



# **JPSS Science Data Services for the Direct Readout Community**

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**AGU Fall Meeting  
December 15-19, 2014**

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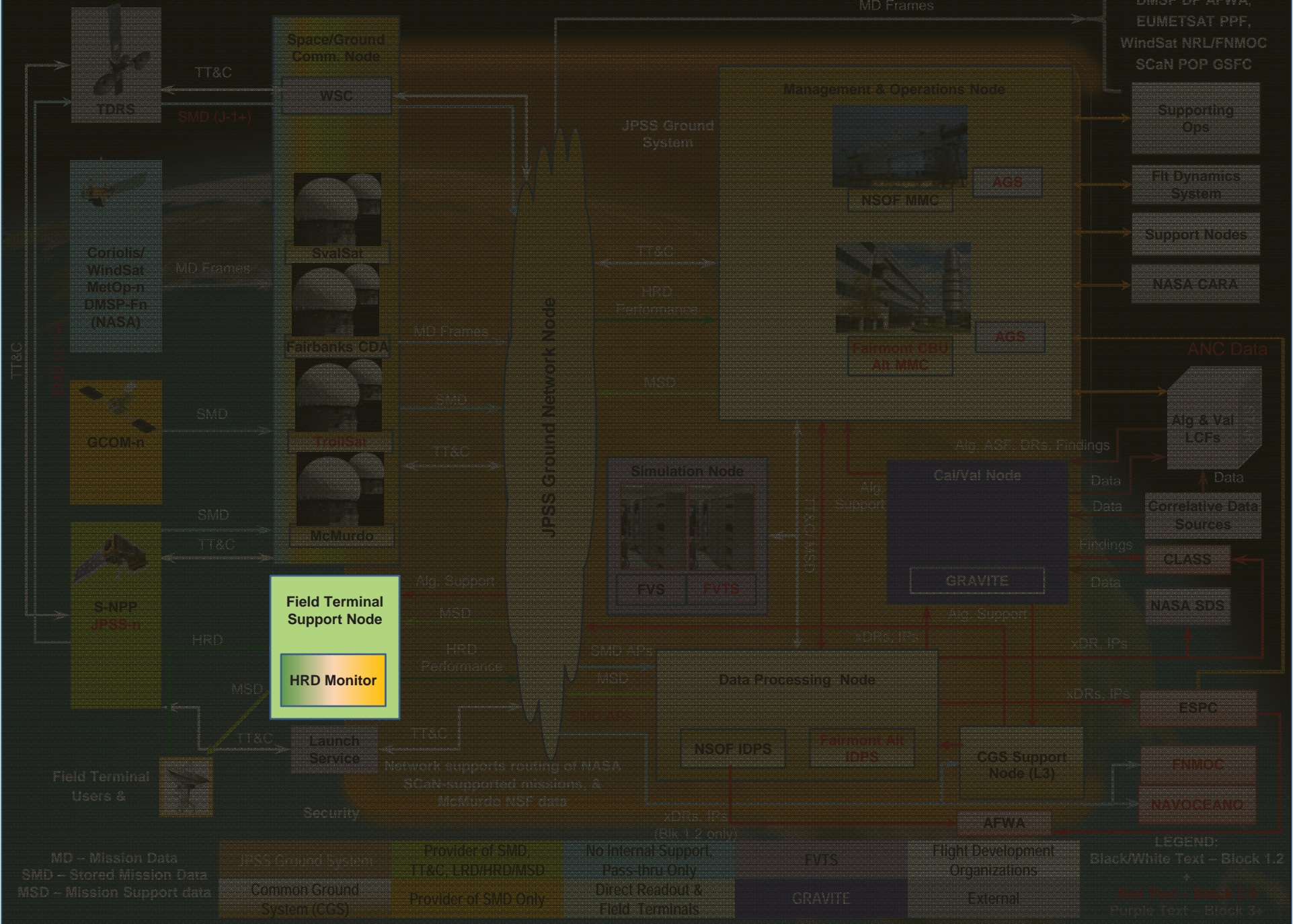
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# Agenda

- FTS Overview
- FTS Requirements and Functions
- FTS Logical Architecture
- FTS Key Milestones
- Progress to Date

