

Monitoring Fires from Space and Getting Data in to the hands of Users

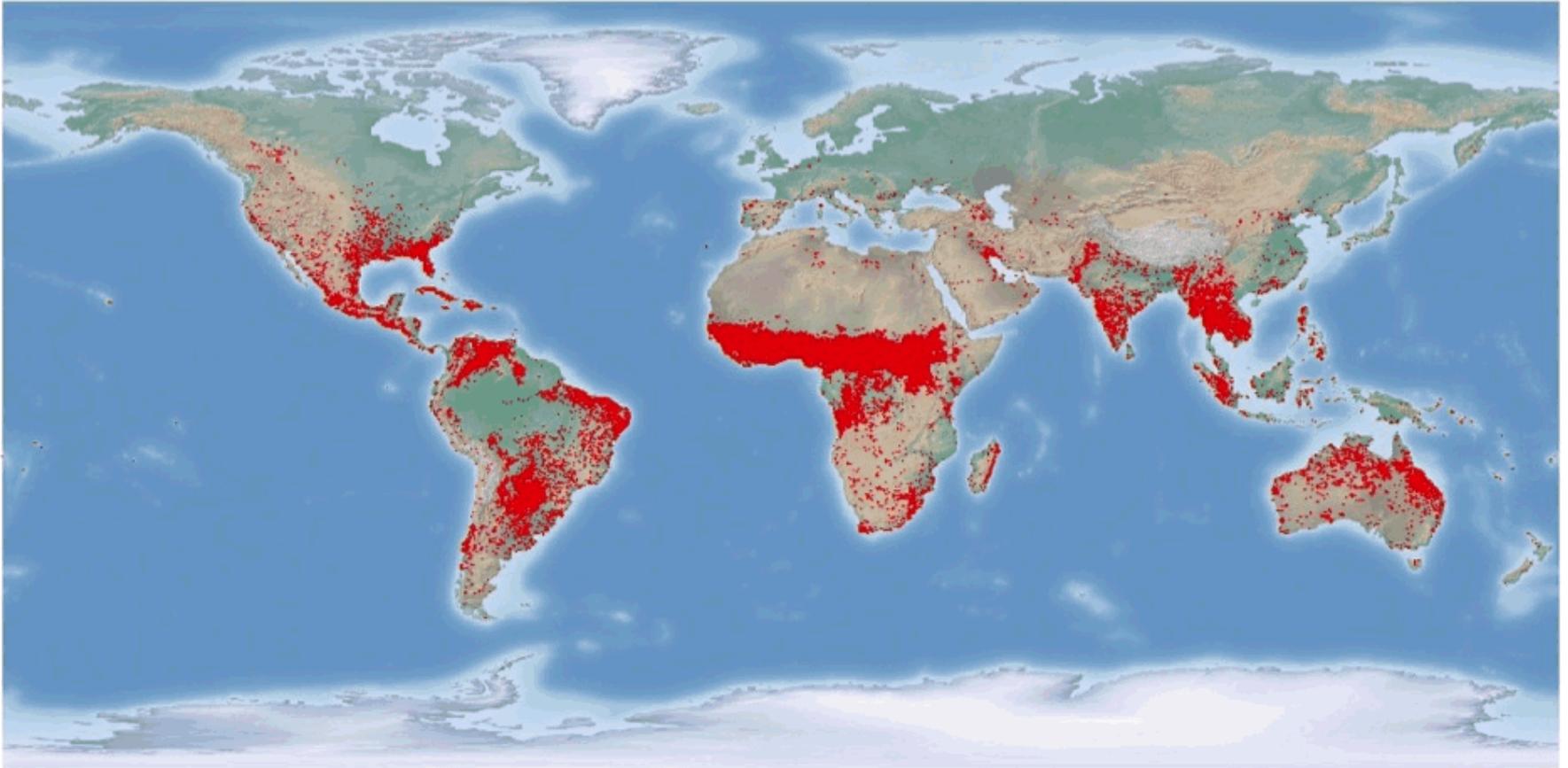
*An Example from NASA's Fire Information for Resource
Management System (FIRMS)*



Diane Davies^{1,2}, Minnie Wong², Greg Ederer³, Gary Fu³ and Otmar Olinsa²,
and Christopher O. Justice⁴

¹ Trigg-Davies Consulting Ltd, ² Science Systems and Applications, Inc, ³ Goddard Space Flight Center, ⁴ University of Maryland

