

GNSS-R Signal Processing and Service Chain definition for Soil Moisture

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In the framework of the MISTRAL project (**M**onitoring soil moi**St**ure and wa**Te**R-flooded **A**reas for agricu**L**ture and **E**nvironment) a service chain for the estimation of the soil moisture based on the use of the GNSS signals measured from a UAV has been defined. This service chain, includes the GNSS sensor to be embedded in the UAV, and all the processing blocks and algorithms necessary for the generation of the Level-2 products (geo-referenced soil moisture values), and its integration on a GIS module to provide the end-user soil moisture maps over the web site.

During the conference, the GNSS-R sensor and the main steps in the signal processing will be described. That will include the data acquisition and extraction (i.e. down conversion of the RF signals to IF, digitalization and then cross-correlation against a clean replica of the GPS C/A code), computation of the Interference Complex Field (ICF) Reflectivity, and dielectric constant, geo-location and calibration of the data, the computation of the soil moisture based on the use of a Maximum Likelihood estimator, and the main functionalities of the GIS module integrated.

In addition, and in order to: 1) test the signal processing and service chain described, 2) prove the concept of high resolution soil moisture maps based on dedicated flights using GNSS-R receivers, data from two experimental airborne campaigns conducted in the south of France in July 2015, will be processed and evaluated using ancillary data (i.e. NDVI maps).

Main results, and conclusions will be presented during the conference.