Joint Polar Satellite System (JPSS) Program Ground Segment Overview

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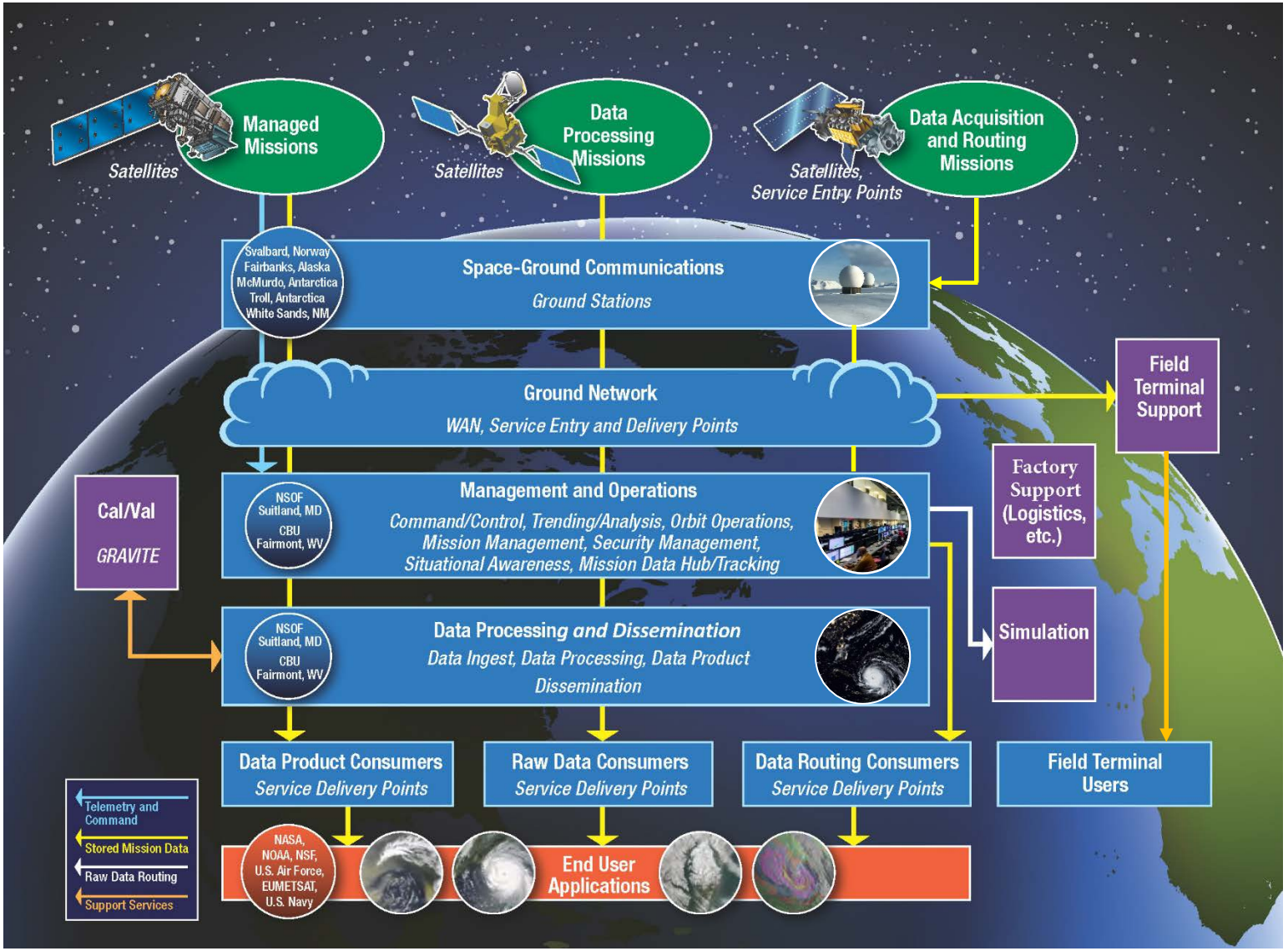
JPSS Ground Segment - Introduction

- Completed in 2017, the JPSS Ground Segment provides an infrastructure supporting NOAA's requirements for global environmental data from low Earth-orbiting satellites using a heterogeneous constellation of missions
- The JPSS Ground Segment provides a suite of services to existing NOAA, inter-agency and international missions
- Support to new missions, exploitation of new technologies, improvements to cyber security and automation are achieved through continuous evolution and sustainment releases.
- As with S-NPP and GCOM-W1, NOAA and JAXA will need to work closely together to ensure the JPSS Ground Segment successfully supports JPSS-2, EUMETSAT 1A/1B and GOSAT-3 beginning in the 2022/2023 timeframe.
- JPSS may also provide ground services to the next generation of USAF weather satellites beginning in 2023.

