

## CAMSIS: An Automated System for the Validation of Surface Reflectance from High Spatial Resolution Sensors

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We present CAMSIS, an automated system for the validation of satellite surface reflectance products. The system is currently installed 120 meters above ground on a TV tower at the Chequamegon National Forest, WI, USA, and captures imagery in Blue (470nm), Green (550nm), Red (650nm) and Near-Infrared (850nm) wavelengths every 15 minutes. Raw imagery from the camera is calibrated to surface reflectance values using a 50% reflectance calibration target mounted on a motorized arm, which permits to protect the reference target while not in use. The calibrated imagery is georeferenced using very-high spatial resolution imagery from an aerial sensor and resampled to match the satellite data spatial resolution and grid. In this work, we present the comparison between CAMSIS calibrated data and 10 meter Sentinel-2 atmospherically corrected reflectance, derived by the LaSRC (Land Surface Reflectance Code) processor. Results for the Blue, Green, and Red bands show Coefficient of Determination ( $R^2$ ) values higher than 0.90 and Root Mean Square Error (RMSE) values close to 0.01. However, the NIR band show worse results with an  $R^2$  of 0.18 and an RMSE of 0.11, which suggests stronger Bidirectional Reflectance (BRDF) effects for this band that still need to be fully accounted for, especially for the pixel of forest areas. Results for the NDVI also show good agreement between S2 and CAMSIS, with an  $R^2$  of 0.86 and RMSE of 0.05. These initial results show that CAMSIS provides valuable information for continuous validation of high spatial resolution surface reflectance. Future research will focus on developing and implementing BRDF correction methods based on CAMSIS data.

Keywords: Surface Reflectance, Camera System, Automated Validation