Enterprise Distribution
Product Distribution and Access (PDA)

Committee for Operational Processing Centers (COPC) F2F

Chris Sisko
NESDIS/OSPO

Telephone: 301-817-4783
Email: Chris.A.Sisko@noaa.gov

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Presentation Outline

- Environmental Satellite Processing Center (ESPC)
- Enterprise PG/PD
  - PDA Ingress and Egress Rates
  - High Level Data Flow Diagram
  - User Integration Status
  - Schedule Overview
  - Transition to Operations Timeline
- Summary
- Background Slides
Environmental Satellite Processing Center (ESPC)

- ESPC provides environmental satellite data to near real-time data users, international partners and other approved stakeholders supporting near real-time missions – i.e. calibration/validation activities, data quality monitoring and anomaly response
- ESPC systems also provide data to CLASS and NCEI for archive purposes and for distribution to non real-time consumers such as the science community
- ESPC is comprised of a number heterogeneous systems, often mission specific, performing the following functions
  - Data Ingestion
  - Processing
  - Distribution
- Locations: NSOF (Suitland, MD), WCDA (Wallops, VA) and CBU (Fairmont, WV)
- Backup sites
  - WCDA (Wallops CDA, VA) - ESPC CIP
  - CBU (Fairmont, WV) - PRIMARY BACKUP for JPSS
Enterprise Product Generation (PG) and Distribution (PD)

- ESPC has a new enterprise data processing and distribution system for near real-time users.

- New local area network enclave integrated within ESPC system boundary:
  - Implements greater security controls commensurate with a HIGH security system as defined by NIST FIPS 199
  - Provides far greater network capacity/performance (internal and external)
  - Includes a scalable architecture

- NDE 2.0 segment (product generation)
  - Designed as a enterprise PG system
  - NDE 1.0 has been operating since 2013 at above 99.9%

- PDA segment (product distribution)
  - Utilizes secure data transfer protocols
  - Provides multi-mission distribution for both GOES-R and JPSS missions
# Product Distribution and Access (PDA) Details

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDA Ingress Capacity</td>
<td>14.25 TB/day</td>
</tr>
<tr>
<td>GOES-R Data Production</td>
<td>GOES-R will generate ~1.25 TB/day (compressed)</td>
</tr>
<tr>
<td>JPSS-1 Data Production</td>
<td>JPSS-1 will generate ~1.5 TB/day (compressed) or ~4 TB/day (uncompressed)</td>
</tr>
<tr>
<td>PDA Egress Capacity</td>
<td>35.92 TB/day</td>
</tr>
<tr>
<td>PDA to DoD</td>
<td>4 - 5 TB/day</td>
</tr>
<tr>
<td>Peak Throughput</td>
<td>23.5 Gbps (initial)</td>
</tr>
<tr>
<td>Network to Edge</td>
<td>Scalable to 120 Gbps</td>
</tr>
<tr>
<td>NWAVE</td>
<td>10 Gbps (primary &amp; back-up)</td>
</tr>
</tbody>
</table>

TB – Terabyte (1 TB = 10^{12} bytes)  
Gbps – Gigabit per second (1 Gigabit = 10^9 bits per second)
Data Distribution Latency as a Function of Time and Bandwidth

Example: Distribution of 200 GB of data from end to end in 5 minutes would require approximately 5 Gbps of dedicated bandwidth throughput.
High Level System Architecture

• **Nominal Operations from NSOF** (Suitland, MD)
  o Enterprise Infrastructure; uses NWAVE Wide Area network
  o NDE 2.0 product generation; running JPSS, GCOM and eventually GOES-R BUFR production for satellite derived winds
  o PDA distribution; providing secure push/pull data transfers to all approved users

• **Backup/COOP Operations from CBU** (Fairmont, WV)
  o Enterprise Infrastructure; uses NWAVE Wide Area network
  o NDE 2.0 product generation; running JPSS (prime mission sensor only for KPPs/Critical products) and GCOM
  o PDA distribution providing only; JPSS (prime mission sensor only for KPPs/Critical products) and GCOM
  o There is no GOES-R product access from the CBU PDA.
Future ESPC Data Operations (To-Be State)
Future ESPC Data Operations (To-Be State)

