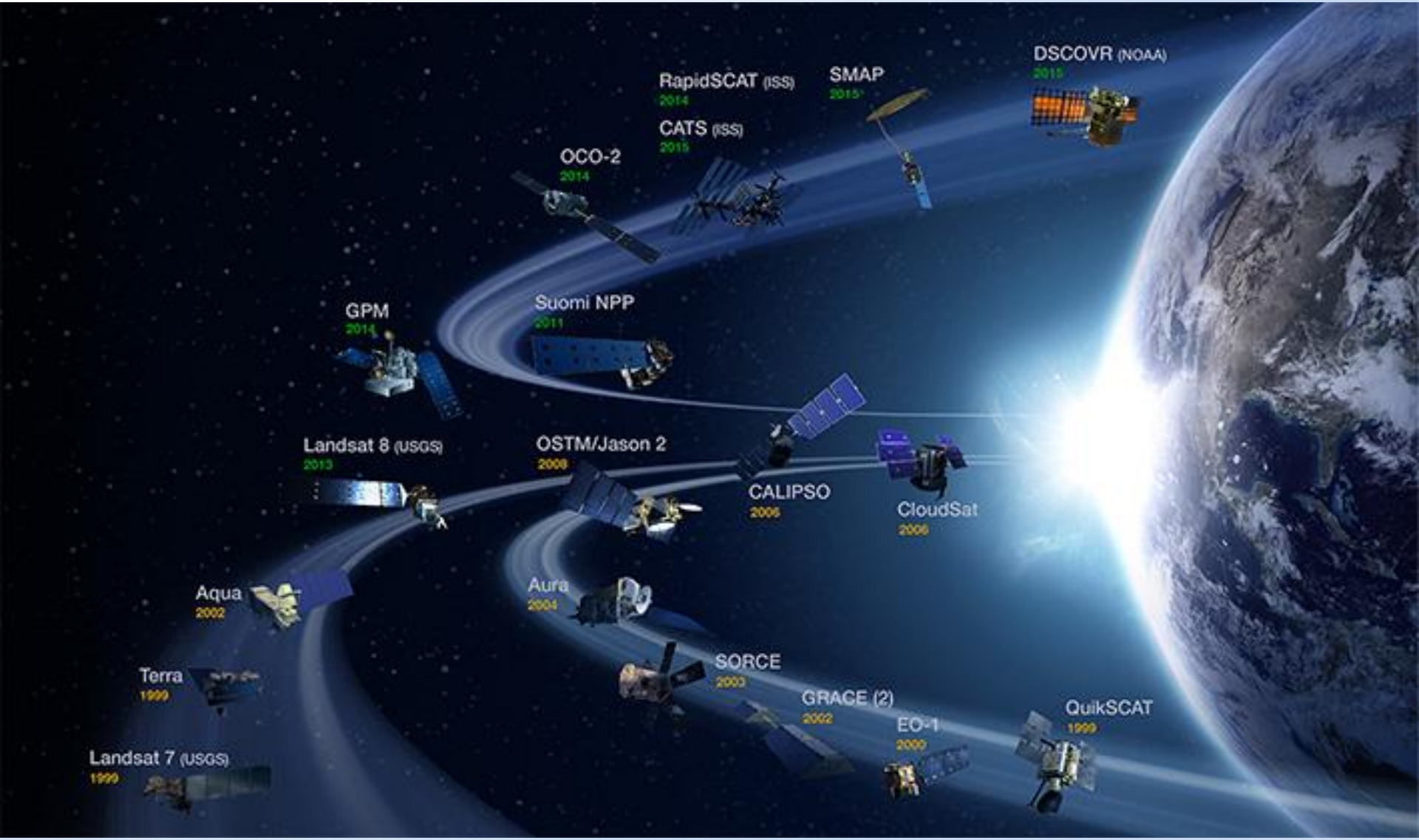
NASA

Earth Observing Data System Data and Information System (EOSDIS) Overview

Stephan Klene