2012 MODIS Active Fire Detections

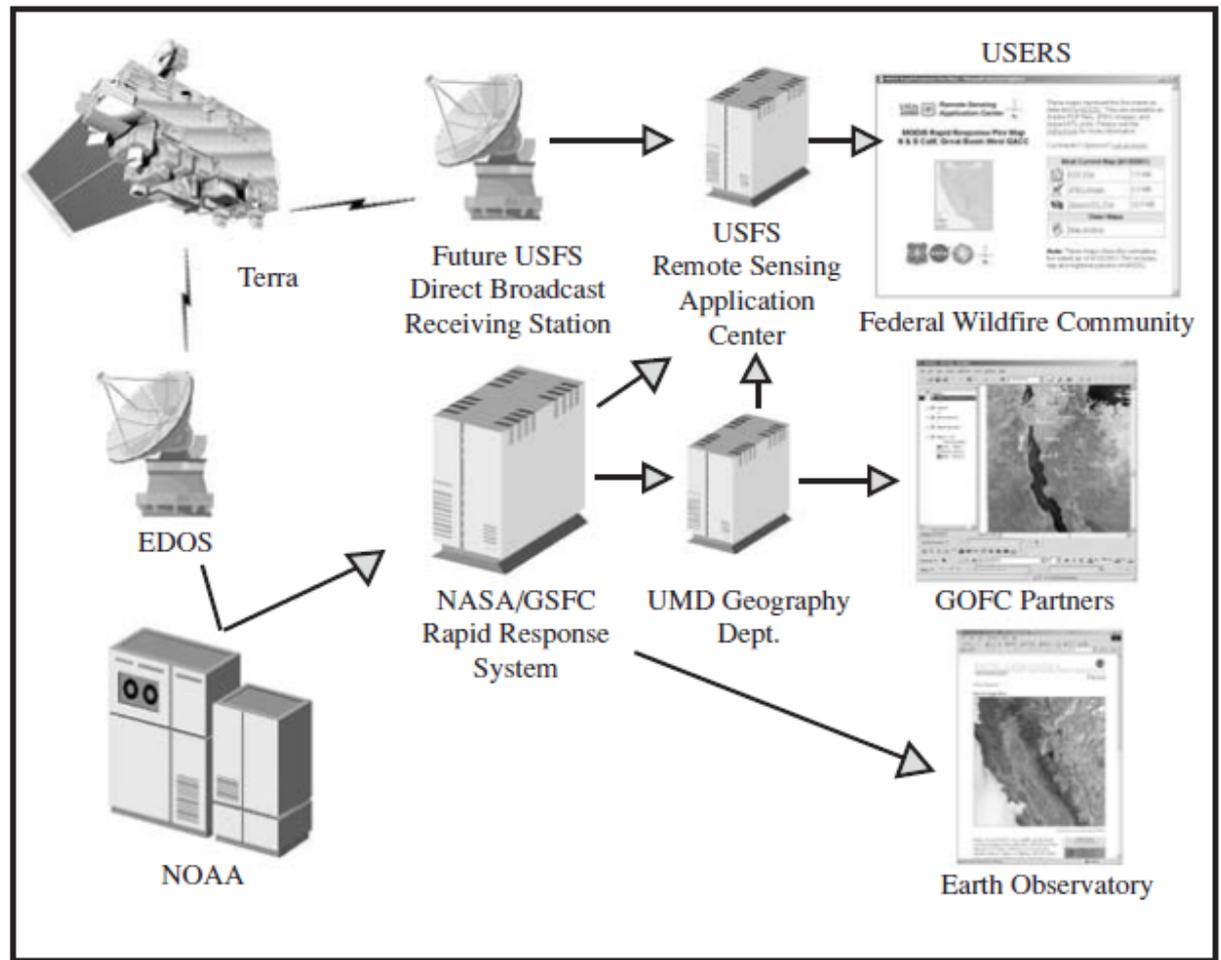


January February March April May June July August September October November December



Active fires, shown in red, are detected using MODIS data from the Aqua and Terra satellites
Source: NASA Fire Information for Resource Management System (FIRMS) <https://earthdata.nasa.gov/firms>

MODIS Rapid Response



Source:
 Sohlberg, R., J. Descloitres, et al.
 (2001). "MODIS Land Rapid
 Response: operational use of
 Terra data for USFS wildfire
 management." The Earth
 Observer **13(5): 8-10,14.**

Figure 1. High-level data flows for Rapid Response. Input data flow from sources on the left of the figure, with processing in the center segment, and delivery to end users at the right.



GOFC/GOLD - Fire



Most of this work was done under the umbrella of GOFC/GOLD Fire

GOFC /GOLD - Global Observation of Forest and Land Cover Dynamics. A panel of the Global Terrestrial Observing System (GTOS)

SAFNet: The Southern African Fire Network (GOFC-Fire group), tested our products and provided feedback on performance

GOFC/GOLD-Fire is partnering with the [Global Fire Monitoring Center \(GFMC\)](#) , and the [United Nations International Strategy for Disaster Reduction \(UNISDR\) Wildland Fire Advisory Group / Global Wildland Fire Network.](#)

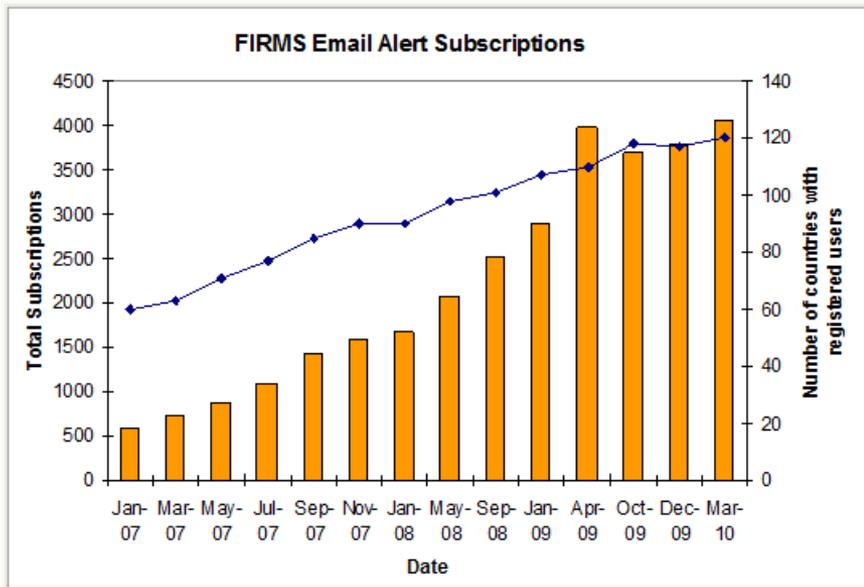
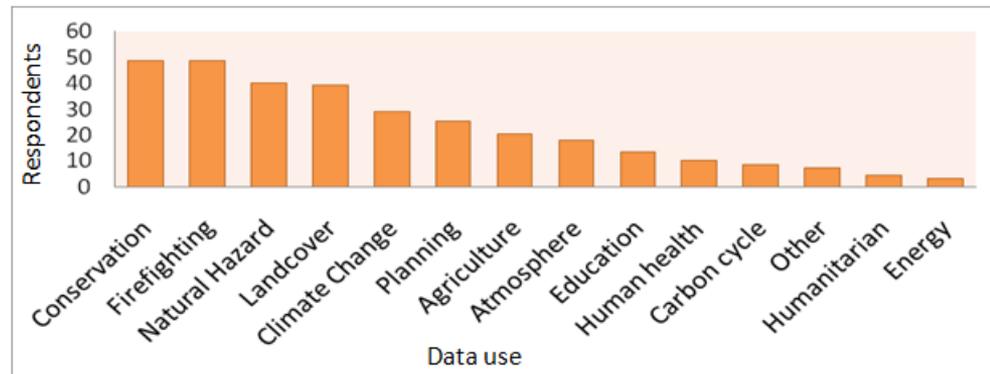




Fire Information for Resource Management (FIRMS)

User survey showed most people use FIRMS for conservation and fire fighting.

