical Transponder

The David Ross Group

WHO

SYSCOM: NAVSEA

Sponsoring Program:

Transition Target:

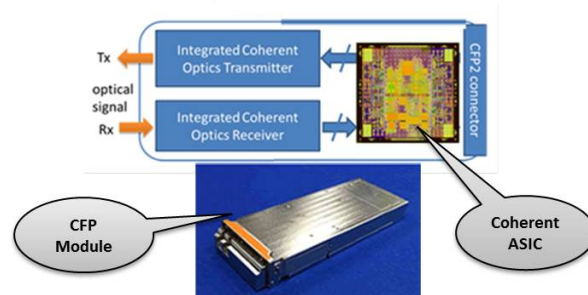
TPOC:

(805)982-2643

Other transition opportunities:

This product would be of interest to a variety of organizations. Within the DoD, ONR and SPAWAR are potential transition opportunities. Commercially the Offshore Oil & Gas Industry and recently emerging deep-sea mining industry are likely partners. In the science community, sponsors of ocean science and observatories such as the National Science Foundation, the National Oceanic and Atmospheric Administration, and Oceans Observatory Initiative would be interested in this device.

10Gbps Coherent Transceiver Implementation



Courtesy of Menara Networks,

WHAT

Operational Need and Improvement: Information Dominance depends on persistent accumulation and analysis of regionally captured intelligence, surveillance and reconnaissance data. Current concepts recognize the benefits of maximizing the utility of deployable, persistent, undersea fiber infrastructures. Proposed undersea operations have identified the need for ocean floor node data transmission. The current gap is in achieving the desired bidirectional data rates at increased distances while minimizing power requirements which are orthogonal to the focus of the commercial telecommunications industry.

Specifications Required: Compatible with Long Haul (9000km) Undersea Trunk Systems, with Bi-directional communications to and from trunk branched subsea Mission Sensor Nodes with Small Form and Fit, Low Power Consumption, High Reliability, and Interchangeability.

Technology Developed: 10 Gigabit per Second (Gbps) Low Power Coherent Transceiver Data Rate: 10 to 12 Gbps, State-of-Art 64 Gigabaud per Second Analog to Digital (ADC) and Digital to Analog (DCA), Configurable Digital Signal Processing (DSP) Core, Selectable Modulation Formats: Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK) for increased capacity, Low Power Consumption: < 15 Watts, Polarization Diversity, Electronic Polarization Mode Dispersion (PMD) and Chromatic Dispersion (CD) Compensation: 190,000 picosec, and 9 -11 dB Soft Decision Forward Error Correction Net Coding Gain (NCG)..

Warfighter Value: >Forward sensor data from subsea mission node to a remote command and control center over long distances, improving operational space awareness.

>Undersea network enabling multiple subsea geographically diverse asset communication and coordination.

>Enable temporary or backup GPS reference frames for asset navigation.

WHEN

Contract Number: N00024-15-C-4001 **Ending on:** September 30, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Technical Design Development	Med	Preliminary Design Review	2	December 2015
ADC / DAC Test Chip Development	Med	Completion of Test Chip Files for Fabrication	3	June 2016
Coherent Module Receiver and ASIC Tapeout	Med	Receiver Module Design Package and Review at CDR	3	December 2016
Prototype Models of Coherent Transceiver	Med	Prototype Units Available for Test	5	September 2017

HOW

Projected Business Model: Our business model for the 10Gbps Coherent Transceiver is based on manufacturing the unit with our partner for direct sale to organizations with a need. The high cost of entry in producing the Digital Signal Processor and the associated ASIC limit the ability to license the technology. We would expect sales in the 100s to 1000s of units annually.

Company Objectives: Manufacture the 10Gbps Coherent Transceiver for direct sales to interested parties using our partners existing marketing and distribution channels, as well as their product support.

Potential Commercial Applications: Potential commercial applications for the 10Gbps Coherent Transceiver include the Offshore Oil & Gas Industry and recently emerging deep-sea mining industry. Both of these industries are expanding the use of deep sea automation, monitoring, and control to improve efficiencies, and this product assists in the objective.

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