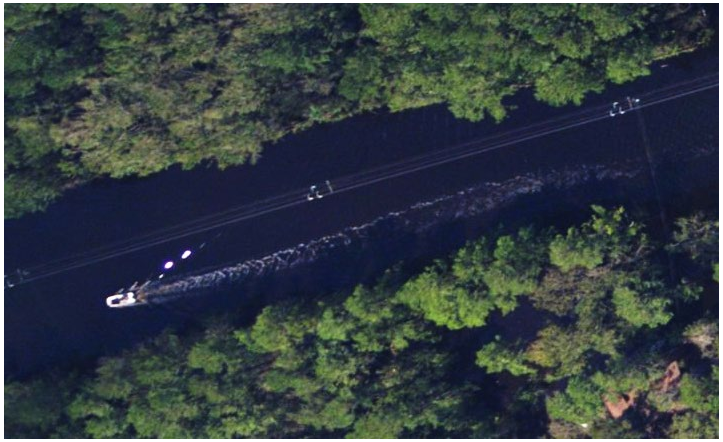
NGS Emergency Response Imagery

Maryellen Sault
NOAA/NGS/RSD
April 2022

Outline

- NGS & ER History
- Coordination and Workflow
- New Digital Camera
- Pre-event Imagery
- Post-event Imagery Access
- Frequently Asked Questions
- Use Case Examples
- Webstats

Before Image: Google Earth



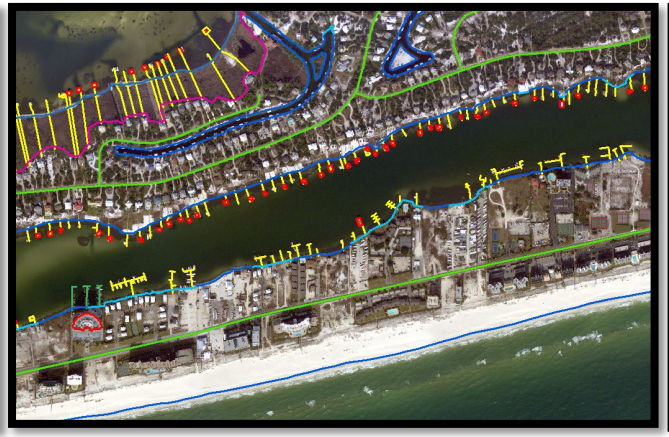
After Image: NOAA

National Geodetic Survey

Mission: Define, maintain and provide access to the National Spatial Reference System.

RSD Primary Programs:

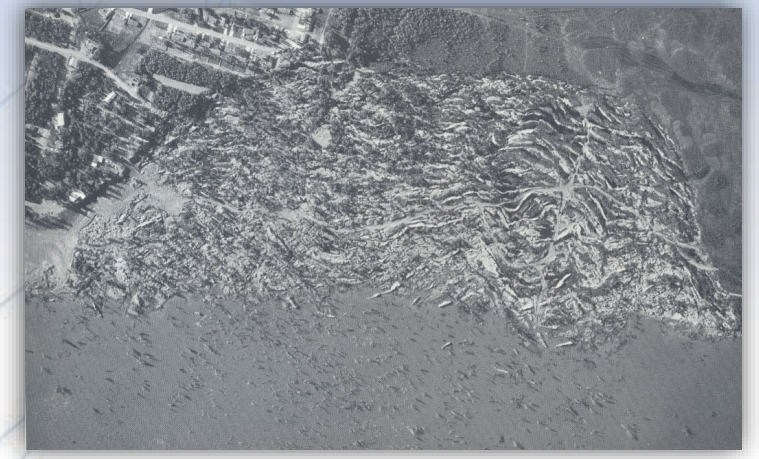
Aeronautical Survey Program



Coastal Mapping Program

Emergency Response

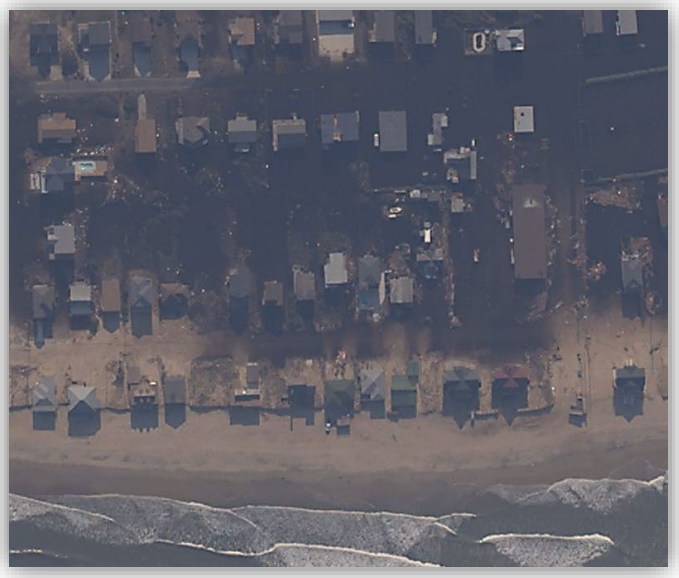
Historical Responses



March 1964: Alaska earthquake

August 1969 Hurricane Camille

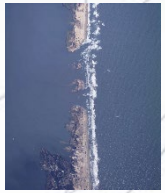
February 1978 Nor'easter



September 2003 Hurricane Isabel

~3 Days

Un-rectified Image



2003

16 MP

~24 hr

Ortho Image

2006

22 MP

~8-12 hr

Tiled Ortho-mosaic

2012

39 MP

"Wheels down to web up"

~4-6 hr Tiled Ortho-mosaic

2016 ~158 MP **

* Image sizes are to scale

** 39+39+80 MP

Emergency Response Imagery

- Support NOAA's requirements and NRF Emergency Support Functions:

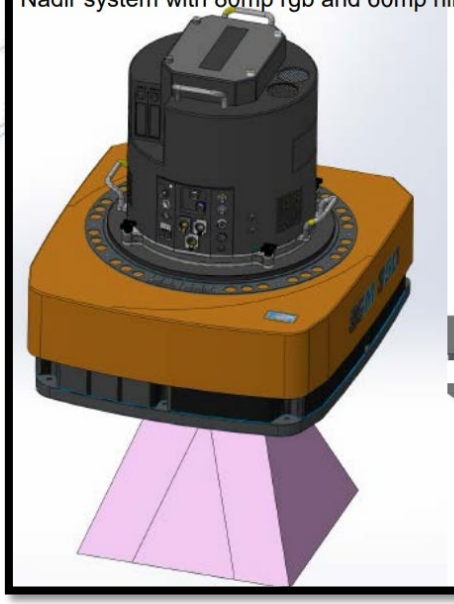
ESF 1	Transportation
ESF 11	Agriculture and Natural Resources
ESF 3	Public Works and Engineering
ESF 9	Search and Rescue
ESF 10	Oil and Hazardous Material Response
ESF 13	Public Safety and Security
ESF 14	Long-term Community Recovery and Mitigation

