Presentation to Latin American fire agencies April 2025 – Spark Operational – a fire simulation tool

Spark Operational (Spark) is a bushfire simulator tool that provides timely, and actionable information to support bushfire response efforts. This presentation will highlight the customisability of Spark.

In a collaborative effort between AFAC and CSIRO’s Data 61, Spark is undergoing development to enhance its existing simulation capability which leverages advanced computational models and extensive data integration. While Spark is available for use across Australia, the simulator is customisable for use outside of Australia and has garnered interest from the United States, France, and New Zealand.

To create bushfire simulations, Spark uses weather, fuels, and terrain data to assist in the simulation of bushfire paths using fire behaviour models. Currently the fire behaviour models are based on Australian fuels and conditions, but work is being done to incorporate overseas models, such a the Rothermel fire spread model.

The whole principle of Spark Operational is to assist Incident Management Teams with the best way to respond to bushfire threat. The visual outputs that it provides are used to produce warnings that are shared with the public to assist with evacuations and other emergency orders. This has been shown to reduce the impact to human lives.

Spark is also in development to provide risk profiling across the landscape. This involves creating a grid of ignition points across a given landscape and running a simulation that ignites all points and shows areas that are at high risk of impact from wildfire. This will assist in identifying vulnerable areas and enable changes to building standards, preseason preparation and creating evacuation plans.