Nominal Operations (NSOF)

Legend:
- Nominal Ops
- Back Up Ops
- Flows activated during Backup
- Hot Back Up
- Warm Back Up
- Cold Back Up
Future ESPC Data Operations (To-Be State)

Backup/COOP Operations (CBU/APC)
Integration Status

- PDA status from end user perspective:
  - Integrated and tested to date are:
    - USAF 557th
    - USN FNMOC
    - USN NAVO
  - Ongoing integration efforts:
    - USN JTWC

Operational Prioritization on PDA:
[1 – 5] where 1 is the highest priority given on the system and is primarily used to shed lower priority users in the event system resources become limited due to system or some other capacity limitation.
## Current User Status – DoD and Others

<table>
<thead>
<tr>
<th>Interfaces</th>
<th>Integration Status</th>
<th>Ops Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSOF Ops</td>
<td>CBU</td>
</tr>
<tr>
<td>OAR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td></td>
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<tr>
<td>USN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USAF</td>
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</tr>
<tr>
<td>EUMETSAT – OISFTP</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>EUMETSAT – IDS/MMDS (new)</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>CMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UKMET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico Nat'l Met Service</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>France (CLS/CNES)</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>India NCMRF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NASA/NOAA/NSF</td>
<td>NSIDC</td>
<td></td>
</tr>
<tr>
<td>NASA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Integration Status

- **Active Data Flow (Fully Integrated)**
- **Flow Not Active (Fully Integrated)**
- **Gray** Not Yet Fully Integrated
- **N/A** Not Applicable

### Operational Tier / Prioritization

1. Life & Property / National Interest Missions
2. Int’l Agreement Missions / NRT NOAA-NASA Environmental Missions/ Launch Support-Cal Val
3. External Mission Support (i.e. AR) / Data Preservation /Archive
4. Ops Test Support
5. Mission (Dev) Test Support / Long Term Approved RT Request
6. Prototype / Temporary Approved Dataflows or Tests / R2O
## Current User Status - NWS

<table>
<thead>
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<th>Interfaces</th>
<th>Integration Status</th>
<th>Ops Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSOF Ops</td>
<td>CBU</td>
</tr>
<tr>
<td>AWIPS</td>
<td>ANCF</td>
<td>N/A</td>
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<tr>
<td></td>
<td>BNCF</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>TNCF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AWIPS DD*</td>
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</tr>
<tr>
<td>NWSTG</td>
<td>Primary</td>
<td>OBE</td>
</tr>
<tr>
<td></td>
<td>Backup</td>
<td>OBE</td>
</tr>
<tr>
<td></td>
<td>Dev</td>
<td>OBE</td>
</tr>
<tr>
<td>NWS</td>
<td>WCOSS - Tide</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>WCOSS - Gyre</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>NCO - IDP A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>NCO - IDP B</td>
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</tr>
<tr>
<td></td>
<td>NHC</td>
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<tr>
<td></td>
<td>SWPC</td>
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<tr>
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<td>AWC</td>
<td></td>
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<td></td>
<td>SPC</td>
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</tr>
<tr>
<td></td>
<td>Pacific Region</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>SMG (JSC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOHSRC</td>
<td></td>
</tr>
</tbody>
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### Operational Tier / Prioritization

<table>
<thead>
<tr>
<th>Tier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Life &amp; Property / National Interest Missions</td>
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<tr>
<td>2</td>
<td>Int’l Agreement Missions / NRT NOAA-NASA Environmental Missions/ Launch Support-Cal Val</td>
</tr>
<tr>
<td>3</td>
<td>External Mission Support (i.e. AR) / Data Preservation / Archive</td>
</tr>
<tr>
<td>4</td>
<td>Ops Test Support</td>
</tr>
<tr>
<td>5</td>
<td>Mission (Dev) Test Support / Long Term Approved RT Request</td>
</tr>
<tr>
<td>6</td>
<td>Prototype / Temporary Approved Dataflows or Tests / R2O</td>
</tr>
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</table>
# Current User Status - NESDIS