Chief Systems Engineer
Columbus Technologies and Services

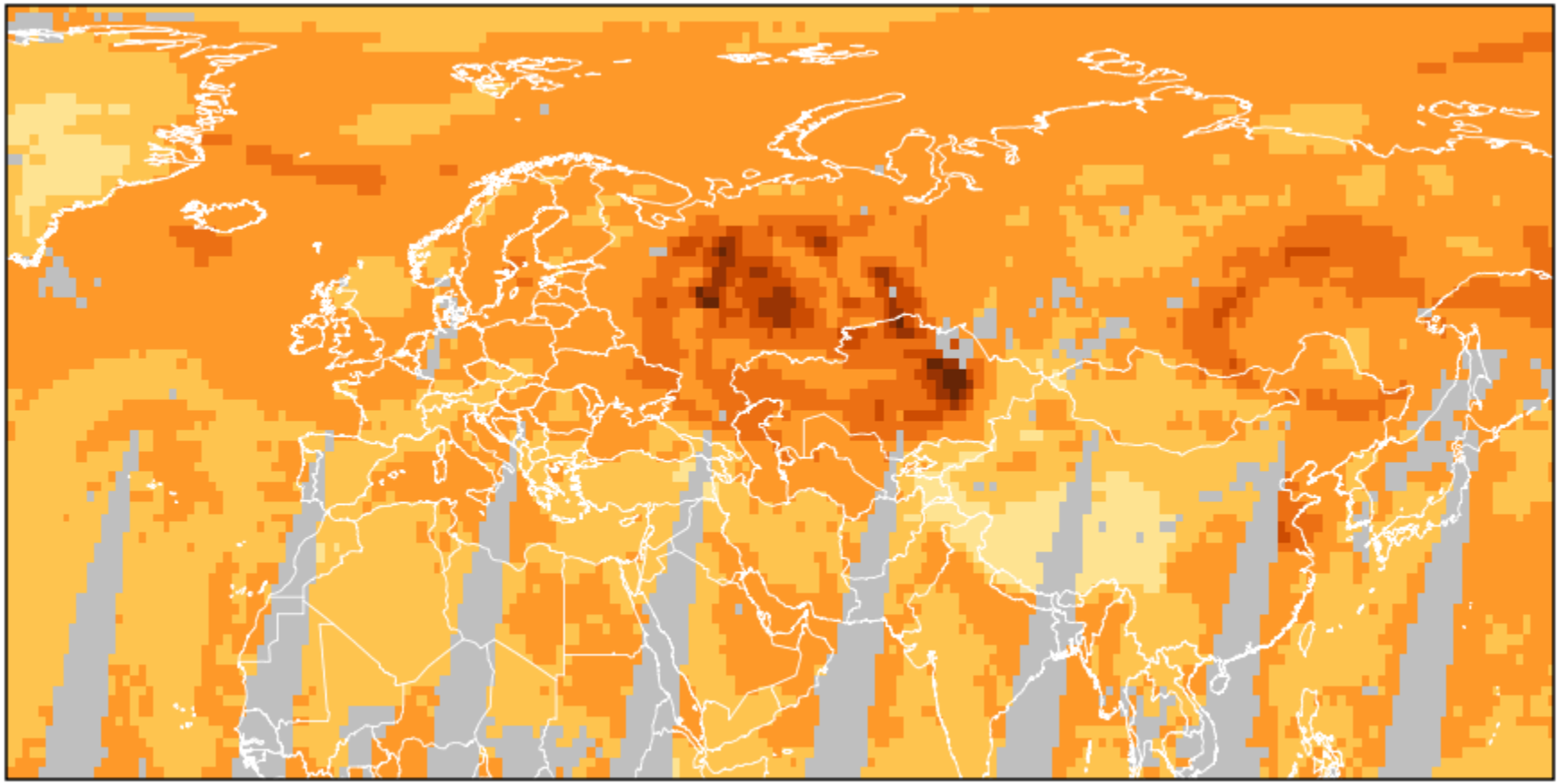
Supporting
NASA
Goddard Space Flight Center (GSFC)

