NOAA's Low Earth Orbit (LEO) Observations Program

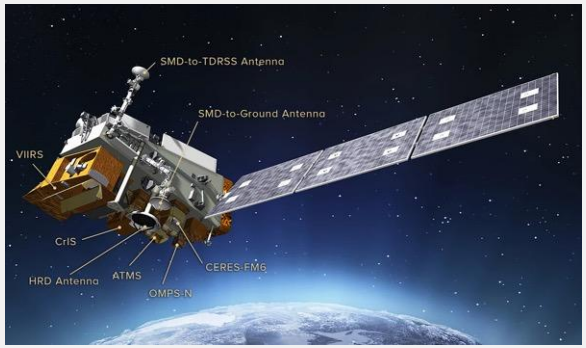
Program Update

National Environmental Satellite, Data, and Information Service

July 16, 2025

Kat Hawley
LEO Lead for Stakeholder Strategy and Customer Impact
NOAA/NESDIS

NOAA Satellites Operate at Three Observation Viewpoints

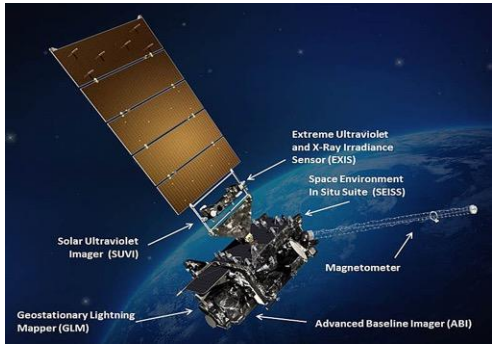


Low Earth Satellites

500 miles above Earth

- **Joint Polar Satellite System (JPSS)**
- **QuickSounder**
- **Near Earth Orbit Network (NEON)**

Legacy POES satellites - NOAA-15,-18,-19 operated under POES Extension program



Geostationary Satellites

22,000 miles above Earth

- GOES-R Series
- Geostationary Extended Observations (GeoXO)

