AUSTRALIAN WILDFIRE INTELLIGENCE COMPANY FIREBALL DELIVERS POWERFUL WILDFIRE DETECTION SYSTEM

Fireball.International, a company based in Peregian, QLD, is using satellites and sensors on towers to detect fires when they are still very small and much easier to extinguish. Fireball's early fire detection system is fusing satellite images with ground-based sensor detections for near-immediate discovery and management of fires. Firefighters can gain control quickly with early and more aggressive attacks.

Under substantial contracts from the State of California and electrical utility companies, the Fireball system is already successfully operating in California. Using the ALERT Wildfire sensor network, Fireball applies powerful machine learning combined with satellite imaging to detect wildland fires early and evaluates their growth.

The satellite used by Fireball detected the Kincade fire in California 66 seconds after a falling power line ignited the fire at 9:24 pm on 23/10/2019. The tower sensors confirmed the alarm within 3 minutes, despite the fact that it was night and the fire was in a canyon, and thus not directly visible to the sensor. The explosive fire growth was so clear from the data that evacuation of a town 10 km away was ordered 20 minutes after ignition. Fire apparatus had not yet worked their way into the fire. Graham Kent of ALERT Wildfire adds: "This marks a stunning improvement in the ability of fire agencies to manage life-threatening emergencies."

Fireball evolved from research into exploding stars conducted at the Siding Springs Observatory in Australia by Breakthrough Prize winner and University of Southern Queensland (USQ) Adjunct Professor Carl Pennypacker. The company's founders also include Dr Tim Ball who has extensive fire research experience as well as Christopher Tylor, Gabrielle Tylor, and Prof Brad Carter from USQ. Collaborating parties are The University of Southern Queensland, the ALERT Wildfire System at the University of Nevada at Reno, the University of California at San Diego (UC San Diego), and the University of California Berkeley (UC Berkeley).

Fireball's technology will incorporate the FUEGO satellite network (Fire Urgency Estimator in Geosynchronous Orbit). Fireball is developing the world's first payload dedicated to detecting fires in real-time. The launch of the first Australian FUEGO payload into geosynchronous orbit is planned for 2024. Fireball will continue to use data from the Himawari, GOES, and Meteosat-EUMETSAT.

Linked with ground-based sensors, Fireball's Fire Information, Assessment and Management System (FIAMS) automatically detects fires while they are still small and manageable. Christopher Tylor, USQ Adjunct Research Fellow and a co-founder of Fireball explains: "Our analytical abilities include satellites, data-driven deep machine learning software trained to detect and confirm fires, and custom sensors that can be installed on towers, allowing us to map

fires with unmatched speed and accuracy. We have the system up and running in California and are ready to implement it at home in Australia."

Tim Ball explains: "The technology is unprecedented and has proven to detect even small fires within minutes, providing critical real-time intelligence for firefighters as fires spread. We are keen to deploy the technology in Australia, given that it can save communities hundreds or thousands of times more than it costs to use." Prof Carl Pennypacker adds: "The data cost pennies to analyse, whereas human life is priceless."

Brad Carter concludes: "We have a working system, but the addition of a satellite designed specifically for early detection is a world-changing development. Fireball's technology is an outstanding example of how maintaining durable support for fundamental scientific research and international collaboration enables universities to stimulate industry."

The implementation of these intelligence systems has had a major positive impact on the way fires are being fought in California. "While Fireball has achieved a multi-million dollar contract for US deployment, we look forward to sharing these changes with Australia", says Gabrielle Tylor. Fireball has already generated strong local interest of Australian stakeholders as a result of the current fire situation and is ready for immediate deployment.

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