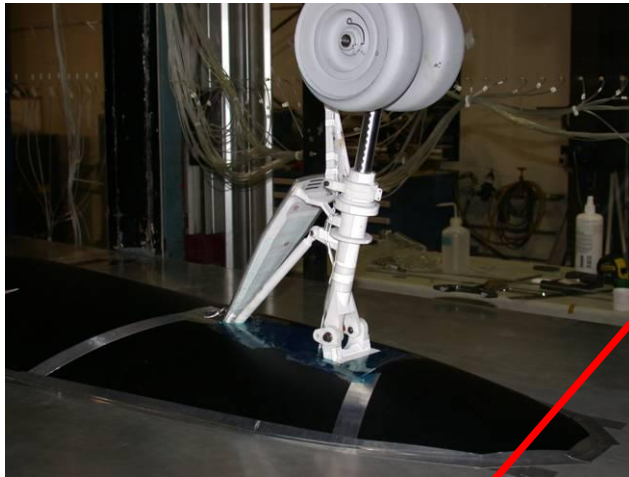
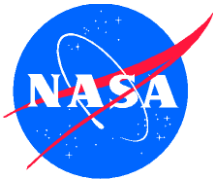

Additional On-Surface and Off-Surface Aerodynamic Data for Partially-Dressed Cavity-Closed Nose Landing Gear Benchmark (PDCC-NLG)

Mehdi R. Khorrami and Dan H. Neuhart
NASA Langley Research Center

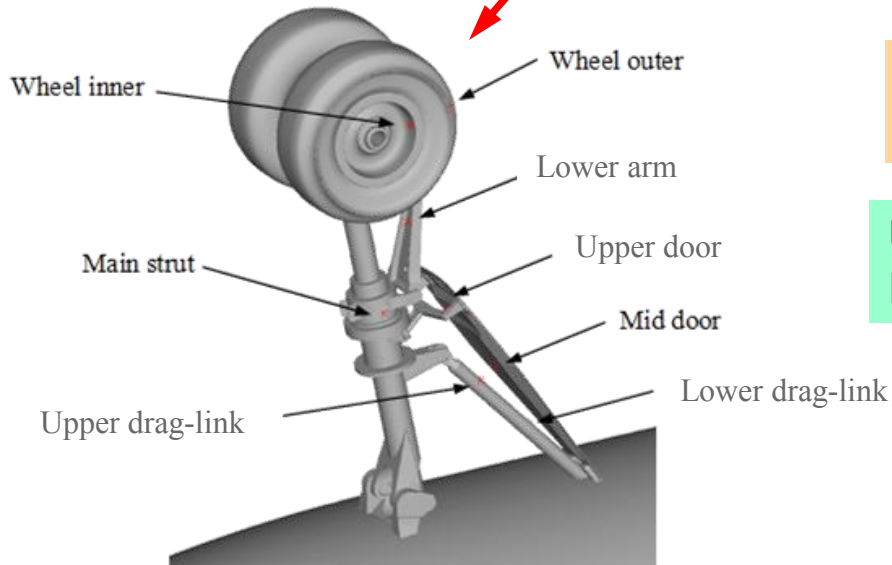
Workshop on Benchmark problems for Airframe Noise Computations
(BANC-1)

Stockholm, Sweden, June 10-11, 2010

PDCC - NLG



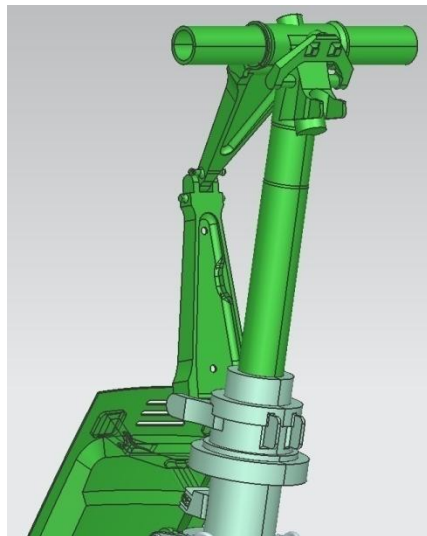
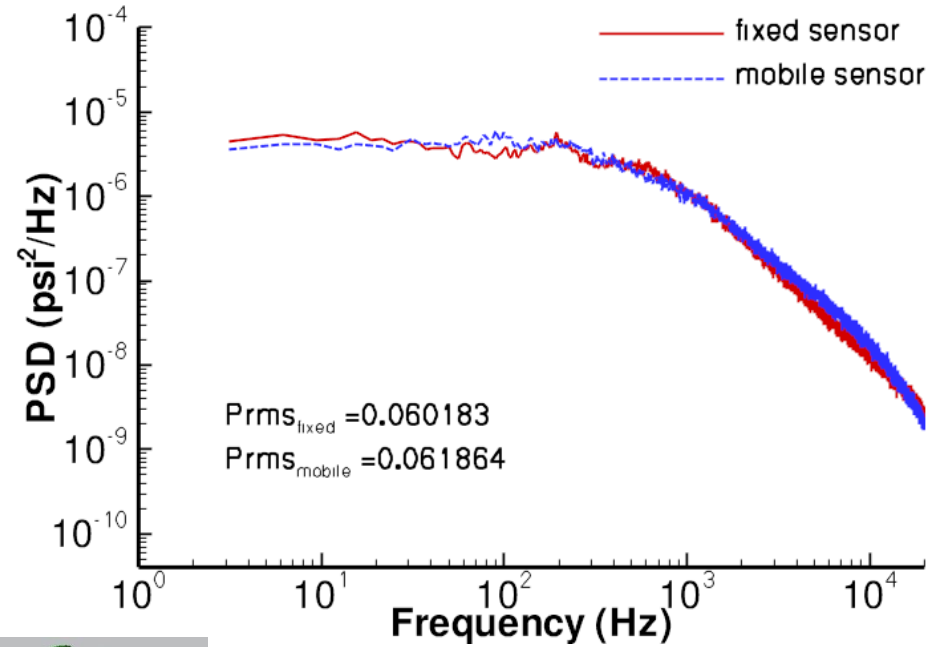
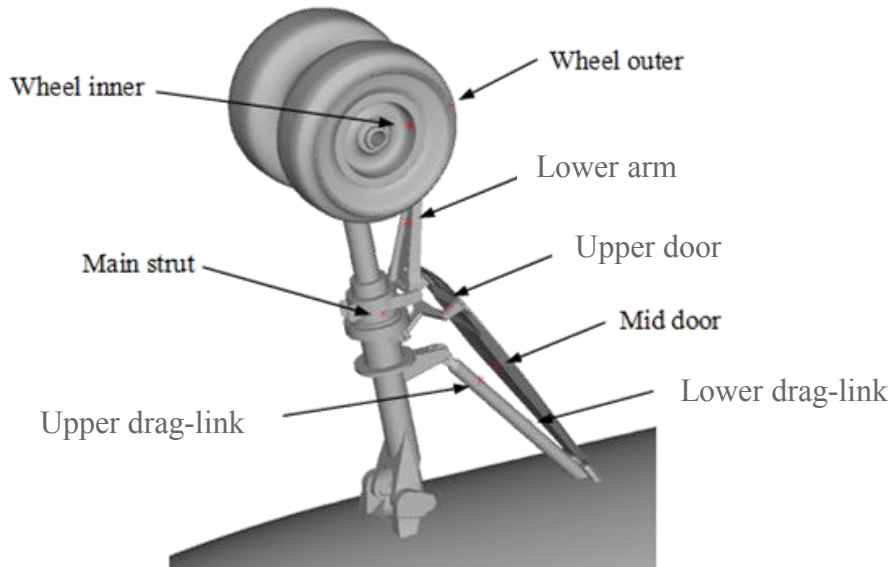
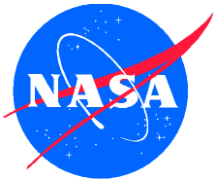
- 11 Dynamic Pressure Transducers (1 Roving)
- ~123 Static Pressure Ports
- Mobile sensor placed at various hot spots during 2008 entry