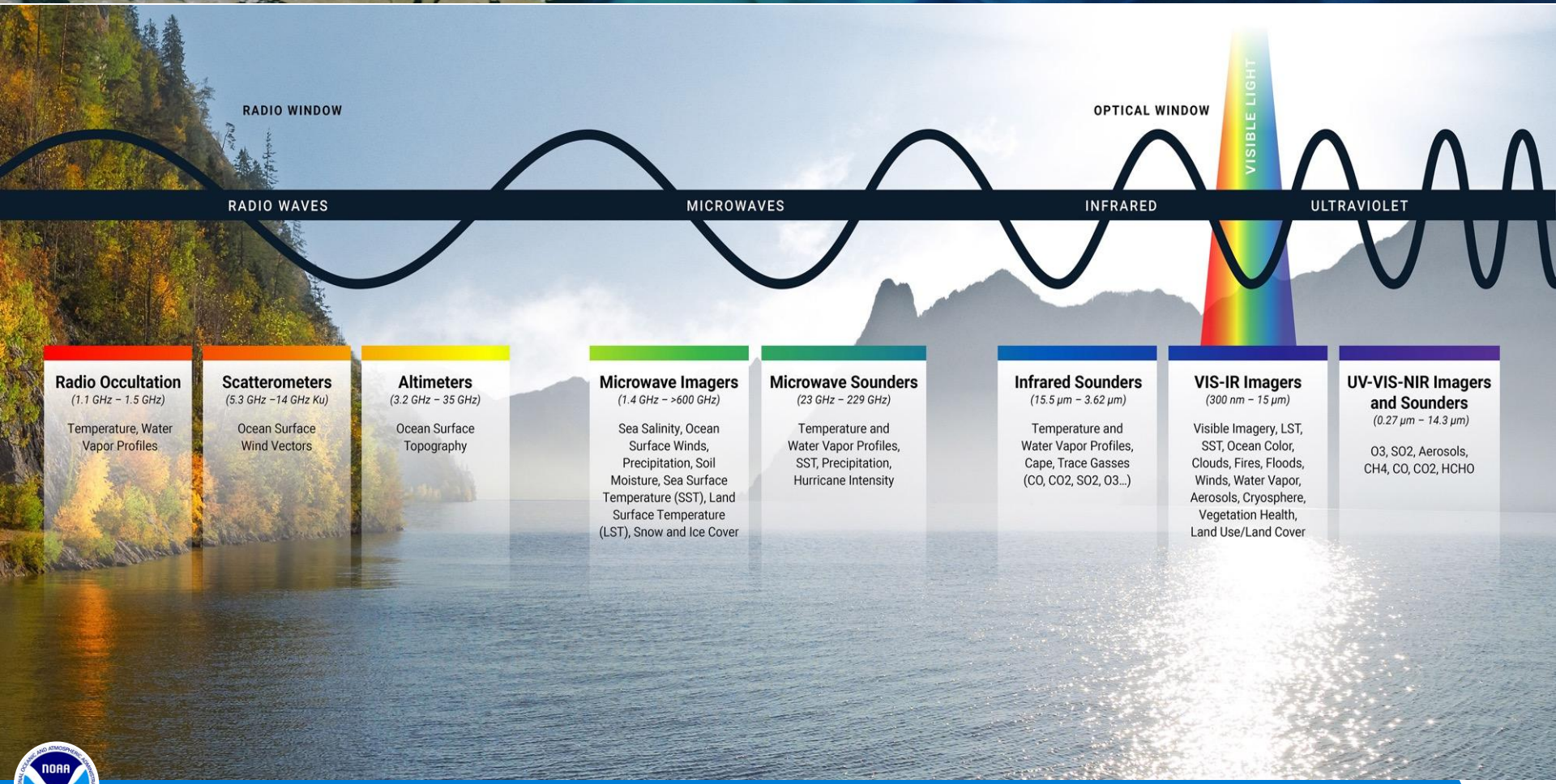
Legacy - GOES-14

Space Weather Satellites

L1: ~1 million miles from Earth and other observation points

- DSCOVR (NOAA)
- Space Weather Follow On
- Space Weather Next

Legacy - Partner leveraged: ACE (NASA), SOHO (NASA/ESA)


RADIO WINDOW
OPTICAL WINDOW
VISIBLE LIGHT
RADIO WAVES
MICROWAVES
INFRARED
ULTRAVIOLET
Radio Occultation
(1.1 GHz – 1.5 GHz)
Temperature, Water Vapor Profiles
Scatterometers
(5.3 GHz –14 GHz Ku)
Ocean Surface Wind Vectors
Altimeters
(3.2 GHz – 35 GHz)
Ocean Surface Topography
Microwave Imagers
(1.4 GHz – >600 GHz)
Sea Salinity, Ocean Surface Winds, Precipitation, Soil Moisture, Sea Surface Temperature (SST), Land Surface Temperature (LST), Snow and Ice Cover
Microwave Sounders
(23 GHz – 229 GHz)
Temperature and Water Vapor Profiles, SST, Precipitation, Hurricane Intensity
Infrared Sounders
(15.5 μm – 3.62 μm)
Temperature and Water Vapor Profiles, Cape, Trace Gasses (CO, CO2, SO2, O3…)
VIS-IR Imagers
(300 nm – 15 μm)
Visible Imagery, LST, SST, Ocean Color, Clouds, Fires, Floods, Winds, Water Vapor, Aerosols, Cryosphere, Vegetation Health, Land Use/Land Cover
UV-VIS-NIR Imagers and Sounders
(0.27 μm – 14.3 μm)
O3, SO2, Aerosols, CH4, CO, CO2, HCHO

THE OFFICE OF

Low Earth Orbit Observations

JPSS

JOINT POLAR SATELLITE SYSTEM PROGRAM

NEAR EARTH ORBIT NETWORK

NEON

NEON

NEAR EARTH ORBIT NETWORK PROGRAM


NEAR EARTH ORBIT NETWORK
NEON
"Buy and partner where we can. Build what we must."

NEAR EARTH ORBIT NETWORK

NEON

The Near Earth Orbit Network (NEON) is NOAA's next generation satellite architecture in Low Earth Orbit (LEO).

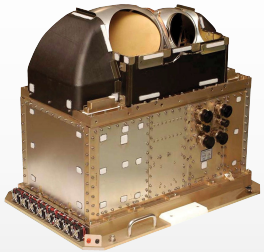
NEON builds on **4 JPSS satellites**, each the size of a pick up truck.

