Laminar Flow Tunnel of Liverpool

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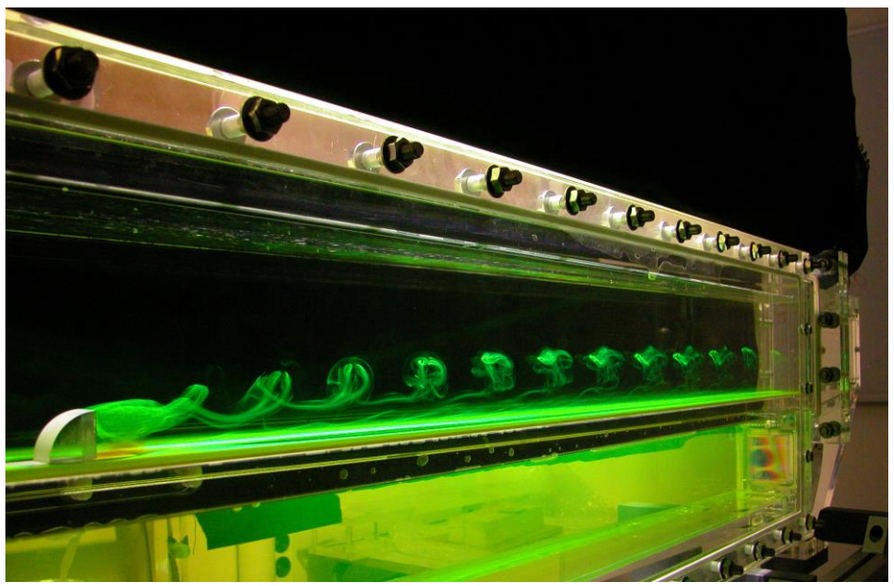
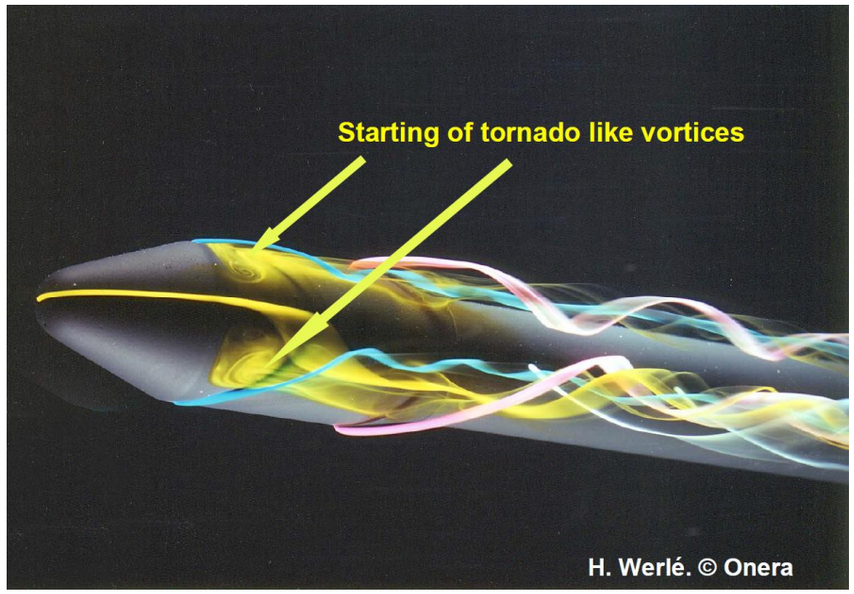
The project