Metrics indicate Fire Email Alerts are sent to users in over 100 countries.



Applications of FIRMS

Email alert brokers

India - Forest Departments in Madhya Pradesh (SMS alerts) and Tamil Nadu

Thailand – DNP sends out notifications to all protected areas

Strategic Fire Management

NorthCom, FEMA

Atmospheric modeling and air quality - NCAR, Smog Blog, EPA Air Now

Conservation – surveillance, allocation of resources and fire management policy

Elephants without Borders, WWF , AWF, WCS,

Civil Society - Greenpeace, WWF, UNOSAT

Increase awareness of burning / challenge official figures e.g. Indonesia and Russia

Raising awareness –during large fire events

Social media , the press , news channels

- FIRMS had the largest number of visits recorded in one in one day of the 29,378 hits over 24,172 originated in Russia.



FEMA



AFRICAN WILDLIFE FOUNDATION®



Earth Observation Data [▶](#) LANCE: NASA Near Real-Time Data and Imagery [▶](#) **Fire**
Information for Resource Management System (FIRMS)

Data

Disciplines: [🌐](#)

Related Content

[Dust Storm off southern Alaska](#)

[EOSDIS Data News - 11/17/2017](#)

[User Profile: Brian Knosp](#)

[AppEEARS 2.0: New Features and Data to Further Improve User Workflow Efficiency](#)

[The EOSDIS Quarterly Update-Fall 2017 Newsletter is now online!](#)

More Resources

[Common Metadata Repository \(CMR\)](#)

[Earthdata Search](#)

Fire Information for Resource Management System (FIRMS)



The Fire Information for Resource Management System (FIRMS) distributes Near Real-Time (NRT) active fire data within 3 hours of satellite overpass from both the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Visible Infrared Imaging Radiometer Suite (VIIRS).

[MODIS Active Fire Products](#)

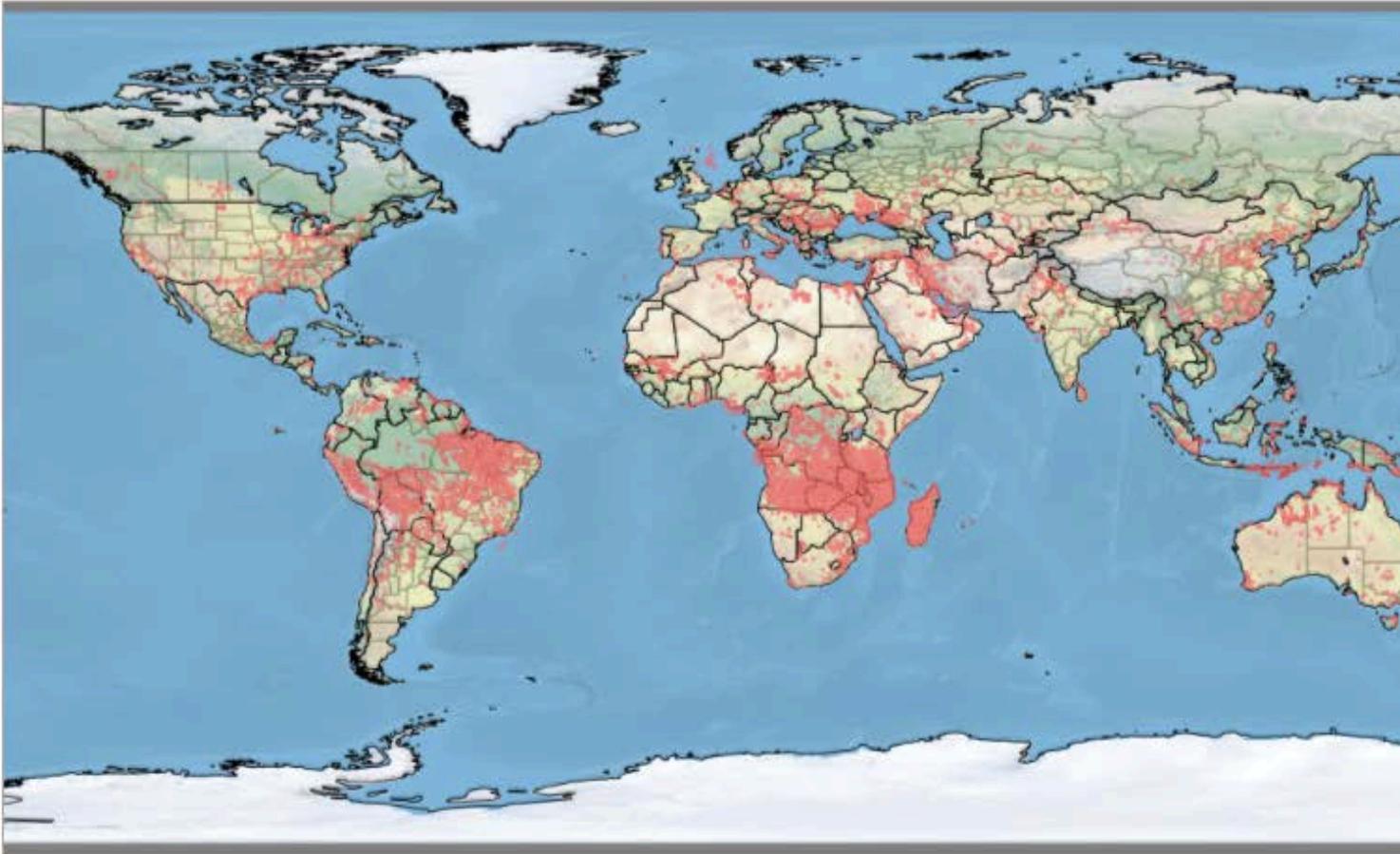
[VIIRS Active Fire Products](#)

Get hotspot/fire locations

Fire Email Alerts	
Download Active Fire Data	
Web Fire Mapper	
Global Fire Maps	
Web Services	



FIRMS Web Fire Mapper



[Bookmark current view](#)

Fires

Select fires to display using the following choices.

