



Facility Factsheet

Vertical Wind Tunnel (VWT)

Description: The VWT is a closed circuit, vertically oriented wind tunnel providing a cost effective, high quality, subsonic test airstream with speeds up to 102 mph. It is the premiere dynamic motion test facility in DoD with combined rotary and forced oscillation test and modeling capability. This capability enables AFRL to simulate highly maneuverable aircraft motions, match flight points and investigate the physics of nonlinear aerodynamics. This data directly impacts control law development and contributes to computational fluid dynamics (CFD) data base and tool development. The test section has a 12-foot diameter by 15 foot length open jet which affords easy access for a model or free falling bodies and parachutes. An additional benefit of the VWT is the ability to test contractor technology concepts, thereby providing the Air Force with an independent audit capability of contractor claims. It takes two people to operate (one for motor control and the other for data acquisition) providing AFRL researchers with a low cost, flexible testing capability.

Capabilities:

Test Conditions:

Mach Number: 0 – 0.14; ($V_{max} = 130$ ft/sec)
Reynolds Number Range (0 – 1.0 million/ft)
Atmospheric Pressure and Temperature

Test Capabilities:

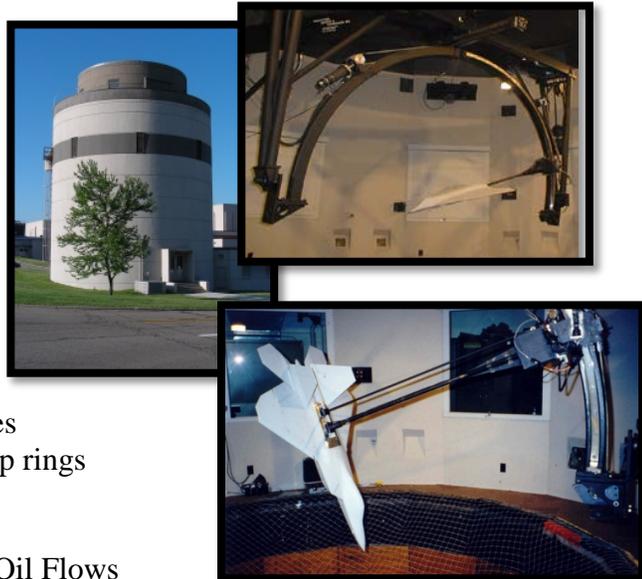
Fixed mount for parachutes or free fly bodies
MAT rig for static & dynamic testing

- Rotation rates to 130 rpm
- Angle Ranges ($-90^{\circ} < a < 90^{\circ}$, $-30^{\circ} < b < +30^{\circ}$)
- Rotary balance and forced oscillation capabilities
- Secondary air and 175 data channels through slip rings

LabView Data Acquisition System

Flow Diagnostics :

Laser sheet, Particle Imaging Velocimetry (PIV), Oil Flows



Examples of Current/Past Programs: Configuration Research, Test Technique Development, High Angle-of-Attack Aerodynamics, Chute Research, UAS Research

Cost/Scheduling Information: To be determined on case by case basis.

Contacts: Primarily in-house and related DoD contractor research. Other U.S. Government agency, DoD contractor and commercial customer programs upon request. Contact: 937-713-6678