

Department of Electrical & Computer Engineering

Airborne Sampling/Sensing of Distal Volcanic Ash

Project Group Meeting #13

Agenda

Date: Friday July 8th 2016

Time: 3pm

Venue: VH 457

Chair: Jamie Van de Laar

Secretary: Mike Shanaher

1. Apologies

No apologies

2. Minutes

(Attached)

3. Matters arising

No matters arising from previous meeting

4. Correspondence

Reply from UC Finance regarding airspeed sensor purchase

5. Progress Reports:

* Ryan – Ash sample capture – cyclone separator
* Mike – Telemetry
* Jamie – Sensor testing
* Jake – Temperature monitoring and airflow
* Parth - Electrostatic sensor

6. Other business:

* Next meeting – Discuss potential new time

Minutes from last meeting below:





Department of Electrical & Computer Engineering

Airborne Sampling/Sensing of Distal Volcanic Ash

Project Group Meeting #12

Minutes

**Minutes of the weekly meeting 1 July 2016**

**Present:**

Maan Alkaisi, Adrian Weller, Jamie Van de Laar, Jake Campbell, Ryan Taylor, Mike Shanaher

**1. Apologies:**

* Parth Thakur

**2. Minutes from last meeting**

* (look at Minutes, June 10 2016)

**3. Matters arising**

* DTA wind tunnel sent today, should arrive next week. Key points:
  + Motor controllers may not be configured correctly
  + Need to seal up gaps in tunnel with tape
  + We need to build the final section
  + High speed running is limited by thermal cut out of ESC’s
  + 30-40% power gives 5 m/s, get ~10 mins on motorcycle battery

**4. Correspondence**

**5. Progress Reports:**

* Ryan Taylor
  1. Cyclone separator 3D printed prototype works using compressed air with ash and a collection jar.
  2. Having a smoother surface in the separator may give better flow and sample yield. Could use a solvent.
  3. Need to think about orientation of the cyclone in the airframe – direction of gravity.
  4. Need to use wind tunnel to test
* Mike Shanaher
  1. Looking at being able to send ash data in a “Mavlink message” – 255 bytes long (all data from PMS1003 is 32 bytes).
  2. Need very low latency when Pixhawk polls sensor via I2C
  3. Pixhawk has flight modes for loitering, return to base etc.
  4. Looking at adding additional flight mode for ascent phase with balloon.
  5. There is a “TLog” where all telemetry data is dumped.
  6. Could use Python script to filter ash data from mass telemetry “TLog” data at ground station.
  7. Adrian asked if we had thought about telemetry being separate to Pixhawk – then don’t need to modify Pixhawk code. However the two telemetry radios could interfere
* Jamie Van de Laar
  1. Have been testing in chamber using PMS1003 sensor
  2. Using AC fine test dust due to finer particles that hang in air better
  3. Suspending/dispersing in chamber using compressed air
  4. Was able to see correlation between sensor reading and opacity meter reading, peaking at ~5000 ug/m3 then reducing as ash settles.
  5. Resolution of opacity meter is only 100 ug/m3. Sensor is about 1 ug/m3
  6. Have ordered connector to interface OPC-N2 with Raspberry Pi
* Jake Campbell
  1. Advice from Jamie and Sally: sensor readings may be dependent on temperature – may change at very low temps.
  2. DTA has an environmental test chamber to emulate very cold environments.
  3. Could use closed loop heating circuit to regulate sensor temperature.
  4. Could use parasitic lost heat from motor speed controller, batteries etc. to heat sensors.
  5. Particle sensors have large heat loss due to cold air flowing through.
* Adrian
  1. Think about termination from balloon
  2. Does plane need to be released level, or can it be dropped pointing downwards (from tail)?

6. **Other business:**

* Adrian may be able to visit in a few weeks’ time.

**Meeting ACTION LIST**

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| **ACTION** | **ASSIGNED TO** | **DUE DATE** |
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**Next meeting date: Friday 8 July, 3pm**