

3-D aerial maps help Australian fire ground recovery

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One location on Kangaroo Island before and after the recent bushfires. Credit: Prof Jorg Hacker, ARA

Adelaide-based Airborne Research Australia is creating free 3D high

resolution maps of devastation caused by fires in the Adelaide Hills and Kangaroo Island to help communities recover and reduce future fire risks.

The maps, which contain unprecedented detail and are available from the Airborne Research Australia (ARA) website, are intended to assist communities, emergency services agencies and researchers to plan recovery from SA's summer infernos, to better understand [fire](#) behavior and develop future fire defense strategies.

ARA collects data for these high-resolution maps from low, slow flights by crewed motorgliders equipped with LIDAR, hyperspectral sensors and high-resolution RGB cameras.

It renders this mapping data in three dimensions (3D) and animates it as flythroughs to simplify viewing.

ARA founder and Chief Scientist, Flinders Emeritus Professor Jorg Hacker, says this high-resolution mapping data would help plan for community recovery and future fire prevention.

"In many cases, remote sensing data taken from fire-affected areas disappears into a black hole, so the general public either never sees it or sees only a down-sampled low-resolution version," he says.

"We want to make all this data available to the public – the affected public especially – to help them recover their landscape, especially the [natural landscape](#)."

For example, Kangaroo Island has some very deep gullies which the fires may have "jumped" over, so the natural habitats may remain intact in these gullies.

"Our sensors can map in unprecedented detail landscape and forest features that are not visible with standard aerial photography or satellite data or from the ground.

"The combination of LIDAR and hyperspectral sensors provide centimeter resolution detail. This lets us both detect the location of such habitats and the state and structure of the undergrowth with LIDAR and even the state of health of the surviving vegetation with hyperspectral scanning.

"We also want to make this data freely available to people in the research community so they can study it and use it to obtain insights that will help communities better prepare against fires and to assist fire defenders to plan their strategies against these unprecedented fire events."

ARA is an Adelaide-based independent, not-for-profit research institute which grew out of Flinders University. From Parafield Airport, ARA operates purpose-designed aircraft carrying sophisticated sensing equipment.

ARA's detailed datasets are used for insights into economic and environmental issues ranging from land, air and water management to food production, mining, energy, coal seam gas fracking and climate change.

ARA flew its first fire flights over the Adelaide Hills in mid-January and its first two Kangaroo Island flights last week, focusing on the Ravine des Casoars Wilderness Protection Area.

Professor Hacker says the ARA maps were much more detailed than commercial aerial surveys. "In most cases, they fly high in order to get coverage of large areas, so you don't see details," he says.

"Our planes are derived from a glider, so they can fly low and slow, with minimal fuel usage. We use less than 15 liters of premium unleaded petrol per hour, producing less pollution and less noise, compared with the smallest Cessnas, which use 40 to 50 liters of Avgas per hour.

"Drones are not a viable option for what we do because they cannot carry the sensors we're using and are limited in their range. Our planes let us cover remote areas such as Kangaroo Island, flying from Adelaide."

The Adelaide Hills flights so far include burnt areas west of Woodside and Lobethal, plus some nature conservation areas at Lobethal Bushland Park and the Porter Scrub Conservation Park.

"We were primarily interested in the natural environment, but there is overlap with other properties, so we have a lot of high-res images of plant health and structure of the grapes by coincidence.

"You can see where vineyards and houses have burnt and where they haven't. This provides valuable data for boundless research."

Provided by Flinders University

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