NWTF2023 Conference

The Exchange
University of Birmingham
May 25-26, 2023

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Imperial College

Where we are

NWTF Current Facilities

NWTF wind tunnels have been running EPSRC, BBSRC, STFC, NERC, Innovate, ATI, UKSA, ESA, EOARD funded projects.

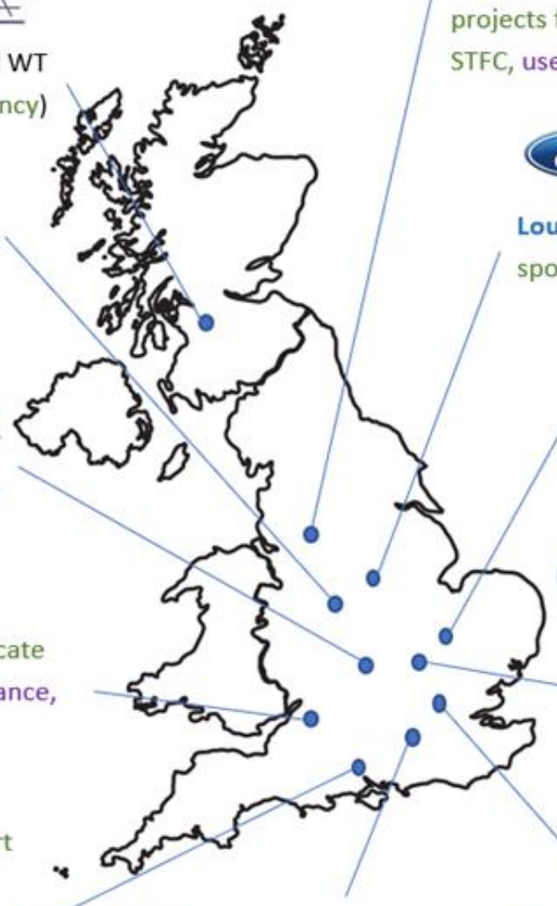
Location: Wind Tunnel (applications, highlights)

Glasgow: de Havilland Low Speed WT (rotorcraft research and aircraft efficiency)

Birmingham: Atmospheric Boundary Layer WT (wind safety) and TRAIN rig WT (crucial for vehicle aerodynamic investigations, users from Japan)

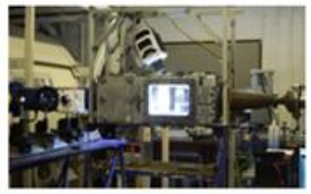
Oxford: T6 Piston Reflected Shock WT (defence, Europe's highest speed WT), High density WT (93% usage level, users from ESA and UKSA)

Southampton: R. J. Mitchell WT (motorsport research
Anechoic WT (high speed trains research), Towing Tank WT (energy, transportation, ship design, one of the largest in Europe)

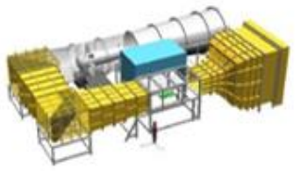


Surrey: Environmental Flow WT (world leader in climate change research, wind farms, air quality, users from Norway, Sweden and France)

Manchester: Hypersonic WT (aerospace research, projects funded by EPSRC, ESA, BAE, Newton Fund, STFC, users from Malaysia)

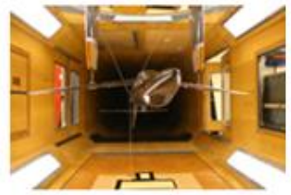


Loughborough: Automotive WT (industry sponsored research on automobile design)



Cambridge: Supersonic/Transonic 1&2 WT (aeronautical applications, CLEANsky project to reduce CO_2 and gas emissions

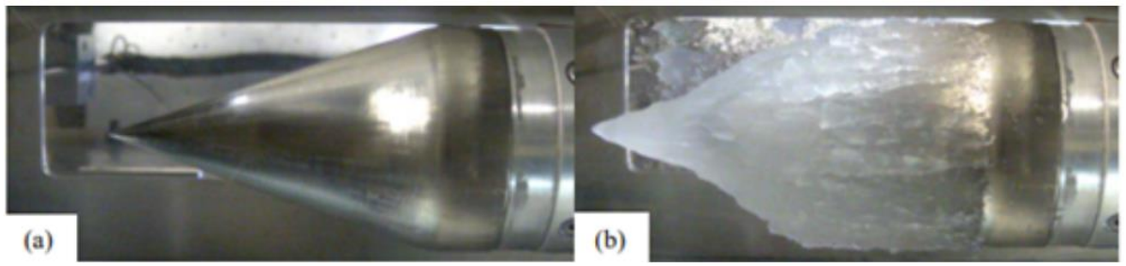
Cranfield: 8ft x 6ft Low Speed WT (automotive, aircraft design), Icing WT (aviation, environmental,



