Joint Polar Satellite System (JPSS) Common Ground System (CGS)

Block 3.0 Communications Strategies

Shawn Miller
Kerry Grant
Kyle Ottinger

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Support to Multiple Missions in the JPSS CGS

- The Joint Polar Satellite System (JPSS) will contribute the afternoon orbit component and ground processing system replacing NOAA’s current Polar-orbiting Operational Environmental Satellites (POES)
  - The JPSS Common Ground System (CGS) provides command, control, data acquisition, routing and processing, and product delivery for the Suomi National Polar-orbiting Partnership (S-NPP) and future JPSS satellites
  - The CGS also provides support to a number of additional missions beyond S-NPP and JPSS
CGS Architectural Tenets for Block 2.0 (Operational in 2017)

- **Key Objectives:**
  - Increasing operational robustness for S-NPP
  - Leveraging lessons learned to date in multi-mission support
  - Taking advantage of newer, more reliable and efficient technologies
  - Satisfying new requirements and budgetary constraints

- **Architectural Tenets to meet the Key Objectives:**
  - System-wide technology refresh for enhanced performance and security
  - New front end architecture for mission data acquisition and transport
  - Enhanced modularity and flexibility in the Interface Data Processing Segment (IDPS) for new and evolving algorithms
  - Comprehensive situational awareness
  - Full backup capability for Continuity of Operations (COOP)
Ground System Support to Global Weather/Environmental Partnerships

- The CGS downlink locations (shown on previous chart and below) are a key architectural enabler for international partnerships.
- As an example, the CGS currently provides data routing for the Meteorological Observational (Metop) satellites from McMurdo Station in Antarctica to the EUMETSAT processing center in Darmstadt, Germany.
- JPSS leverages interagency and international agreements to collaboratively meet weather and environmental observation requirements. The NOAA/EUMETSAT partnership is covered by 3 separate agreements:
  - The Initial Joint Polar System (IJPS) agreement, covering Metop A/B and POES (NOAA N and N prime) satellites.
  - The Joint Transition Activities (JTA) agreement, covering Metop C, Suomi NPP and JPSS-1 satellites.
Animations of Operational Concepts

- The following 3 charts show video captures of iPad-based animations of operational concepts

- When these animations were developed, the plan was for 20-minute separation between S-NPP and JPSS-1

- The latest plan is to separate S-NPP and JPSS-1 by half an orbit to maximize science value

- For the latest official information and more visualizations, please visit https://svs.gsfc.nasa.gov/4430
JPSS CGS MultiMission Support
Nominal Concept of Operations for JPSS-1 Downlinks (McMurdo)
Alternate Concept of Operations for JPSS-1 Downlinks (TDRSS)
Future Potential Concept of Operations: JPSS and EPS-SG Satellites

The JPS agreement includes the sharing of data and ground system resources. One potential approach is illustrated below: JPSS satellites downlink via new EUMETSAT antennas at Svalbard and the National Aeronautics and Space Administration’s (NASA’s) Tracking and Data Relay Satellite System (TDRSS); and EPS-SG satellites downlink via existing JPSS receptors at McMurdo.
Summary and Conclusion

- First 5+ years of S-NPP Operations have been a success
  - Risk reduction for JPSS, but also generating products for operational weather forecasting today
  - Lessons learned that have flowed into our Block 2.0 architecture for the CGS, which further enables international cooperation

- Raytheon continues to work with NOAA to ensure future concepts of operations are fully supported by the CGS

- With this head-start on planning for Block 3.0 and beyond, the CGS can continue its successful support of this vital global partnership in weather and environmental monitoring