Very Large-Scale, High Spatial Resolution Airborne Thermal Mapping of Wildfires in Canada using the TABI-1800

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Keywords: wildfire, push-frame MWIR, hotspot detection, airborne large-area surveys

ABSTRACT

The TABI-1800, a high-performance, thermal imaging/mapping system, has been used since 2011 to operationally map active wildfire-affected regions in Northern Alberta, Canada, and produce GIS-compatible map products. This commercial-off-the-shelf imager, with proven high detection rate of hot spots, ability to see through most smoke, and patented 1800 across-track pixel diffraction-limited optical system, was flown under contract to the Alberta Government in a Cessna 310 aircraft in support of wildfire suppression efforts. During one extended campaign, over 400 square kilometers of actively burning boreal forest were thermally mapped each night by a small crew at an average spatial pixel resolution of 1.5 meters/pixel. After each night's mission, fast turnaround of more than 100 gigabytes of raw TABI-1800 data to radiometrically calibrated, orthorectified, and analyzed fire map products was typically completed in less than five hours after landing. Large scale, precision georeferenced, and GIS-compatible map products showing detailed fire front perimeters and delineated hot spots were provided to wildfire managers before the commencement of the day's wildfire suppression efforts. These maps were used to efficiently and effectively coordinate both water-bombing air operations and mobilization of ground personnel and assets.