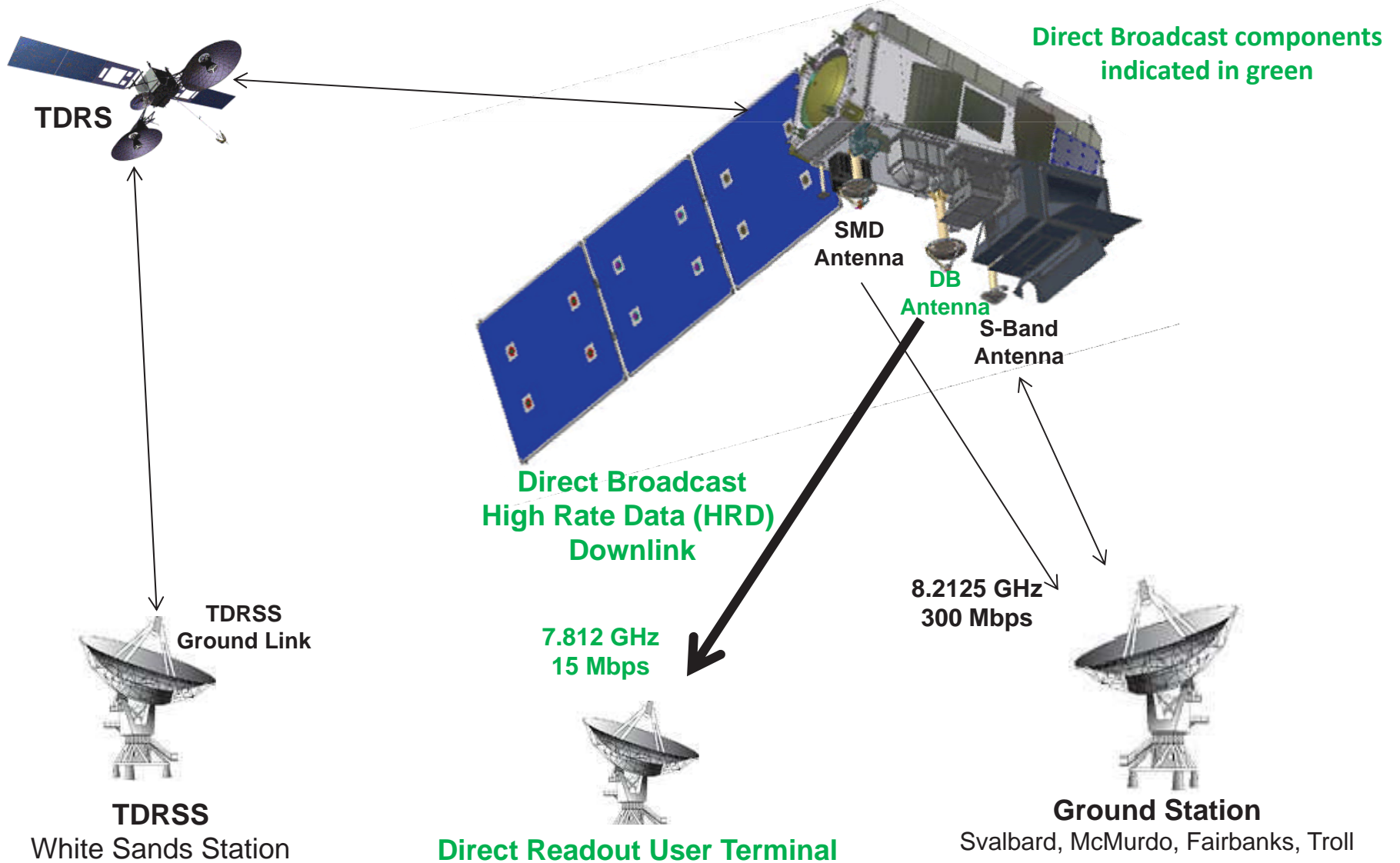


JPSS Ground System High-level Architecture OV-2 (Jul 14, 2014)





# Satellite Communication Links



# FTS Level 1 Requirements

- JPSS Level 1 Requirements Document (JPSS L1RD) provides the fundamental requirements and scope of JPSS FTS
  - JPSS-1 will provide HRD broadcast
  - JPSS-2 will provide HRD broadcast
  - ~~– JPSS-2 will provide Low Rate Data (LRD) broadcasts~~
  - JPSS shall provide the DR community with software, documentation, and periodic updates to enable them to produce data products from JPSS, using their own hardware to receive the JPSS HRD broadcasts
- The JPSS Program is not responsible for developing, testing, or deploying any JPSS capable field terminal
- JPSS will not perform encryption of the direct broadcast