NOAA-21 launched November 10, 2022

NEON Builds on JPSS

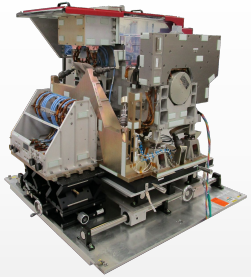
NEON will fly next-generation versions of JPSS instruments on individual satellites in the early morning and early afternoon orbits

ATMS



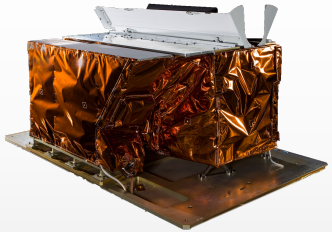
Advanced Technology **Microwave Sounder**

CrIS



Crosstrack **Infrared Sounder**

VIIRS



Visible Infrared **Imaging** Radiometer Suite

OMPS

Ozone Mapping and Profiling Suite


COMMERCIAL INDUSTRY
INNOVATION
EXPERTISE
TECHNOLOGY
NEAR EARTH ORBIT NETWORK
NEON
NEON exemplifies the ideal synergy between government stewardship and commercial efficiency.

Our Value to the American Public



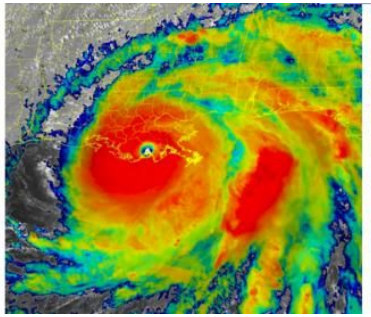





Photo By: EJ Hersom, DOD

Our data is vital to NOAA's mission, providing timely and accurate information that **strengthens public and military response,** enhances America's understanding and resilience to dangerous weather, and plays a critical role in national defense **to protect the safety of all Americans**.

LEO's data touches many lives every day.

User Community

Domestic

Internal NOAA

International

How Do We Get There?

By Intentional Design Focused on Outcomes

Conducting VoI Cost-Benefit Economic Assessments

Focusing on a Particular Job or Task

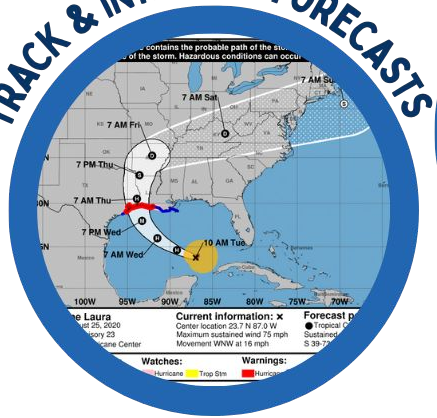
STEP 1	Develop Baseline & Identify Value
STEP 2	Define How Information Influences Decisions & Actions
STEP 3	Conduct VoI Analysis to Determine Investments

Understand What is Needed For Hurricane Response

PREPAREDNESS ACTIVITIES

Provides essential information to local, state and federal governments, enabling them to assess risks.

TRACK & INTENSITY FORECASTS



Enables emergency managers to execute timely evacuations and identify areas that are most at risk

