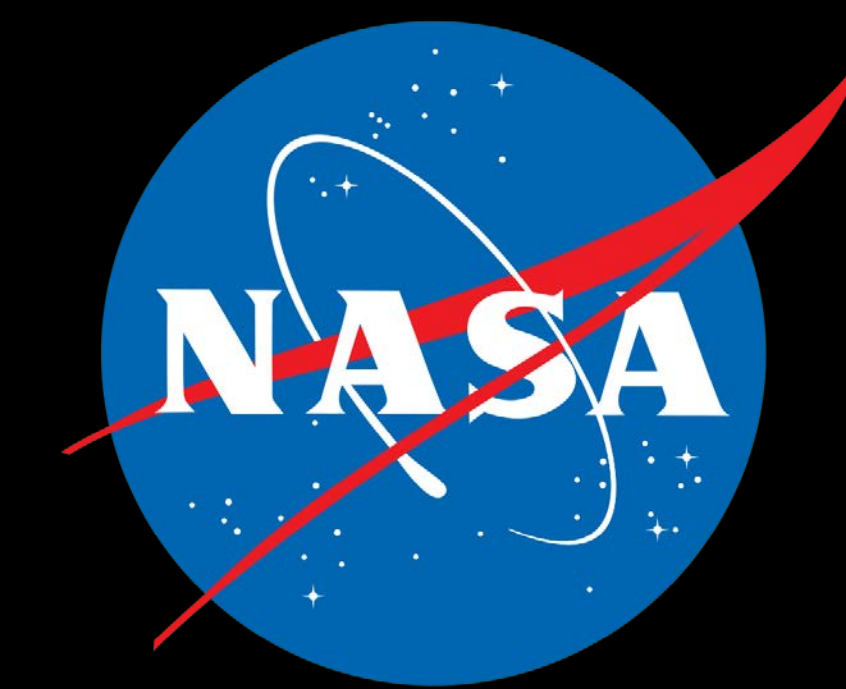




NASA's Land, Atmosphere Near Real-time Capability for EOS (LANCE) @10 Years.

A look back at its origins in MODIS Terra



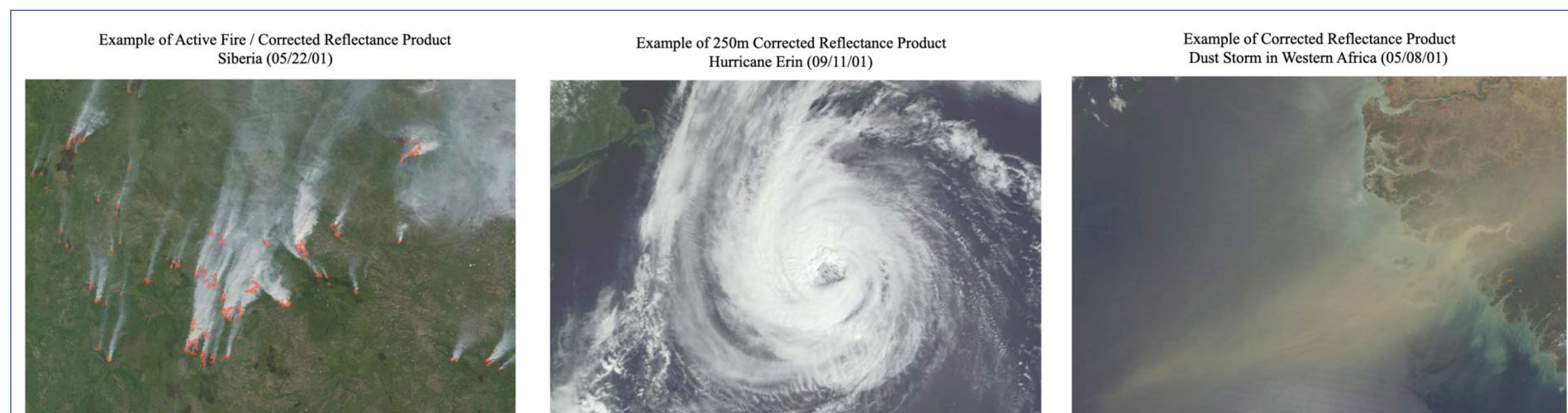
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IN21E-0883

This poster looks back on how the first near real-time (NRT) images from MODIS Terra provided the impetus for the creation of the Land, Atmosphere Near Real-Time Capability for EOS (LANCE) – a near real-time (NRT) capability that currently serves low latency products for monitoring air quality, floods, dust storms, snow cover and agriculture, as well as for public education and outreach to users in over 160 countries.

