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Eagle-1 Optical Modem

EAGLE-1 OPTICAL MODEM FOR OPTICAL GROUND STATIONS

The Celestia Eagle-1 Optical Modem is optimized for the Eagle-1 QKD satellite. It handles the high-speed classical optical communications between ground and space, and is designed for integration into optical ground stations. The Modem is compatibility tested with the Eagle-1 flight terminal. The system can be delivered with an Optical Front End with a receiver and/ or multiple tunable seeds with programmable skew.

The Eagle-1 Optical Modem serves as the counter-terminal for the Eagle-1 satellite. The19-inch rack -mountable unit is designed for optical ground stations and can be configured with or without an Optical Front End that houses the laser transmitters and the optical receiver. The hardware and firmware are optimized for communication with the Eagle-1 flight terminal, utilizing a common data-handling framework. Built-in features such as FEC and ARQ help prevent data loss, while the optical receiver incorporates a fade-mitigation mechanism that compensates for rapid fades.

The Eagle-1 Optical Modem is designed to be seamlessly integrated with the customer's systems. External transmitters and receivers can be accommodated. Remote control is supported, and a local GUI can also be accessed directly or through Windows® Remote Desktop.

The Eagle-1 Modem is agnostic to the data being transmitted and received: User data is not interpreted by the Modem and is provided on a separate LAN interface that connects to the user's ingress/ egress system.

KEY FEATURES

General

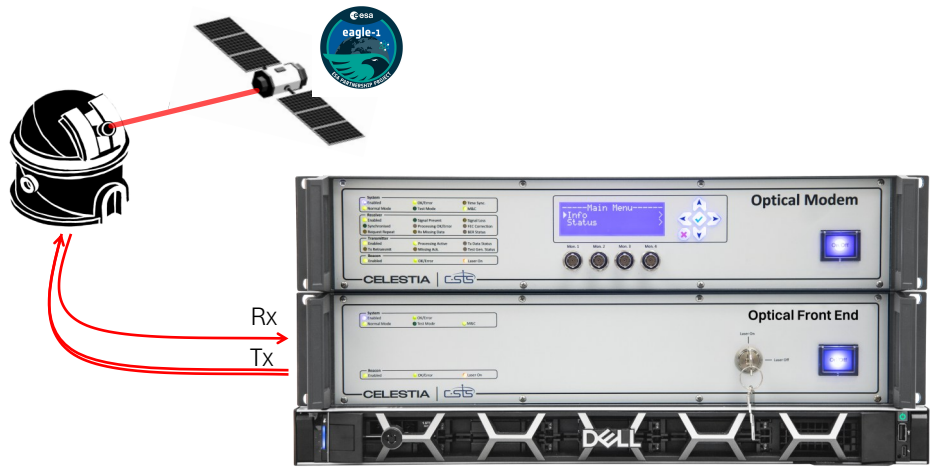
- Eagle-1 specific Optical Modem
- Standard compatibility: SDA 2.1.2
- Multiple optical Tx outputs with programmable skew
- Powerful receiver for very low optical input powers
- FC/APC input and output bulkhead connectors
- Gigabit LAN for data ingress/egress
- Control and Monitoring software included

Data Processing

- Hardware processing of digital bitstream from optical receiver
- Bitstream decoding, FEC decoding and data extraction
- Internal BER test data generation: PRBS or custom from file
- Internal loopback tests: optical and electrical

EAGLE-1 OPTICAL MODEM

The modem is connected to the optical ground station telescope via fibre and optical Tx and Rx data is received/ transmitted, and processed directly by the Modem. The system can be configured with multiple optical Tx outputs with programable skew. The outputs are on the same channel, and are normally configured with a slight wavelength offset from one another.



Optical Front End (OFE) for Optical Modems

- Electrical to optical converter: Multiple tunable optical Tx outputs with programmable skew
- Optical to Electrical converter: Powerful receiver for very low optical input powers
- Control and Monitoring via Ethernet
- Adjustable squelch
- RSSI output
- Uplink / Downlink wavelengths and data transmission/reception rates as per EAGLE-1

C-STS Data Management

- C-STS Control and Management
- Ingest Platform
- Logging
- Data Access

The modem is compliant to the EAGLE-1 Optical Free Space Interface Control Document (ICD) for the European Commission (EC) EAGLE1-STS-TE-ICD-0087 Issue D and Ground Terminal Interface Control Document for the European Commission EAGLE1-00746-SYS-ICD-TCO Issue 1.0.

Interface to Telescope (with Optical Front End)	Single Mode Fibre, Multi Mode Fibre	**Dimensions H x W x D**	133 x 448 x 500 mm
Baud Rate	Up to 10 Gbits	**Weight**	<15kg
Monitoring Interfaces	4 x BNC ports	**Input Power Range**	100 - 240VAC 50 - 60Hz
Control Interfaces	Gigabit Ethernet	**Operating Temperature**	+10°C to +40°C
Compatibility	SDA 2.1.2, EAGLE-1	**Operating Humidity**	30% - 85% (non-condensing)
10G TCP/IP Data Offload	SFP+ Optical or Copper	**Storage Temperature**	-10°C to +60°C
Dimensions Optical Modem H x W x D	133 x 448 x 500 mm (Dimensions are indicational only)	**Storage Humidity**	Up to 85% (non-condensing)

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Scan the QR code to access the C-STS website for all data sheets and more information

Datasheet version 2.0