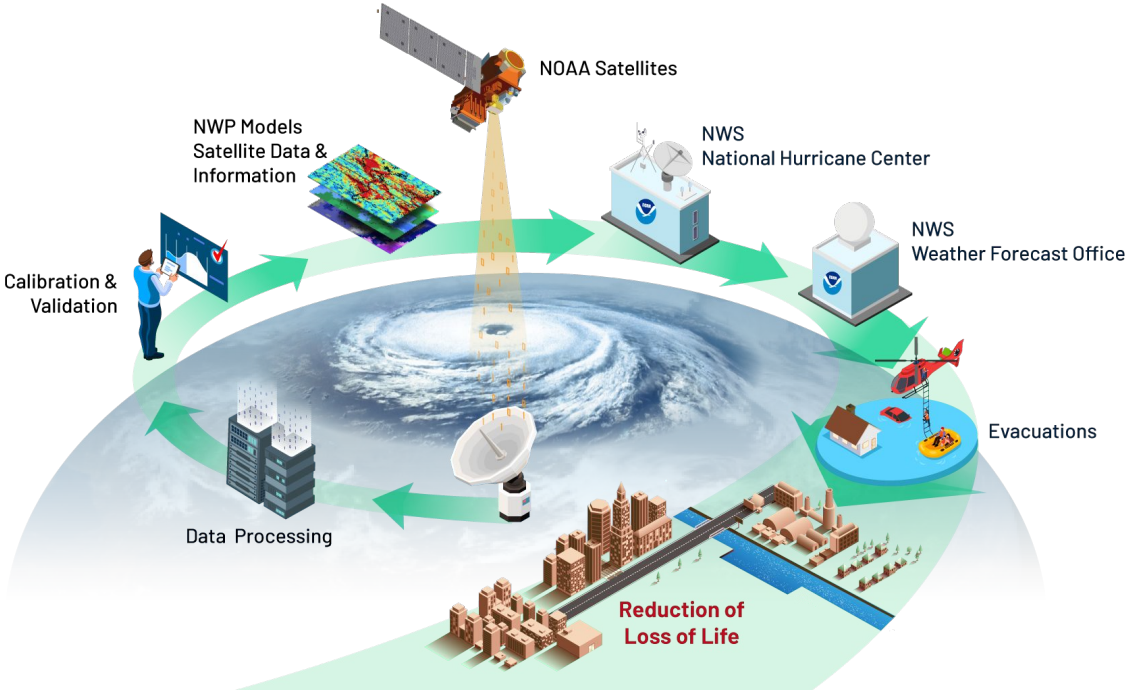
RECOVERY

Informs post-storm recovery efforts such as where to respond first, power restoration, and emergency services.

REBUILD

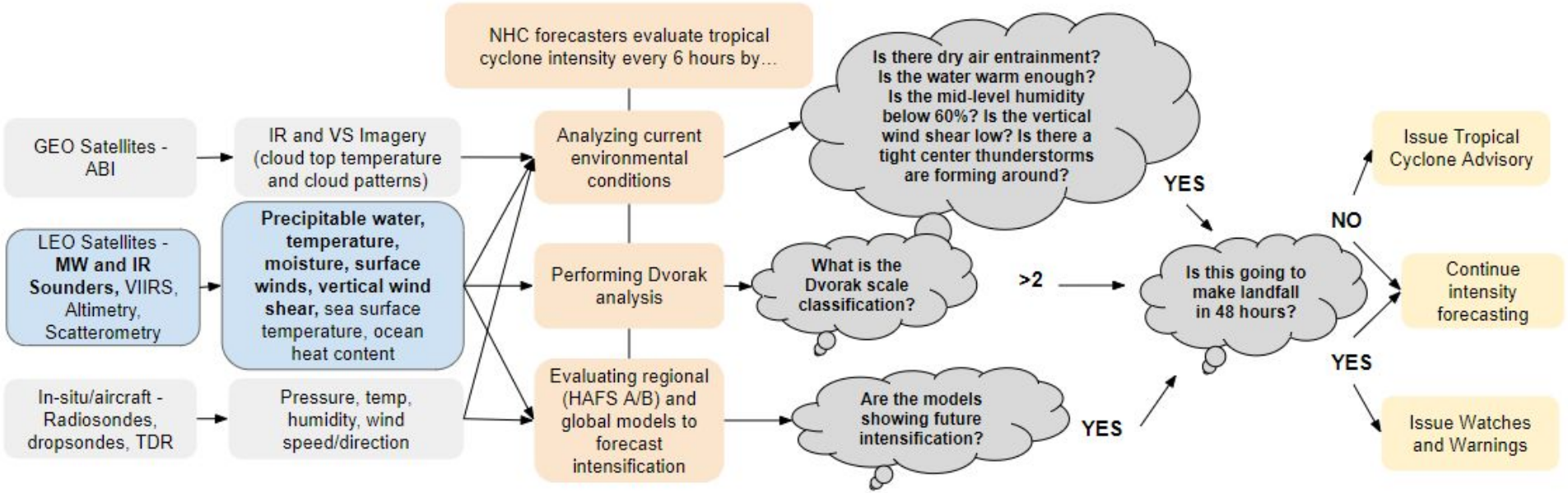
Informs industry when it is safe to restore critical infrastructure, minimizing disruptions to supply chains, refinery operations, and transportation.

