Architecting a High-Demand Image Service for GOES-16
Abstract #GC11J-1017

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Geostationary Operational Environmental Satellites (GOES)

GOES satellites provide the kind of continuous monitoring necessary for intensive data analysis. They circle the Earth in a geosynchronous orbit, which means they orbit the equatorial plane of the Earth at a speed matching the Earth's rotation. This allows them to hover continuously over one position on the surface. The geosynchronous plane is about 35,800 km (22,300 miles) above the Earth, high enough to allow the satellites a full-disc view of the Earth. Because they stay above a fixed spot on the surface, they provide a constant vigil for the atmospheric "triggers" for severe weather conditions such as tornadoes, flash floods, hailstorms, and hurricanes. When these conditions develop, the GOES satellites are able to monitor storm development and track their movements.
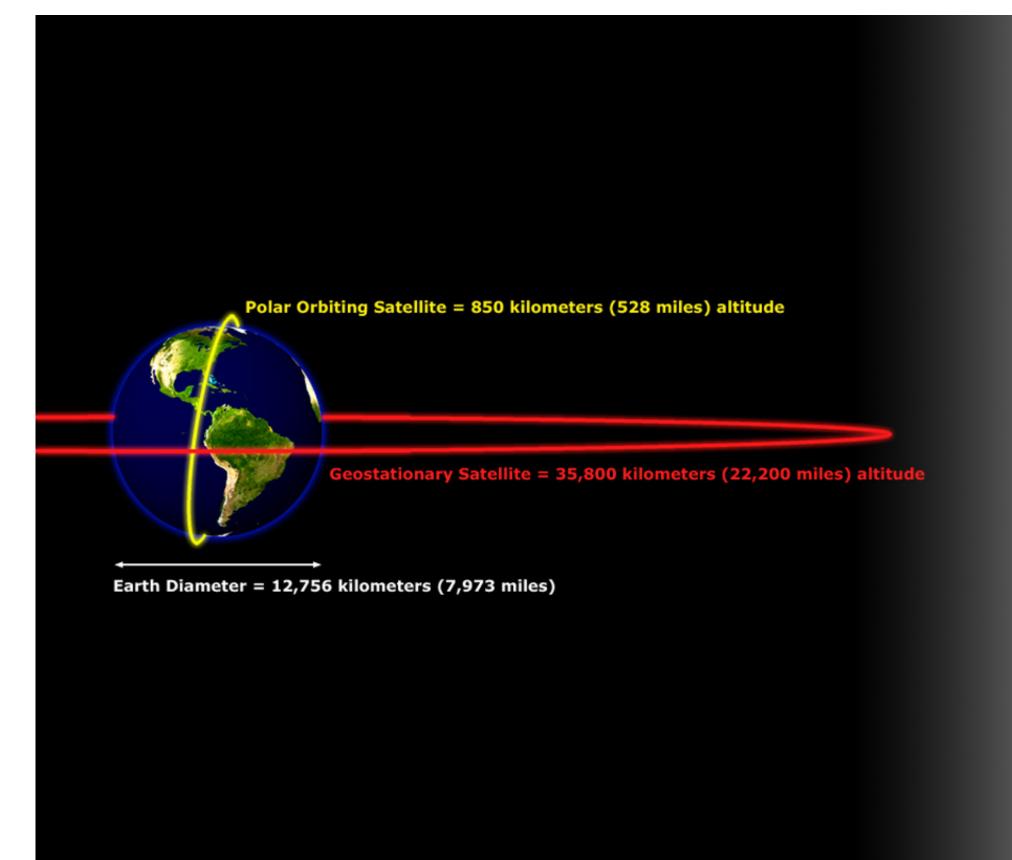
NASA launched the first GOES for NOAA in 1975. The GOES-N series includes GOES-15, which was launched in 2010.

