Instruments

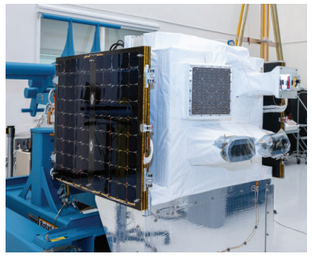
GXS, ACX and OCX

The Geostationary Extended Observatories (GeoXO) satellite system will replace the existing Geostationary Operational Environmental Satellite (GOES) system and provide more detailed observations and more precise tracking of our weather, oceans and climate.

BAE Systems was selected to develop the GeoXO Sounder (GXS), Atmospheric Composition (ACX), and Ocean Color (OCX) 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), and other environmental hazards.

Our innovative instrument design leverages advancements in component technologies like large-format focal plane arrays and builds on the success of current UV/VIS geostationary grating spectrometers (TEMPO, GEMS) and low-Earth-orbit LWIR grating spectrometers to enable a proven and reliable design.



MethaneSAT

Launched in 2024, MethaneSAT is designed to locate and precisely measure methane emissions around the world with a precision and at a scale never before achieved, giving decision makers a new ability to track, quantify and reduce emissions.

A 200-kilometer view path coupled with high-resolution sensors makes MethaneSAT unique from other methane monitoring satellites. It monitors regions with high oil and gas production, as well as emissions from industrial agriculture and other human-made methane sources.

BAE Systems designed and built MethaneSAT's high-performance instrument and provided flight system integration, testing and launch support.

Images (Top to Bottom): GeoXO satellite renderings; MethaneSAT rendering; MethaneSAT preparations for solar array testing.

Advancing Earth Science

BAE Systems is dedicated to advancing the future of Earth Science to solve important problems for the nation. We are currently developing and maturing various technologies that fill important data gaps and help to lower program costs. These technologies include:

Airborne Initiative

Through our airborne initiative, we design, build and demonstrate innovative remote sensing technologies for airborne platforms, providing the science community with new measurement capabilities for a variety of applications, from vector winds and methane to soil moisture and sea surface temperature.

Miniaturized Science Instruments

Our close collaboration with the science community enables us to design systems that optimize science return within platform and cost constraints. For example, we built the Compact Infrared Radiometer in Space (CIRiS) instrument for integration on a cubesat platform as part of NASA's In-Space Validation of Earth Science Technologies (InVEST) program. CIRiS aimed to demonstrate and validate the ability of miniaturized science instruments to effectively deliver highly-calibrated, scientifically-significant data while also reducing overall costs.

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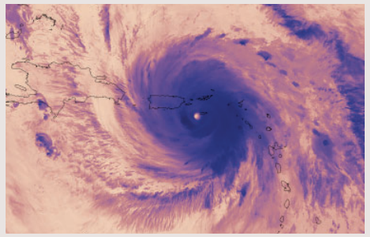
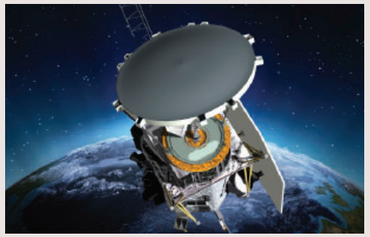
BAE SYSTEMS

Weather & Environment

For decades, BAE Systems has designed and built innovative remote sensing instruments, spacecraft and systems that support actionable environmental intelligence. From enabling more accurate weather forecasts to delivering insightful observations of our planet, we provide decision makers the information they need to protect lives and property.

Spacecraft

Images (Left to Right): JPSS-1; Hurricane Maria captured by Suomi-NPP; WSF-M

BAE Systems offers cost-effective spacecraft solutions that deliver the reliability and performance needed to ensure mission success. These options span from standard spacecraft products to custom solutions. No matter which option you choose, our spacecraft offer modular configurations, adaptive manufacturing processes, and experience-backed dependability to increase affordability and maximize performance.

JPSS-1

The Joint Polar Satellite System-1 (JPSS-1), which launched Nov. 18, 2017 is a NOAA polar orbiting weather and environmental satellite, collects critical data for weather forecasting.Data collected from JPSS-1 (known as NOAA-20) increases the timeliness and accuracy of forecasts three to seven days in advance of severe weather events, enabling emergency managers to make timely decisions to protect lives and property.

BAE Systems designed and built the JPSS-1 spacecraft and Ozone Mapping and Profile Suite instrument (OMPS), integrated all five of the satellite's instruments, performed satellite level testing and provided launch support.

