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# EXPERIMENT SETUP FOR AN AIRBORNE GNSS-REFLECTOMETRY EXPERIMENT

**Abstract**

GNSS Reflectometry (GNSS-R) is one of the many techniques used for Earth observation and sensing nowadays. GNSS-R utilizes the reflection of GNSS signals from Earth's surface to sense multiple characteristics of the Earth such as wind-speeds and geophysical characteristics of Earth surfaces. The Bundeswehr University in Munich (UniBw), is leading the SeRANIS (Seamless Radio Access networks for Internet of Space) satellite project. Part of the payload of the SeRANIS project is the GNSS Reflectometry & Occultation Experiment (GNSS-ROX). In the context of payload experiment development, a field test campaign (GNSS-ROX FTC) is carried out with an airborne (drone) GNSS-R experiment serving as proof of concept. This experiment mimics the structure and performance of the payload experiment that is to be conducted on the satellite. Field tests will be performed as part of a test campaign to study the geophysical characteristics of different material of Earth surfaces, however at much lower altitudes than that of the planned Low Earth Orbit (LEO) of the SeRANIS satellite. Reflected L1 & L5 GNSS signals of both polarization's, Right Hand Circularly Polarized (RHCP) and Left Hand Circularly Polarized (LHCP), along with direct RHCP GNSS signals are received and recorded. The recorded signals are then processed to create Delay Doppler Maps (DDMs). Wind speeds and geophysical characteristics of surface materials can then be derived by processing the recorded data. This paper describes in detail the experiment setup and measurement planning process of the airborne GNSS-ROX FTC. Computation of essential parameters like location of the specular point, specular point tracking, link budget, surface area of antenna footprint, and EM wave polarization reversal are described in this paper. A brief overview of the post-processing techniques of the recorded data is also described.