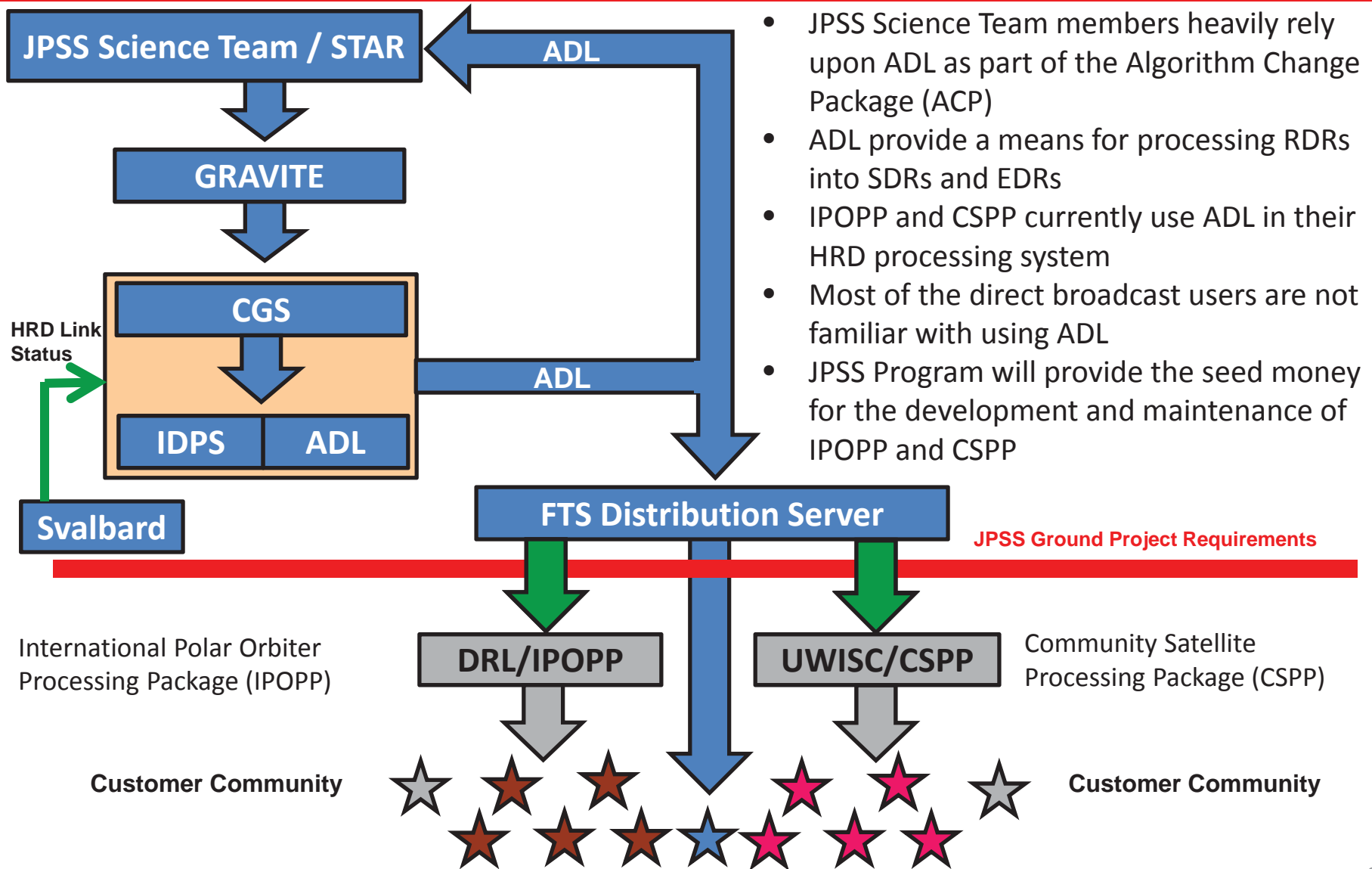
# Key Functions of FTS (1 of 2)

- Provide the following functionality:
  - Hardware Specifications
    - Suggested field terminal configurations
  - DFCB and RF-ICD
    - Containing specifics on direct broadcast data format
  - Software to produce RDRs from packets
    - Provide and maintain RT-STPS
  - Algorithms & Software
    - Used to create data products from direct broadcast
  - Updated algorithms & software
    - Notification when updates are available
  - Mission Support Data
    - Ancillary/auxiliary data