SUOMI-NPP

The Suomi National Polar-orbiting Partnership (Suomi-NPP) mission served as the primary polar-orbiting spacecraft for NOAA's operational weather forecasting mission from 2014 to 2018 (when replaced by NOAA-20), collecting critical data on Earth's atmosphere, oceans and land surface.

BAE Systems designed and built the Suomi-NPP spacecraft and OMPS instrument, integrated all five of its instruments, performed satellite-level testing and provided launch support. We are currently under contract for continued spacecraft operations.

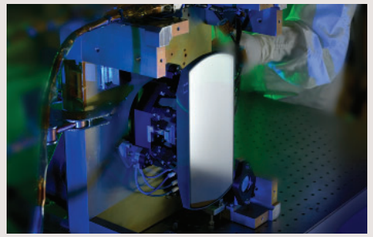
WSF-M

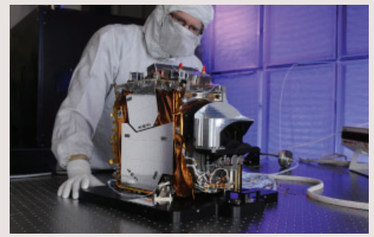
Launched in 2024, Weather System Follow-on - Microwave (WSF-M) is the Department of Defense's next-generation operational environmental satellite system. The mission will improve weather forecasting over maritime regions by taking global measurements of the atmosphere and ocean surface. The mission is designed to specifically address three high-priority space-based environmental monitoring (SBEM) requirements: ocean surface vector winds; tropical cyclone intensity; and LEO energetic charged particle characterization, a space weather gap. The design characteristics of the WSF-M microwave sensor, including a large 1.8 meter antenna, will also enable mitigation of three more SBEM gaps, sea ice characterization, soil moisture and snow depth.

BAE Systems is the prime contractor for the WSF-M mission, responsible for developing and integrating the entire microwave system, including the instrument, spacecraft and ground system software.

Instruments

Images (Left to Right): TEMPO optic; OLI-1; OMPS Nadir Sensor





From air quality and precipitation to ozone and clouds, our reliable and affordable instruments are helping scientists track Earth's weather and climate trends like never before. Spanning the electromagnetic spectrum, our instruments fly on both airborne and space-based platforms and support a wide-range of Earth-sensing missions.

TEMPO & GEMS

NASA's Tropospheric Emissions: Monitoring of Pollution (TEMPO) mission is revolutionizing our understanding of air quality, providing space-based hourly measurements of major air pollutants across North America for the first time. BAE Systems built TEMPO's spectrometer and telescope using a two-axis scan mirror. TEMPO is the first BAE Systems instrument to be hosted on a geostationary communications satellite.

In tandem with TEMPO, BAE Systems built the Geostationary Environmental Monitoring Spectrometer (GEMS), a joint development effort by BAE Systems and the Korea Aerospace Research Institute (KARI), South Korea. Launched in February 2020, GEMS is the Asian element of a global air quality monitoring capability that includes TEMPO.

GEMS and TEMPO are the first hyperspectral spectrometers to fly in geostationary orbit.

LANDSAT

The Landsat program, a series of satellites jointly managed by NASA and the U.S. Geological Survey, provides the longest continuous space-based record of Earth's surface unmatched in quality, detail and coverage.

BAE Systems is helping to continue this record with the Operational Land Imager (OLI), a multispectral imaging instrument that enables better spatial resolution and greater sensitivity to brightness and color than any previous Landsat mission. We built the OLI-1 for Landsat 8 and OLI-2 for Landsat 9. Additionally, we contributed the cryocooler for the Thermal Infrared Sensor-1 (TIRS-1) for Landsat 8 and the TIRS-2 cryocooler for Landsat 9.

BAE Systems also leveraged our Landsat heritage to develop a next-generation imaging instruments applicable to a wide variety of NASA missions.

OMPS

OMPS measures the global distribution and vertical structure of Earth's ozone layer, continuing the nation's more than 40-year record of total-ozone and ozone-profile observations. OMPS is currently flying aboard the NOAA-21, NOAA-20 and Suomi NPP satellites.

BAE Systems designed, built and tested all three OMPS instruments, as well as supported instrument integration on Suomi NPP, NOAA-20, and NOAA-21 satellites. As a result of our success on the first two OMPS builds, we received sole-source contracts from NASA to build OMPS instruments for all the next JPSS missions (JPSS-2, JPSS-3 and JPSS-4).

OMPS builds on our heritage of developing ozone monitoring instruments for NOAA and NASA. We built nine Solar Backscatter Ultraviolet Radiometers, which helped to confirm the existence of the ozone hole above Antarctica in 1987.