GeoXO Overview

NOAA
National Environmental Satellite, Data, and Information Service

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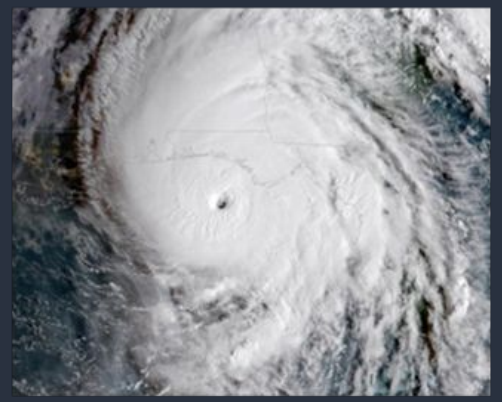
Current Generation: The GOES-R Series

The GOES-R Series is the Western Hemisphere's most advanced weather-observing and environmental monitoring system. GOES-R observations contribute to public safety, protection of property, and our nation's economic health and prosperity.

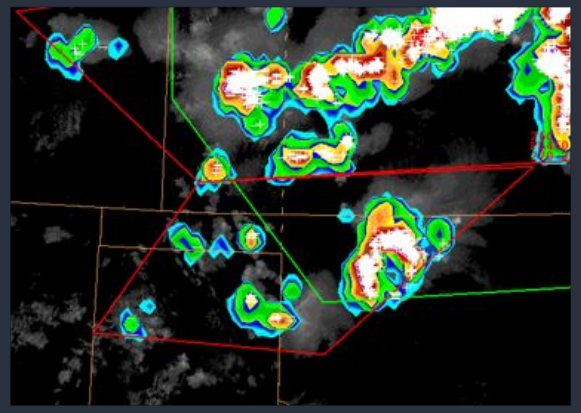
ABI



Visible & Infrared Imagery

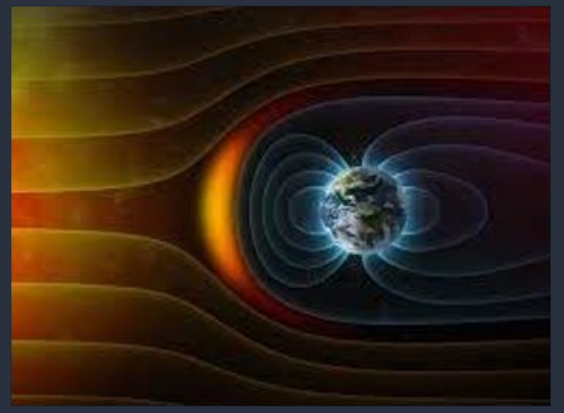
- ✔ Hurricane track and intensity forecasts
- ✔ Early warning of severe storms
- ✔ Fire detection, monitoring, and intensity estimation
- ✔ Data for air quality warnings and alerts
- ✔ Detection of low clouds and fog
- ✔ Data for aviation route planning and reducing weather-related flight delays

GLM



Lightning Mapping

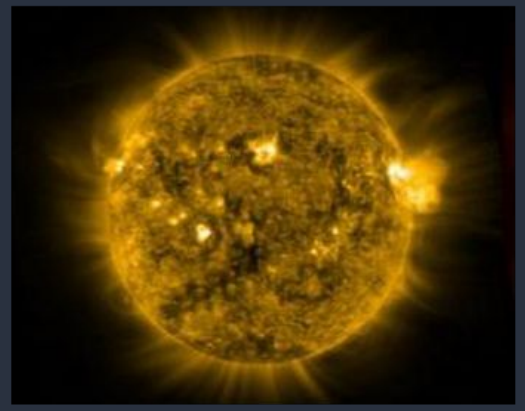
MAG and SEISS



Space Weather Monitoring

- ✔ Detection of volcanic eruptions and monitoring of ash and sulfur dioxide
- ✔ First-ever operational lightning mapper from geostationary orbit
- ✔ Warning of space weather hazards responsible for communications and navigation disruptions and power blackouts
- ✔ Monitoring of energetic particles responsible for radiation hazards
- ✔ Coronal Mass Ejection Monitoring*

