Updates on Suomi-NPP, JPSS and GOES-R Fire Data Products

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additional credits are given on select slides
JPSS Status Overview

Suomi NPP
- Launched on October 28, 2011
- Primary PM for weather since May 1, 2014
- Excellent health and data availability

JPSS-1
- Integrated satellite in test phase
- On track for 2017 launch (NET March)
- 7-year mission lifetime
- 96-min mission data latency (photons -> NWS)
- Stored Mission Data capacity ~6 orbits

JPSS-2
- Instrument parts/assembly phase
- Spacecraft kick-off phase

JPSS-3/4 continuity until 2038

SNPP/JPSS-1/2/3/4 Carry Similar Instruments for Continuity of Observations

(Slide Curtsey of Lihan Zhou, STAR)
JPSS-1 status

• Launch expected NET mid-March 2017
• A larger ground system provides the following:
  – Half orbit dumps in both polar regions (Svalbard and McMurdoo)
  – A full backup instantiation in Fairmont, WV for continuity of operations
  – Redundancy at the primary site (NSOF – Suitland, MD)
  – The ability to use TDRSS (Tracking and Data Relay Satellite System) for additional critical telemetry/command control and capability for receiving stored mission data
• Products/data will be made available in phases based on the calibration/validation schedule; emphasis is on KPP products first.
**JPSS-1 Instruments and Products**

<table>
<thead>
<tr>
<th>JPSS Instruments</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATMS</strong> - Advanced Technology Microwave Sounder</td>
<td>ATMS and CrIS together provide high vertical resolution temperature and water vapor information needed to maintain and improve forecast skill out to 5 to 7 days in advance for extreme weather events, including hurricanes and severe weather outbreaks</td>
</tr>
<tr>
<td><strong>CrIS</strong> - Cross-track Infrared Sounder</td>
<td></td>
</tr>
<tr>
<td><strong>VIIRS</strong> - Visible Infrared Imaging Radiometer Suite</td>
<td>VIIRS provides many critical imagery products including snow/ice cover, clouds, fog, aerosols, fire, smoke plumes, vegetation health, phytoplankton abundance/chlorophyll</td>
</tr>
<tr>
<td><strong>OMPS</strong> - Ozone Mapping and Profiler Suite</td>
<td>Ozone spectrometers for monitoring ozone hole and recovery of stratospheric ozone and for UV index forecasts</td>
</tr>
<tr>
<td><strong>CERES</strong> - Clouds and the Earth’s Radiant Energy System</td>
<td>Scanning radiometer which supports studies of Earth Radiation Budget (ERB)</td>
</tr>
</tbody>
</table>

**JPSS Program Data Products**

- **VIIRS (26 EDRs)**
  - RDR & SDR (for each of 22 bands)
  - EDRs:
    - Active Fires
    - Albedo (Surface)
    - Aerosol Optical Thickness
    - Aerosol Particle Size Parameter
    - Cloud Base Height
    - Cloud Cover/Layers
    - Cloud Effective Particle Size
    - Cloud Optical Thickness
    - Cloud Top Height
    - Cloud Top Pressure
    - Cloud Top Temperature
    - Cloud Mask
    - Ice Surface Temperature
    - Imagery
  - EDRs:
    - Land Surface Temperature
    - Ocean Color/Chlorophyll
    - Quarterly Surface Type
    - Sea Ice Characterization
    - Snow Cover
    - Surface Type
    - Suspended Matter
    - Vegetation Indices
    - Green Vegetation Fraction
    - Polar Winds
    - Sea Surface Temperature
    - Vegetation Health Index Suite

- **OMPS-Nadir (2 EDRs)**
  - RDR, SDR, TDR
  - EDRs:
    - Cloud Liquid Water Imagery
    - Land Surface Emissivity
    - Moisture Profile
    - Precipitable Water
    - Rainfall Rate
    - Land Surface Temperature
  - EDRs:
    - Ozone Total Column
    - Ozone Nadir Profile
  - EDRs:
    - OMPS-Limb
    - OMPS-L RDR

