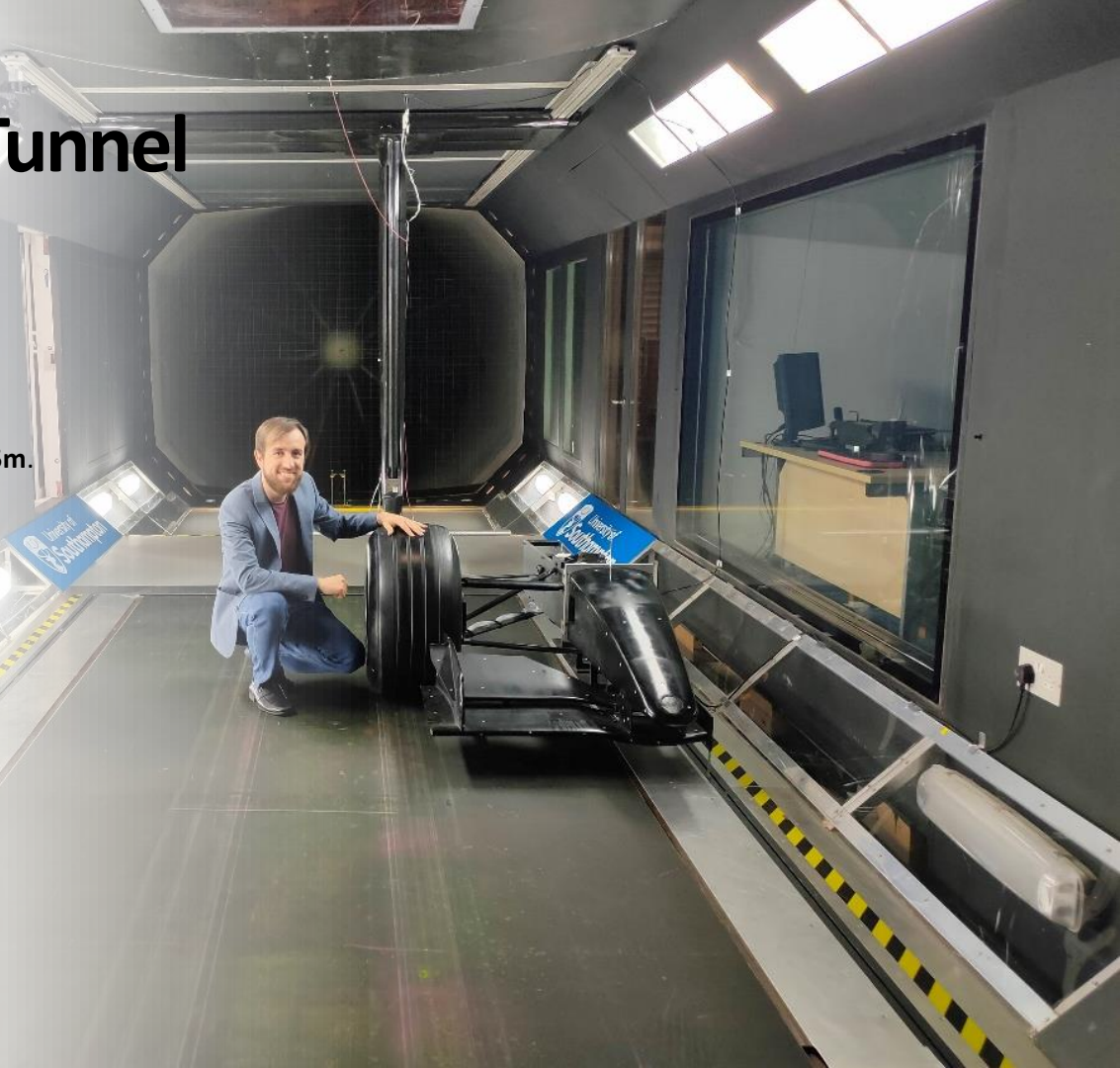
R.J. Mitchell Wind Tunnel

University of Southampton
UK

- Largest university-owned wind tunnel in the UK:
  - 11x8[ft] working section: **3.5m x 2.4m, 10.5m**.
  - Wind speed from **2.5 to 40 m/s**, <0.2% I.
  - Moving ground available: **1.95m x 4m belt**.
- In-model or overhead balance options, **automated yaw angle** and **ride heights**.
- 2D remote controlled traverse for flow analysis.
- Temperature-controlled freestream: **[7 - 40°C]**
- Available for commercial use (approx. **2900 £/day** - excl. VAT)



