

High Supersonic Tunnel – University of Manchester

Location: Manchester

Designation: HSST

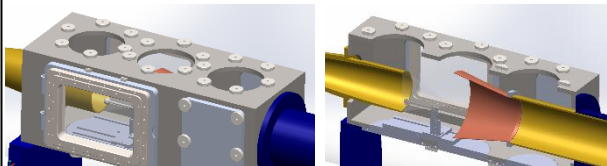
Owner(s):

Mark Quinn
Shan Zhong

Performance

Working gas: Air
Mach Number: 4,5,6
Flow Speed: 670 – 1300 m/s
Reynolds No: up to 25M/m
Total Pressure: up to 850kPa
Total Temperature: up to 950K
Turbulence intensity: ~1%
Run Time: up to 7 seconds
Typical Turnaround Time: ~10 minutes

Test flow size: 150mm diameter test jet
Test section size: plenum section around test jet with 80mm below, 100mm above and to the sides of the nozzle.



Operational Status: Fully operational

Number and Type of Staff:

Scientific: three academics, one PDRA, multiple PhDs
Technical Support: two experienced technical staff

Test support:

Installation, wiring, design, and tunnel operation.
Installation of custom hardware and patch panels.
Bench power supplies lighting for experiments.

Testing Capabilities:

Model Support:

Full model sting + 3 axis balance, half model 3 axis balance, release testing from magnetic supports

Data Acquisition:

Modular NI CRIO with multiple high-speed AI channels. Kulites, PCB, Endevco gauges, Thermocouples, remote traverses. Phantom T2410

Measurement hardware:

Schlieren, Shadowgraph, Background Oriented Schlieren, Self Aligned Focusing Schlieren, Infra-red thermography, Particle Image Velocimetry (2D3C but can be scanning), PSP steady and fast response, TSP, CO2 condensate imaging, digital image correlation, model motion tracking, oil flow.

Specialist Rigs:

- Intake unstart rig – adjustable back pressure generator for intakes
- Magnetic release rig – model held with electromagnets and dropped during test
- Mach 5 centrebody nozzle for plume and boundary layer growth studies
- In-tunnel PSP calibration capability
- Synchronous PSP and Schlieren measurement capability (steady and fast)

