



S-NPP/JPSS ESPC Operations Today and Tomorrow

Chris Sisko

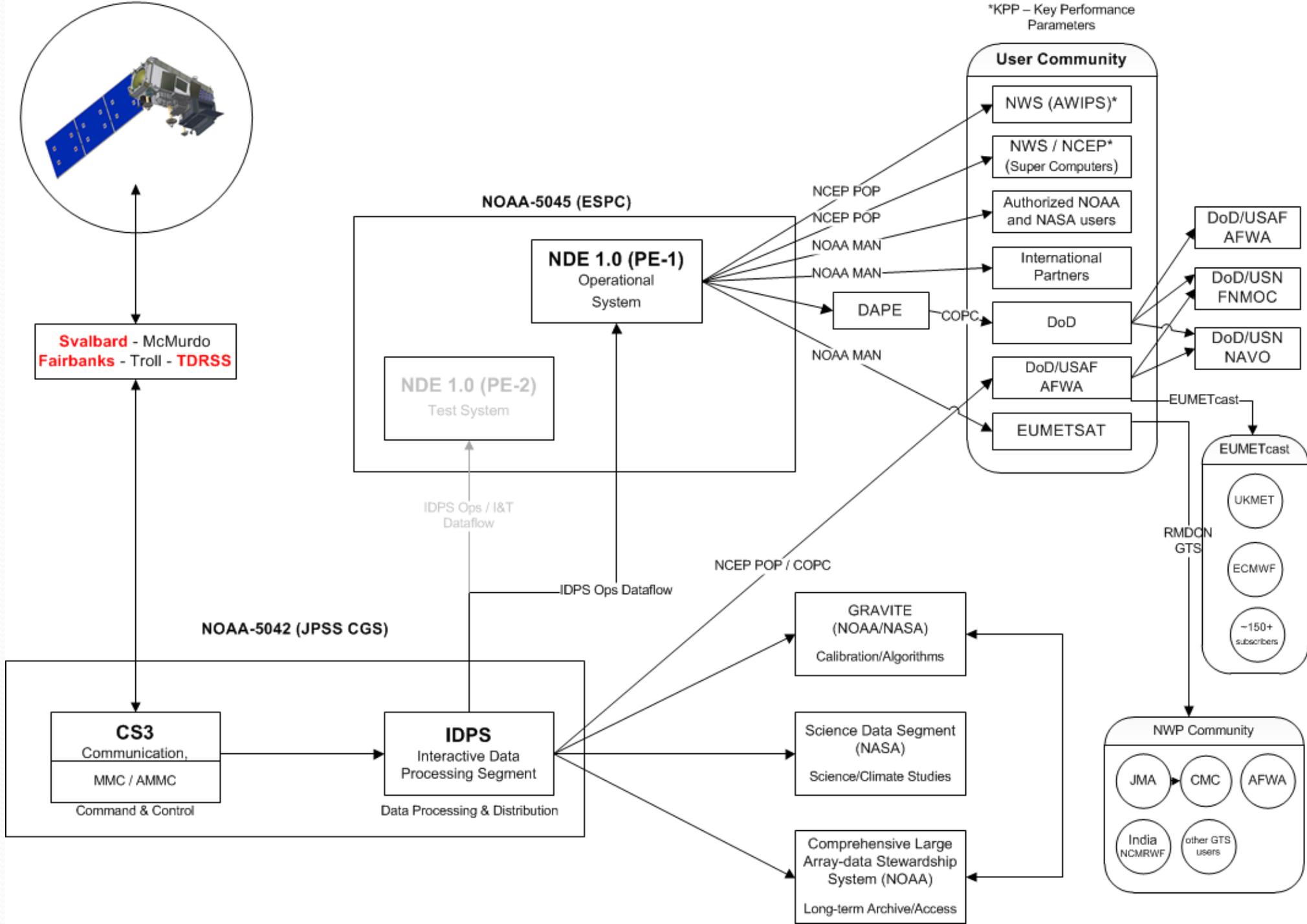
Data Operations Manager

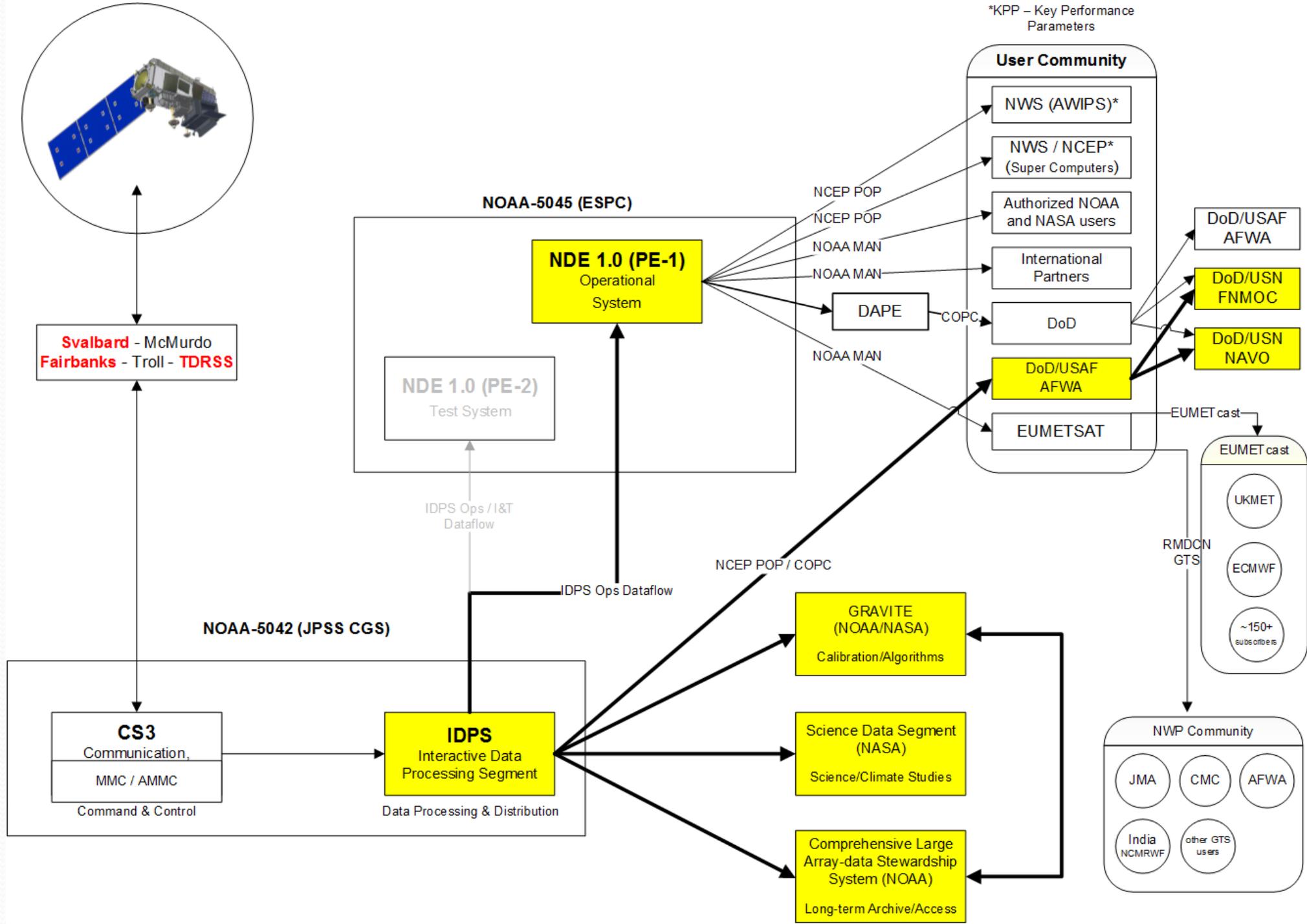
NESDIS/OPSO

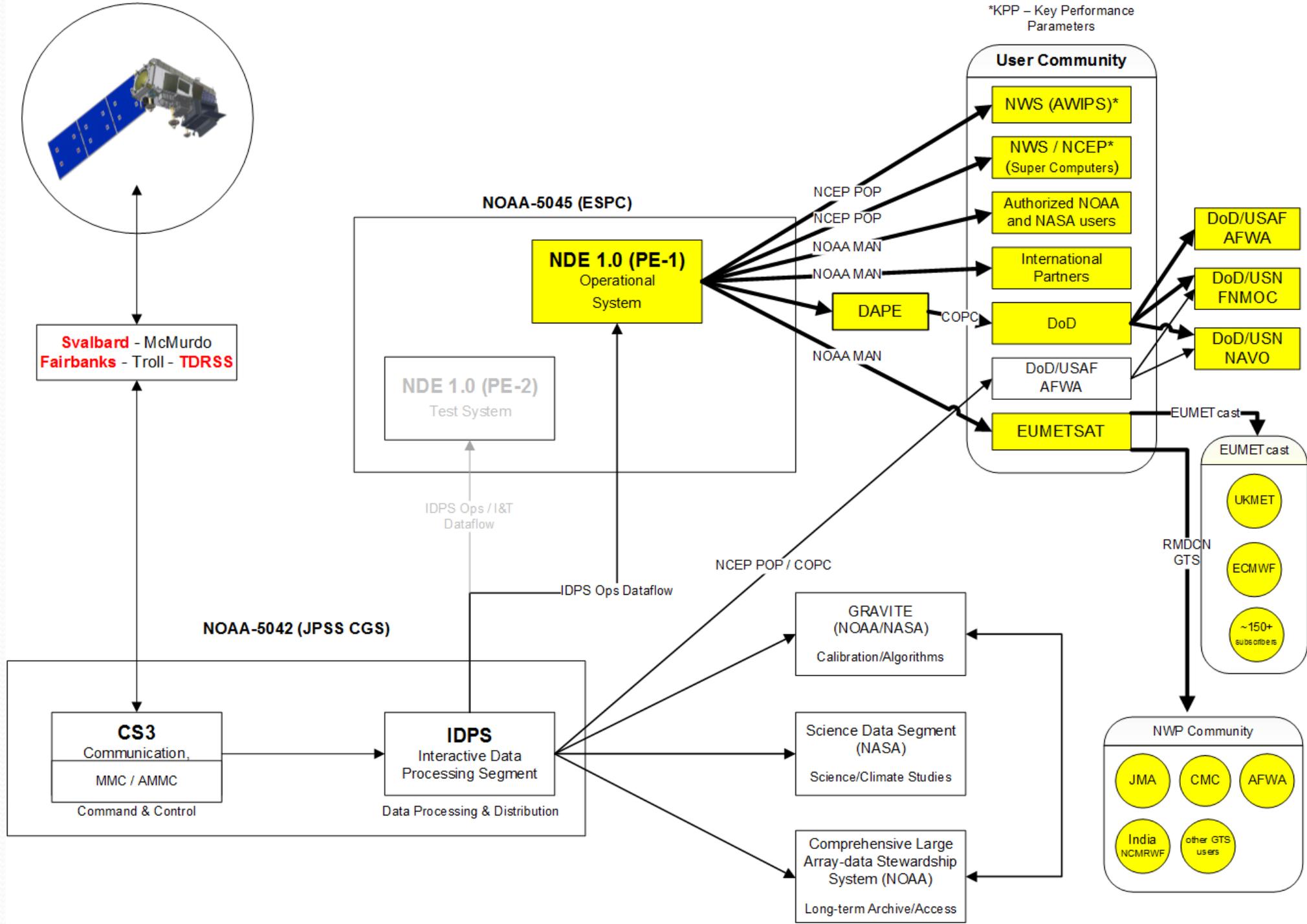
May 15th, 2014

Outline:

