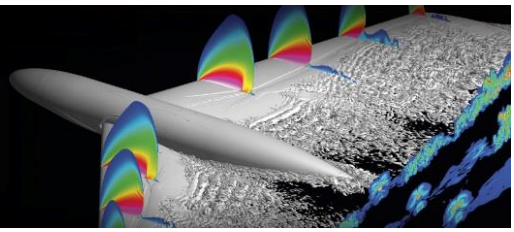


Visit of the research platform Prometée (duration 2h – maximum 40 attendees) :

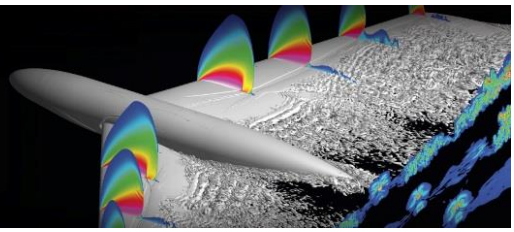
Bruits & Vent anechoïc wind tunnel :
This facility is dedicated to the study of turbulent jets and associated noise emission. A tri-axial flux system enters the large anechoïc chamber 12.6x10.6x7.85 m^3 to finely characterize propulsive jets and their installation in aeronautics. Finely resolved coupled pressure-velocity measurements are obtained using microphone arrays and time resolved optical measurements (Particle Image Velocimetry, Laser Doppler anemometry) driven by theory of sound generation of turbulent flows.

T200-S150 wind tunnels
The compressible wind tunnels of P' Institute allow to study transonic and supersonic flows. Using a compressed air suply of 200 bars, these blowdown wind tunnels enable tests of a duration of approximately 10 minutes. The T200 wind tunnel features co-axial compressible jets (total pressure of primary jet < 150 bars, total pressure of the secondary jet < 3 bars). The S150 wind tunnel generates high velocities flows (Mach 0,8 to 2,8) with a test section of 150 x 150 mm2. Ongoing research projects are concerning compressible effects on turbulence and aerodynamic instabilities, separated nozzle flows, shock-turbulence interaction, boundary layer flows, …

BATH High Temperature Wind tunnel
BATH, (Banc AeroTHermique in French language) is dedicated to studies of turbulent flows and interactions with solid structures under extreme temperature and pressure conditions (up to 1300 °C, 10 Bars, 166 m/s). The BATH test bench was designed and sized to obtain, in the test section with optical accesses, academic-type inlet conditions which consist of homogeneous conditions of temperature and low turbulent quantities. The design of this test section allows to study different types of flows by using advanced thermal and aeraulic metrology (TOMO-PIV, PLIF-2 , ZnO phosphorescence ...).

MISTRAL Test Bench :
The test rig MISTRAL allows, by means of a 60kW prototype electrospindle and two test cells, to test respectively supporting components (aerostatic bearing) and sealing components (mechanical seal). It was designed to use air as working fluid with rotational speeds up to 100 000 rpm. The tested components can have diameters from 50 to 100 mm and can be tested with pressure differential up to 150 bar. Experiments under hot temperature are also possible.

PERGOLA Test Bench :
PERGOLA (for "Propulsion ERGOLs Avancés" in French) test bench has been developed by PPRIME and CNES to study green storable propellants for space propulsion in engine like condition. The specific objectives are to investigate and characterize the behaviour of the key physical phenomena involved in such combustors: atomization of propellant sprays, ignition ability, combustion stability, propulsion efficiency. PERGOLA is a mid-scale combustor (maximal total flow rate: 800 g/s, chamber maximal pressure: 50 bar, maximal thrust 1 kN, test duration : up to 1 mn) allowing physical measurements in its present configuration (opaque chamber). Using Hydrogen-Peroxyde as oxidizer, any kind of safe storable fuels like ethanol or kerosene can be studied. In the present configuration, ignition is performed using a H2-air torch ignitor and injection and atomization are based on impinging liquid jets (doublet like or unlike triplet).



Visit of some research facilities in ENSMA (duration 1h – maximum 20 attendees) :

S620 wind tunnel:
The S620 has a test section of 2.6 * 2.4 m² and a length of 6m. The wind speed range is from 5m/s to 60m/s with a turbulence intensity of less than 0.5%. Dedicated assemblies (current plane or raised floor) allow a wide range of tests ranging from ground transport (dedicated roller bank for rotating wheels) to aeronautics (aircraft or airfoil) through renewable energies (wind turbines). The wind tunnel is equipped with 6-component aerodynamic balances allowing the measurement of average or unsteady forces via the use of piezoelectric sensors. Regarding the pressure measurement, the wind tunnel has acquisition chains for average and unsteady pressure sensors. Velocity measurements are performed through the use of Particle Image Velocimetry (PIV) as well as the implementation of Laser Doppler Anemometry (LDA) or Constant Temperature Anemometry (Hot Wires or Films).

Thermo-regulated wind tunnel:
This subsonic, thermo-regulated, closed loop wind tunnel is dedicated to aerothermal characterisation of transverse jets in extreme conditions of temperature and pressure. In this facility, it is studied the design of the injectant for the application of wall cooling. The wind speed is varying from 5 to 30 m/s and the temperature is controlled from 10 to 60°C.

CV2 Test Bench:
Thermodynamic cycles based on pressure-gain combustion, such as constant-volume combustion (CVC), feature a clear potential for efficiency improvement of propulsive systems. CV2 (Constant Volume Combustion Vessel) is a recent versatile setup developed in the framework of the CAPA Chair (Alternative Combustion mode for Airbreathing Propulsion) to study cyclic piston-less CVC without the heavy constraints imposed by intake and exhaust technological systems of the final application. The CV2 device allows for the spark-ignited or auto-ignition air-breathing combustion of either gas or liquid fuels directly injected into the chamber. Full optical access allow the use of optical diagnostics like high speed visualizations, PIV, PLIF, particle sizing, and spectroscopy measurements. The large intake and exhaust tanks allow to study the intake and exhaust pressure impact on dilution by residual burned gas, and its consequences on all phases of the combustion process.