<table>
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<tr>
<th>Interfaces</th>
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<td></td>
<td>NSOF Ops</td>
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<td>OSPO</td>
<td></td>
<td></td>
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<tr>
<td>GOES-R PPZ</td>
<td>Green</td>
<td>N/A</td>
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<tr>
<td>JPSS CGS</td>
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<td></td>
</tr>
<tr>
<td>Oceanos</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>ESPC SFS</td>
<td>Green</td>
<td>N/A</td>
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<tr>
<td>PolarProd</td>
<td>Green</td>
<td>N/A</td>
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<tr>
<td>DAPE-(DoD-GW)</td>
<td>OBE</td>
<td>OBE</td>
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<tr>
<td>NIC</td>
<td>Yellow</td>
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<tr>
<td>VIIRSDIST</td>
<td>Yellow</td>
<td>N/A</td>
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<tr>
<td>SAB</td>
<td>Yellow</td>
<td>N/A</td>
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<td>Coast Watch*</td>
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<td>Yellow</td>
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<td>NCEI SS</td>
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<tr>
<td>CLASS</td>
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<td>N/A</td>
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<td>STAR</td>
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<td>Dist Servers</td>
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<tr>
<td>CIMSS</td>
<td>Yellow</td>
<td>N/A</td>
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High Level Schedule Drivers

• PDA Operational Readiness Review (ORR) – Nov 15, 2016
  o Scope: PDA 2nd ORR that includes NDE 2.0 production generation

• JPSS Block 2.0 data Operations ORR – Dec 5-9, 2016
  o Scope: product generation and distribution systems; also includes data routing missions from McMurdo

• JPSS Ground Segment ORR – Dec 13, 2016 (TBC)
  o Scope: roll-up ORR of all systems

• Leads us to a transition to operations (TTO) of all the above systems no earlier than Jan 9, 2017
Ground Segment Transition: User Transition Timeline ORR – 120 to TTO + 30 ( Decommission Start )

Pre- Block 2.0 Data Operations

ORR Timeline

- **ORR - 120 days**: Freeze period for on-boarding new users.
- **ORR - 90 days**: Coordinate with users.
- **ORR - 45 days**: NDE 1.0 support final NAB phase.
- **ORR - 30 days**: Formal notification of TTO. All PDA Subscriptions in Place.
- **ORR - 20 days**: Recheck with major stakeholders.

TTO

- **TTO - 2**: Coordinate the exact times for the switch to occur during a back orbit.
- **TTO - 7**: Seven days notice from TTO.
- **TTO = 0**: NDE 1.0 supported on Block 2.0 with NAB.

Post-TTO Timeline

- **TTO + 30**: End of User Transition Period. Decision gate. Start decommissioning old systems.

Prime Users

- Definite
- NWS/AWIPS
- NCEP/WCOSS (NCO-OPEX)
- EUWETSAT
- SS7™
- CLASS
- *GRAVITE

Prime Users to be integrated prior to TTO

- NCEP/EMC
- NCEP/NCO-IDP A/B (NPDS)
- NCEI SS
- FNMO
- NAVO
- ESRC/NIC
- ESRC/IVAS

* Indicates the user is only Block 2.0 dependent.

Remaining Users

- External User Groups
  - STAR-NC/WCP
  - CMIC
  - NASA-JPL
  - NOAA-AOML
  - India-NC
  - NASA-GPM
- NASA-SPoRT

- Internal User Groups
  - ESPC/VIIRS
  - ESPC/Okeanos
  - ESPC/Geostationary
  - ESPC/PCMDI
  - ESPC/MISR
  - NASA-SPoRT
  - NASA-DAPE
  - NASA/NESDIS
  - NASA/TOAST

NOTE: Only internal users that cannot get to the shared file system will be integrated.

COPC F2F (October 25th – 26th, 2016)
Chris Sisko (chris.a.sisko@noaa.gov)
Summary

- PDA and significant network upgrades (ESPC 2.0) are integral in future mission success for SNPP, JPSS and GOES-R; those activities are on track and are going well.

- The NWAVE high speed network architecture has been used for operational data flows and it is highly scalable; segments critical for operational service are subject to Critical Weather Day freeze process.