Data source :
VIIRS 375 m

- Time period:
- Past 24 hours
 - Past 48 hours
 - Past 72 hours
 - Past 7 days

Custom

Start: 2017-10-01
End: 2017-10-02

[Viewing the Fire Aggregate Grid?](#)
[Toggle Fire Aggregates Legend](#)

Note: Cloud cover may obscure active fire detections.

- [Regions](#)
- [Background Images](#)
- [Layers](#)
- [Activity Log](#)
- [Links](#)

 **FIRMS Rapid Alert Id 20235, viirs-v1**

NASA FIRMS

Sent: Monday, November 20, 2017 at 8:57 PM

To: Davies, Diane K. (GSFC-619.0)[SCIENCE SYSTEMS AND APPLICATIONS INC]

📎  R_FirePoints_20235_171120155743_viirs-v1.csv (11.7 KB) [Preview](#)

 You forwarded this message on 11/21/17, 6:32 PM.

NASA FIRMS: Fire Email Alert

99 fires/hotspots detected during the most recently processed satellite overpass

[\(Custom Polygon\)](#)



[View map image on NASA FIRMS server](#)

NOTE: Cloud cover might obscure active fire detections.

This email was generated on 2017-11-20 20:57:44 UTC

NASA FIRMS Data Source: VIIRS 375m

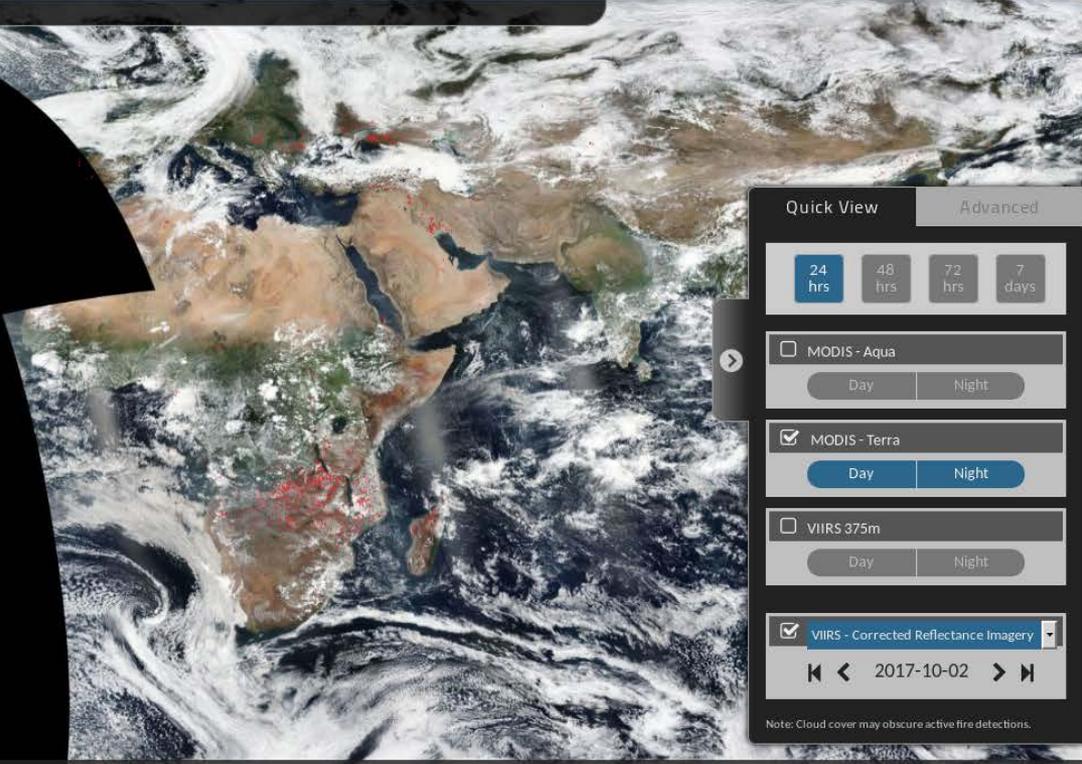
FIRMS Update

- Updated the backend code to be more compatible with MODAPS
- Streamlined the processing of email alerts to run faster
- Designed new look to fit with Earthdata look and feel,
- Pulls in latest CR and SR imagery from MODIS and VIIRS via GIBS
- Design is more generic and configurable, and will be re-usable for flood mapping viewer and other possible upcoming applications that are still in the pipeline
- Plan in place and implementation beginning to move FIRMS processing to more modern equipment, use standard MODAPS processing system, and deploy to more secure web environment



FIRMS

Fire Information for Resource Management System



Quick View Advanced

- 24 hrs
- 48 hrs
- 72 hrs
- 7 days

MODIS - Aqua
Day Night

MODIS - Terra
Day Night

VIIRS 375m
Day Night

VIIRS - Corrected Reflectance Imagery
2017-10-02

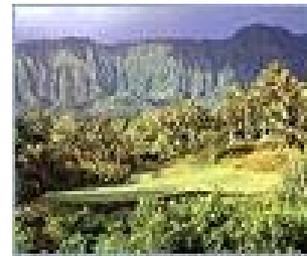
Note: Cloud cover may obscure active fire detections.