## Key Functions of FTS (2 of 2)

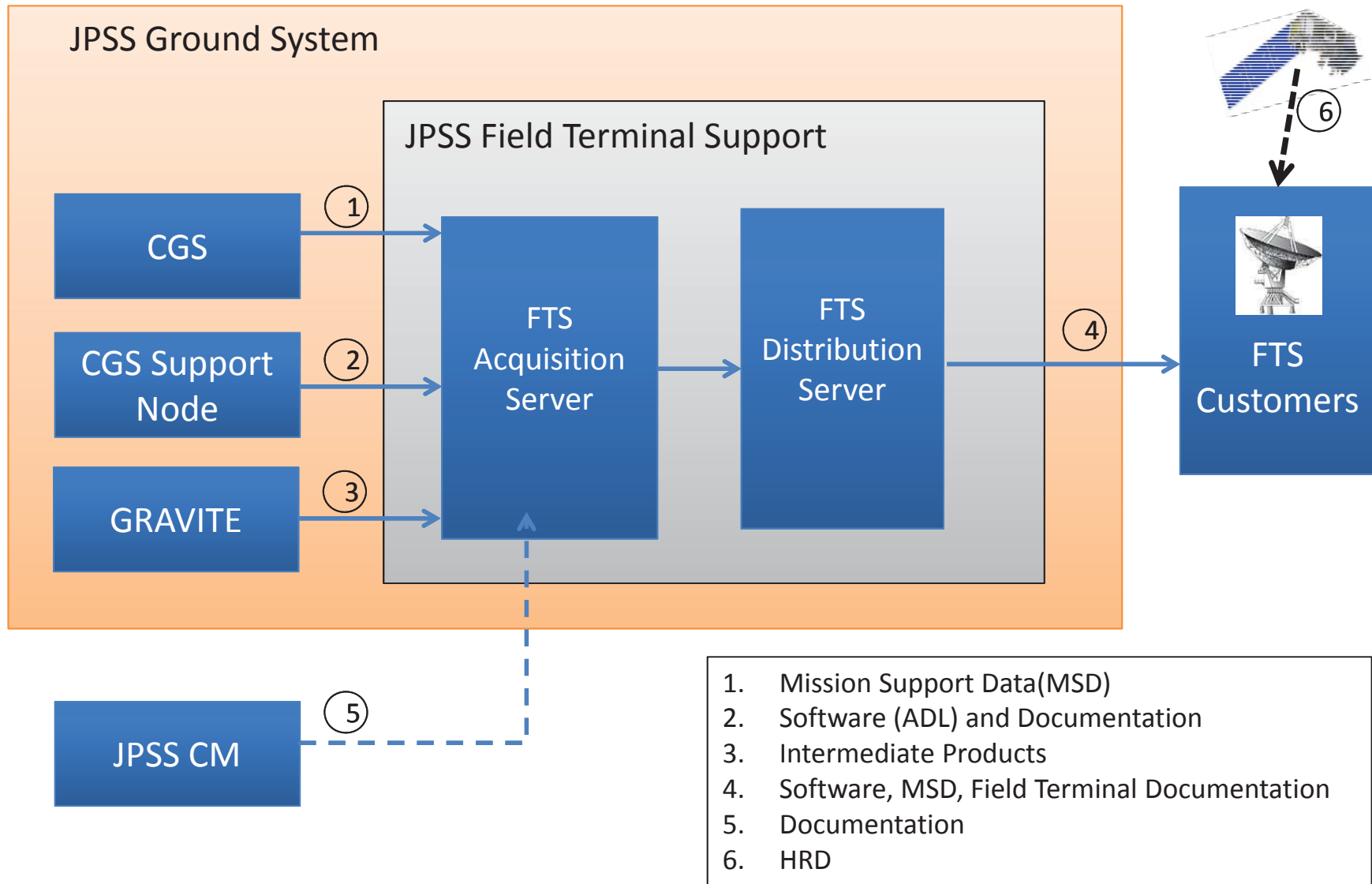
- Provide the following functionality (cont'd):
  - Maintain list of registered users
    - Condition for NTIA Frequency allocation approval
  - Mission status
    - Users are provided status of the JPSS direct broadcast
  - HRD Link status
    - Users are provided post-pass performance information
  - On-orbit checkout and special tests
    - Gather feedback from FTS community
  - User community prioritization of the HRD link
    - Provide feedback to the Program
  - Promote the use of the JPSS data products from HRD link