- The NOAA-EUMETSAT Communications Roadmap initiative is crucial in terms of near term data sharing and exchanging future data – this will be critical for NOAA and DoD once it is made operational.
Many Thanks!
Background Slides
Future Architecture/Future Geo Operations

Contingency Operations
- GRB (up)
- T&C
- Fairmont (CBU)

Nominal Operations
- GRB (down)
- NSOF

Nominal Operations
- GRB (up)
- T&C
- Wallops CDA

Legend:
- Green: Nominal Ops
- Red: Back Up Ops
- Dashed: Flows activated during Backup

Networks:
- NWS
- DoD
- ELUM
- STAR
- Other NOAA
- Other Int'l Partners
- NASA
- CLASS

GOES-R Satellite Relay

AWIPS2 SBN
KPPs
Secondary
Primary Only
Primary

GRB Users
Current S-NPP Near Real-time Data Flow from ESPC

- **NOAA-5045 (ESPC)**
  - NDE 1.0 (PE-1) Operational System
  - ESPC LAN
  - ESPC Internal Users/Systems

- **Receptor Sites**
  - Svalbard
  - Fairbanks (Alt)

- **NOAA-5042 (JPSS CGS)**
  - CS3 MMC/SGMMC
  - IDPS Ops Flow

- **Internal Users**
  - VIIRS
  - NIRS
  - TCP
  - NUCAPS
  - TOAST
  - PRODMON
  - GVF

- **External Users**
  - CMC
  - AOML
  - CLASS
  - CMC
  - JMA
  - NASA GPM
  - NASA SPoRT
  - STAR-NWCWP
  - EUMETSAT

- **User Product Expiration Times**
  - Up to 180 mins
  - Up to 5 hours
  - Up to 8 hours
  - Up to 12 hours
  - Up to 24 hours
  - 24 hours or more

- **3rd Party Relay**
  - EUMETcast
  - WMO/GTS

- **SAN**
  - DAPE
  - NOAA MAN (internet)
  - NCEP POP
  - NCEP POP/COPC Via DAPE

- **External NESDIS Dataflow**
- **Internal NESDIS Dataflow**

- **IDPS Interactive Data Processing Segment**
ESPC User Overview (Today)
General near real-time data access categories

- **Critical Users** [near real-time justification]
  - Protection of Life and Property
  - National Security
  - Economic Security
    - Transportation (air, ground & marine), energy sector, etc

- **Priority Users** [near real-time justification, resources permitting]
  - International partners - mutual data sharing agreements
  - Critical user support – additional decision support information
  - Anomaly support
  - Launch support
  - Private sector
    - Weather enterprise, transportation, energy, client support purposes, etc

- **Support-related Users** [near real-time justification, resources permitting]
  - Calibration / Validation activities
  - Research to Operations (R2O) or Testbed initiatives
  - General product monitoring
Current Internal and External NDE Users