EXIS, SUVI, CCOR*



Solar Imaging

*GOES-19 only

ABI + GLM Hurricane Helene

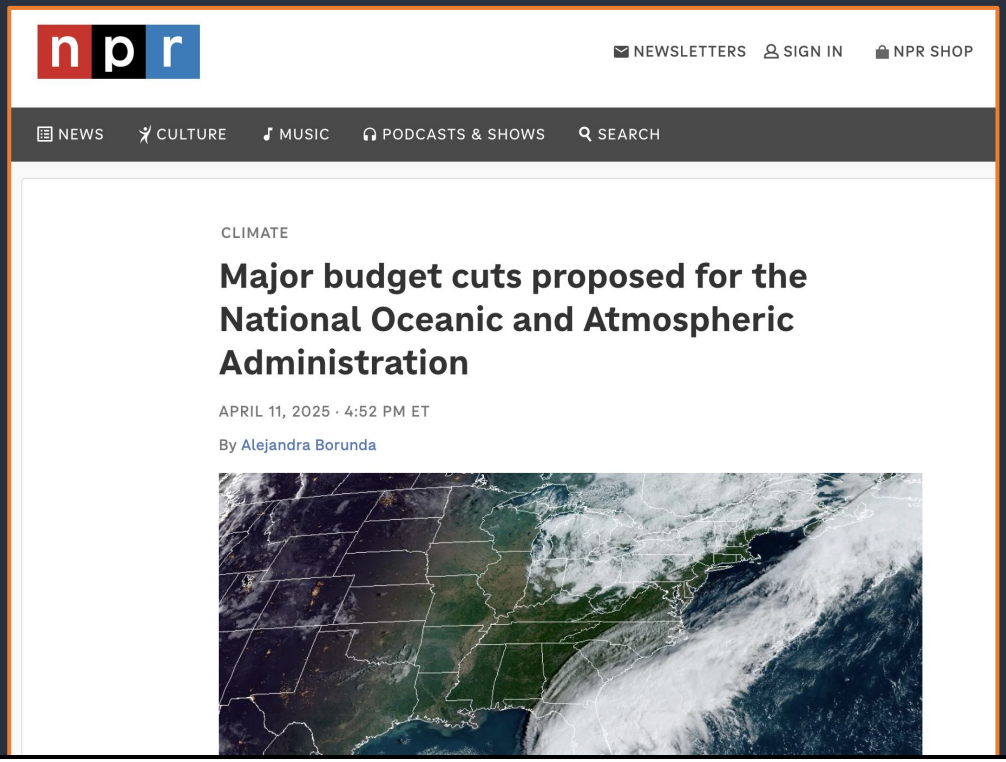
Helene was a major hurricane that made landfall in the Big Bend region of Florida just before midnight on September 26th, 2024.

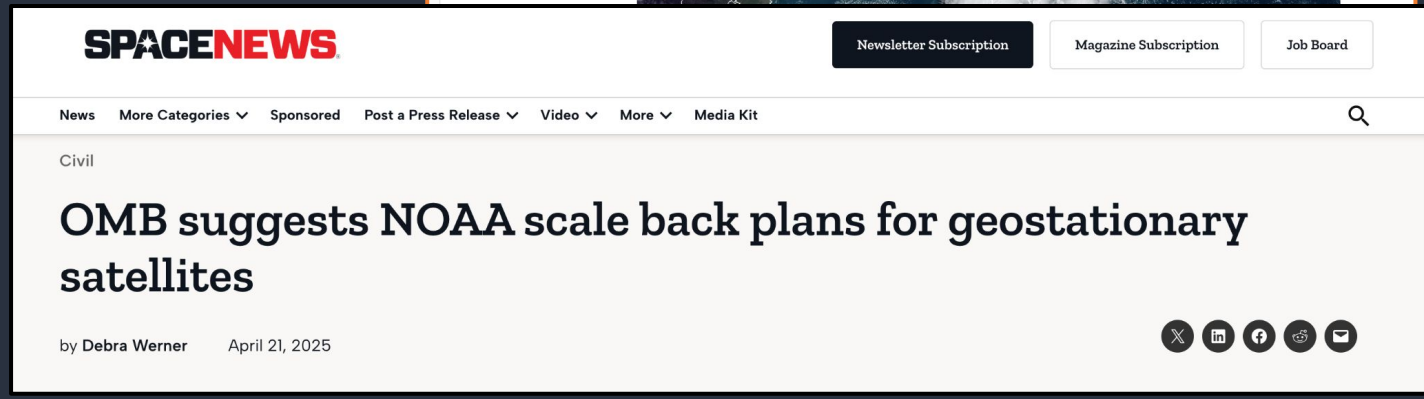
On September 25th, 2024, Helene strengthened up to hurricane status as it began to move into the Gulf of Mexico.