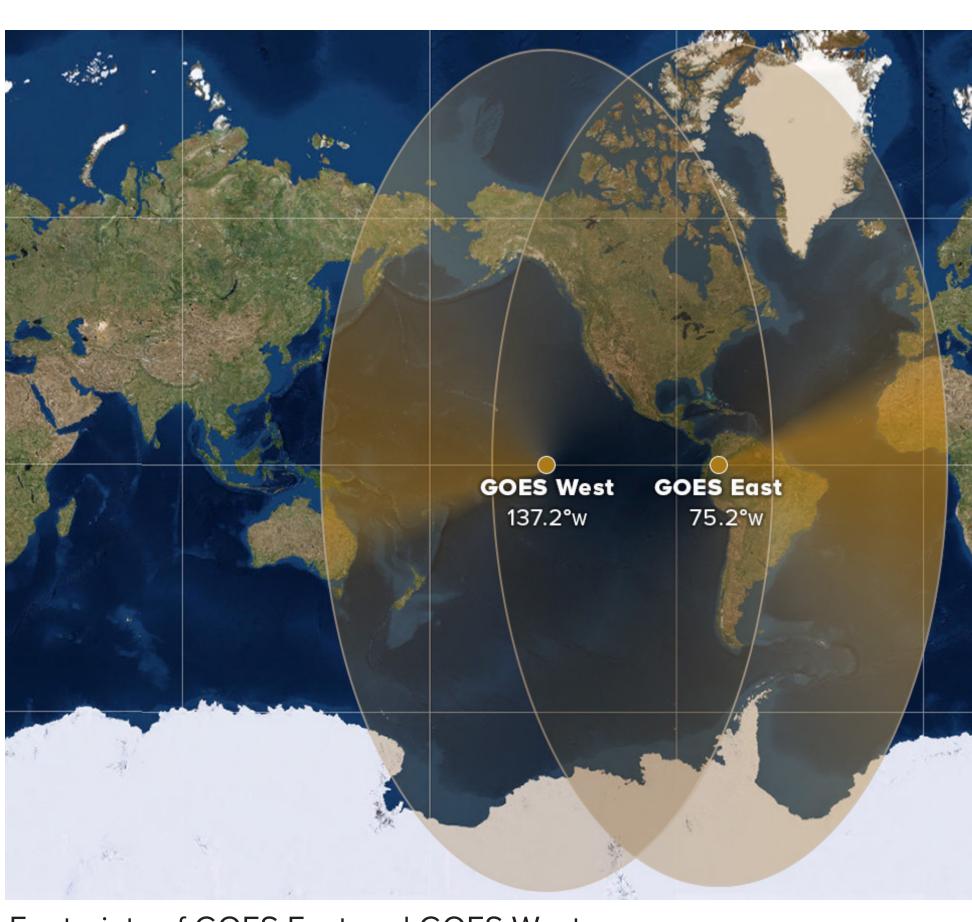The latest generation of GOES is the GOES-R series. The satellites in the GOES-R Series are:
- GOES-R (now GOES-16) launched on November 19, 2016. GOES-16 is currently operating as GOES East.