<table>
<thead>
<tr>
<th>Internal Users (ESPC)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW</td>
<td>ESPC Coast Watch systems</td>
</tr>
<tr>
<td>VIIRSDIST</td>
<td>VIIRS Mcidas system - SAB</td>
</tr>
<tr>
<td>IMS</td>
<td>Interactive Multi-sensor Snow and Ice Mapping System – NIC/ESPC (X)</td>
</tr>
<tr>
<td>TCP</td>
<td>Tropical Cyclone Product systems</td>
</tr>
<tr>
<td>NIC</td>
<td>National/Naval Ice Center</td>
</tr>
<tr>
<td>BSST</td>
<td>Blended Sea Surface Temperature</td>
</tr>
<tr>
<td>MIRS</td>
<td>Microwave Integrated Retrieval System</td>
</tr>
<tr>
<td>NUCAPS</td>
<td>NOAA Unique CrIS/ATMS Processing System</td>
</tr>
<tr>
<td>TOAST</td>
<td>Ozone</td>
</tr>
<tr>
<td>Okeanos</td>
<td>Ocean Color systems</td>
</tr>
<tr>
<td>GVF</td>
<td>Global vegetation systems</td>
</tr>
<tr>
<td>PRODMON</td>
<td>NDE PG Product Monitoring</td>
</tr>
<tr>
<td>GCOM</td>
<td>GCOM -&gt; npds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External Users</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWS/AWIPS</td>
<td>National Weather Service/ Advanced Weather Interactive Processing System</td>
</tr>
<tr>
<td>NCEP/WCOSS (NCO-OPS)</td>
<td>NCEP Super Computers (Tide/Gyre)</td>
</tr>
<tr>
<td>557th</td>
<td>United States Air Force (USAF) 557th Weather Wing</td>
</tr>
<tr>
<td>NOAA-AOML</td>
<td>Coast Watch nodes (GOMEX &amp; Caribbean)</td>
</tr>
<tr>
<td>NCEP/NCO-IDP A/B (NPDS)</td>
<td>NCEP College Park/Boulder Systems</td>
</tr>
<tr>
<td>NCEP/EMC</td>
<td>Environmental Modelling Center (Dev)</td>
</tr>
<tr>
<td>FNMOC</td>
<td>Fleet Numerical Meteorology and Oceanography Center</td>
</tr>
<tr>
<td>NAVO</td>
<td>Naval Oceanographic Office</td>
</tr>
<tr>
<td>JTWC</td>
<td>U.S. Navy – Joint Typhoon Warning Center</td>
</tr>
<tr>
<td>NASA-JPL</td>
<td>Jet Propulsion Laboratory – NASA DAAC (archive)</td>
</tr>
<tr>
<td>JMA</td>
<td>Japanese Meteorological Association</td>
</tr>
<tr>
<td>CMC</td>
<td>Environment Canada – Met Centre</td>
</tr>
<tr>
<td>India-NC</td>
<td>India Medium Range Forecast Center</td>
</tr>
<tr>
<td>NCEI</td>
<td>National Centers for Environmental Information</td>
</tr>
<tr>
<td>EUMETSAT</td>
<td>European Organisation for the Exploitation of Meteorological Satellites</td>
</tr>
<tr>
<td>STAR-NCWCP</td>
<td>STAR – Central Distribution System</td>
</tr>
<tr>
<td>STAR-CIRA</td>
<td>Colorado State – Cooperative</td>
</tr>
<tr>
<td>NASA-GPM</td>
<td>Global Precipitation Mission</td>
</tr>
<tr>
<td>CLASS/NCEI</td>
<td>NOAA Archive</td>
</tr>
<tr>
<td>SSEC/CIMSS</td>
<td>Space Science and Engineering Center (Univ of Wisconsin) - Cooperative</td>
</tr>
<tr>
<td>NWSTG-OPS</td>
<td>NWS Telecommunications Operations Center</td>
</tr>
</tbody>
</table>

Red – Critical Users
Blue – Primary Users
Black – Support-related Users

ESPC/DAPE – provides specialized data access to DoD today; however, all new mission data will be provided by PDA once operational.
## NDE Operational Products (Today)

