# Wildland Fire Sensors at the Urban Interface

 **Science and Technology**

## WILDLAND FIRE SENSOR ADVANCEMENTS

Wildfires across the U.S. and around the world are becoming more frequent, costly, and dangerous. Risk factors include urban sprawl into previously undeveloped lands prone to wildfires and climate change hazards, necessitating technical innovations to assist firefighters on the front lines and keep our communities safe and resilient.

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) is working with TechNexus and the Virginia Innovation Partnership Corporation to guide the development of a suite of sensors, platforms, and other early wildfire detection technologies to assist the Federal Emergency Management Agency and state and local emergency management partners.

## LAB TESTING FIRE SENSING TECHNOLOGY



*(Photo: Santa Barbara County Fire Department, c. 2017)*

S&T's industry performers made enhancements to their sensor technology designs based upon initial testing—laboratory-controlled burns were performed in repeatable and adjustable environments to evaluate different characteristics (e.g., ignition, flaming, smoldering, humidity, wind speeds, smoke concentrations, particulates, etc.) and combinations of the factors.

Prior to field testing, extensive modeling was performed to define and understand the level of smoke composition and particulate matter at varying distances and wind speeds.

## CONTROLLED FIELD TEST AND EVALUATION

 Several sensor arrays were deployed in Red Bluff, CA during a prescribed burn with CALFIRE as part of first responder firefighter training. The test was held on The Nature Conservancy's property; more than 1,000 acres burned over a two-day period in June 2021.

Based upon the field test, the next Phase of S&T's research will focus on improving detection algorithms to increase detection speeds; decreasing false positives; hardening devices; applying meteorological sensors (e.g., wind, humidity, temperature), increasing off-grid capabilities through improved battery and solar harvesting techniques; increasing communications backhaul, and improving the graphical user interface. Further field tests and evaluations are planned for Summer 2022 to further refine detection capabilities with additional sensors.



## FIRE SENSOR PERFORMERS

 Breeze Technologies (www.breeze-technologies.de) Breeze specializes in hyperlocal air quality monitoring and analysis through advanced AI, air quality sensor networks, and external data sources.

N5 Sensors, Inc. (www.n5sensors.com) N5 focuses on next-generation sensors for integrated gas and particulate matter detection currently used in industrial and first-responder applications.



## ADDITIONAL COLLABORATORS