Volume XXXIX-B7

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B7, 1-5, 2012
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXIX-B7/1/2012/
doi:10.5194/isprsarchives-XXXIX-B7-1-2012

REFLECTANCE CALIBRATION SCHEME FOR AIRBORNE FRAME CAMERA IMAGES

U. Beisl
Leica Geosystems AG, 9435 Heerbrugg, Switzerland

Keywords: Atmosphere, Modelling, Radiometric, Calibration, Processing, Multispectral, Digital, Camera

Abstract. The image quality of photogrammetric images is influenced by various effects from outside the camera. One effect is the scattered light from the atmosphere that lowers contrast in the images and creates a colour shift towards the blue. Another is the changing illumination during the day which results in changing image brightness within an image block. In addition, there is the so-called bidirectional reflectance of the ground (BRDF effects) that is giving rise to a view and sun angle dependent brightness gradient in the image itself. To correct for the first two effects an atmospheric correction with reflectance calibration is chosen. The effects have been corrected successfully for ADS linescan sensor data by using a parametrization of the atmospheric quantities. Following Kaufman et al. the actual atmospheric condition is estimated by the brightness of a dark pixel taken from the image. The BRDF effects are corrected using a semi-empirical modelling of the brightness gradient. Both methods are now extended to frame cameras. Linescan sensors have a viewing geometry that is only dependent from the cross track view zenith angle. The difference for frame cameras now is to include the extra dimension of the view azimuth into the modelling. Since both the atmospheric correction and the BRDF correction require a model inversion with the help of image data, a different image sampling strategy is necessary which includes the azimuth angle dependence. For the atmospheric correction a sixth variable is added to the existing five variables visibility, view zenith angle, sun zenith angle, ground altitude, and flight altitude – thus multiplying the number of modelling input combinations for the offline-inversion. The parametrization has to reflect the view azimuth angle dependence. The BRDF model already contains the view azimuth dependence and is combined with a new sampling strategy.

Conference Paper (PDF, 787 KB)

Citation: Beisl, U.: REFLECTANCE CALIBRATION SCHEME FOR AIRBORNE FRAME CAMERA IMAGES, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B7, 1-5, doi:10.5194/isprsarchives-XXXIX-B7-1-2012, 2012.

Bibtex EndNote Reference Manager XML