- SNPP real-time data operations – Today
- Key Performance Parameters (KPPs)
- Operational products currently available from the NDE system
- Short term activities
 - NDE Test System (System Acceptance / Handover)
- Future direction:
 - Data Quality Assurance
 - High level depiction of PG/PD systems
 - Readiness for ground system upgrades
 - Schedules
- Summary



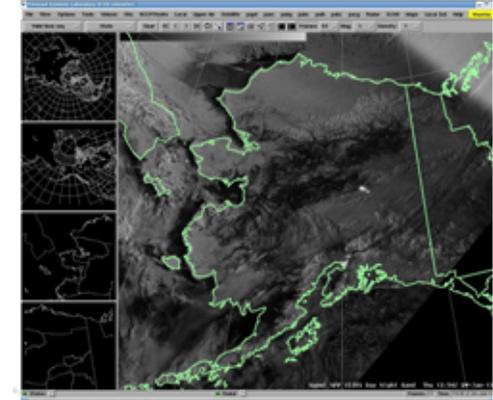




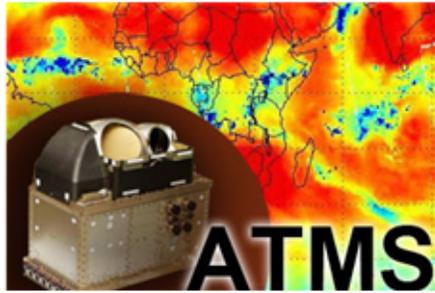
VIIRS Imagery EDR - 0.64 μ m (I01), 3.74 μ m (I04), 11.45 μ m (I05), 8.55 μ m (M14), 10.763 μ m (M15), and 12.03 μ m (M16) for latitudes greater than 60°N in the Alaskan region



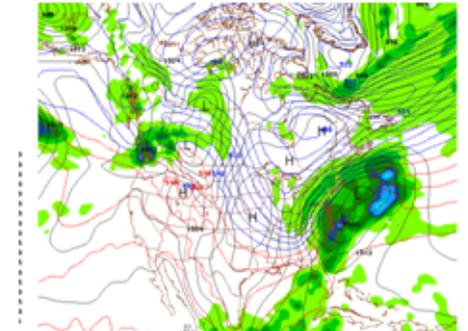
NWS Alaska Region
Anchorage WFO
Fairbanks WFO



CrIS & ATMS SDRs – for data assimilation into numerical weather prediction (NWP) models



National Centers
for Environmental
Prediction (NCEP)



NWS/NCEP GDAS – NWP Data Assimilation (covering the time period for: March 2014)

Daily Average (RECEIVED)

	00Z	06Z	12Z	18Z	Total
ATMS	661,550	658,445	659,555	660,323	2,639,873
CrIS	33,244,481	33,209,169	33,330,465	33,191,693	132,975,808
HIRS4	10,613,244	10,556,369	10,441,145	10,549,585	42,160,343
AMSU-A	15,722,630	16,003,873	16,339,462	15,487,544	63,553,509
MHS	14,240,432	13,824,664	13,724,892	13,825,513	55,615,501
GOME	107,798	107,789	105,627	107,941	429,155
IASI	363,066,786	355,270,608	350,559,872	364,489,233	1,433,386,499
Total Number of Observations					

Daily Average (SELECTED)

	00Z	06Z	12Z	18Z	Total
ATMS	253,424	252,711	252,509	253,110	1,011,754
CrIS	4,941,416	4,937,000	4,952,361	4,930,124	19,760,901
HIRS4	733,822	734,141	724,042	733,046	2,925,051
AMSU-A	998,096	994,271	983,831	989,992	3,966,190
MHS	246,630	240,423	238,482	241,149	966,684
GOME	8,334	8,386	8,251	8,268	33,239
IASI	13,760,992	13,442,259	13,361,808	13,744,473	54,309,532
Total Number of Observations					

NDE Operational Products (Sep 27th, 2013)

Application Short Name	Application Name	Product Name	Format	Satellite
ATMS-SDR	ATMS SDR radiances	ATMS SDR radiances 22 channels (NDE)	BUFR	SNPP
CRIS-SDR-399	CrIS SDR radiances 399	CrIS IR sounder SDR radiances 399 channels for NWP data assimilation (NDE)	BUFR	SNPP
CRIS-SDR-1305	CrIS SDR radiances 1305	CrIS IR sounder SDR radiances 1305 channels for NWP data assimilation (NDE)	BUFR	SNPP
VIIRS-EDR-I01	VIIRS EDR-I01	VIIRS EDR Band I01 0.64 μm (NDE)	netCDF	SNPP
VIIRS-EDR-I04	VIIRS EDR I04	VIIRS EDT Band I04 3.74 μm (NDE)	netCDF	SNPP
VIIRS-EDR-I05	VIIRS EDR I05	VIIRS EDT Band I05 11.45 μm (NDE)	netCDF	SNPP

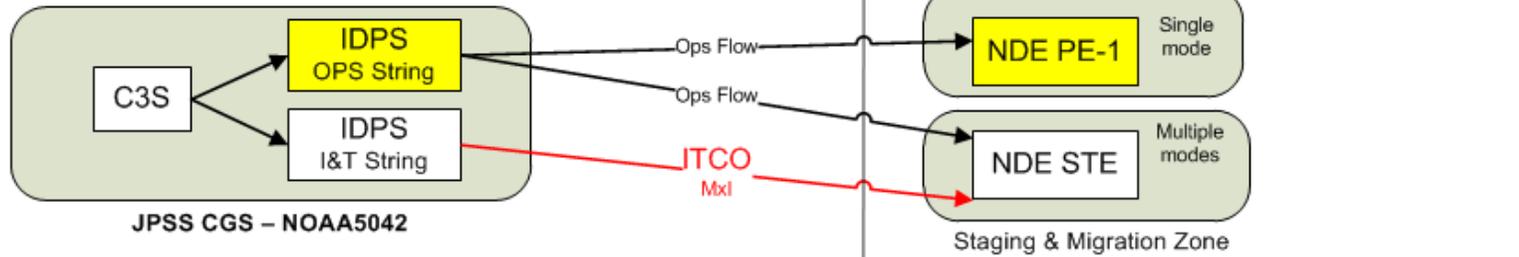
- NDE PE1 (Production Environment) ORR completed on Sep 17th, 2013.
- Operational on Sep 27th, 2013
- Customers: NCEP, NWS-AWIPS (NCF) and EUMETSAT

NDE Operational Products (Today)

Application Short Name	Application Name	Product Name	Format	Satellite
ACSPO SST	Advanced Clear Sky Processor for Oceans (NDE) - SST	SST, Clear Sky Mask	netCDF	SNPP
AOT	Aerosol Optical Thickness	VIIRS Aerosol Optical Thickness (NDE)	BUFR	SNPP
ATMS-SDR	ATMS SDR radiances	ATMS SDR radiances 22 channels (NDE)	BUFR	SNPP
CRIS-SDR-399	CrIS SDR radiances 399	CrIS IR sounder SDR radiances 399 channels for NWP data assimilation (NDE)	BUFR	SNPP
CRIS-SDR-1305	CrIS SDR radiances 1305	CrIS IR sounder SDR radiances 1305 channels for NWP data assimilation (NDE)	BUFR	SNPP
NUCAPS Level 1	NOAA Unique CrIS ATMS product System Level 2	CrIS/ATMS Atmos Temp Profile CrIS/ATMS Atmos Moisture Profile	netCDF	SNPP
MIRS ATMS	Microwave Integrated Retrieval System (NDE) - ATMS	MIRS ATMS granule image products MIRS ATMS granule SND products MIRS ATMS tailoring image products MIRS ATMS tailoring SND products	netCDF	SNPP
OMPS-NP	OMPS nadir profile	Ozone nadir profile (NDE)	BUFR	SNPP
OMPS-TC	OMPS total column	Ozone total column (NDE)	BUFR	SNPP
VIIRS-EDR-I01	VIIRS EDR-I01	VIIRS EDR Band I01 0.64 μm (NDE)	netCDF	SNPP
VIIRS-EDR-I04	VIIRS EDR I04	VIIRS EDT Band I04 3.74 μm (NDE)	netCDF	SNPP
VIIRS-EDR-I05	VIIRS EDR I05	VIIRS EDT Band I05 11.45 μm (NDE)	netCDF	SNPP
VPW	VIIRS Polar Winds	VIIRS Polar Winds (NDE)	BUFR, netCDF	SNPP

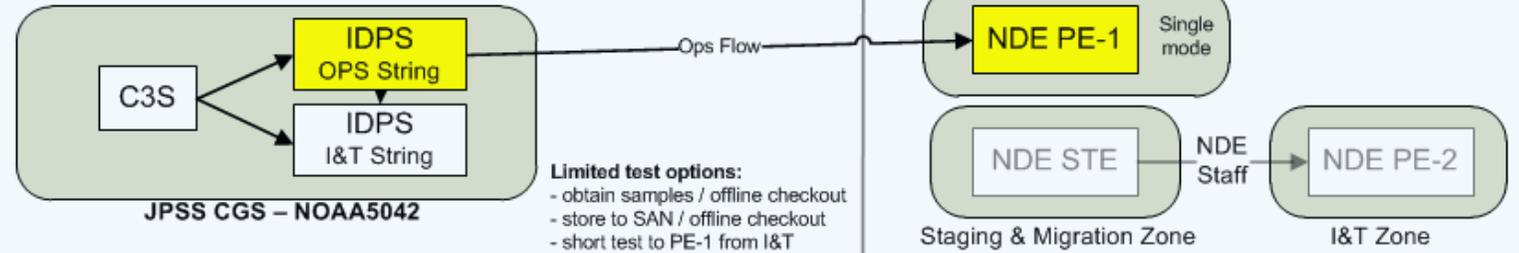
- Green Vegetation Fraction
- Microwave Tropical Cyclone Products

