

**Transforming Monitoring the Environment:**

Future capabilities arising from improved sensors, Internet of Things devices, unmanned aerial vehicles

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March 9, 2016

AMS Forum on Observing the Environment from the Ground Up

**Problems with current measurements...**

**Solution? UAS!**

**NOAA/OAR/ARL/ATDD's DJI S-1000**

Current capabilities:

- 1) Measure T/RH/P from a mobile VTOL platform
- 2) Remotely sense surface temperature
- 3) Flight time: 15 minutes, limited by batteries
- 4) Flight altitude: 400 meters\*, limited by FAA/NOAA regulations

Applications:

- 1) Boundary layer profiles of T/RH/P
- 2) Surface heat fluxes over a limited area

Currently being flown in VORTEX-SE in Northern Alabama to look at conditions leading to development of severe storms and tornadoes.

\*Can vary from 400 feet to 400 meters, depending on class of airspace!

**NOAA/OAR/ARL/ATDD's DJI S-1000**

In action: Calibrating and validating measurements from the S-1000 to a Graw weather balloon.

Video courtesy of John Walker, NOAA UAS Program Office

**NOAA/OAR/ARL/ATDD's DJI S-1000**

Comparison data:

**Future operations (short term, 1-3 years):**

- FAA Part 107 – A step in the right direction!
- Vehicles still remain under control of a trained pilot, within line-of-sight.

**Future operations (long term, 4-7 years):**

- Vehicles could be flown autonomously within designated sectors of airspace.
- Flight beyond line-of-sight probable.
- Utilize targets of opportunity (e.g. Amazon delivery drones).
- Networked, swarming operations (e.g. NRL CICADA).
- NOAA plans to use combinations of VTOL and fixed-wing aircraft operationally.

**Challenges:**

- How to record and efficiently ingest large quantities of data...
- How to ensure data is adequately quality controlled...
- Keeping batteries charged...
- Processing data in a timely manner for ingest into numerical models...



## Questions?

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