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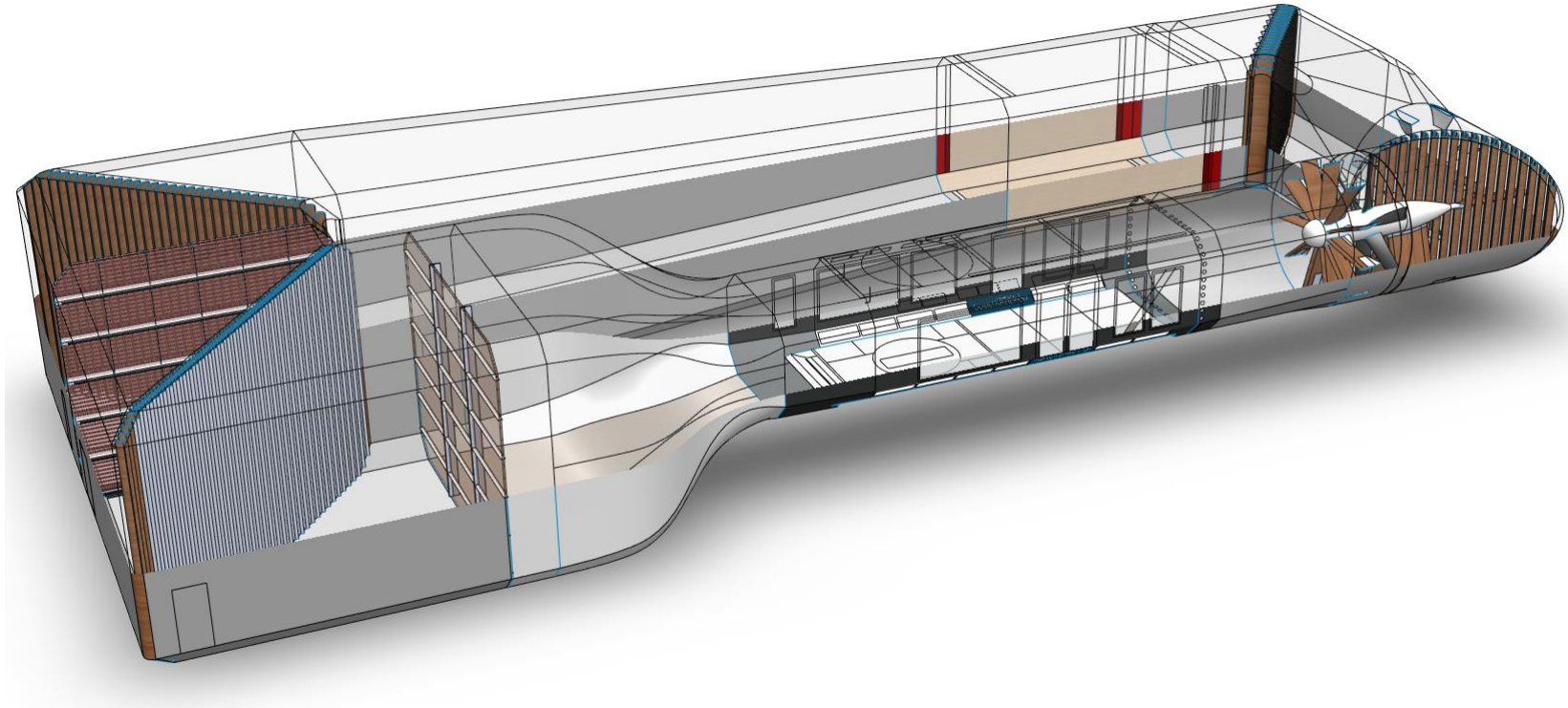
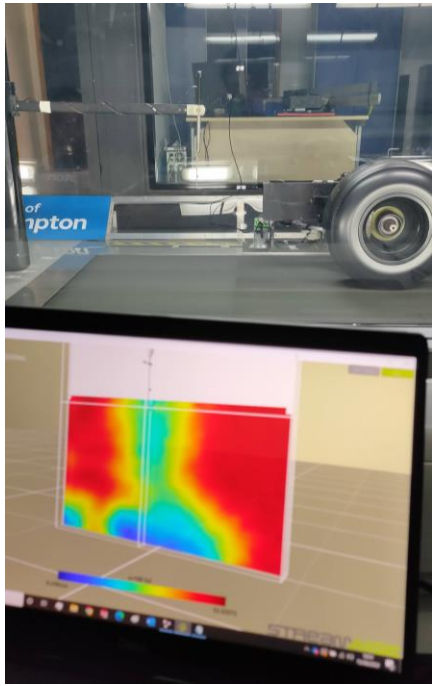


