## Error Analysis of UAV-based Near-Field Antenna Measurements

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One of the most important characteristics of an antenna is its far-field (FF) radiation pattern. An established method to obtain the FF pattern involves near-field (NF) measurements in combination with a subsequent NF to FF transformation (NFFFT). The achievable high accuracy of NF measurements is the result of continuous improvements over decades. Highly sophisticated positioning systems as well as calibration procedures, e.g., via standard gain antennas, are employed. The measurements themselves are performed in anechoic chambers since this controlled environment provides an acceptable approximation of free space.

In recent years, the field of in-situ antenna measurements gained increasing interest and this was especially driven by dramatic developments in the field of unmanned aerial vehicles (UAVs). UAV-based antenna measurements open up new opportunities due to their mobility and flexibility. With this technology, antenna measurements do not have to take place in anechoic chambers anymore and can be performed on-site which allows for the measurement of large or mounted antennas. The measurement setup is usually designed in a way that the UAV carries the probe antenna and flies around a stationary antenna under test (AUT) while measuring the field. However, the very different setup for UAV-based antenna measurements also introduces new error sources, which have to be treated carefully.

In this contribution, we give an overview of possible error sources of a typical UAV-based measurement setup, where we describe and characterize the most relevant components of the measurement system, e.g., the probe antenna and the flight controller, in terms of their error contributions. For this, simulations are performed, which are based on measurement results of the single components.