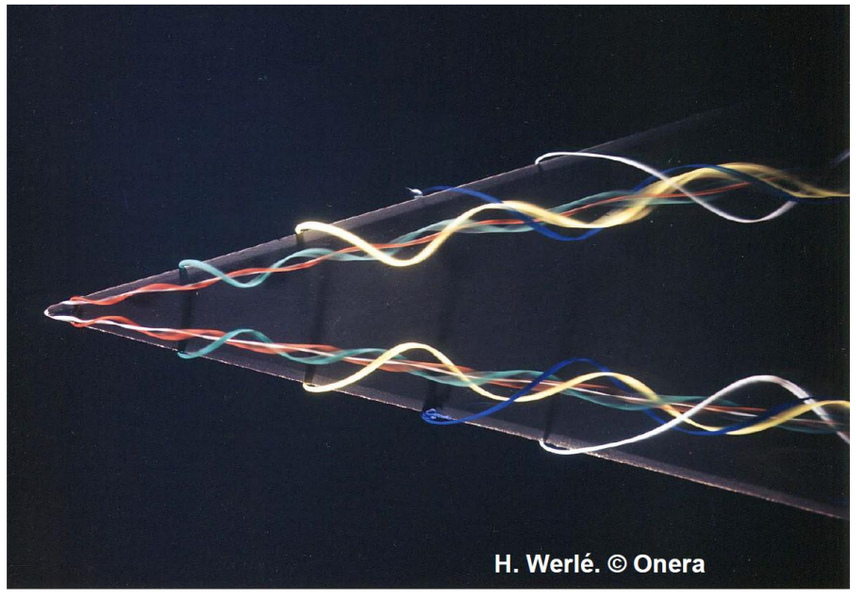
3D complex laminar flow physics of separated flows

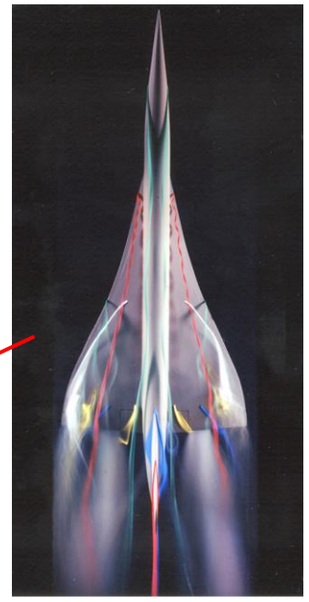


- **Aerodynamics**
  - A stepping stone for understanding the complex wake dynamics at higher Reynolds numbers
  - Verification of DNS and global stability analysis predictions
- **Non-Newtonian and Biological flows**
  - Viscoelastic flows past 3D objects
  - Fluid structure interaction (flagella, cilia)