Full-scale F1 legacy setup

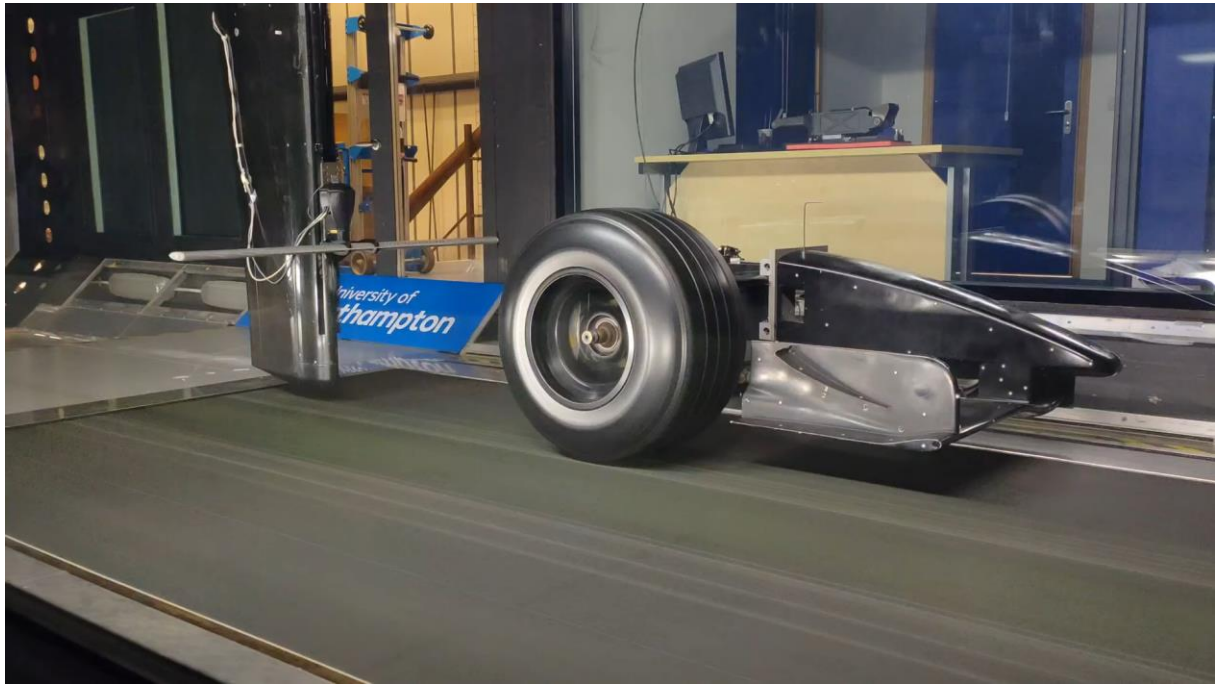
Wheel wake mapping – 5-hole probe (pressure and 3D velocity properties)



- ProCap system: 5-hope probe with motion tracking
- Both pressure and converted 3D velocity vector mapping.
- Ideal for qualitative analysis prior high-accuracy methods.

Full-scale F1 legacy setup

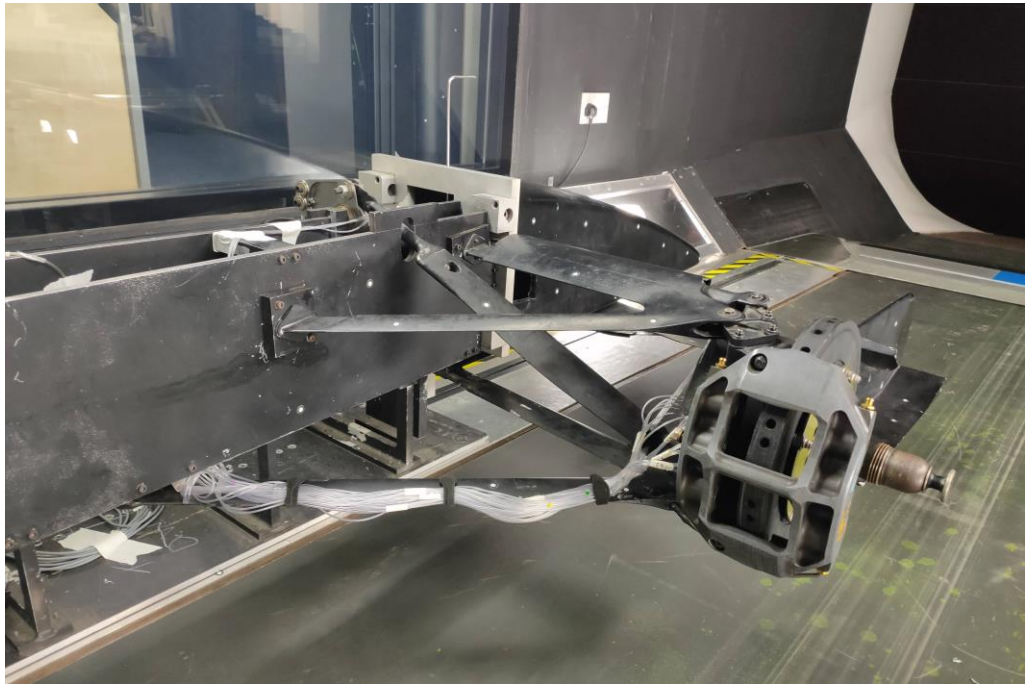
Wheel wake mapping – Linear pressure rake