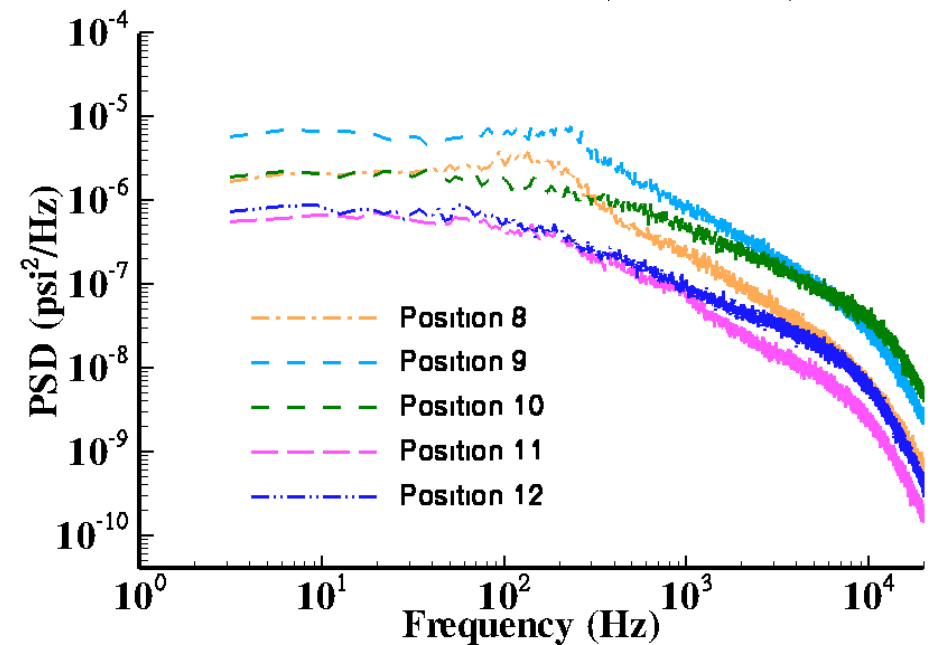
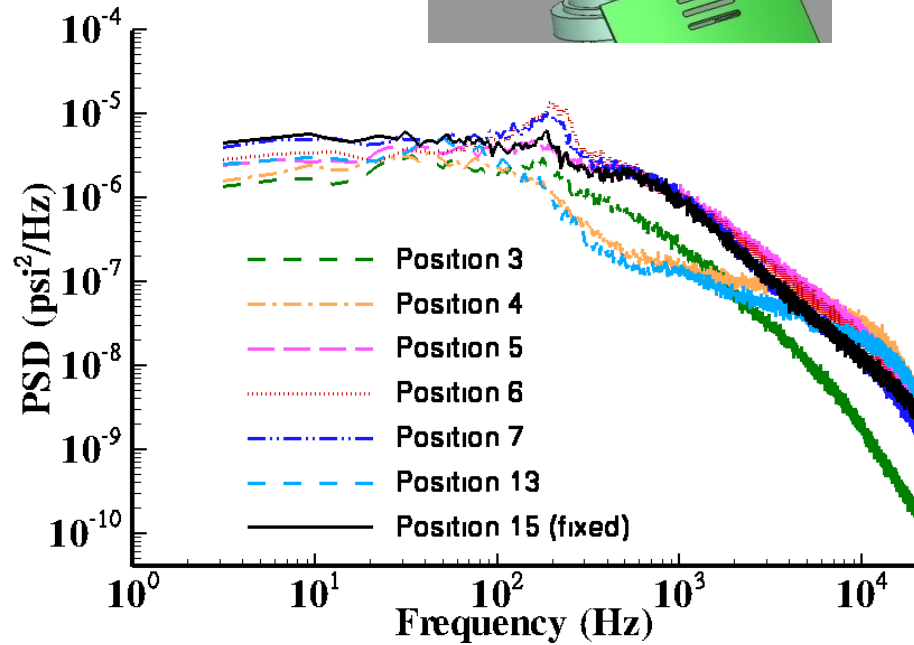
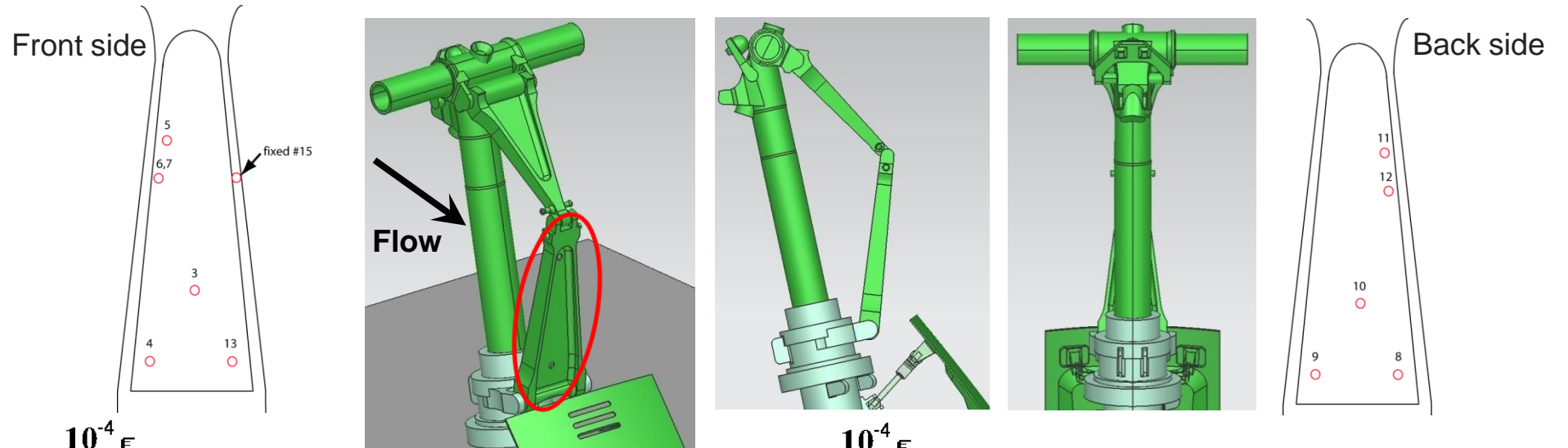
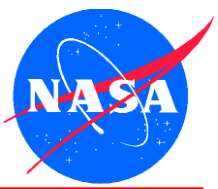
Unsteady pressures (fixed probes) + PIV data
D. H. Neuhart et al. [AIAA 2009-3152]

