PROJECT A4
DISASTER LANDSCAPE ATTRIBUTION: THERMAL ANOMALY AND HAZARD MAPPING

bushfire&natural HAZARDSCRC

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THIS PROJECT SEEKS TO (1) OPTIMIZE THE USE OF EARTH OBSERVING SYSTEMS FOR ACTIVE FIRE MONITORING BY EXPLORING ISSUES OF SCALE, ACCURACY AND RELIABILITY, AND (2) TO IMPROVE THE MAPPING AND ESTIMATION OF POST-FIRE SEVERITY AND FUEL CHANGE THROUGH EMPIRICAL REMOTE SENSING OBSERVATIONS.

INTRODUCTION

Understanding the trade-offs between sensors and their ability to map and measure fire related attributes over a range of different landscapes and fire scenarios is important. The purpose is to develop approaches that provide new information to assist fire agencies in responding to fire management tasks and future proof their practices to parallel developments in remote sensing.

DEPI collecting data before and after a prescribed burn.

Research Objectives

- To implement, and assess, the utility of earth observation sensors and algorithms for the enhanced surveillance of the extent, intensity and configuration of fire.
- To develop methods for the remotely sensed assessment of burn severity and fuel change (pre-& post-fire) to enable a more accurate parameterisation of fire behaviour models.
- To test and validate the above methods and data products for application in peri-urban, grassland and forest sites in Australia using simulation and empirical techniques.
- To build a system-of-systems approach that will support the integration of multi-scale fire surveillance and landscape condition observations (from across geostationary, polar orbiting, aerial and ground based platforms).

ACTIVE FIRE MONITORING

The predominant global fire detection system is based on the Moderate Resolution Imaging Spectrometer (MODIS) sensor. The DLR TET-1 satellite (launched in 2012), includes an infrared camera system designed for the detection of high temperature events, with the ability to detect fires with a smaller area and lower temperatures than MODIS due to its higher spatial resolution.

MODIS, TET-1 (and geostationary satellite systems, such as Himawari-8 –when they come on stream) will be assessed and integrated for a multi-scale approach for accurately mapping fire temperature, area and configuration.

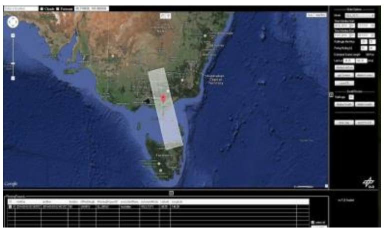

Figure 2. Software used for planning flight campaigns to under fly TET-1 during fire validation experiments.

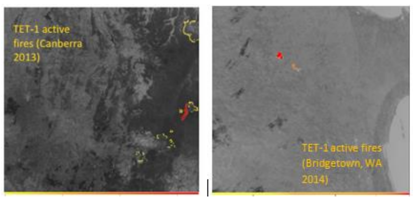

Figure 3. Sample imagery of active fires taken over Australia from the German satellite TET-1.

BURN SEVERITY AND HAZARD MAPPING

Typical methods to map and describe the pre-burn and the post-burn landscape rely largely on visual assessments. This work develops new methods and metrics derived from technologies such as terrestrial LiDAR to provide quantitative, reliable and repeatable measures of fuel and burn severity, before and after a fire event.

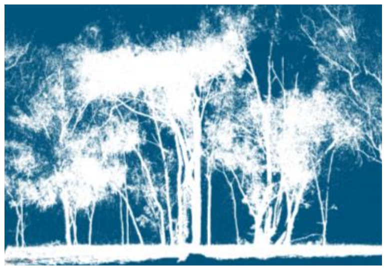

Figure 4. Example of a 3D terrestrial laser scan of a dry sclerophyll forest prior to a prescribed bun event.

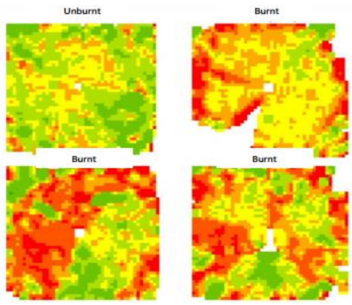

Figure 5. Maps derived from terrestrial laser scanning (see Figure 4) three months after a burn event showing areas of minimal to no change(green), small change (yellow) and large change (orange/red).

"Outcomes of this project have the potential to enhance current mapping information used to support fire response, recovery and planning activities." (N. Withers, Radio and Information Services, DEPI)

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