



# OpenSpace Platform: Enabling Next Generation Earth Observation and Remote Sensing Satellite Services

## Deliver Services Faster and more Cost-Effectively at Scale

With the increasing amount of information being collected and transmitted from the current and next-generation of Earth Observation (EO) and Remote Sensing (RS) satellites, there is increasing pressure for ground systems to become more agile, cost-effective, and scalable.

The OpenSpace Platform is the first digital, fully virtualized and orchestrated satellite ground system that addresses the need for highly dynamic EO/RS services.

Whether bare metal or cloud hosted, OpenSpace efficiently uses servers to run the critical virtual network functions (VNFs) needed during a satellite pass to acquire signals, provide TT&C, download payloads and rapidly stand up new services for the next satellite. Smaller hardware footprints in ground stations mean power, heating and cooling savings.



## Digital, Virtualized, and Orchestrated

Within the OpenSpace Platform, all signal processing is performed on generic compute, as opposed to dedicated single-purpose hardware. This allows the OpenSpace Platform to leverage IT-standard tools, best practices, and technologies to deliver a secure and scalable EO/RS ground system.



Deploy and maintain with mainstream IT tools and training



Deploy services in minutes instead of weeks



Improve security with IT best practices

## Virtual Ground for EO/RS

The OpenSpace Platform orchestrates the applications required to download large volumes of data on the fly during the short time periods when satellites are over the ground system. Platform capabilities are configured for precise mission needs. Once a pass is complete the resources used are returned to the compute pool. This allows for greater operational control of when, and where, EO/RS workloads are executed.

By using generic compute in public or private cloud environments, the OpenSpace Platform allows customers to deploy EO/RS workloads in concert with their other IT systems, avoiding the use of purpose-built hardware that is more difficult to manage.



Works with most satellites and payloads



Reconfigures automatically for approaching satellites

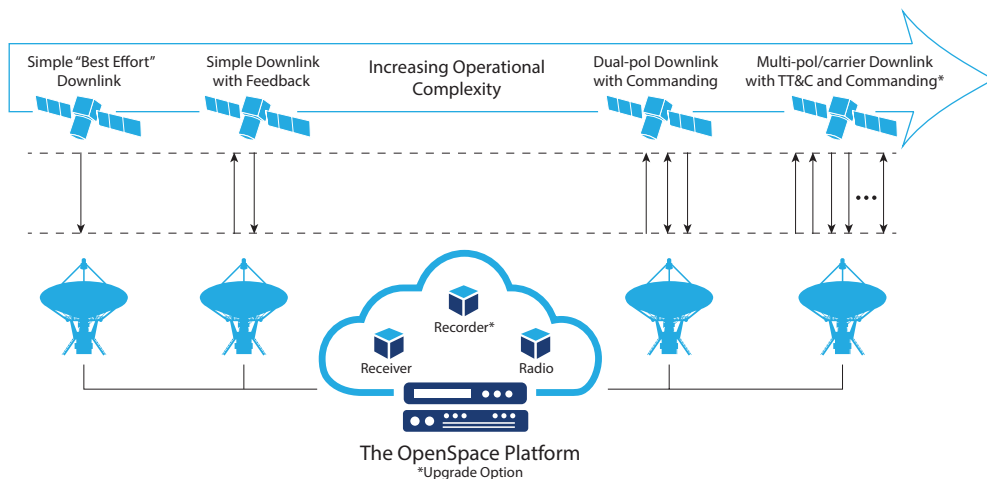


Works with any antenna and enables GSaaS for faster time to market

## EO/RS Use Cases

The OpenSpace Platform provides support for a diverse range of satellites and increasing payload complexity.

To deliver a service, ground stations with antennas for S-band, X-band, Ka or Ku-band or combinations of signals, may have multiple satellites per day attempting to downlink payloads.



From the simplest always streaming satellites to complex multi-pole X-Band downlinks with payload commanding and TT&C S-Band connections, the OpenSpace Platform orchestrates combinations of TT&C radio and wideband receiver applications connected to digitizers. Configured to receive and process signals during a pass, with the ability to re-use the digitizer and computing platforms to load pre-configured applications for each pass, OpenSpace saves time, reduces errors, and requires less hardware, without dedicating racks of modems that sit idle between passes.