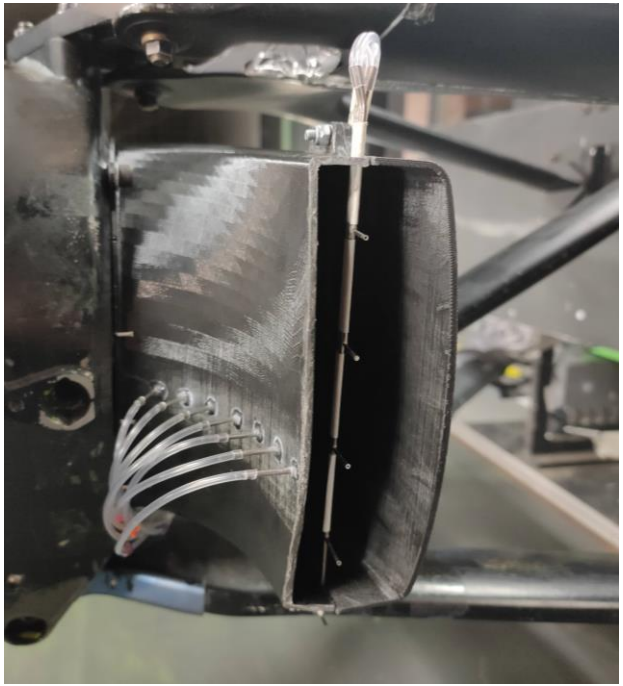


- Linear Pressure Rake: 53 stagnation probes
- Support strut automated into the crossflow plane (2D remote control)

