Joint Polar Satellite System (JPSS)
Features of Deployed Common Ground System (CGS)

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Accomplishments

- The State 1 (NPP on-orbit only) C3 and IDP Segments (Figure 1) have undergone extensive testing and were installed and transitioned to operations in 2007 and 2009 respectively.
- NPOESS Preparatory Project (NPP) Compatibility Tests for telemetry and command have been executed from the NSOF by operational personnel to flow data from the NPP Spacecraft at the Ball Aerospace and Technologies Corporation (BATC) factory (Figure 3) through to the NSOF.
- Stored Mission Data (SMD) has been recorded through the C3S Baseband and Preprocessor Equipment at the BATC factory from the NPP Spacecraft.
- Recorded NPP SMD has been transferred to Svalbard, played back through the Preprocessor at Svalbard through C3S JPSS WAN, processed by the Data Handling Node, and transferred to IDPS at NESDIS and AFWA for processing (Figure 4).
- System Testing has verified data throughput to the Centrals.
- C3S and IDPS State 2 (NPP, JPSS-1, DWSS-1 on-orbit) CGS development has started with the award of the JPSS CGS NASA Contract using State 1 as starting point (Figure 2).
- JPSS Distributed Receptor Network (DRN) work is underway (Figure 5) to support 2014 launch date.
- IDPS State 2 baseline delivers additional computing and storage and incorporates the algorithms to support the processing of JPSS and DWSS instruments (Figure 6).
- State 2 architecture supports near continuous flow of SMD from receptors: 1 contact per orbit for NPP and multiple contacts per orbit for JPSS and DWSS satellites.