- **ATMS (11 EDRs)**
  - RDR, SDR, TDR
  - EDRs:
    - Cloud Liquid Water Imagery
    - Ocean Color/Chlorophyll
    - Quarterly Surface Type
    - Sea Ice Characterization
    - Snow Cover
    - Surface Type
    - Suspended Matter
    - Vegetation Indices
    - Green Vegetation Fraction
    - Polar Winds
    - Sea Surface Temperature
    - Vegetation Health Index Suite

- **CrIS (5 EDRs)**
  - RDR, SDR
  - EDRs:
    - Carbon Dioxide
    - Carbon Monoxide
    - Infrared Ozone Profile
    - Methane
    - Outgoing Longwave Radiation

- **CrIS/ATMS (2 EDRs)**
  - EDRs:
    - Atmospheric Vertical Temperature Profile
    - Atmospheric Vertical Moisture Profile

- **CERES**
  - Cloud Liquid Water Imagery
  - Sea Ice Concentration
  - Total Precipitable Water
  - Snow Water Equivalent
  - Temperature Profile
  - Snow Cover

**KEY**

- RDR: Raw Data Record
- SDR: Sensor Data Record
- TDR: Temperature Data Record
- EDR: Environmental Data Record
- Products with Key Performance Parameters

Data available through PDA, CLASS, and Direct Readout

(Slide Curtesy of NJO / Lihan Zhou, STAR)
Background of VIIRS IDPS* Active Fire Product

- VIIRS represents **continuity** with NASA EOS **MODIS** and NOAA POES **AVHRR** fire detection (and also international missions such as (A)ATS R)
- VIIRS **design allows for radiometric measurements** to detect and characterize active fires over a wide range of observing and environmental conditions
- The VIIRS fire product is expected to be used by **real-time resource and disaster management; air quality monitoring; ecosystem monitoring; climate studies** etc.
- **IDPS product is a sparse array of lon/lon or fire pixels** and row/column and quality flag

NW Canada
07 July 2013
20:14:55-20:20:34 UTC

*Interface Data Processing Segment (operational NOAA Production system; only KPPs going forward)
NOAA Operational VIIRS Fire Product Status (2/1)

- Tailored version of the M-band UMD / NASA ST algorithm operational within the Suomi NPP Data Exploitation (NDE) system since March 15, 2016
  - includes fire mask and fire radiative power (FRP)
- Data available from OSPO in simplified text and other formats
  - ftp://satepsanone.nesdis.noaa.gov/FIRE/VIIRS/
- Data available from CLASS (http://www.class.ncdc.noaa.gov/)
  - ftp interface at ftp://ftp-npp.class.ngdc.noaa.gov/
    - pick the date, then to the folder NDE-L2/VIIRS-Active-Fire-EDR-NOAA-Enterprise-Algorithm/
  - ordering capability through the Web interface also available
  - all operational data from March 16, 2016 have been backfilled from the STAR archive
- Long-term quality monitoring ongoing (including both NDE and IDPS products)
  - https://www.star.nesdis.noaa.gov/jpss/EDRs/products_activeFires.php
NOAA Operational VIIRS Fire Product Status (2/2)

• Ongoing integration into NOAA operational and experimental systems e.g.
  – Hazard Mapping System
  – eIDEA – extended Infusing Satellite Data into Environmental Applications
  – NWS Advanced Weather Interactive Processing System (AWIPS-II)
  – High Resolution Rapid Refresh (HRRR)  
    [http://rapidrefresh.noaa.gov/HRRRsmoke/](http://rapidrefresh.noaa.gov/HRRRsmoke/)

• IDPS production, long-term monitoring and maintenance until all downstream products in NDE / NOAA ESPC Enterprise system

