

Development of a concept for wind measurements using drones



Drone with attached MultiGas instrument, tested at Bagana volcano, Papua New Guinea, in September 2016.

During recent years the development of drones, and applications using drones, have had a strong increase. So far the main focus has been of photography and filming but also the use of drones as carriers of other measurement devices are currently being developed. At Department of Space, Earth and Environment at Chalmers we are presently developing measurement strategies using drones in three specific applications:

1. Study of volcanic gas emissions. Here the drone is carrying different instruments for gas monitoring in transects below the gas plume, as well as into the gas plume at 1-2 km altitude above ground.
2. Measurements of gas emission from industry using ground-based remote sensing downwind the studied facility.
3. Studies of the content of sulfur in ship fuel by in-situ and remote sensing of the sulfur/carbon ratio in the combustion gas emission.

A common problem in all these applications is that we need information on the speed and direction of the wind in the gas plume we are monitoring. As the location of this gas plume is often inaccessible due to high elevation or geographical constraints, using a drone is an attractive option. Especially if this meteorological information can be obtained simultaneously as the drone performs gas concentration measurements in the plume.

Different concepts should be investigated. Most attractive is to use the drone flight parameters to derive the local meteorology (drone control parameters are used to keep the drone in a fixed position under prevailing wind conditions), but also more direct methods using e.g. strategically located anemometers may be considered.

Prerequisites

- strong motivation
- some programming experience
- ability to solve practical problems
- interest to do field-work
- **ability to start soon, spring 2019, is highly valued as we aim for field-tests in June**

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