Last Updated: 2017-07-13 04:15
Version: VIIRS 375 m



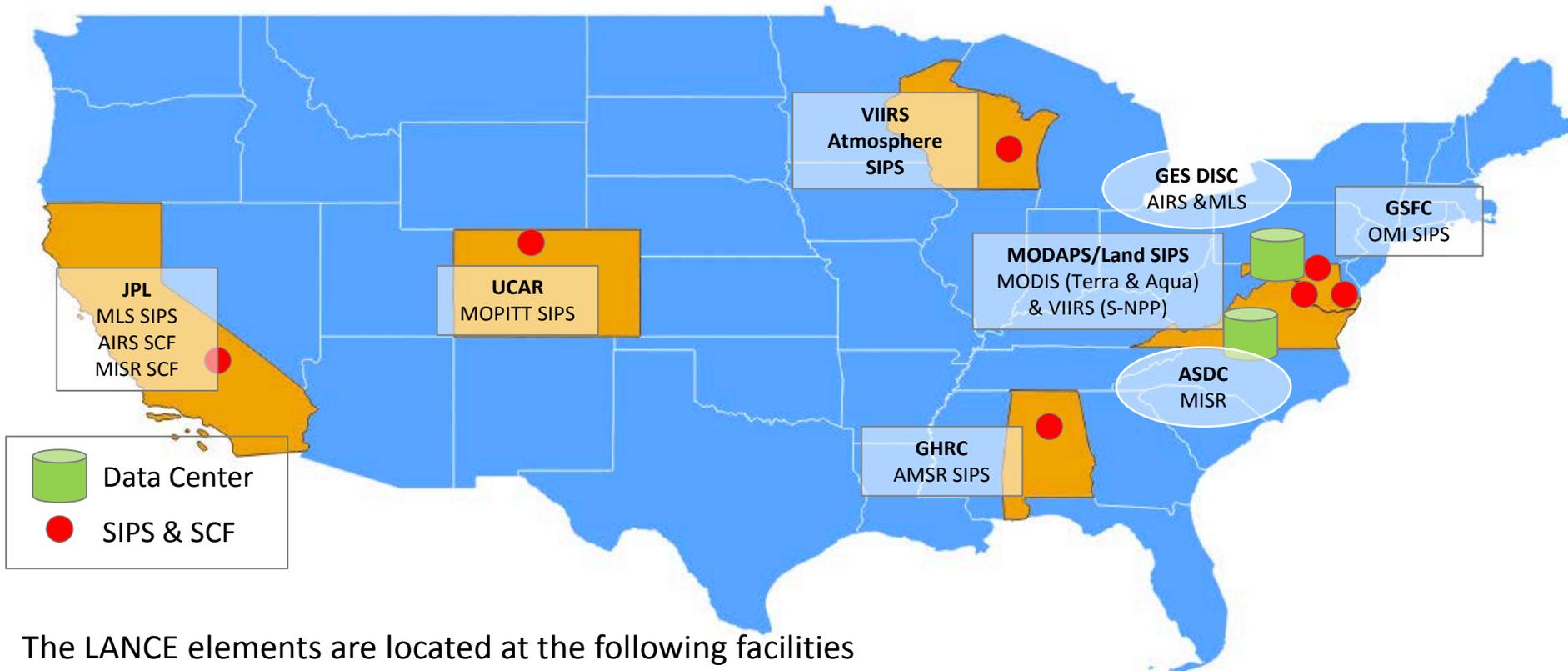
Land, Atmosphere Near Real-time Capability for Earth Observing Systems (LANCE)

- The goal of LANCE is to provide near real-time (NRT) data products within 3 hours of observations to meet the timely needs of applications users.
- LANCE provides NRT data and imagery from many instruments (AIRS, AMSR2, MISR, MLS, MODIS, VIIRS, OMI) much quicker than routine processing allows



LANCE provides data, imagery, and products to support a range of applications including Air Quality, Dust storms, Fires, Vegetation changes, floods, ash plumes, drought, smoke plumes, sea ice mapping, and severe storms

LANCE FACILITIES



The LANCE elements are located at the following facilities

- **GSFC Earth Sciences Data and Information Services Center (GES DISC)** is providing AIRS with support from the AIRS Science Computing Facility (SCF) at JPL , and MLS data via the MLS SIPS at JPL
- **Atmospheric Science Data Center (ASDC)** is providing MISR data with support from the MISR SCF at JPL
- **AMSR Science Investigator-led Processing System (SIPS)** is providing AMSR2 data
- **MODIS Adaptive Processing System (MODAPS) and Land SIPS** are providing MODIS and VIIRS Land data
- **OMI Science Investigator-led Processing System (SIPS)** is providing OMI and OMPS data
- **MOPITT SIPS (University Corporation for Atmospheric Research (UCAR))** is providing MOPITT data
- **Atmosphere SIPS (University of Wisconsin)** is providing VIIRS Atmosphere data