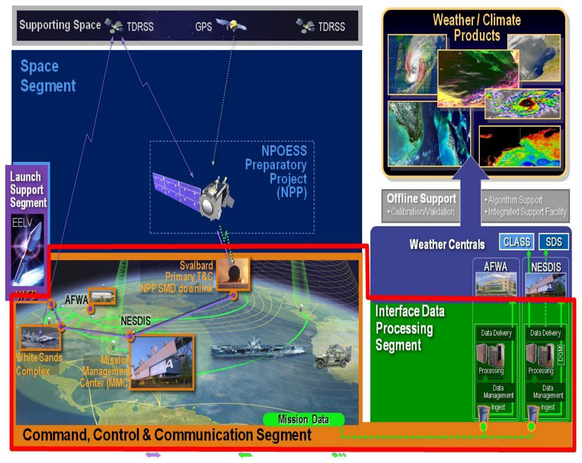

Figure 2 - State 1 JPSS System

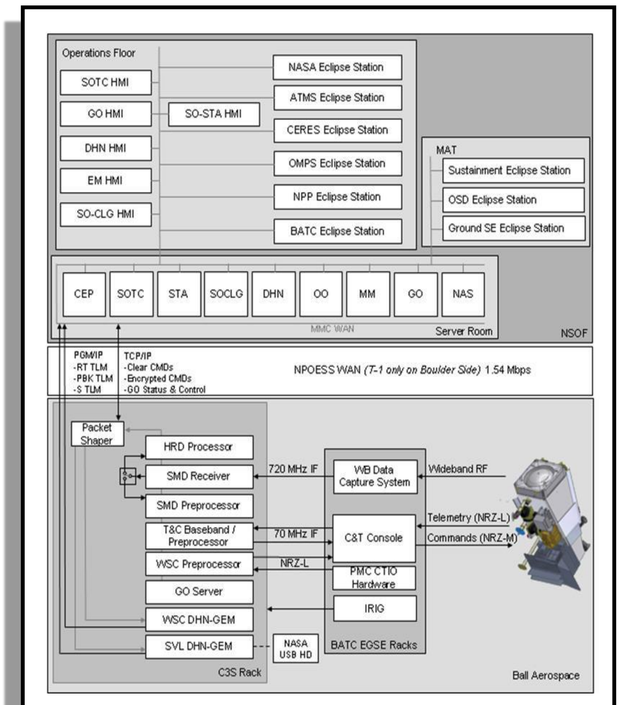

Figure 3 - NPP Data Generated at the BATC Factory

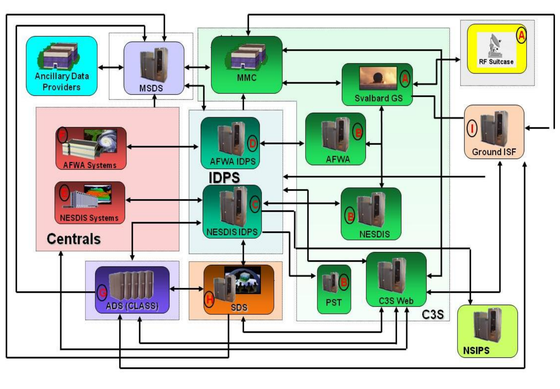

Figure 4 – NPP Data Flow

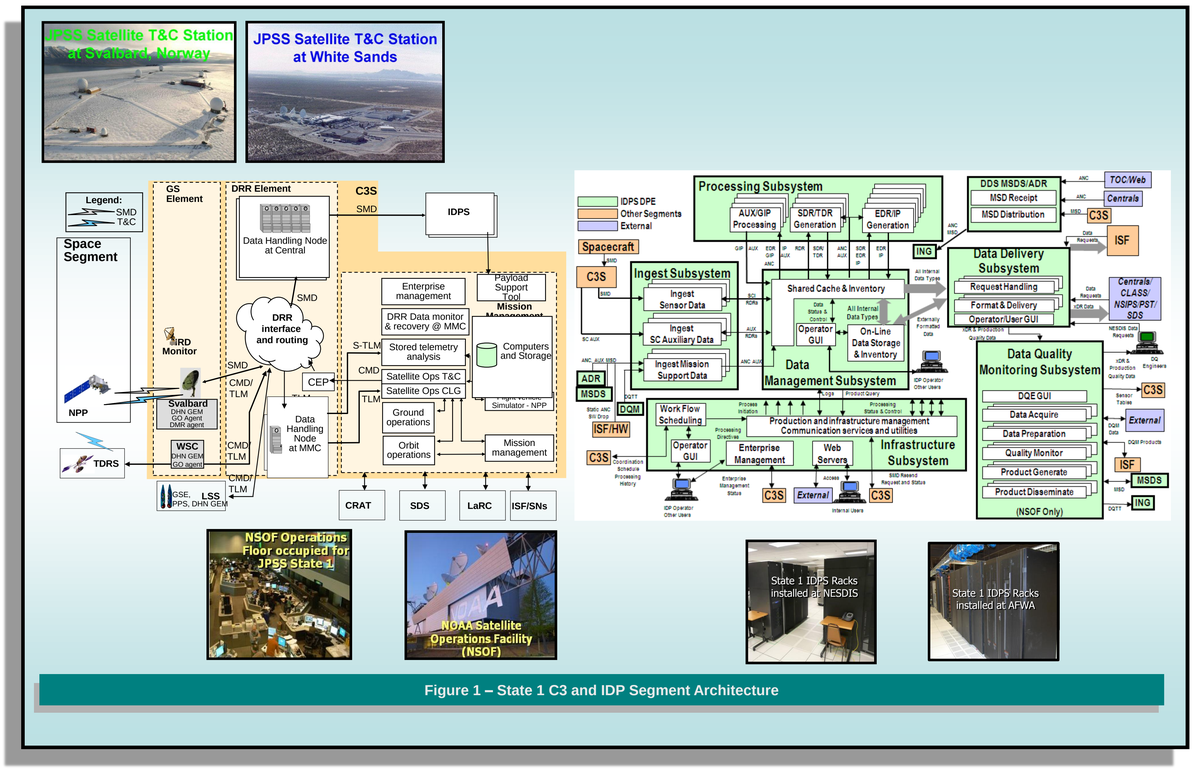

Figure 1 – State 1 C3 and IDP Segment Architecture

Figure 5 - JPSS Receptor Progress

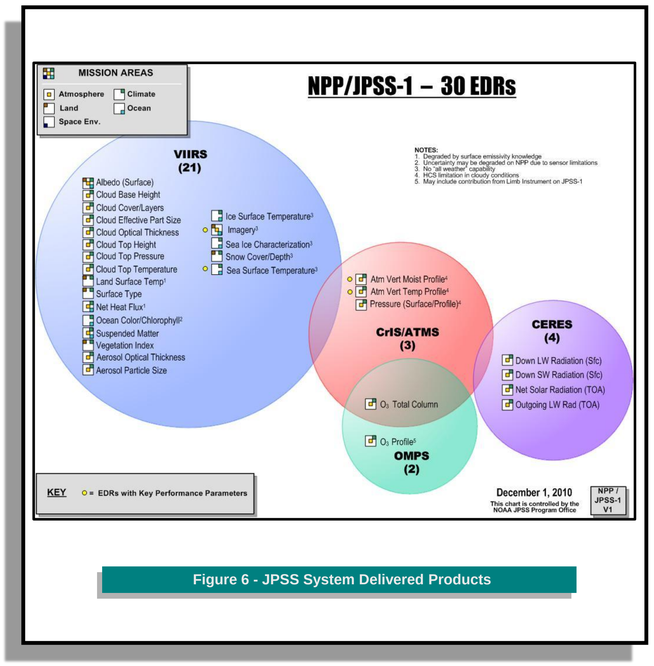

Figure 6 - JPSS System Delivered Products

Key Features of the Deployed C3S System

- Data latency of less than 30 Seconds from ground receipt of data to delivery to IDPS
- Operational Availability of greater than 99.9% with no single points of failure in critical SMD path
- SMD Data Availability of greater than 99.9% for delivery and recover of Science Data
- Modular and scalable architecture supports expansion for additional spacecraft
- Ground Station (GS) Element - provides space-ground connectivity
  - Svalbard polar GS for NPP T&C
  - Svalbard polar GS for NPP HRD
  - WSC for LEO&A, emergency backup, and NPP maneuvers
    - T&C only
- Data Routing and Retrieval (DRR) Element - provides reliable and secure data delivery
  - Local network infrastructure at each site and wide-area network for Svalbard and WSC
  - Data handling and front-end processing of SMD at each IDP Central
  - Front-end telemetry and command encryption processing at MMC
  - Recovers CCSDS APs in preparation for IDPS Ingest