Storm surge up to 15-20 feet was forecast for areas along the Florida Panhandle. Places in the Tampa Bay region saw record breaking rises in water levels.

GeoXO Future is Uncertain

- GeoXO Program is being reviewed.
- Final decisions are unknown.
- We expect GeoXO to be more focused on the weather mission and to have a larger commercial role.
- We hope that a sounder will remain a part of the program.
- Stay tuned.





Evolution of GOES

1974

NASA SMS

1975

1980

GOES 1-3

- NOAA's First GOES
- Spin-stabilized

1994

GOES 4-7

- Vertical Profiling

2006

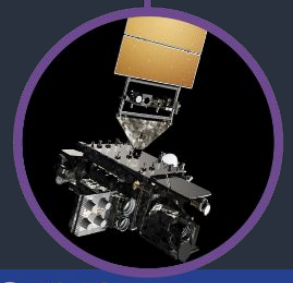
GOES 8-12

- 3-axis stabilized
- Simultaneous imaging, sounding 100% of time

2016

GOES 13-15

- Simultaneous, independent imaging, sounding



2032

GeoXO

- Improved imager spatial resolution and additional spectral channels
- Improved lightning mapping
- Infrared sounding
- Ocean color
- Atmospheric composition

GOES 16-19

- Improved spectral, spatial and temporal resolution in imaging
- Lightning mapping
- Improved space weather monitoring