- Pre-Scripted Mission Assignments (PSMA) With FEMA

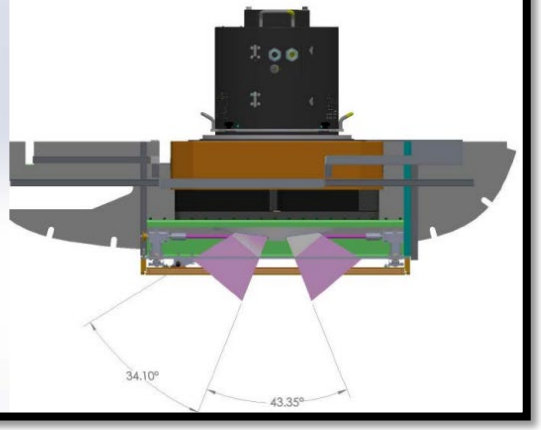
Pre-event Planning

Aircraft and Sensors

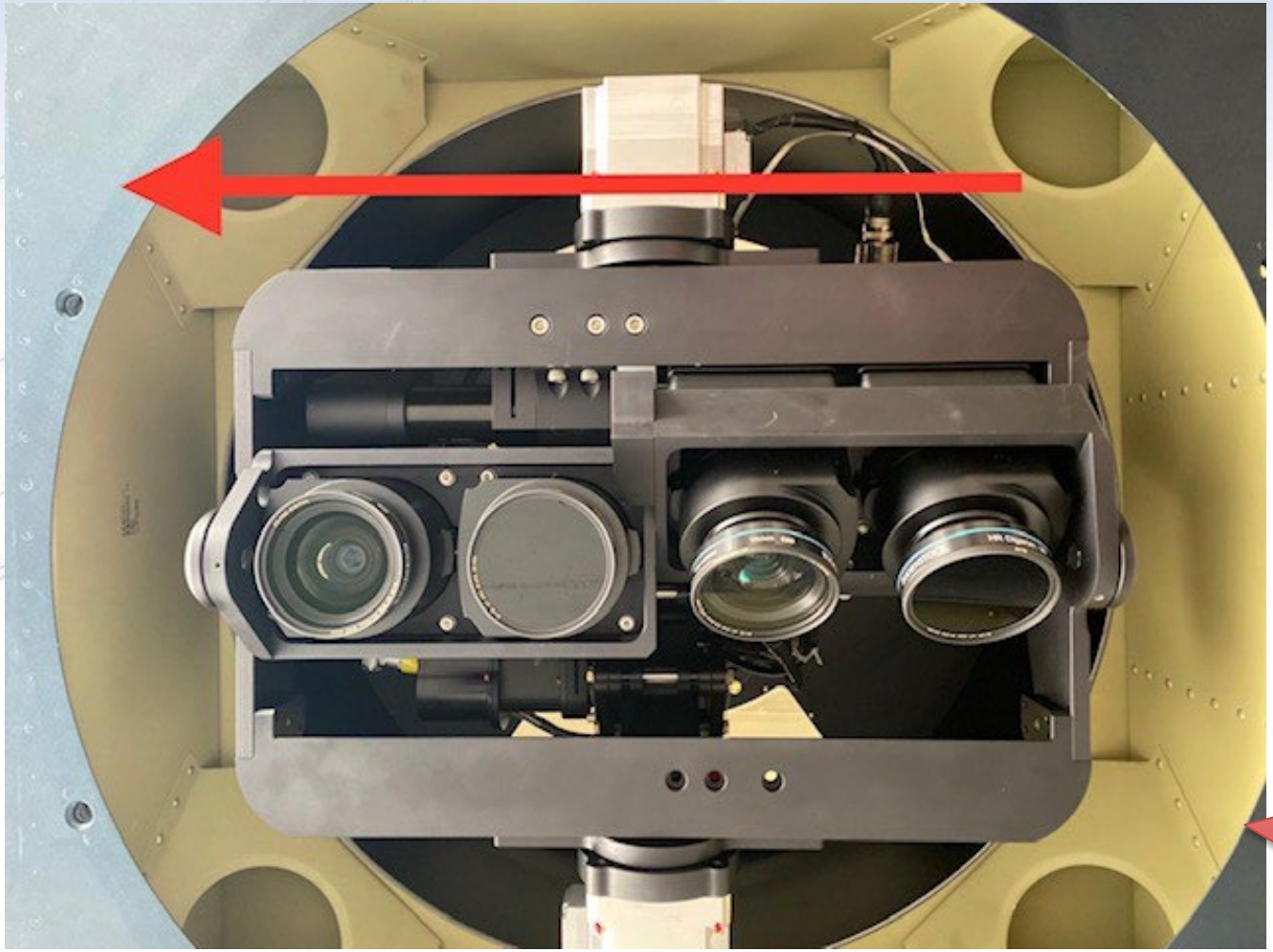
Nadir system with 80mp rgb and 60mp nir



Oblique system with two 39mp rgb



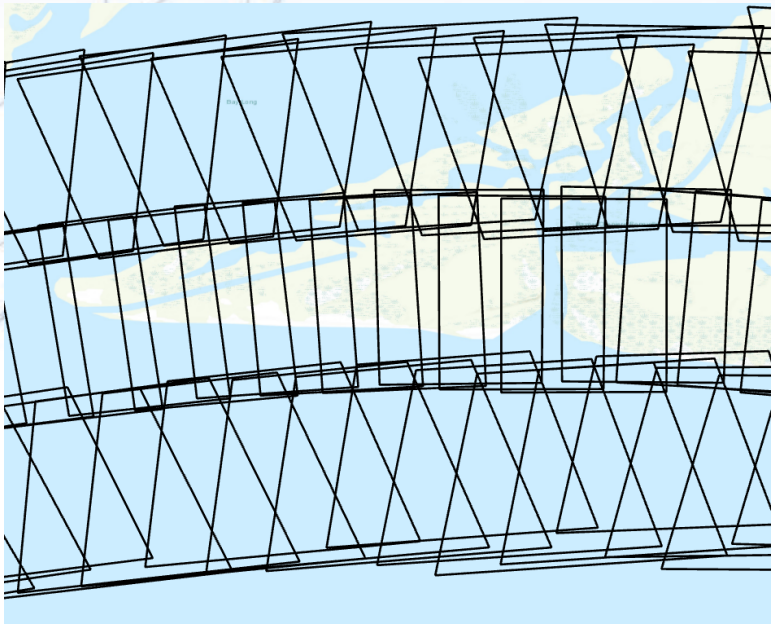
Applanix / LeadAir DSS (Version 6)



NEW

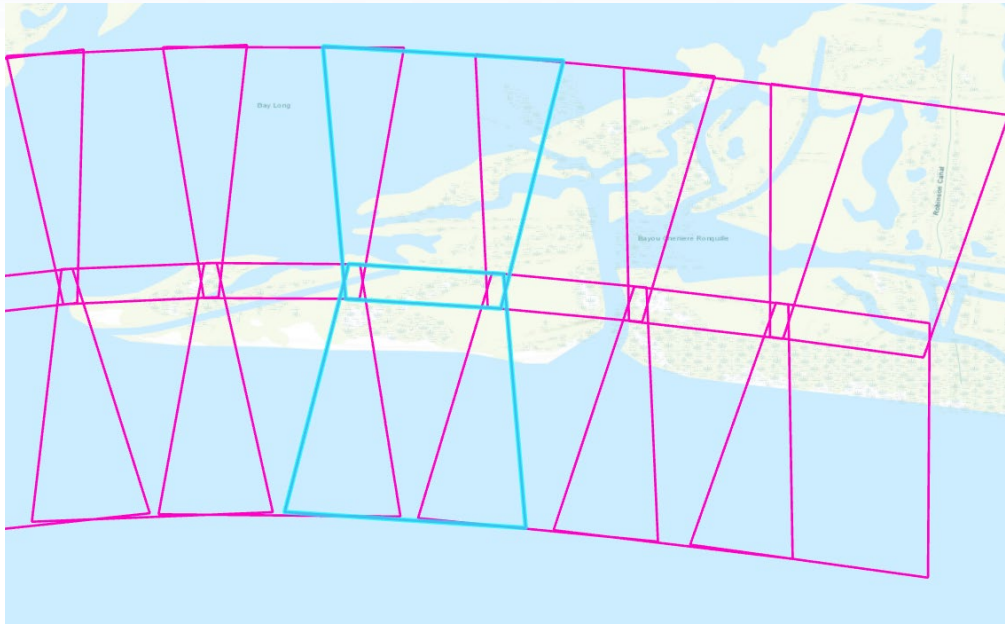
Footprint Comparison

2020 Hurricane Zeta



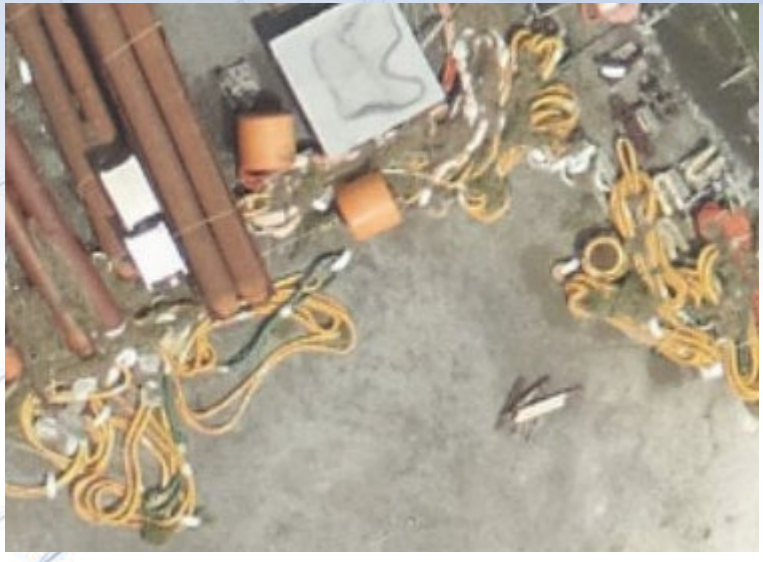
Applanix DSS

2021 Hurricane Ida



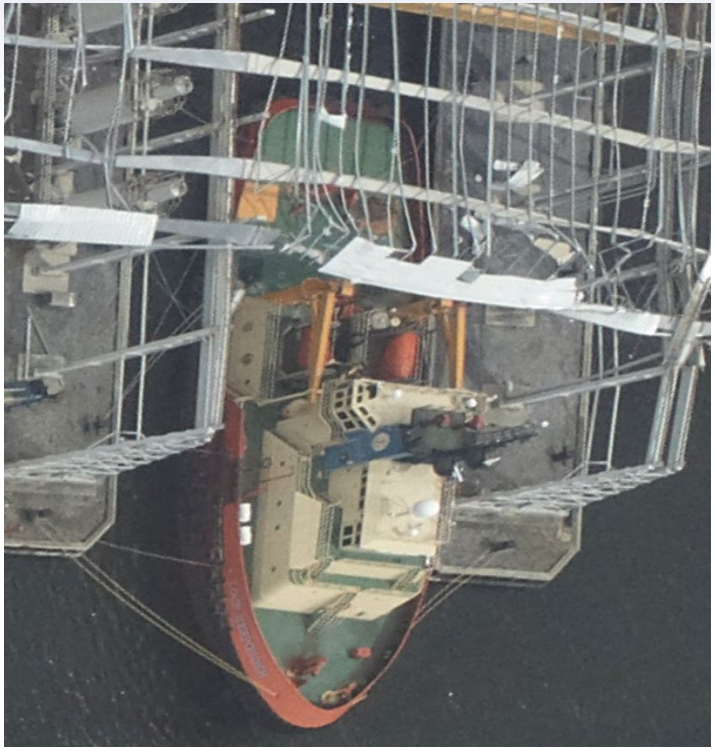
Applanix/ LeadAir DSS (Version 6)

Increased Resolution



Value of Oblique Imagery

2021 Hurricane Ida Imagery

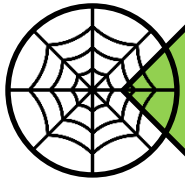


Response Workflow

Imagery uploaded to cloud after landing

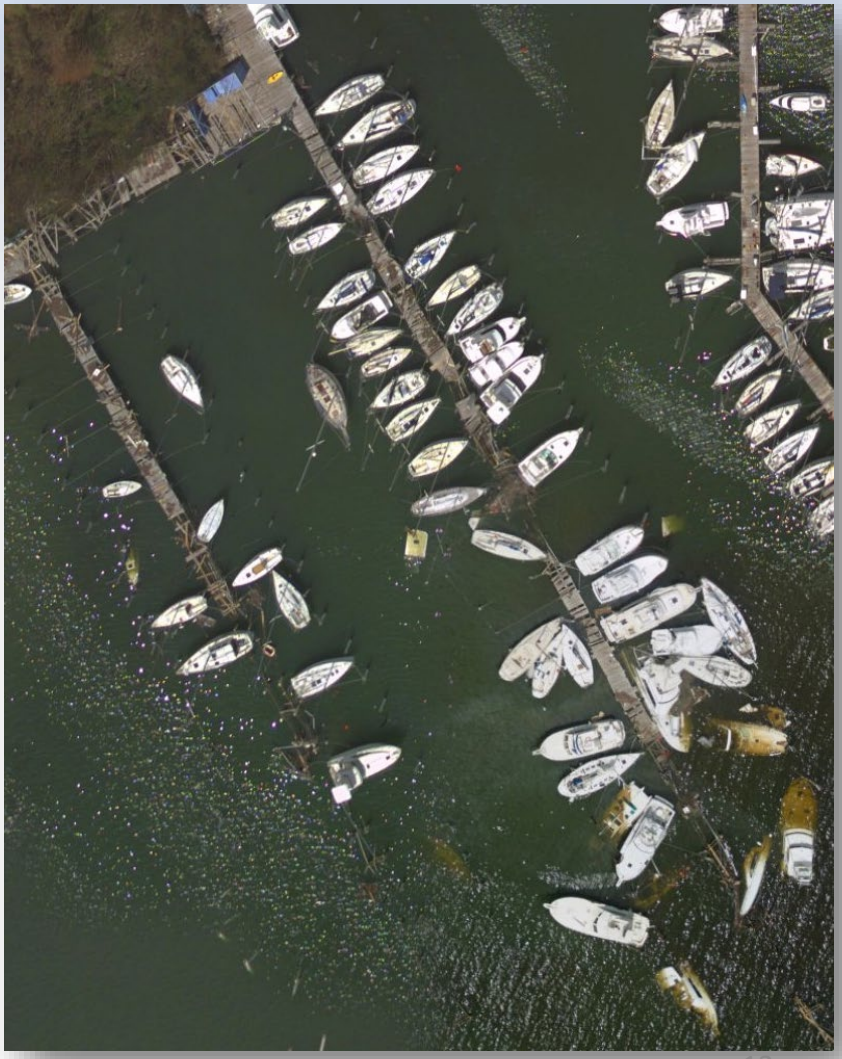
Ortho-rectification, mosaic processing & web-map tiling in cloud

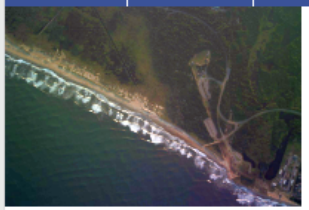
Mosaicked tiles are warehoused in **AWS** storage



TileServer & MapBox are used to make the data web accessible

Public website is created





The imagery posted on this site was acquired by the NOAA Remote Sensing Division to support NOAA homeland security and emergency response requirements. In addition, it will be used for ongoing research efforts for testing and developing standards for airborne digital imagery.