# Algorithm Development Library (ADL) Centerpiece of FTS Implementation

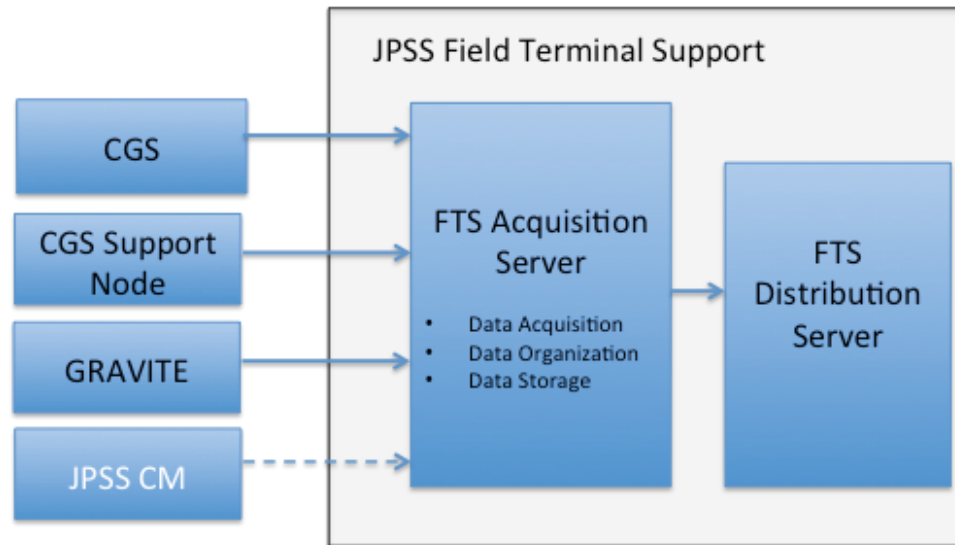




# FTS Logical Architecture

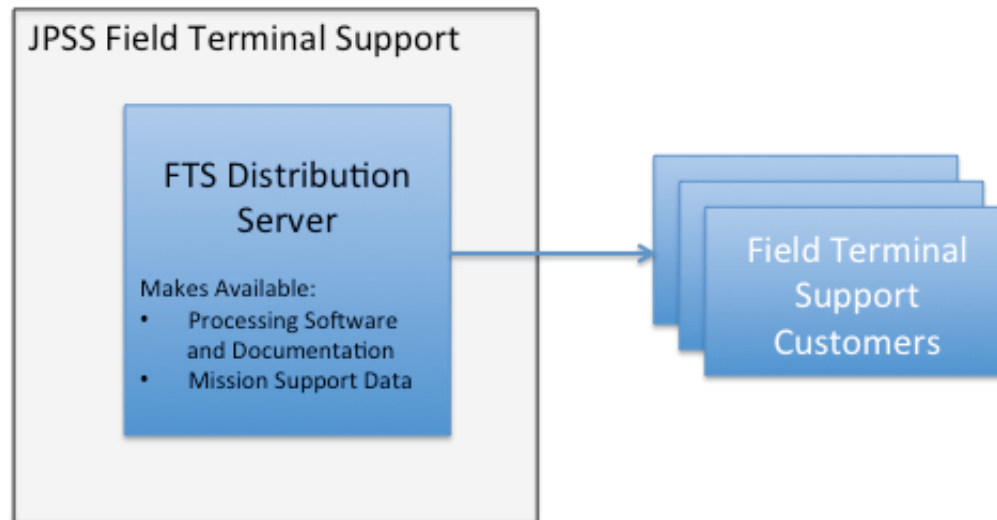


# FTS Data Acquisition and Organization



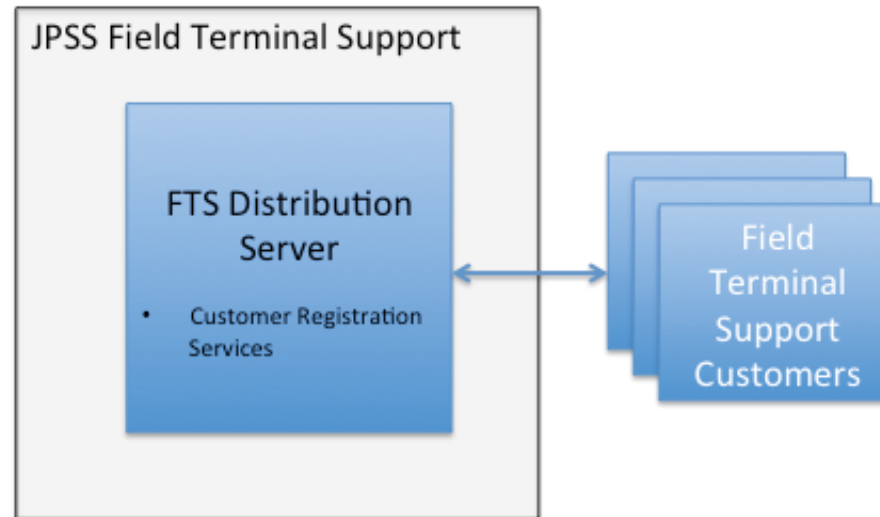
- FTS acquires and organizes data and documentation relevant to HRD processing from JPSS-managed satellites
- Data is obtained from the CGS, the CGS support node, GRAVITE and JPSS CM, and stored in the Data Acquisition server
- This data includes processing source code (e.g., ADL, algorithm update packages, RT-STPS), documentation, ancillary data, intermediate products and auxiliary data (PCTs, LUTs, Mission Notices, Schedules)

# FTS Data Distribution



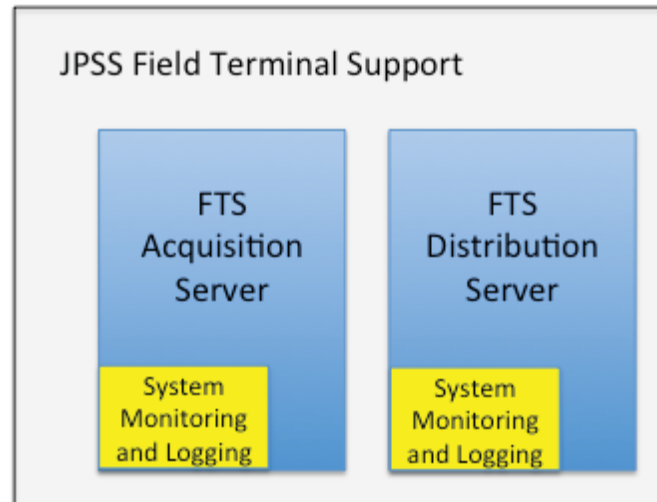
- The FTS mechanism for data distribution is a web portal. Selected data stored on the FTS server is made available for distribution by the FTS Distribution Server
- Customers desiring the system building blocks (e.g., ADL, algorithms or RT-STPS) interact with the FTS Distribution Server to download source code distribution packages for these components
- Mission Support Data, updated regularly from the CGS, is similarly made available to FTS customers

