A Heritage of Innovative Space Solutions

For decades, BAE Systems has delivered innovative space solutions to meet the needs of the nation's most challenging problems. As a spacecraft, payload and ground systems developer, we have a unique understanding of instrument integration and experience delivering end-to-end systems. Our mission systems expertise translates into a proven ability to fulfill the most challenging customer requirements. BAE Systems instruments, sensors and spacecraft lead the industry in performance and value.







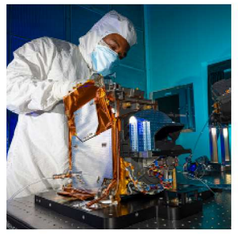
OPIR – BAE Systems is developing sensors for the U.S. Space Force's next-generation missile warning system, Overhead Persistent Infrared (OPIR). A watchful eye in the sky from geosynchronous and polar orbits, these sensors will provide greater coverage and a clearer view for detecting and tracking missile attacks.



TEMPO – BAE Systems built the spectrometer and telescope for NASA's Tropospheric Emissions: Monitoring of Pollution (TEMPO) instrument, which is tracking pollution at micro-urban scales, with measurements made every daylight hour, improving air quality prediction accuracy by an expected 50 percent.



GEMS – In tandem with TEMPO, BAE Systems produced the Geostationary Environmental Monitoring Spectrometer (GEMS), a joint development effort with the Korea Aerospace Research Institute (KARI), South Korea. The two instruments share much of the same technology, resulting in design and production efficiencies.



OMPS – BAE Systems designed, built, and tested all three Ozone Mapping and Profiler Suite (OMPS) instruments that are currently in orbit. In addition to monitoring ozone, OMPS is capable of measuring and tracking other atmospheric constituents, including ash and sulfur dioxide from volcanoes, smoke clouds and dust.



Landsat – BAE Systems delivered the Operational Land Imager (OLI) for Landsat 8, which launched in 2013, and OLI-2 for Landsat 9, which launched in 2021. The OLI instruments provide 15-meter (49 ft) panchromatic and 30-meter (98 ft) multi-spectral spatial resolutions along a 185 km (115 miles) wide swath, allowing the entire globe to be imaged every 16 days. Landsat imagery provides crucial, objective data needed for post wildfire impact assessments.

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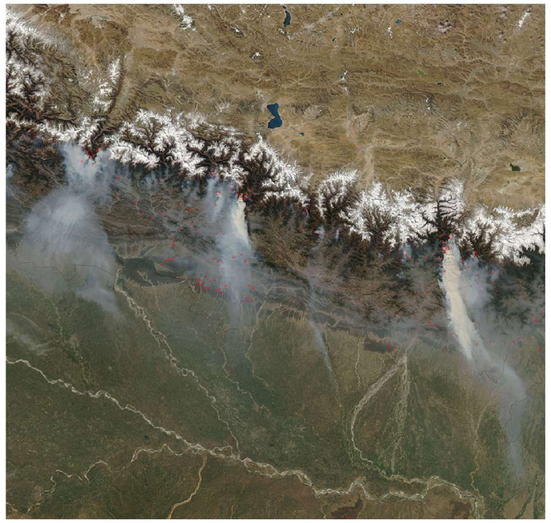
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Wildfire Early Detection & Tracking System

Since the 1980s, the impacts of wildfires have grown considerably—from total burned area to the annual cost of fighting fires to the effect on air quality. Climate projections indicate the wildfire problem will only get worse, with longer lasting and more intense fire seasons. Mitigating impact to lives, property and the economy will require a multi-pronged approach. When countering any national security threat, early detection is the first step. BAE Systems has the capabilities to deliver a space-based system that can provide essential data for early warning, tracking and mitigation of wildfires.

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Existing Capability Gaps

Wildfires are a threat to our national security. As such, this problem requires an integrated, operational approach, leveraging traditional geospatial intelligence (GEOINT) methodologies to provide leaders the actionable information they need to make decisions and mitigate disaster. The first element of such an approach is the early warning element to "tip and cue" wildfire managers and decision makers to the actual threat before it is able to grow into a destructive event.

Existing space-based observing systems provide some insight into wildfire initiation and movement on a broad scale, but there are key information gaps to early mitigation. For example, data updates from existing systems are provided every 10 - 15 minutes and at a ground resolution of 2 x 2 km. Fires can change direction in a matter of seconds and spread quickly. Therefore, detecting, tracking and mapping wildfires in near-real-time and with high spatial and temporal resolution and geolocation accuracy is essential to quickly and efficiently keep our communities safe.

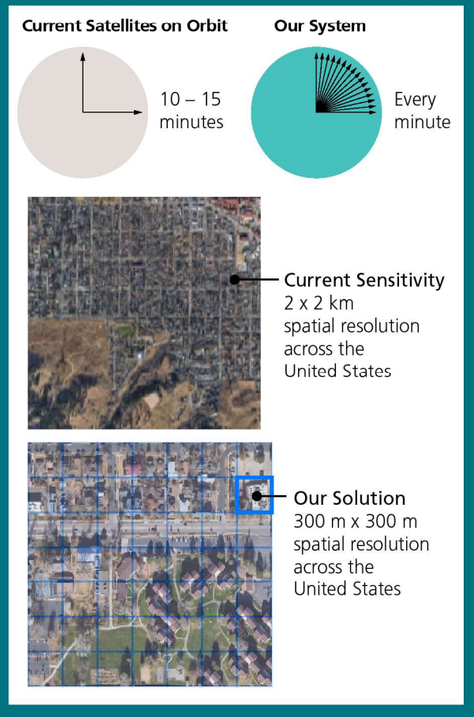
Quick Facts

Wildfire Impacts

The devastating impacts of wildfires on lives, property and our economy and have only worsened with time.

