Test Flight

Test flight measurements have already been performed using a manned ultra-light aircraft. We use two antennas: one on top for the satellite signal, one below for the signal reflected by the ground. This campaign has demonstrated the technical feasibility of the MISTRALE and was successful in measuring ground reflected GNSS. Detailed soil moisture maps are obtained after processing the reflected GNSS signals.

Project Partners

This project has received funding from the European GNSS Agency under the European Union’s Horizon 2020.
Introduction

The Mistrale project aims at support farmers and water-managers providing soil moisture maps. Using dedicated RPAS to measuring soil moisture using the GNSS Reflectometry.

Purpose

Spatial variability in soil moisture content is an important variable. MISTRALE sets up a service providing soil moisture maps that complement satellite-based and field measurements. These soil moisture maps help farmers to make more efficient decisions where and when to irrigate. They will be used by water managers to optimise their catchment and nature managers to optimize their wetlands.

Need

Agriculture uses around 70 percent of all freshwater worldwide. To feed an additional 2 billion people by 2030, water demand is expected to increase tremendously in the next decades. Farmers are challenged to produce “more crop per drop”.

Extreme weather events - such as dry periods and floods - challenge water managers, who need new tools to monitor soil moisture, and to understand water logging and flooding.

Technique

MISTRALE develops a prototype of a new sensor, called GNSS-R, integrated on a dedicated unmanned aircraft. This sensor use GNSS signals, such as GPS and the European GALILEO system. It compares the GNSS signals from the satellite directly and that reflected on the ground. The reflected signals are affected by the soil humidity content, so, as a consequence the moisture can be derived from the signal comparison.

The use of GALILEO signals, with its larger bandwidth and its different carriers will enable better accuracy of GNSS-R measurements.

Project

Six partners are involved in the MISTRALE project. STARLAB and M3 Systems develope the GNSS-R sensor and algorithms. The development of the unmanned aircraft (RPAS) is the experience of ENAC. GET is focussing on uses and customers. L’Avion Jaune performs the manned and unmanned flights. Finally, AeroVision is responsible for the business plan development and the dissemination.