

IS-HS Project:
**Integration of in-situ data and hyperspectral remote sensing for
plant production modeling**

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PRESENTATION ABSTRACT

The Flemish Regional Government of Belgium has sponsored the development of a hyperspectral sensor for incorporation in the South African Multi-Sensor Microsatellite Imager (MSMI), onboard the second generation SUNSAT satellite (ZASat). This micro-satellite has an expected launch date of end-2007 to 2008. This sensor nominally will have 200 wavelength bands between 400 – 2350 nm, a spectral resolution of 10 nm, a radiometric resolution of 10 bits, a spatial resolution of 15 m, and on-board pre-processing capabilities. A swath of 15 km is envisaged, with a storage capacity of 18 square cubes of hyperspectral imagery.

The IS-HS project was developed to study vegetative production processes by jointly using *in-situ* and hyperspectral data as model inputs. This approach will not only deepen our understanding of such processes, but also will aid in the management of vegetative systems. Accurate modeling has significant implications especially for production-oriented systems, given the potential to monitor abiotic and biotic stresses, vegetative accretion, and current system state. The goal is to provide resource managers with up to date information to pro-actively manage vegetative systems.

Present research efforts at the K.U.Leuven are geared towards the development of crop-specific models and applications, including process description and analysis, using *in-situ* sensors and portable hyperspectral spectroradiometers. These model-based applications will eventually be scaled to satellite sensor-level to lay the foundation for continuous and relevant satellite sensor output data for natural resource managers.

Further research will focus on a combination of *in-situ* and hyperspectral data to better understand and model vegetative production systems. Potential research projects include, among others, early abiotic and biotic stress detection to enable preventative management, monitoring of water cycles, and carbon and respiration modeling of high-biomass-volume crops. Potential collaborators include the wine-, fruit-, forestry-, and agricultural sectors.

An overview of the system-concept will be given at the conference.