The first request for NRT products from the MODIS instrument on the Terra satellite dates back to the 2000 wildfires on the Idaho-Montana border, when the US Forest Service (USFS) requested MODIS fire detections within hours of acquisition, instead of the expected 7 day latency, to help manage wild land fires. The MODIS Land Discipline Group created a series of hand-crafted imagery products that demonstrated the significant contribution that MODIS Terra data could make to wildfire suppression and rehabilitation. To be of value to the USFS, the data and imagery would need to be available within three hours of satellite acquisition. This was achieved through the MODIS Rapid Response system.



Early images from MODIS Rapid Response: Initially the MODIS Rapid Response Project was used for wildfire management but it soon became clear that there were many other applications such as monitoring hurricanes, dust storms as well as crops, floods, ash plumes and oil spills.

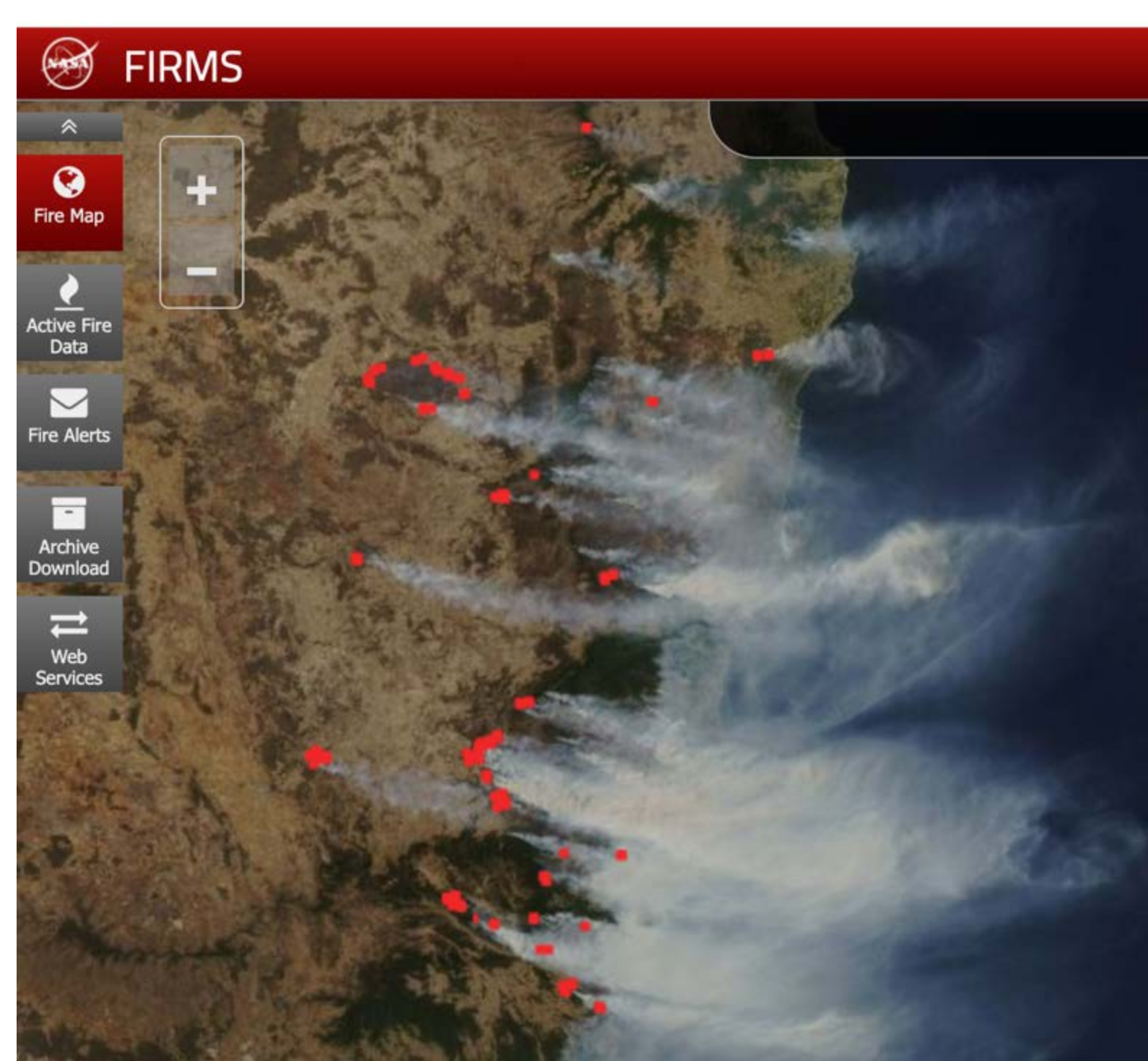
MODIS Rapid Response was a collaborative effort between scientists from the University of Maryland (UMD) and NASA Goddard Space Flight Center; the data was obtained from the NASA/NOAA/Department of Defense Near Real-Time Processing Effort (NRTPE).



