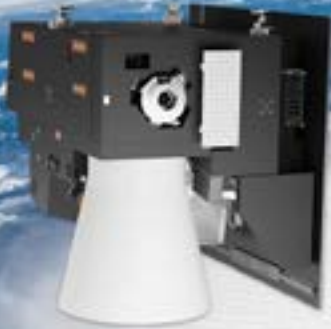


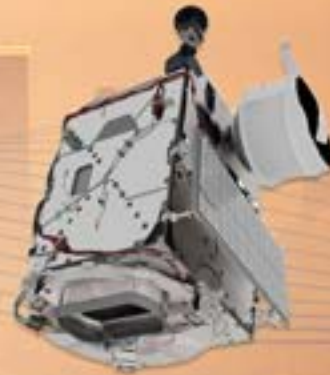
Geostationary Extended Observations (GeoXO)

NOAA's GeoXO program will enhance forecasting technologies, strengthening the security and economic resilience of our Nation. This advancement will support forecasters, emergency managers, and safeguard public health, ultimately driving significant economic benefits.



GeoXO Sounder (GXS)

Atmospheric Composition Instrument (ACX)



Ocean Color Instrument (OCX)



Overview

NOAA's GeoXO satellite system expands observations beyond the current GOES-R Series, adding powerful new measurements that will drive economic and societal benefits into the 2050s. When deciding on GeoXO instrumentation, NOAA considered whether required observations 1) could be provided commercially from a domestic or foreign source; 2) should be gathered from geostationary orbit; or, 3) was technologically ready for development.

BAE Systems was selected to develop the Atmospheric Composition (ACX), Ocean Color (OCX) and GeoXO Sounder (GXS) instruments. These advanced hyperspectral instruments will provide measurements every 1-2 hours, improving forecast models while providing more accurate warnings and alerts related to severe weather events, air quality and harmful algal blooms (HABs). More frequent, high-resolution observations will equip decision-makers and first responders with more time to prepare for events.

GeoXO Sounder (GXS)

GXS will use hyperspectral infrared sounding to provide real-time information about the vertical distribution of atmospheric moisture, temperature and winds over the Western Hemisphere. GXS data will enable a significant leap forward in forecasting severe storms like tornados due to its high resolution and rapid refresh rate.¹ GXS sounding data is expected to improve sensing rates ten-fold over current observations, decreasing weather prediction error over the U.S. and significantly improving regional weather forecast accuracy.

Atmospheric Composition (ACX)

The ACX instrument is a hyperspectral spectrometer that will provide continuous observations of air quality that can be harmful to vulnerable populations like the elderly and children.² ACX will support wildfire management by monitoring smoke movement help farmers protect their crops, and assess pollution emissions transported from beyond our Nation's borders.¹

Ocean Color (OCX)

The OCX instrument is a hyperspectral imager designed to detect changes in water conditions, monitoring America's coastlines and providing data that supports the commercial fishing, tourism and coastal recreation industries.¹ OCX will help state and local managers reduce unnecessary beach and fishery closures associated with harmful algal blooms, saving billions in lost economic output.¹ OCX data has tremendous value for U.S. Navy and U.S. Coast Guard operations around our Nation's coasts.³

GeoXO Benefits

GXS

- Airlines: GXS data will help reduce weather-related airline delays with more accurate forecasts. Economic impact studies show that GXS data could save the airline industry \$2B annually by providing wind shear, icing and turbulence data that would reduce delays.⁴
- Hurricane Forecast: Improved information on hurricane position and intensity can help reduce unnecessary evacuations by increasing forecast accuracy and certainty. Studies have shown that the 50% increase in forecast accuracy between 2007 and 2020 saved an estimated \$5B per hurricane.⁵

ACX

- Wildfires: Hourly observations of wildfire behavior and more accurate predictions of downwind smoke movement can help protect first responders and nearby communities from the adverse impacts of wildfire smoke.¹
- Agriculture: A U.S. Department of Agriculture study found current ozone levels show relative crop yield losses to ozone pollution ranged 20-30% in the U.S. over the past four decades.⁶ ACX data will enable smart agriculture.

OCX

- Battlespace Awareness: Water clarity is essential for a variety of military applications, including diver visibility,⁷ mine warfare,⁸ UUV operations, optical communications,⁹ anti-sub,¹⁰ and salvage operations.¹¹ OCX will have tremendous value for U.S. Navy operations within the instrument's field of view.
- Tourism: According to NOAA, ocean-based tourism contributes approximately \$143B in GDP to the national economy every year and accounts for almost 2.5M jobs.¹² HABs and Red Tide events can result in significant economic losses and damages to coastal industries like fishing, ocean recreation and tourism. OCX will increase the accuracy and precision of HAB forecasts, reducing unnecessary beach closures and fishing restrictions.

(1) Adkins J. 2022. (2) Sunyer J, Esnaola M, Alvarez-Pedrerol M, et al. 2015. (3) Oceanography and Mine Warfare.; 2000. (4) Adkins J, Alsheimer F, Ardanuy P, et al. 2023. (5) NBER. 2024. (6) Liu X, Desai AR. 2021. (7) Lee Z, Shang S, Hu C, et al. 2015. (8) Oceanography and Mine Warfare.; 2000. (9) Smart JH. 2006. (10) Liu Q, Liu D, Zhu X, et al. 2020. (11) Lindsey DT, Nam S, Miller SD. 2018. (12) Office for Coastal Management Digital Coast, 2018.