Tips for navigating the Emergency Response Imagery Viewer.

Navigation

National Geodetic Survey

Pre-Event Imagery

Contact Us

Content and Technical Issues

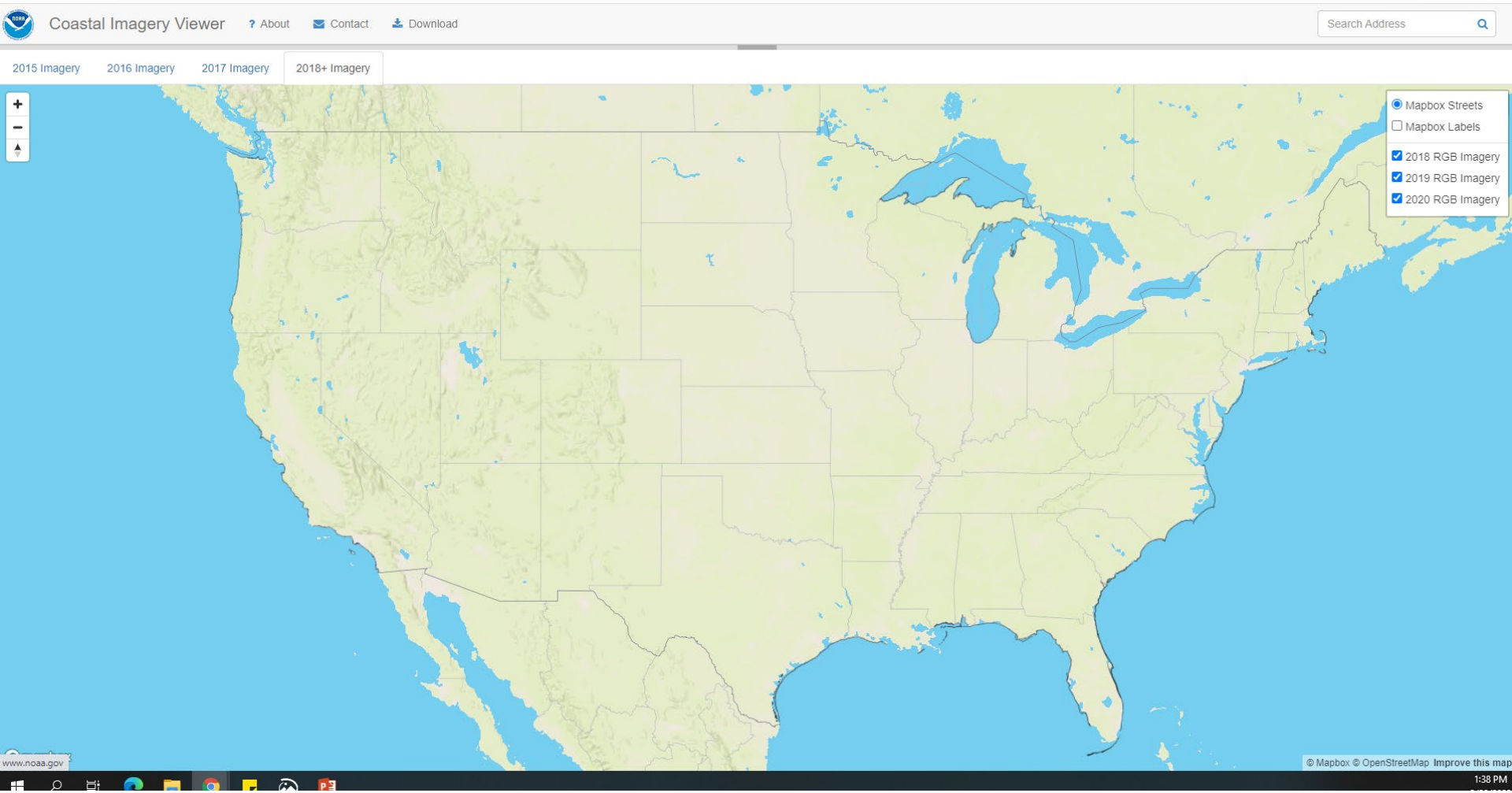
Comments and Policy Issues

Emergency Response Imagery:

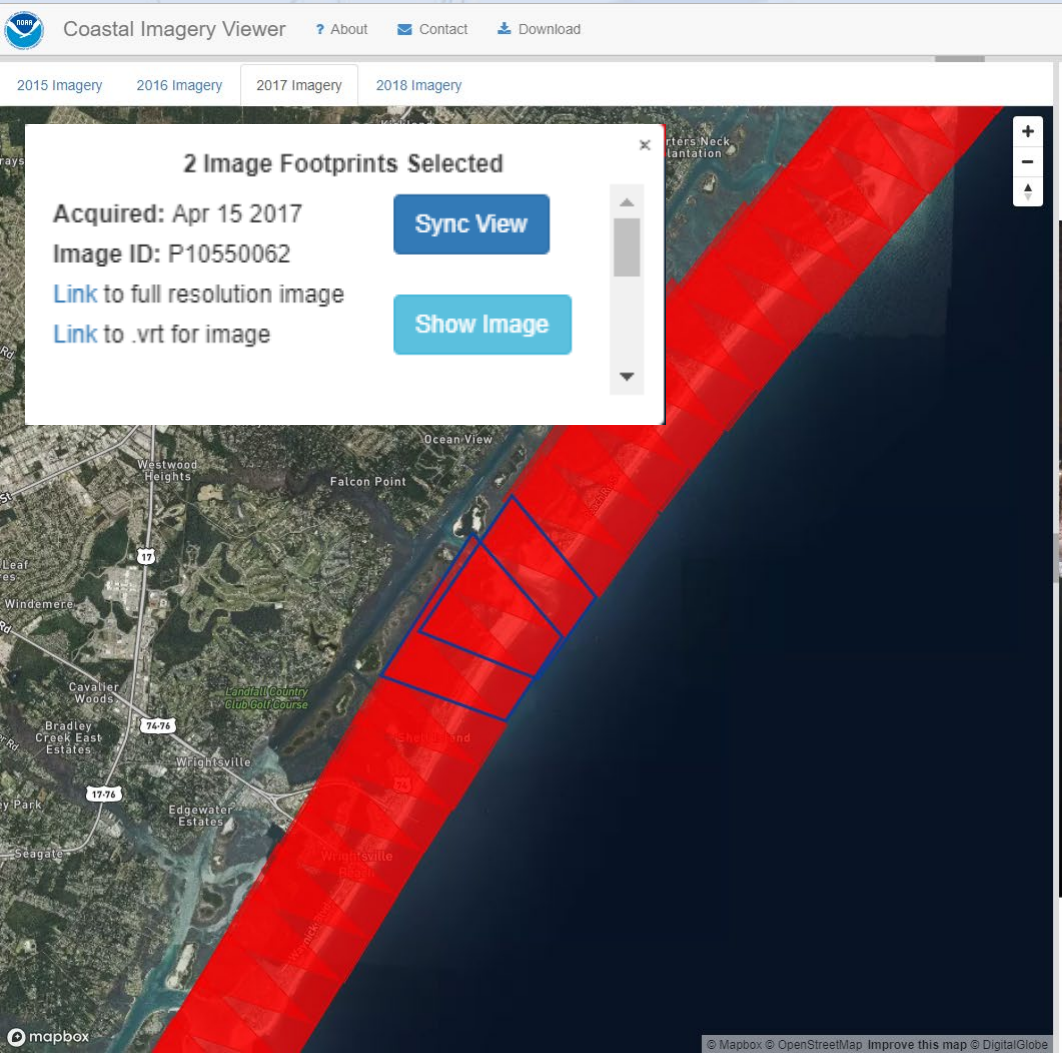
Hurricane Ida (2021)
Hurricane Henri (2021)
Hurricane Zeta (2020)
Hurricane Delta (2020)
Hurricane Sally (2020)
Hurricane Laura (2020)
Hurricane Isaias (2020)
Nashville Tornadoes (2020)
Hurricane Dorian (2019)
Hurricane Barry (2019)
Hurricane Michael (2018)
Hurricane Florence (2018)
Tropical Storm Gordon (2018)
Hurricane Nate (2017)
Hurricane Maria (2017)
Hurricane Irma (2017)
Hurricane Harvey (2017)
Hurricane Matthew (2016)
Louisiana Flooding (2016)
Midwest U.S. Flooding (2015)
Illinois Tornadoes (2015)
Hurricane Arthur (2014)
Hurricane Sandy (2012)
Hurricane Isaac (2012)
Hurricane Irene (2011)
Joplin, MO Tornado (2011)
Tuscaloosa, AL Tornado (2011)
North Dakota Flooding (2011)
Hurricane Earl (2010)
Nor'Easter Nov09 (2009)
Hurricane Ike (2008)
Hurricane Gustav (2008)
Hurricane Humberto (2007)
Tropical Storm Ernesto (2006)
Hurricane Wilma (2005)
Hurricane Rita (2005)
Hurricane Ophelia (2005)
Hurricane Katrina (2005)
Hurricane Dennis (2005)
Hurricane Ivan (2004)
Hurricane Jeanne (2004)

