

Title: Acousto-Optic Tunable Filter-based Remote Sensing system Characterization Guidelines

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Abstract

This work exhibits a procedure to characterize a developed acousto-optic tunable filter (AOTF) based hyperspectral imaging (HSI) system operating in the visible-near infrared (VNIR) spectrum. The developed AOTF-HSI system consists of an AOTF-based-hyperspectral imager, illuminating sources, and a computer with a home-made acquisition software. The AOTF-HSI setup comprises a complementary metal oxide semiconductor (CMOS) camera (2048 x 2048 pixels), a VNIR lens (Canon EF-S 55–250 mm f/4–5.6), and an AOTF (11 x 12 mm aperture). Two multifaced reflector tungsten-halogen lamps (150 W) were used for providing double-sided illumination for object of interest. The imager system is operated by a C# code for data acquisition. The operating code enables both hyperspectral and multispectral imaging for the sample under test in the VNIR range of 450 – 850 nm. The developed spectral imager presents a valuable opportunity for noninvasive evaluation of medical samples.

Keywords: Remote Sensing, Hyperspectral Imaging, Camera Characterization, AOTF