- Between 1990-2015, the number of homes in wildfire prone areas grew by 32 million, with an additional 59 million homes in close proximity (<1 km) to wildfire prone areas.
- The federal government spends >$2B each year fighting fires with indirect impacts to infrastructure and communities up to 30x that amount.
- Megafires, defined by devasting more than 100,000 acres of land, have increased in frequency 3-4x since the 1980s. Since 2000, it has resulted in >$76B in losses.

Existing Capabilities vs. Our System

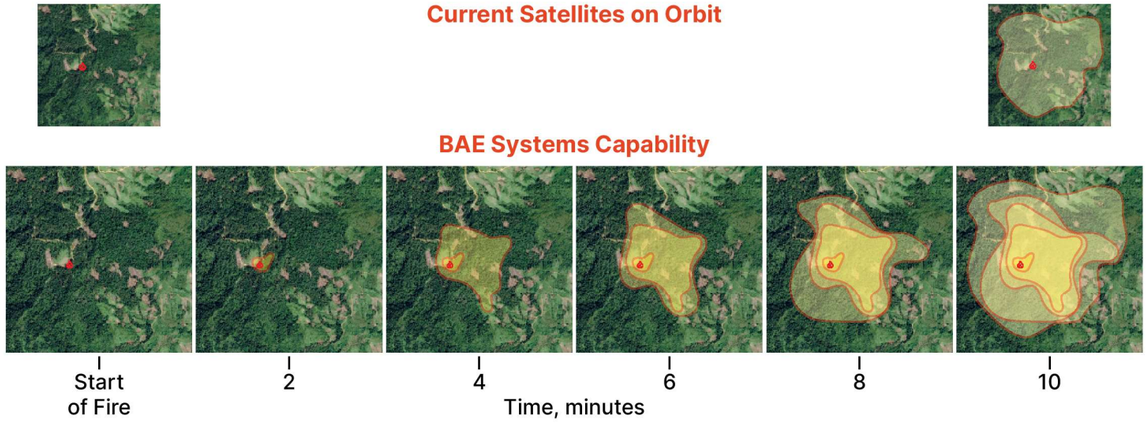


The Need for an Early Warning System

With expertise in developing advanced GEOINT systems, we can deliver a space-based wildfire detection capability that could acquire data every minute over the continental U.S., providing near-real-time updates. With a ground resolution of about 300 x 300m, this system could also detect fires about the size of a compact car, allowing easier spotting of fires before they grow out of control and capture details of the fire frontline as it moves.

This capability could be integrated into a comprehensive operational wildfire management system, working in tandem with existing commercial, local and science-based assets. For example, our system could spot a new fire quickly, which would then cue NASA, other government and commercial LEO satellites, aircraft and drone deployment to the area to provide complimentary contextual information (i.e., fire structure, typography, fuel conditions, etc.), in addition to providing actionable data for wildfire modeling and prediction tools. Together, this data would give decision makers earlier warning for fires that threaten people, homes and critical infrastructure, enabling them to quickly respond. More precise fire behavior data will help protect more than 60,000 wildland urban interface communities in the U.S. that are at risk of wildfires.

BAE Systems is uniquely qualified to contribute to an integrated solution, merging our expertise in developing Earth observing systems for NASA, NOAA and USGS with advanced GEOINT technologies designed for the military.

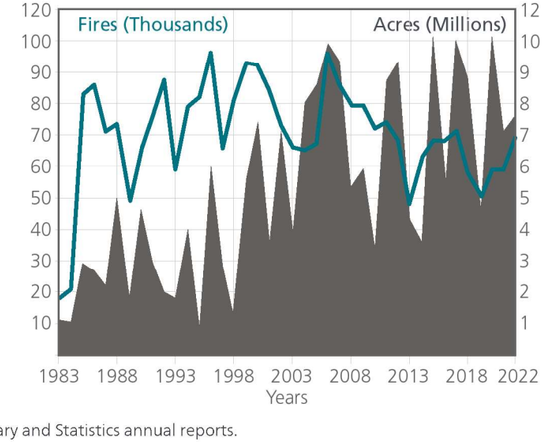


Wildfires can spread and change trajectory in minutes. The top row shows the resolution and time scale (10 - 15 minutes) with which current satellites can track a fire. In comparison, the bottom row demonstrates the difference our system could provide, delivering updates every minute at a 300x300 m resolution. Over the time span of ten minutes, the amount of spread is significant, and the data missing in those gaps between images could cost precious time for effective mitigation.

Top Five Years with Largest Wildfire Acreage Burned



Annual Wildfires and Acres Burned



Source: NICC Wildland Fire Summary and Statistics annual reports.