Post-ORR to early-Mar

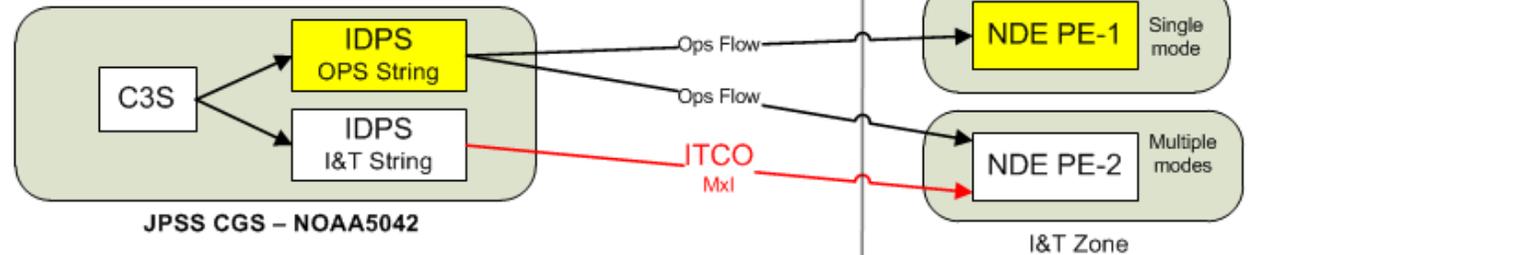


early-Mar to ORR

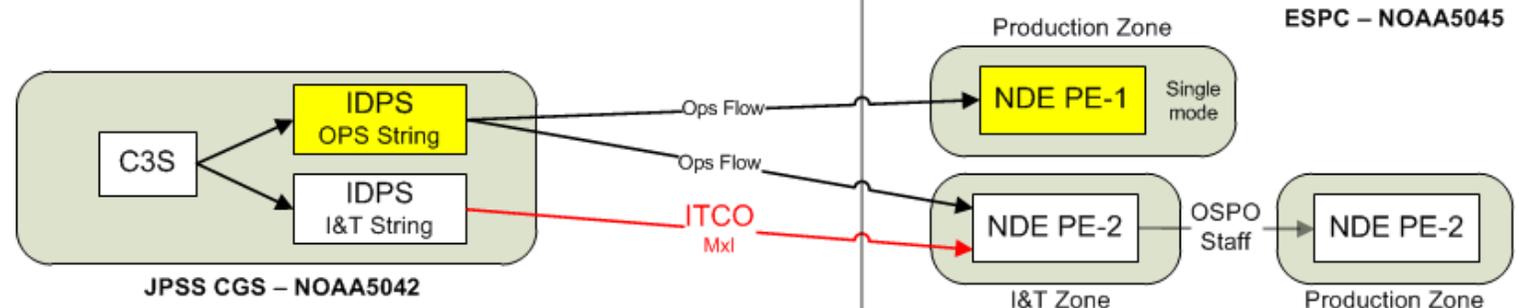
Current Configuration



PE-2 Handover Jun 18



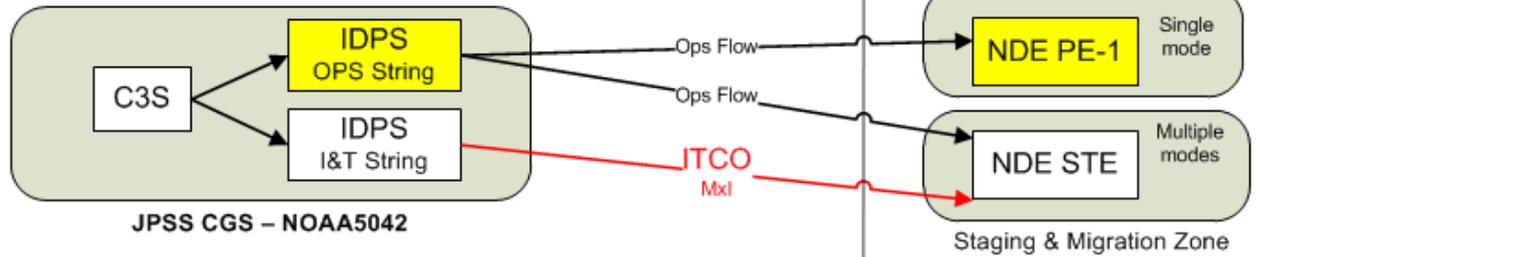
Post PE-2 Handover (migration to Production Zone)



Operational PG/PD Systems

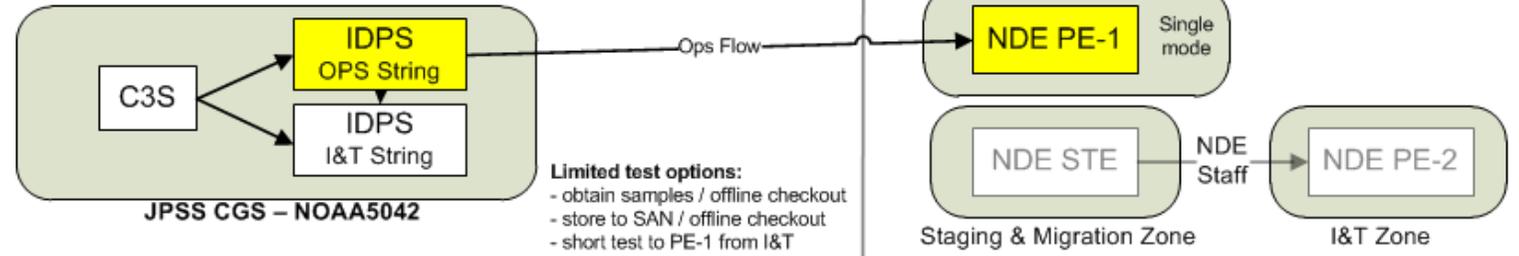
Note - PE-2 is a Test Environment (not a backup to PE-1)

Post-ORR to early-Mar

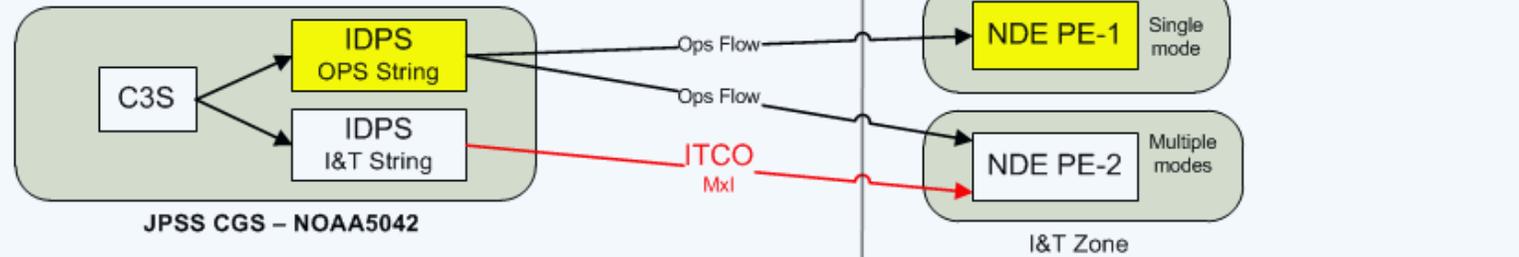


early-Mar to ORR

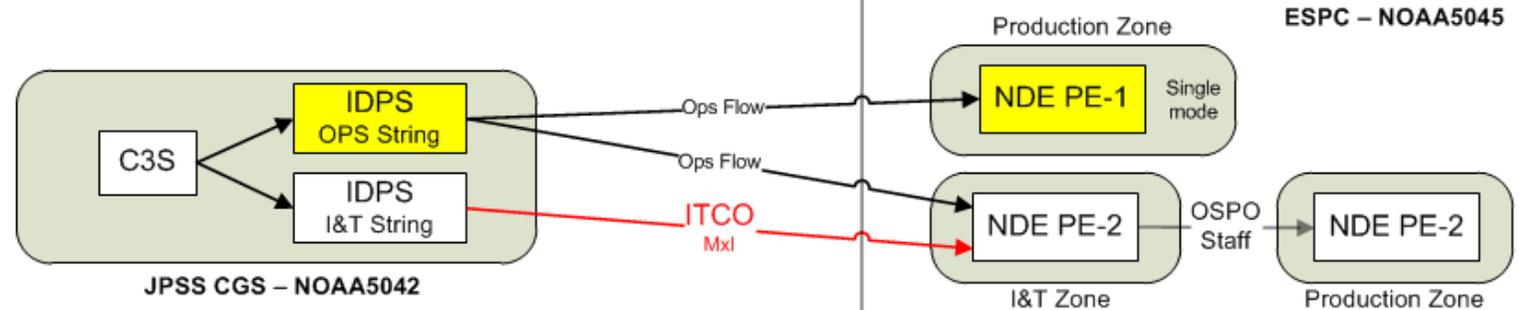
Current Configuration



PE-2 Handover Jun 18



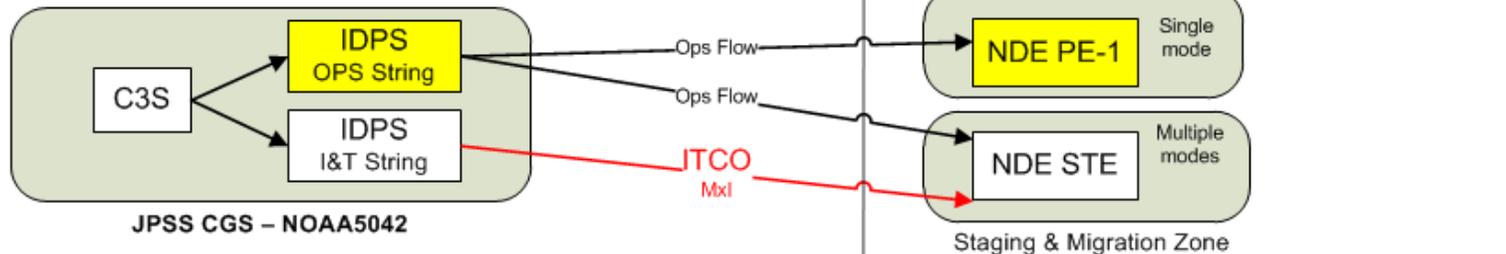
Post PE-2 Handover (migration to Production Zone)