JPSS Ground Segment



Summary of Supported Missions

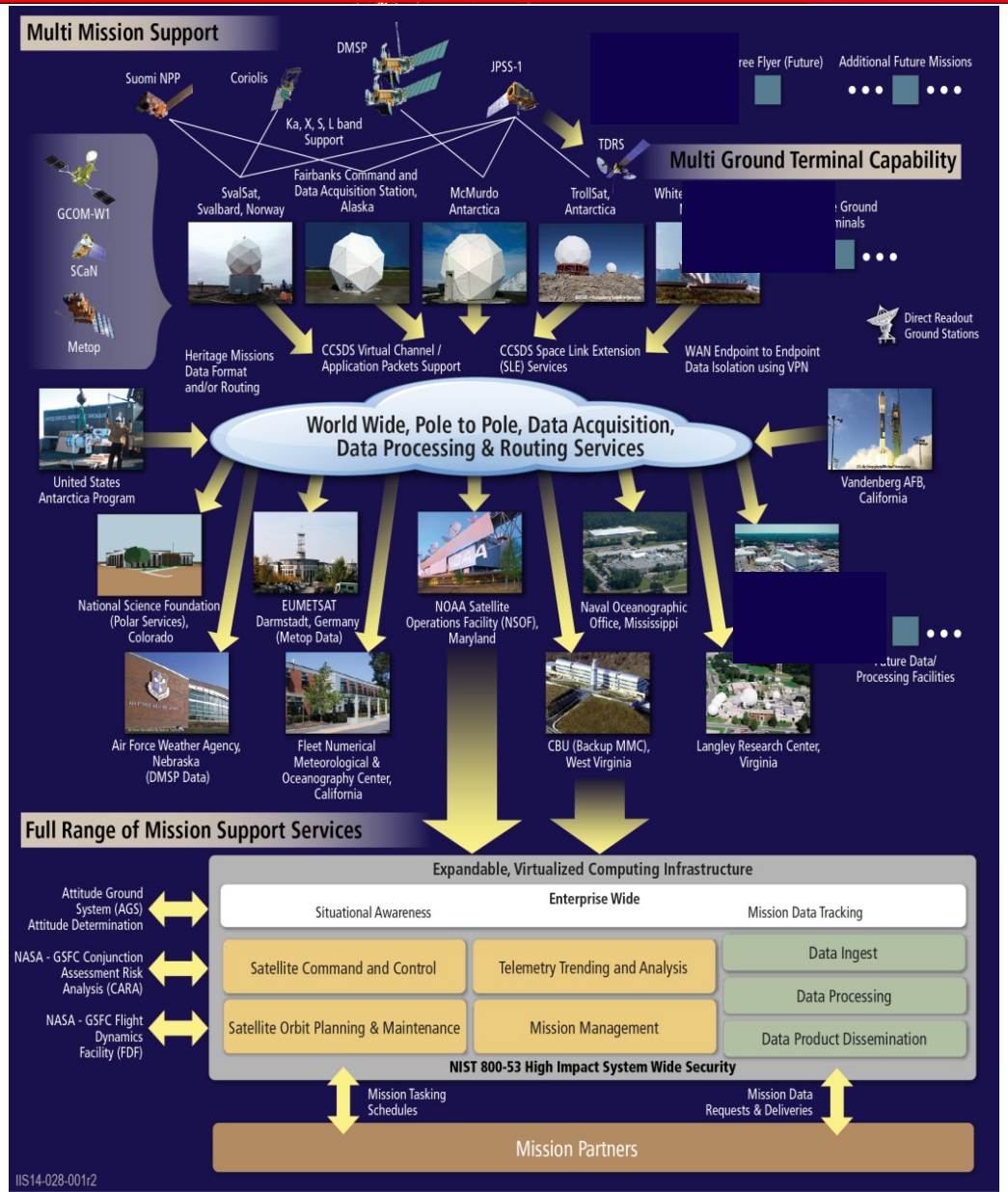
	Data Acquisition, Routing and Processing Missions								Managed Missions			
	NSF	Coriolis/ WindSat	NASA Supported Missions	DMSP	Metop	GCOM-W1	EUMETSAT -SG 1A/1B	GOSAT-3	S-NPP	JPSS-1	JPSS-2	JPSS-3/4
Launch Ready Date	N/A	Operational					Nov. 2022 Nov. 2023	NET 2022	Operational		Mar. 2022	NET 2025 NET 2028
Mission Planning	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Spacecraft Control	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Satellite Command and Telemetry	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Data Acquisition	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Routing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Processing and Dissemination	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cal/Val	No	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Field Terminal Support	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Existing Missions

