ESPC 2.0/PDA Status

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Agenda

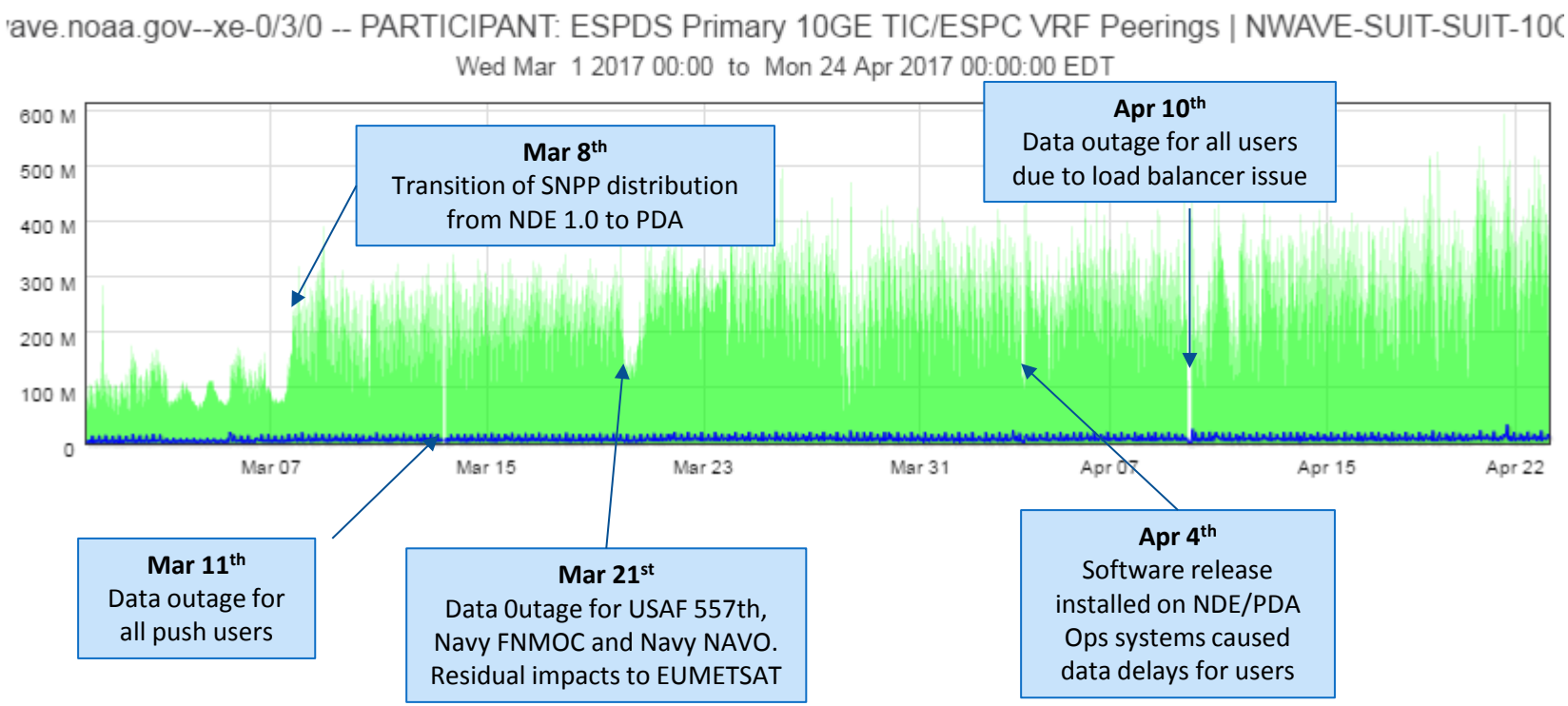
- NDE 2.0/PDA Ops Status
- Recent System Anomalies
- PDA User Allocation
- PDA Products to DoD

PDA Ops Environment Status

- NDE 2.0, PDA and EI (ESPC new network) status:
  - Put into operations on Dec 5th, 2016 at 12:00 UTC
  - Supported GOES-16 ABI data activations on Mar 1, 2017
  - Transitioned to full operations (B2.0 transition) on Mar 8, 2017 at 15:00 UTC
- Four significant data disruptions/events to date:
  - Mar 11, 2017 – OCSP responder/repeater outage
  - Mar 21, 2017 – Network issue on COPC links
  - April 4, 2017 – Software installation issues on Ops system
  - April 10, 2017 – Load balancer issue
- Transition status
  - All NDE 1.0 users are on PDA at this time; old NDE system is being decommissioned
  - Next big PDA data activations expected in June when GOES-16 ABI data reaches provisional maturity

