



# Case Study: MobilLas

The MobilLas sensor is developed for precision fertilization, crop protection, and other field operations. The new sensor (patent pending) is a dual instrument measuring crop structure (height, density and Leaf Area Index (LAI)), biomass and canopy chlorophyll content. Other sensors developed for precision fertilization are single sensors that can only provide an estimate of either LAI, biomass or chlorophyll content. The dual sensor approach has a number of advantages:

- the canopy nitrogen status including carry over effects is measured
- nitrogen fertilisation can be linked to crop demand in absolute terms (kg n ha<sup>-1</sup>)
- nitrogen fertilisation is based on sensor measurements alone
- high yields are realised with a minimum of nitrogen input and loss
- optimised crop protection can be based on a range of canopy variables



The MobilLas sensor includes the following two instruments:

- highly optimised laser range finder for measuring canopy structure
- four band radiometer for computing the Ratio Vegetation Index (RVI) or other index from canopy spectral reflectance observations.

Crop height and Leaf Area Index (LAI) are estimated from laser range measurements made at a slant angle. The RVI spectral index is calculated as the ratio of near-infrared and visible red reflectance measurements. The RVI index is well correlated with green biomass and canopy chlorophyll content. From these can be computed the RVI/LAI ratio that is well correlated with the leaf level chlorophyll and nitrogen content.

## **Algorithm for nitrogen fertilization**

An algorithm for winter wheat has been developed that converts sensor measurements into a nitrogen fertilization rate. The algorithm is based on lines fitted to measurements made during april and early may in a plot experiment including several n-rates. It is shown how the position of a measurement in the RVI versus RVI/LAI space is related to the need for supplemental nitrogen to reach a target (e.g. 160 kg n) development.

## **MobilLas status**

The MobilLas sensors and combined sensor response have been compared to reference measurements with good results. The work on algorithms will be extended to include other crops than winter wheat.

## **The Equipment Used**

2 & 4 band radiometers are supplied to your own wavelength requirements. Skye are proud to be able to offer this bespoke service, so that you, the researcher, can match your precise area of interest to the instrument. Many radiometers from other companies have fixed wavebands. From Skye you can choose your centre wavelength and the bandwidth - we do our very best to match this. Please ask for the datasheets on our 2 & 4 channel sensors, or visit the Skye website at [www.skyeinstruments.com](http://www.skyeinstruments.com)

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