Full-scale F1 legacy setup

Brake cooling intake – Experimental flow analysis





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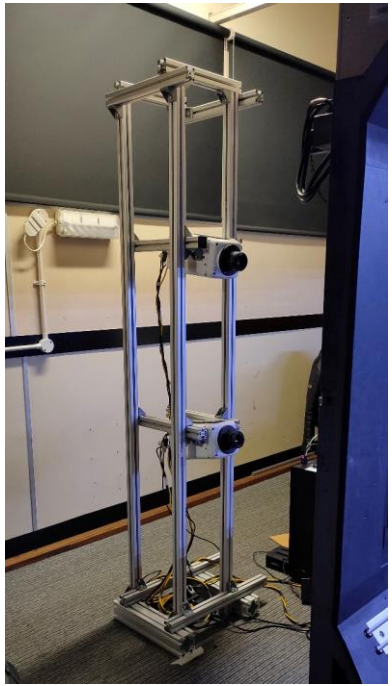
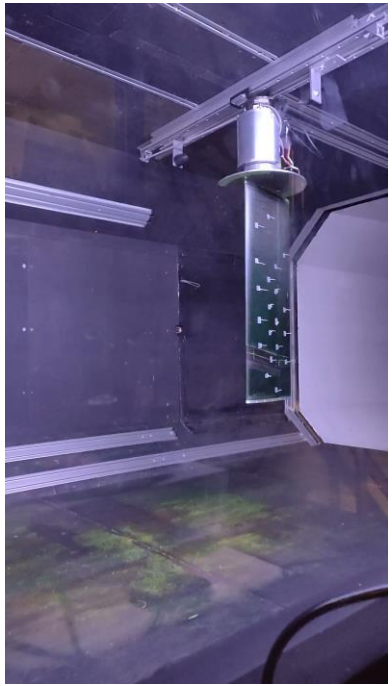
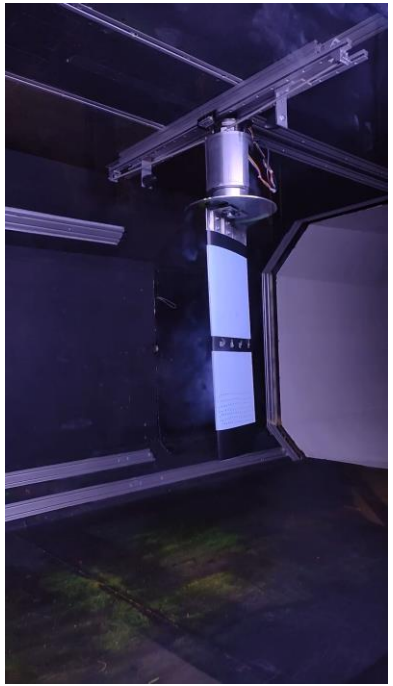
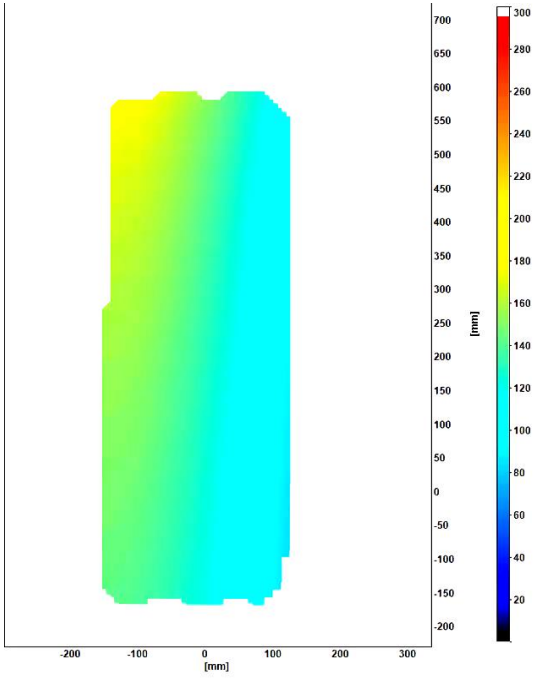
Rigid and flexible wings – Digital image correlation (DIC) method









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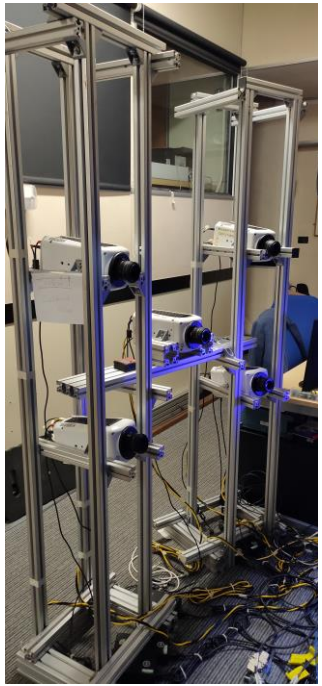
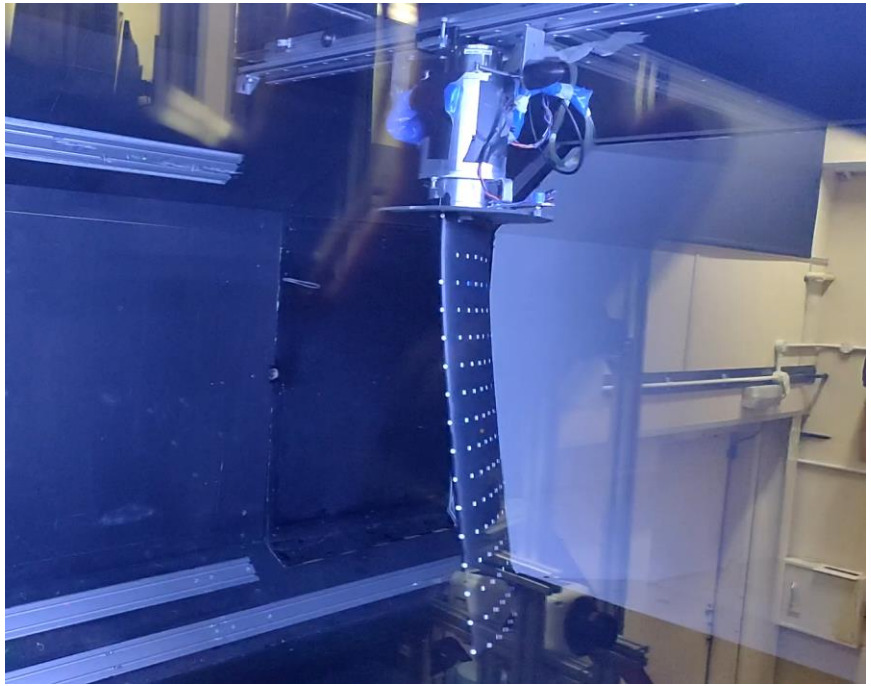
Rigid and flexible wings – PTV method