PDA Egress Rates through N-Wave

(using 1 hour averages)



User Load (PDA to NWAVE)

~3 TB/day

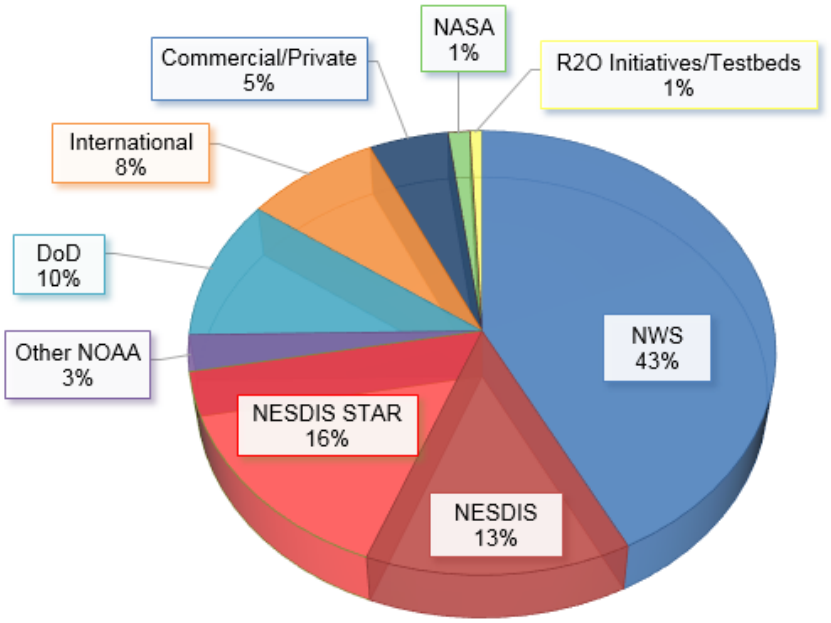
System Ingest from NWAVE (Met-8)

~90 GB/day

PDA Data Allocation - System Capacity Overview

- PDA was initially designed with a data volume capacity egress rate of ~40 TB/day (at 25 Gbps); PDA and infrastructure is scalable to meet growing demand
- As of January 30, 2017 ~41.55 TB/day has been allocated to approved users

PDA Daily Data Allocation by Major User Category (TB/day)		
NOAA	NWS	17.65
	NESDIS	5.55
	NESDIS STAR	6.75
	Other NOAA	1.1
NASA		0.55
DoD		4.25
Commercial/Private		2.0
International		3.4
R2O initiatives/Testbeds		0.3
Total		**41.55**



PDA Egress - Daily Data Allocation

Note - These data allocations per user are maximums and for many of the big data consumers it is unlikely they will fully utilize as much data as currently allocated over the next 12-24 months

Coordination Activities - Informational

- Held technical meeting with USAF 557th Weather Wing, topics included:
  - improve coordination between PDA and 557th
  - understand each OPC's operating constraints
  - identify the best triggers for escalation of on-call staff to respond to anomalies

