

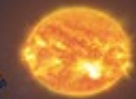


NOAA
National Environmental Satellite,
Data, and Information Service

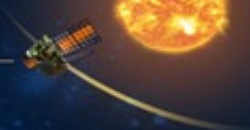
The NOAA Report to ITWG 2021

Mitch Goldberg, NESDIS Chief Scientist

Alone: NOAA Operates 16 Satellites



DISCOVER  



-  USA
-  JAPAN
-  SOUTH KOREA
-  INDIA
-  CHINA
-  FRANCE
-  RUSSIA
-  SPAIN

-  NOAA
-  EUMETSAT
-  EUROPEAN COMMISSION
-  NATIONAL SPACE ORGANIZATION (NSPO)
-  EUROPEAN SPACE AGENCY
-  NASA
-  DEPARTMENT OF DEFENSE



-  GEOSTATIONARY ORBIT
-  NEAR-POLAR ORBIT
-  LAGRANGE POINT 1



Together: We Form an International Community

-  USA
-  JAPAN
-  SOUTH KOREA
-  INDIA
-  CHINA
-  FRANCE
-  RUSSIA
-  SPAIN

-  NOAA
-  EUMETSAT
-  EUROPEAN COMMISSION
-  NATIONAL SPACE ORGANIZATION (NSPO)
-  EUROPEAN SPACE AGENCY
-  NASA
-  DEPARTMENT OF DEFENSE