Unsteady pressures (mobile sensor) + additional PIV data provide further insight into flow field

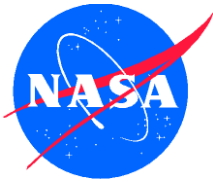
Fixed vs. Mobile Sensor



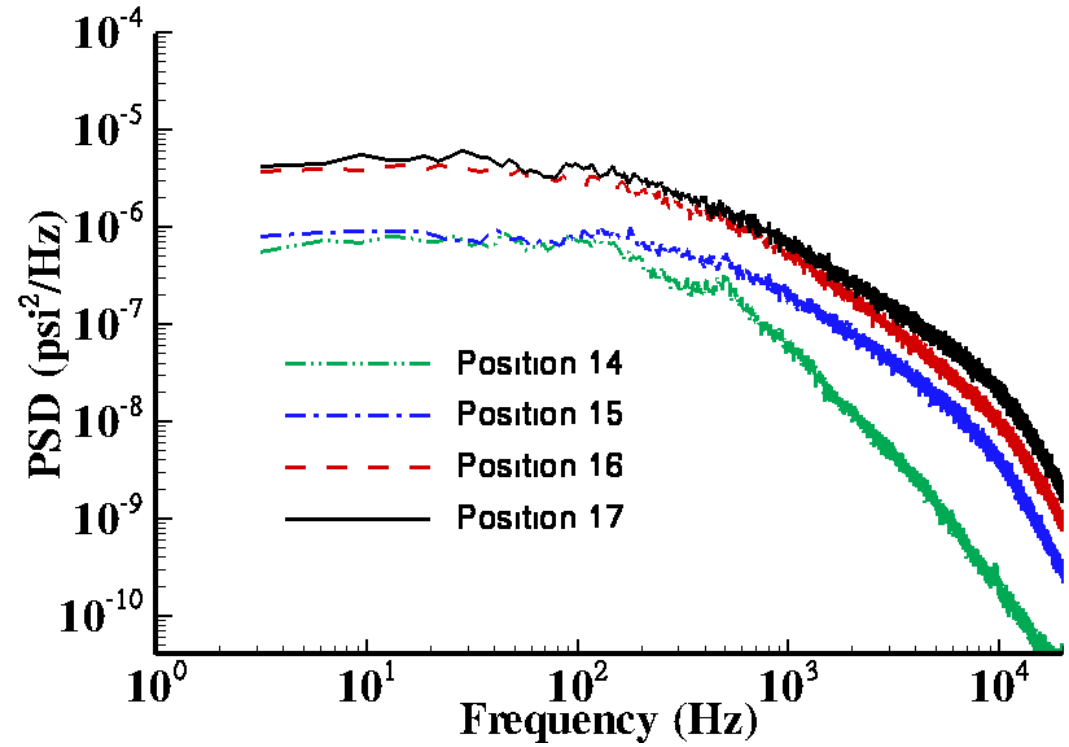
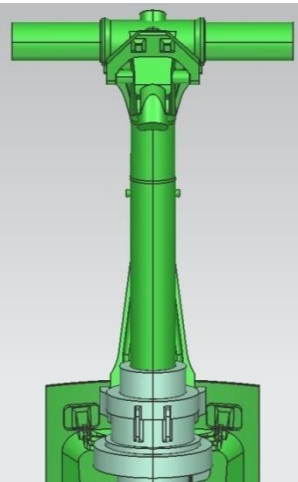
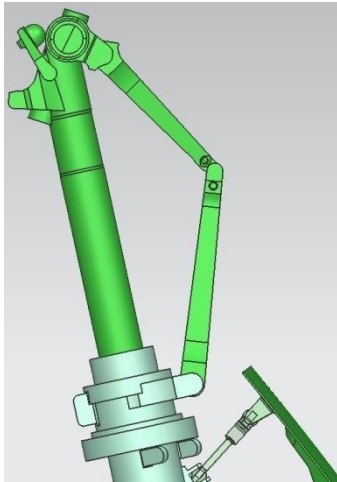
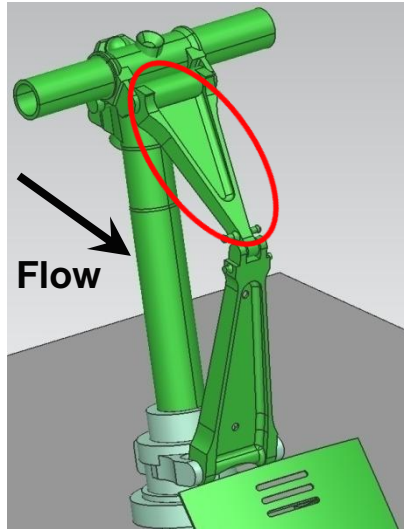
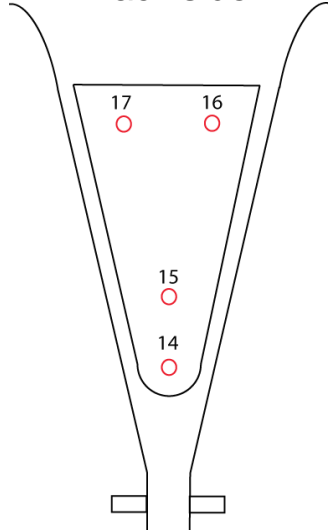
Lower Torque-Arm



