



ADDING A MISSION TO THE JOINT POLAR SATELLITE SYSTEM (JPSS) COMMON GROUND SYSTEM (CGS)



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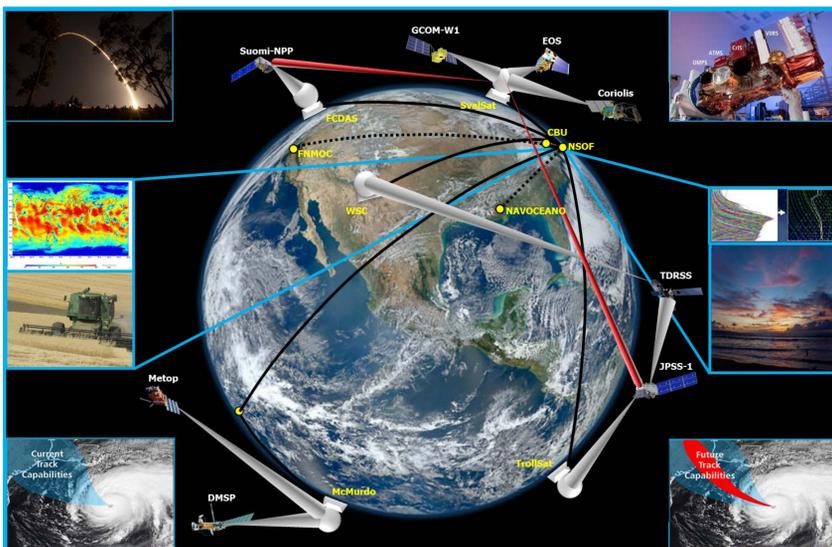


Figure 1. Multi-Mission Operations Concept.

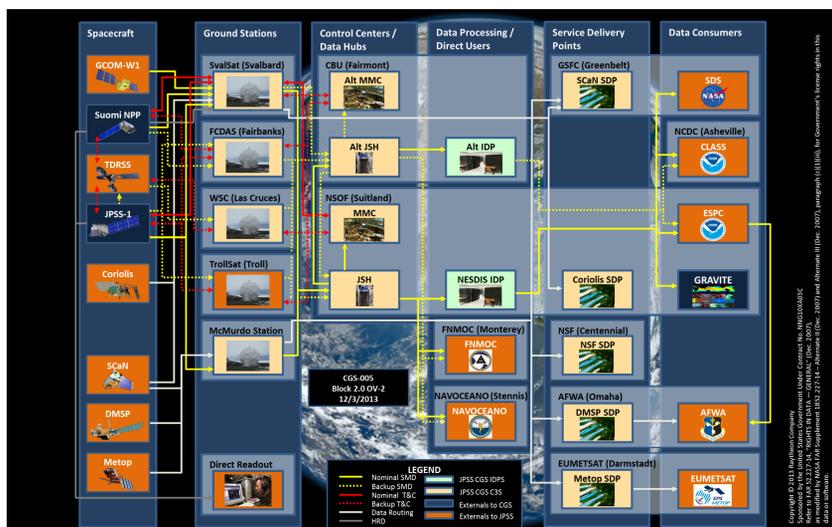


Figure 2. CGS Architecture

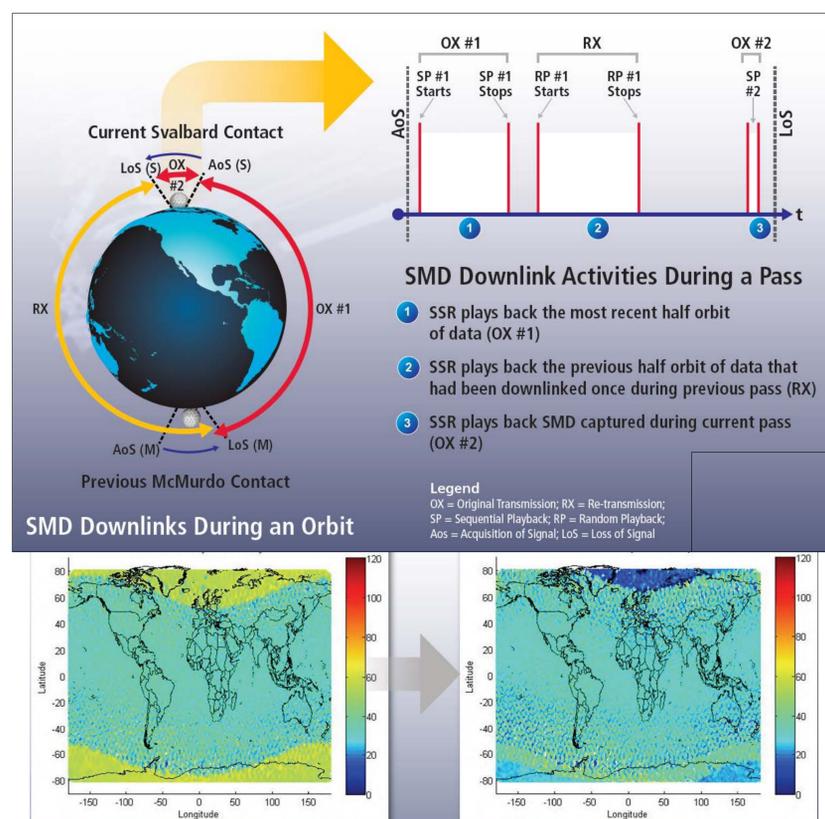


Figure 3. Block 2.0 ConOps Significantly Improves Latency.