https://storms.ngs.noaa.gov/

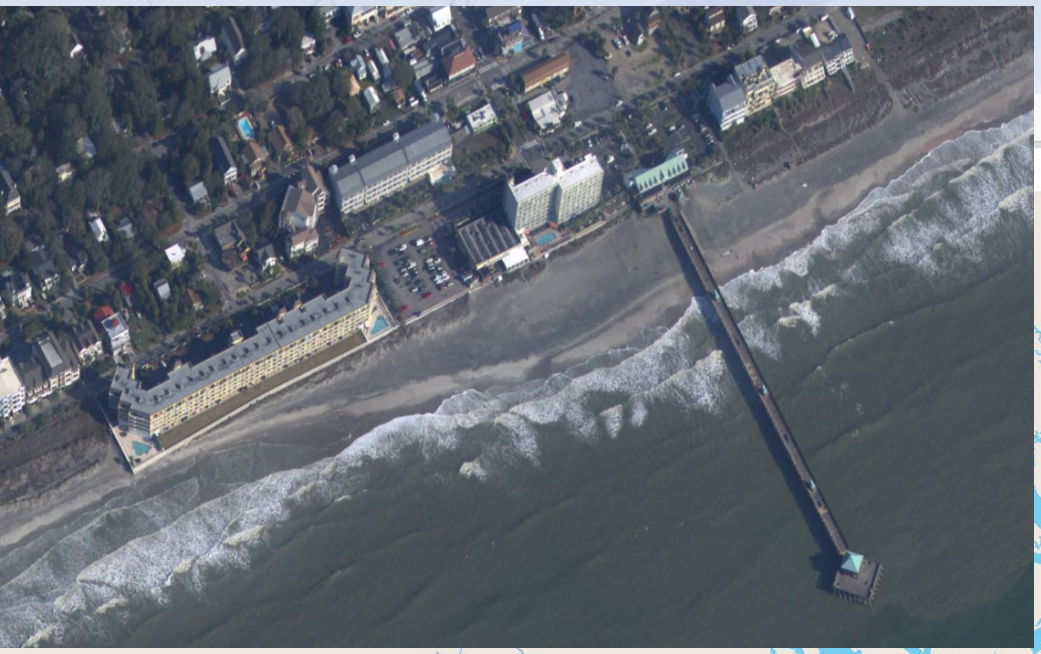
Pre-Event Imagery



2017 Pre-Event Imagery



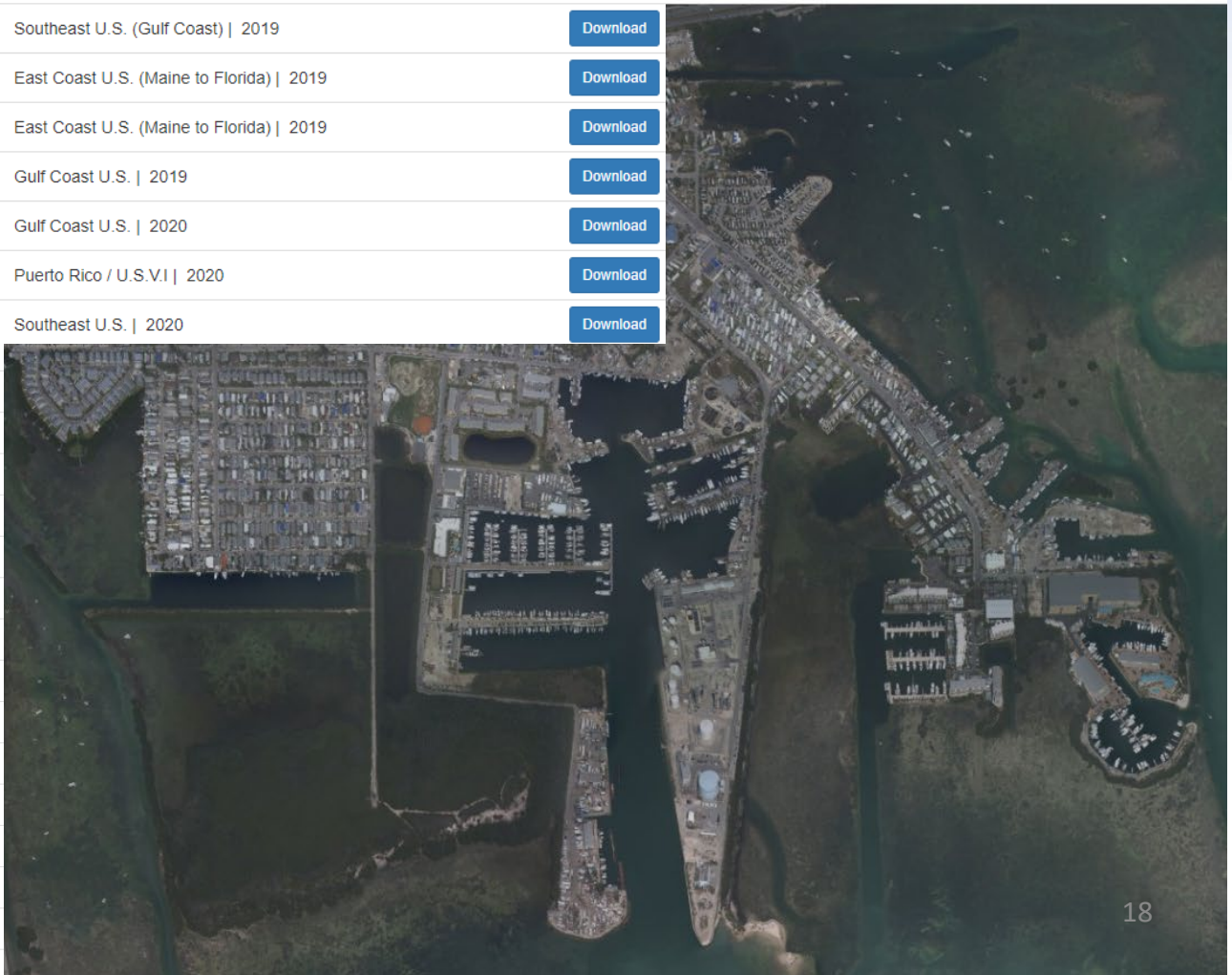
2020 Pre-Event Imagery



Pre-Event Imagery Download

Coastal Imagery Viewer ? About Contact Download

Southeast U.S. (Florida Gulf Coast) | 2015	Download
Southeast U.S. (Florida Gulf Coast) | 2015	Download
Southeast U.S. (Florida Gulf Coast) | 2015	Download
South U.S. (Mississippi to Louisiana) | 2015	Download
South U.S. (Louisiana to Texas) | 2015	Download
South U.S. (Texas) | 2015	Download
South U.S. (Texas) | 2015	Download
Southwest U.S. (California) | 2015	Download
Northwest U.S. (Oregon to Washington) | 2015	Download
Northeast U.S. (New York to to North Carolina) | 2016	Download
West Coast U.S. | 2016	Download
Puerto Rico | 2016	Download
Alaska | 2016	Download
Great Lakes Region U.S. | 2016	Download
South U.S. (Louisiana to Florida Gulf Coast) | 2017	Download
Southeast U.S. (Virginia to Florida) | 2017	Download
Northeast U.S. (Maine to North Carolina) | 2018	Download
Northeast U.S. (Maryland to New York) | 2018	Download
Southeast U.S. (North Carolina to South Carolina) | 2018	Download
Southeast U.S. (South Carolina to Florida) | 2018	Download
Southeast U.S. (Florida to Texas) | 2018	Download
Southeast U.S. (Texas) | 2018	Download
Great Lakes Region U.S. | 2018	Download
West Coast U.S. | 2018	Download
West Coast U.S. | 2018	Download
Puerto Rico / U.S.V.I | 2018	Download
Southeast U.S. (Gulf Coast) | 2019	Download
East Coast U.S. (Maine to Florida) | 2019	Download
East Coast U.S. (Maine to Florida) | 2019	Download
Gulf Coast U.S. | 2019	Download
Gulf Coast U.S. | 2020	Download
Puerto Rico / U.S.V.I | 2020	Download
Southeast U.S. | 2020	Download



The imagery posted on this site was acquired by the NOAA Remote Sensing Division to support NOAA homeland security and emergency response requirements. In addition, it will be used for ongoing research efforts for testing and developing standards for airborne digital imagery.

Tips for navigating the Emergency Response Imagery Viewer.

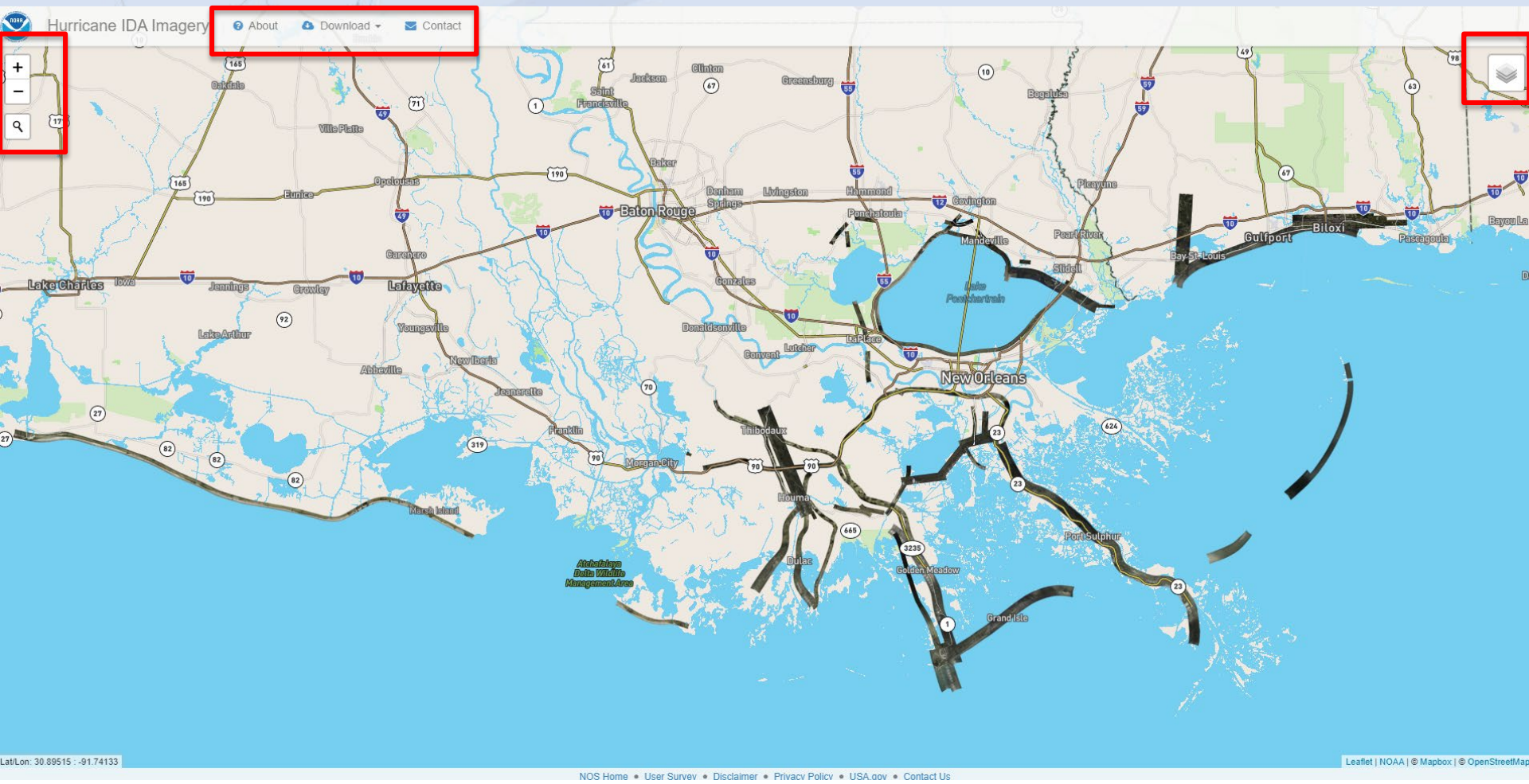
Navigation
National Geodetic Survey
Pre-Event Imagery