PDA Products going to DoD

USAF 557th Weather Wing		
ATMS-SCIENCE-RDR	VIIRS-CTT-EDR	VIIRS-M2ND-EDR
ATMS-SDR	VIIRS-DNB-GEO	VIIRS-M3-SDR
ATMS-SDR-GEO	VIIRS-DNB-SDR	VIIRS-M3RD-EDR
ATMS-TDR	VIIRS-I1-IMG-EDR	VIIRS-M4-SDR
ATMS_BUFR	VIIRS-I1-SDR	VIIRS-M4TH-EDR
CRIS-SCIENCE-RDR	VIIRS-I2-IMG-EDR	VIIRS-M5-SDR
CrIS-SDR	VIIRS-I2-SDR	VIIRS-M5TH-EDR
CrIS-SDR-GEO	VIIRS-I3-IMG-EDR	VIIRS-M6-SDR
CrIS_C0399_BUFR	VIIRS-I3-SDR	VIIRS-M6TH-EDR
OMPS-NP-EDR	VIIRS-I4-IMG-EDR	VIIRS-M7-SDR
OMPS-NP-GEO	VIIRS-I4-SDR	VIIRS-M8-SDR
OMPS-NP-SDR	VIIRS-I5-IMG-EDR	VIIRS-M9-SDR
OMPS-NPSCIENCE-RDR	VIIRS-I5-SDR	VIIRS-MOD-GEO
OMPS-TC-EDR	VIIRS-IMG-GEO	VIIRS-MOD-GEO-TC
OMPS-TC-GEO	VIIRS-IMG-GEO-TC	VIIRS-MOD-GTM-EDR-GEO
OMPS-TC-SDR	VIIRS-IMG-GTM-EDR-GEO	VIIRS-NCC-EDR
OMPS-TCSCIENCE-RDR	VIIRS-IST-EDR	VIIRS-NCC-EDR-GEO
VIIRS-AF-EDR	VIIRS-LST-EDR	VIIRS-OCC-EDR
VIIRS-Aeros-EDR	VIIRS-M1-SDR	VIIRS-SA-EDR
VIIRS-Aeros-EDR-GEO	VIIRS-M10-SDR	VIIRS-SCD-BINARY-SNOW-FRAC-EDR
VIIRS-CBH-EDR	VIIRS-M11-SDR	VIIRS-SCD-BINARY-SNOW-MAP-EDR
VIIRS-CCL-EDR	VIIRS-M12-SDR	VIIRS-SCIENCE-RDR
VIIRS-CEPS-EDR	VIIRS-M13-SDR	VIIRS-SIC-EDR
VIIRS-CLD-AGG-GEO	VIIRS-M14-SDR	VIIRS-SST-EDR
VIIRS-CM-EDR	VIIRS-M15-SDR	VIIRS-ST-EDR
VIIRS-COT-EDR	VIIRS-M16-SDR	VIIRS-SusMat-EDR
VIIRS-CTH-EDR	VIIRS-M1ST-EDR	VIIRS-VI-EDR
VIIRS-CTP-EDR	VIIRS-M2-SDR	

~820 GB / day

NAVY FNMOC
GMASI-NH-End_Product_SIM_bin
GMASI-SH-End_Product_SIM_bin
NPOES_GFS_(00hr)
NPOES_GFS_(03hr)
NPOES_GFS_(06hr)
NPOES_GFS_(09hr)
NPOES_GFS_(12hr)
NPOES_GFS_(15hr)
NPOES_GFS_(18hr)
NPOES_GFS_(21hr)
NPOES_GFS_(24hr)
NPR-MIRS-IMG_33min_v11
NUCAPS_CCR
NUCAPS_EDR
SWP_AP_Flux
SWP_DGD
SWP_DSD
VIIRS_WINDS_BUFR

~9 GB / day

NAVY NAVO
ABI-L1b-RadF
AMSR2_L1R
ASCAT-OSW-25KM-EP-Binary
MIRS_ATMS_SND

~57 GB / day

SNPP/JPSS EDR Reallocation: IDPS to NDE

- EDRs have been reallocated:
  - IDPS SST -> NDE ACSPO SST
  - IDPS Active Fires -> NDE Active Fires
- Future EDRs to be reallocated:
  - VIIRS Aerosol
  - VIIRS Cloud
  - VIIRS Cryosphere
  - OMPS NP
  - OMPS TC

* All NDE products are available in NetCDF4 and other tailored formats.

Many Thanks!

Background Slides

NDE ACSPO SST

- ACSPO SST in 10-min granule
- Available in NetCDF4 and GHRSST
- *OSPO PAL: John Sapper*

NDE Active Fire Product

Product Name	Product Size
Active Fire in NetCDF4 AF_v1r0_npp_****.nc	12MB per granule

OSPO PAL: Zhaohui Cheng

Outputs

Name	Description	Type	NetCDF4 File
fire mask	Fire mask 2D array (unit-less)	8 bit integer	AF_*nc
algorithm QA	Fire algorithm QA mask 2D array (unit-less)	32 bit Integer	AF_*nc
FP_line	Fire pixel line Sparse data array (unit-less)	16 bit Integer	AF_*nc
FP_sample	Fire pixel sample Sparse data array (unit-less)	16 bit Integer	AF_*nc
FP_latitude	Fire pixel latitude Sparse data array (unit: degrees)	32 bit Float	AF_*nc
FP_longitude	Fire pixel longitude Sparse data array (unit: degrees)	32 bit Float	AF_*nc
FP_power	Fire radiative power Sparse data array (unit: MW)	32 bit Float	AF_*nc
FP_confidence	Fire detection confidence Sparse data array (unit: %)	8 bit Integer	AF_*nc
FP_land	Land pixel flag Sparse data array (unit-less)	8 bit Integer	AF_*nc