The background





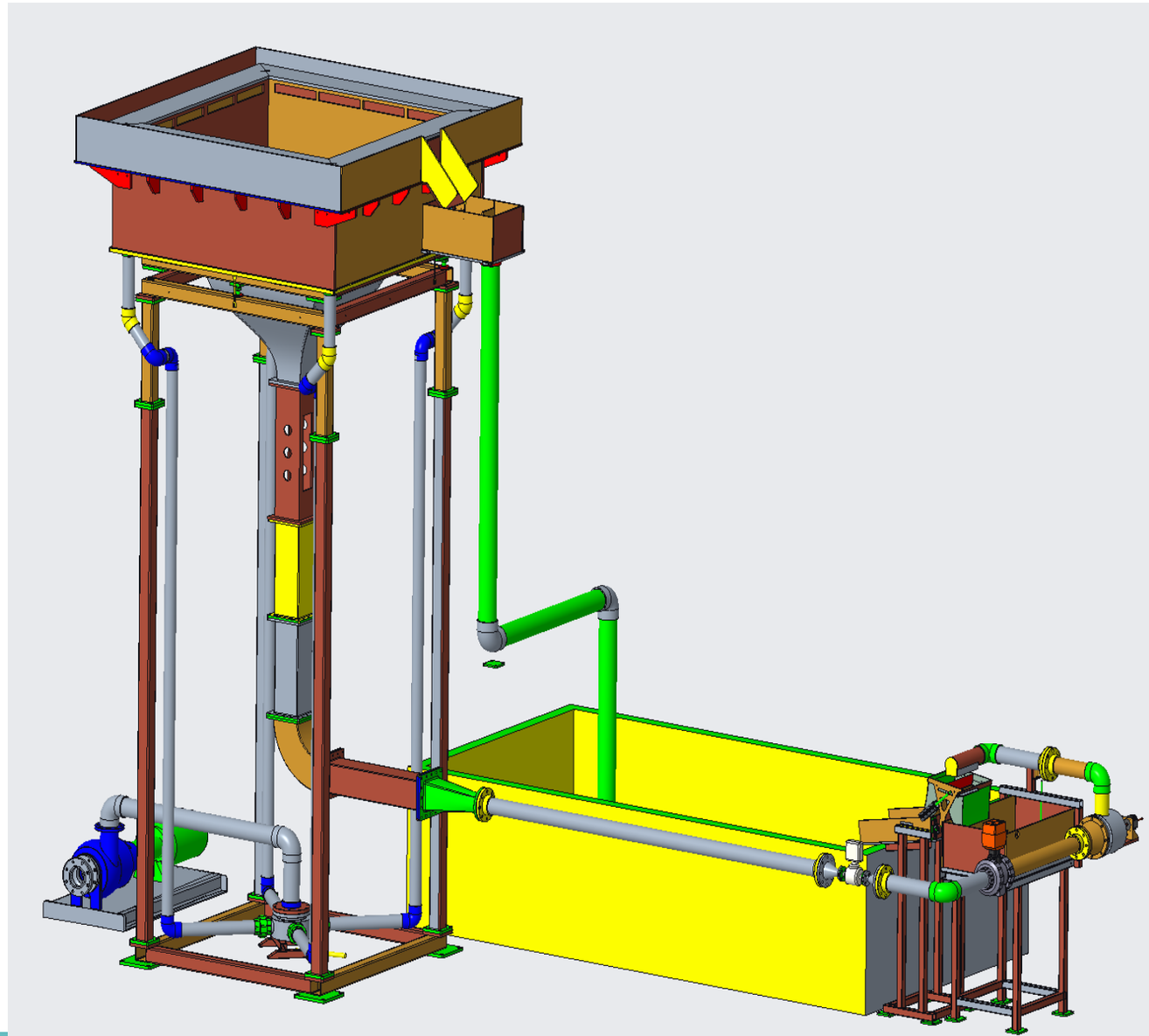


3D flow investigation with volumetric PIV (time and space resolved)