Contact Us
Content and Technical Issues
Comments and Policy Issues

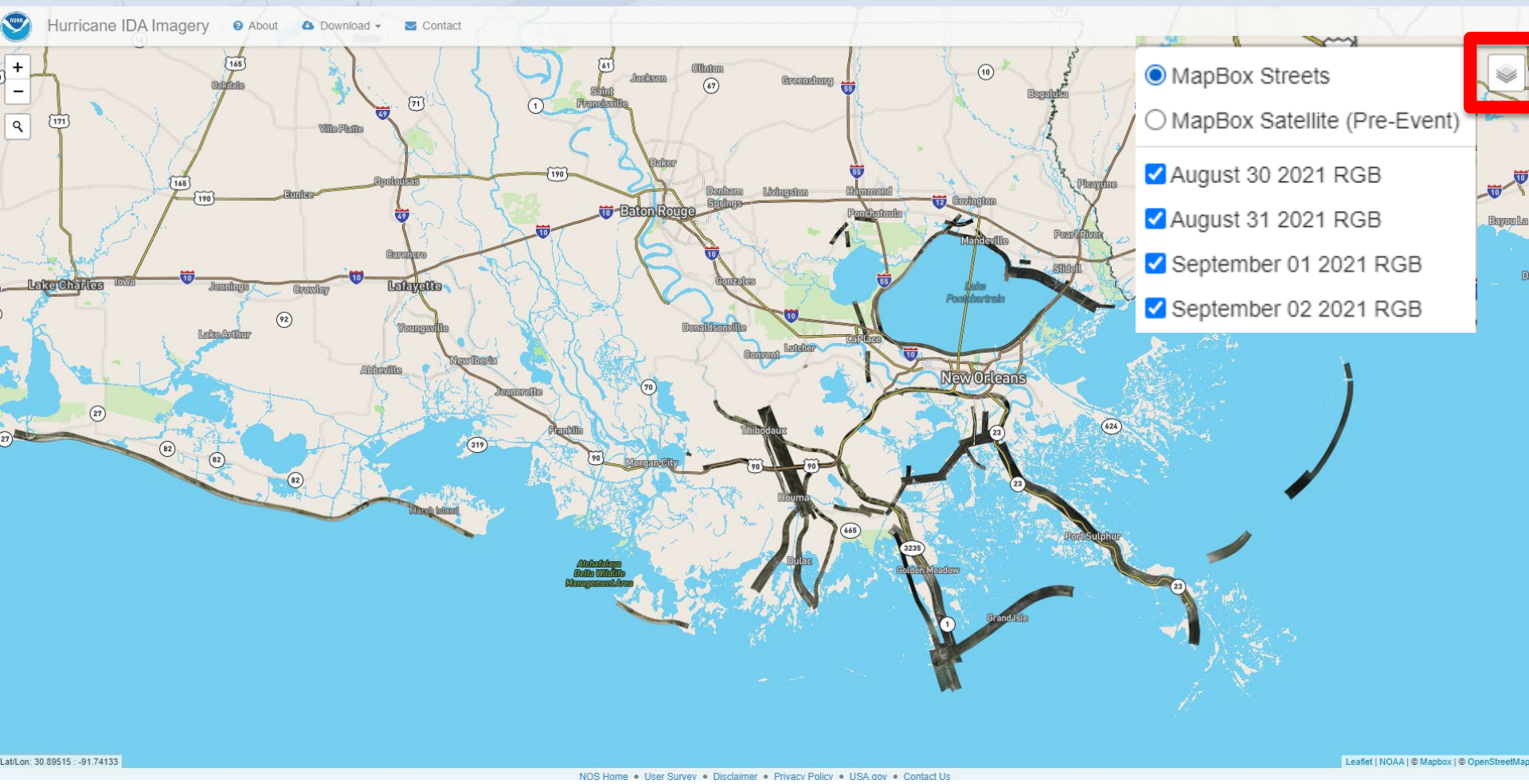
Emergency Response Imagery:

- Hurricane Ida (2021)
- Hurricane Henri (2021)
- Hurricane Zeta (2020)
- Hurricane Delta (2020)
- Hurricane Sally (2020)
- Hurricane Laura (2020)
- Hurricane Isaias (2020)
- Nashville Tornadoes (2020)
- Hurricane Dorian (2019)
- Hurricane Barry (2019)
- Hurricane Michael (2018)
- Hurricane Florence (2018)
- Tropical Storm Gordon (2018)
- Hurricane Nate (2017)
- Hurricane Maria (2017)
- Hurricane Irma (2017)
- Hurricane Harvey (2017)
- Hurricane Matthew (2016)
- Louisiana Flooding (2016)
- Midwest U.S. Flooding (2015)
- Illinois Tornadoes (2015)
- Hurricane Arthur (2014)
- Hurricane Sandy (2012)
- Hurricane Isaac (2012)
- Hurricane Irene (2011)
- Joplin, MO Tornado (2011)
- Tuscaloosa, AL Tornado (2011)
- North Dakota Flooding (2011)
- Hurricane Earl (2010)
- Nor'Easter Nov09 (2009)
- Hurricane Ike (2008)
- Hurricane Gustav (2008)
- Hurricane Humberto (2007)
- Tropical Storm Ernesto (2006)
- Hurricane Wilma (2005)
- Hurricane Rita (2005)
- Hurricane Ophelia (2005)
- Hurricane Katrina (2005)
- Hurricane Dennis (2005)
- Hurricane Ivan (2004)
- Hurricane Jeanne (2004)
- Hurricane Isabel (2003)