EOSDIS processes, archives and distributes data from Earth observing satellites

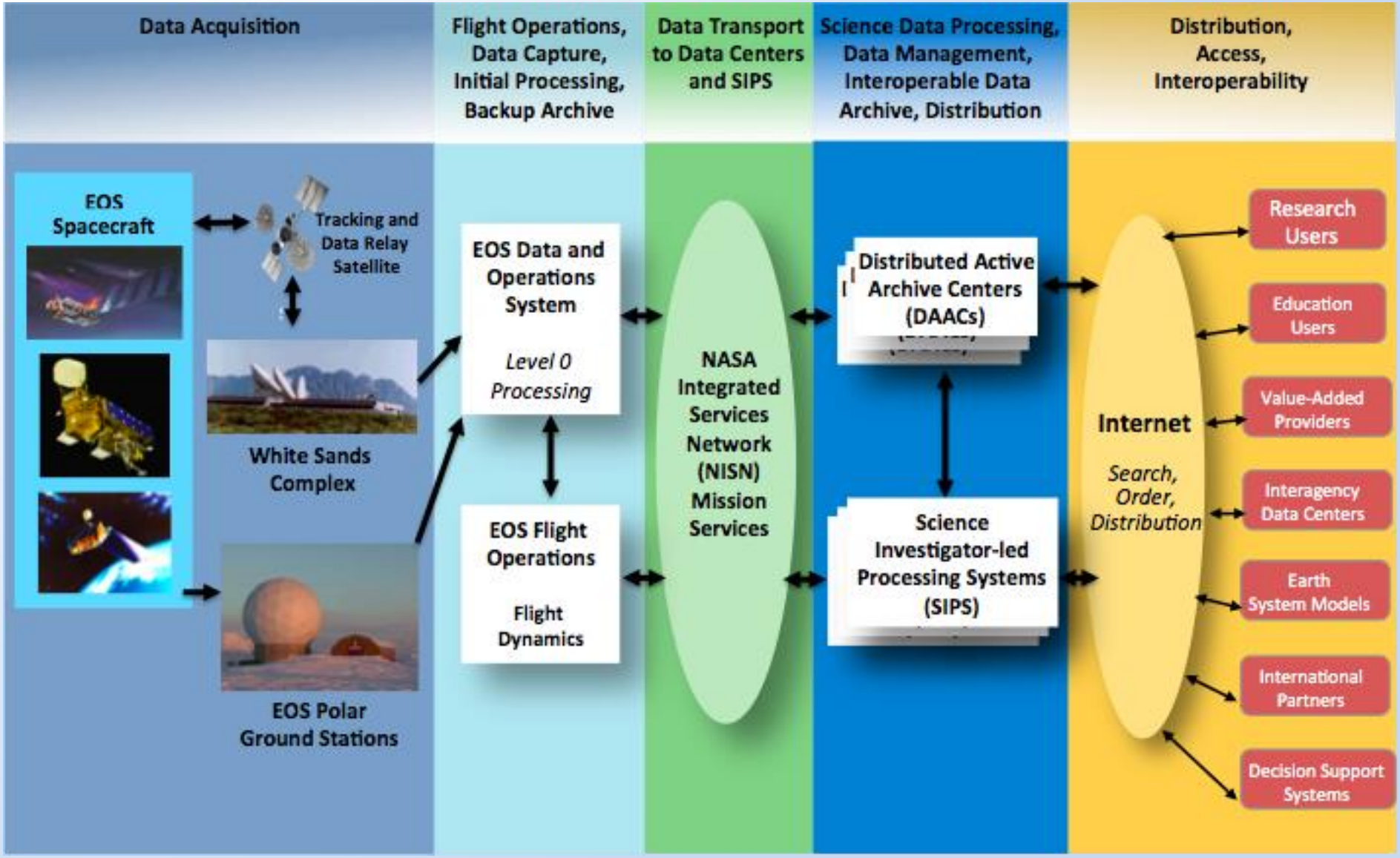


Example: Atmospheric Infrared Sounder (Aqua Satellite)