- GOES-S (now GOES-17) launched on March 1, 2018 and is in Post Launch Test (PLT).
- GOES-T is planned to launch in 2020.
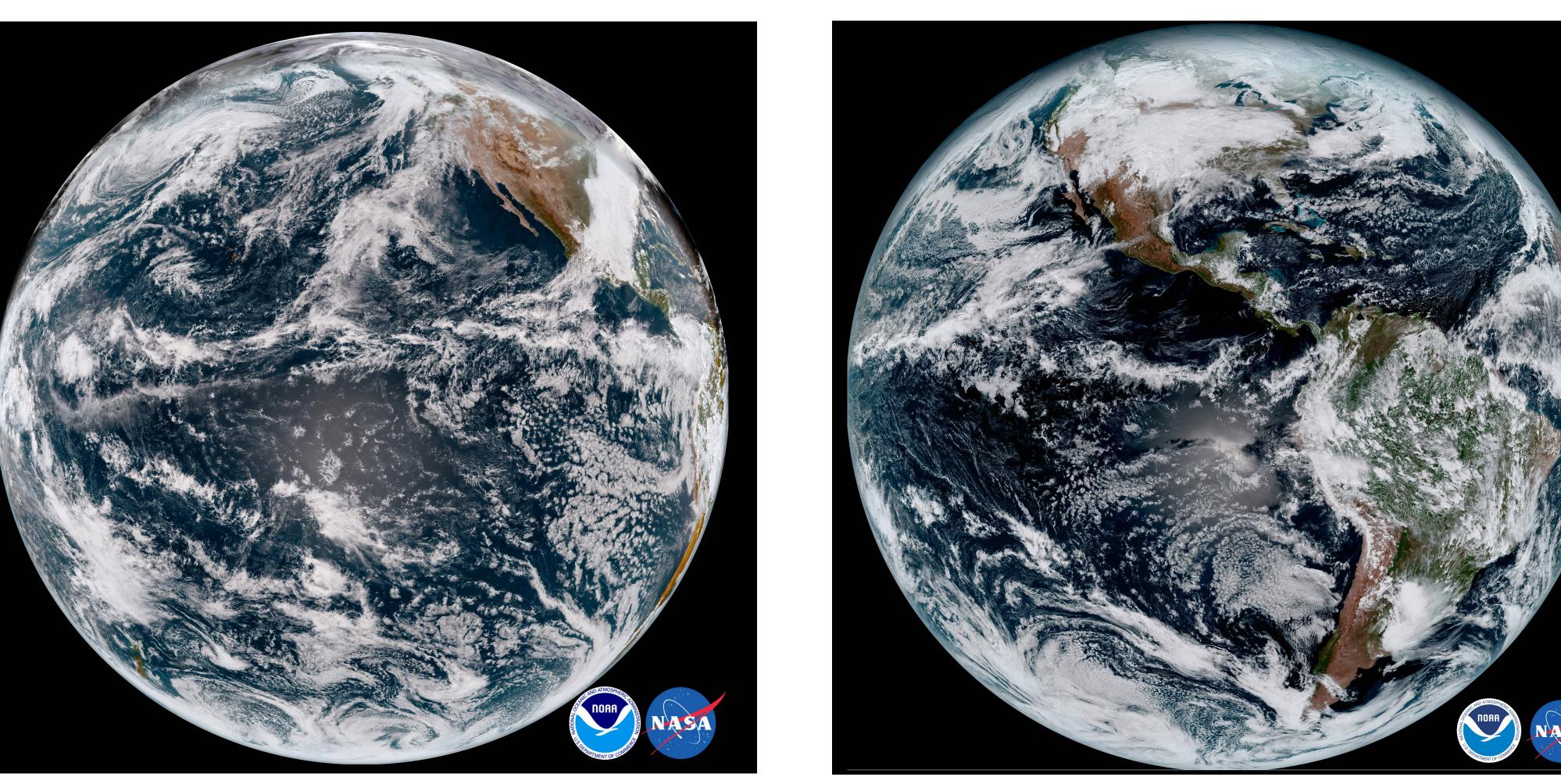- GOES-U is planned to launch in 2024.