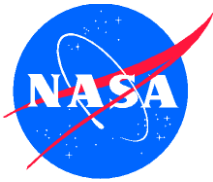
Upper Torque-Arm



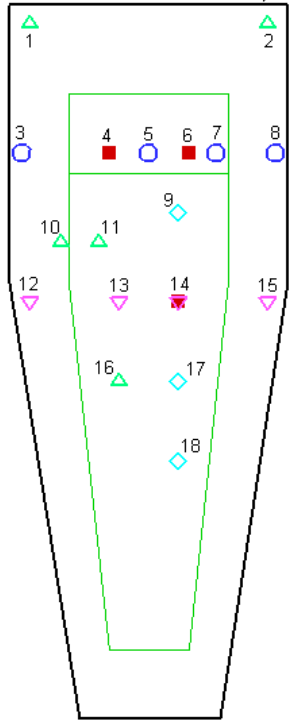
Back side



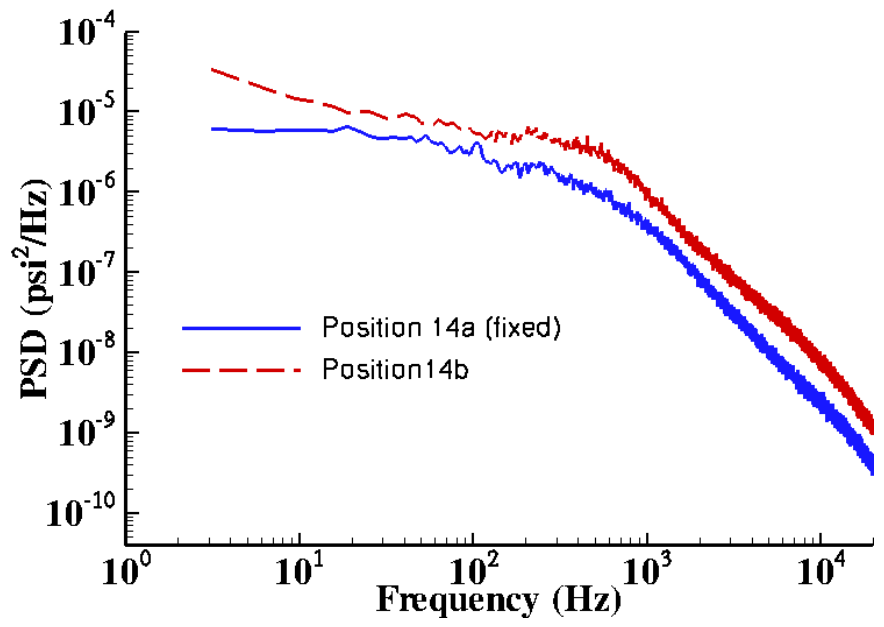
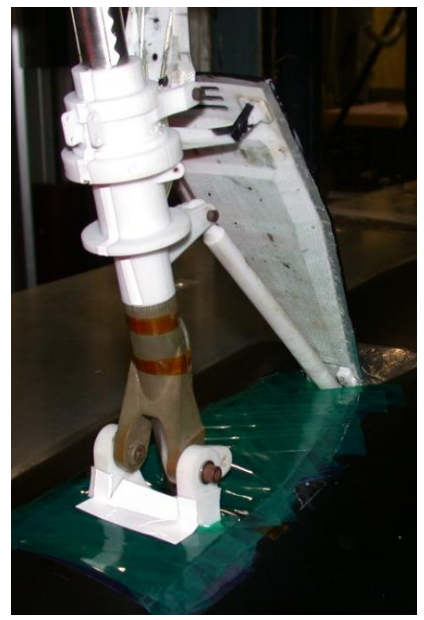
Door Front Side



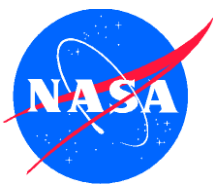
Starboard side



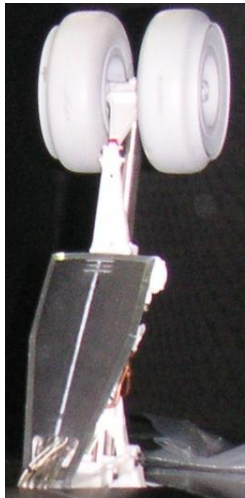
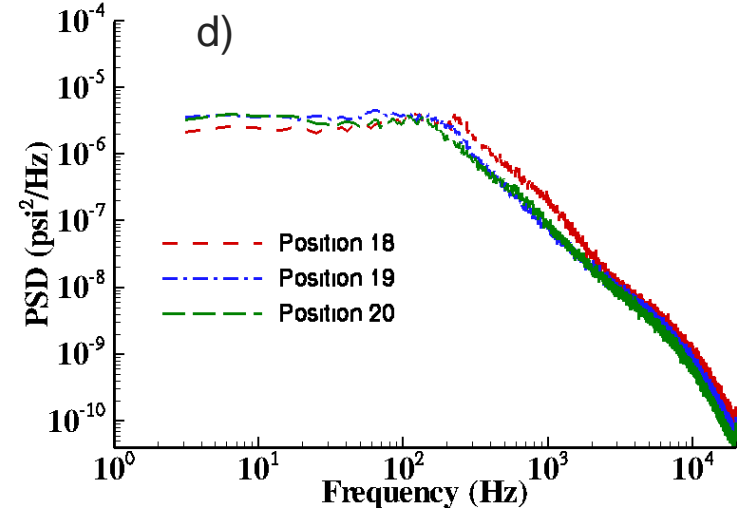
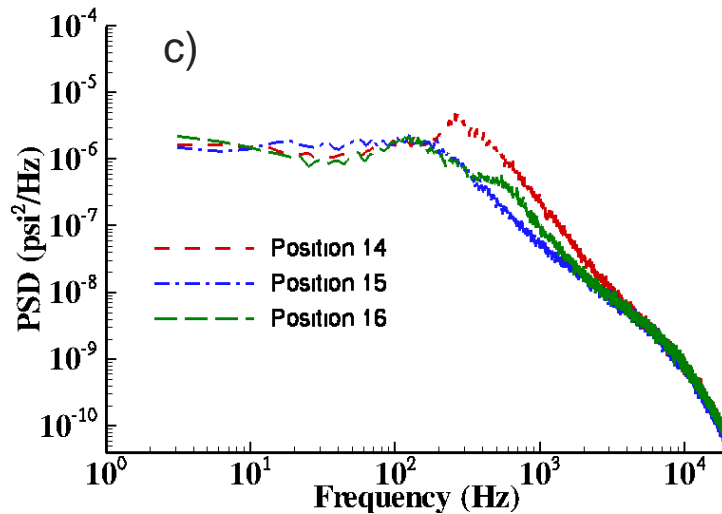
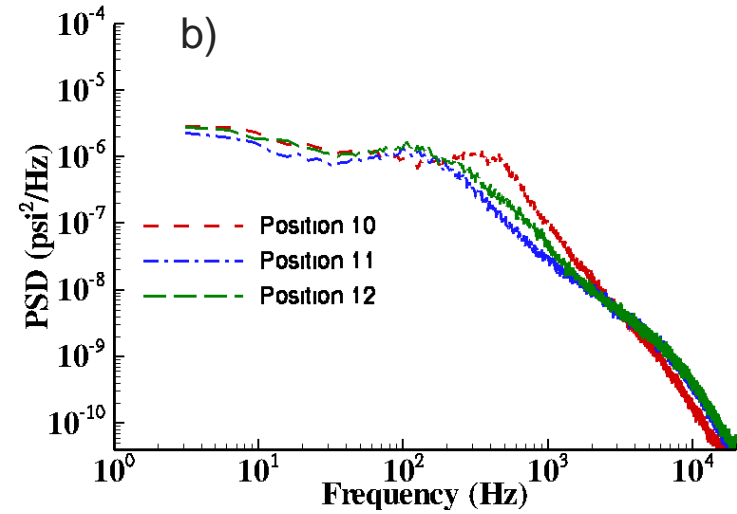
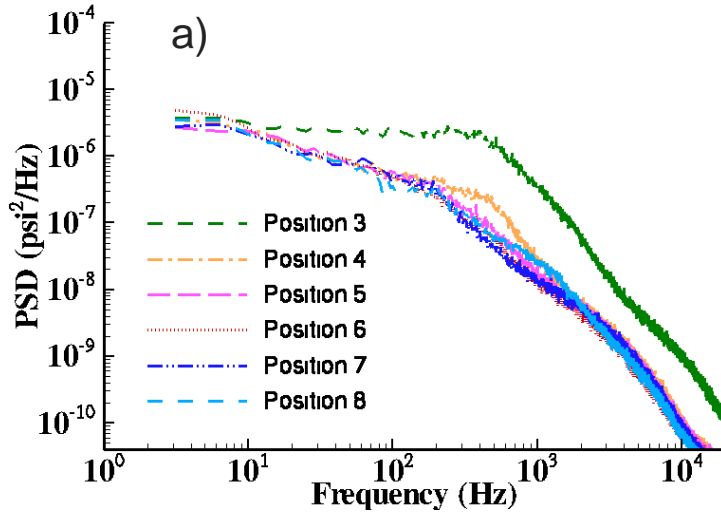
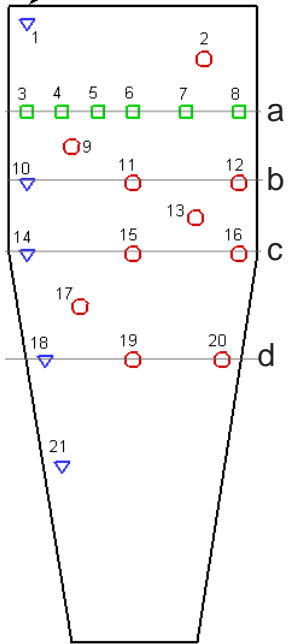
- Existing kulite locations
- 1st horizontal row
- ▽ 2nd horizontal row
- ◇ Vertical row
- △ Additional locations