- Attempt to track both flow and body motion with a non-intrusive technique (PTV).
- Added in-house tracking solutions in heave and pitch motions for validation purposes.

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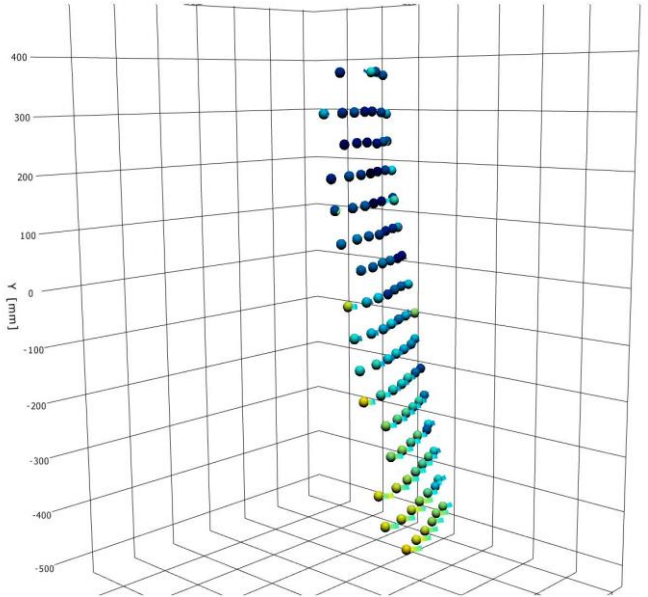
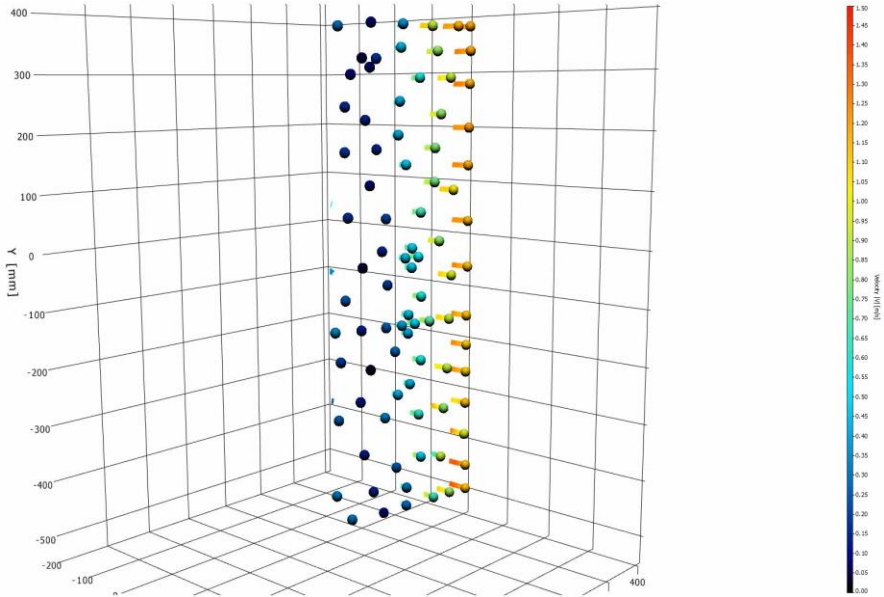
Body motion by PTV