Establishment of LANCE

By 2008 the growing demand for near real-time images and an aging NRTPE system, spurred NASA Headquarters to fund LANCE - a new, more robust system; serving NRT data not only from MODIS, but also the Atmospheric Infrared Sounder (AIRS) aboard NASA's Aqua satellite, the Microwave Limb Sounder (MLS) and Ozone Monitoring Instrument (OMI) aboard NASA's Aura satellite, and, soon afterward, the Advanced Microwave Scanning Radiometer for EOS (AMSR-E) aboard Aqua. LANCE was formally established in September 2009 and today serves products from 10 instruments.

Fire Information for Resource Management System (FIRMS)

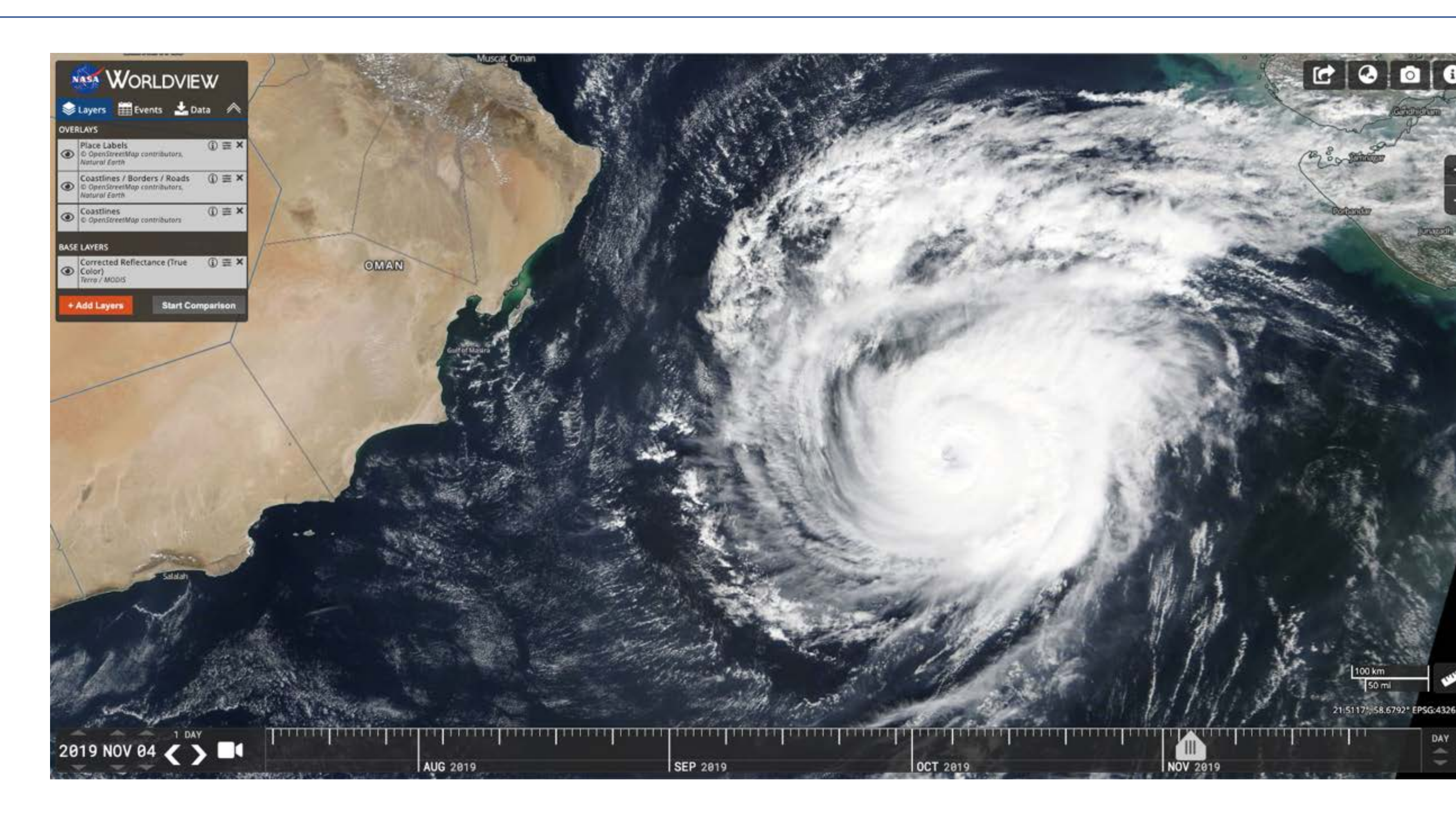


FIRMS built on the success of MODIS Rapid Response; making MODIS NRT active fire/thermal anomaly data available in easy to use formats. Global active fire detections can be downloaded or viewed interactively using FIRMS Fire Map, and users can sign up to receive email Fire Alerts notifying them of potential fires detected in specific areas of interest. Today FIRMS is also part of LANCE and serves data and imagery from MODIS and the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument.