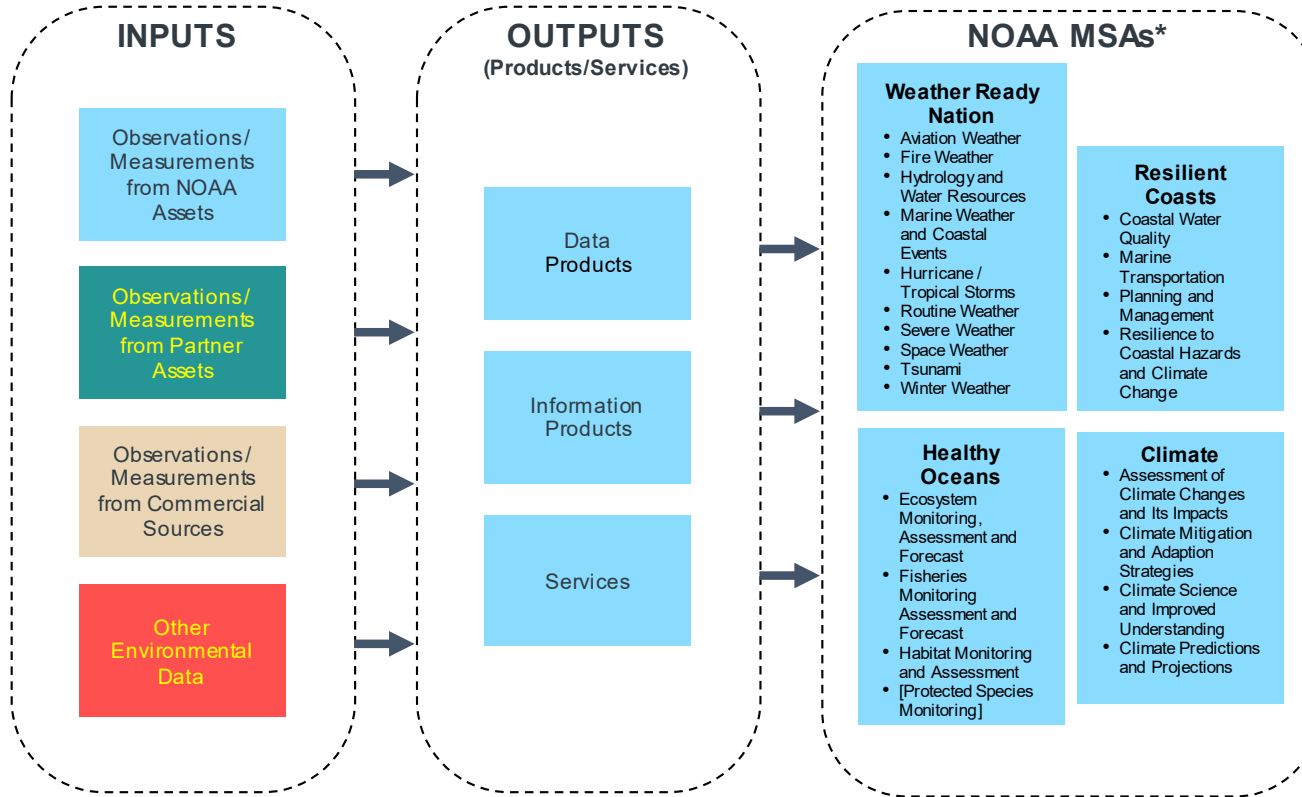


-  GEOSTATIONARY ORBIT
-  NEAR-POLAR ORBIT
-  LAGRANGE POINT 1



NESDIS Support to NOAA's Mission

Current Approach

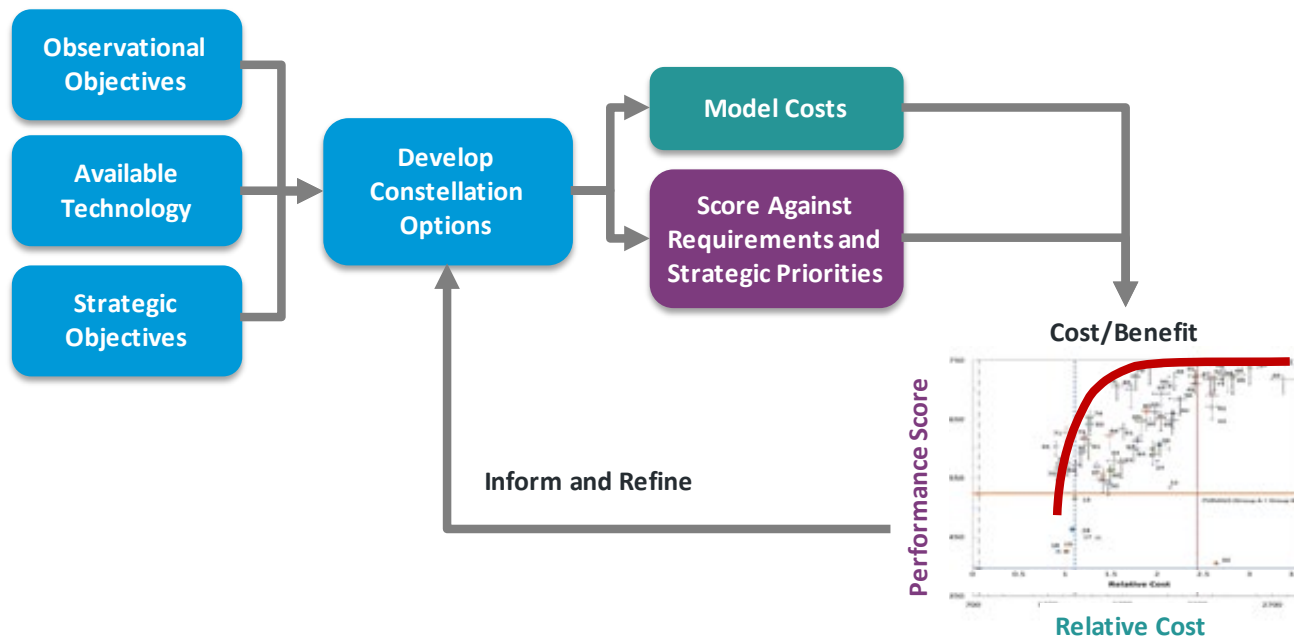


* NESDIS Products/Services also support the DoD tactical, NASA science and Emergency Management missions



2018 Architecture Study Informs Our Next-Gen Decisions

NSOSA identified the most cost effective space segment architectures for performing the NOAA mission beyond the POR to 2050.



