**April 8, 2016 - Kessler**

UTC = local time + 6hrs

Flights conducted 15-20 yards away from the Washington Mesonet Tower

Front

Back

Windsonde 248

Windsonde 247

Windsonde 249

Windsonde 246

All windsondes located away from the rotors on the ends of the booms and shielded by a small PVC pipe (not in contact). See pictures below.

Flight 1

Start Battery: 12.37 V

Start Direction: 350° N

Windsondes: 248 & 246

Ascent Start: 18:22.26 UTC

Flew off to W 18:22.46

\*Line came off

Max Height: 100 m

Landed: 18:23.35 UTC

End Battery: 12.09 V

Ascent Start: 18:25.25

18:26.40 veered slightly east

18:31.40 reached 100m

Landed: 18:35.22 UTC

End Battery: 11.05 V

Remarks: The copter was programmed (with Mission Planner) to ascend 10 m and stop for 20 seconds before ascending another 10 m all the way up to 100 m. It rotated at some point in its flight before we noticed while it was descended. The rotation had a visible affect on the windsonde data. During its ascent, one windsonde was reading noticeably higher temperature values (5° C). However, after the copter rotated, the temperature values for the sondes levelled out and the sonde that was reading cooler temperatures started reading warmer temperatures. Then after it rotated back, the same sonde started reading cooler temperatures again. This could be caused by which sensor was on the side of the copter that was facing the sun. Even though the PVC pipes protect the sensors from direct sunlight, it does not protect from extra heating. We might need to add Styrofoam on the inside to insulate the sensor more.

Flight 2

Start Battery: 11.10 V

Start Direction: 330° N

Windsondes: 247 & 249

Ascent Start: 18:40.46 UTC

18:41.00 veered E

Coming Down: 18:44.00 UTC

End Battery: 7.89 V

18:44.10 Crash landed from ~ 45 m (damage)

Remarks: The copter was programmed (with Mission Planner) to ascend 10 m and stop for 10 seconds before ascending another 10 m all the way up to 100 m. It started descending because of low battery but then the battery voltage plummeted below 8 V (Failsafe: 10.5 V). We have never seen any battery get that low. Then the copter completely shut off and crashed landed. One arm broke in half and three of the four wooden boones were cracked. One prop flew off but we were able to recover it. Two of the four props are bent. However, there was no damage to the electric wiring. See pictures below.

For next time: There are multiple things we need before next time. Firstly, we need to figure out a way to insulate the PVC pipes better. We’ve only flown in the morning when it was cooler, so flying in hot sunny weather showed that the PVC pipes are not doing enough to insulate the sensors and block them from the sun’s heat. We need to replace the copters arm and the damaged props, reattach more wooden boones and the PVC pipes. We need to figure out why the battery voltage dropped so rapidly (heat?) and how to prevent it in the future.