- Mission Management Center (MMC) - provides insight and oversight of total operations
  - Provides tools necessary to effectively manage the State 1 Mission
  - Operations planning, monitoring, control, and reporting
  - Satellite and C3S ground resource management
  - Computer and storage infrastructure at each site

Key Features of the Deployed IDPS System

- The IDP Segment Supports
  - Ingest of pre-processed SMD via C3S
  - Production of RDRs, SDRs, TDRs, EDRs
  - Data Quality Monitoring
  - Product delivery to the Centrals
  - Product delivery to CLASS for archive
  - Product delivery to NASA Science Data Segment
  - Distributed IDP deployment at NESDIS and AFWA Centrals
  - Symmetric processor architecture
  - Product Granule size optimization
  - Load balancing fault management
  - DoD 5200 compliant Centrals interface
- Modular architecture supports additional spacecraft
- Configurable, expandable, modular software
- Expandable hardware
- Data driven architecture independent of time period of contacts – orbit based delivery (NPP)
- Data product latency of 70 minutes (includes queuing) for 90% of NPP data
- Data availability of 99.99% annually for NPP RDRs

SUMMARY

Deployed State 1 C3S and IDPS systems are supporting mission readiness and rehearsals.

NPP Spacecraft compatibility tests prove that the deployed system meets the processing and data distribution requirements.

C3S and IDPS are in development to meet the State 2 launch dates.