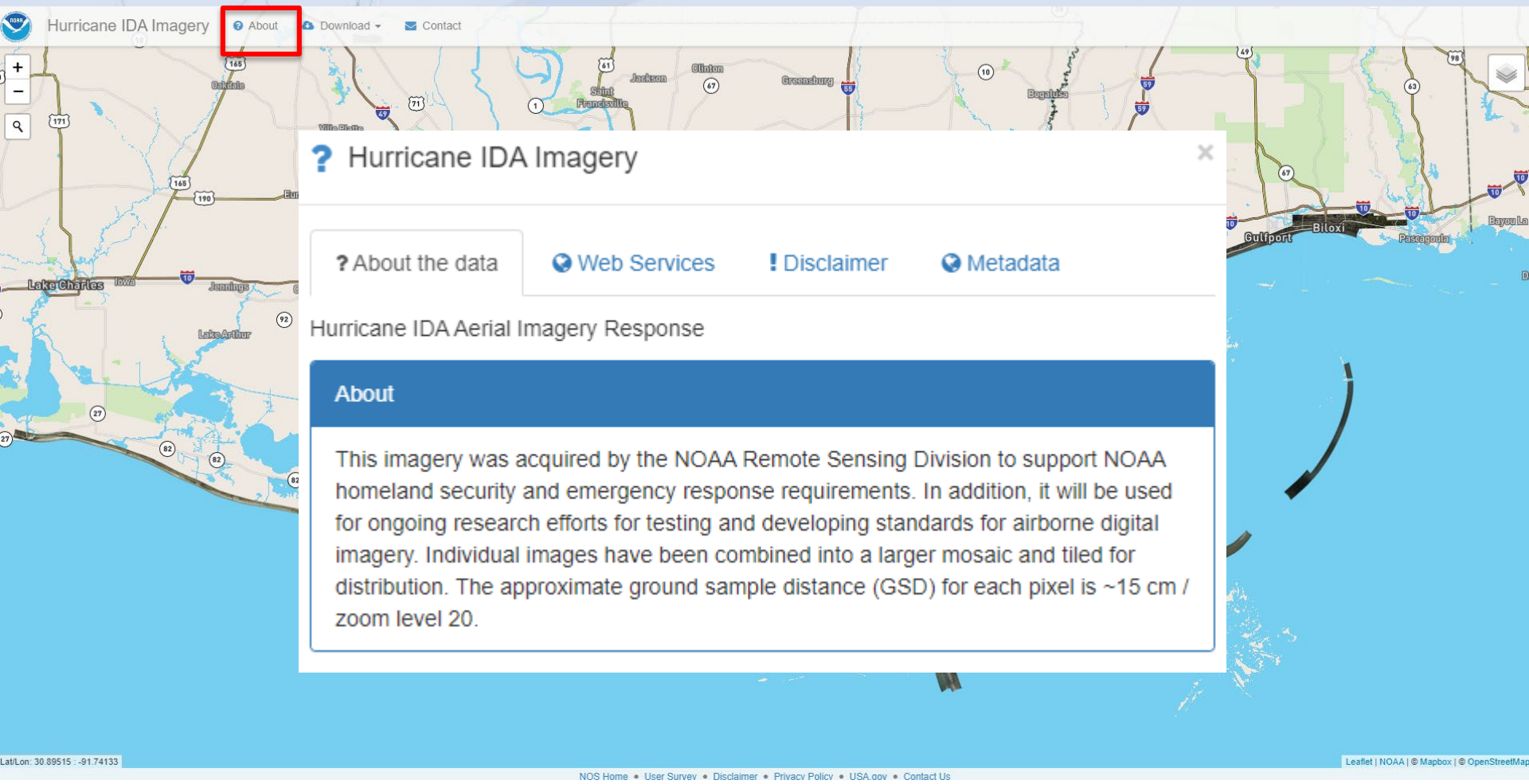
Hurricane Ida



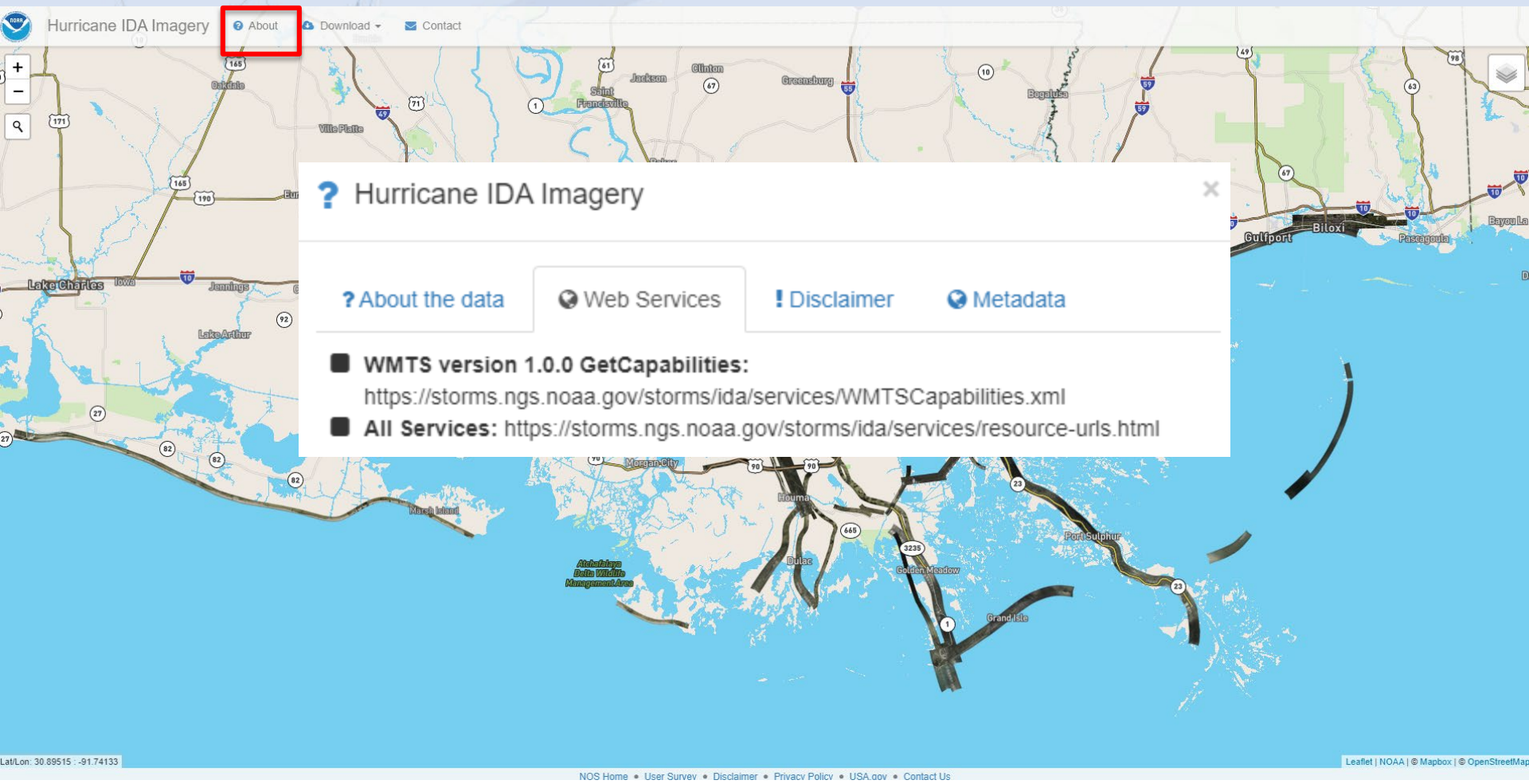
Hurricane Ida



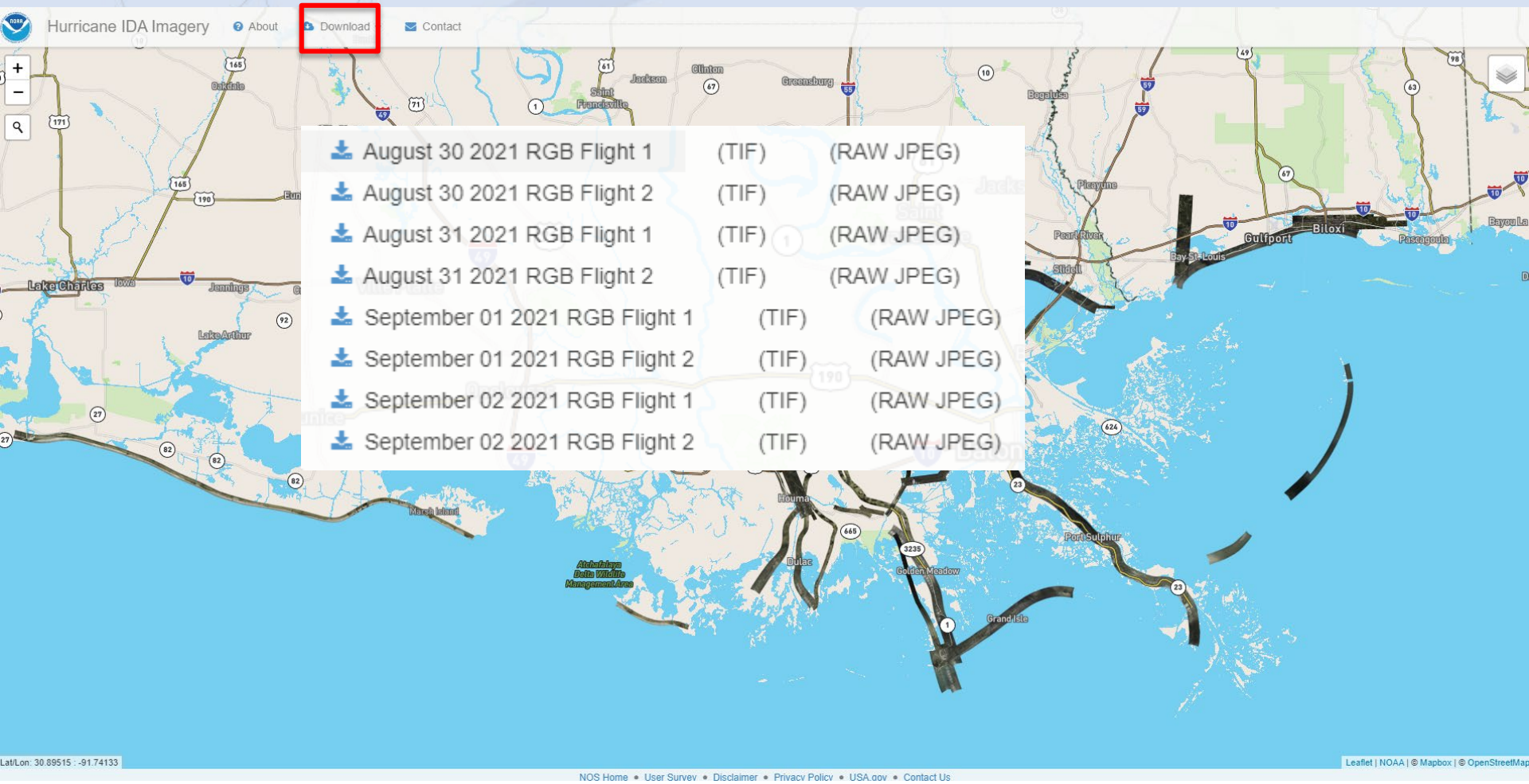
Hurricane Ida



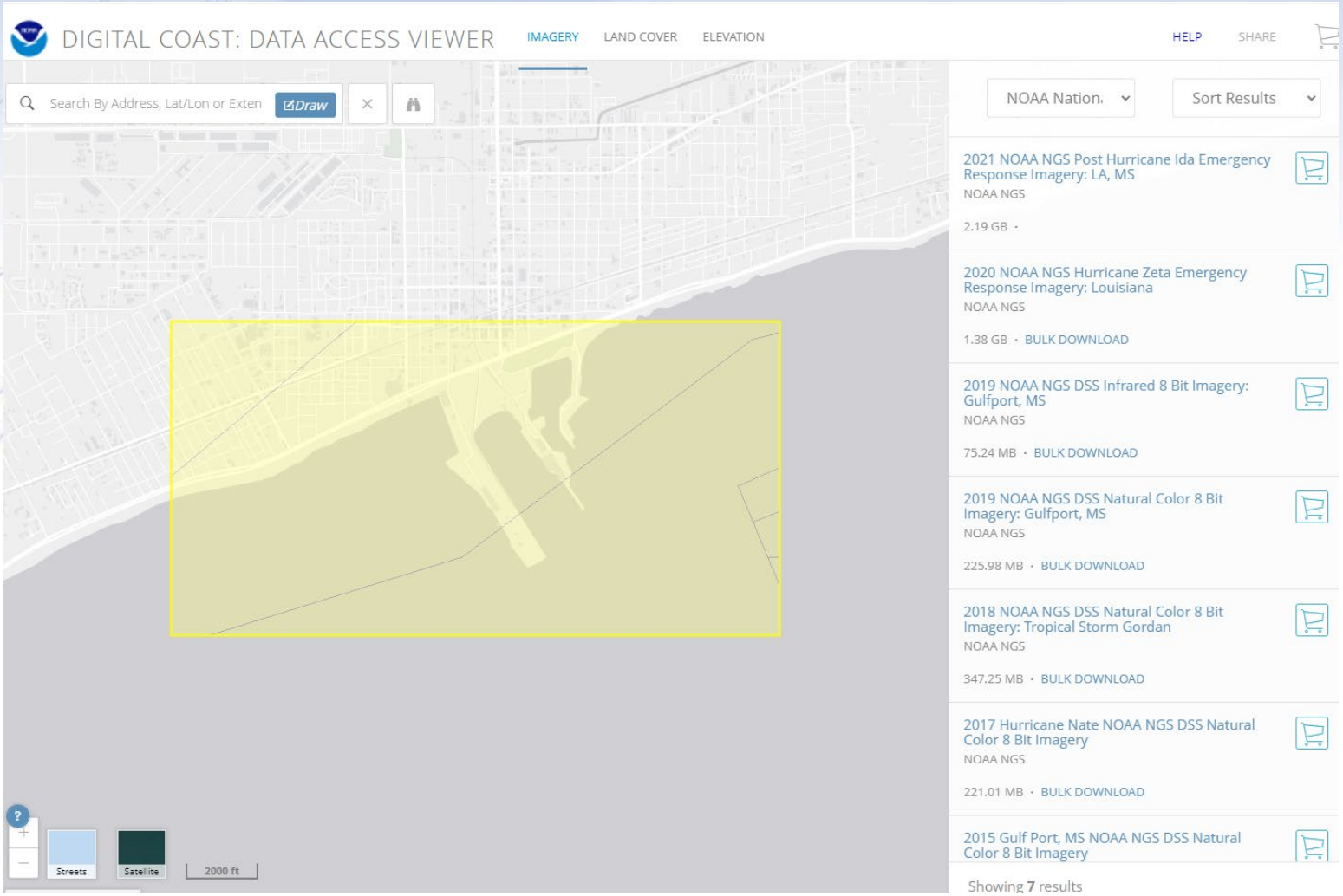
Hurricane Ida WMTS



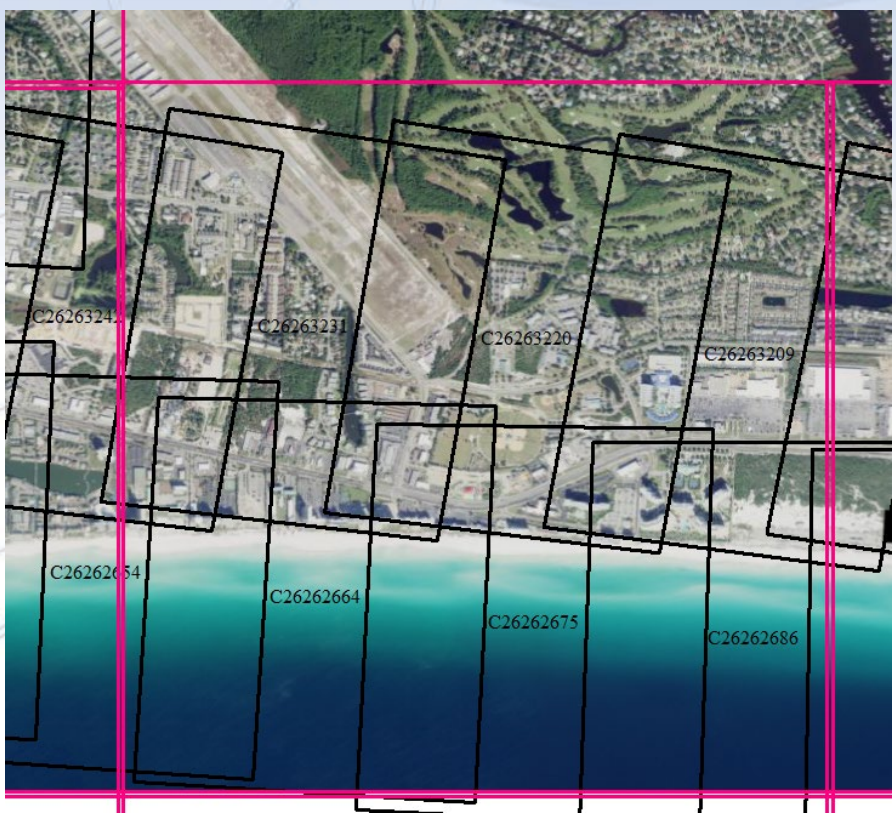
Hurricane Ida Download

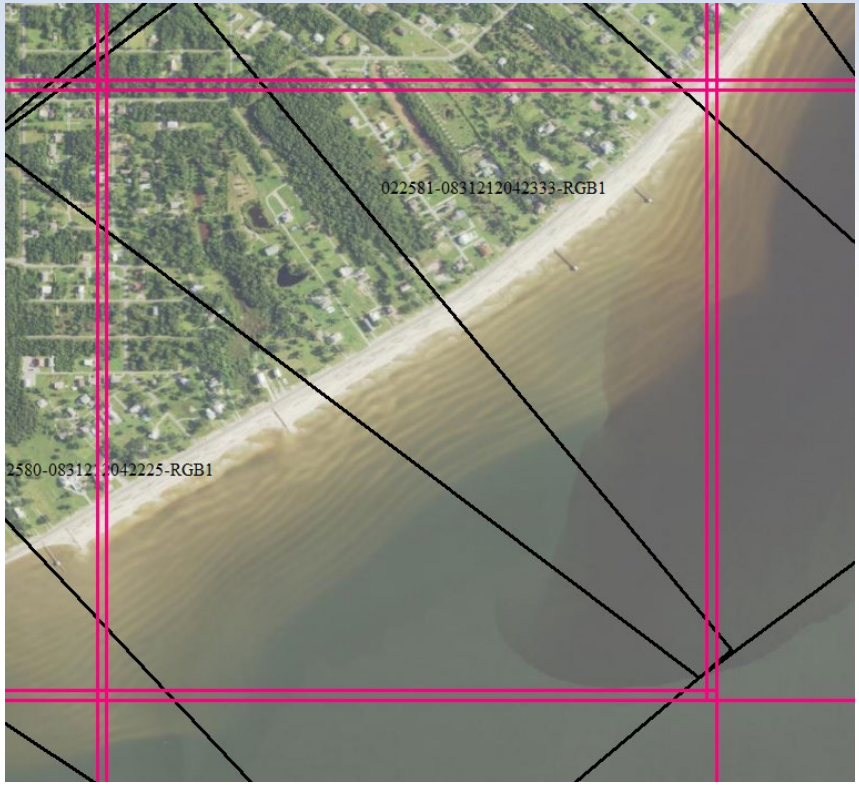