Understand how Data is Transformed & Used

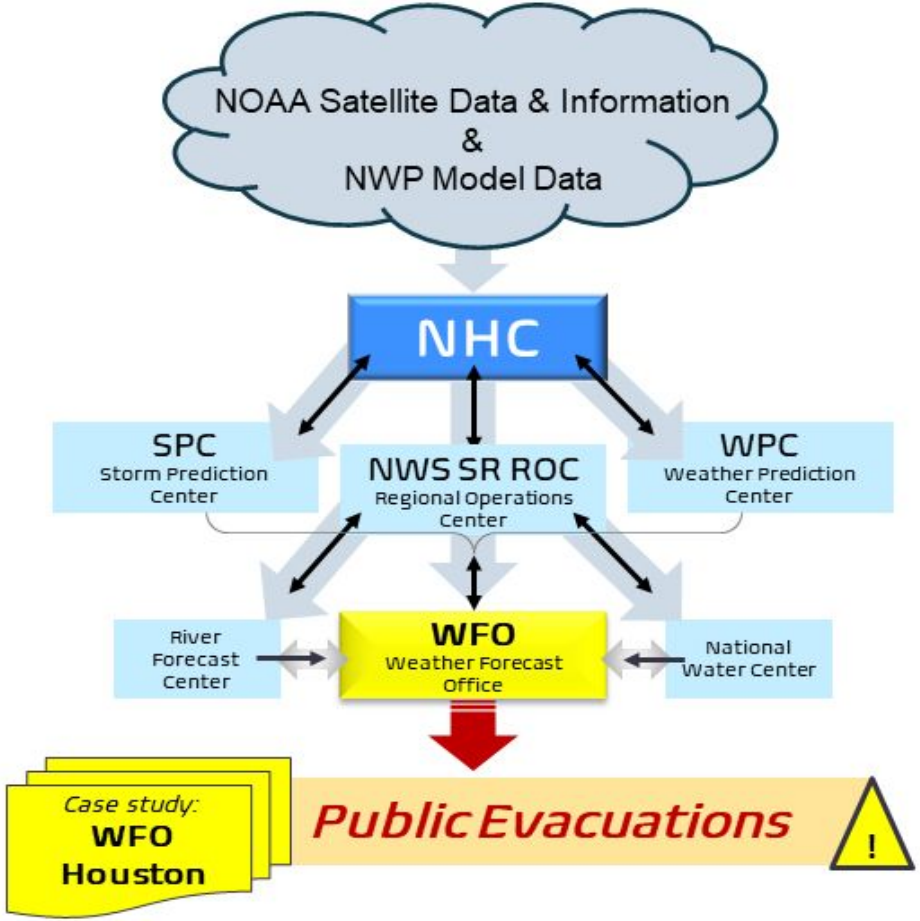


LEO data gives emergency managers **the ability to make risk-informed decisions**, helping them carry out timely evacuations, identify areas most at risk for power outages, gas shortages, and infrastructure damage, and ultimately protect lives in the process.

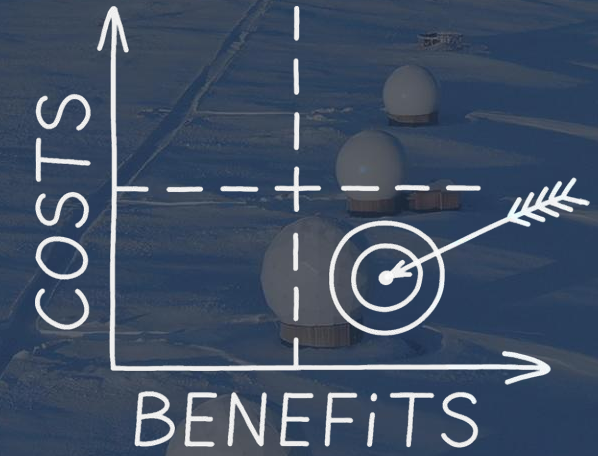
Determine How Data and Information Is Critical - User Baseline



Define how information Influences Decisions & Actions

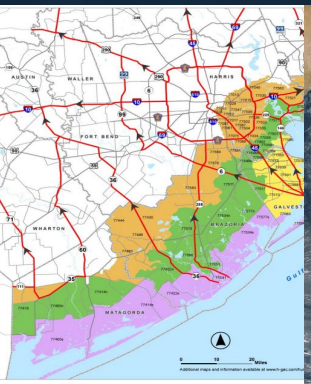


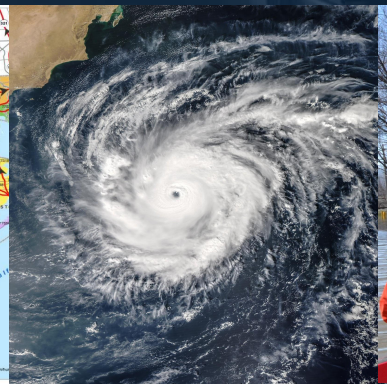
Cost Benefit Analysis:
Define Most Effective & Efficient Architecture



