Geostationary Extended Operations Sounder Instrument

National Aeronautics and Space Administration

The National Oceanic and Atmospheric Administration (NOAA) currently flies sounders on polar-orbiting satellites that orbit from pole to pole and fly over an area once a day. Those instruments do not provide the nearly constant eye of geostationary spacecraft. Although NOAA flew multispectral sounders on an earlier generation of Geostationary Operational Environmental Satellites (GOES), the U.S. has not yet flown a hyperspectral infrared sounder in geostationary orbit. The legacy GOES sounders had only 18 spectral bands, while the next generation would have over 1,550 bands.

The GeoXO Sounder (GXS) instrument will be able to obtain temperature and humidity information about a column of the atmosphere from the tropopause to the surface from a geostationary orbit. It will also provide forecasters insight into the behavior of the atmosphere where weather happens and will help make better forecasts. This includes estimates of atmospheric instability to better forecast the locations of convection.

When

The GeoXO Acquisition Strategy Meeting (ASM) was conducted on November 16, 2021, for the GeoXO Program as required by NPR 7120.5, NASA Space Flight Program and Project Management Requirements.

Based on the scope, projected funding, resources, and timelines associated with the GeoXO Program documented in the briefing charts presented on November 16, 2021, the acquisition strategy, including the major acquisitions was approved on December 9, 2021, by the NASA Goddard Space Flight Center Director, NASA Headquarters Science Mission Directorate, Associate Administrator, and the NOAA Satellite and Information Services Assistant Director.

The GeoXO Series has a potential for six satellite launches with the GXS instrument scheduled to be launched on the third and fifth launches. The current launch date for the central location satellites, carrying the GXS instruments, are October 2035 (third GeoXO launch) and November 2040 (fifth GeoXO launch) for the second GXS. The GXS Instrument Contract requires 15 years of post-launch support.

Who/Where

Geostationary Extended Observations (GeoXO) is NOAA's sixth generation GEO satellites, providing observational continuity following the GOES-R series that will improve observations for weather forecasting over the Western Hemisphere. It will extend observations to ocean and atmospheric monitoring as a series of six satellites, operated in a constellation of three.

EAST AND WEST LOCATIONS

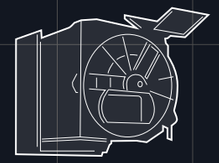
IMAGER (GXI)
Real-time, high-resolution visible and infrared imagery for monitoring Earth's weather, oceans, and environment.

LIGHTNING MAPPER (LMX)
Lightning detection to analyze severe storms, predict the intensity of hurricanes, respond to wildfires, estimate precipitation, and mitigate aviation hazards.

OCEAN COLOR (OCX)
Measurements of the biology, chemistry, and ecology of the ocean to better monitor fisheries and protected species populations, track ocean pollution, and analyze ecosystem change, coastal and inland water quality, and hazards like harmful algal blooms.

CENTER LOCATION

SOUNDER (GXS)
Real-time information about the vertical distribution of atmospheric moisture, winds, and temperature for better numerical weather prediction and forecasts for short-term severe weather.



ATMOSPHERIC COMPOSITION (ACX)
Observations of air pollutants to improve air quality monitoring and mitigate health impacts from severe pollution and smoke events.

PARTNER PAYLOAD INSTRUMENTS
This constellation can also accommodate a partner payload on the spacecraft flying in the central location.

GXS is the hyperspectral sounder and is a new instrument for the GeoXO Program. It will provide sounding observations of the western hemisphere for the first time, with critical information on the spatial and temporal gradients of atmospheric temperature and water vapor which will be fed into numerical weather prediction models run by National Weather Service and Oceanic and Atmospheric Research (OAR). GeoXO is a collaborative mission between NOAA and NASA. NASA is managing the development of the satellites and will launch them for NOAA, which will operate them and deliver data to users worldwide. GXS is among the suite of instruments to be flown on the GeoXO Satellites. BAE Systems will design and build the GXS instrument.

Why

The mission of NOAA is to provide daily weather forecasts, severe storm warnings, climate monitoring to fisheries management, coastal restoration, and the support of marine commerce. NOAA's products and services support economic vitality and affect more than one-third of America's gross domestic product. The GXS instrument further complements the suite of instruments by providing real-time information about the vertical distribution of atmospheric moisture, winds, and temperature. GXS will provide real-time data of the troposphere (the lowest level of the atmosphere where weather occurs), at a much higher frequency than current methods.

Image of a harmful algal bloom in Lake Erie as seen from the NOAA/NASA Suomi-NPP satellite on August 16, 2015. The Ocean Color Instrument on GeoXO will overcome the limitations of low-Earth orbiting satellites whose observations are often affected by cloud cover and sunglint.

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NASA

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NASA Office of Procurement
// Geostationary Extended Operations Sounder Instrument

How

On April 30, 2021, Goddard's Office of Procurement released a Request for Proposal (RFP) under full and open competition for a definition-phase study of the GeoXO GXS instrument. Two proposals were received and both offerors were awarded a firm-fixed-price contract for the 22-month definition phase for the GXS instrument.

Following the definition phase, a full and open competition was conducted for the design, development, launch and post launch support for the GXS instrument. The RFP was released in February 2023. Two proposals were received for the acquisition and following proposal evaluations, in September 2023, BAE Systems was selected and awarded the GXS Cost Plus Award Fee Phase B, C Contract.

BAE SYSTEMS