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Space-based Observations of Hot-spot Events using Microbolometers: Performance Modeling

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Space-based observations of hot-spot events have numerous direct benefits to life on Earth. Such observations would enhance the health and safety of human beings and would protect quality of the natural environment. Hot-spot data can be used for fire detection and fire monitoring, volcanic monitoring, land cover change monitoring as well as studies related to biomass burning, carbon emissions and climate change.

This paper discusses a technology development study, under a contract by the Canadian Space Agency (CSA), related to the space-based observation of hot-spot events using an imager employing microbolometer technology. The main objective of the study was to demonstrate the concept feasibility of hot-spot observations using microbolometers.

This paper presents a conceptual instrument design, performance modeling, instrument design optimizations, trade-off studies and sample performance analysis results. Using the performance model, a preliminary performance assessment has been performed.

Some future plans and the usefulness of the instrument concept and the performance model for future hotspot observation missions are discussed.

Keywords: Performance model, thermal imaging, space-based observations, microbolometer, conceptual design, simulation, retrieval, hot-spot events, biomass burning.