Operational PG/PD Systems

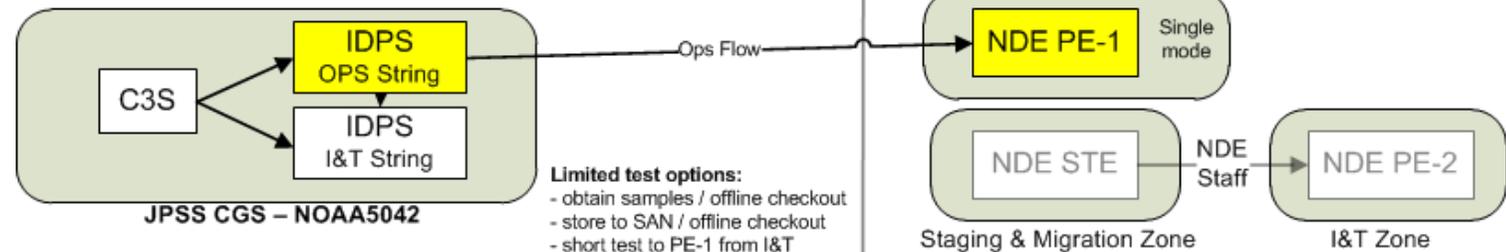
Note - PE-2 is a Test Environment (not a backup to PE-1)

Post-ORR to early-Mar



early-Mar to ORR

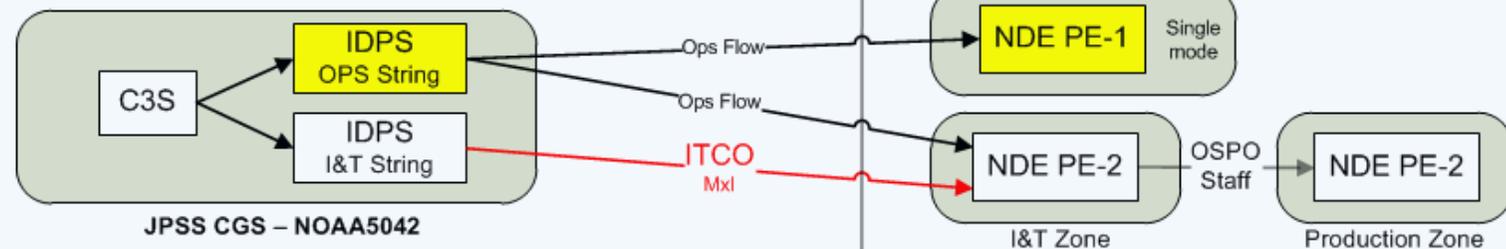
Current Configuration



PE-2 Handover Jun 18



Post PE-2 Handover (migration to Production Zone)

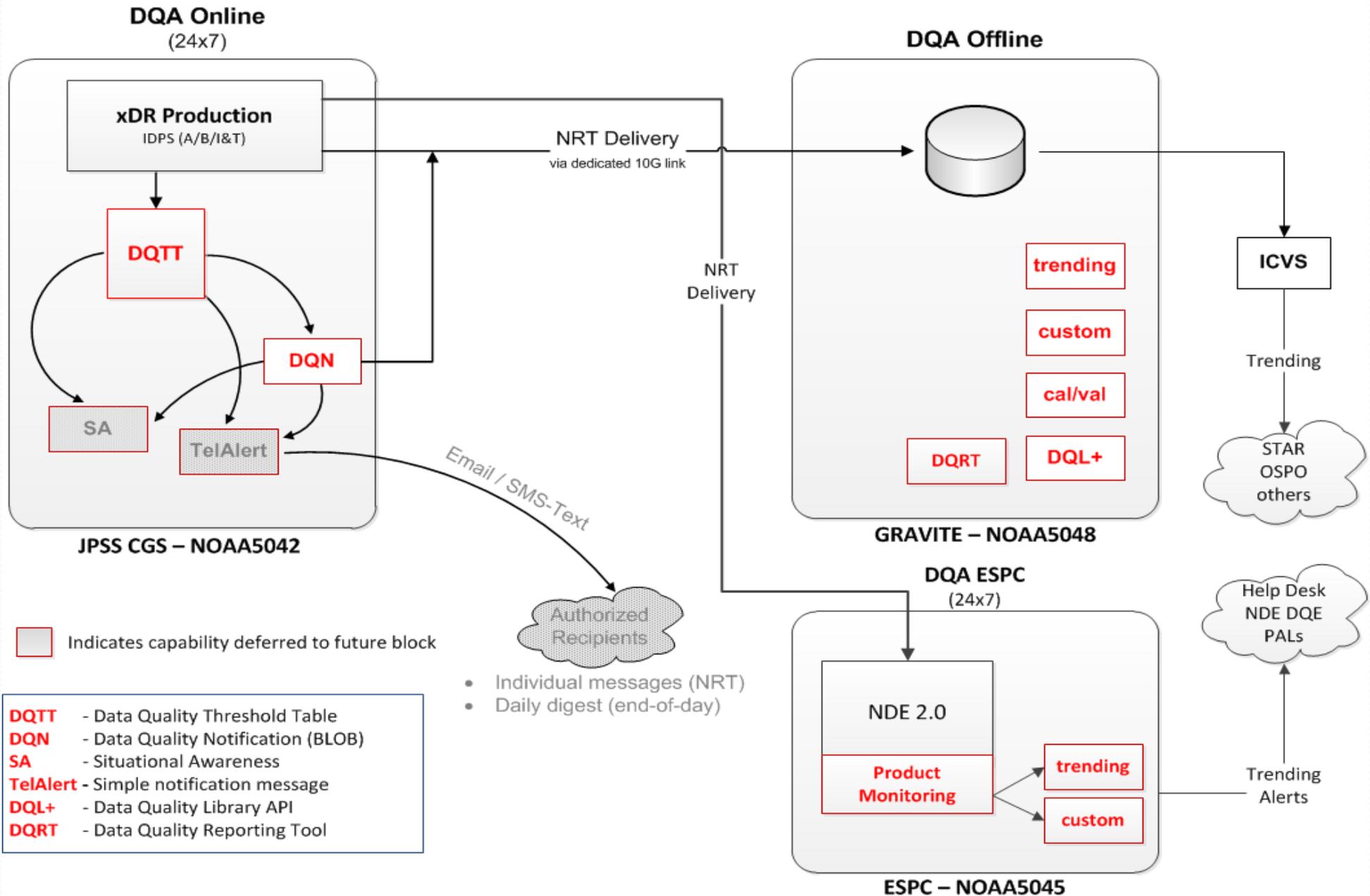


Operational PG/PD Systems

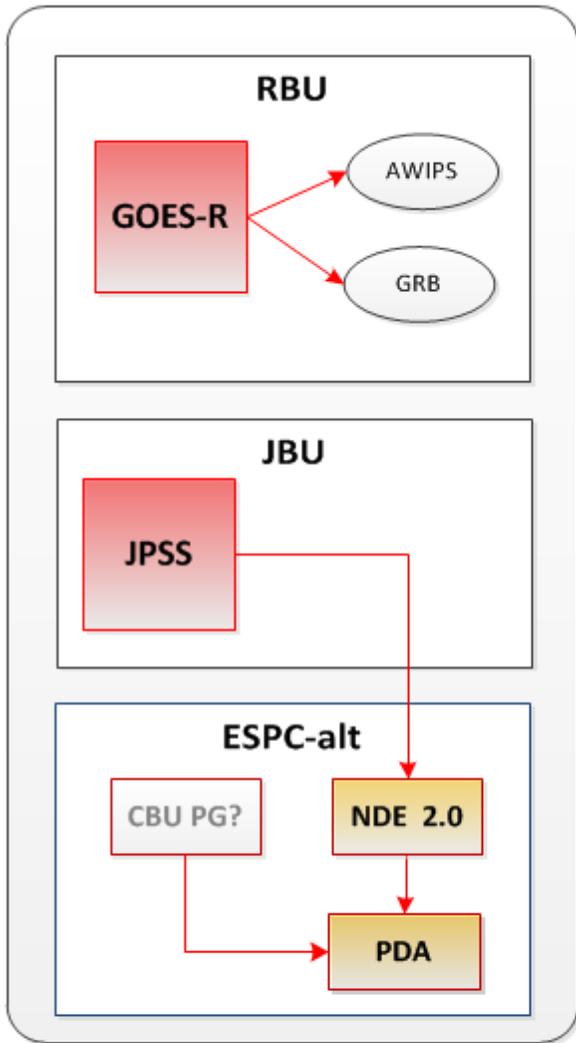
Note - PE-2 is a Test Environment (not a backup to PE-1)

Future Direction

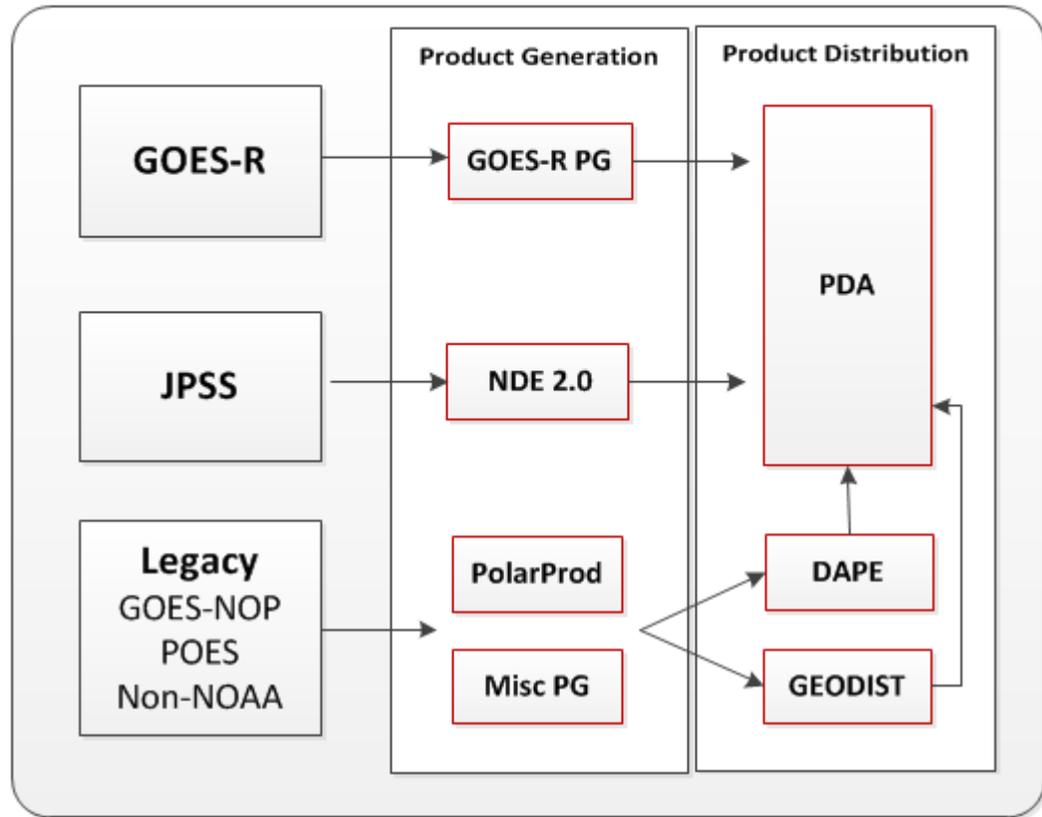
- Data Quality Assurance (DQA)
- PDA – Enterprise Distribution
- Backup Facility (Fairmont, WV)
 - Consolidated Backup (CBU)
- Readiness Activity approach for ground segment upgrade
 - JPSS Block 2.0
 - NDE 2.0 and PDA
- Schedules