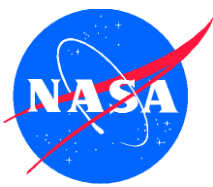
Door Backside (Horizontal Rows)



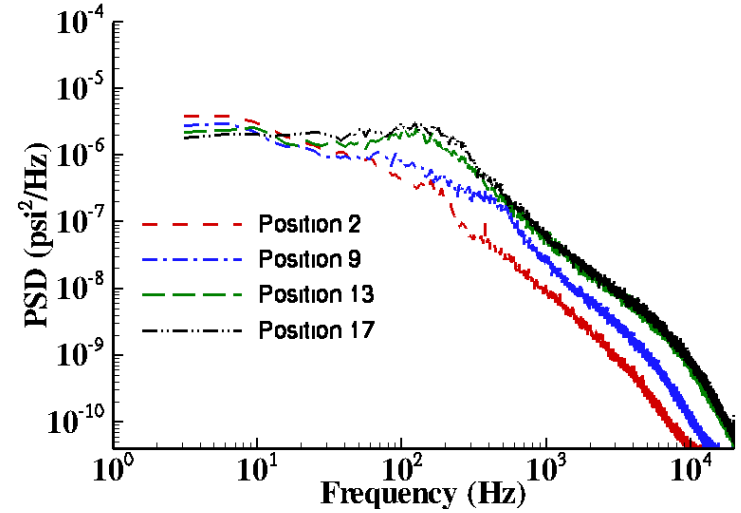
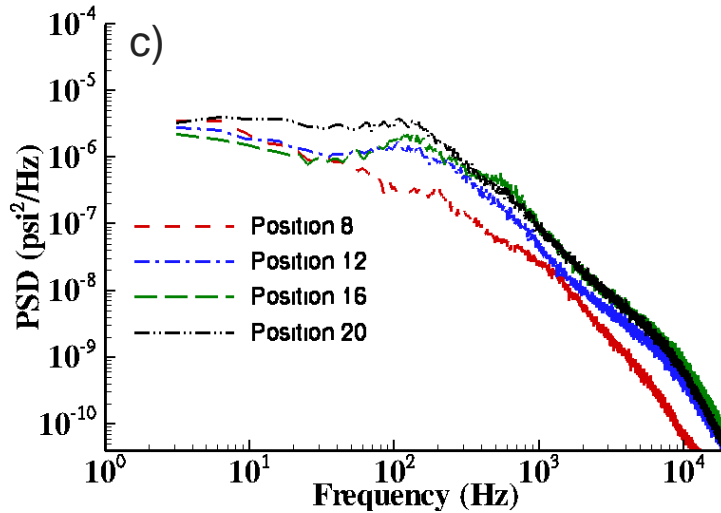
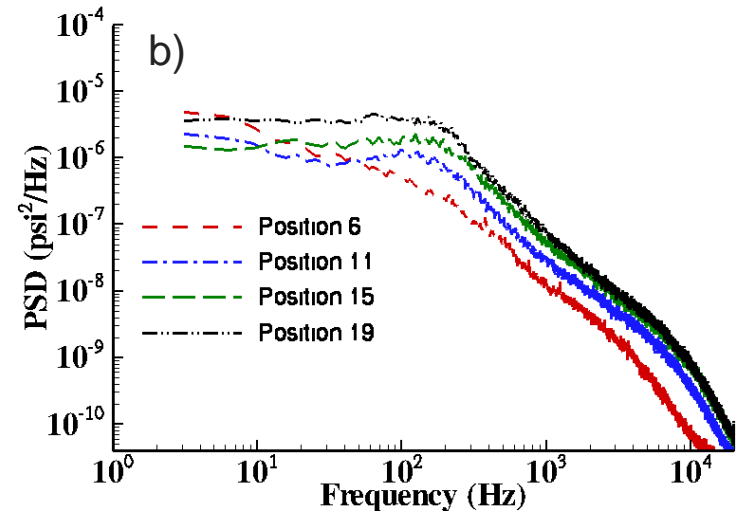
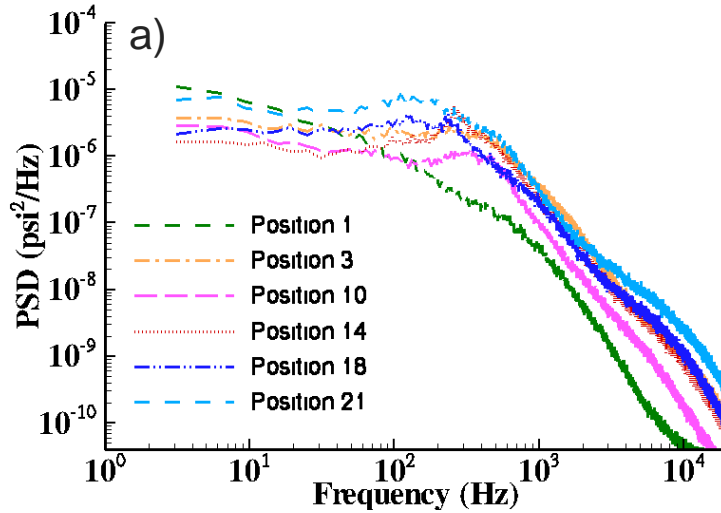
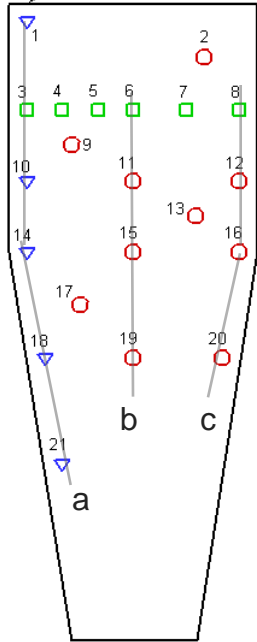
Starboard side



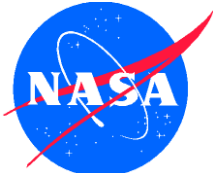
Door Backside (Vertical Rows)