# FTS Customer Registration and Reporting



- Customer registration for FTS access is a self-service capability enabled through interaction with the Distribution Server main page
- Customer-provided contact information is available to the FTS operator for reporting purposes (e.g., to support requests for frequency usage documentation) and notification purposes (to make FTS customers aware of changes to in system status)

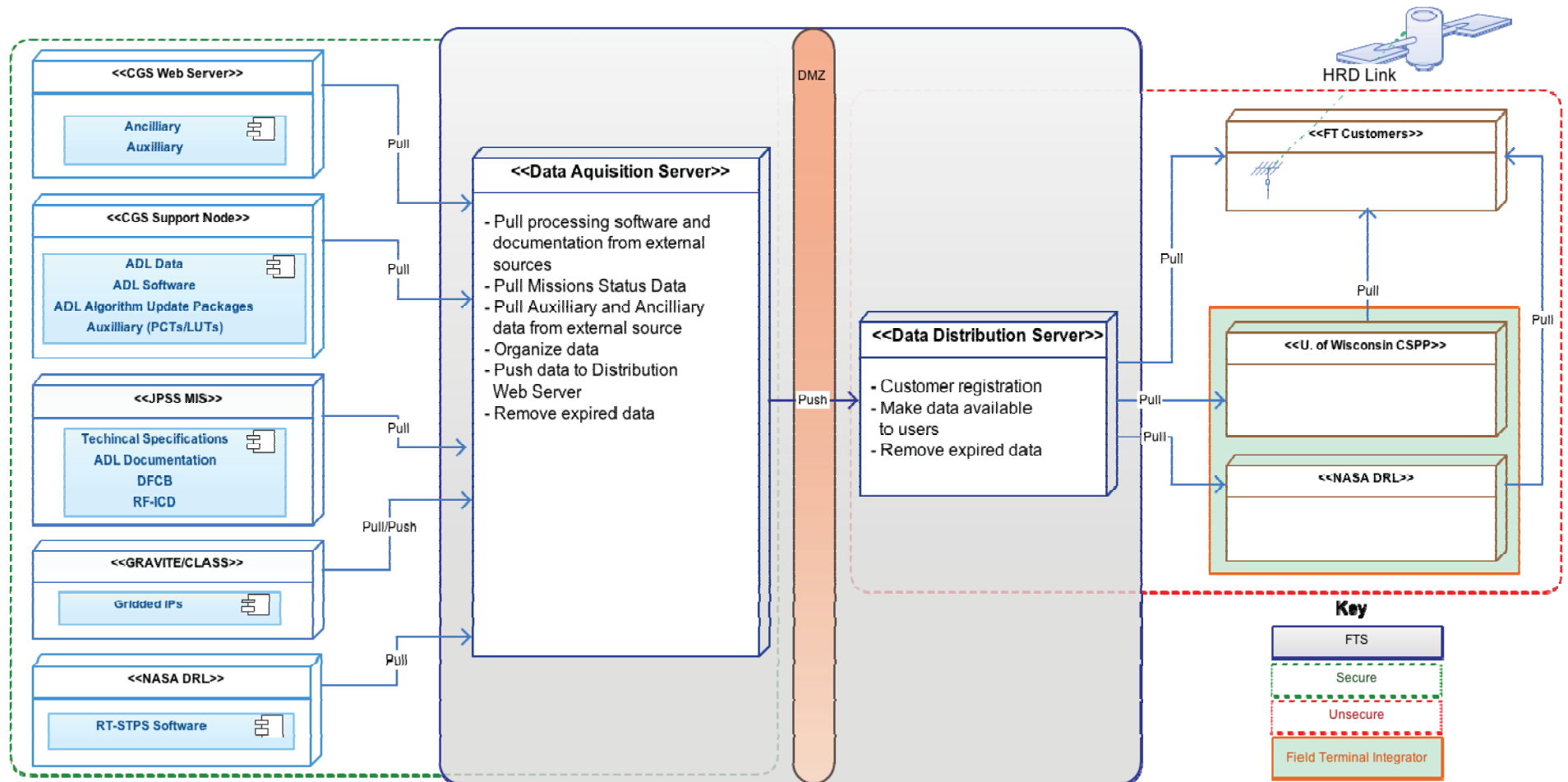