Geostationary and Polar Satellite Orbits

Footprints of GOES East and GOES West

Full-disk view from GOES West

Full-disk view from GOES East

NOAA Satellite Maps Data Processing

1 GOES-R Series Satellite

2 Wallops Ground Station - GOES

3 NOAA Satellite Operations Facility (NSOF)
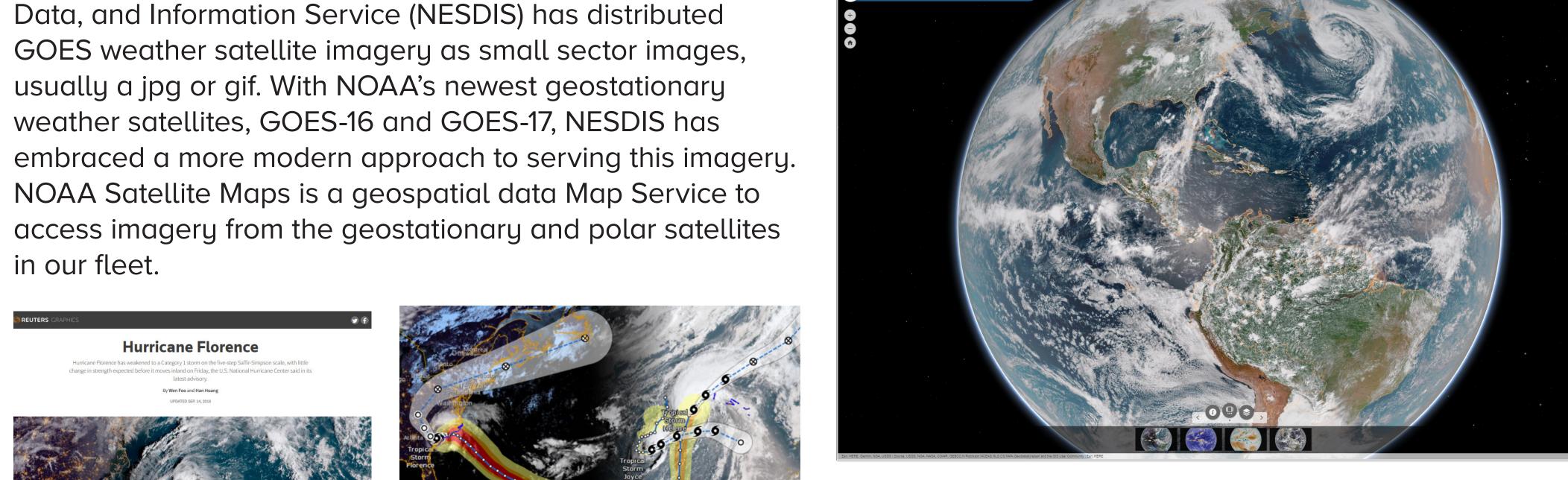
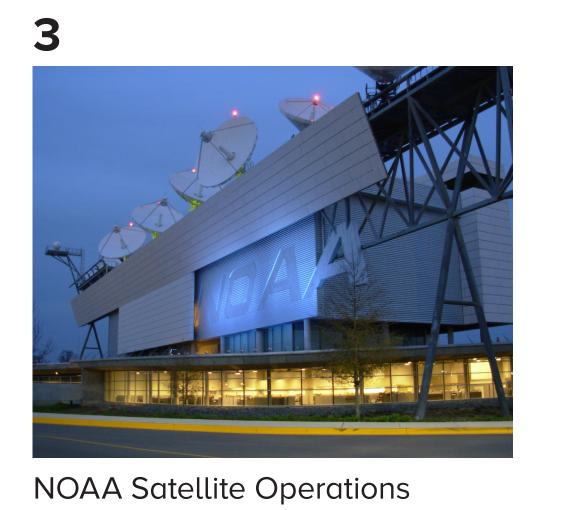**4** Center for Satellite Applications and Research (STAR)