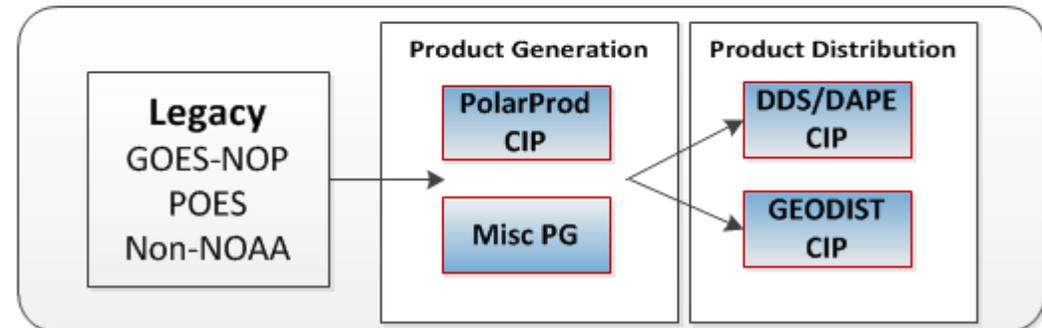
CBU



NSOF (nominal operations)



CIP



■ Hot Back Up

■ Warm Back Up

■ Cold Back Up

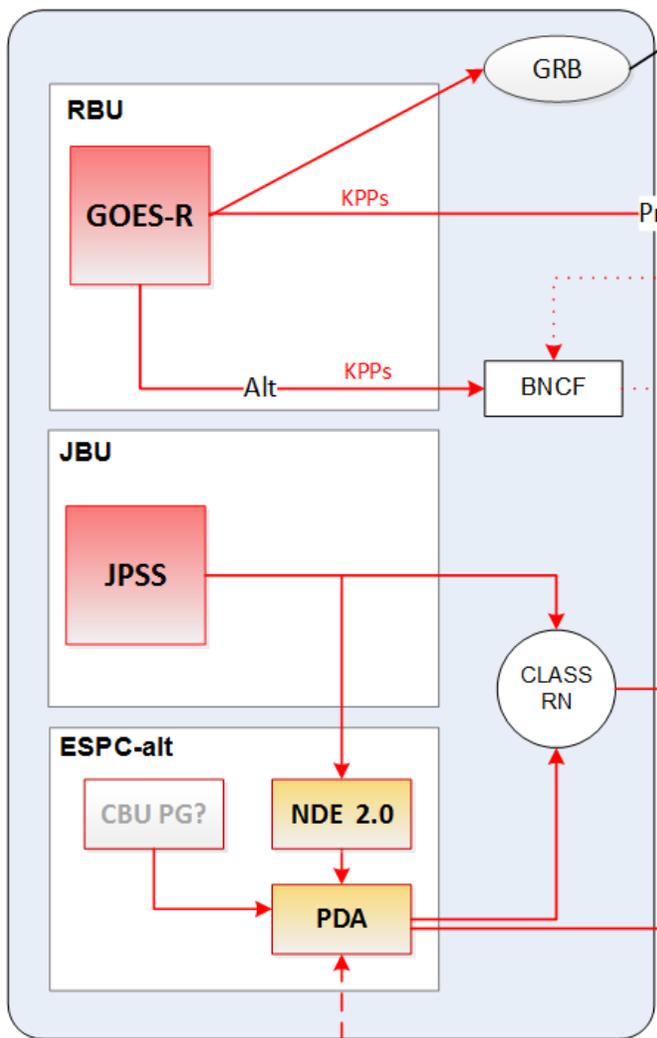
CBU – Consolidated Back Up

RBU – GOES-R Back Up

JBU – JPSS Back Up

CIP – Critical Infrastructure Protection

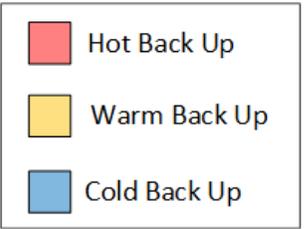
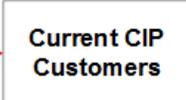
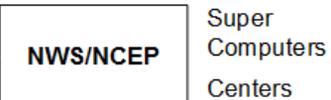
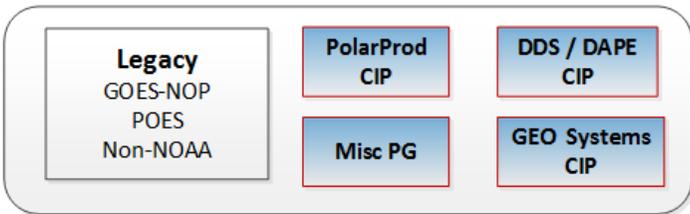
CBU (Faimont, WV)



NWS Centers and WFOS w/ GRB Receivers
External Users w/ GRB Receivers



CIP (Wallops, VA)



Primary

Primary

Alt

KPPs

KPPs

Primary

DoD PoP

via internet

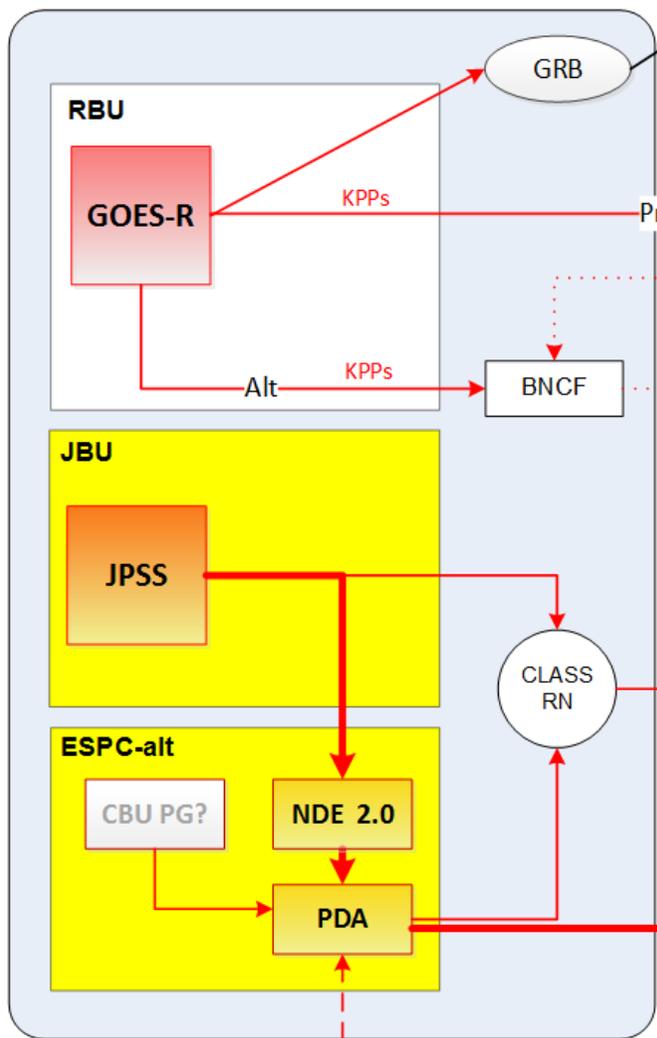
via internet

MPLS Fail-over

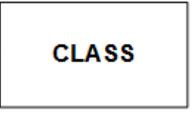
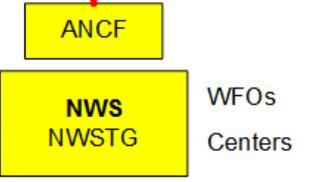
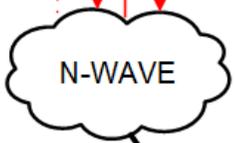
-Data sync to CBU?-

* is NCEP POP or alternate NWS POP

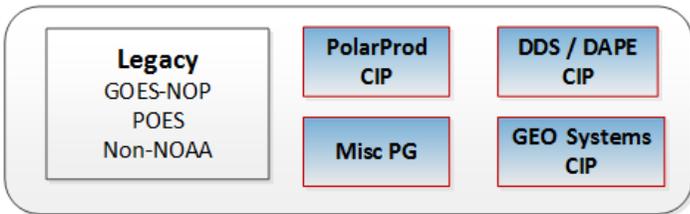
CBU (Faimont, WV)



NWS Centers and WFOS w/ GRB Receivers
External Users w/ GRB Receivers



CIP (Wallops, VA)

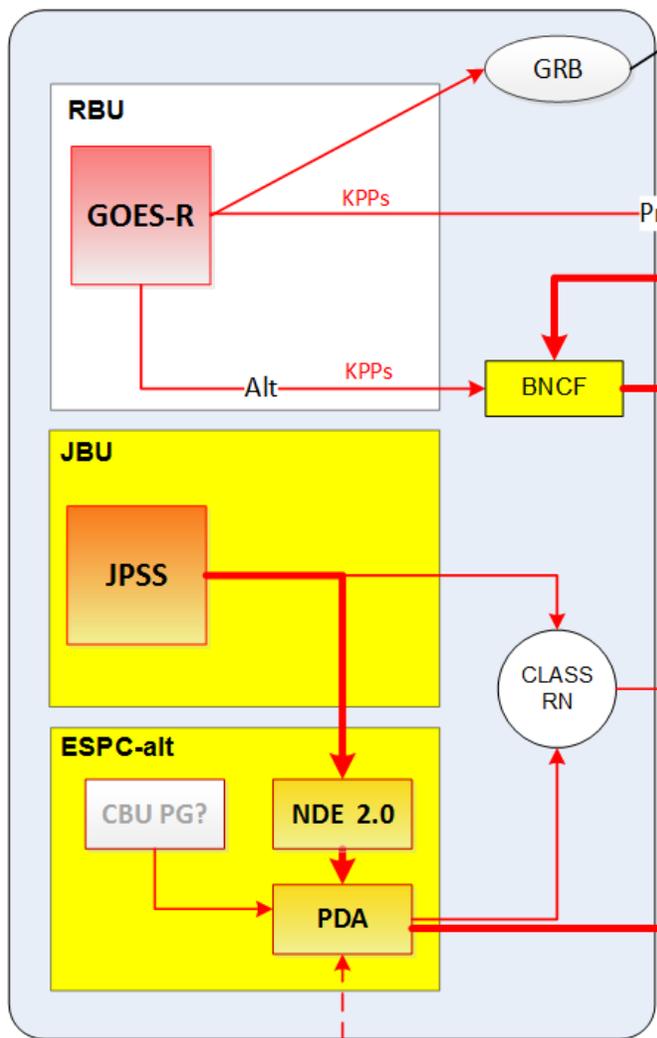


- Hot Back Up
- Warm Back Up
- Cold Back Up

-Data sync to CBU?-

* is NCEP POP or alternate NWS POP

CBU (Faimont, WV)