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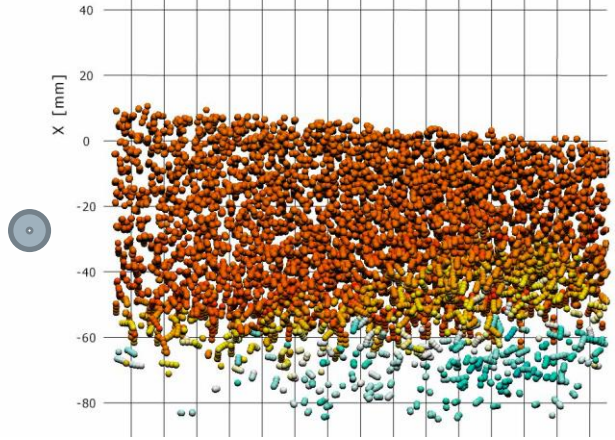
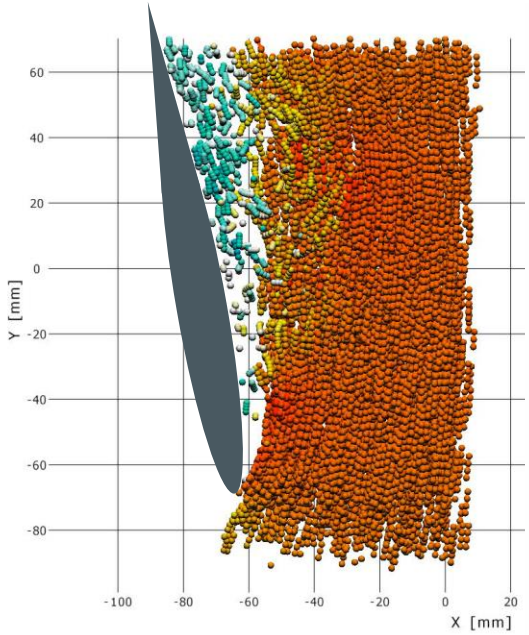
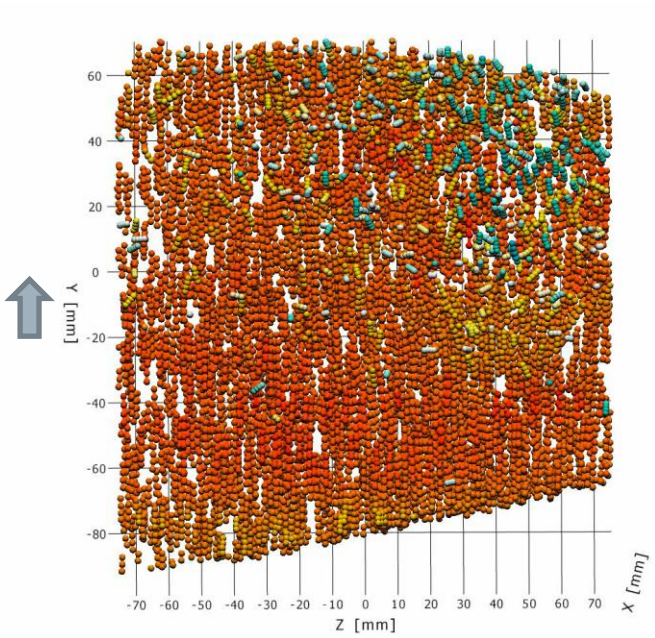
Independent PTV validation project