<table>
<thead>
<tr>
<th>Application Short Name</th>
<th>Application Name</th>
<th>Product Name</th>
<th>Format</th>
<th>Satellite</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACSPO SST</td>
<td>Advanced Clear Sky Processor for Oceans (NDE) - SST</td>
<td>SST, Clear Sky Mask</td>
<td>netCDF</td>
<td>SNPP</td>
</tr>
<tr>
<td>AOT</td>
<td>Aerosol Optical Thickness</td>
<td>VIIRS Aerosol Optical Thickness (NDE)</td>
<td>BUFR</td>
<td>SNPP</td>
</tr>
<tr>
<td>ATMS-SDR</td>
<td>ATMS SDR radiances</td>
<td>ATMS SDR radiances 22 channels (NDE)</td>
<td>[BUFR]</td>
<td>SNPP</td>
</tr>
<tr>
<td>CRIS-SDR-399</td>
<td>CrIS SDR radiances 399</td>
<td>CrIS IR sounder SDR radiances 399 channels for NWP data assimilation (NDE)</td>
<td>[BUFR]</td>
<td>SNPP</td>
</tr>
<tr>
<td>CRIS-SDR-1305</td>
<td>CrIS SDR radiances 1305</td>
<td>CrIS IR sounder SDR radiances 1305 channels for NWP data assimilation (NDE)</td>
<td>BUFR</td>
<td>SNPP</td>
</tr>
<tr>
<td>NUCAPS Level 2</td>
<td>NOAA Unique CrIS ATMS product System Level 2</td>
<td>CrIS/ATMS Atmos Temp Profile CrIS/ATMS Atmospheric Moisture Profile</td>
<td>[netCDF]</td>
<td>SNPP</td>
</tr>
<tr>
<td>MIRS ATMS</td>
<td>Microwave Integrated Retrieval System (NDE) - ATMS</td>
<td>MIRS ATMS image products MIRS ATMS SND products</td>
<td>[netCDF]</td>
<td>SNPP</td>
</tr>
<tr>
<td>OMPS-NP</td>
<td>OMPS nadir profile</td>
<td>Ozone nadir profile (NDE)</td>
<td>BUFR</td>
<td>SNPP</td>
</tr>
<tr>
<td>OMPS-TC</td>
<td>OMPS total column</td>
<td>Ozone total column (NDE)</td>
<td>BUFR</td>
<td>SNPP</td>
</tr>
<tr>
<td>VIIRS-EDR</td>
<td>VIIRS EDR</td>
<td>VIIRS EDR (NDE)</td>
<td>netCDF</td>
<td>SNPP</td>
</tr>
<tr>
<td>VIIRS-SDR</td>
<td>VIIRS SDR</td>
<td>VIIRS SDR (NDE)</td>
<td>netCDF</td>
<td>SNPP</td>
</tr>
<tr>
<td>VIIRS Binary Snow Cover</td>
<td>VIIRS Binary Snow Cover</td>
<td>VIIRS Binary Snow Map</td>
<td>netCDF</td>
<td>SNPP</td>
</tr>
<tr>
<td>VPW</td>
<td>VIIRS Polar Winds</td>
<td>VIIRS Polar Winds</td>
<td>[BUFR], netCDF</td>
<td>SNPP</td>
</tr>
<tr>
<td>GVF</td>
<td>Green Vegetation Fraction</td>
<td>VIIRS Green Vegetation Fraction</td>
<td>netCDF, GRIB2</td>
<td>SNPP</td>
</tr>
<tr>
<td>NTCP</td>
<td>Microwave Tropical Cyclone Products</td>
<td>Microwave Tropical Cyclone Products</td>
<td>netCDF, TXT, PNG</td>
<td>SNPP</td>
</tr>
<tr>
<td>VHP</td>
<td>Vegetation Health Products</td>
<td>VIIRS Vegetation Health Products</td>
<td>netCDF</td>
<td>SNPP</td>
</tr>
<tr>
<td>GAASP Day 1</td>
<td>GCOM-W1 AMSR2 Algorithm Software Processor</td>
<td>AMSR 2 Microwave Brightness Temperature (MBT), Total Precipitable Water (TPW), Cloud Liquid Water (CLW), Precipitation Type/Rate (PT/R), Sea Surface Temperature (SST), Sea Surface Wind Speed (SSW)</td>
<td>netCDF, BUFR</td>
<td>GCOM-W1</td>
</tr>
<tr>
<td>Active Fire</td>
<td>Active Fire</td>
<td>VIIRS Active Fire</td>
<td>netCDF</td>
<td>SNPP</td>
</tr>
</tbody>
</table>
Current NDE 1.0 Operational Summary

- NDE Operational System (PE1) is performing as expected (> 99.9%).
- NDE Operational System (PE1) is the largest single distribution system within ESPC (legacy network) – utilizes ~35-40% of the internal network resources.

<table>
<thead>
<tr>
<th></th>
<th>Sep 2013 (Initial operations)</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of users (subscriptions)</td>
<td>3 (12)</td>
<td>34 (411)</td>
</tr>
<tr>
<td>Total Data Ingest*</td>
<td>~70 TB</td>
<td>~117 TB</td>
</tr>
<tr>
<td>Production Success*</td>
<td>99.9%</td>
<td>99.9%</td>
</tr>
<tr>
<td>Distribution Success*</td>
<td>99.5%</td>
<td>99.9%</td>
</tr>
<tr>
<td>Total Distributed Data Size*</td>
<td>~10 TB</td>
<td>~35-40 TB</td>
</tr>
</tbody>
</table>

Statistics are based on a 30-day period.
PDA Status

• Primary PDA interface is functioning as designed; this interface serves the vast majority of users including KPP interfaces.