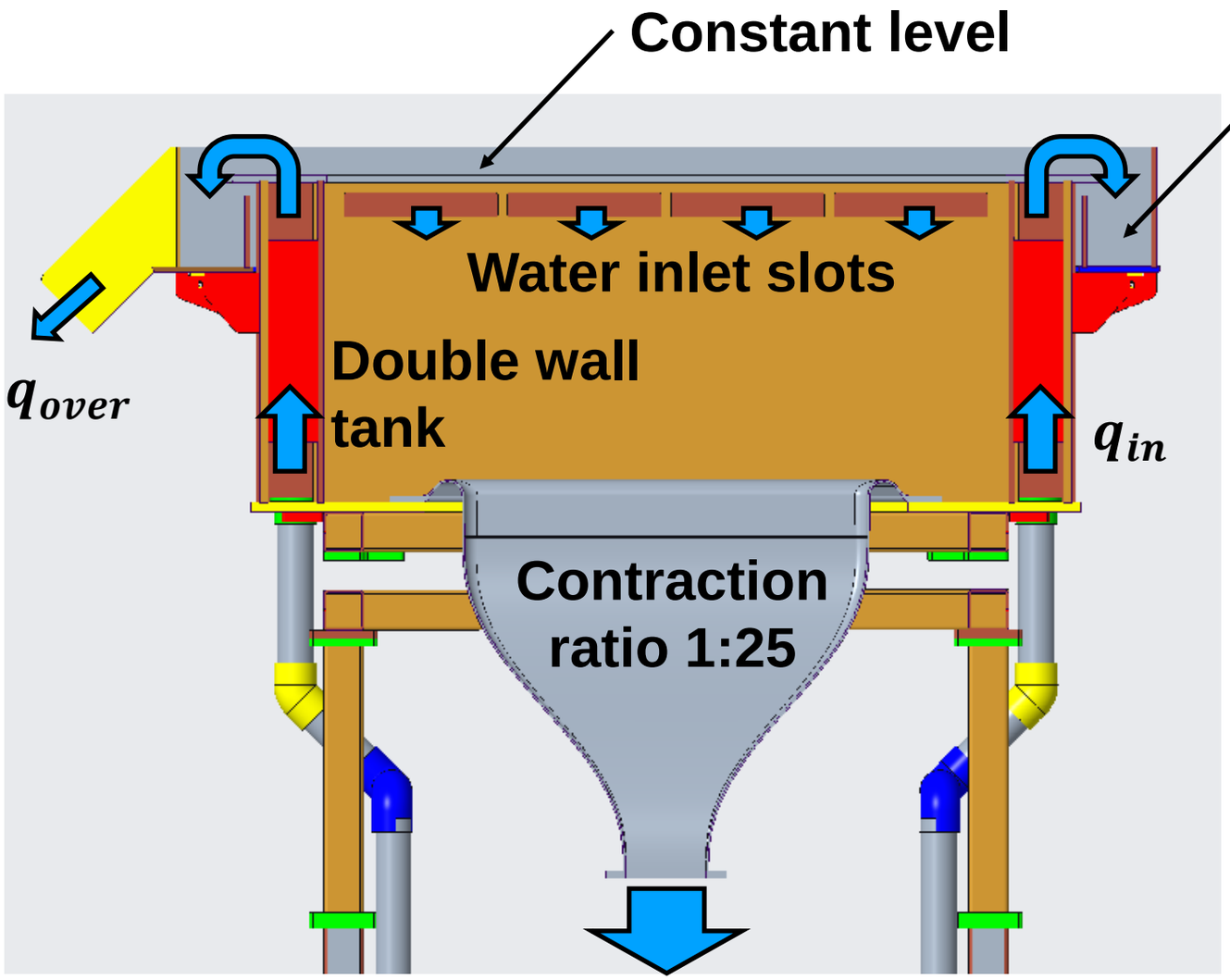
The LFT design

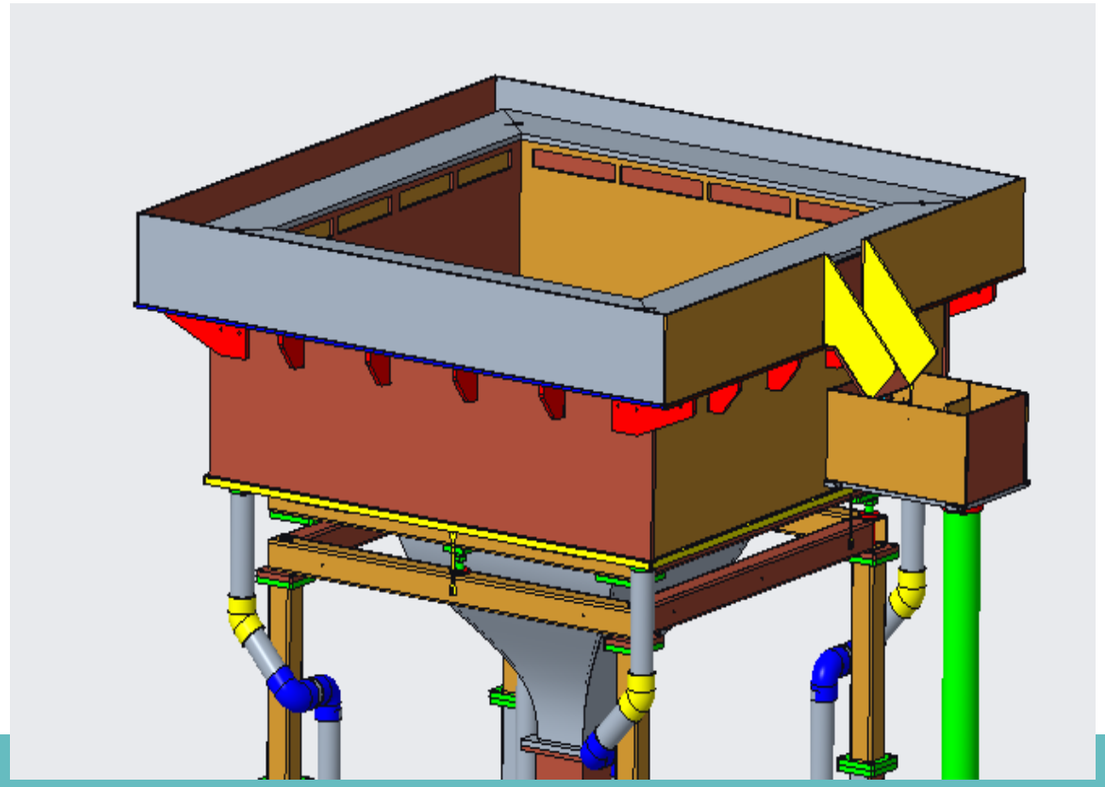
Test section : 200mmX200mmX1000mm
Velocity : 0.5 cm/s to 1m/s (large velocity range, 2 decades in Re)
Models : 3cm , 150<Re<30000

