

# Unmanned Aerial Vehicle (UAV) operated spectral camera system for forest and agriculture applications

H. Saari<sup>1</sup>, T. Antila<sup>1</sup>, C. Holmlund<sup>1</sup>, J. Mäkynen<sup>1</sup>, K. Ojala<sup>1</sup>, H. Toivanen<sup>1</sup>, I. Pellikka<sup>2</sup>, S. Tuominen<sup>3</sup>, L. Pesonen<sup>4</sup> and J. Heikkilä<sup>5</sup>.

<sup>1</sup>VTT Photonic devices and measurement solutions, Espoo and Oulu, Finland,

<sup>2</sup>Department of Mathematical Information Technology, University of Jyväskylä, Finland,

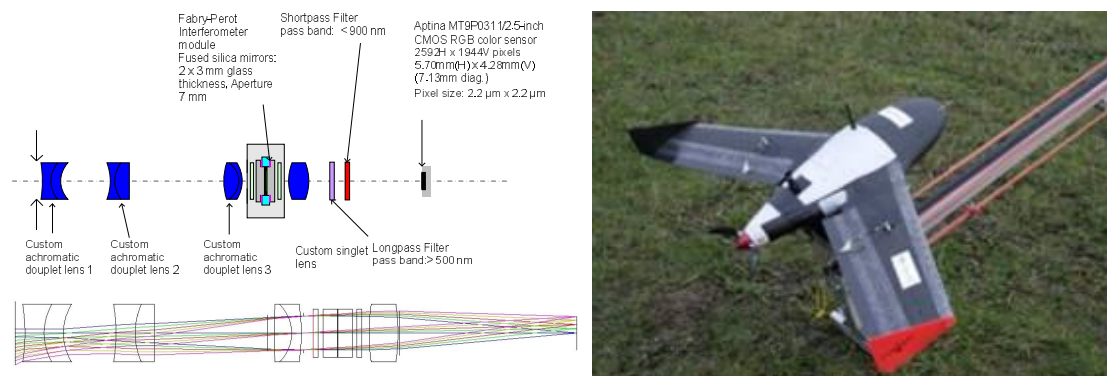
<sup>3</sup>Finnish Forest Research Institute, Vantaa, Finland

<sup>4</sup>MTT - Agrifood Research Finland, Helsinki, Finland

<sup>5</sup>Pioneering Ltd., Helsinki, Finland

Innovative and compact spectral camera integrated into a very light UAS (unmanned aerial system) with modern classification algorithms provides significantly improved ways for remote sensing for forest and agriculture applications. Tekes, the Finnish Funding Agency for Technology and Innovation, has granted a funding for this large cooperation research project of four research institutes and several companies. The project is coordinated by University of Jyväskylä. The objective of the project is to be able to evaluate forest and agriculture biomass changes. There are also application possibilities for the military and for all kinds of aerial environmental observation.

The spectral camera is based on VTT proprietary technology<sup>3,4</sup>. It enables to build a 5 Megapixel spectral imager with the size and mass compatible with the light weight UAS planes. The wavelength range of the camera is 500 – 900 nm and spectral resolution 7 - 11 nm @ FWHM. The mass of the UAS spectral camera including the battery and all electronics is less than 400 g. The major dimensions of the device are 62 mm x 56 mm x 120 mm. The spectral camera uses Piezo actuated Fabry-Perot Interferometer module to record simultaneously a 2D image of the scenery at three narrow wavelength bands. Bands are determined by the selected three orders of the Fabry-Perot Interferometer which depend on the air gap between the mirrors of the Fabry-Perot Cavity<sup>1,2</sup>. The optics concept of the spectral camera is presented in Fig. 1. The design and characterization results of the built spectral camera will be presented at the conference.



**Fig. 1** Optical concept of the UAS spectral camera based on customized optics (on the left) and a typical light weight Unmanned Aerial Vehicle.

## References

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