Total output for one granule: 11.7 Mb + number of fires * 79 bytes

The number of fires in the sparse array is described by the netCDF dimension "nfire"

Outputs

Output	Type	Description	
Fire Mask	8-bit unsigned integer	Missing – 0	Brightness temperatures for M13 or M15 unavailable
		Scan – 1	Not processed (trim)
		Other – 2	Not processed (other reason)
		Water – 3	Pixel classified as non fire water
		Cloud – 4	Pixel classified as cloudy
		No Fire – 5	Pixel classified as non fire land
		Unknown – 6	Pixel with no valid background pixels
		Fire Low – 7	Fire pixel with confidence strictly less than 20% fire
		Fire Medium – 8	Fire pixel with confidence between 20% and 80%
		Fire High – 9	Fire pixel with confidence greater than or equal to 80%
Fire Algorithm QA Mask	32-bit unsigned integer	Details on next slide	

For each pixel in the granule

Outputs

Fire Algorithm QA Mask (4 bytes for each pixel in the Granule)

Bits	Description
0-1	Surface Type (water=0, coastal=1, land=2)
2-3	Atmospheric correction (reserved for future use)
4	Day/Night (daytime = 1, nighttime = 0)
5	Potential fire (0/1)
6-10	Background window size parameter
11	Fire Test 1 valid (0 - No, 1 - Yes)
12	Fire Test 2 valid (0 - No, 1 - Yes)
13	Fire Test 3 valid (0 - No, 1 - Yes)
14	Fire Test 4 valid (0 - No, 1 - Yes)
15	Fire Test 5 valid (0 - No, 1 - Yes)
16	Fire Test 6 valid (0 - No, 1 - Yes)
17-19	N/A
20	Adjacent clouds (0/1)
21	Adjacent water (0/1)
22-23	Sun Glint Level (0-3)
24	Sun glint rejection
25	False Alarm 1 (excessive rejection of legitimate background pixels)
26	False Alarm 2 (water pixel contamination)
27	Amazon forest-clearing rejection test
28-31	N/A

NDE VIIRS Aerosol products

- Aerosol Detection – Smoke & Dust
- Aerosol Optical Depth
- Aerosol Particle Size
- Volcanic Ash Mass Loading
- Volcanic Ash Height
- *OSPO PAL: Shuang Qiu*

NDE VIIRS Cloud products

- Cloud Mask
- Cloud Top Phase
- Cloud Type
- Cloud Top Height
- Cloud Top Temperature
- Cloud Top Pressure
- Cloud Optical Depth
- Cloud Particle Size Distribution
- Cloud Liquid Water
- Cloud Ice Water Path
- *OSPO PAL: Shuang Qiu*

NDE VIIRS Cryosphere products

- Ice Concentration and Cover
- Ice Surface Temperature
- Ice Thickness/Age
- Snow Cover
- Fractional Snow Cover
- *OSPO PAL: Shuang Qiu*

OMPS V8Pro and V8TOZ

- OMPS NP V8 Profile Ozone
- OMPS TC V8 Total Ozone
- Available in NetCDF4 and BUFR
- *OSPO PAL: Vaishali Kapoor*

