The use of multispectral cameras to validate satellite derived curing data

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The grassland condition is an essential component of grass fire behaviour and spread modelling including the calculation of the Grassland Fire Danger Index (GFDI). For operational grassland curing assessments, curing can be quantified by ground or satellite derived observations. Both techniques however have their strengths and weaknesses. For ground assessments, destructive sampling and levy rod techniques are known to be accurate but are costly, time consuming, and not practical for large areas and high frequency (weekly) assessments. Visual observations are known to be subjective, cover a limited area and produce high variable in results. Satellite derived curing however provides more extensive coverage of curing data both spatially and temporally, is non subjective and repeatable. Bushfire CRC has developed satellite-based approaches to the mapping of curing nationwide (Newnham et al., 2010) and further validation and calibration were recommended to increase accuracy and reliability of the maps within each jurisdiction.

DFES has explored whether ground based curing assessments can be improved by utilising a handheld multispectral camera which provide discrete spectral bands (Red, Green, Blue, Red Edge and Near Infrared) and therefore are capable of producing a Normalised Difference Vegetation Index (NDVI) that can then be integrated into curing algorithms. These cameras come with brightness calibration panels to compensate the lighting conditions on the day, are unaffected by cloud, produce quantitative data and capture large scenes.

This research is a joint collaboration between Department of Fire and Emergency and Landgate, with project aims to (1) assess the effectiveness of handheld multispectral camera in estimating grassland curing, (2) relate ground curing with satellite curing data derived from high resolution low frequency satellites such as MODIS, Landsat and Sentinel and low resolution high frequency satellites such as Himawari-8. The combination of both techniques aims to improve efficiency and accuracy in weekly operational grassland curing monitoring.