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GPU-ACCELERATED SIMULATION OF SPATIAL AND SPECTRAL STRAY-LIGHT EFFECTS ON SATELLITE HYPERSPECTRAL IMAGERS

Abstract

This paper demonstrates how to efficiently apply GPU computing for Earth Observation (EO) missions with highly demanding computational needs and execution time constraints. Stray-light effects play an important role in EO optical satellite missions, and achieving adequate processing performance on their simulation may be critical for the timely delivery of mission products. In this paper we report on the usage of graphics processing units (GPU) for accelerating spatial and spectral stray-light simulation computations. In particular, the benchmarking of a traditional CPU/MKL-based C++ implementation is compared to a GPU/CUDA implementation by considering different NVIDIA GPU models. The obtained results show how GPU-accelerated computing is able to reach order-of-magnitude performance gains for stray-light simulation compared to highly optimised CPU-based implementations.