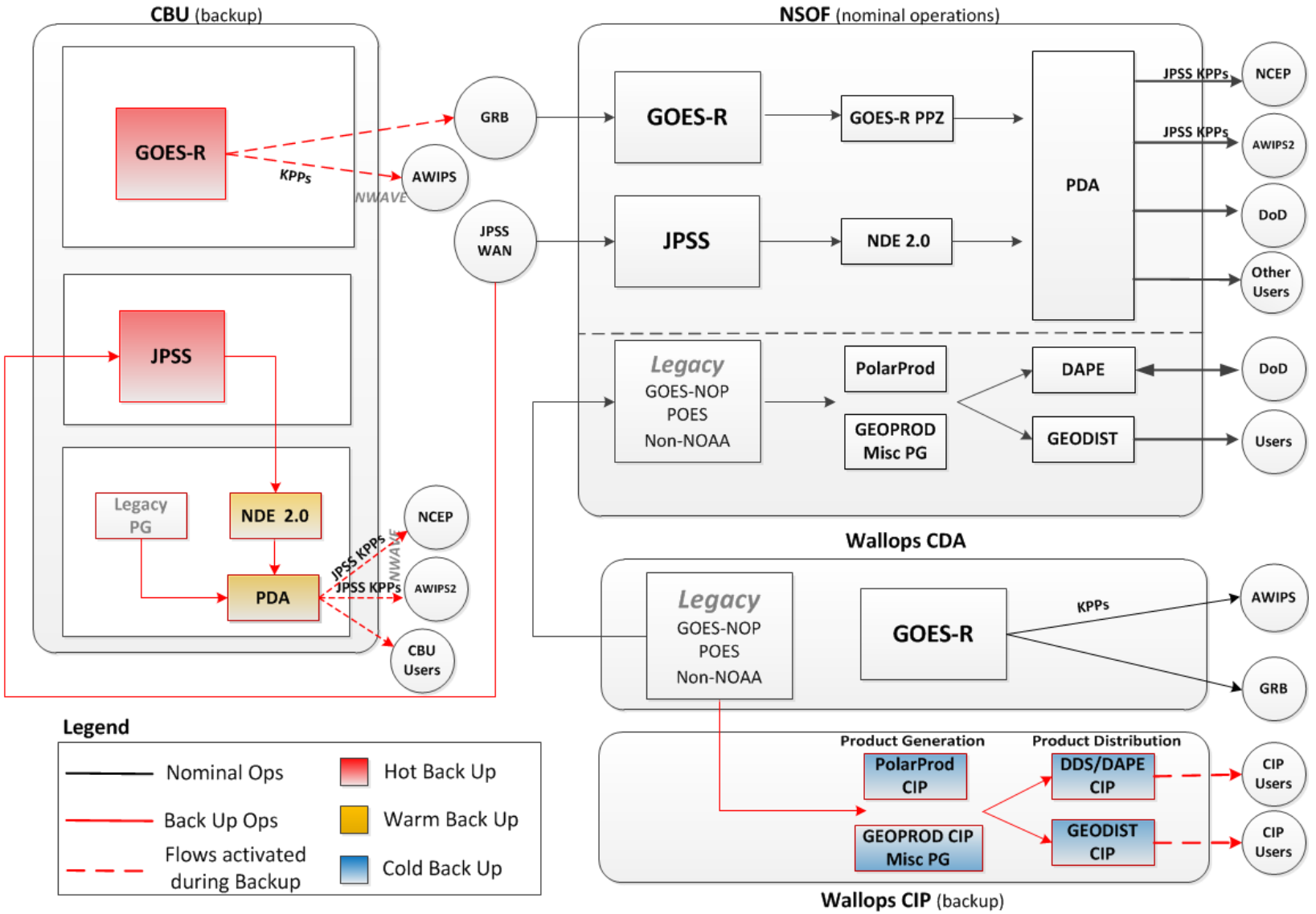
Notes regarding DAPE

- Access to new datasets (**including SNPP**) are serviced only from PDA; DAPE will maintain data continuity of its existing legacy product suite to DoD (with the exception of SNPP).
- Current NESDIS position regarding DAPE and PDA:
  - continue supporting/sustaining DAPE in terms of legacy data flow
  - new mission data requests will be serviced by PDA (today)
- This current strategy will eliminate potential disruptions to existing services while the final path forward regarding DAPE functionality is determined; this approach also gives DoD an opportunity to build confidence with PDA distribution.
- PDA operations - ESPC feeds DoD directly any new mission data they require; legacy product distribution will remain on DAPE.

