

# Ground Station in the Cloud



Innovations in satellite technology from multi-constellations, flexible payloads to space based payloads are driving the ground segment to keep pace with the changes in space. The ground station has remained fairly static over the last 20 years with a suite of support systems, highly specialized and proprietary equipment and a lack of flexibility for end users. The cloud offers the ground station the potential to become more agile and software defined to deliver on the promise of the new capabilities from satellites in space.

Kratos is at the forefront of enabling the movement of ground systems to the cloud by offering new and enhanced ground system products that capitalize upon the advantages of virtual and cloud-based architectures to help lower costs, increase efficiencies, enhance security and increase scalability in service offerings. From earth observation, remote sensing to geostationary communications there are a myriad of applications that can benefit from a cloud-enabled solution.

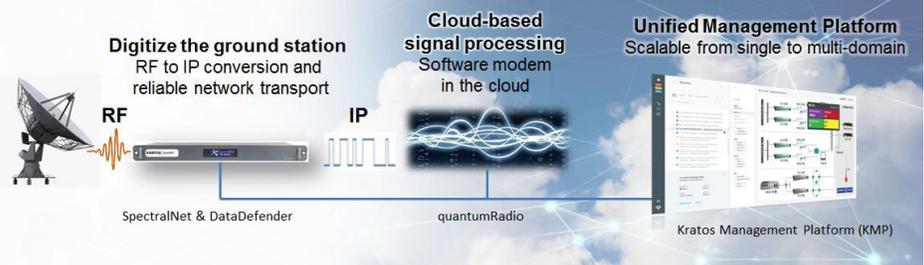
Kratos' virtual solutions are built following satellite ground radio standards, while leveraging new software technology and innovative approaches specifically designed to match the requirements, schedules and budgets of satellite communication programs in orbit. The cloud capabilities include digital IF as an on-ramp to the cloud, virtual transport solutions and multi-domain management.

## On-Ramp to the Cloud – Digital IF

The first step to the cloud enabled ground station is to digitize the RF signal to IP and transport it in an assured manner to overcome any issues from the TCP/IP network (e.g. – latency, jitter). SpectralNet and DataDefender, work together to provide a trusted on-ramp to the cloud for satellite data. SpectralNet digitizes the signal and transports RF over IP networks, preserving both frequency and timing characteristics. Data Defender assures reliable transmission over impaired network links and overcomes the challenges that packet-based TCP/IP sometimes brings to real-time RF streams.

## Signal Processing in the Cloud

The second step is to process the signals in the cloud, in other words, move from traditional RF analog equipment running on proprietary hardware to purely software defined applications running on generic compute. A great example is Kratos' quantumRadio, a proven high performance, scalable software modem for TT&C and data applications that can be run in a virtual cluster or in the cloud.



Key technologies enabling the ground station in the cloud.

## Multi-Domain Management

Another imperative is to move away from the silos in the ground station to a more centralized approach. Today the ground station uses multiple management tools that do not communicate to monitor the various domains – like the network, VSAT systems and carriers. The Kratos Management Platform (KMP) is cloud enabled and will allow multi-domain management across network equipment, RF signals and VSAT equipment. Network Management is the first module of KMP with more coming in the near future. KMP will enable the ground station to develop analytics across all operations to create new insights and opportunities to reduce costs and improve operational efficiency.