Left: FIRMS Fire Map showing active fires in New South Wales, Australia. The fires, overlaid in red, are on a corrected reflectance true color image from VIIRS Suomi-National Polar orbiting Partnership from 11/13/ 19

GIBS and Worldview

MODIS Rapid Response demonstrated the ability to provide near real-time imagery, and the value of quick and simple access to this imagery. Building upon this, ESDIS developed the LANCE-powered Global Imagery Browse Services (GIBS) and the NASA Worldview interactive data visualization application in 2011. As a result, users can easily download NRT imagery, interactively explore this imagery, and download the underlying data behind this imagery.

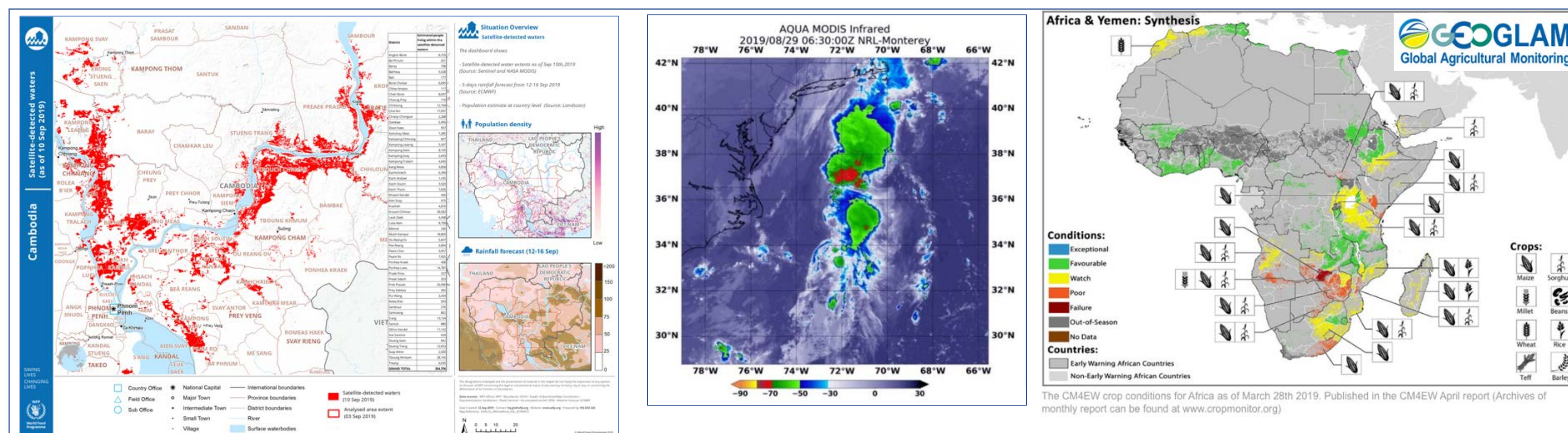


Left: Screenshot of MODIS Terra corrected reflectance imagery in Worldview showing Tropical Cyclone Maha on November 4, 2019.

MODIS and VIIRS NRT Corrected Reflectance imagery are the most viewed imagery in GIBS and Worldview.

Applications supported by LANCE

Data and imagery from MODIS and VIIRS, are used for a wide range of applications from air quality, dust storms, fires, vegetation changes, floods, drought, smoke plumes, sea ice mapping, and severe storms.



Examples of NRT MODIS data being used (images from left to right): i) a situation overview from the UN World Food Program combining the MODIS NRT Flood product with Sentinel 1 SAR information for flood mapping, ii) output from the Naval Research Laboratory (NRL) – Monterey; in this example the Aqua MODIS Infrared data is used for monitoring extra-tropical system Erin off the eastern coast of the U.S and iii) a GEOGLAM crop conditions bulletin for Africa - GEOGLAM uses MODIS NRT data to produce vegetation indices for crop monitoring forecasts.

Products from MODIS in LANCE

Over the last two years the following products have been requested and added to LANCE:

- **MAIAC - the Multi-Angle Implementation of Atmospheric Correction** - to support the worldwide air quality and climate and atmospheric modeling communities.
- **MODVOLC** to more rapidly detect the onset of a volcanic eruption and quantify changes in the intensity of the eruption as it progresses.
- **MODIS Global Flood product** to ensure continuation of the flood product which is widely used by a range of international organizations (expected in Spring 2020).

Organizations that use LANCE products



For more information on: LANCE <http://earthdata.nasa.gov/lance>