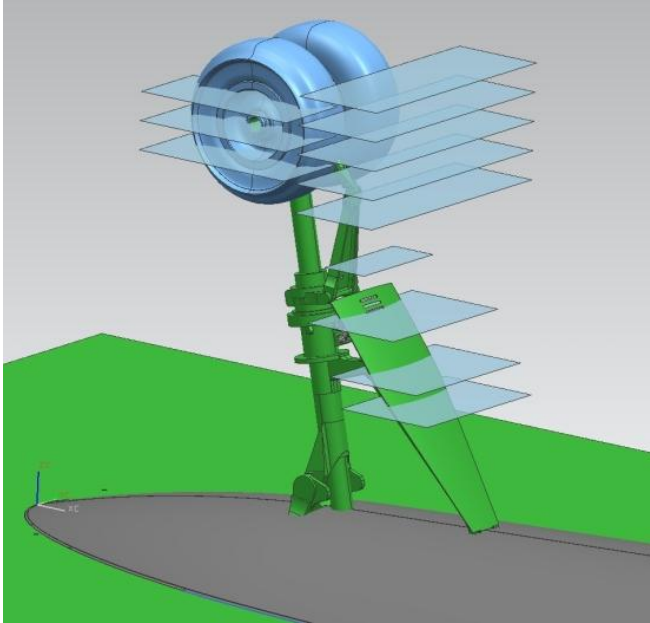
Starboard side



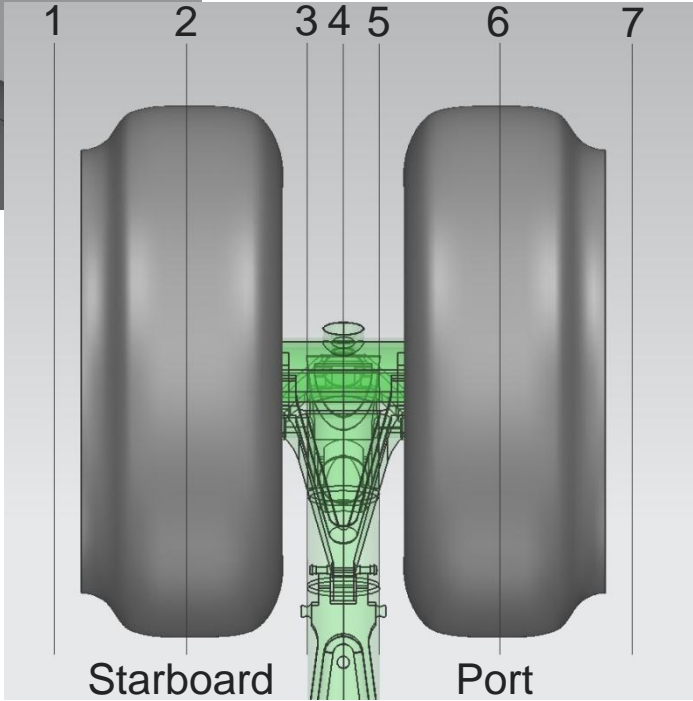
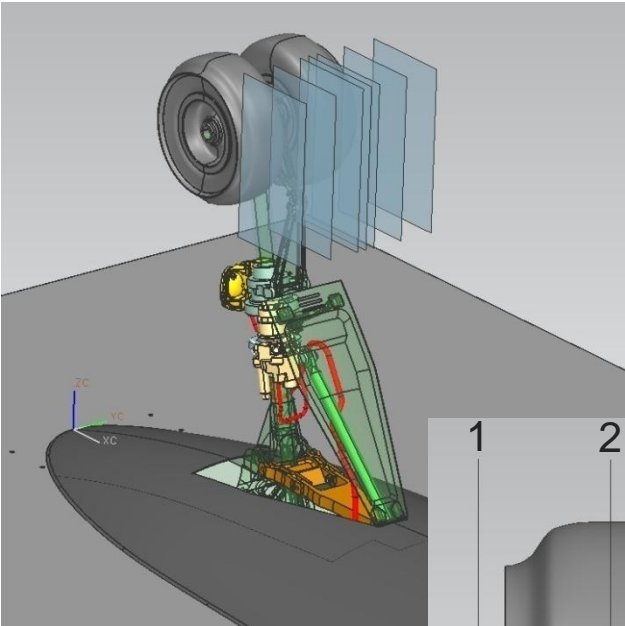
PIV Planes



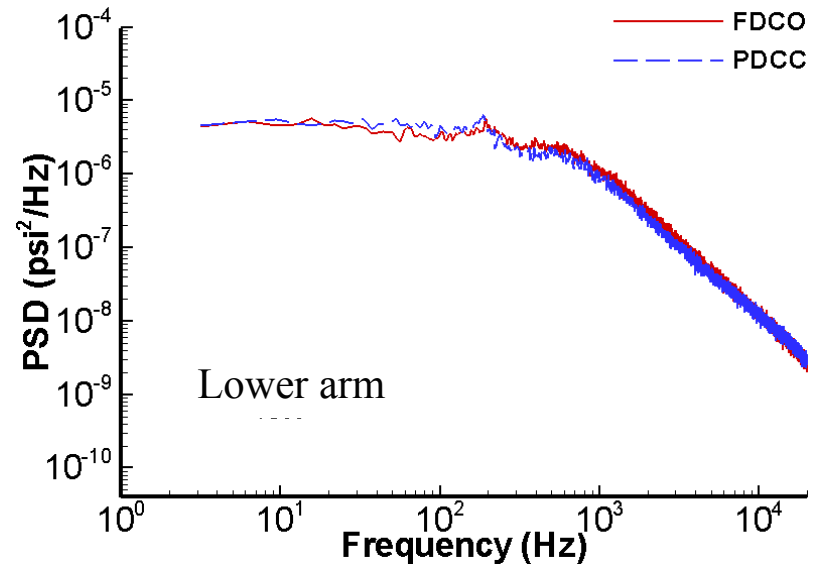
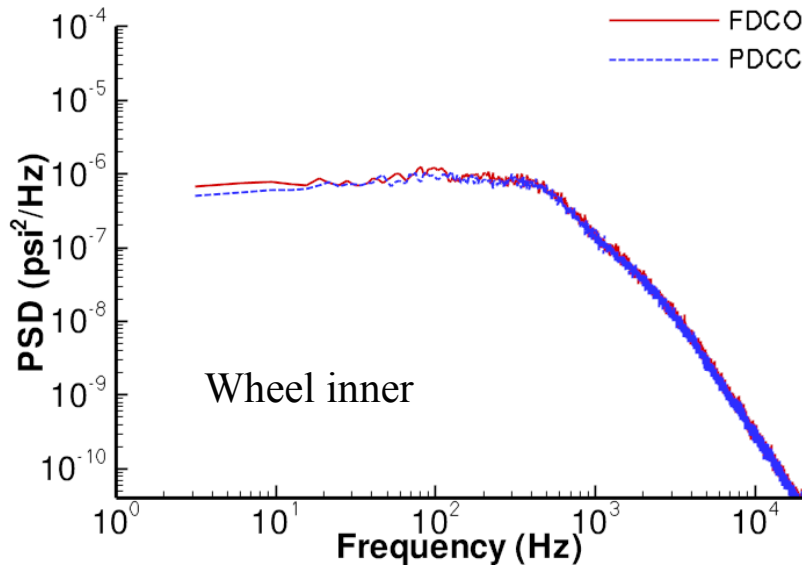
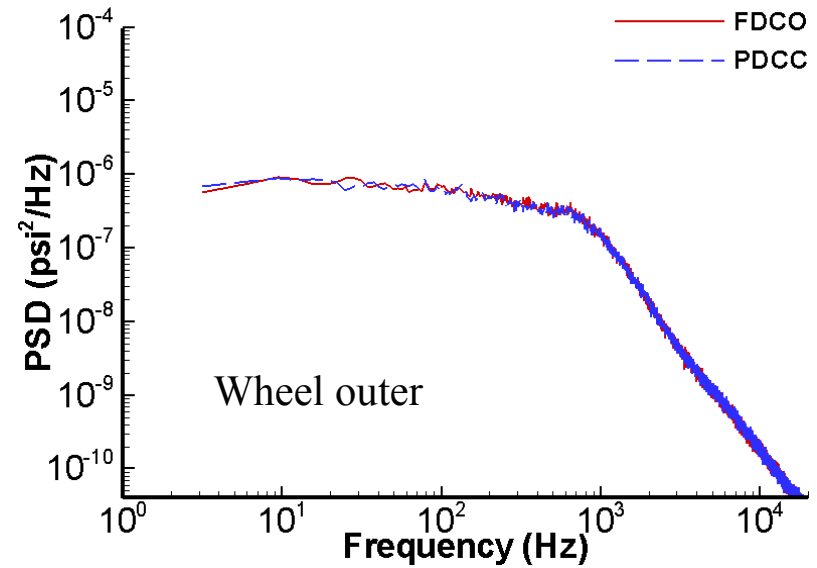
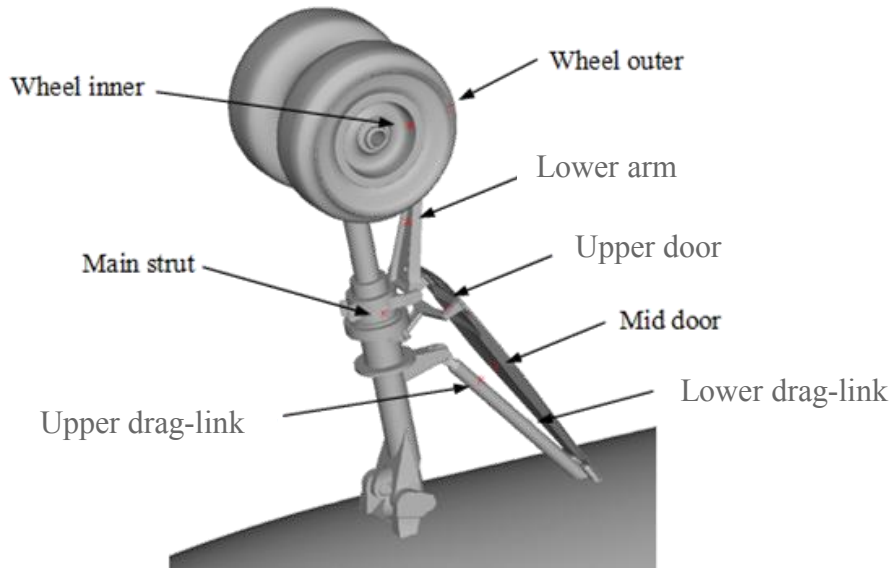
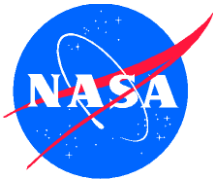
2008