• Other ongoing activities:
  – JPSS-1 testing / preparations
  – preparations for VIIRS SDR reprocessing
  – code integration into CSPP (Community Satellite Processing Package)
  – work towards UMD / NASA I-band / hybrid product transition to operations
  – end user interaction / support - NOAA JPSS Fire and Smoke Initiative
    • RealEarth™ – Google Maps etc.
UMD/NASA VIIRS Active Fire Product Update

- Baseline **750 m active fire product** built on MODIS Collection 6 algorithm
  - L2 product basis for NOAA NDE
  - Small customization performed in order to account for unique L1B data
  - Fire detection and characterization (fire radiative power)
  - Output format supporting MODIS-VIIRS data continuity

- Alternative **375 m active fire product** developed
  - Unique algorithm optimizing use of channel I4 (MIR) data (frequent saturation, folding)
  - First version produced fire detections only
  - Latest version providing fire detection and FRP
    - Hybrid approach using 375 and 750 m data
    - Output format supporting MODIS-VIIRS data continuity
VIIRS Active Fire Product Lineage

Details soon to be available at: http://viirsfire.geog.umd.edu/
**NDE output file content**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>fire mask</td>
<td>Fire mask</td>
<td>8 bit int</td>
</tr>
<tr>
<td>algorithm QA</td>
<td>Fire algorithm QA mask</td>
<td>32 bit Int</td>
</tr>
<tr>
<td>FP_line</td>
<td>Fire pixel line</td>
<td>16 bit Int</td>
</tr>
<tr>
<td>FP_sample</td>
<td>Fire pixel sample</td>
<td>16 bit Int</td>
</tr>
<tr>
<td>FP_latitude</td>
<td>Fire pixel latitude</td>
<td>32 bit Float</td>
</tr>
<tr>
<td>FP_longitude</td>
<td>Fire pixel longitude</td>
<td>32 bit Float</td>
</tr>
<tr>
<td>FP_power</td>
<td>Fire radiative power</td>
<td>32 bit Float</td>
</tr>
<tr>
<td>FP_confidence</td>
<td>Fire detection confidence</td>
<td>8 bit Int</td>
</tr>
<tr>
<td>FP_land</td>
<td>Land pixel flag</td>
<td>8 bit Int</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing – 0</td>
<td>Brightness temperatures for M13 or M15 unavailable</td>
</tr>
<tr>
<td>Scan – 1</td>
<td>Not processed (trim)</td>
</tr>
<tr>
<td>Other – 2</td>
<td>Not processed (other reason)</td>
</tr>
<tr>
<td>Water – 3</td>
<td>Pixel classified as non fire water</td>
</tr>
<tr>
<td>Cloud – 4</td>
<td>Pixel classified as cloudy</td>
</tr>
<tr>
<td>No Fire – 5</td>
<td>Pixel classified as non fire land</td>
</tr>
<tr>
<td>Unknown – 6</td>
<td>Pixel with no valid background pixels</td>
</tr>
<tr>
<td>Fire Low – 7</td>
<td>Fire pixel with confidence strictly less than 20% fire</td>
</tr>
<tr>
<td>Fire Medium – 8</td>
<td>Fire pixel with confidence between 20% and 80%</td>
</tr>
<tr>
<td>Fire High – 9</td>
<td>Fire pixel with confidence greater than or equal to 80%</td>
</tr>
<tr>
<td>0-1</td>
<td>Surface Type (water=0, coastal=1, land=2)</td>
</tr>
<tr>
<td>2-3</td>
<td>Atmospheric correction (reserved for future use)</td>
</tr>
<tr>
<td>4</td>
<td>Day/Night (daytime = 1, nighttime = 0)</td>
</tr>
<tr>
<td>5</td>
<td>Potential fire (0/1)</td>
</tr>
<tr>
<td>6-10</td>
<td>Background window size parameter</td>
</tr>
<tr>
<td>11</td>
<td>Fire Test 1 valid (0 - No, 1 - Yes)</td>
</tr>
<tr>
<td>12</td>
<td>Fire Test 2 valid (0 - No, 1 - Yes)</td>
</tr>
<tr>
<td>13</td>
<td>Fire Test 3 valid (0 - No, 1 - Yes)</td>
</tr>
<tr>
<td>14</td>
<td>Fire Test 4 valid (0 - No, 1 - Yes)</td>
</tr>
<tr>
<td>15</td>
<td>Fire Test 5 valid (0 - No, 1 - Yes)</td>
</tr>
<tr>
<td>16</td>
<td>Fire Test 6 valid (0 - No, 1 - Yes)</td>
</tr>
<tr>
<td>17-19</td>
<td>N/A</td>
</tr>
<tr>
<td>20</td>
<td>Adjacent clouds (0/1)</td>
</tr>
<tr>
<td>21</td>
<td>Adjacent water (0/1)</td>
</tr>
<tr>
<td>22-23</td>
<td>Sun Glint Level (0-3)</td>
</tr>
<tr>
<td>24</td>
<td>Sun glint rejection</td>
</tr>
<tr>
<td>25</td>
<td>False Alarm 1 (excessive rejection of legitimate background pixels)</td>
</tr>
<tr>
<td>26</td>
<td>False Alarm 2 (water pixel contamination)</td>
</tr>
<tr>
<td>27</td>
<td>Amazon forest-clearing rejection test</td>
</tr>
<tr>
<td>28-31</td>
<td>N/A</td>
</tr>
</tbody>
</table>
NDE VIIRS Fire Text Output*  Example