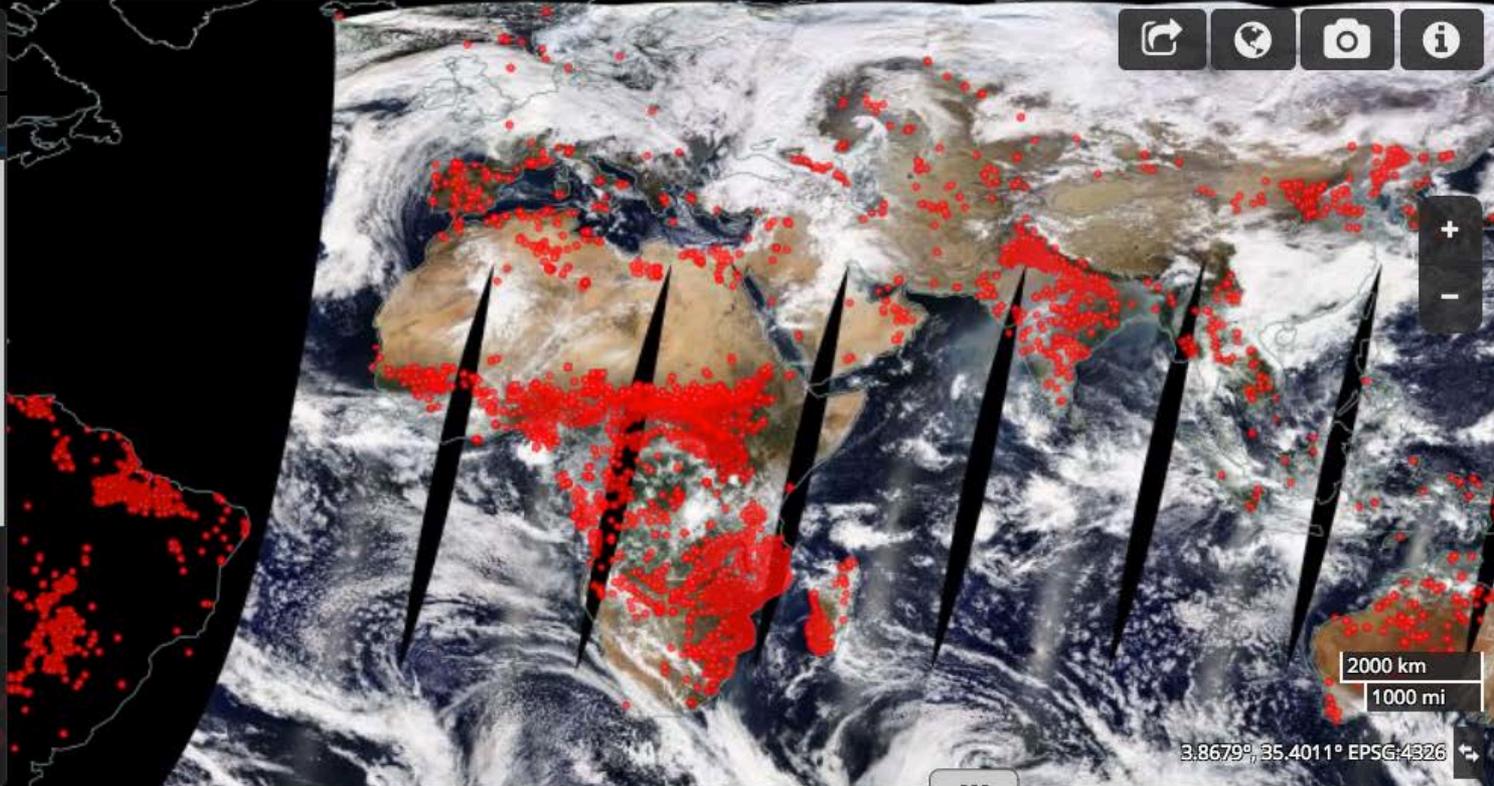
NASA WORLDVIEW

Layers Events Data

OVERLAYS

- Fires and Thermal Anomalies (Day, 375m)
Suomi NPP / VIIRS
- Fires and Thermal Anomalies (Night, 375m)
Suomi NPP / VIIRS
- Fires and Thermal Anomalies (Day and Night)
Terra and Aqua / MODIS
- Place Labels
© OpenStreetMap contributors, Natural Earth
- Coastlines / Borders / Roads
© OpenStreetMap contributors, Natural Earth

+ Add Layers



2017 NOV 21

OCT 2017 NOV 2017 DEC 2017

DAYS MONTHS YEARS

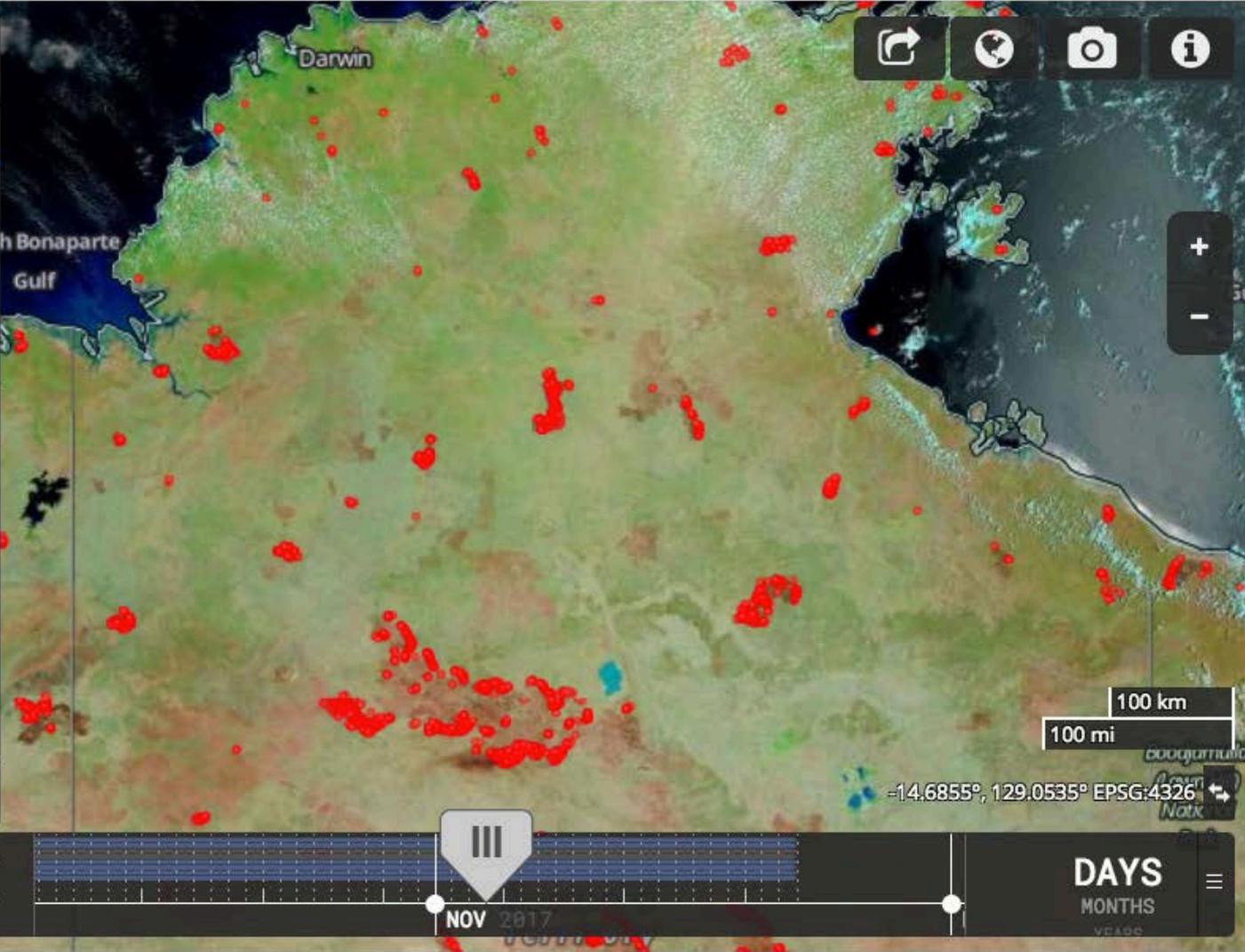
NASA WORLDVIEW

Layers Events Data

- (Day and Night) Terra and Aqua / MODIS
- Place Labels © OpenStreetMap contributors, Natural Earth
- Coastlines / Borders / Roads © OpenStreetMap contributors, Natural Earth
- Coastlines © OpenStreetMap contributors