Future Missions

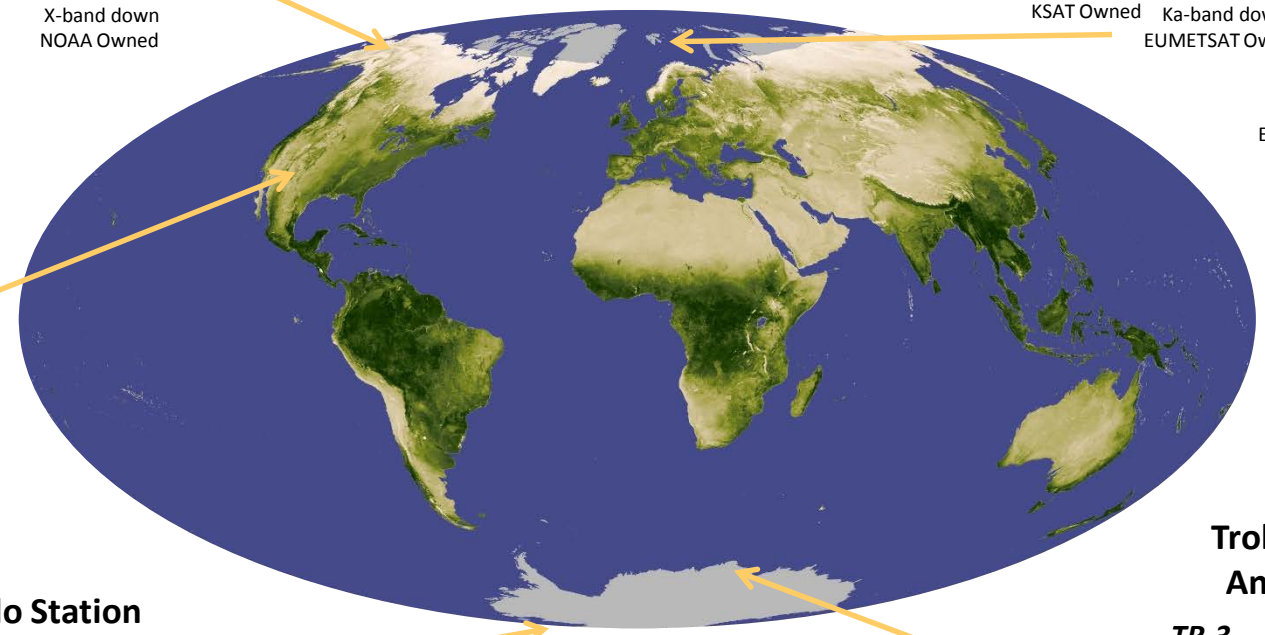
JPSS Ground Segment is a fielded and evolving multi-mission ground system

JPSS Ground Segment Architecture



	Capability
Data Operations	Multi-mission data acquisition and routing
	Data processing of weather / environmental products
	North pole mission data downlink with backup
	South pole mission data downlink with backup
	Full backup Data Processing Center
	Tracking and Data Relay Satellite System (TDRSS) mission data downlink
Command and Control	Planning, command, control, and telemetry
	Full backup Mission Control Center
	Improved situational awareness and data accounting
Architecture	Cyber Security: boundary protection, IA hardening, centralized auditing
	Cyber Security: Full NIST 800-53 implementation
	Multi-mission architecture to support LEO satellite constellation