5 Image processing—McIDAS, C, Python, IDL, McIDAS, and other code

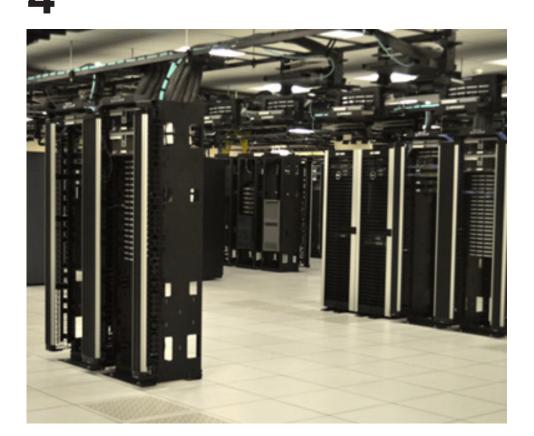**6** Georeferenced GeoTIFFs—GDAL MRF—esri ArcGIS® Server Image Services
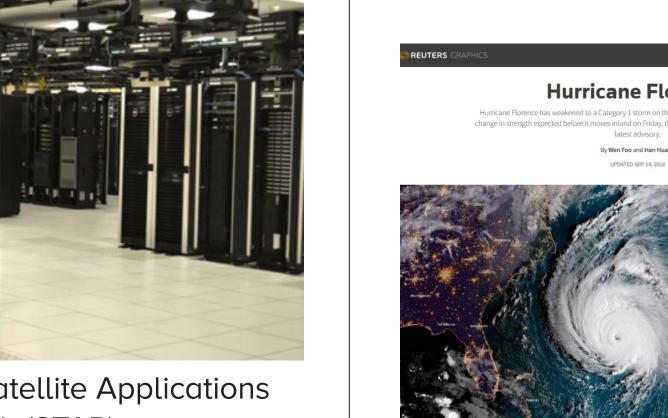15 minute archive, 24 hour rolling archive and latest

NOAA Satellite Maps

Traditionally, the NOAA National Environmental Satellite, Data, and Information Service (NESDIS) has distributed GOES weather satellite imagery as small sector images, usually a jpg or gif. With NOAA's newest geostationary weather satellites, GOES-16 and GOES-17, NESDIS has embraced a more modern approach to serving this imagery. NOAA Satellite Maps is a geospatial data Map Service to access imagery from the geostationary and polar satellites in our fleet.

Reuters Article about Hurricane Florence

2018 Hurricane Tracker
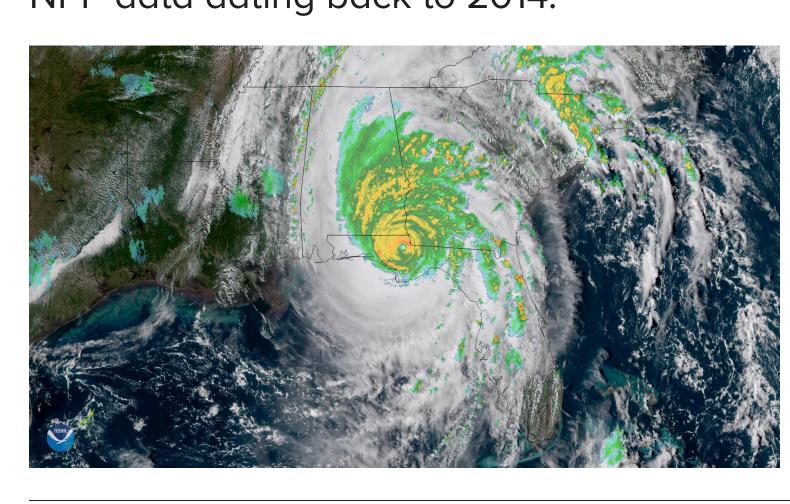
3d Scene in Satellite Maps

NOAA Satellite Maps supports open information sharing and integration through a RESTful Service on the internet. This service can be accessed by a multitude of GIS software packages and web map applications (both open and commercially licensed) for free. One of the most important features of the Satellite Maps layers service is the interoperable nature of its data. Users can combine georeferenced data layers from other datasets together with the Satellite Maps data, allowing infinite opportunities for providing meaning and value to NOAA data.

Current Satellite Maps datasets include GOES East (GOES-16) Advanced Baseline Imager (in GeoColor, Band 10—infrared water vapor, and Band 13—infrared cloud temperature) updated every 15 minutes, and NOAA-20 (formerly JPSS-1) VIIRS TrueColor Global mosaics updated daily, as well as a Global Archive of Polar orbiting Suomi-NPP data dating back to 2014.