- BASE LAYERS
- Corrected Reflectance (Bands 7-2-1) Terra / MODIS
 - Land Surface Reflectance (Bands 7-2-1) Terra / MODIS
 - Corrected Reflectance (True Color) Suomi NPP / VIIRS

+ Add Layers



2017 NOV 04 < > 🎥



NOV 2017

DAYS MONTHS

Worldview

<https://worldview.earthdata.nasa.gov>

<https://go.nasa.gov/2hLjmZb>

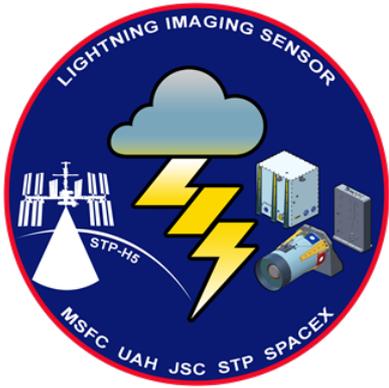


ISS LIS Status

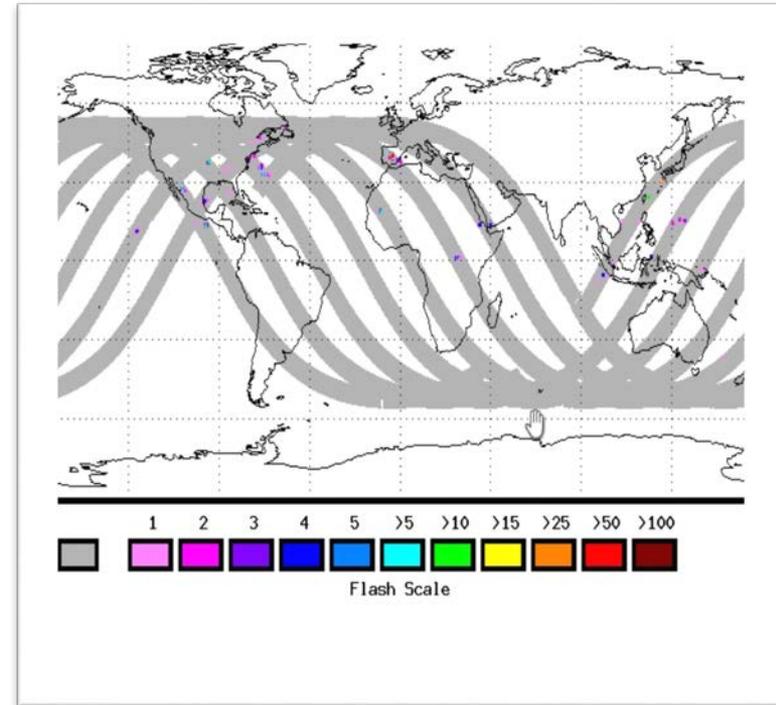
Helen Conover
Sherry Harrison

LANCE User Working Group Meeting
October 3, 2017





- Lightning website
 - <https://lightning.nsstc.nasa.gov/data/>
- HyDRO
 - <https://ghrc.nsstc.nasa.gov/hydro/>
- Earthdata Search
 - <https://search.earthdata.nasa.gov/>
- Subscriptions
 - (coming soon)