Gravity driven flow
(water or water/glycerol mixture)



Upper tank design

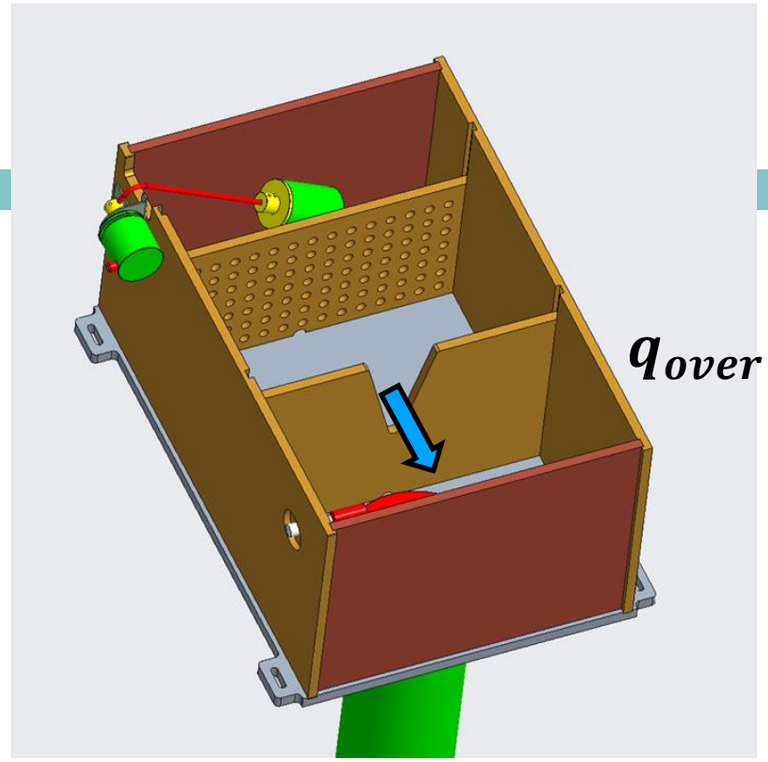


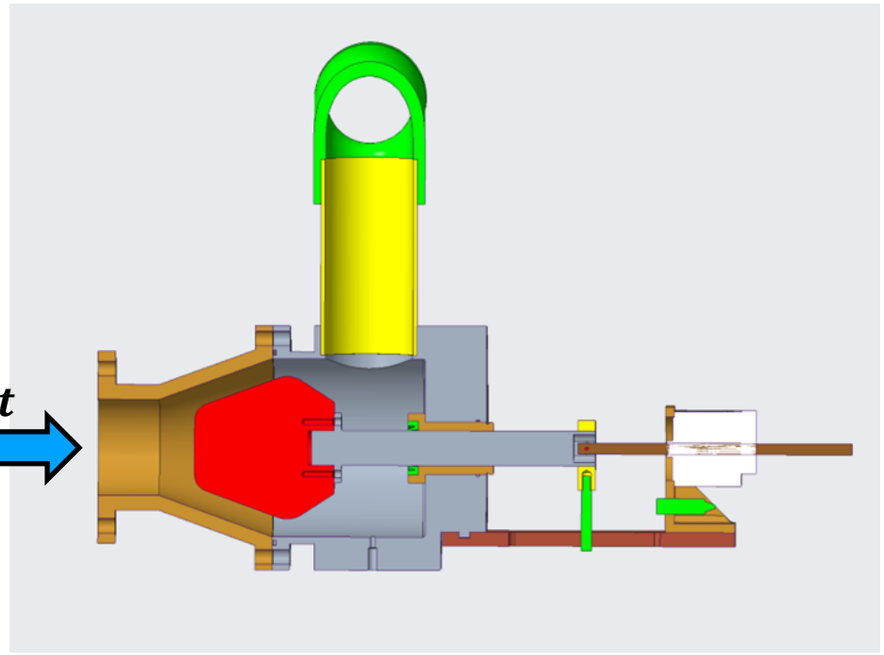


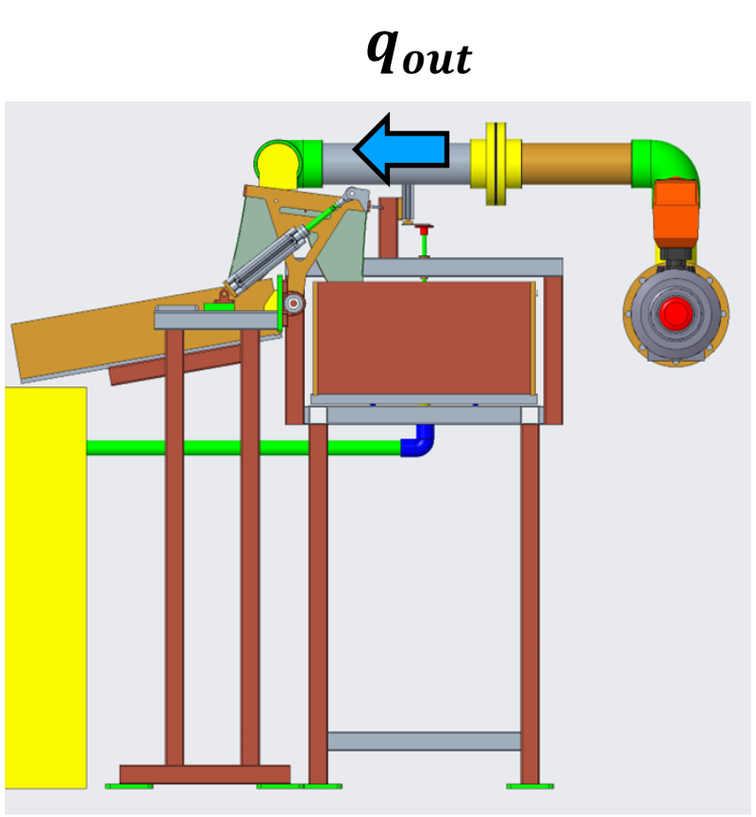
Flow control

The pump flowrate q_{in}, is controlled to have a constant overflow of $q^c_{over} \approx 1l/s$