Ground Station Attributes



NOAA FCDAS
Fairbanks, Alaska

FCDAS-A,B,C

13-m
S-band up/down
X-band down
NOAA Owned

FC-Ka

4-m
Ka & S
down only
NOAA Owned

Svalsat Station
Svalbard, Norway

SG-4

13-m
S-band up/down
L & X-band down
NOAA Owned

SG-22

7.3-m
S-band up/down
X & Ka-band down
KSAT Owned

SG-25

13-m
S-band up/down
X-band down
KSAT Owned

SG-51

7.3-m
Ka-band down
EUMETSAT Owned

SG-52

7.3-m
Ka-band down
EUMETSAT Owned

SG-60

4-m
Ka & S
down only
NOAA Owned

Space Network
White Sands, NM

S-band up/down
Ka down
NASA Owned

McMurdo Station
Antarctica

MC-1

4-m
Ka & S
down only
NOAA Owned

MC-2

4-m
Ka & S
down only
NOAA Owned

MC-3

4-m
Ka & S
down only
NOAA Owned

Troll Station
Antarctica

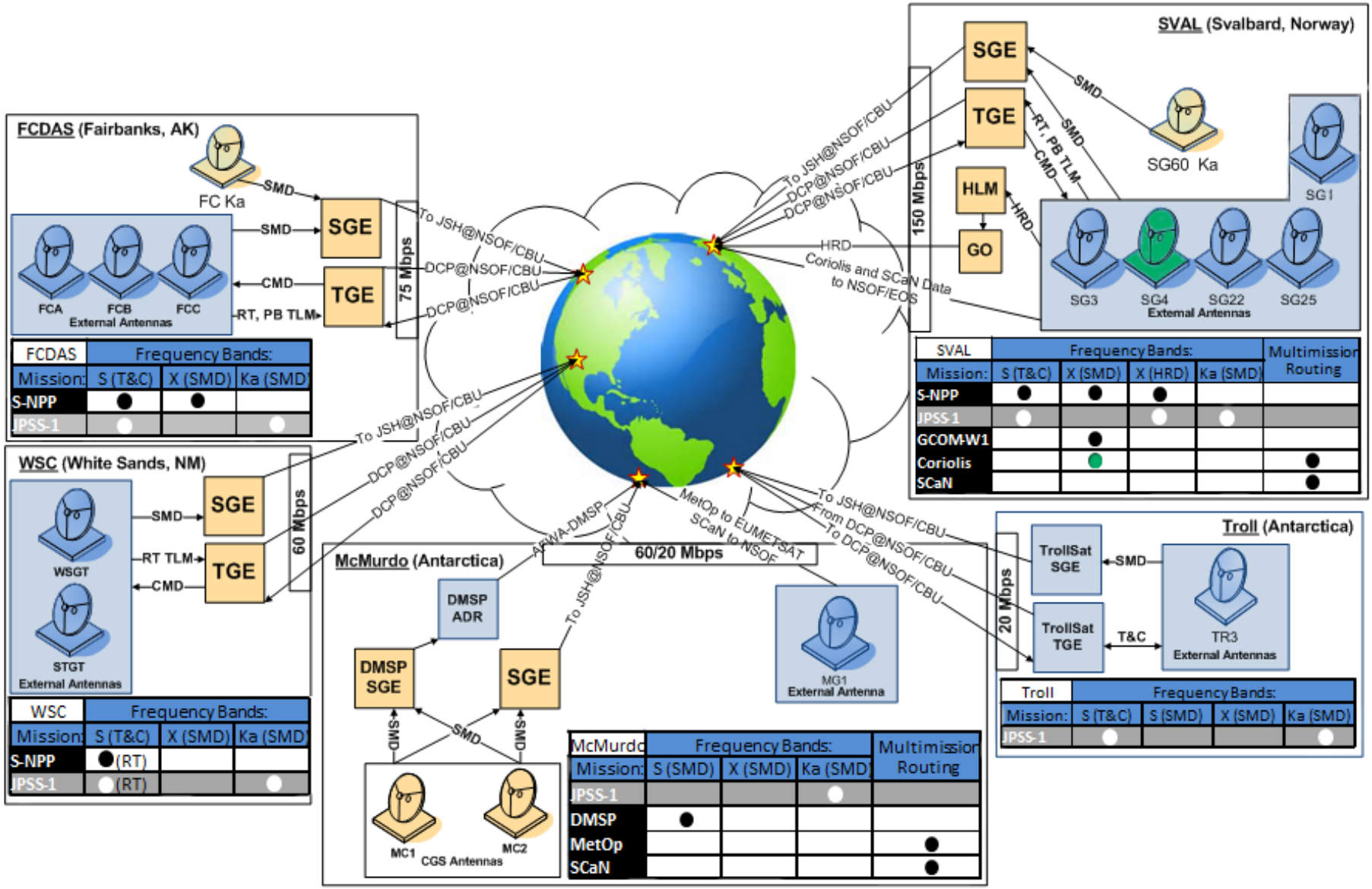
TR-3

7.3-m
S-band up/down
X & Ka-band down
KSAT Owned

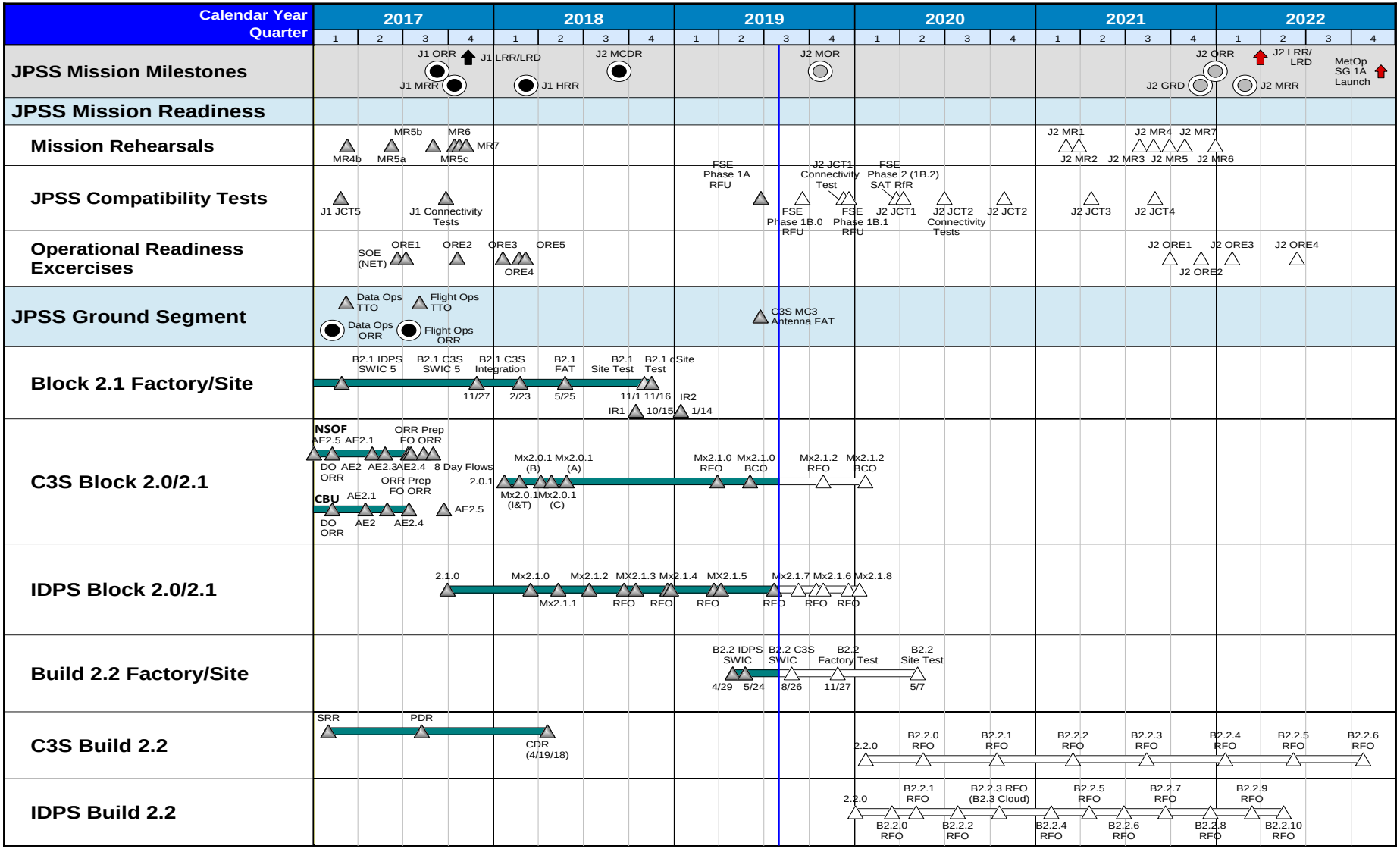
TR-9

7.3-m
S-band up/down
X & Ka-band down
KSAT Owned

Data Acquisition and Routing Capabilities



JPSS Ground Segment Status

- JPSS Ground Segment management and contracts transitioned from NASA to NOAA in Summer 2018
- Transitioned from a Development to a Maintenance/Sustainment Posture
- Command, Control and Communications
  - Command system technology refresh is underway with deployment to operational environment
  - New capabilities needed for JPSS-2 have been deployed to the integration environment in preparation of mission readiness activities
  - McMurdo antennas, pre-processors and telecommunications equipment are undergoing technology refresh and modifications to support JPSS-2 and EUMETSAT-SG
- Data Processing
  - A trade study conducted in 2018 recommended moving mission unique data processing to a cloud-based environment
  - Completed SRR (June) and PDR (August), with CDR planned for December 2019
  - Migrating to cloud-based environment expected by late December 2020

JPSS Ground Segment Schedule