3d Scene with Geostationary Lightning data

Satellite Maps with Doppler Radar

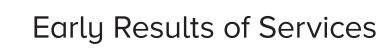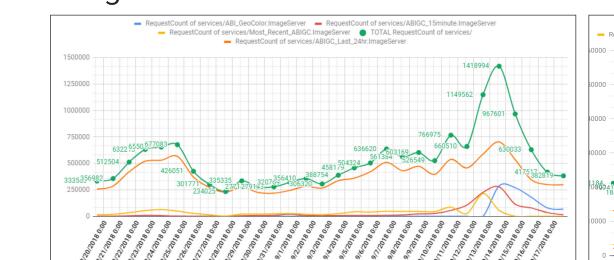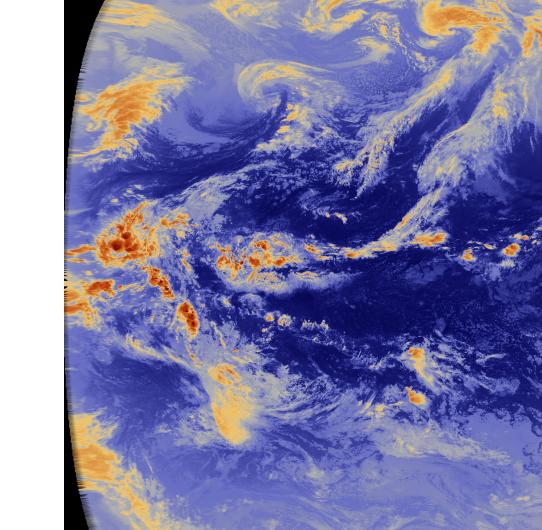3d Scene in Satellite Maps with Doppler Radar

Users can combine georeferenced data layers from other datasets together with the Satellite Maps data, allowing infinite opportunities to discover new connections and create insights. For example, GOES East infrared Band 10 data can be combined with Doppler radar data to see how cloud cover and instances of rain align during a critical weather event. These geospatial web services are free and accessible to the public and are located on our Satellite Maps ArcGIS REST Web Service.

Please note: Data is for display purposes only, and should not be used operationally.
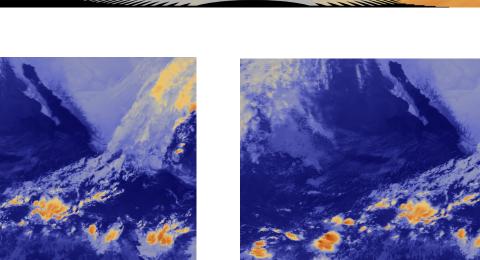
Link to geospatial image service:
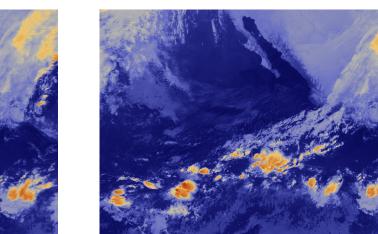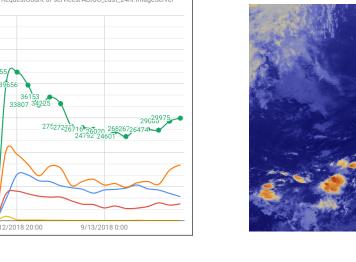https://satellitemaps.nesdis.noaa.gov/arcgis/rest
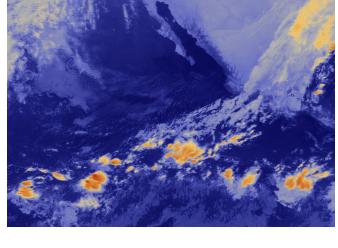

What's Next

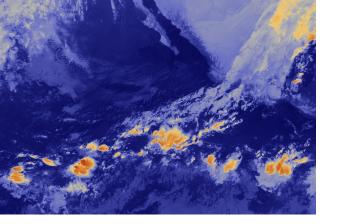Early Results of Services

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