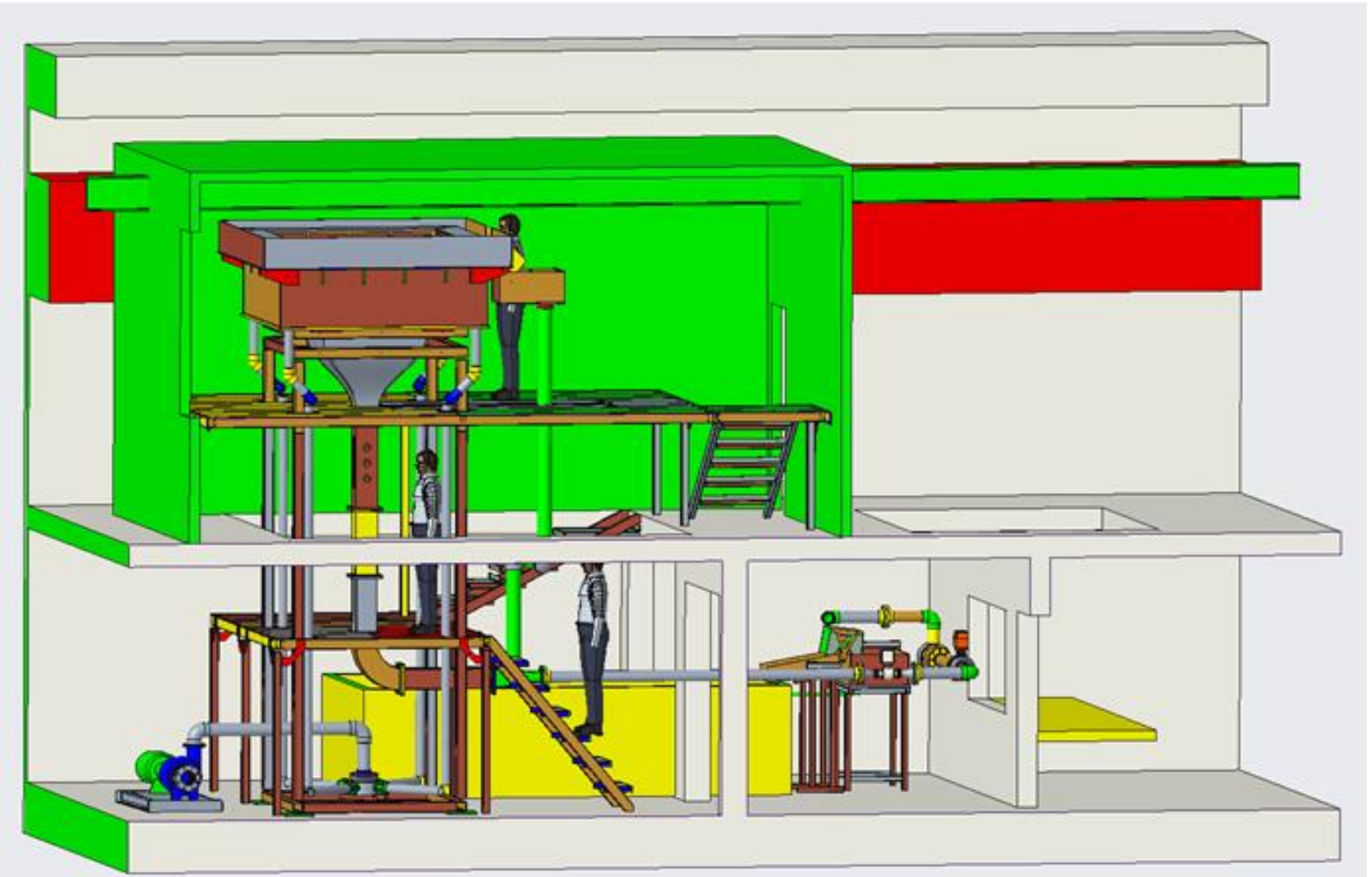
$$\frac{dq_{in}}{dt} = -K(q_{over} - q^c_{over})$$







