# Trisonic wind tunnel

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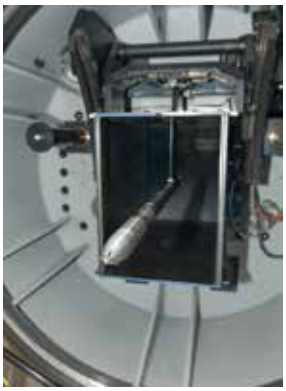
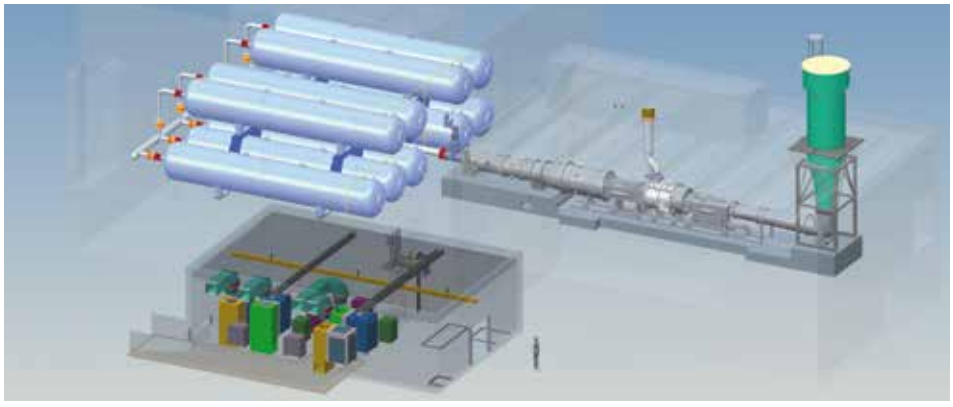
The trisonic wind tunnel of ISL serves to study the aerodynamic behaviour of flying objects, such as aeroplanes, artillery projectiles or missiles in all three speed regimes: subsonic, transonic and supersonic.
Using small-scale models, ISL is able to conduct tests at low cost. In the next step, numerical simulations are conducted, allowing to scale up the results to real dimensions.



## How does the wind tunnel work?

Pressurised air is stored in tanks. The air flux is accelerated through a nozzle upstream of the test section. In the transonic speed regime the flow conditions are controlled through the combined function of an air pressure regulation system upstream, air suction through holes in the side panels of the test section as well as a diffuser at the end of the chain. In the supersonic mode, different flow Mach numbers are obtained by changing the geometry of the flexible nozzle during the test phase.

In order to provide tailored solutions to our customers, airflow conditions can be adjusted. The test results can then be presented and delivered in the data format chosen by the customer.



## Features

- Test section: 30 x 40 cm
- Mach range: M = from 0.5 to 4.5
- Reynolds number: up to 2 million for a model with a cross section of 40 mm
- Dynamic pressure: from 1.1 to 20 bar
- Test duration: from 30 to 120 s, depending on Mach number and pressure selected
- Up to 15 tests per day

## Metrology

- Force and moment measurements thanks to an aerodynamic 6-component balance
- Pressure measurements thanks to pressure sensors and pressure-sensitive paints (PSP)
- Determination of dynamic effects thanks to free rotating models (MiRo)
- Visualisation of air flows thanks to Schlieren photography, shadowgraphy and differential interferometry
- 3D-reconstruction of density fields thanks to the CBOS-method
- Flow field velocity measurements thanks to Particle Image Velocimetry (PIV), Doppler Global Velocimetry (DGV) and Laser Doppler Anemometry (LDA)

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