# FTS System Status and Health



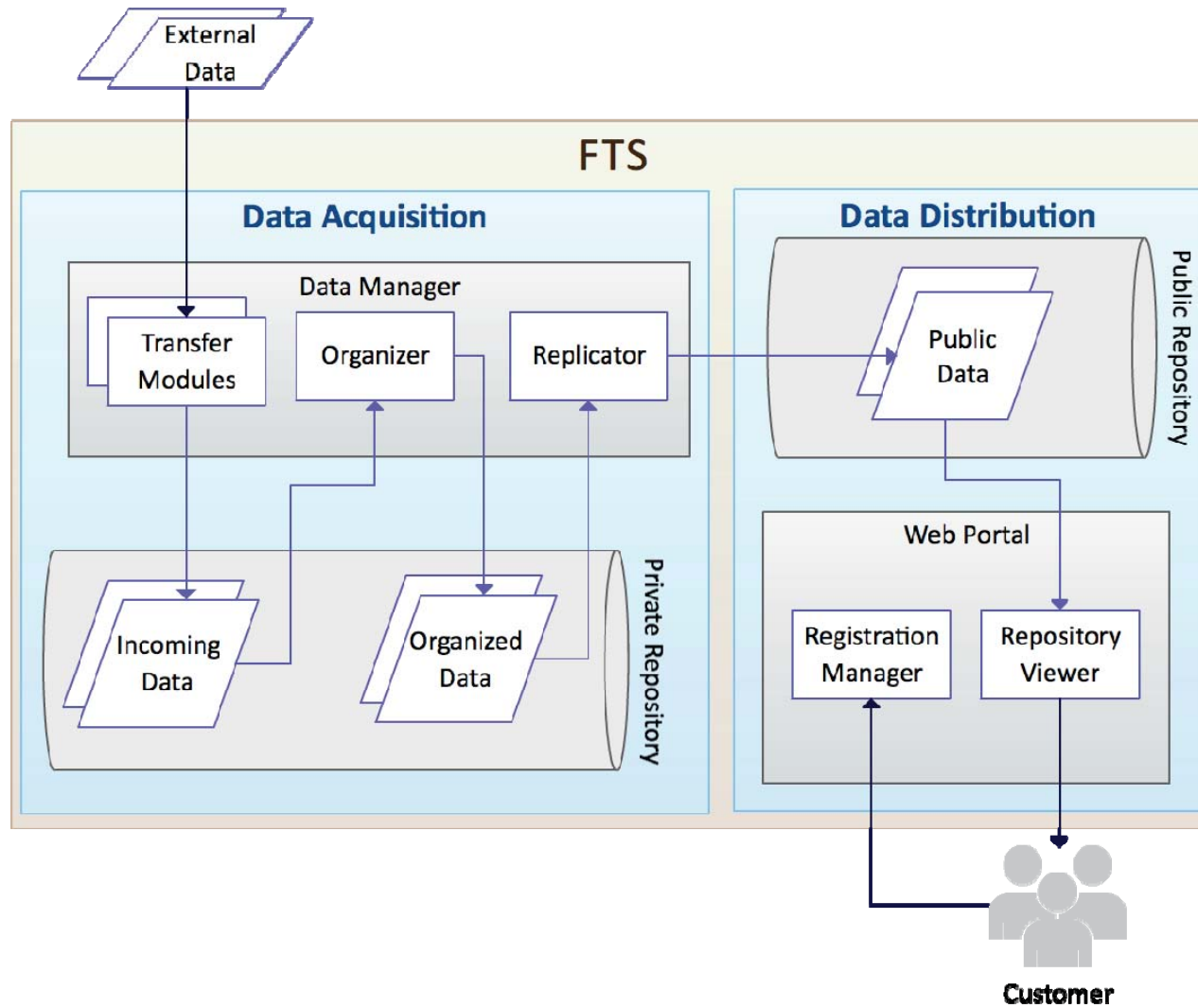
- The FTS internally monitors FTS component health and status, and logs relevant information on the FTS server to support FTS troubleshooting and recovery
- The monitoring approach planned for the FTS leverages existing capabilities used for monitoring DPES infrastructure. Expected items to monitor may include:
  - Hardware Status,
  - Disk, CPU and Network Utilization
  - Server Availability
  - Process Status