High-Value Frontier Attributes

Mix of higher-impact observations

- Small & medium platforms
- Enhanced imagery & high-altitude coverage

More agility

- Disaggregated
- Onramps to new technology

New business models

- Data purchases, ride shares, & hosted payloads



Four Pillars of NOAA's Next Gen Earth Observation

Integrated, Adaptable, and Affordable: Orbits, Instruments & Systems

LEO

Miniaturized instruments on small, affordable, and proliferated satellites and partner data improving forecasts through better and additional data. Better precipitation forecasts, wave height predictions, ocean currents, and more.

GEO

Continuous real-time observations supporting warnings and watches of severe weather and hour-by-hour changes. Monitoring of oceans, atmosphere, and climate to improve productivity and health outcomes.

Space Weather (SWO)

Reliably monitoring coronal mass ejections from L1, GEO, and LEO can protect the nation's valuable, vulnerable infrastructure. New capabilities at L5 and high earth orbit can provide additional insight and improve forecasts.

Common Ground Services

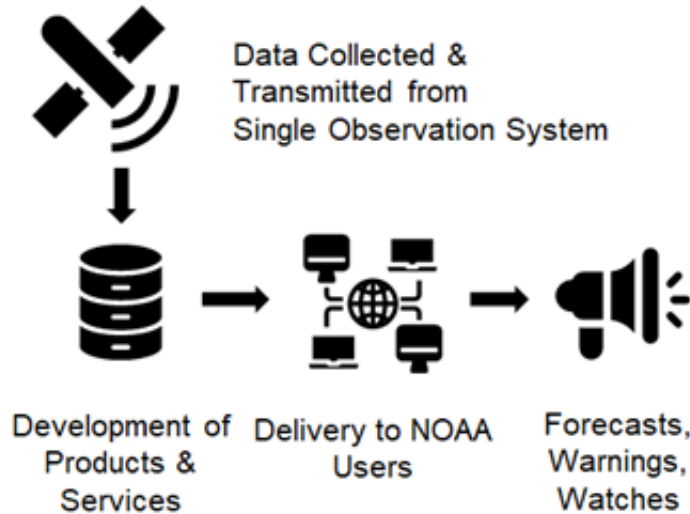
Secure ingest of data in different formats from different partners requires a flexible, scalable platform. Common Services approach integrates cloud, AI, and machine-learning capabilities to verify, calibrate, and fuse data into new and better products and services.



A New Paradigm in Data Science and Information Services

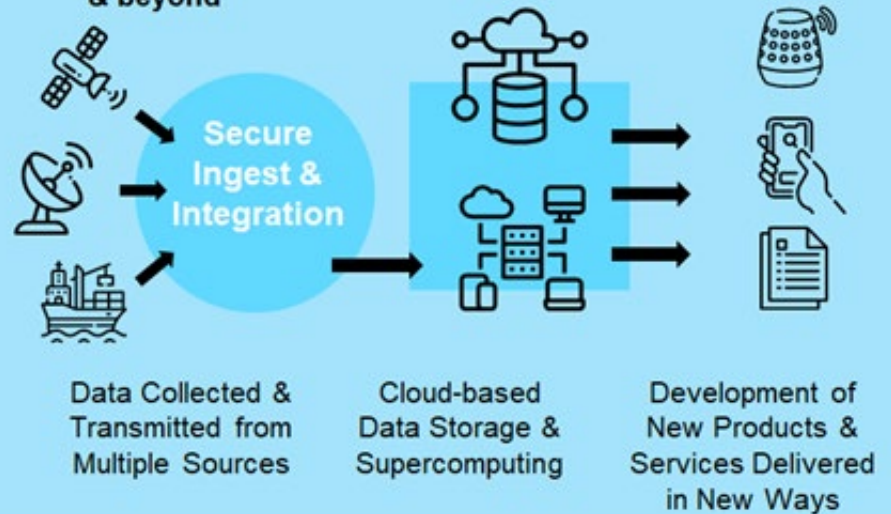
TODAY'S GROUND SERVICE

- Single system data services
- Limited computing power



TOMORROW'S GROUND SERVICE

- Secure ingest for all data types
- Powered by AI, data science
- Super-computing capability through cloud transition & beyond



