

Theme: Atmospheric remote sensing and GNSS

Using drones for weather radar calibration

Background

The research work planned in the master project is to design and investigate a calibration method of the radar reflectivity based on a well-known target (radar cross section easy to calculate) hanging under a stable drone of which the position must be known.

The faculty of Civil Engineering and Geosciences owns a drone with GPS and attitude sensors on board. The research encompasses design of the calibration method, design and carrying out of the experiments with drones, processing and analysis of the results. The processing includes both the radar reflectivity, as well as the GPS positioning.

One of the most successful sensors to measure precipitation and clouds is the radar. Its main advantage is its ability to measure at different ranges through precipitation and clouds without encountering severe attenuation problems. The weather radar measures the reflectivity, proportional to the received power. The reflectivity is related to the sizes and concentration of particles within the radar resolution volume. Of course, it is important to have accurate estimates of the reflectivity. Currently, this is still an issue.

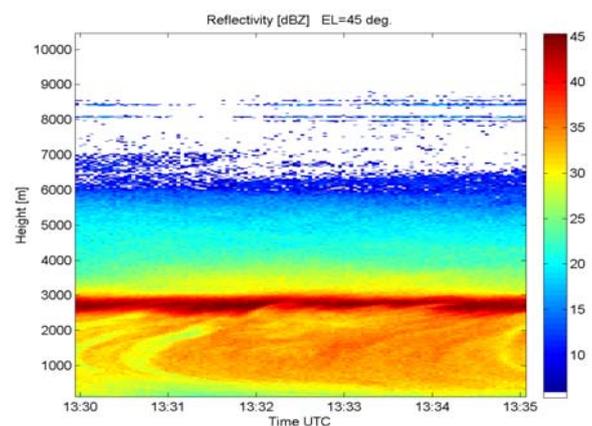
The Delft University of Technology has designed two weather radars (3 and 10 GHz), which are located at the atmospheric site of Cabauw, The Netherlands. Furthermore, the Dutch meteorological institute (KNMI) has a 35 GHz cloud radar at the same site. The Cabauw site is used to study and measure the atmosphere with different sensors, preferably in real-time. The plan is to make Cabauw a European weather radar calibration site.

for TU-Delft radar real-time measurements at Cabauw see: <http://ftp.tudelft.nl/TUDelft/irctr-rse/tara>

Objective

The aim is to develop a weather radar calibration technique using drones. If successful, such calibration will be carried out on a yearly basis at Cabauw by students within the master Geosciences and Remote Sensing.

The programming language for this master assignment is Matlab.



Obligatory committee members:

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