

Total Control Over Small Satellite Constellations

quantumFleet®

KRATOS



The popularity and success of small satellites has created new opportunities for sizeable small satellite constellations, and as these constellations grow so does the complexity and demand for the Command and Control (C2) system.

Kratos leveraged its 25 years of satellite TT&C experience to design and develop quantumCMD C2 system specifically for small satellites. And now Kratos offers quantumFleet, an out of the box software application designed specifically to coordinate multiple C2 systems, provide enterprise level management and consolidate mission awareness of on-orbit operations for a small satellite constellation. As a pre-integrated software application, quantumFleet is designed to work with Kratos' quantumCMD applications to provide the small satellite operations manager with complete control and situational awareness of numerous satellite contacts from a single user console. The pre-integration with the C2 system leads to a quicker turn-around to standing up fleet operations and the scalability to grow with the constellation.

Kratos quantum products employ industry standards such as Ground Equipment Monitoring Service (GEMS) and XML Telemetry and Command Exchange (XTCE) to streamline integration, reduce cost and dramatically shrink the time to full operation.

quantumFleet consolidates constellation-wide data and operations in a single web browser to provide top level ground and space awareness with drill down capability to detailed information just a mouse click away. Authorized users can monitor satellite contacts, investigate alerts or anomalous data, and even take action across all quantumCMD applications. Sharing of procedures, displays, databases, and other mission data enables the ground system to handle the larger constellations and automation allows for "lights out" operations through the management of scheduled actions for all contacts.

Everything Needed, All In One Box

quantumFleet is a purely software application designed to meet the situational awareness and management needs of a small satellite constellation. Architected to coordinate operations of multiple quantumCMD applications with enterprise-level functionality, quantumFleet out of the box functionality includes:

- Administrative and Security Services
 - Provides centralized user account management
- Data Synchronization Services

- Synchronizes data across multiple quantumCMD applications, including automation procedures, user displays, vehicle databases...
- Contact Scheduling
 - Scheduling and schedule-based automation of ground and space assets
 - XML schema defined for schedule enables ingest and updates from planning application
- Fleet-wide Automation
 - Manages automation across quantumCMD applications
- Fleet-wide Situational Awareness
 - Customizable user displays including data from any/all quantumCMD applications
- RESTful Interface
 - Industry standard used for integrating capabilities of quantumCMD into external ground systems

Flexibility to Meet a Variety of CONOPS

quantumFleet delivers a powerful tool designed to operate small satellite constellations of any size or mission while minimizing the cost and schedule of development and integration. Streamlining satellite operations is achieved through “lights out” capable automation, centralized system administration of user accounts, and well-defined interfaces for external source data sharing. Easily customized user displays with drill down capability provide situational awareness across the entire ground system and satellite fleet while integrated planning tools simplify resource assignments. All of which leads to reduced system setup, efficient operations, improved constellation awareness, and a Total Cost of Ownership well below traditional solutions.

Ready For What's Next

quantum is a complete small sat ground system package that includes the three major elements you need: Command and Control (quantumCMD) coupled with digital front end processing (quantumFEP) and RF signal processing (quantumRadio). quantum leverages our proven experience in RF and C2 solutions to develop pure software applications that are modular and extensible, a ready to use “out-of-the-box” solution.

Some small sat ground systems already have a C2 solution selected. Some are planning on using a third party ground network to provide signal processing and antenna resources. Whatever your preferred approach to communicating with your satellite or constellation, the modular elements of quantum are available to complete your ground system architecture:

- **quantumCMD** for command & control of single satellites up to large constellations. Manages contact scheduling and execution on all passes, provides a single portal for viewing all ground and space status and consolidates data, security, and system administration tasks.
- **quantumFEP** connects C2 systems to RF signal processing equipment - handling command and telemetry stream formatting, encryption/decryption devices, CCSDS processing, and network interfaces to either quantumRadio or third party ground antenna networks
- **quantumRadio**, the signal processing solution when you have your C2 and digital front end processing already covered. Supports a wide range of uplink/downlink frequency bands at low to high data rates.

Give us a call and let us show you how easily and quickly you can be ready to fly your satellite.

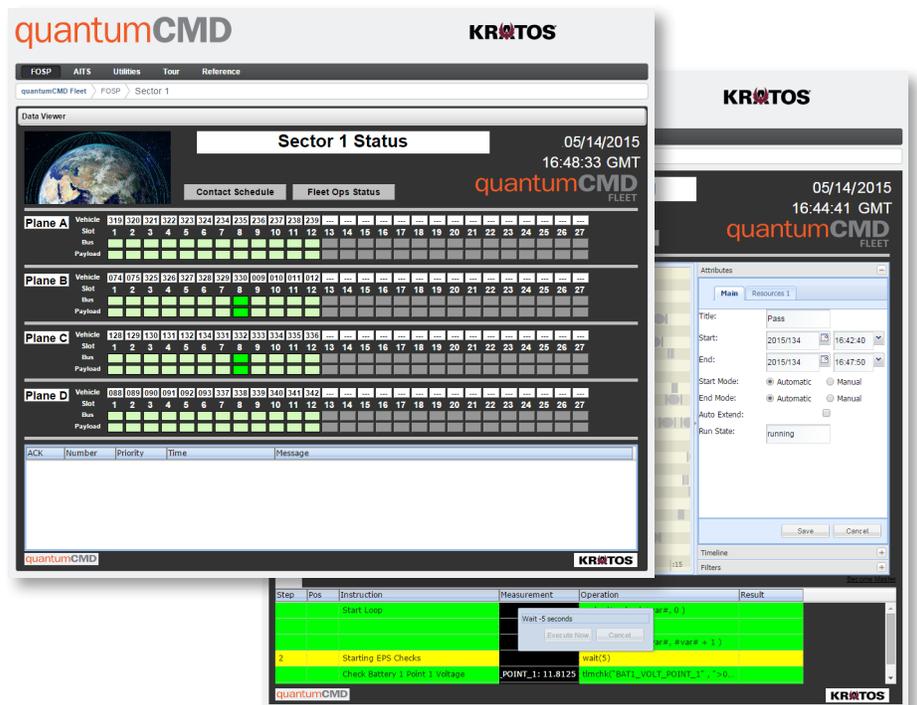


Figure 1: quantumFleet User Interface