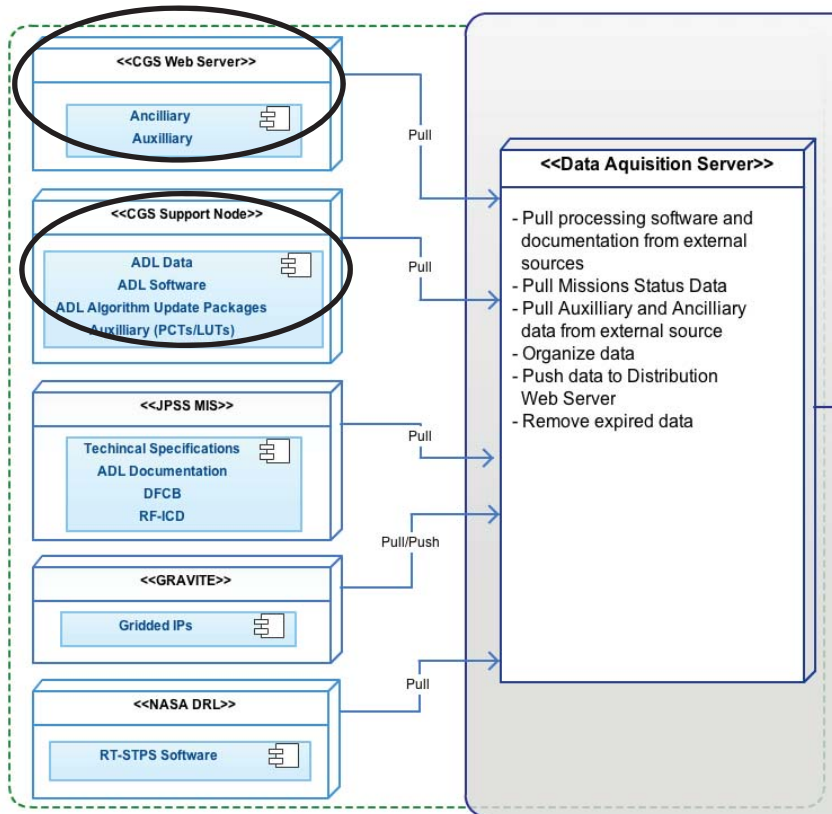
# System Architecture



# Software Design



# FTS Block 2.0 TTO Path Forward



- Block 2.0 Changes for FTS
  - **Inputs from CGS changing with Block 2.0:**
    - CGS Extranet Web Server
    - CGS Support Node content with Block 2.0
  - **Internal changes to FTS:**
    - » Checksum calculation differences (from CRC to SHA 384)
    - » Possible directory changes
  - **Output:**
    - University of Wisconsin and GSFC Direct Readout Lab (DRL) using FTS Web Portal instead of NPP External Mission Support Data Server (E-MSDS) for accessing Ancillary and Auxiliary Files

# FTS Key Milestones

10/1/14

CY	2014									2015								
	Q2			Q3			Q4			Q1			Q2			Q3		
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FTS SRR/SDR	▼																	
FTS CDR						▼												
FTS SW Build 1 TRR									▽									
FTS SW Build 1 Complete									▽									
FTS SW Build 2 TRR											▽							
FTS SW Build 2 Complete											▽							
FTS HW Build for V1 ATRR											▽							
FTS HW Build for V1 Complete											▽							
FTS SW Build 3 TRR												▽						
FTS SW Build 3 Complete												▽						
FTS Version 1.0 TRR (HW/SW)													▽					
FTS Version 1.0 Operational														▽				

# Progress to Date (1 of 2)

- The new FTS implementation plan was accepted by the Ground, PSE, and NJO management, presented at the JPSS Customer Forum (Nov 2013), and discussed with key stake holders (Dec 2013)
- Upgraded HRD link receiver provided by the Svalbard Ground Station
- Successfully awarded grants to NASA/DRL and Uwisc/CIMSS
- Completed FTS Software and Hardware Design
  - During the development of the Design Documents, three Peer Reviews were held (June through August 2014) with Stakeholders
  - Reviewers included the Integrators, JPSS Security, Mission Assurance and MSE
  - Comments received were incorporated into the next Draft of the Documents
- Supporting Documentation Developed (Subset)
  - FTS OpsCon Updated
  - FTS Level 3 and 4 Requirements Baselined
  - FTS Interface Definition Document (IDD) Completed
  - FTS Software Test Plan Completed



## Progress to Date (2 of 2)

- The FTS SRR/SDR was successfully held on Apr 21, 2014
  - The IRT concluded that the artifacts clearly demonstrated that the FTS team has a reasonable OpsCon, a good set of requirements, and a well thought out system
  - Some of the key concerns included the scope of the FTS effort and clarification on certain FTS requirements
  - Received 6 RFAs and 4 ADV: All are closed
- The FTS CDR scheduled for Sep 17, 2014
  - The CDR was highly successful and the IRT was extremely pleased with the proposed Software and Hardware Design
  - The review panel approved the FTS team to proceed for implementation
  - Received 5 RFAs and 2 RFIs: All are closed

# Summary

- There is a paradigm shift in the FTS implementation
  - The JPSS Ground Project is no longer providing data processing framework
  - FTS is providing the necessary building blocks (software, documentation, and mission support data) on the web portal
  - The proposed FTS implementation plan leverages ongoing activities to support needs of DB community and meets all the FTS requirements
  - The proposed FTS implementation will ensure to meet NASA and NOAA Standards, Software Engineering Requirements (NPR 7150.2A), IT Security, and Safety Mission Assurance
- The JPSS Program is supporting the development and maintenance of software package (IPOPP/CSPP) to demonstrate the ability to produce ready-to-use products from the SNPP/JPSS HRD link
- FTS will leverage existing annual workshops to provide a forum for the DB community to present, discuss, learn, and provide feedback to the JPSS Program