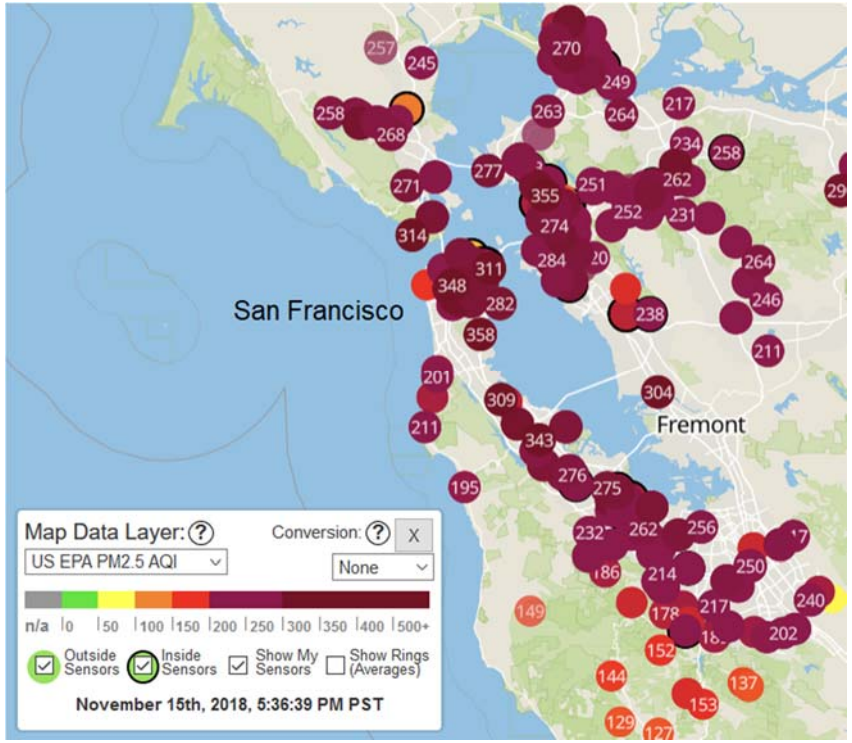
AMFITZGERALD & ASSOCIATES

Newsletters

Commentary, opinions, and insights on all things MEMS.

May 2019: Distributed sensor networks prove their value to public safety

Last November in California, the huge Camp Fire, sparked by electrical power lines and rapidly spread by dry, windy weather, destroyed the town of Paradise, CA. Massive amounts of smoke spread over northern California and covered more than 10 million people with acrid, hazardous air for more than two weeks.



Smoke from the Camp Fire (240 km away!) caused Bay Area air quality to reach hazardous levels on November 15, 2018. Each dot displays the PM2.5 AQI measurement from one sensor unit, color indicates hazard level. (Data from purpleair.com)

As the fire raged, those of us living in the Bay Area quickly learned about two air quality sensor networks, one maintained by the US government (Airnow.gov) and the other, a world-wide network created by volunteers (purpleair.com). The data from these two distributed sensor networks helped Bay Area residents make informed decisions to safeguard health: whether to wear a N95 mask when going outside; whether it was safe to exercise or to let children play outdoors; how long to keep the air filters running inside the house; and how far to drive to find healthier air.

These networks are composed of building-mounted sensor units, maintained by individuals or local government, which

stream data via WiFi to a web-based mapping program. Just a few hundred sensor units, distributed across the Bay Area, were enough to identify significant local variances in the spread of smoke and particles. The Santa Cruz mountains, for example, protected downwind coastal towns, whereas the

Sacramento river delta suffered unprecedented hazardous air quality as smoke stagnated in its wide, low areas.

As climate change and severe weather continues to cause loss of life and billions of dollars in damage, it is clear that more sensor networks would help to keep the public informed about hazardous conditions, such as tornadoes, flooding, wind, etc. As these air quality networks have demonstrated, sensors distributed over a large geographic area, feeding real-time data to maps, can provide very valuable and actionable information.