• The highest priority data consumers have been integrated and are in the process of understanding the system (i.e. such as tailoring functionality, subscription usage, etc) – external user training has been provided.

• A specialized NWS web service interface (PDA OGC-like web services / AWIPS Data Delivery) is continuing to mature – this specialized service represents a paradigm shift in terms of direct distribution expansion for NWS only.

• NDE 1.0 (current system) is under freeze for new users integration, product changes or new products – waiver must be approved by senior management.

• Preparations for transitioning to new ground segment have been underway for 15+ months

• 1\textsuperscript{st} PDA ORR was conducted on July 20/21, 2016; 2\textsuperscript{nd} ORR scheduled for mid-Nov.
PDA Validation Testing

- Systems completed verification testing and 1\textsuperscript{st} phase of validation testing is completed.
- 2\textsuperscript{nd} phase of validation will be completed in mid-September.
- Successfully received and delivered simultaneous long duration data flows from JPSS and GOES-R programs.
  - 21 day dataflow from JPSS to PDA
    - major test objectives were executed based on 18 days of available data
  - DOE-4 dataflow from GOES-R to PDA
    - Successful delivery of simulated GOES-R data from Wallops to PDA interface.
    - Standing PDA subscriptions were successfully fulfilled.
    - A developing NWS interface called OGC/AWIPS-DD was also tested with partial success, issues are actively being worked.
NOAA-EUMETSAT Communications Roadmap

- Initiative is well underway to increase trans-Atlantic communications capacity between NOAA/NESDIS and EUMETSAT.
- Leads are: NESDIS/ACIO and EUMETSAT Network Team
- Objective is to use NWave/internet2 and GEANT (high speed R&D networks) for large data transport. Goal is to establish a 5 Gbps secure VPN tunnel to TICs in College Park and Denver.
- H/W is installed at CP-MAX and Denver
- Circuit contracts in place with GEANT
- Performance characterization tests are ongoing
- EUMETcast terrestrial multicast already flowing to test client receiver located at STAR (College Park)
NWAVE Network – Real Time Atlas

http://carto.nwave.noaa.gov/www/atlas.cgi?map_name=Nwave%20New
Ground Segment Data Ops Transition

**Just prior to TTO=0 (Primary on: Block 1.2)**

- Start of data transfer
  - IDPS B1.2 → NDE 1.0 (PE1)
- AOS (SVL) Current Contact
- Normal NDE 1.0 Production Cycle
  - 60 mins - PG, includes ACSPO
  - 40 mins - PG, without ACSPO
  - Exception: GVF* once a day

**B1.2 Processing Period**

- Deactivate user subscriptions on NDE 1.0 (PE1)
- Point NDE 1.0 (PE1) To NAB LZ
- Activate user subscriptions on PDA
- AOS (SVL) Next Contact
- Prepare to monitor new data flow

**Target Transition Group**

- S57
- NWS AWIPS/NCF
- NWS NCEP/Super Computers
- EUMETSAT
- CLASS

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**Just after TTO=0 (Primary on: Block 2.0)**

- Start of data transfer
  - IDPS B2.0 → NDE 2.0
  - NAB → NDE 1.0 (PE1)
- AOS (SVL) Current Contact
- Normal NDE 2.0 Production Cycle
  - 60 mins - PG, includes ACSPO
  - 40 mins - PG, without ACSPO
  - Actual runtimes (TBD)
  - Exception: GVF* once a day

**B2.0 Processing Period**

- Monitor data transfer
  - Confirm that PDA subscriptions are being filled
  - Troubleshoot any issues
- Report processing status of current orbit
- AOS (SVL) Next Contact

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*Note: GVF runs once a day at approximately 02:002 and takes 5-6 hours.*