NWS Centers and WFOS w/ GRB Receivers
External Users w/ GRB Receivers

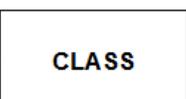
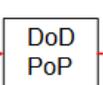
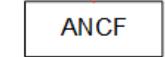
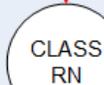
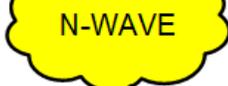
Primary

Alt

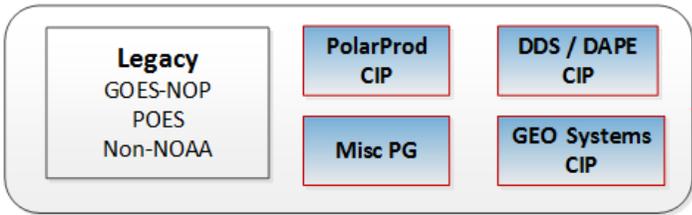
KPPs

KPPs

Primary



CIP (Wallops, VA)



MPLS
Fail-over

Current CIP
Customers

-Data sync to CBU?-

* is NCEP POP or alternate NWS POP

- Hot Back Up
- Warm Back Up
- Cold Back Up

Readiness Activities – Approach

- Primary objective: provide frequent opportunities for external users to test with the systems, when possible.
- Continue outreach and establish training opportunities for all users (via webinars, and/or recorded sessions) on how to use the core and full capabilities of the system.
- Ensure key customers are kept informed of external user interface activation and interface test schedules early on for their planning process (i.e. resource management).
- Potential constraints:
 - resource availability
 - other test commitments (GOES-R, internal testing, etc.)
 - infrastructure (i.e. network bandwidth capacity, etc.)
 - operational priorities (critical weather events and/or other factors)
 - user availability (competing priorities)



NOAA

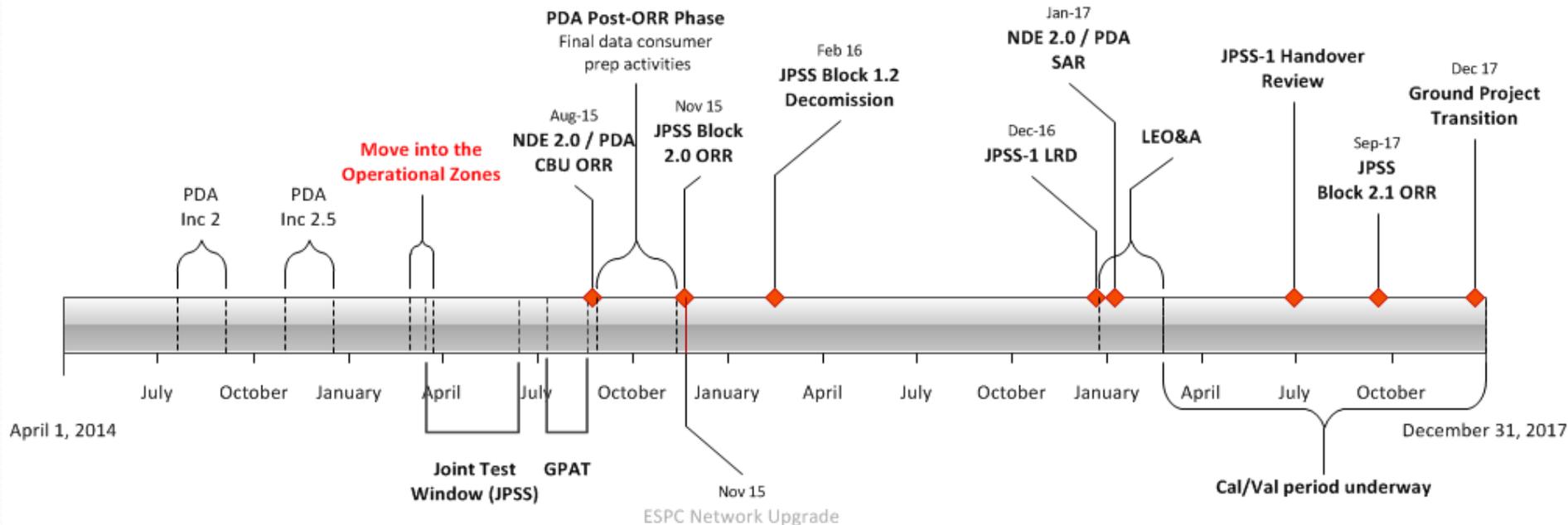
OFFICE OF SATELLITE AND PRODUCT OPERATIONS

NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

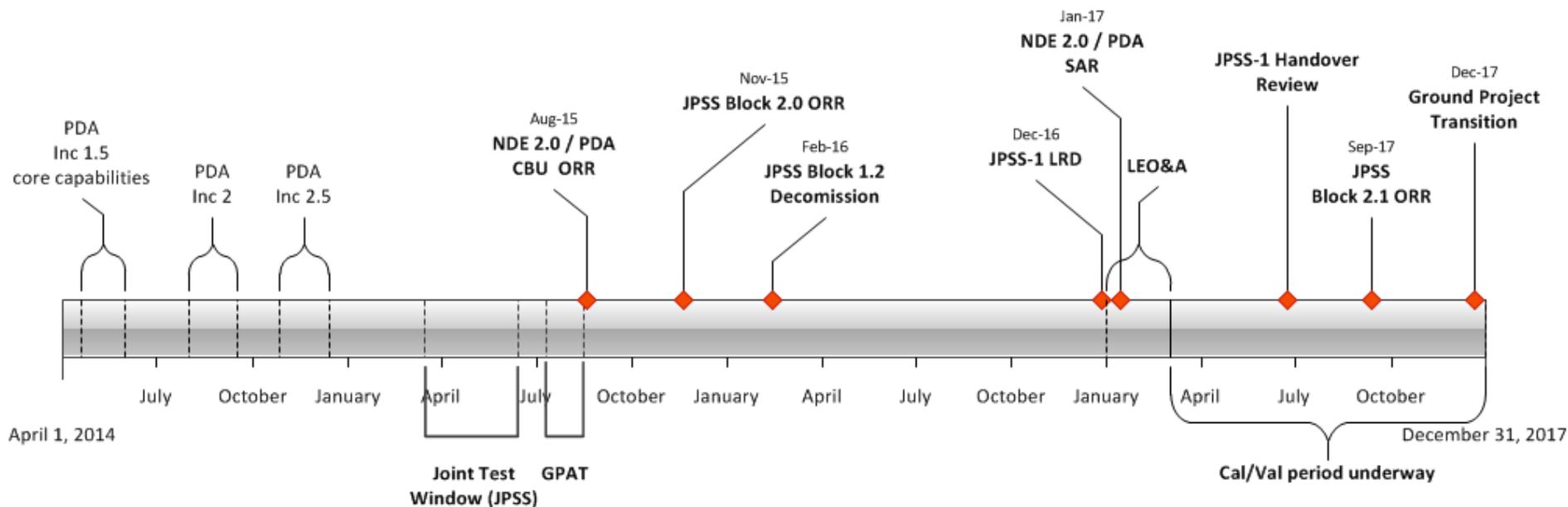
User Change Impact Table

Data Consumer	Ground Segment Upgrade	JPSS-1 Time Period	NSOF → CBU	CBU → NSOF
NWS (AWIPS) - NWSTG - NCF	<ul style="list-style-type: none"> interface (PDA) Data mgmt method IP/network (user's primary POP) 	<ul style="list-style-type: none"> xDR changes cal/val status 	<ul style="list-style-type: none"> IP/network (alt POP) Coordinated switching 	<ul style="list-style-type: none"> IP/network (user's primary POP) coordinated switching
NWS (NCEP) - WCOSS - Nat'l Centers	<ul style="list-style-type: none"> Interface (PDA) Data mgmt method IP/network (user's primary POP) 	<ul style="list-style-type: none"> xDR changes cal/val status BUFR changes 	<ul style="list-style-type: none"> IP/network (alt POP) Coordinated switching 	<ul style="list-style-type: none"> IP/network (user's primary POP) coordinated switching
DoD - AFWA - FNMOC - NAVO	<ul style="list-style-type: none"> Interface (PDA) Data mgmt method IP/network (user's primary POP) 	<ul style="list-style-type: none"> xDR changes cal/val status PDA DAPE service functionality 	<ul style="list-style-type: none"> IP/network (alt POP) Coordinated switching 	<ul style="list-style-type: none"> IP/network (user's primary POP) coordinated switching
EUMETSAT	<ul style="list-style-type: none"> Interface (PDA) Data mgmt method IP/network (TAT) 	<ul style="list-style-type: none"> xDR changes cal/val status BUFR changes 	<ul style="list-style-type: none"> IP/network (internet) Coordinated switching 	<ul style="list-style-type: none"> IP/network (TAT) coordinated switching
Other vital operational NOAA partners	<ul style="list-style-type: none"> Interface (PDA) Data mgmt method IP/network (internet) 	<ul style="list-style-type: none"> xDR changes cal/val status 	<ul style="list-style-type: none"> IP/network (internet) Coordinated switching 	<ul style="list-style-type: none"> IP/network (internet) Coordinated switching
All others	<ul style="list-style-type: none"> Interface (PDA) Data mgmt method IP/network (internet) 	<ul style="list-style-type: none"> xDR changes cal/val status BUFR changes 	<ul style="list-style-type: none"> Service not available Directed to 3rd party data rely services 	<ul style="list-style-type: none"> Service not available Directed to 3rd party data rely services

NSOF PDA I&T (String 2) – becomes the OSPO operational system in 2015



CBU PDA I&T – becomes the CBU operational system in 2015



Summary

- The S-NPP NDE 1.0 real-time product generation/distribution system has been operational since Sep 27, 2013 and serving key customers with vital mission needs.
- Future activities:
 - In 2015, there are significant transition / upgrade activities occurring: JPSS Block 2.0, NDE 2.0, PDA and CBU (backup facility).
- Challenges:
 - Infrastructure constraints (network capacity)
 - Supporting significant transition activities – ESPC, JPSS and GOES-R.

