NWTF >

Imperial College Supersonic Wind Tunnel TS4

Location: London	Designation: Intermittent hybrid blow-down / suck- down arrangement
Owner(s): Imperial College Aeronautics, Exhibition Road, London SW7 2AZ	Performance: Mach Number: 0.6 - 3 Maximum Flow Speed: 600 ms ⁻¹ Reynolds No: 2-20 x 10 ⁶ m ⁻¹ (variable) Total Pressure: 1 x 10 ⁵ Pa (max, variable) Dynamic Pressure: ~ 1 x 10 ⁵ Pa (max, variable) Total Temperature: 290K Turbulence intensity: 1% (estimated, tbc) Run Time: 10 s Typical Recharge Time: 20 min Testing Capabilities: Modular working section: Fully configurable test section with variable length to accommodate range of models and facilitate tests with variable boundary layer thicknesses. Control system & data acquisition: National Instruments (LabVIEW) PID tunnel controller and DAQ system. Measurement hardware: 32 channel low speed (500 Hz) pressure, pressure sensitive paint, high speed schlieren, surface oil-flow and integrated seeding system for LDA and PIV.
Test Section Size: 0.15 m x 0.15 m x 2 m (max) 20:1 contraction ratio.	
Operational Status: In construction, due for commissioning in March 2017	
Number and Type of Staff: Scientific: n/k Technical Support: 1 technician	
Test support: Fully equipped workshop for wind tunnel model design, CNC 4-axis mill, CNC 3-axis mill, CNC Lathe, CNC etching and cutting, a range of rapid prototyping manufacture and modification capability, 3D CAD support and drafting.	

Specialist Rigs (planned):

- Seeding: Integrated, adjustable seeding system for solid (TiO2) & liquid droplet (Oil) flow seeding
- Adaptive flow control: Computer-controlled deployment of variable geometry (active) flow control devices (e.g. shock control bumps using multiple actuators using LabVIEW)
- Unsteadiness: Mechanism for generating unsteady pressure pulses upstream and downstream of test section (amplitude: 1-5 % p₀, frequency range 10 Hz 10 kHz)
- **Gas injection:** Test section module for moderate flow rate injection of various (Air, He, CO₂, tbc) configurable (e.g. for scramjet fuel mixing studies)