

**F2**

**Research  
Low Speed  
Wind Tunnel**

**Very low turbulence level  
Extensive optical access  
High levels of customer service**

**ONERA Wind Tunnel Division  
Le Fauga-Mauzac Center**

## F2 low speed wind tunnel

---

Aerodynamic research facility

Test section (l x h x w): 5 m x 1.8 m x 1.4 m

Mach number up to 0.3

Very low turbulence level: less than  $4 \cdot 10^{-4}$  at 100 m/s  
(60 Hz to 5 kHz)

### Capabilities

---

#### • Closed-loop wind tunnel

- 12-blade fan driven by a 680 kW electric motor,
- 4 screens and honeycomb filter in the settling chamber together with a contraction ratio of 12 supply high quality flow with very low turbulence level,
- Total temperature controlled within  $\pm 0.5$  K,
- Controlled flow stability criteria may be chosen: Mach number, Velocity, Reynolds number.

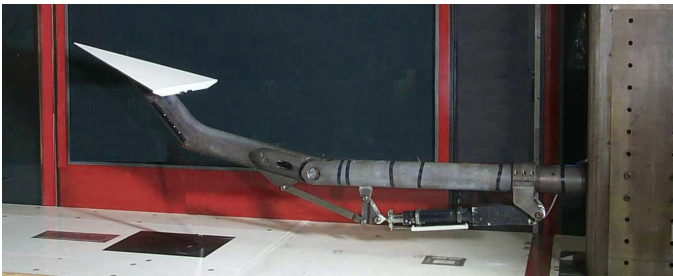
#### • Facility features for testing

- Adaptable lateral, ceiling and floor walls to optimize optical access,
- 3-axis bench for optical measurement systems displacement,
- Remotely controlled 3-axis wall element for flow field survey,
- Compressed air supplied up to 9 bar for cold or hot jet simulation.

### Model support examples

---

- 360° wall turret,
- Floor turret: standard range  $\pm 20^\circ$ ,
- Sting holder quadrant: standard pitch range  $\pm 20^\circ$ ,
- Side Turret for wall to wall 2D testing: standard angle of attack range  $\pm 20^\circ$ .



### Typical tests

---

- Studies of complex flow phenomena: three-dimensional boundary layer, flow separation, jet interaction, wakes, ...,
- Boundary layer transition,
- Two-dimensional airfoils,
- Dynamic and static stall,
- Active flow control (vortex generator, plasma actuators, ...),
- Aeroacoustics (landing gear, high-lift airfoils, ...),
- Probe calibration.





## Measurement Techniques

- **Model measurements:**

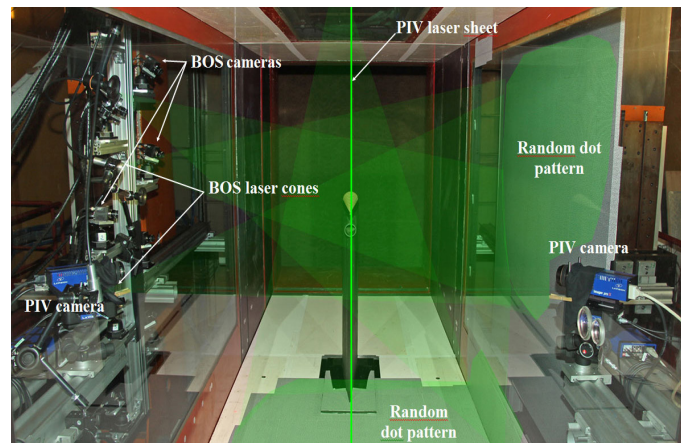
- Steady and unsteady pressures,
- Thermocouples,
- Loads (6-component balance),
- Tuft and colored oils visualization.

- **Flow survey:**

- Hot wire,
- Pressure rake,
- Thermocouple.

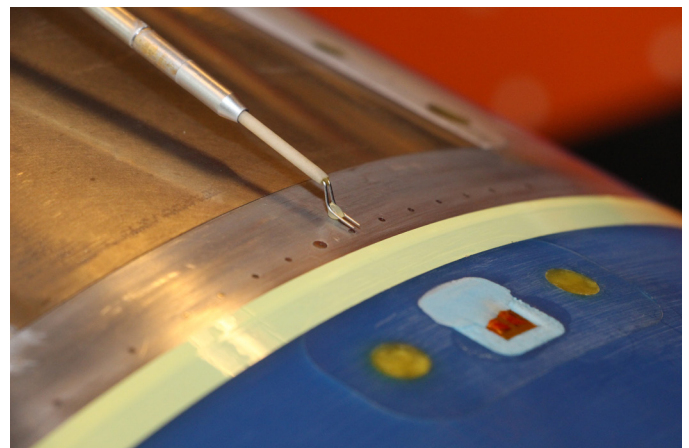
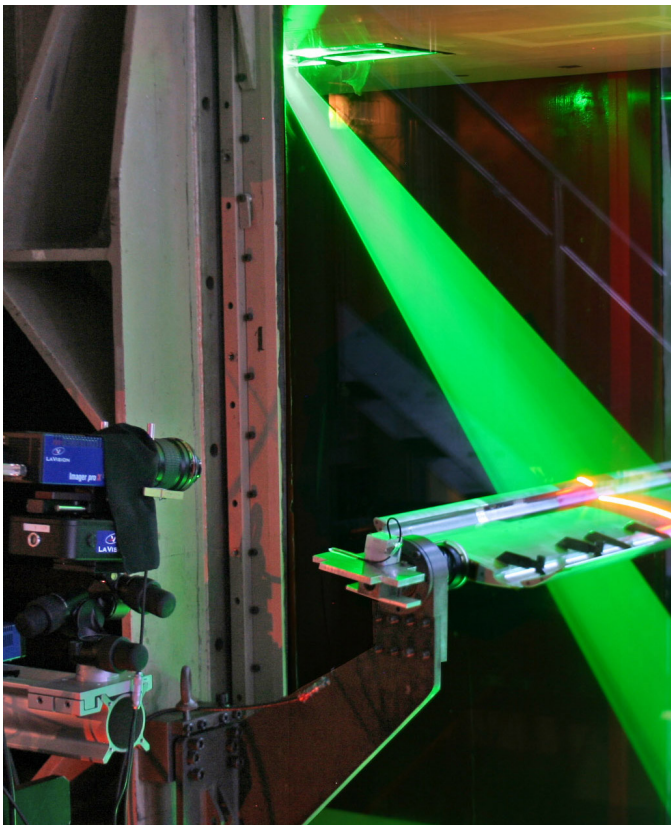
- **Standard optical measurement techniques:**