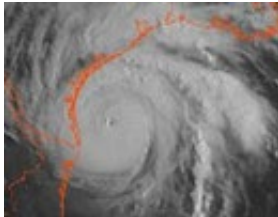
Evolution from GOES-R to GeoXO – 1

Growing needs require new observations

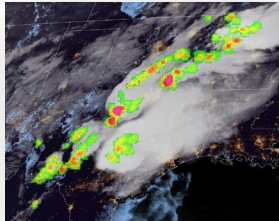
GOES-R provides **Visible/Infrared Imagery** and **Lightning** data:

- Essential for short-range forecasting, issuing severe weather watches and warnings, and monitoring hazardous environmental conditions including tropical storms, severe storms, damaging winds, snow, ice, flooding, fog, fires, smoke, and volcanic ash

Vis/Near-IR Imagery



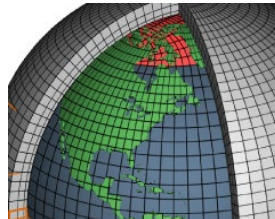
Lightning Mapping



GeoXO will continue and improve **Imagery** and **Lightning** data and add new observations:

- **Hyperspectral IR Sounder** for numerical weather prediction and local nowcasting
- **Ocean Color Instrument** for monitoring dynamic coast/ocean features, ecosystem change, water quality, and hazards
- **Atmospheric Composition Instrument** for monitoring air quality and the linkage between air quality, weather, and climate

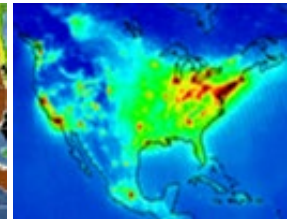
IR Sounding



Ocean Color



Atmo. Composition



Recommended GEO-XO Architecture

(Preliminary, pending program approval)



GEO-West
Vis/IR Imager
Lightning Mapper
Ocean Color
Space Wx Suite*

On-orbit Storage
105°W



GEO-Central
Hyperspectral IR Sounder
Atmospheric Composition
Partner Payload



GEO-East
Vis/IR Imager
Lightning Mapper
Ocean Color
Space Wx Suite*



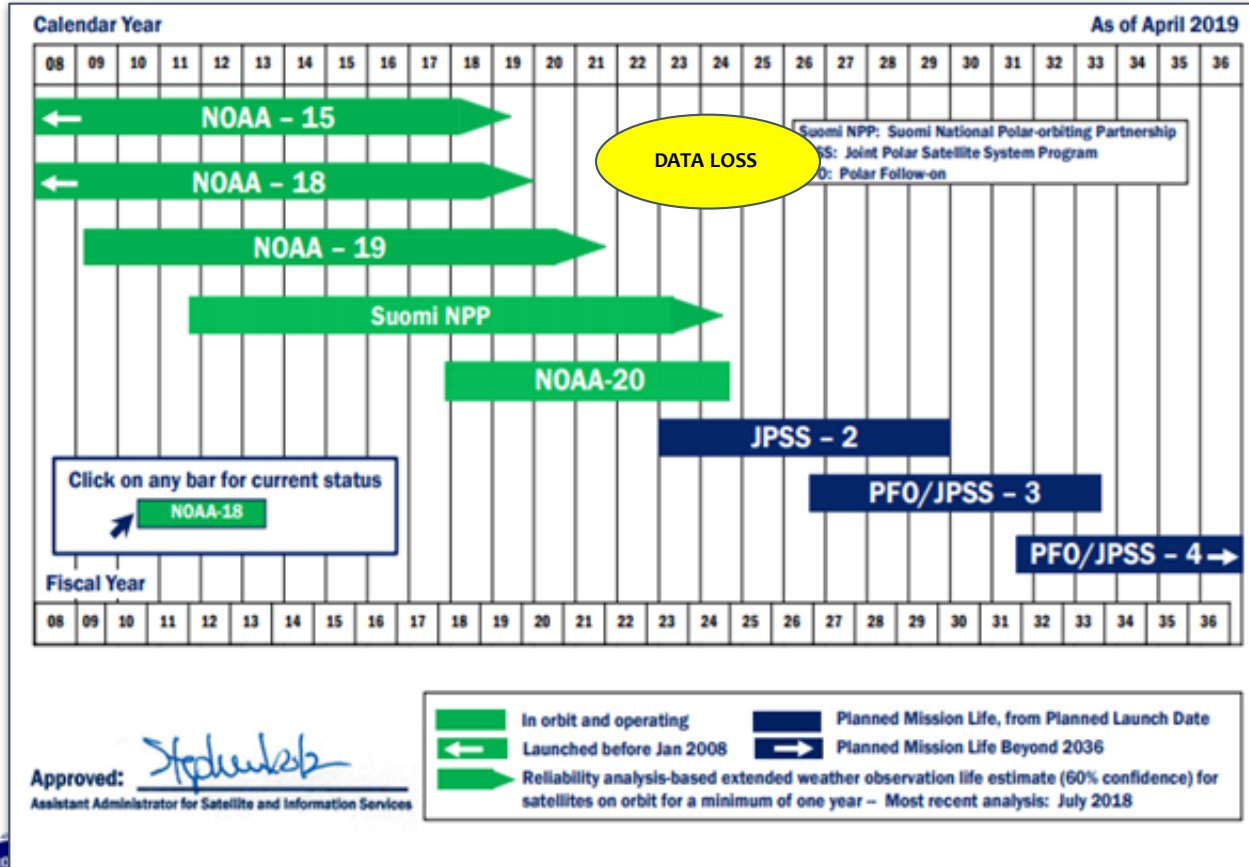
NOAA Satellite Operations
Facility, Suitland MD
Command and Data Acq.
Station Wallops VA