- NACA0012, 12deg
- 12 deg





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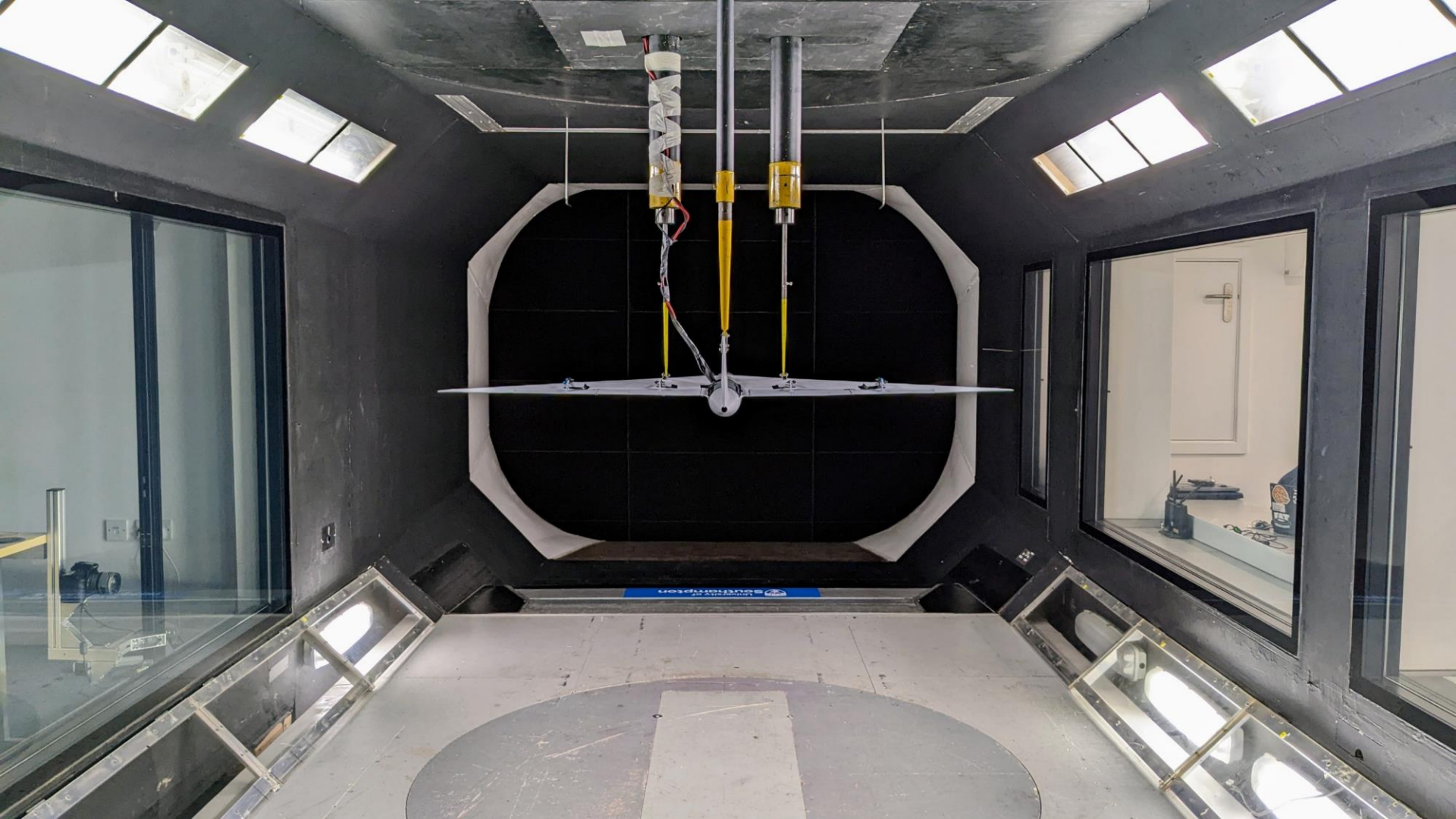
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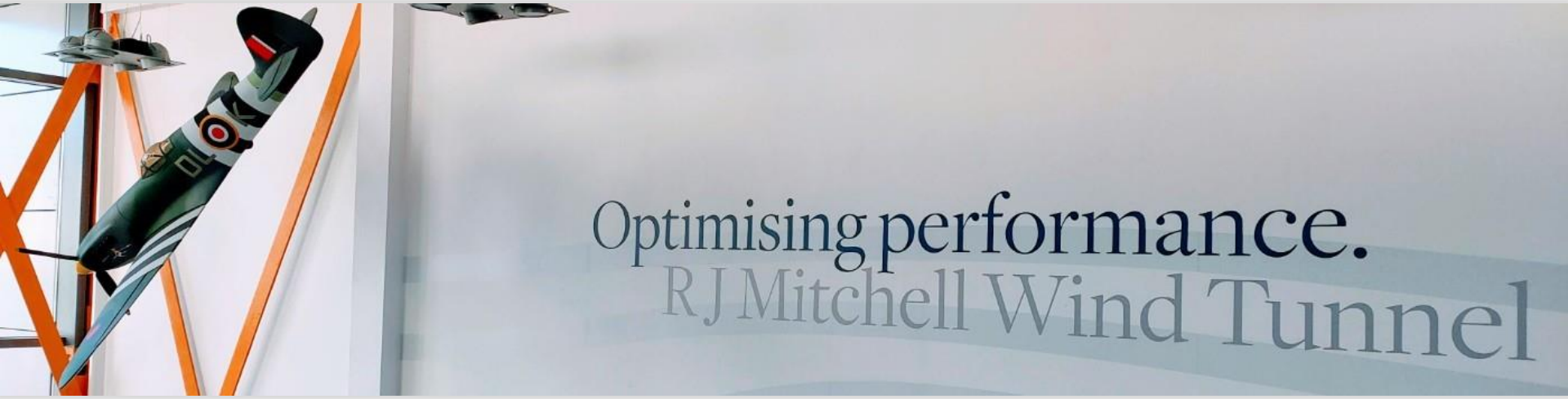

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Thank You!

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