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## END-TO-END DATA PROCESSING OF KANYINI MISSION HYPERSPECTRAL IMAGERY FOR WILDFIRE ANALYSIS

### Abstract

In recent years, on-board data processing has emerged as one of the major challenges facing the field of Earth Observation. This is due to the fact that its importance has grown substantially. The ability of a satellite to process data onboard cuts down on overall latency, eliminates the requirement for imagery downlinking, and reduces the amount of time that passes between the reception of an image and its subsequent processing. It is conceivable to swiftly give warnings and responses that are capable of providing real-time or near-real-time alerts when it is conceivable that catastrophic events will take place. In our previous work, we demonstrated that it is possible to perform wildfire segmentation processing and analysis by using the L2D: Geocoding (orthorectification) of L2C, data on-board by using space-qualified hardware accelerators. This was done so that the data could be processed and analyzed in real-time/near real-time. In this research work, we are exploring the possibility of using L0 data for End-to-End data processing, also known as going from Level 0 to Information, on-board the satellite utilizing coarse co-registration. As a result of this work, valuable and meaningful information can be directly extracted and analyzed on-board, and useful and informative insights are downlinked to meet the needs of the satellite's owner and operator. This article presents a high-level general architecture that can be used for end-to-end data processing using hyperspectral imagery from the KANYINI Mission. The architecture's capacity for generalization is analyzed, and possible applications for the architecture use in future missions are outlined. The following groups are collaborating together on this project: RMIT University, Khalifa University, The European Space Agency-Philab (ESA- -lab), the Italian Space Agency (ASI), the National Institute of Geophysics and Volcanology (INGV), and the SmartSat Cooperative Research Centre (CRC).