Consolidated
Backup Unit,
Fairmont WV

*GEO-East and West will also carry
Space Weather Program-provided
Solar and In Situ instruments.

Continuity and Improvement in LEO Observations



Legacy POES (NOAA-15, -18, -19) are not baseline requirements for NOAA, but continue to provide useful observations for NWP.

DMSP is a baseline national asset, but DOD does not plan to replace all observations with their new programs.

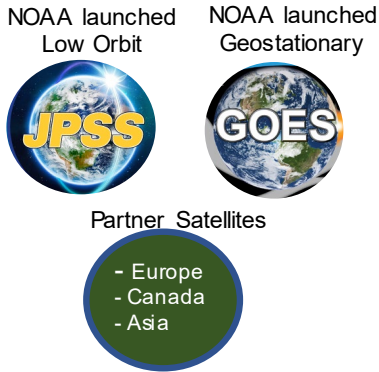
NOAA will lose all these observations by the mid-2020s.

Critical replacement sounding data is needed at that time to maintain performance and more to improve NWP forecasts

NWP improvements are reliant on increased atmospheric and environmental data sets, arguing for enhanced LEO observational data set.

Joint Venture – Leveraging Partnerships

Current



2030-2050



Enterprise Architecture

- Partially disaggregated Low Orbit
- Mixed US government Geostationary
- Partner Satellites
- Mixed resolution, update rates
- NOAA launched, rideshare, and payload
- Data buys

Joint Venture

Leverage capabilities being developed by other federal partners & industry - to provide high return on funds

- Exploit partner data
- Exploit partner technologies
- Partner to supplement other agencies' initiatives to meet NOAA needs
- Initial Concept Development to operationalize new data & technology





Commercial Data

- Commercial Weather Data Pilot Round 2 completed Spring 2020: Demonstrated readiness of commercial sector to provide RO data operationally
- Two-year contracts awarded in November 2020 to GeoOptics and Spire Global for RO data for operational use, with specific data Delivery Orders released one at a time
- Use of commercial data in operational NWP models in May 2021
- New RFP was released for RO commercial data with near-real-time access to NWP Centers



Other news

- New funding for the NOAA Climate Data Program
- Demonstrated reprocessing JPSS data in the NESDIS Cloud
- New Field Terminal Support (Direct Broadcast) portal
 - Field Terminal Support (FTS) provides NOAA's S-NPP and JPSS Direct Broadcast (DB) users with Mission Data (ancillary and auxiliary), software (ADL-Algorithm Development Library), mission notices, and documentation through a web portal

<https://fieldterminal.nesdis.noaa.gov>