year,month,day,hh,mm,lon,lat,mask,confidence,bright_t13,frp,line,sample
2016, 06, 30, 13, 31, 14.393053, -16.983391, 8, 57, 316.378326, 28.955824, 75, 114
2016, 06, 30, 13, 31, 14.396797, -16.972019, 8, 53, 339.941559, 77.328888, 84, 113
2016, 06, 30, 13, 31, 14.384778, -16.974693, 8, 69, 344.900421, 97.380959, 84, 114
2016, 06, 30, 13, 31, 14.393543, -16.958811, 8, 37, 321.766541, 32.511524, 85, 113
2016, 06, 30, 13, 31, 15.573229, -15.742855, 8, 49, 306.925323, 23.677296, 228, 4
2016, 06, 30, 13, 31, 14.185258, -15.916477, 8, 69, 310.967590, 21.830891, 246, 103
2016, 06, 30, 13, 31, 14.688642, -15.625280, 8, 64, 327.718658, 63.247353, 267, 60
2016, 06, 30, 13, 31, 14.691998, -15.618657, 8, 55, 321.560547, 41.713535, 276, 59
2016, 06, 30, 13, 31, 14.678295, -15.621688, 8, 75, 358.754883, 197.803665, 276, 60
2016, 06, 30, 13, 31, 14.688756, -15.604889, 8, 42, 314.810394, 27.194593, 277, 59
2016, 06, 30, 13, 31, 14.675403, -15.607850, 9, 88, 332.556183, 75.214859, 277, 60
2016, 06, 30, 13, 31, 14.976258, -14.989869, 8, 72, 312.135651, 30.420597, 358, 26
2016, 06, 30, 13, 31, 14.554691, -12.548762, 8, 56, 314.716003, 35.709991, 731, 5
2016, 06, 30, 13, 31, 14.559263, -12.547178, 8, 57, 314.763763, 35.436863, 740, 4
2016, 06, 30, 13, 31, 14.450356, -12.540216, 8, 74, 313.761322, 33.999859, 742, 11
2016, 06, 30, 13, 31, 14.410105, -12.396758, 8, 47, 311.148468, 25.756071, 761, 11

*Text output files are not part of the core NDE production, but are generated by OSPO and STAR.
Characterizing Fires: confidence and radiative power