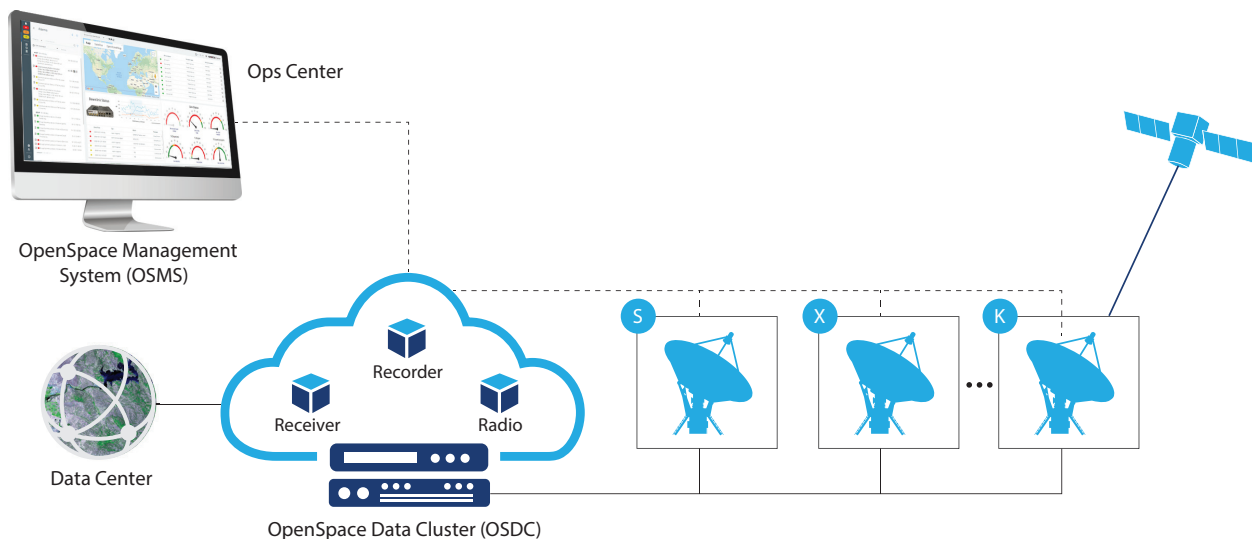
## OpenSpace Platform Architecture

The OpenSpace Platform is built on three core capabilities: fully digital and virtualized data processing, end-to-end network management and orchestration, and industry leading applications for signal processing.

### Fully Digital and Virtual Processing

The OpenSpace Platform's power is in orchestrating TT&C modems, wideband receivers, and other applications running on standard Intel x86 compute, with no additional FPGAs or GPUs required. Digitizers connected to antennas send VITA 49 Digital Intermediate Frequency Interoperability (DIFI) 1.0/1.1 streams to combinations of virtual functions for TT&C or wideband signal processing.

The OpenSpace EO/RS base package includes 1RU servers for the OpenSpace Management System (OSMS) and OpenSpace Data Cluster (OSDC), a 1 RF SpectralNet wideband digitizer, and a network switch. This small size, lightweight, power efficient combination of hardware can support up to 250 MHz of bandwidth digitized into VITA 49 DIFI compliant streams.



The OpenSpace Platform end-to-end digital ground system for EO/RS

### OpenSpace Key Features

- Highly compact - 4 RU combination of servers, digitizer and network switch
- Integrated OpsCenter NMS
- Software upgradeable for new features and maintenance
- Automatically reconfigures to process satellite passes
- Seamlessly extensible with additional servers and digitizers
- Supports redundant and highly-available configurations
- Available as a small footprint base package

### Network Management & Orchestration: OpenSpace OpsCenter

OpsCenter provides a user-friendly graphical user interface for managing network services and remote terminals. It enables operators to design, monitor and control (hardware and virtual functions), troubleshoot and report on services across the ground system. OpsCenter also offers extensive monitoring options and a rich set of REST-based APIs for integration of the OSS/BSS and customer specific workflows.

### OpenSpace Platform Features and Specifications

The fully digital and software-based approach of the Platform, allow deployments to be on-premise in a teleport or data center, or in a private/hybrid/public cloud environment.

| Specifications                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OpenSpace Management System</b> <ul style="list-style-type: none"><li>• Astro-compliant web-based user interface</li><li>• Configurable dashboards, monitoring and alarm systems</li><li>• Integrated M&amp;C for common gateway components</li><li>• Extensive REST-based APIs for OSS/BSS integration orchestration</li></ul> |
| <b>OpenSpace Data Cluster Node</b> <ul style="list-style-type: none"><li>• Up to 5 virtual functions per OSDC</li><li>• Maximum carrier size: 250 MHz</li><li>• Minimum 1 Gbps network</li></ul>                                                                                                                                   |
| <b>SpectralNet Wideband</b> <ul style="list-style-type: none"><li>• Up to 500 MHz Instantaneous Bandwidth</li><li>• Built-in channelizer supports up to two gateway feed services at 250 MHz each</li><li>• Can be extended to 2x500 MHz</li><li>• Fully DIFI compliant</li></ul>                                                  |

### For More Information

To learn more about the OpenSpace Platform please refer to these additional resources:

Website: [www.KratosDefense.com/EO](http://www.KratosDefense.com/EO)

Contact us: [www.KratosDefense.com/contact-us](http://www.KratosDefense.com/contact-us)