

ADVANCEMENTS IN WEATHER SATELLITES

BY DAVID HARARY



VARYSIAN



Advancements in weather satellites

The latest weather satellites herald a new era in weather forecasting

For decades, instruments onboard Earth-orbiting satellites have given scientists unparalleled data on our atmospheric and Earth systems.

As remote sensing tools become more sophisticated, so too does the demand for environmental intelligence. Climate change and environmental degradation threaten economic and societal systems and this will only continue to worsen in the coming years. Fortunately, new innovations in both remote sensing and space technologies enable scientists and policymakers to predict, forecast and respond to environmental crises with greater accuracy and precision than ever before.

New tools onboard the National Oceanic and Atmospheric Administration's (NOAA) latest tranche of environmental satellites are several times more technologically advanced than any previous generation.

A new era in weather prediction

The agency's first launch of a GOES-R series satellite in 2016 represented a new era in weather prediction. Its advanced baseline imager (ABI) is able to scan the Earth five times faster with four times the resolution and three times the number of channels than any previous geostationary operational environmental satellite (GOES).

Every 30 seconds, new images of storms and hurricanes in the Western Hemisphere can be downloaded by any user in any country. The data's timeliness and clarity allows GOES-R to be a game changer for environmental intelligence.

The mission set for these satellites is also quite broad. From tracking severe weather and monitoring fog for aviators to scanning for brush and forest fires, GOES-R's ABI takes operational weather forecasting to the next level. That's good news for emergency responders, who rely on up-to-the-minute data that is tailored to their unique mission to save lives.

Meanwhile, climate change continues to worsen and increase the frequency of extreme weather and storms. In the face of that challenge, mitigating disasters becomes far easier for

governments, businesses and NGOs when they are given the foresight needed to prepare, respond and rescue.

The NOAA GeoXO satellite system

NOAA most recently announced its development of a new generation of geostationary weather satellites that will succeed GOES-R through to 2055. NOAA's Geostationary Extended Observations (GeoXO) satellite system will bring a suite of new capabilities to address the extraordinary environmental challenges to come in an unprecedented era of climate change.

GeoXO will allow users to customise the way they access data and usable environmental information. Users will have the option to choose from multiple data delivery systems, such as an internet storefront, mobile device access and satellite broadcast. NOAA also plans to build on the successes of the ABI by acquiring new instruments that provide more detailed observations and higher resolution tracking of severe weather.

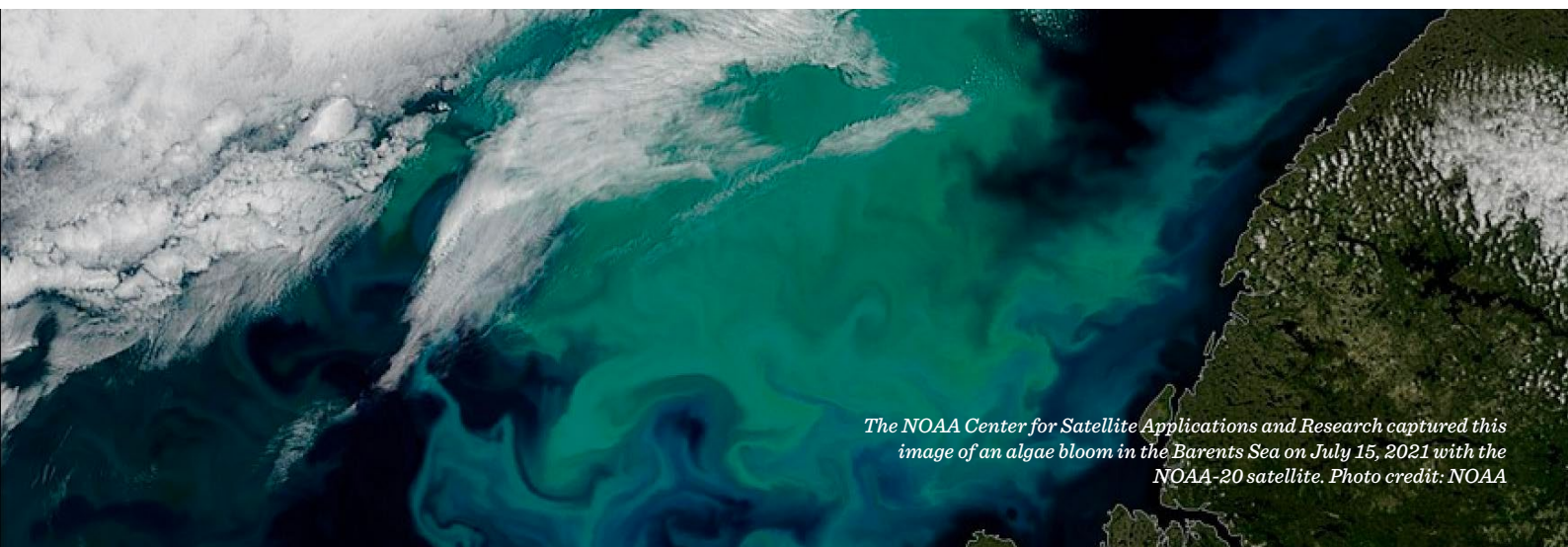
For example, GeoXO will detect wildfires four times smaller than before, which NOAA hopes can increase lead time to respond before the flames get out of control. In addition, an onboard infrared sounder will provide users with real-time data about the vertical distribution of atmospheric temperature and water vapour.

With these data in tow, advanced numerical weather prediction models will help improve forecasting of storms and extreme weather events.

Environmental monitoring satellites have become a critical tool to predict and prepare for the consequences of climate change. Newly innovative sensors and instruments come at a particularly opportune time when the need for sophisticated and timely data is high.

These satellites need to be a part of the equation to address the major environmental, economic and security challenges that have arisen during climate change.

Author: David Harary, Executive Director of the US think tank Center for Development and Strategy



The NOAA Center for Satellite Applications and Research captured this image of an algae bloom in the Barents Sea on July 15, 2021 with the NOAA-20 satellite. Photo credit: NOAA