Insertion in the existing building



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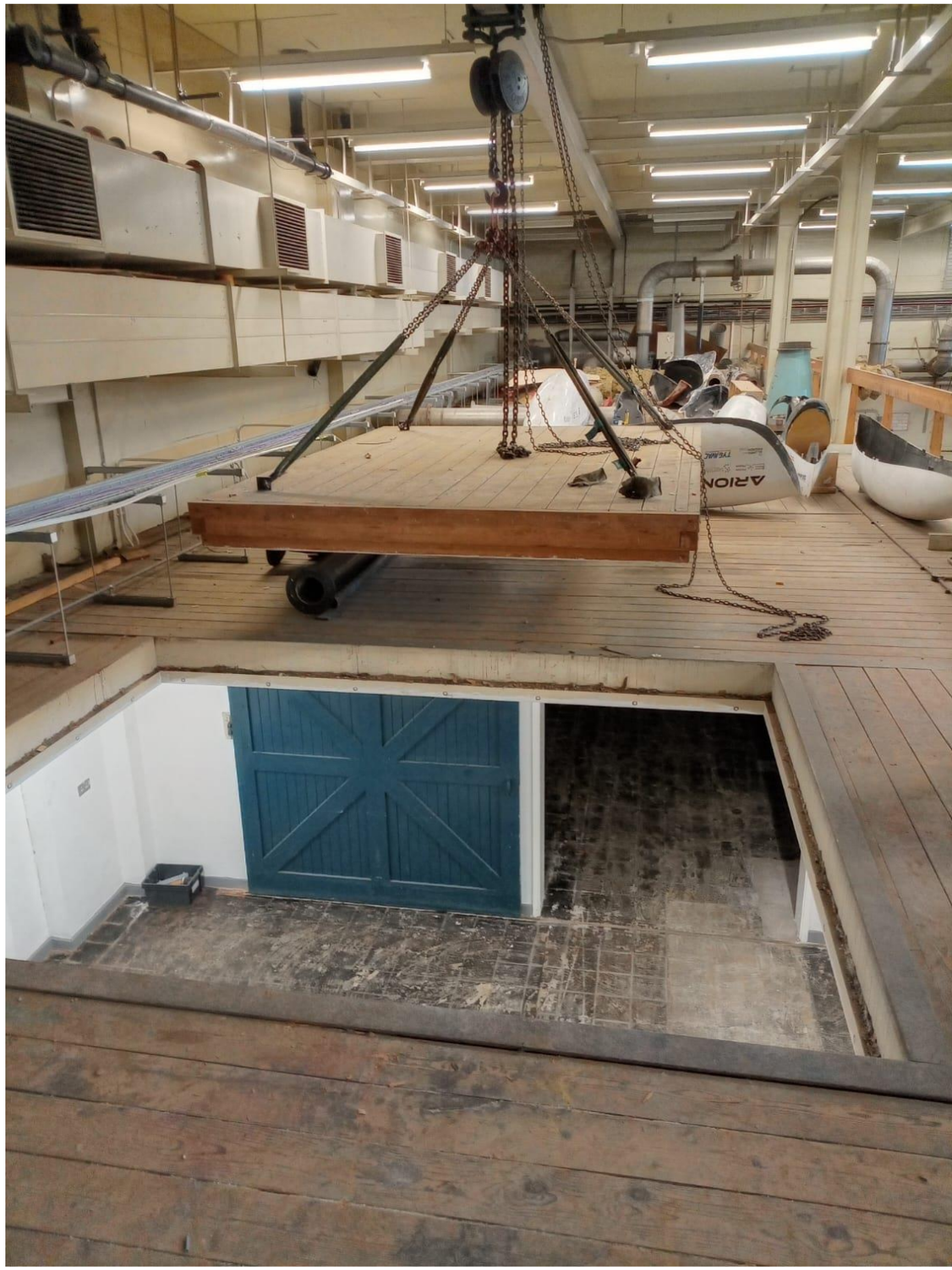
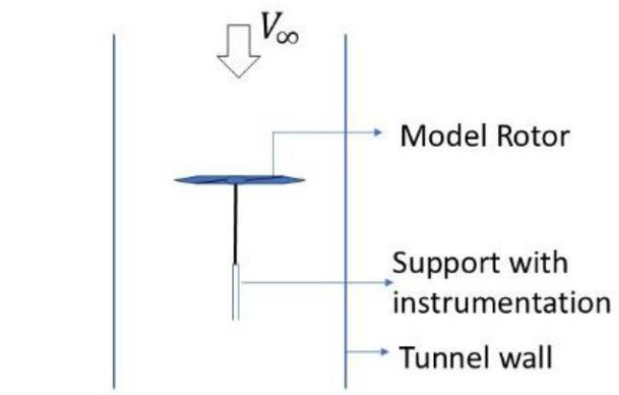


Newton International Fellowship Application

Stability Properties of a Rotor's Wake in Axial Flow from Laminar to Turbulent Regime



Model Rotor in the Laminar Flow Tunnel

Thank you for your attention