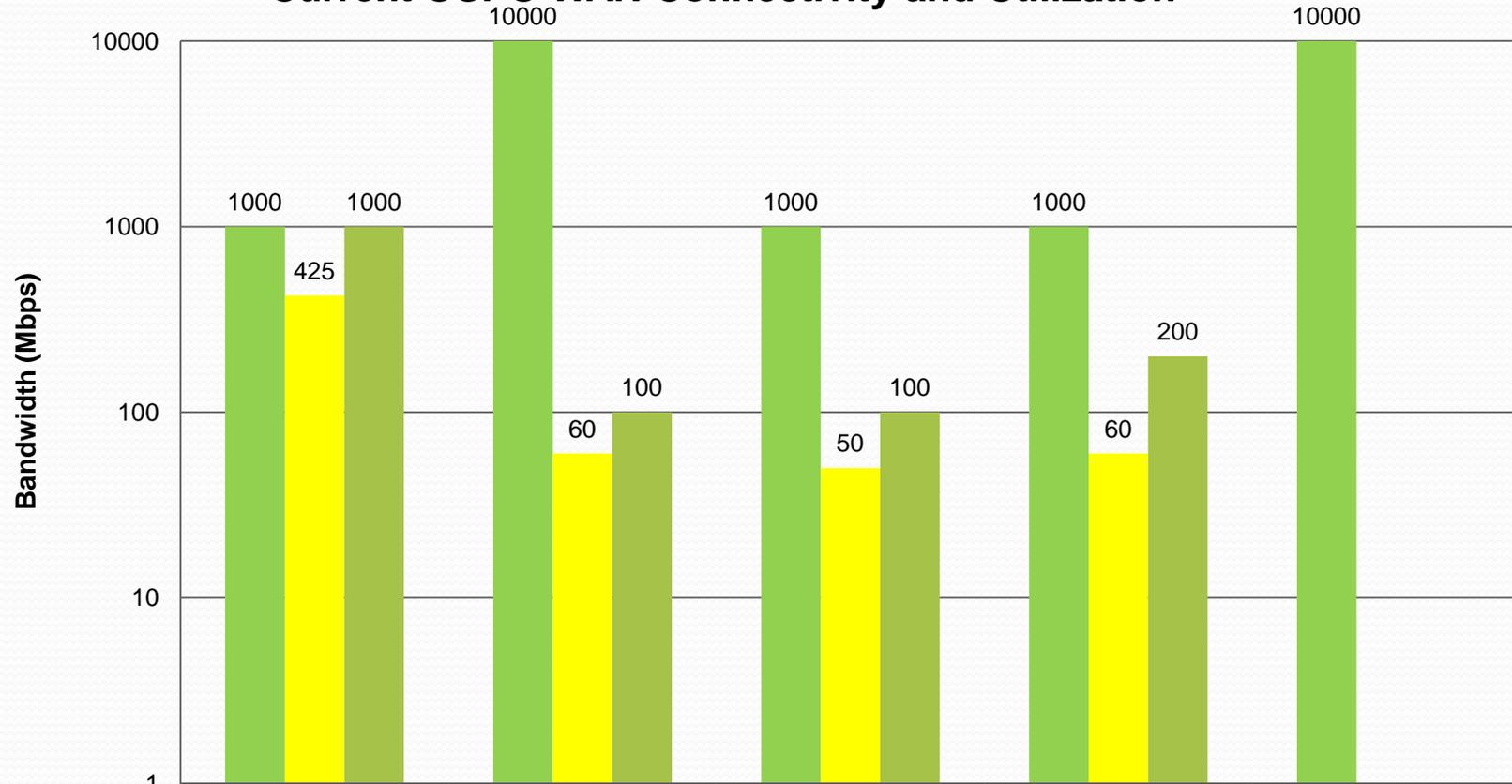
Questions or Comments





Background Slides

Current OSPO WAN Connectivity and Utilization



	NOAA MAN	NCEP PoP	PON (to NCWCP)	NIC	N-WAVE
■ Full Capacity	1000	10000	1000	1000	10000
■ Average Utilization	425	60	50	60	0
■ Spikes	1000	100	100	200	0

External internet traffic to STAR and other authorized partners.

NCEP, NWS & DOD
Does not include IDPS AFWA connection

OSPO/SPSD

10G example

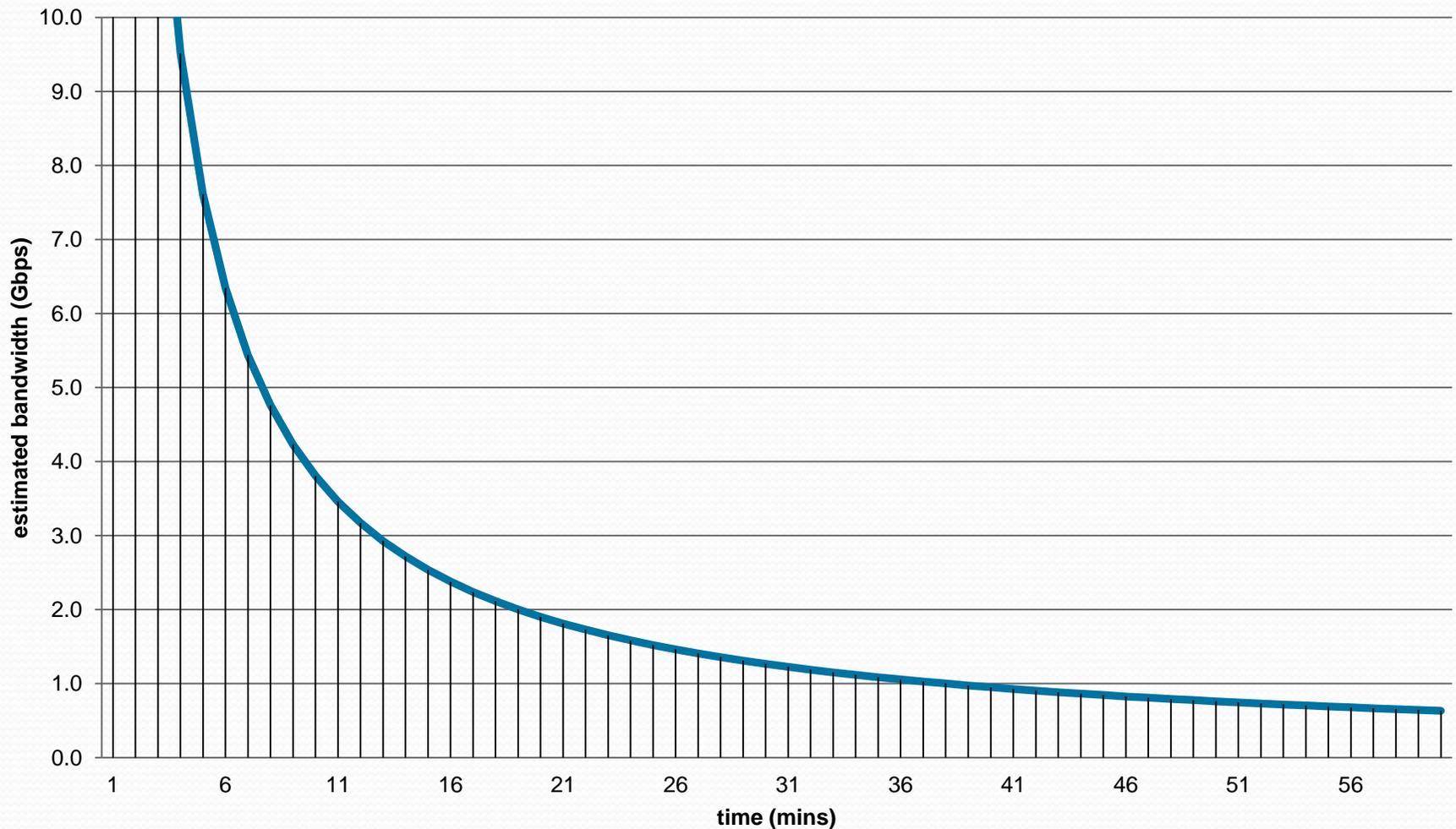


Figure 1. Estimated bandwidth necessary to transfer one full orbit of SNPP data as a function of time. SNPP generates a data volume of approximately 4 TB/day (uncompressed) - equates to approximately 290 GB/orbit . The depicted bandwidth curve is rough estimate (does not include network overhead or contention).

Definition of Hot, Warm and Cold Backup

- **Hot Backup** - system is fully functional and producing data; data is ready for distribution to end points, but delivery is a suspended activity until it is needed.
- **Warm Backup** - system is fully functional and standing by in a ready state; minimal routine activity such as synchronizing configurations and other activity may be ongoing within the system to maintain its readiness state.
- **Cold Backup** - system is functional, requires manual intervention to place it into a mode capable of becoming operational. Full functionality may take several hours or several days before reaching nominal operational capacity.



Example of COOP activation notice to External Users

Subject: Administrative Notification of ESPC CIP Activation:

***Topic: *Notification of ESPC CIP Activation**

***Date/Time**:** * September 30, 2010 2055 UTC * *

***Product(s) or Data Impacted:** *CIP Phase 1-3 Products.**

***Date/Time of Initial Impact:** * September 3, 2010 2030 UTC* *

Date/Time of Expected End: Unknown* *

***Length of Outage:** *This exercise will not effect normal ESPC data distribution.**

***Details/Specifics of Change:** * The ESPC Critical Infrastructure Protection (CIP) site will begin Activating the CIP in support of the Production Zone Network Outage. Products will meet their optimum capability 24 hours after activation.** The CIP site, in Wallops Island, will remain activated until Further Notice.* *

* *

Contact Information for Further Information:

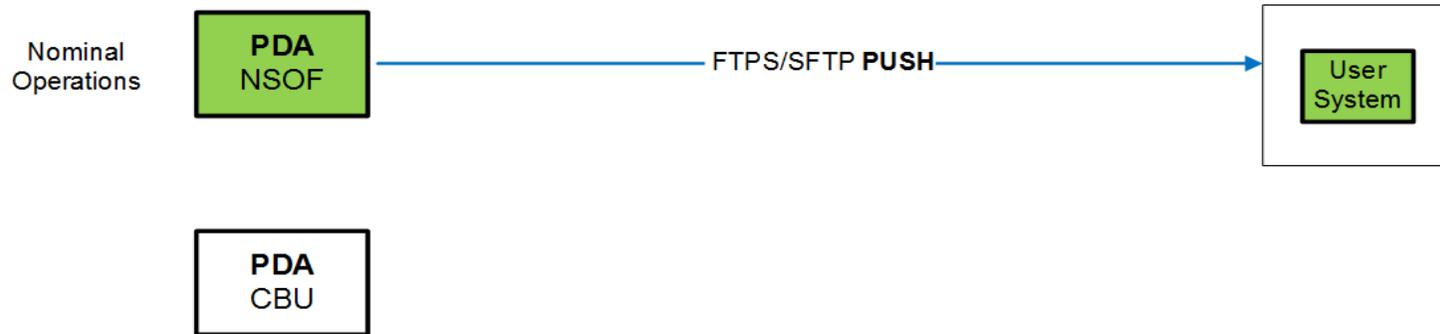
ESPC Operations at ESPCOperations@noaa.gov at 301-817-3880