Fires in Australia on December 1, 2015
VIIRS 750 m Fire Pixels (March 2016)
VAFIRE_L2D (consistent with NOAA JPSS NDE)
Hybrid (375+750m) FRP Retrieval

Scenario 1

- Co-locate 375 & 750 m data

Scenario 2

- Calculate FRP

\[ FRP_i = FRP \]
\[ FRP_i = FRP \div 2 \]
VIIRS 375m (hybrid) Fire Pixels (March 2016)
‘Collection 2’

FRP (MW)
- < 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 10
- 10 - 17
- > 17
VIIRS Active Fire Long-term Monitoring
http://www.star.nesdis.noaa.gov/jpss/EDRs/products_activeFires.php
Examples of IDPS and NDE VIIRS fire product anomalies

- **Along-scan**: (most anomalies)
- **Along-track**: (a few anomalies)
IDPS Suomi NPP Active Fire Product history: data anomalies and product maturity (3/1)

2012

<table>
<thead>
<tr>
<th>April 3, 2012</th>
<th>IDPS Mx5.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Beta</td>
<td>Beta</td>
</tr>
<tr>
<td>October 16, 2012</td>
<td>IDPS Mx6.3</td>
</tr>
<tr>
<td>Provisional</td>
<td></td>
</tr>
</tbody>
</table>

\[ N_{\text{max}} \]

\( N_{\text{max}} \): maximum number of detections within a scanline

2013

<table>
<thead>
<tr>
<th>Provisional</th>
</tr>
</thead>
</table>

\[ N_{\text{max}} \]

\( N_{\text{max}} \): maximum number of detections within a scanline
IDPS Suomi NPP Active Fire Product history: data anomalies and product maturity (3/2)

2014

N_{\text{max}} \quad \text{Provisional} \quad \text{August 13, 2014} \quad \text{IDPS Mx8.5} \quad \text{Validated stage 1}

No anomalies detected in 2015

2015

N_{\text{max}} \quad \text{Validated stage 1}

N_{\text{max}}: \text{maximum number of detections within a scanline}
IDPS Suomi NPP Active Fire Product history: data anomalies and product maturity (3/3)

2016

$N_{\text{max}}$: maximum number of detections within a scanline
Reprocessing: missing or incorrectly calibrated scanlies

Original IDPS; current CLASS archive

Reprocessed; repaired granule and latest SDR algorithm
Reprocessing: missing or incorrectly calibrated scanlies

GMODO-SVM13_npp_d20120515_t1808155_e1813559_b02843_c20161008070834377460_noaa_ops

[220-352K]

Original IDPS; current CLASS archive

GMODO-SVM13_npp_d20120515_t1808155_e1813559_b02843_c20161008070834377460_noaa_ops

[400-562K]

SVM13_npp_d20120515_t1808155_e1809397_b02843_c20160923170107206350_devl_dev

Reprocessed; repaired granule and latest SDR algorithm

[220-352K]
Reprocessing: M13 saturation handling

**before**

2 unagg subpixels are out of EBBT limits (BT = 0)

3 unagg subpixels saturated → BT = -999.9
(DN=4095)

Only unsaturated sub-pixels are used, but their BTs are beyond EBBT upper limit

**after**

3 unagg subpixels saturated → BT = -999.9
(DN=4095)

The 2 previously out of limit pixels are calibrated successfully after reprocessing using the unsaturated sub-pixels.

March 11, 2014
Hazard Mapping System and AWIPS-II status

- VIIRS data are included in operational HMS
  - [http://www.ospo.noaa.gov/Products/land/hms.html](http://www.ospo.noaa.gov/Products/land/hms.html)
  Global NDE data are available in text format
  - granule-based (.txt) : real-time
  - daily summary (.dat)

- VIIRS data are included in new AWIFS-II release
  - Advanced Weather Interactive Processing System
Expectations for GOES-R
(To be launched on November 19, 2016)

The GOES-R series will provide significant improvements in the detection and observation of meteorological phenomena that directly impact public safety, protection of property, and our Nation’s economic health and prosperity.