Multi-Mission Support for Current and Future Systems

The Joint Polar Satellite System (JPSS) Common Ground System (CGS), developed and deployed by Raytheon Intelligence, Information and Services (IIS), manages and supports numerous missions, as shown in Figure 1. The CGS architecture is currently being upgraded to:

1. Support JPSS-1 launch in early 2017
2. Increase operational robustness
3. Leverage lessons learned in operations to date
4. Take advantage of newer technologies

The CGS provides three different types of services:

1. **Managed Mission Services:** CGS flies the satellite, manages mission resources, acquires and/or routes raw data, and generates and delivers data products
2. **Data Processing Mission Services:** Same as above, minus flying the satellite and managing the mission
3. **Data Acquisition and Routing Mission Services:** CGS acquires and/or routes the raw data

Figure 2 shows how these services are applied to multiple missions today and into the near future.

Through carefully crafted architecture and concepts of operations, along with our rigorous approach to Technical Performance Measures (TPMs), we are confident the upgraded system will continue to deliver excellent performance, as illustrated in Figure 3.

CGS Scalability for Adding Missions

Scalability is a key tenet of the CGS. Table 1 summarizes the CGS scalability requirements and associated architectural enablers. Figure 4 shows a level-deeper picture of the architecture, annotated with a mapping to the Joint Architecture Reference Model (JARM) and locations of CGS extension points for scalability. These extension points enable the addition of new missions to the CGS, and essentially serve as a “checklist” per each new mission, which has been demonstrated in expanded CGS multi-mission support to date.

For example, the addition of Data Acquisition and Routing support for DMS required the use of extension points 1 (configuration of CGS receptors at McMurdo) and 6 (connection to the service delivery point for the 557th Weather Wing). The addition of Data Acquisition and Routing support for Metop required the use of extension point 6 (connection to the service delivery point for EUMETSAT). The addition of Data Processing support for GCOM-W1 required the use of extension points 1 (shared antenna usage at SvalSat), 2 (routing to the NSOF for data processing), 4 (code to package the raw data into HDF) and 5 (delivery of the raw data to a local delivery point at the NSOF).

Table 1. CGS Scalability Requirements and Enablers

Mission Services	Baseline Support	Scalability Requirement	Architectural Enablers
Managed Missions	<ul style="list-style-type: none"> • S-NPP • JPSS-1 • JPSS-2 	<ul style="list-style-type: none"> • 2 Solar Irradiance Missions • DoD Weather Mission • JPSS-equivalent Mission 	<ul style="list-style-type: none"> • Scalable hardware • Virtualization • Mission-specific software slots • Global scalable WAN
Data Processing	<ul style="list-style-type: none"> • GCOM-W1 	<ul style="list-style-type: none"> • GCOM-W2 • GCOM-W3 • GCOM-C1 • GCOM-C-equivalent Mission 	<ul style="list-style-type: none"> • Scalable hardware • Virtualization • Global scalable WAN
Data Acquisition & Routing	<ul style="list-style-type: none"> • NSF • DMS • Metop • SCAN • Coriolis 	<ul style="list-style-type: none"> • Metop-equivalent Mission • POES-equivalent Mission 	<ul style="list-style-type: none"> • Scalable hardware • Global scalable WAN

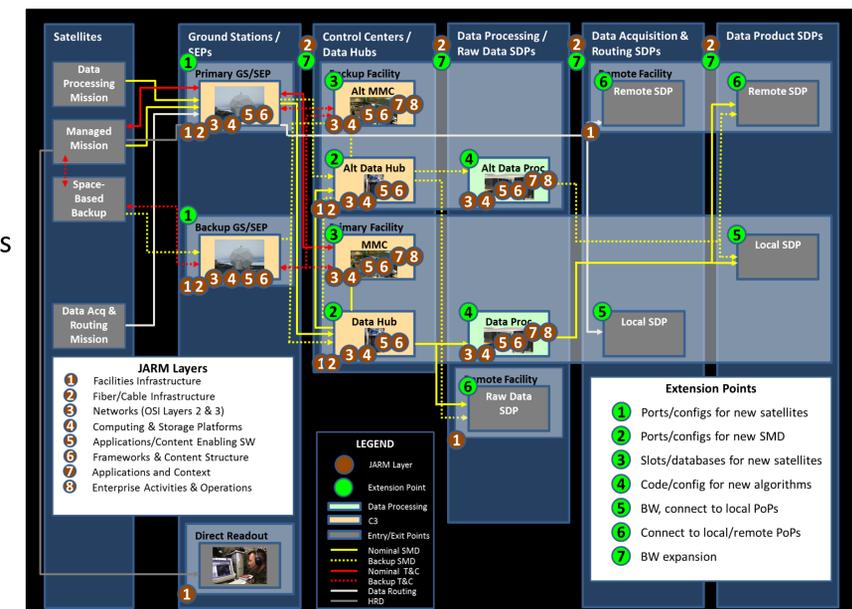


Figure 4. CGS Architectural Extension Points

Summary

The CGS provides support to multiple national and international missions today, and the processes used to build this portfolio can be easily extended to new missions in the future.