GeoXO Constellation

GOES West 137W

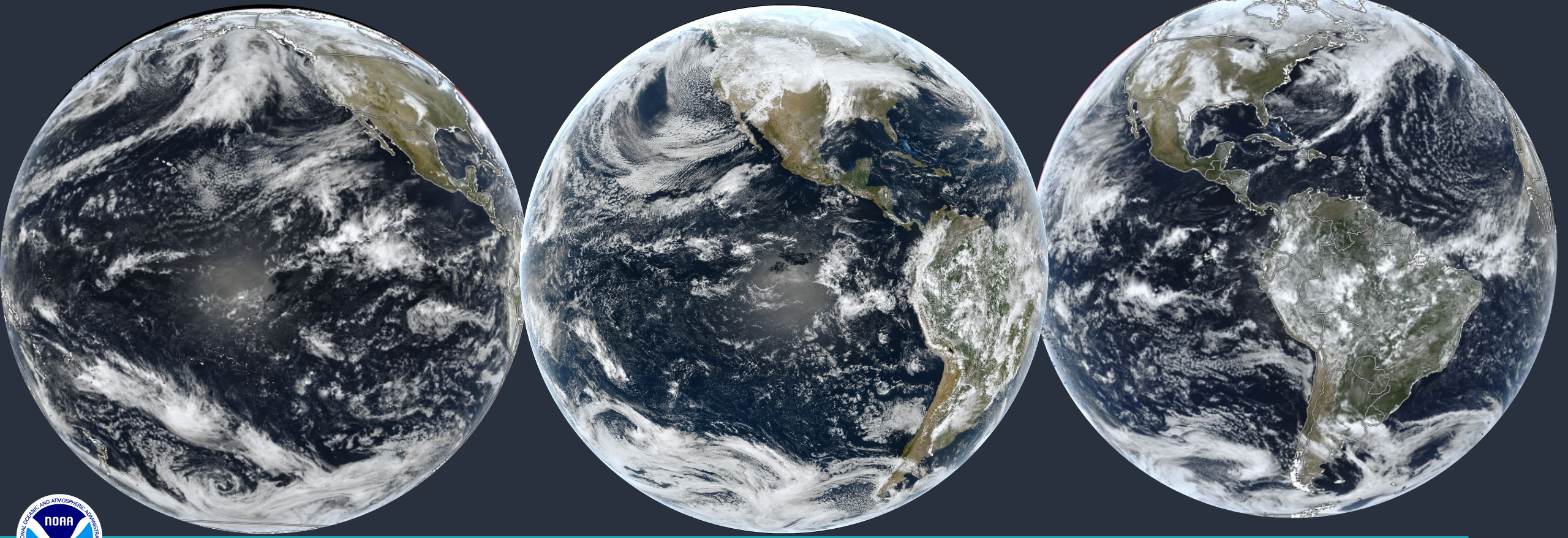
imager
lightning
ocean color

GOES Central 105W

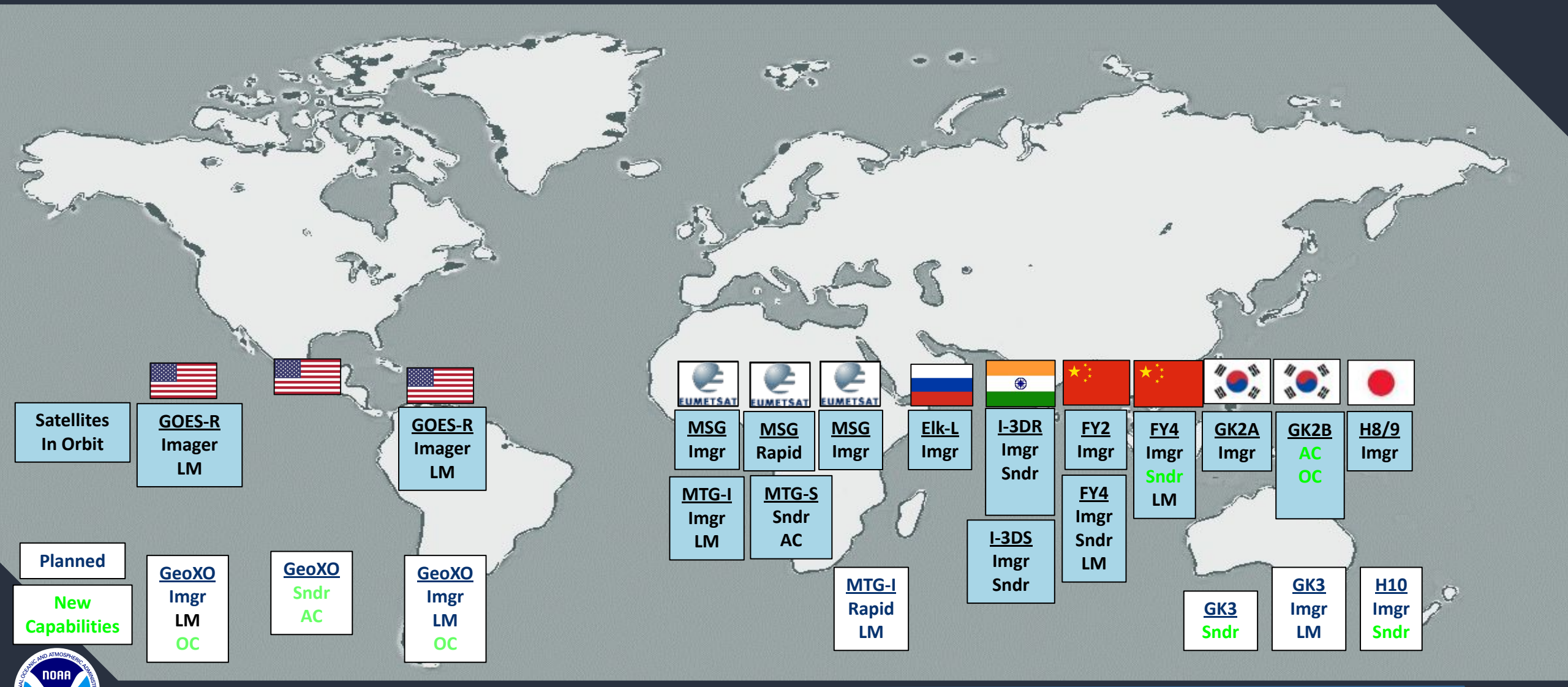
sounder
atmos comp
partner payload

GOES East 75W

imager
lightning
ocean color



GEO Ring of Meteorological Satellites



GeoXO Imager (GXI)

- No Changes but GXI still provides improvement over ABI

ABI CONFIGURATION

Wavelength (μm)		Band	GSD
VNIR	0.47	Band 1	1 km
	0.64	Band 2	0.5 km
	0.865	Band 3	1 km
	1.378	Band 4	2 km
	1.61	Band 5	1 km
	2.25	Band 6	2 km
MWIR	3.9	Band 7	2 km
	6.185	Band 8	2 km
	6.95	Band 9	2 km
	7.34	Band 10	2 km
	8.50	Band 11	2 km
LWIR	9.61	Band 12	2 km
	10.35	Band 13	2 km
	11.20	Band 14	2 km
	12.30	Band 15	2 km
	13.30	Band 16	2 km