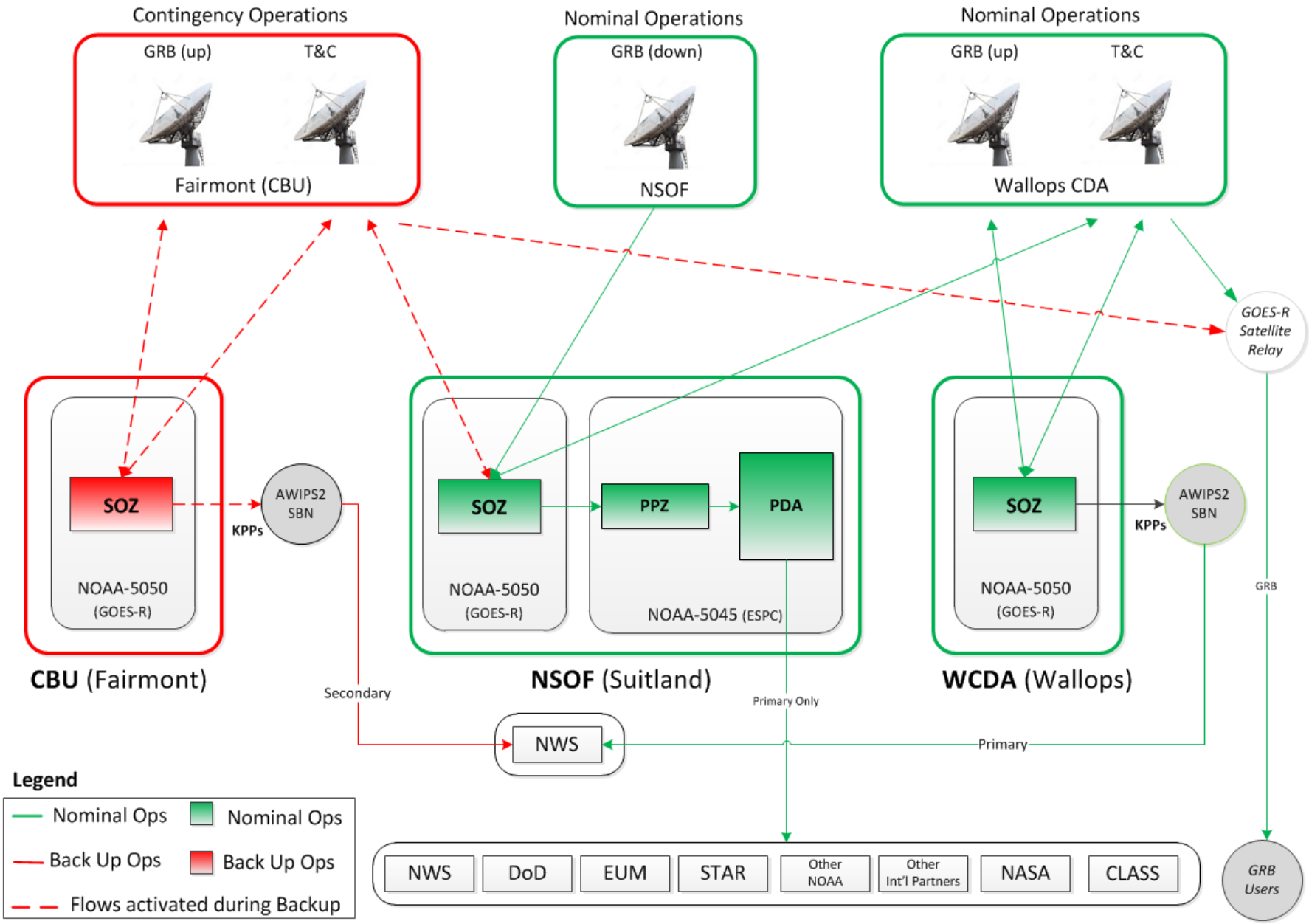
NDE → PDA Transition

- On March 8, 2017 PDA became the primary operational distribution system of SNPP data to ESPC users
- Challenges during/after transition
  - It took 3 SNPP contacts to get the 557th fully established and an additional day to set up required subscriptions for DoD, including B1.2 IPs → B2.0 EDRs
  - JPSS implemented a calibration algorithm change to improve the quality of the ATMS TDR/SDR coincident with the Block 2 Transition to Operations (TTO), which several users were not prepared to handle
    - NWS is now assimilating ATMS into the models
  - IDPS VIIRS Moderate products and NDE downstream NUCAPS, VPW, VHP products are impacted due to incorrect S-NPP VIIRS Cloud Mask over the Southern Hemisphere. Significant areas of the Southern Hemisphere, especially Antarctica, are incorrectly labeled as "snow/ice free. Developers are working to implement a fix (tentatively scheduled to be operational on April 10th)
  - Worked on characterizing slowness issues for several users, including NCEP super computers.
    - Added another utils server instance to PDA that greatly increased through-put

ESPC Data Operations



Future Architecture/Future Geo Operations



Architecture/Polar Operations