NRT: 12 Hour Browse Image

https://lightning.nsstc.nasa.gov/data/data_iss_lis.html

Earth Science Data Operations

Earth Science Mission Operations

ESDIS

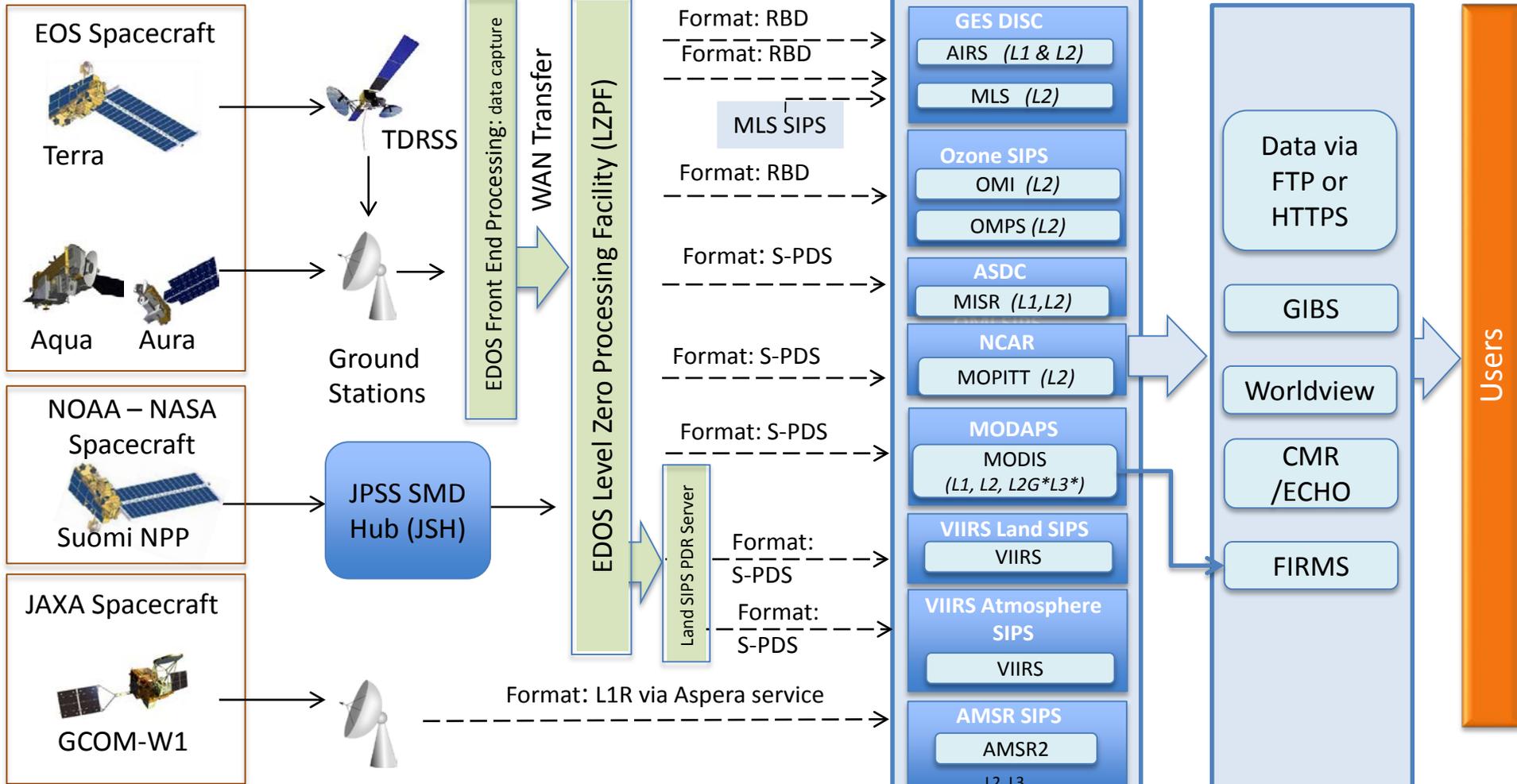
Data Acquisition

Data Capture & Processing

Data to SIPS

Science Data Processing & Distribution

Distribution & Access



RBD: Rate Buffered Data

S-PDS: Session Based Production Data Set, T-PDS: Time Based Production Data Set

*L2G and L3 products have a latency of 27 – 48 hours

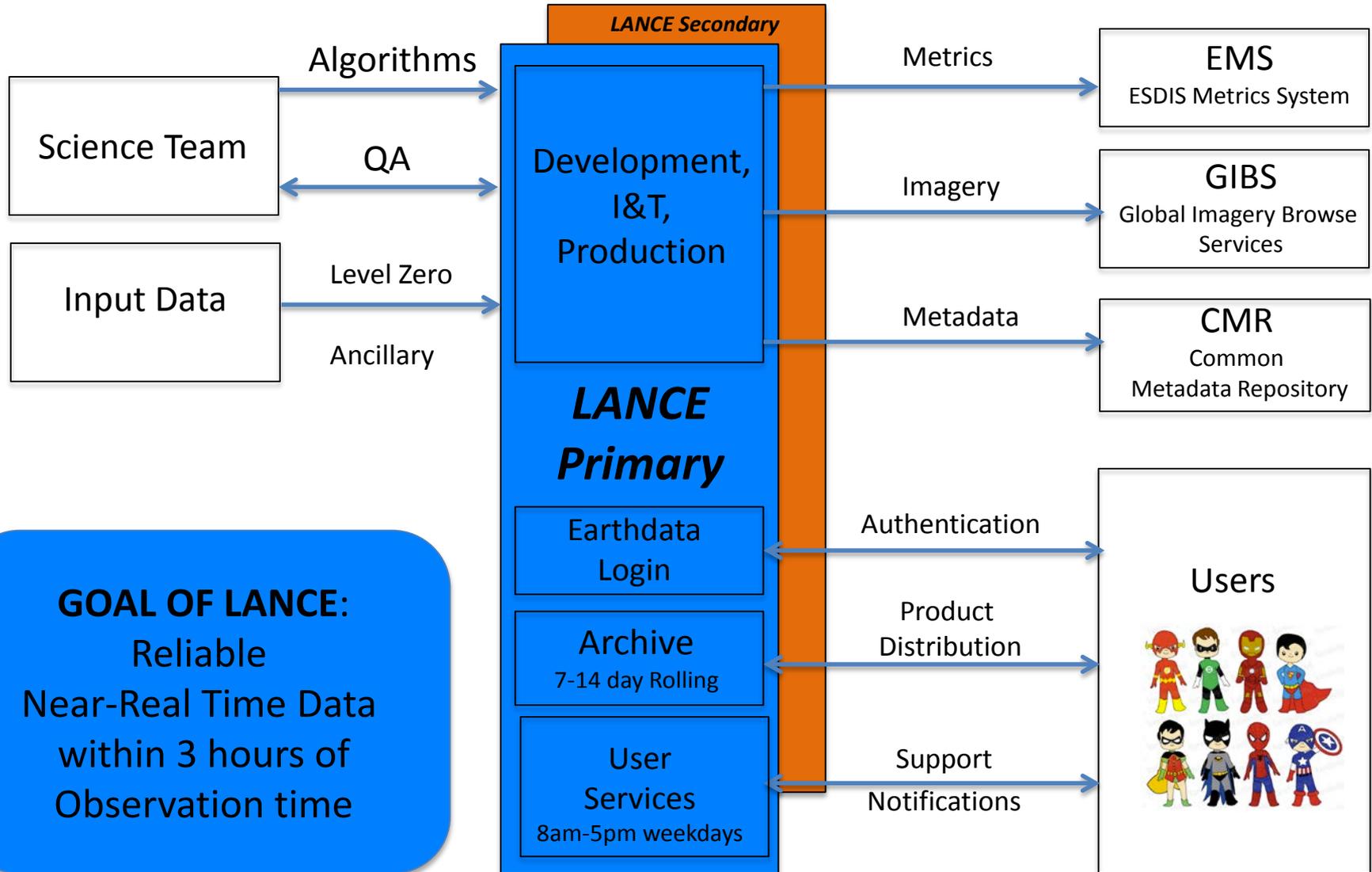
SIPS: Science Investigator-led Processing Systems

TDRSS: Tracking and Data Relay Satellite System

Direct Broadcast /
Readout Stations



LANCE IN A Nutshell



GOAL OF LANCE:
Reliable
Near-Real Time Data
within 3 hours of
Observation time