ESPC Notifications (WMO Bulletins):

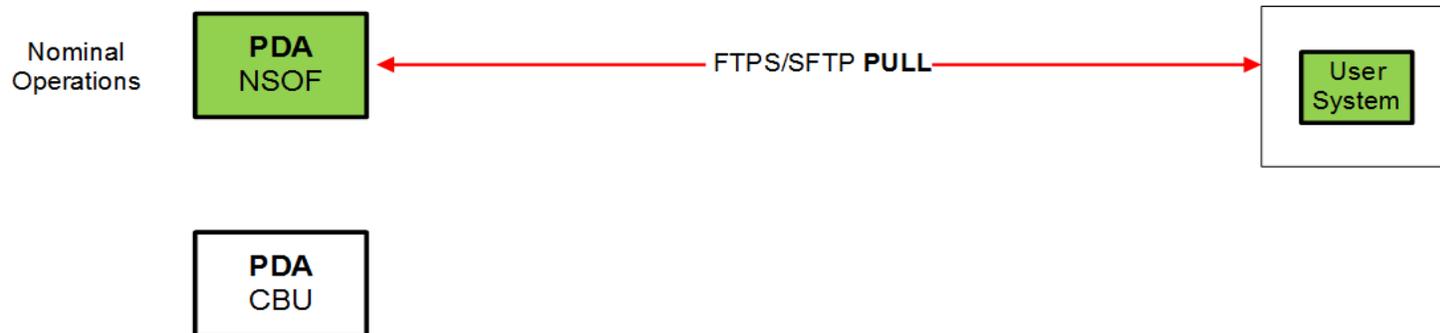
- **NOUS71 KNES** (AWIPS ID ADANES) for urgent notices (e.g., outages or anomalies).
- **NOUS72 KNES** (AWIPS ID ADMNES) for routine notices.

Nominal Operations (NSOF)

PUSH Data Consumers



PULL Data Consumers



Blue denotes data PUSH

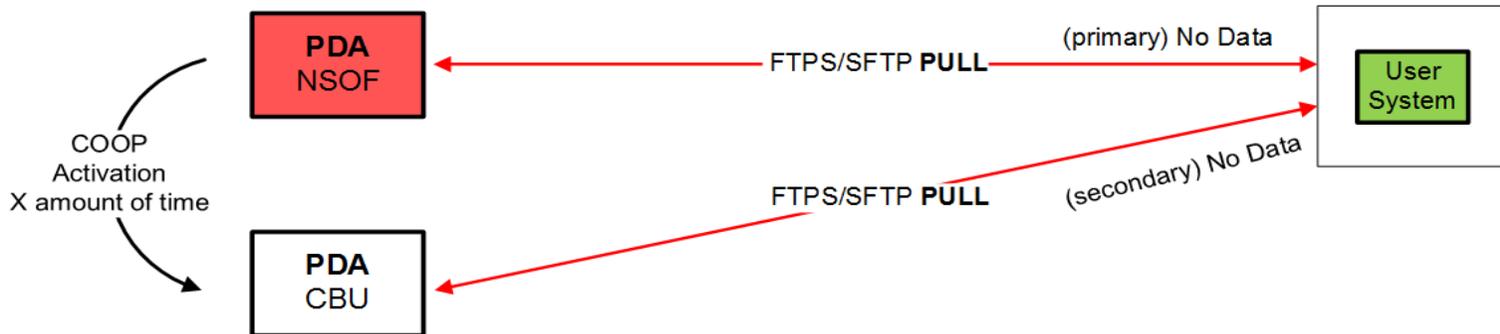
Red denotes data PULL

Transition of Operations (NSOF → CBU)

PUSH Data Consumers



PULL Data Consumers

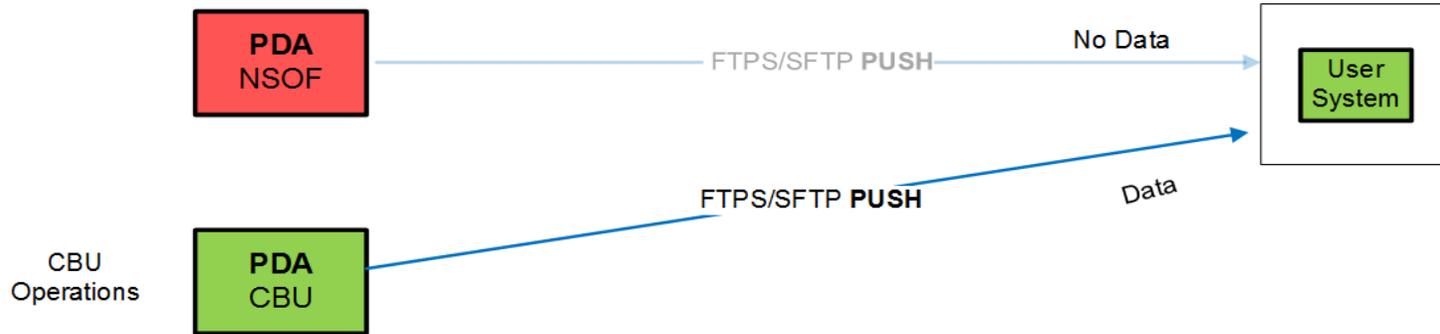


Blue denotes data PUSH

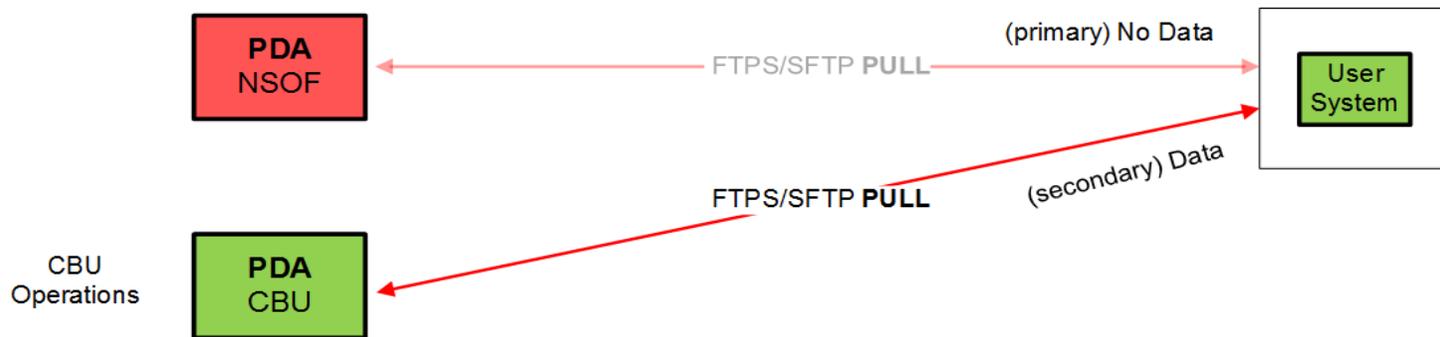
Red denotes data PULL

CBU Operations

PUSH Data Consumers



PULL Data Consumers

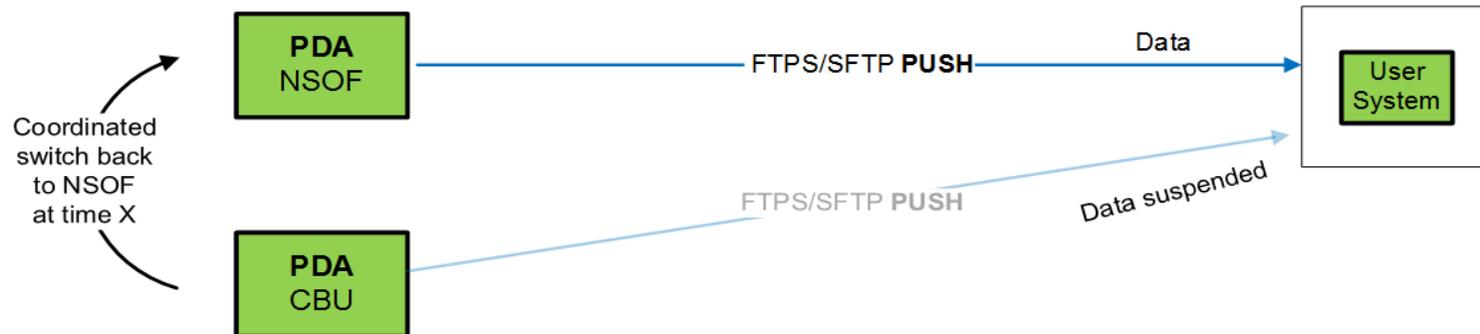


Blue → denotes data PUSH

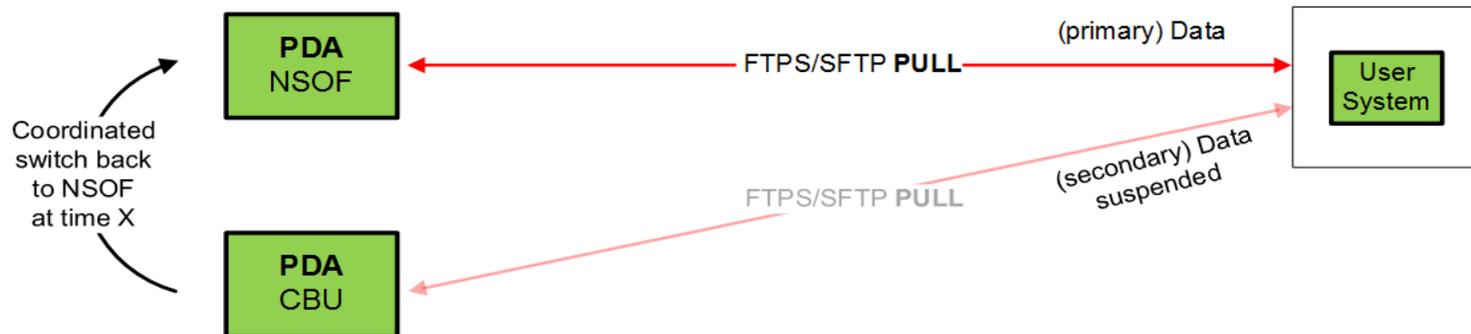
Red ↔ denotes data PULL

Transition of Operations (CBU → NSOF)

PUSH Data Consumers



PULL Data Consumers



Blue denotes data PUSH

Red denotes data PULL