- Improves hurricane track & intensity forecasts
- Increases thunderstorm & tornado warning lead time
- Improves aviation flight route planning
- Data for long-term climate variability studies
- Low latency (30 sec ABI, 20 sec GLM)

- Improves solar flare warnings for communications and navigation disruptions
- More accurate monitoring of energetic particles responsible for radiation hazards to humans and spacecraft
- Better monitoring of Coronal Mass Ejections to improve geomagnetic storm forecasting

(Slide Curtsey of GOES-R Program, Product Readiness and Operations Team, Algorithm Working Group)
### GOES-R PRODUCTS

#### Advanced Baseline Imager (ABI)
1. Aerosol Detection (Including Smoke and Dust)
2. Aerosol Optical Depth (AOD)
3. Clear Sky Masks
4. Cloud and Moisture Imagery (KPP)
5. Cloud Optical Depth
6. Cloud Particle Size Distribution
7. Cloud Top Height
8. Cloud Top Phase
9. Cloud Top Pressure
10. Cloud Top Temperature
11. Derived Motion Winds
12. Derived Stability Indices
13. Downward Shortwave Radiation: Surface
14. Fire/Hot Spot Characterization
15. Hurricane Intensity Estimation
16. Land Surface Temperature (Skin)
17. Legacy Vertical Moisture Profile
18. Legacy Vertical Temperature Profile
19. Radiances
20. Rainfall Rate/QPE
21. Reflected Shortwave Radiation: TOA
22. Sea Surface Temperature (Skin)
23. Snow Cover
24. Total Precipitable Water
25. Volcanic Ash: Detection and Height

#### Geostationary Lightning Mapper (GLM)
1. Lightning Detection: Events, Groups & Flashes

#### Space Environment In-Situ Suite (SEISS)
2. Energetic Heavy Ions
6. Solar and Galactic Protons

#### Magnetometer (MAG)
7. Geomagnetic Field

#### Extreme Ultraviolet and X-ray Irradiance Suite (EXIS)
8. Solar Flux: EUV

#### Solar Ultraviolet Imager (SUVI)
10. Solar Imagery (X-ray): coronal holes, solar flares, coronal mass ejection source regions

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**Baseline Products Are Our Post-Launch Priorities**

(Slide Curtsey of GOES-R Program, Product Readiness and Operations Team, Algorithm Working Group)
### GOES-R vs. Current GOES

<table>
<thead>
<tr>
<th>Feature</th>
<th>ABI</th>
<th>Current GOES Imager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spectral Coverage</strong></td>
<td>16 bands</td>
<td>5 bands</td>
</tr>
<tr>
<td><strong>Spatial resolution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.64 μm Visible</td>
<td>0.5 km</td>
<td>Approx. 1 km</td>
</tr>
<tr>
<td>Other Visible/near-IR Bands (&gt;2 μm)</td>
<td>1.0 km</td>
<td>n/a</td>
</tr>
<tr>
<td>Spatial coverage</td>
<td>2 km</td>
<td>Approx. 4 km</td>
</tr>
<tr>
<td>Full disk</td>
<td>4 per hour</td>
<td>Scheduled (3 hrly)</td>
</tr>
<tr>
<td>CONUS</td>
<td>12 per hour</td>
<td>~4 per hour</td>
</tr>
<tr>
<td>Mesoscale</td>
<td>Every 30 sec</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Visible (reflective bands)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-orbit calibration</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

(Slide Curtesy of GOES-R Program, Product Readiness and Operations Team, Algorithm Working Group)
Scan modes for the ABI:

**Mode 3 (default):**
- Full disk images every 15 minutes
- CONUS images every 5 minutes
- Mesoscale images (2) every 1 minute