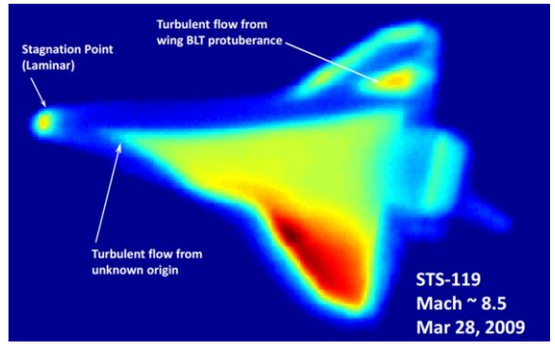
London (City and Imperial): Transonic/Supersonic WT (aerospace), 10ft x 5ft Low Speed WT (aerodynamic safety of vehicles and buildings, 90% usage level Supersonic WT (aerospace), Low Turbulence WT (aviation)

New Facilities

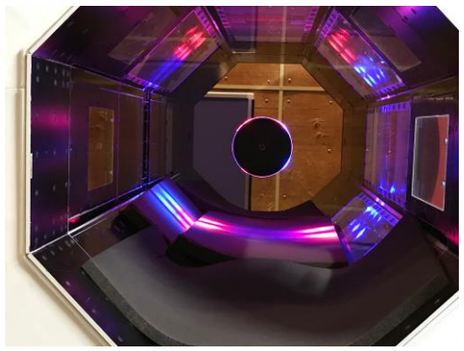
RIM: Southampton



Altitude Icing: Oxford

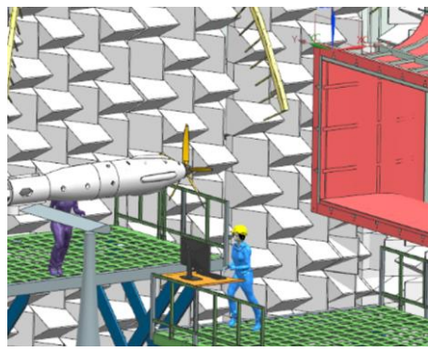


Hypersonic Quiet: Oxford

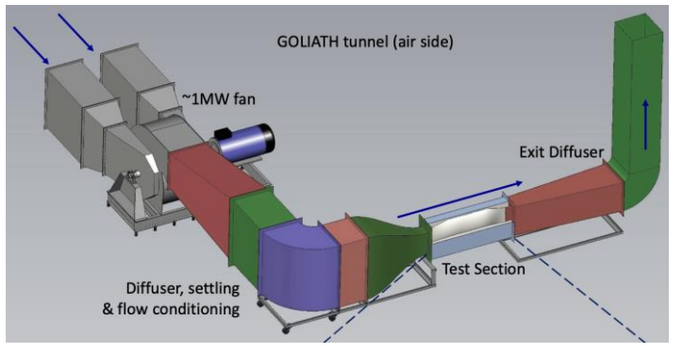


MSBS: Imperial & Oxford

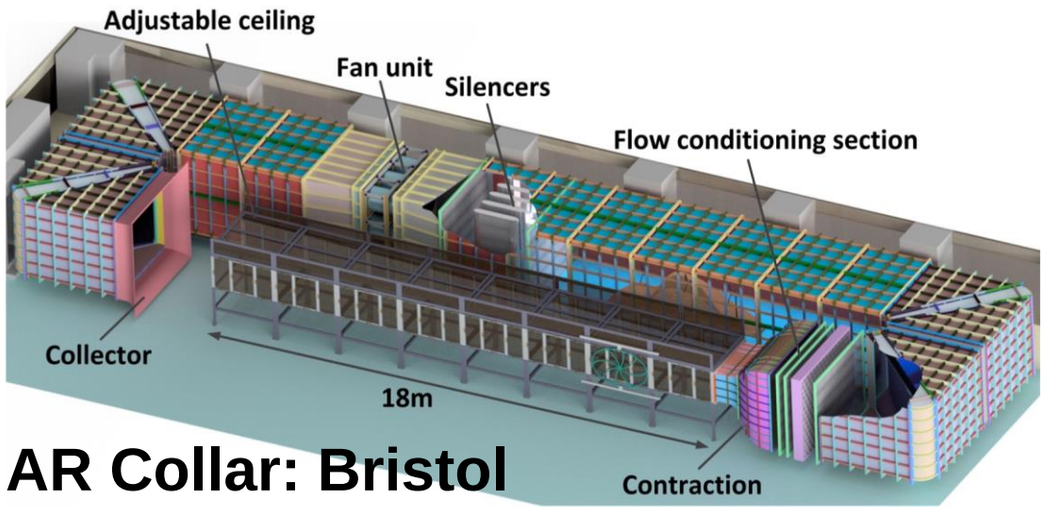
Human-Flow: Manchester



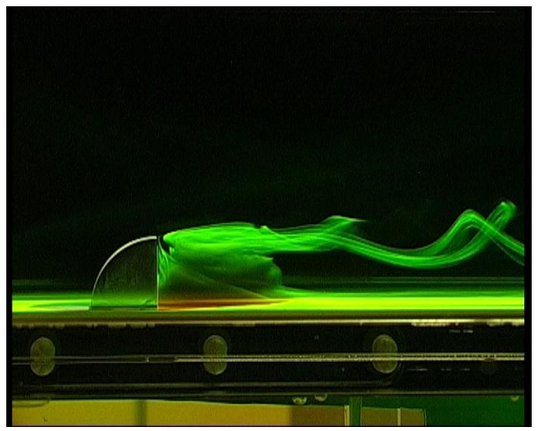
NPT: Bristol



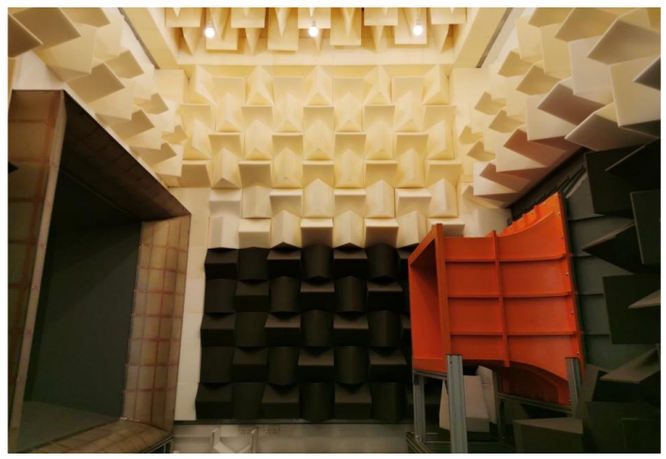
LH2: Oxford



AR Collar: Bristol



Laminar Flow: Liverpool



Pressure-Neutral: Bristol

What does NWTF look like in 5-10 years?

- What will the scientific and societal challenges be?
- Is distributed hub / node network appropriate?
- Is a mixed private / public funding mechanism appropriate?
  - In what areas could NWTF expect to be self-sustaining?
  - Core funding?
  - Do ‘high-earners’ subsidise ‘high-impact, low-earners’?
- Should the nodes (facilities) include both university and industry tunnels?
- Is the list of core facilities complete - where are the gaps? Where do we want to be world-leading?
- How do we engender inclusiveness?
  - Enable researcher mobility.
  - Experimental databases, relationship to CFD community.
  - Outreach - training workshops.
- NWTF as a legal entity?
- Tiered membership - university, researcher, and industry — are these appropriate?
  - What is the right tension between benefit and commitment?

Industry - NWTF roadmap

Gap analysis suggests the need for new (better access to) facilities at TRL5+:

- Icing tunnel ‘workhorse’
- Aeroacoustics
- Mid-range trisonic
- Propulsion integration

How can NWTF help improve the join between academia (“bottom up”) and industry (“top down”): need for multiple partners, maximum spillovers?

- What is the added value? Where is the win? What are we good at?
  - technological innovation – where are the gaps?
  - scientific environment – tunnels as attractors: the ecosystem
  - maintaining capability
  - skills and training
  - jobs – supply chains, new products
- Where is the vision?
  - Who will own it?
  - Who will support the facility[ies] financially?
  - Who will use them – short / long term?
  - Where is the gain?