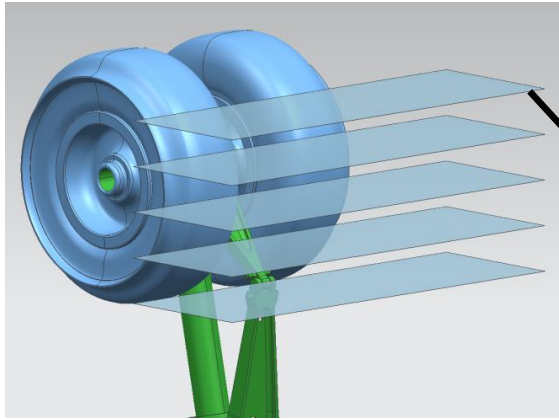
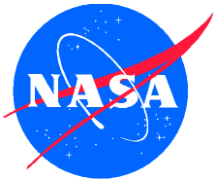
2007



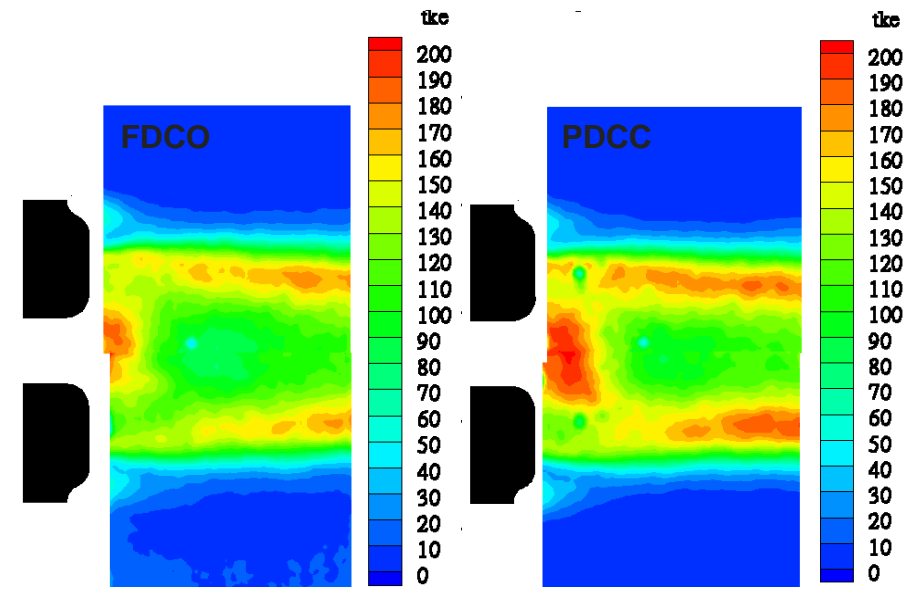
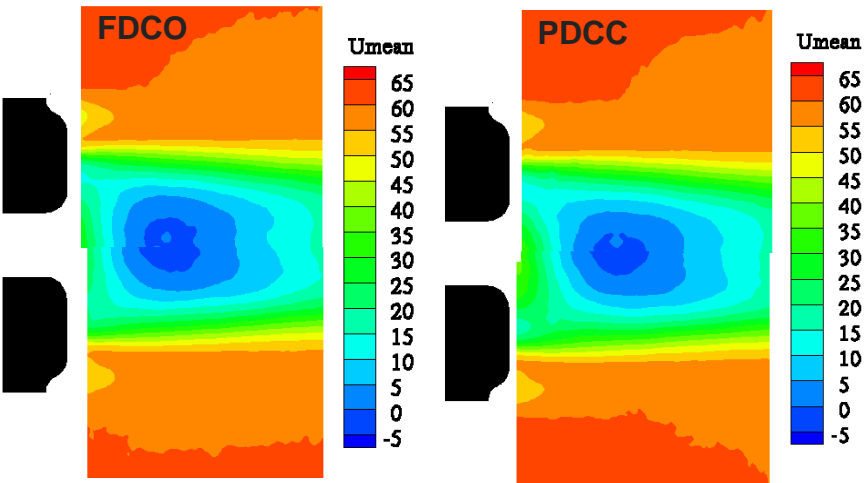
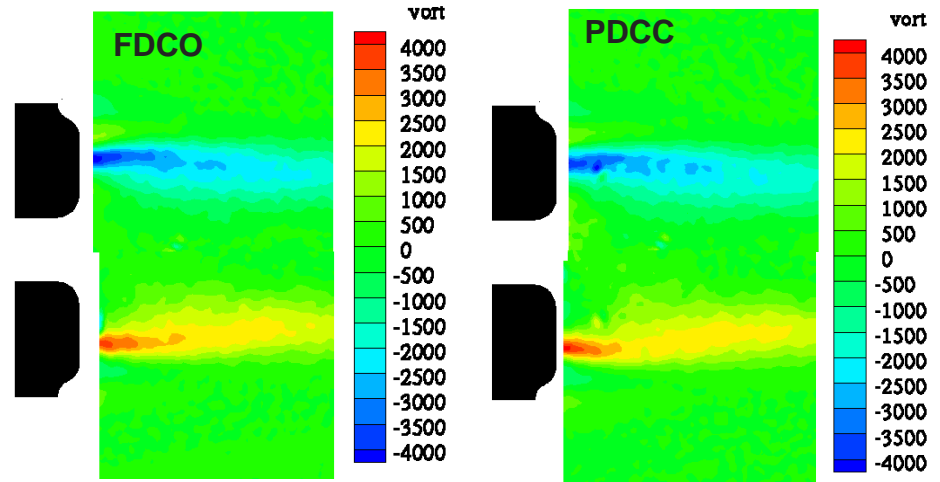
PDCC vs. FDCO Surface Pressures



