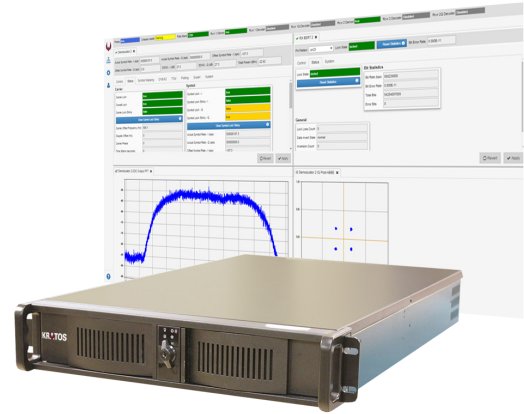




# OpenSpace quantum Mission Receiver (MR) - Optimized for Wideband Operations



The OpenSpace quantumMR is a complete software defined radio with an all-digital processing chain for high performance and pass-to-pass configurability

As satellites deliver more high bandwidth data to the ground, there is a need for the infrastructure on the ground to be more scalable, cost-effective, and agile to respond to changing mission needs.

Capitalizing on the benefits of virtualization and cloud technologies, Kratos has developed OpenSpace® a family of solutions that enable the digital transformation of ground systems to become a more dynamic and powerful part of space network.

The OpenSpace quantum Mission Receiver™ (MR) is an appliance based payload data receiver specifically designed for earth observation and remote sensing missions.

The quantumMR is a complete software defined radio with an all-digital processing chain for high performance and pass-to-pass configurability.

The wideband receiver is robust, full featured and supports virtual architectures by embracing standards such as Vita-49 and CCSDS.

OpenSpace quantumMR offers the following benefits:

- Downloads wideband earth observation and sensing data
- Provides high performance and pass-to-pass configurability
- Upgrade in the field or add new features through software downloads
- Easy to access with web based GUI
- Offers lights out operation

The OpenSpace quantumMR capabilities include:

- Ability to support standard carrier tracking, demodulation, bit synchronization and digital processing of dual, independent Intermediate Frequency (IF) signal inputs at transmission rates adjustable up to 1.5 Gbps.

## Key Features

- Dual receiver chains
- Tunable, independent IFs
- Direct-PSK and DVB-S2
- BPSK, QPSK, OQPSK, 8PSK, 16QAM, 16/32 APSK, MSK
- DVB-S2 CCM and VCM

## Applications

- Remote Sensing
- DVB-S2 Reception
- Earth Imaging
- System Test

## Platform Benefits

- >40K MTBF
- Dual 1GbE & 10GbE
- Redundant Power Supplies
- Hardened OS
- CE Compliant

## Optional Features

- Test Modulator
- Error Vector Magnitude

- Offers a rich feature set for single missions or ones that span a wide range of science, remote sensing, or commercial communication applications with the support of industry standards like DVB-S2 and CCSDS.
- Supports downlink processing of BPSK, QPSK, 8PSK, 16/32APSK, 16QAM and MSK signals. The mission receiver supports symbol rates from 10 Msps to 500 Msps for direct PSK Modulation signals and 10 Msps to 500 Msps for DVB-S2 signals using CCM and VCM schemes.
- Provides demodulation processing that is supplemented by bit synchronization, Pulse Code Modulation (PCM) code conversion, digital filtering, and adaptive signal equalization for transmission optimization.

- Supports Forward Error Correction (FEC) options including Viterbi and Reed-Solomon (RS)
- Provides an industry leading modular architecture that allows for field upgradability via software download.
- Delivers a user-friendly GUI hosted on any commercial browser avoiding heavy, client software.
- Flexibly supports different demodulation and processing schemes and, unlike legacy analog implementations, requires no calibration.
- Provides soft-programmable implementation allowing for new capabilities to be installed without the need to return the system to the factory.
- Includes TCP/IP interfaces for monitor and control.

## Modem Specifications

### Waveform Processing

- Dual, Independent Channel Processing Chains
- Tunable IF Frequency: 2400MHz +/- 325MHz; 720 +/- 200 MHz; 1200MHz +/- 325MHz
- Modulation Capabilities: BPSK, QPSK, SQPSK, 8PSK, 16/32 APSK, 16QAM, MSK
- Symbol Rates:
  - PSK: 10Msps to 500 Msps x 2 channels
  - DVB-S2: 10Msps to 500Msps x 2 channels
- FEC Capabilities:
  - Convolutional: Single, Dual (I&Q), Stacked (Parallel) up to 8, Convolutional Interleaving
  - Reed-Solomon: CCSDS, Block Interleaving, Randomization up to 8, and unlimited Virtual-Fill
  - DVB-S2 LDPC (All MODCODS)
- Matched Filtering
  - Raised Cosine, Root Raised Cosine (0.2 to 1.0)
- Fully Complex Adaptive Base Band Equalization (ABBE)

### Data Processing

- Programmable Frame Syncs for Independent Channels
- CCSDS Frame Processing (VCU/UPID)

### Baseband Data Interfaces

- 1GbE Output Data (VITA-49 Packets), RJ45
- 10GbE-T Output Data (VITA-49 Packets), RJ45

### Control and Status Interfaces

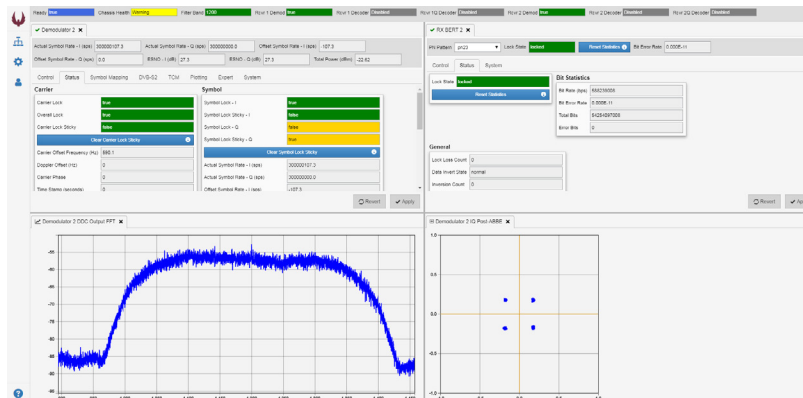
- Web-Based (HTML-5) GUI
- TCP/IP interface GEMS, REST via 1GbE
- Chassis Health and Status (Fans, Power-Supply)

### General System and Hardware

- Linux Operating System (Cent OS)
- Hot-swappable, Redundant Power Supplies for Easy Sustainment
- 2U Chassis (19 x 5.25 x 29)

### IA and Cyber

- STIG, DISA, NIST OS Hardening Available



View the performance of OpenSpace quantumMR through any web browser any-time and any place.



OpenSpace® is a family of solutions that enable the digital transformation of ground systems to become a more dynamic and powerful part of space network. OpenSpace supports a variety of customer paths, goals and business models. OpenSpace SpectralNet serves as the on-ramp

to digital transformation of ground systems, reliably converting and transporting RF spectrum to IP. The OpenSpace quantum products are individual virtualized network functions that replace traditional hardware. The OpenSpace Platform delivers a fully dynamic, service oriented, and orchestrated approach for ground operations.