**Mode 4 (per request):**
- Full disk images every 5 mins
Three Times More Spectral Information

GOES-13/14/15 Spectral Bands

GOES-R Spectral Bands

(Slide Curtsey of GOES-R Program, Product Readiness and Operations Team, Algorithm Working Group)
Rim Fire

• GOES-14 was in a special mode during the summer of 2013 as a testbed for GOES-R

• The images were created using GOES visible and infrared (11 µm) clouds, WFABBA fires (yellow, red, magenta, blue), and the Blue Marble Second Generation from NASA

• They are centered on the Rim Fire’s reported starting point and are in the GOES-14 native projection
Imagery is typically available every 15 minutes today, but could be available every 30 seconds with GOES-R.

ABIs finer spectral, spatial, and temporal resolution will enable improvements in fire detection, characterization, monitoring, and forecasting.

We expect immediate and positive impacts on NWS Fire Operations.
Leveraging Himawari-8/AHI for GOES-R Readiness

- Himawari-8 was successfully launched October 7, 2014 and carries the AHI which is an almost identical instrument to the ABI.

- Availability of AHI datasets brings an unprecedented opportunity to
  - Use, demonstrate, and train with bands similar to ABI
  - Exercise the Level-2 algorithms developed for GOES-R

- NESDIS/STAR is routinely pulling full resolution AHI data (all bands) from JMA’s Cloud Service and making it available to its Cooperative Institutes and other partners.

- Special thanks to JMA for sharing data and collaborating with NOAA and NASA during their post launch checkout.

Blue Marble, Himawari 8 True Color Composite
25-January-2015 02:30 UTC
Steve Miller (CIRA) - GOES-R AWG Imagery Team
Himawari-8 Band 7 (3.9 μm; 2km) Loop, 4/13 @ 00 UTC through 4/15 @ 04 UTC

Data courtesy of JMA
Loop courtesy of Dan Lindsey (NESDIS/STAR/CIRA)

Active Fires (Hot spots)
Fire/Hot Spot Characterization

- **Algorithm Highlights**
  - Heritage lies with the GOES operational Wildfire Automated Biomass Burning Algorithm (WF_ABBA)
  - Dynamic, multi-spectral, thresholding contextual algorithm
  - Utilizes the 0.64, 3.9, 11.2 and 12.3 mm channels
  - Leverages ABI’s higher spatial and temporal resolution data

- **Operational Applications**
  - Fire weather monitoring and forecasting
  - Air quality forecasting

(Fire Detections over Sumatra 3:15 UTC on 24 September 2015)

Fires are sub-pixel features. ABI’s higher spatial and temporal refresh rate will improve the detection and characterization of fires.

(Slide Curtsey of GOES-R Program, Product Readiness and Operations Team, Algorithm Working Group)
Fire Detection Using H-8/AHI

Case showing:

- Agreement between MODIS and GOES-R fire algorithm detects

MODIS Fire Detects:

- Red polygons

GOES-R Fire Algorithm FDCA:

- Red – processed fire
- Magenta – Cloud-covered fire
- Cyan – Medium probability fire

Fire Detections over Sumatra
3:15 UTC on 24 September 2015

(SlideCourtesy of GOES-R Program, Product Readiness and Operations Team, Algorithm Working Group)
Summary

- JPSS VIIRS and GOES-R ABI are excellent assets for fire monitoring
  - JPSS-1 launch probably in mid-2017
    - three more missions to follow with similar VIIRS sensors
  - GOES-R launch on November 19, 2016
    - compatible with Himawari AHI

- VIIRS fire product development and distribution is done by various key stakeholders
  - Products are now mature
  - Concerted effort to assist users to find the most appropriate product
  - NOAA, NASA, USDA Forest Service products and activities
  - reprocessing is ongoing
    - Improved SDR/L1, latest granules, latest algorithms

- GOES-R fire product a critical component
  - a baseline product, available soon after spacecraft checkout