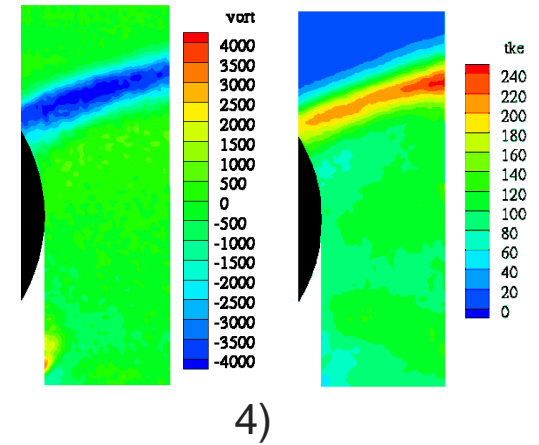
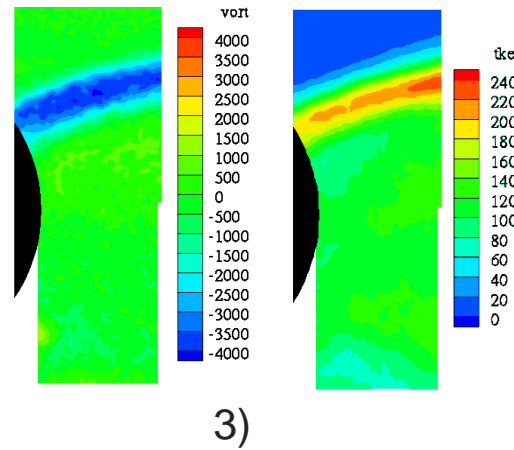
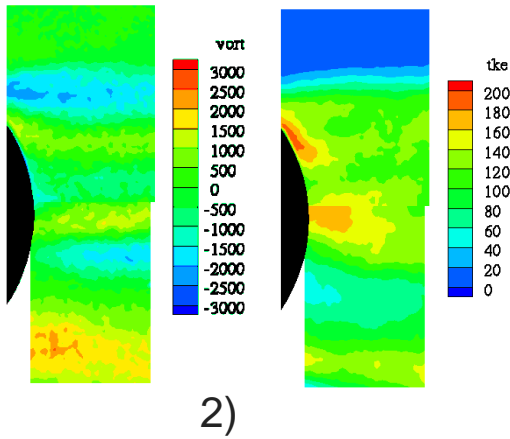
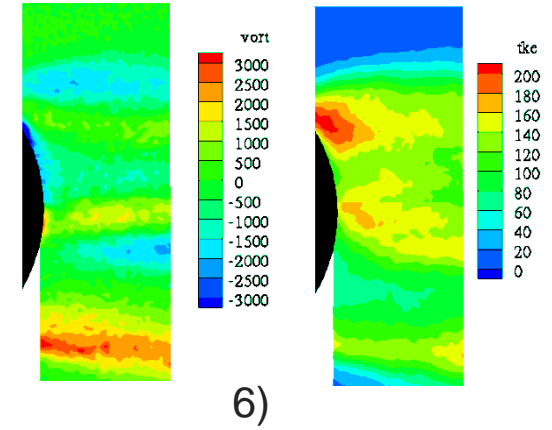
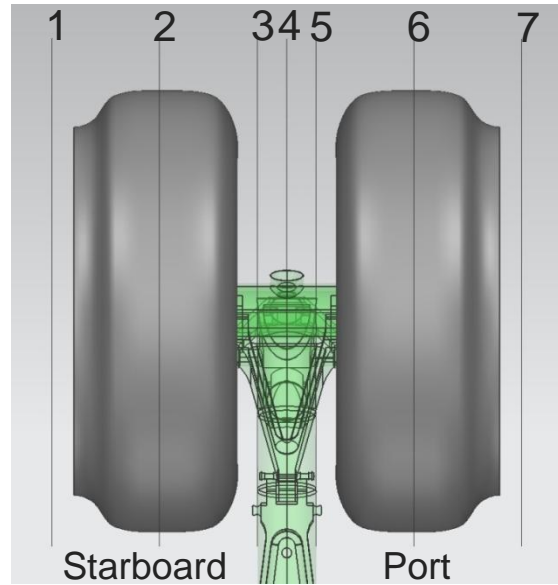
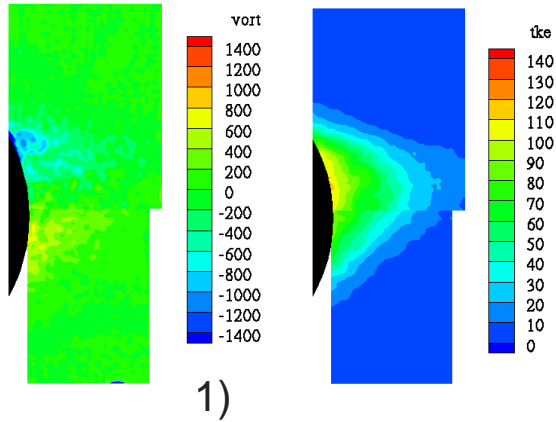
FDCO vs PDCC Comparison



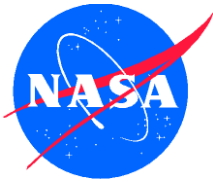
Displayed plane



X-Z Plane PIV Measurements



Summary



- **Unsteady surface pressures from the mobile sensor confirm the broadband nature of, and lack of any tonal character in, the pressure field, corroborating previous results obtained with the fixed sensors**
- **The shock-strut torque-arm combination produces flow interactions reminiscent of tandem cylinder flow field**
- **The X-Z PIV planes downstream of the wheels show the wake to be symmetric**
- **A collective decision must be made as to whether the present data should be added to the PDCC-NLG dataset**
- **What more can be done and how else can we improve the dataset for the PDCC-NLG benchmark?**

Backup Charts

