

A survey of in flight radiometric calibration methods and their applicability to Nanosatellites

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Abstract

An accurate in-flight calibration of the sensor is a key point for providing the best image quality of the Earth Observation products.

After having defined the radiometric model, and its parameters (dark currents, equalization coefficients, absolute calibration coefficients, noise model coefficients), we will focus on different calibration methods and corresponding acquisitions used on institutional HR and VHR missions :

- Dark acquisitions over Ocean,
- Yaw steering acquisitions (AMETHIST Method for Pleiades HR [1])
- Use of On Board Calibration Units (S2 sun diffuser [2] for example)
- Acquisition on uniform desert sites (Arctic, Antarctic, sand deserts)
- Acquisitions on instrumented sites (RadCalNet [3])
- Simultaneous Nadir Overpasses method [4]
- ...

Finally we will determine the applicability and interest of these methods, in the context of HR missions on nanosatellites.

[1] Ph.Kubik & al, "AMETHIST :A Method for Equalization Thanks to HISTograms", SPIE Maspalomas, Spain (2004) [2] Charlotte Revel & al, " Sentinel-2A and 2B absolute calibration monitoring ", European Journal of Remote Sensing (2019) [3] <https://www.radcalnet.org> [4] Li, S &al, " Sentinel-2 MSI Radiometric Characterization and Cross-Calibration with Landsat-8 OLI" Advances in Remote Sensing, 6, 147-159. (2017)

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