Digital Coast Data Access Viewer



FAQ - Image Time



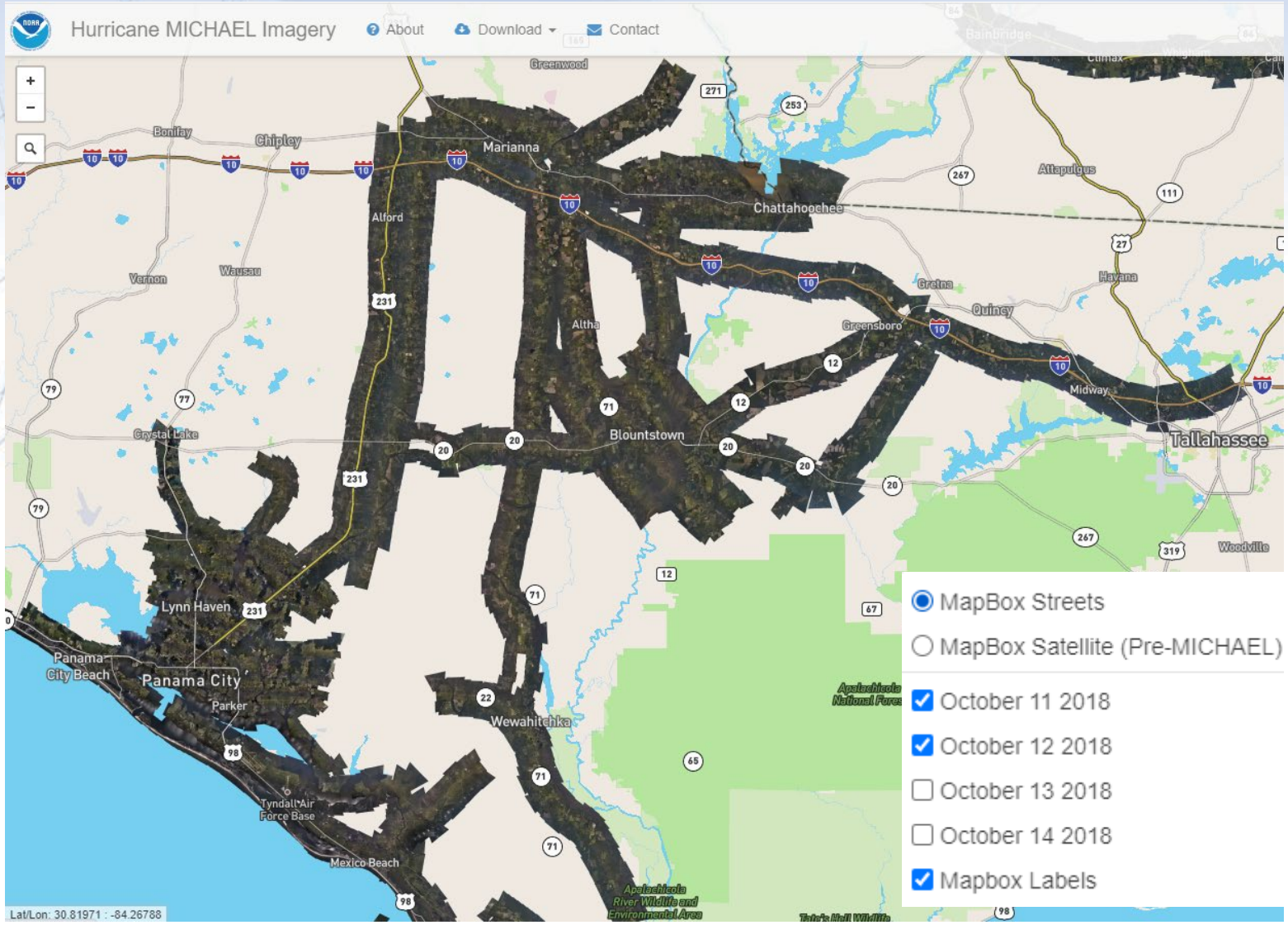


C26262664
C = Camera identifier
262 = GPS day of year
62664 = Approximate seconds of GPS day 262

022581-0831212042333-RGB1.jpg
022318 = image id
083121 = MMDDYY
2042333 = HHMMSSs (UTC)
RGB1 = camera id