GXI CONFIGURATION

Wavelength (μm)		Band	GSD
VNIR	0.47	Band 1	0.5 km
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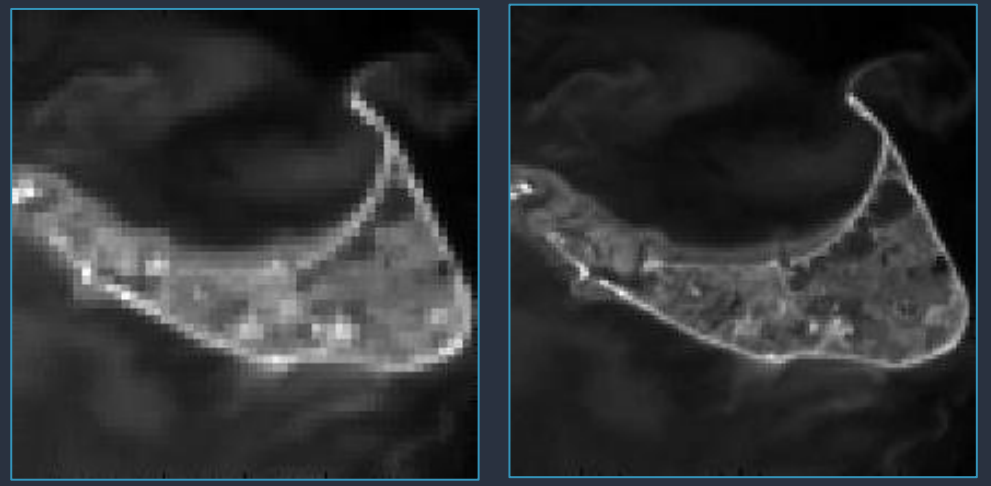
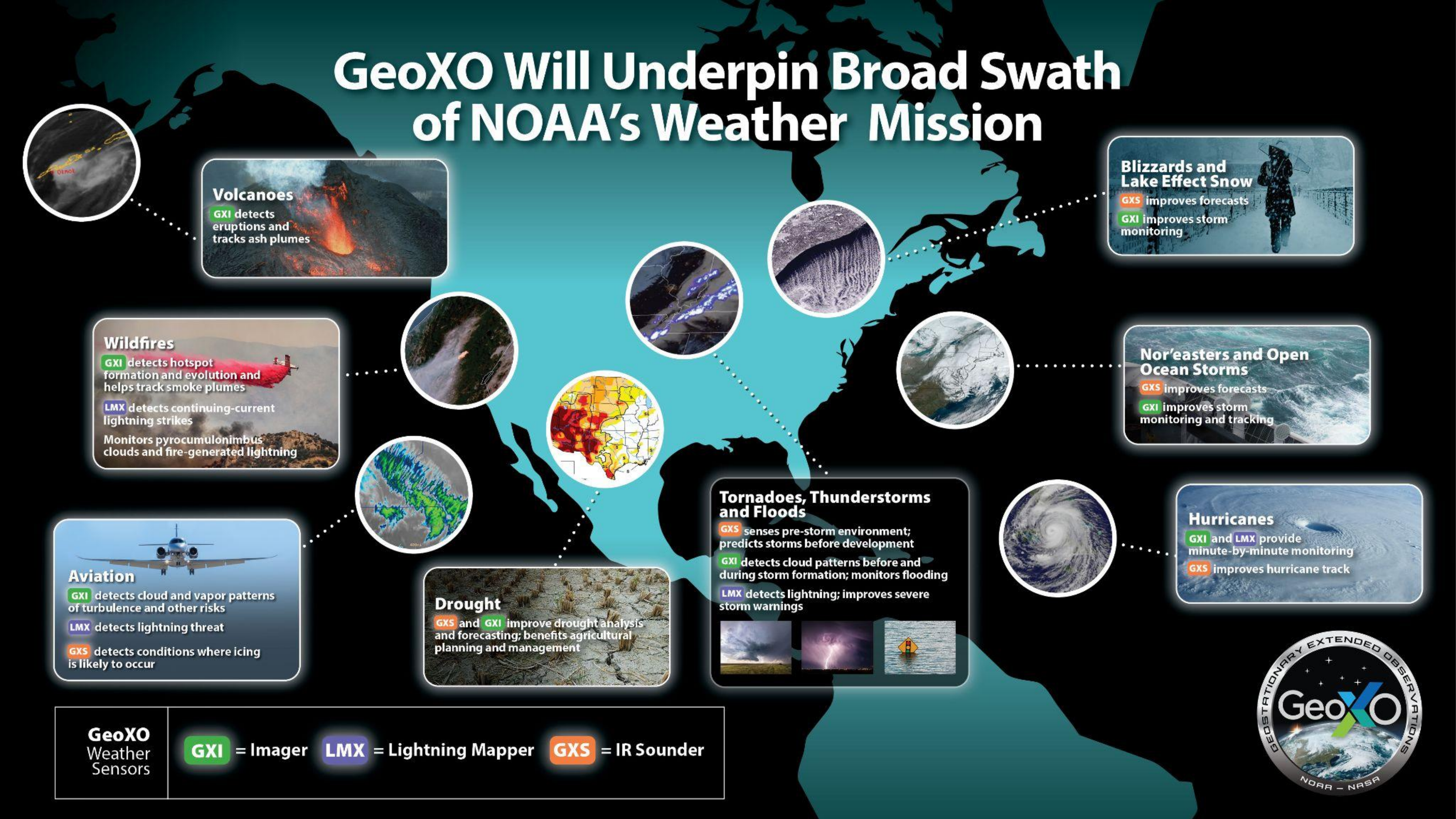
	10.35	Band 15	1 km
	11.20	Band 16	2 km
	12.30	Band 17	2 km
	13.30	Band 18	2 km

