**Solution name**: FireWatch - A community-based fire detection and management system

**Solution description**: FireWatch is a web-based platform that leverages satellite data, crowdsourced information, and machine learning to provide near real-time fire detection, confirmation, and management. FireWatch has three main components:

* [A **fire detection** component that uses ultra real-time (URT) MODIS and VIIRS active fire data from multiple direct readout ground stations in the US and Canada](https://www.cstarsd3s.ucdavis.edu/systems/goes-efd/)[3](https://wiki.earthdata.nasa.gov/pages/viewpage.action?pageId=258343755). [This component also uses the GOES Early Fire Detection (GOES-EFD) system](https://www.cstarsd3s.ucdavis.edu/systems/goes-efd/)[4](https://appliedsciences.nasa.gov/our-impact/news/near-real-time-global-fire-emissions-data-now-available-nasa-disasters-mapping), which utilizes images from geostationary weather satellites to detect new wildfire ignitions and fire intensification in real time.
* A **fire confirmation** component that uses crowdsourced information from local communities, such as photos, videos, reports, and feedback. This component also uses machine learning to verify the authenticity and accuracy of the user-submitted data, and to filter out false positives and noise.
* A **fire management** component that uses near real-time global fire emissions data from the Global Fire Emissions Database (GFED) to provide information on fire behavior and spread, such as fire radiative power, carbon emissions, smoke plumes, and air quality. This component also uses interactive maps, alerts, and notifications to engage local communities in fire management and prevention, such as evacuation, suppression, mitigation, and restoration.

**Solution benefits**: FireWatch aims to provide a comprehensive and reliable solution for managing fire by increasing community-based fire management opportunities. Some of the benefits of FireWatch are:

* It improves the timeliness, reliability, and coverage of fire detection by using multiple sources of satellite data and innovative algorithms.
* It enhances the validation and confirmation of fire detections by using crowdsourced information from local communities and machine learning techniques.
* It provides near real-time information on fire behavior and spread by using global fire emissions data and interactive visualization tools.
* It engages local communities in fire management and prevention by providing alerts, notifications, feedback mechanisms, and educational resources.

**Solution challenges**: FireWatch also faces some challenges and limitations that need to be addressed. Some of the challenges are:

* It depends on the availability and quality of satellite data, which may be affected by cloud cover, sensor resolution, orbital frequency, and data processing delays.
* It relies on the participation and cooperation of local communities, which may vary depending on the level of awareness, trust, motivation, and incentives.
* It requires the development and maintenance of a robust web-based platform that can handle large volumes of data, ensure data security and privacy, and provide a user-friendly interface.

**Solution future work**: FireWatch is a potential solution that can be further improved and expanded in the future. Some of the future work are:

* It can incorporate other sources of data, such as aerial imagery, drone footage, ground sensors, weather data, and social media posts.
* It can apply advanced machine learning techniques, such as deep learning, computer vision, natural language processing, and anomaly detection.
* It can extend its scope to other regions and countries that are prone to wildfires or other types of fires.