NEW

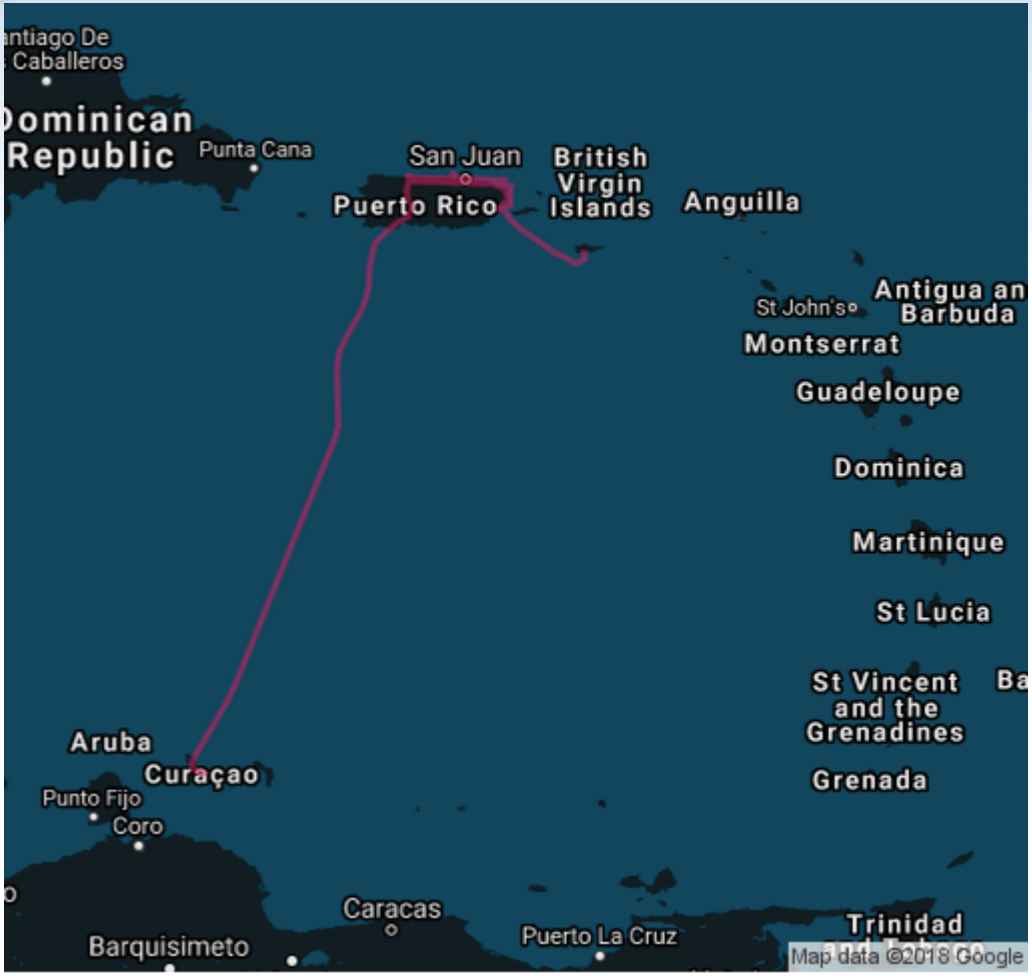
FAQ – Missing Area



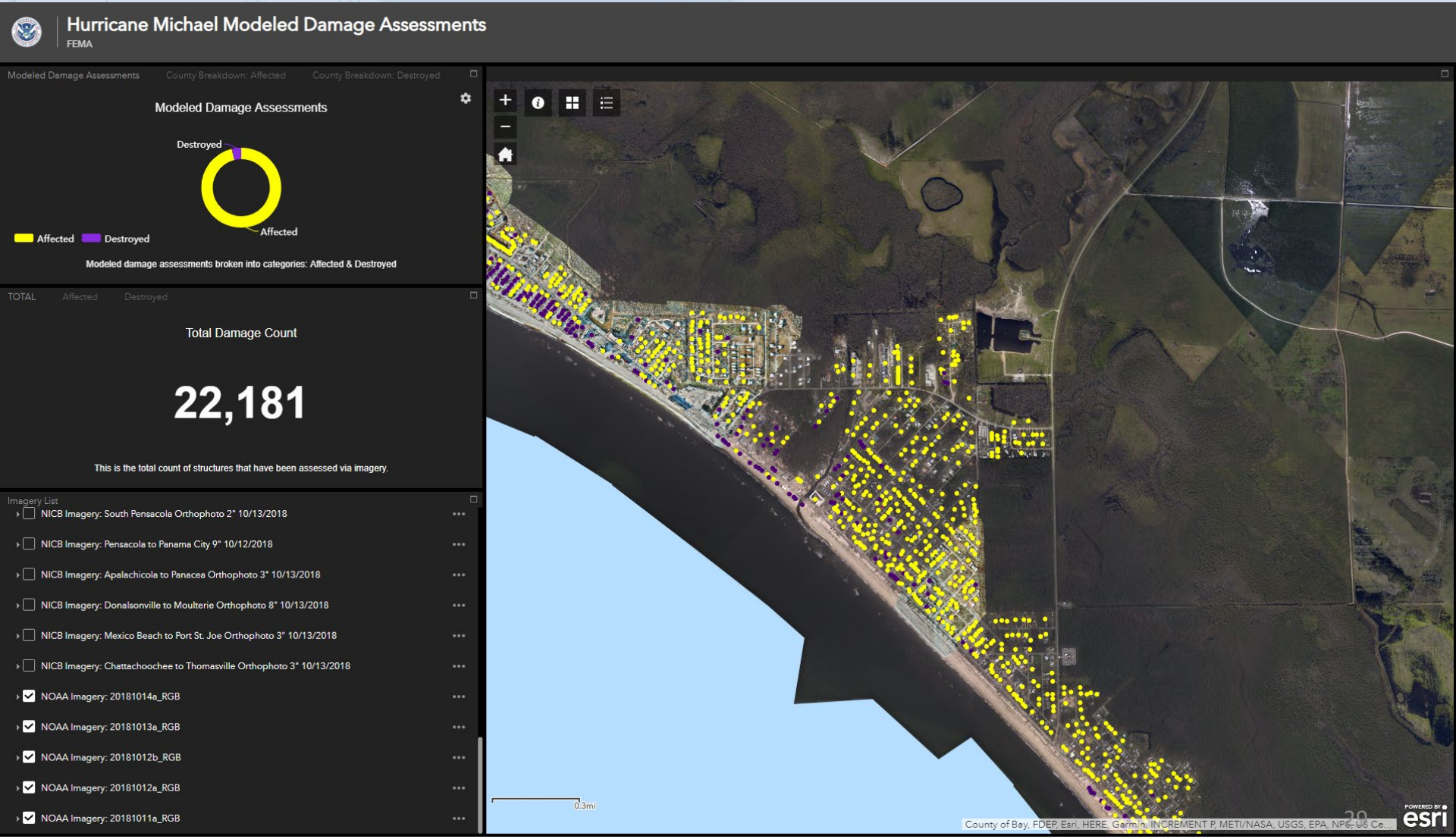
FAQ – Viewer Updated

Hurricane Maria

- Remote Operations
- No Electricity
- No Internet
- Closed Airport
- Weather

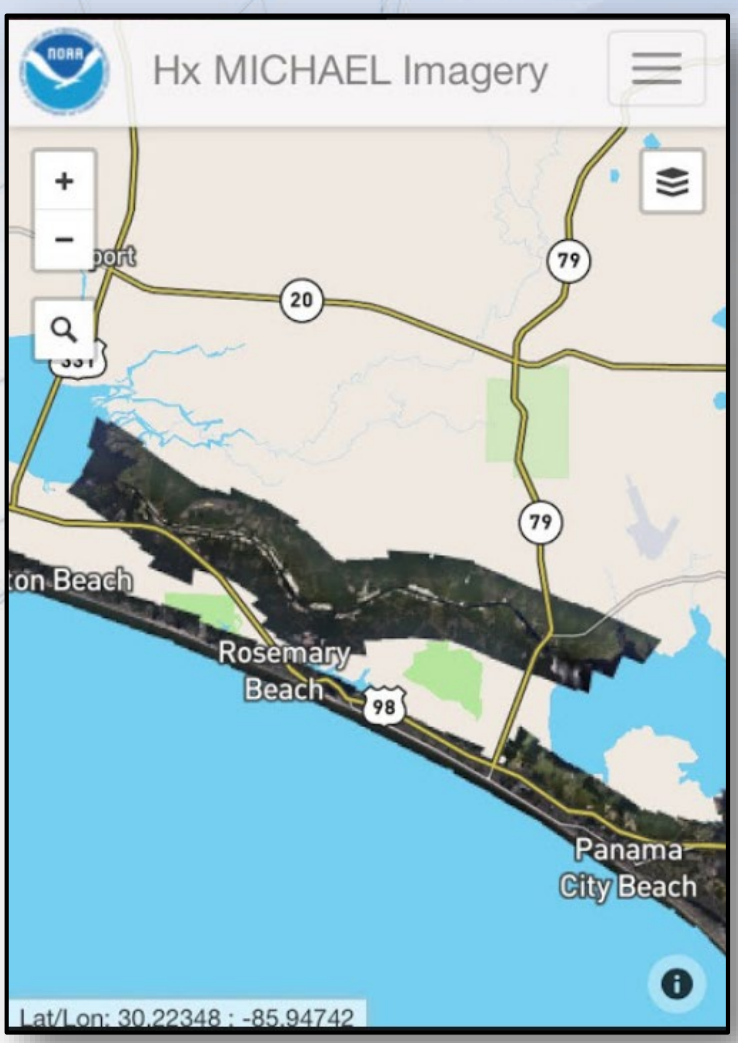


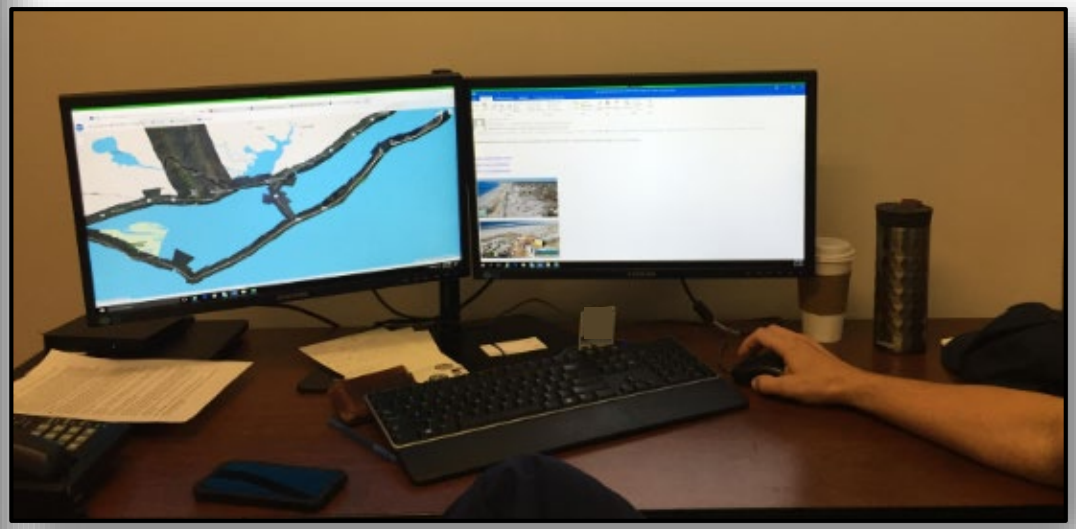
FEMA Geospatial Damage Assessment



Hurricane Michael Search and Rescue

Safety of Navigation





Team Rubicon is an international non-profit disaster response organization that unites the skills and experiences of military veterans with first responders to rapidly deploy emergency response teams, free of charge, to communities affected by disasters.

GEOVIS Team Comment: Three neighborhoods butler road, Wallace Mhp Ln, Duke St all under water with substation as well under water.

HF Product #002-0923-2018

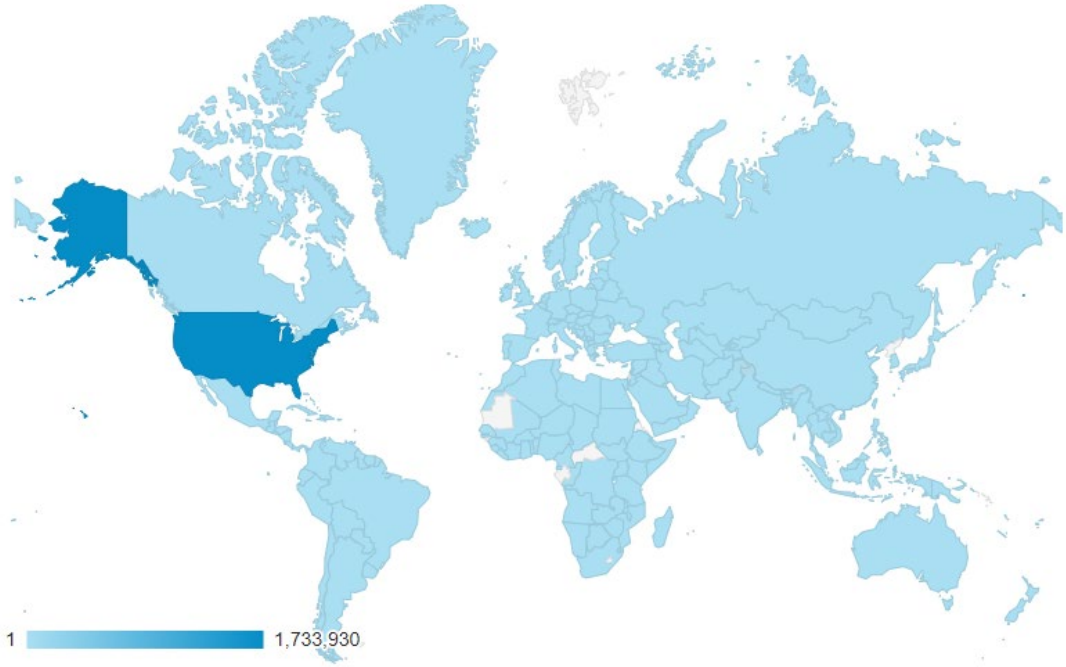
Website Stats (Feb 15, 2018 – April 13, 2022)

1,800,00 Users

4,126,780 Pageviews

Top Pages Viewed

1. Michael
2. Florence
3. Ida
4. Laura
5. Harvey
6. Maria



Summary

- Data has been acquired to support emergency response efforts due to hurricanes, flooding, earthquakes, and tornadoes since the mid-1960s.
- Data is disseminated to federal, state, and local government agencies, as well as the general public to facilitate support efforts
- Imagery is collected, processed, and disseminated in GIS ready formats
- Goal: processed and available 6-8 hours after landing
- Technical Questions: ngs.hurricane1@noaa.gov