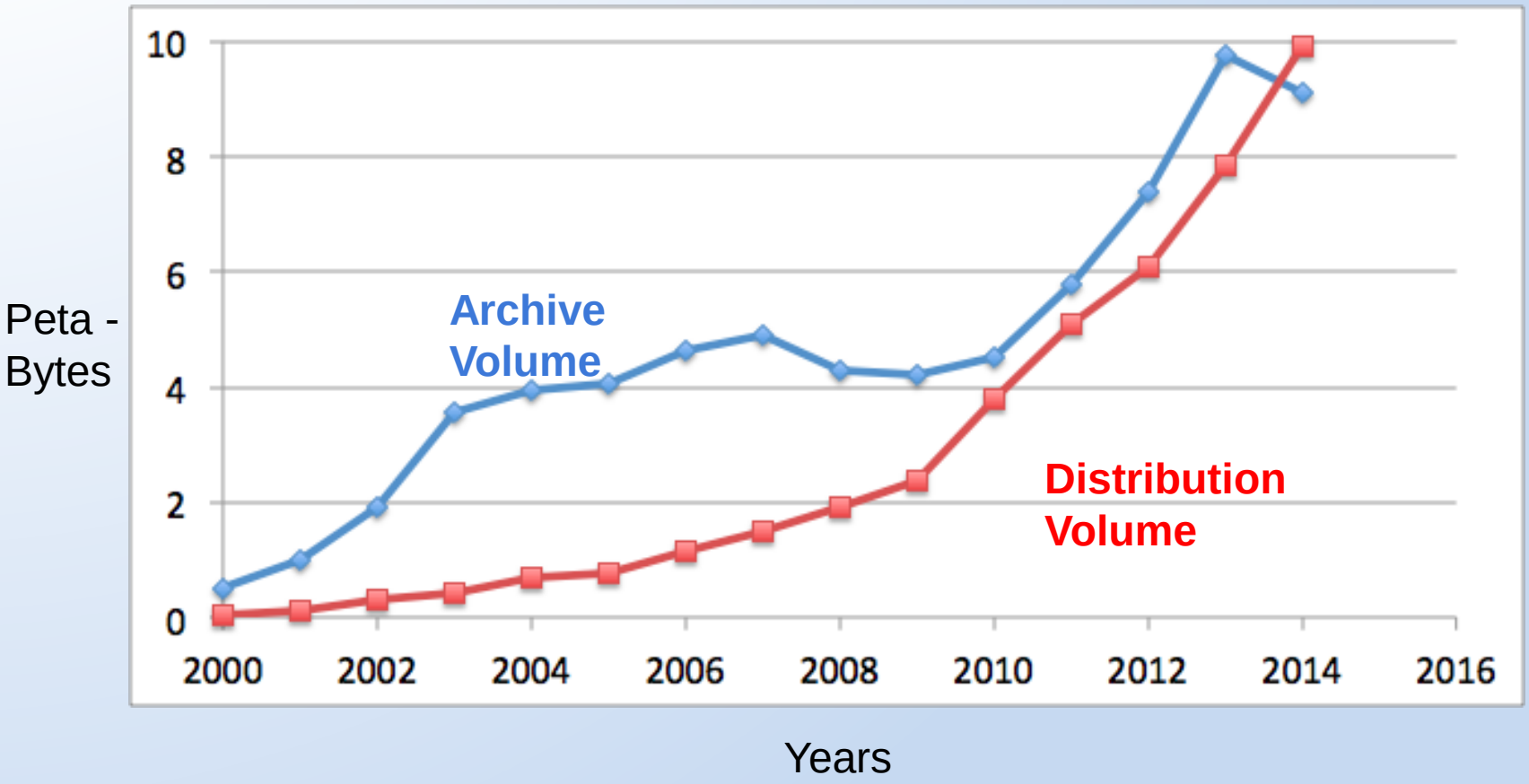
Total Column Carbon Monoxide,
Night 11 Aug 2011



EOSDIS manages data from downlink to distribution



Big Data Distribution Growth



Big Earth Data Initiative

- The White House Office of Science and Technology Policy (OSTP) has made it a priority to improve earth observation data discoverability, accessibility, and usability
  - Data is still sometimes difficult for the non-expert user to discover, access, and use
- OSTP proposed the Big Earth Data Initiative (BEDI) to focus on improving:
  - Interoperability of earth observation between US federal agencies
  - Earth observation data management practices

NASA's BEDI - Example Efforts:

- Catalog and Data Discovery Improvements
  - Metadata Guidance and Recommendations
  - Digital Object Identifier (DOI)
- Web Services for Direct Data Access
  - Global Image Browse Service (GIBS)
  - OPeNDAP and Webification (w10n-sci)
  - Support for Open Standards:
    - WMS
    - WCS