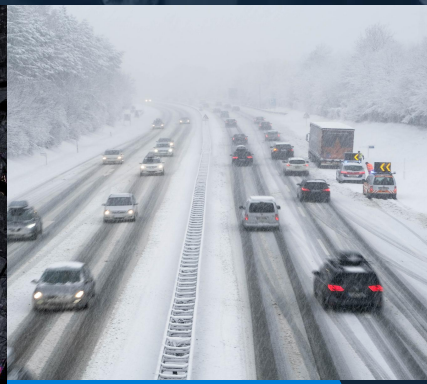
We Want to Hear From You

Interviews, Surveys, Public Meetings, & Tabletop Exercises

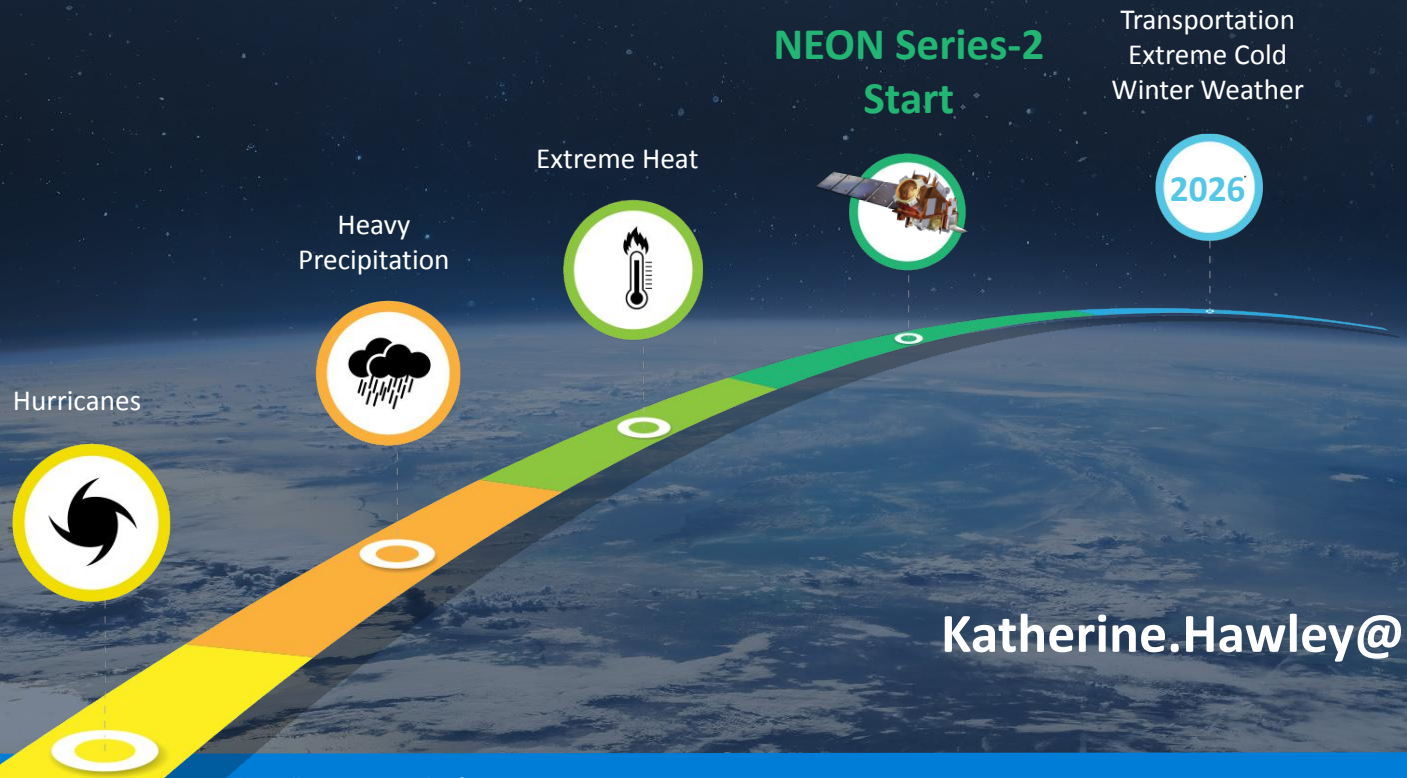








What is Next?



Katherine.Hawley@noaa.gov

THANK YOU!

Kat Hawley
Katherine.Hawley@noaa.gov

JPSS.PROGRAM @JPSSPROGRAM @NOAASATELLITES