Other Baseline Requirements	
Coverage Area	Same as ABI
Revisit Time	Same as ABI

Nantucket Island at ABI 0.5km vs GXI 0.25km Resolution



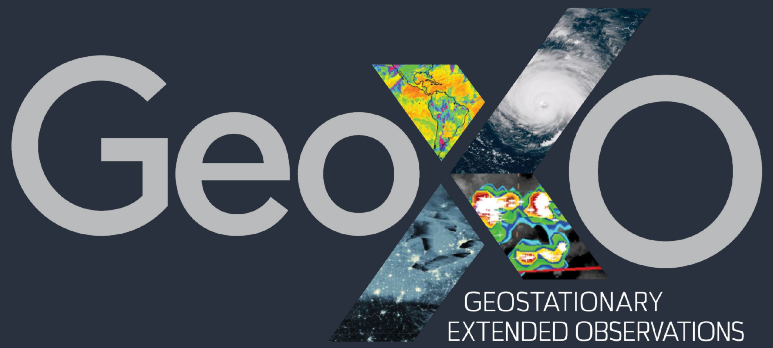

GeoXO Will Underpin Broad Swath of NOAA's Weather Mission
Volcanoes
GXI detects eruptions and tracks ash plumes
Wildfires
GXI detects hotspot formation and evolution and helps track smoke plumes
LMX detects continuing-current lightning strikes
Monitors pyrocumulonimbus clouds and fire-generated lightning
Aviation
GXI detects cloud and vapor patterns of turbulence and other risks
LMX detects lightning threat
GXS detects conditions where icing is likely to occur
Drought
GXS and GXI improve drought analysis and forecasting; benefits agricultural planning and management
Tornadoes, Thunderstorms and Floods
GXS senses pre-storm environment; predicts storms before development
GXI detects cloud patterns before and during storm formation; monitors flooding
LMX detects lightning; improves severe storm warnings
Blizzards and Lake Effect Snow
GXS improves forecasts
GXI improves storm monitoring
Nor'easters and Open Ocean Storms
GXS improves forecasts
GXI improves storm monitoring and tracking
Hurricanes
GXI and LMX provide minute-by-minute monitoring
GXS improves hurricane track
GeoXO Weather Sensors
GXI = Imager
LMX = Lightning Mapper
GXS = IR Sounder
GEOSTATIONARY EXTENDED OBSERVATIONS
GeoXO
NOAA – NASA

Conclusions

- GeoXO is going through a period of uncertainty and we don’t know the outcome.
- GeoXO will survive and we need your involvement to ensure its success.
- We hope it will keep a sounder in its constellation.
- Thank you for attending this event.

Open Questions about the GeoXO Sounder

- The GeoXO imager has 4 IR and 1 solar H_2O Channels and channels with O_3 and CO_2 sensitivity. What is the optimal method inclusion of these imager observations in the sounder applications?
- Is there a desire to make profiles and applications from the GEO-Ring of sounder from algorithms with similar approaches and performance? If so, can ITSC provide guidance?
- Does the sounder radiance community want similar PCA formats from each agency?
- Is 105W the optimal position of the GeoXO sounder?
- Optimal configuration of the NOAA LEO and GEO (and GEO-Ring) sounders are still discussed.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EXTENDED OBSERVATIONS


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Thank You