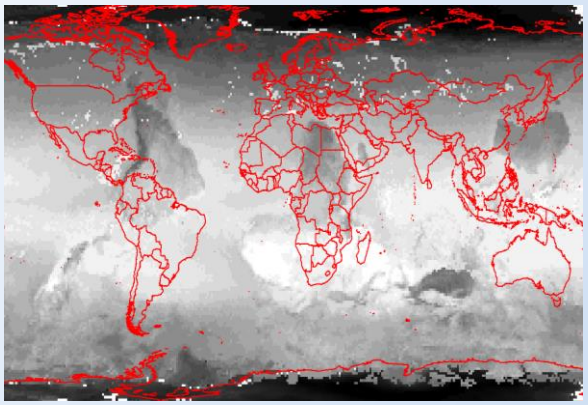
Updated Image Reference Data

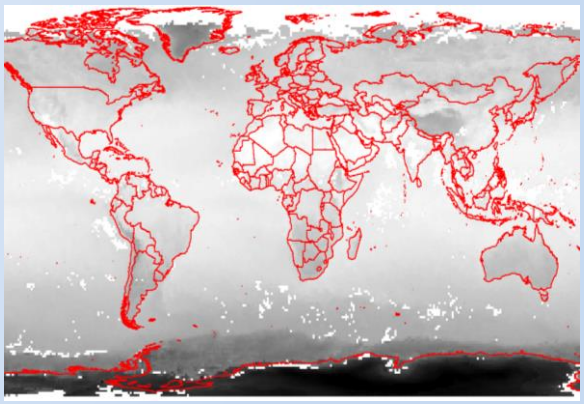
Atmospheric Science Data Center

Before | **After**

Image Displayed Inverted

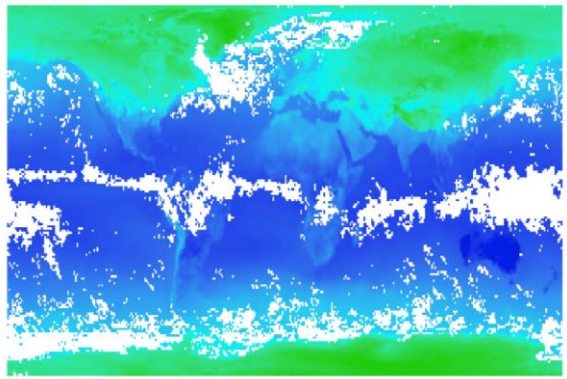
MOP03TM.005 (HDF4):
Retrieved Surface Temperature Night



