

**From:** Moat, Ben ben.moat@noc.ac.uk  
**Subject:** Re: CFD results for the RV Knorr  
**Date:** April 3, 2014 at 5:39 AM  
**To:** Ludovic Bariteau ludovic.bariteau@noaa.gov  
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Hi Ludovic,

I have checked our tilt measurement and found an error in the script – sorry about that.  
The updated tilts are highlighted below, but are still of the order of 2 to 3 degrees, rather than 5.

We have also seen discrepancies between the model tilt from the CFD models and the measurements.  
We tend not to think of the tilt as a measure of airflow distortion, e.g. you can still have high airflow distortion with low tilt values.

Therefore we have never adjusted our wind speed errors based on the tilt.

I assume the 5 degree tilt from the NOAA sonic is absolute tilt (earth frame co-ordinates).  
We define the model tilt as the angle of the airflow at the anemometer and is calculated from the u, v, and w components of the velocity.

I hope this helps,  
Ben

#### **RV knorr 0 degrees (flow directly over the bow)**

##### **UH Sonic (42.976,16.29,-0.17)**

Vertical displacement of the flow = 0.475 m

Mean velocity at the anemometer location = 15.316 m/s

Freestream velocity at the height of the anemometer = 15.713 m/s

Free stream velocity at the height the airflow originated = 15.674 m/s

Wind speed error without vertical displacement = -2.52 %

Wind speed error with vertical displacement = -2.282 %

Tilt = **2.63** degrees

##### **NOAA Sonic (42.671, 15.91, 0.79)**

Vertical displacement of the flow = 0.497 m

Mean velocity at the anemometer location = 15.290 m/s

Freestream velocity at the height of the anemometer = 15.682 m/s

Free stream velocity at the height the airflow originated = 15.642 m/s

Wind speed error without vertical displacement = -2.497 %

Wind speed error with vertical displacement = -2.245 %

Tilt = **2.75** degrees

##### **PML Sonic (24.687, 20.298, 0 )**

Vertical displacement of the flow = 1.18 m

Mean velocity at the anemometer location = 15.854 m/s

Freestream velocity at the height of the anemometer = 16.018 m/s

Free stream velocity at the height the airflow originated = 15.937 m/s

Wind speed error without vertical displacement = -1.023 %

Wind speed error with vertical displacement = -0.517 %

Tilt = **3.16** degrees

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