- LDV: Three-component Laser Doppler Velocimetry,
- SPIV: Stereo Particle Image Velocimetry,
- IRT: Infra-Red Thermography,
- MDM: Model Deformation Measurement.

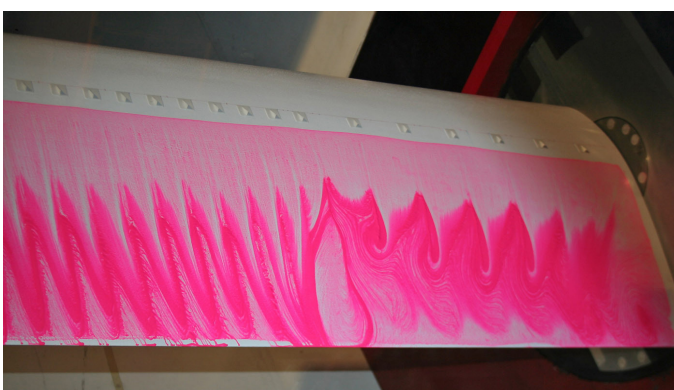


- **Other measurement techniques:**

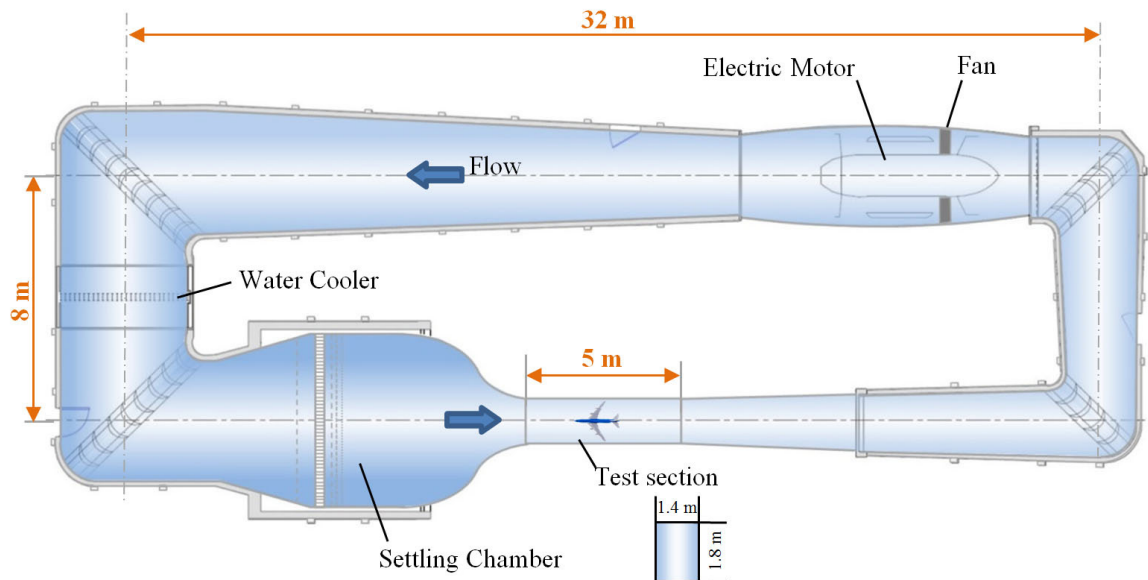
- TR-SPIV: Time Resolved SPIV,
- BOS: Background Oriented Schlieren,
- PSP: Pressure Sensitive Paint,
- Acoustic with wall-mounted microphone antenna.



## Data acquisition and processing



- Test data is delivered real-time to the customer representatives,
- Pressure acquisition with PSI® multi-sensors,
- Continuous monitoring of test conditions,
- Measurements possible during continuous sweeps of a test parameter.



## Quality Management

- Our Quality Management system is certified to be ISO 9001 compliant,
- High levels of customer service,
- The ONERA wind tunnel division is committed to deliver the best service and value for money to its customers. Test matrices can be customised during the test itself, to maximise value to the customer.

## Quality in measurement techniques

- New capabilities are being introduced as part of our continual improvement strategy.

## Confidentiality

- Secure test preparation and testing sites, data & computer firewalls.



ONERA Centre du Fauga-Mauzac  
31410 Mauzac – France  
Tél. : +33 1 80 38 69 21

Website : [www.onera.fr/en/windtunnel](http://www.onera.fr/en/windtunnel)

contact : [ds-contact@onera.fr](mailto:ds-contact@onera.fr)