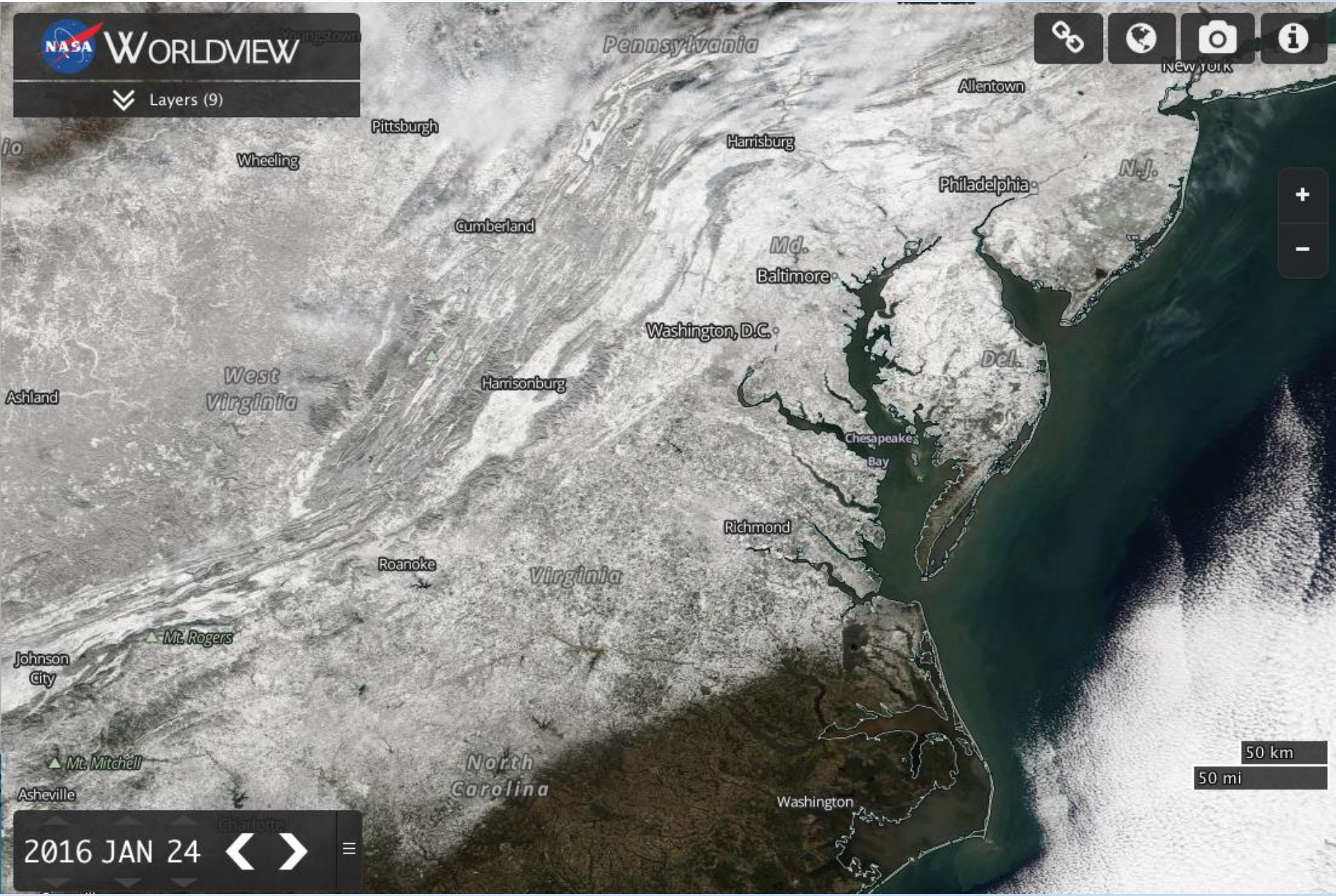


Missing Geo-Reference & 90 Degree Rotated

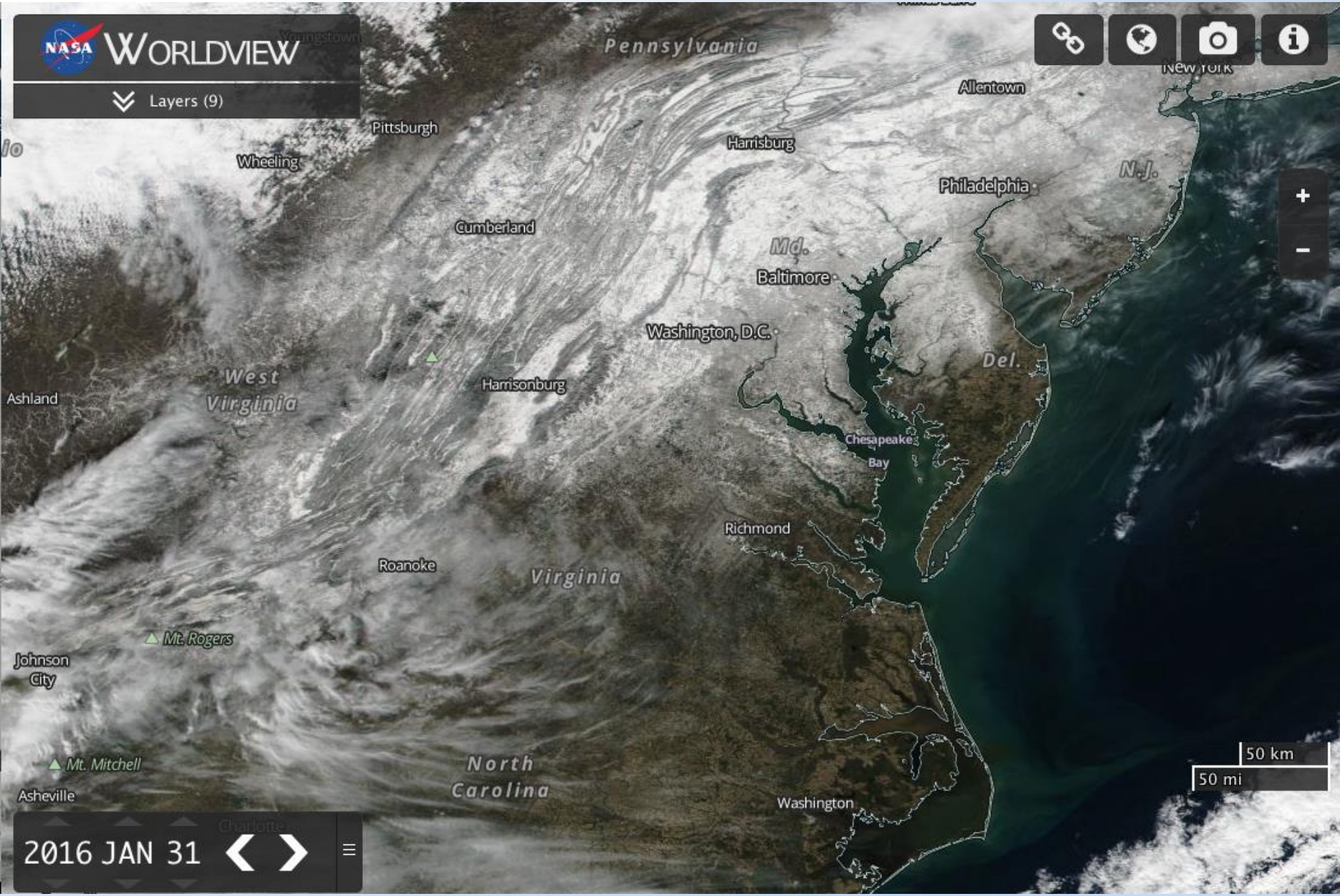
MOP03TM.006 (HDF5):
A Priori Surface Temperature Night



Images generated with ArcMap 10.2.2
Enhancements to Geospatial Data Abstraction Library (GDAL)



Data available 3 hours after collection



Visualize retreating snowline

Esri and NASA Collaborate
to Advance Cloud Access to Imagery

"Esri and NASA are collaborating to improve access to imagery and raster data stored in the cloud using a combination of two technologies, Meta Raster Format (MRF) and Limited Error Raster Compression (LERC)."

http://www.esri.com/esri-news/releases/15-4qtr/esri-and-nasa-collaborate-to-advance-cloud-access-to-imagery

December 17, 2015
Redlands, California—Esri and NASA are collaborating to improve access to imagery and raster data stored in the cloud using a combination of two technologies, Meta Raster Format (MRF) and Limited Error Raster Compression (LERC). MRF is an Open raster format originally designed at the NASA Jet Propulsion Lab (JPL) to optimize web access to rasters. LERC is a highly efficient algorithm that provides fast lossless and controlled lossy compression of image and raster data. LERC is especially suitable for geospatial applications. Esri was recently awarded a US Patent for LERC, and is making the patented LERC technology freely available to the geospatial and earth sciences community.

By sharing MRF and LERC with the community, NASA and Esri will enable organizations to lower storage costs and gain fast access to imagery and data as web services. Speedy and accurate web access to imagery will help improve the way people understand and analyze changes in the Earth.
"We have been working with NASA to improve the MRF format, but want to take this a step further and release our patent on LERC," said Esri president Jack Dangermond. "By contributing the LERC algorithm to the geospatial community, we hope to inspire innovation and encourage problem solving."
NASA has had notable success using MRF as an image raster format and is collaborating with Esri on improvements to the format. In addition, Esri has contributed code improvements to the Open Source geospatial data abstraction library (GDAL) implementation of MRF. This work is focused on access to rasters stored in the cloud on object stores.
"We've been using MRF to create and distribute imagery for a number of years, but we are only now starting to explore browser access to these datasets," said NASA Earth Science Data Systems program executive Kevin Murphy. "Our collaboration with Esri and the release of Esri's patent on LERC ensures that more people can enjoy efficient, accurate transmission of imagery and data over the web."
LERC is being released as Open Source under an Apache2 License and will also be included in the NASA MRF Open Source project.

For more information:

earthdata.nasa.gov

Thank you

Stephan Klene
Chief Systems Engineer
Columbus Technologies and Services

Supporting
NASA
Goddard Space Flight Center (GSFC)