

VISIT #1: The aerospace research center - ONERA

Schedule : 09h00 - 11h30

Location : 15 min walking distance from Lille Grand Palais

5, Boulevard Paul Painlevé
59014 LILLE Cedex

Quantity : 60 visitors maximum

Mandatory : a scanned copy of your valid ID is to be sent before August 1st to the organizers at erf2016@aaaf.asso.fr

Important : No camera and no picture allowed during the visit

The ONERA Lille site is one of eight Centers operated by the French aerospace research agency, ONERA (Office National d'Etudes et Recherches Aéronautiques). Well established in the region, it is the gateway to a dynamic scientific community, deeply involved in ambitious projects on the local, national and European levels. Whether involved in basic research, applied research or technical investigations, our Lille-based researchers, numbering 90, are constantly inventing, experimenting, simulating, measuring, always with an eye on industrial applications. The Lille Research Center is specialized in fluid, flight and structural mechanics. It deploys a powerful suite of test systems and facilities, as well as an experienced team for the design and construction of instrumented models.

The visit of ONERA will be focused on its main facilities, according to the 5 following domains :

1- Fluid mechanics : shaping modern design

To enhance all types of products, the aerodynamicists at Lille are working on both new shapes and new methods to characterize these shapes. They constantly compare their numerical models with the results of experiments, so they can deliver validated computation codes and concepts to the end user. This work is primarily for the aerospace industry, but fluid mechanics is also the engine driving the Lille Research Center's diversification strategy.



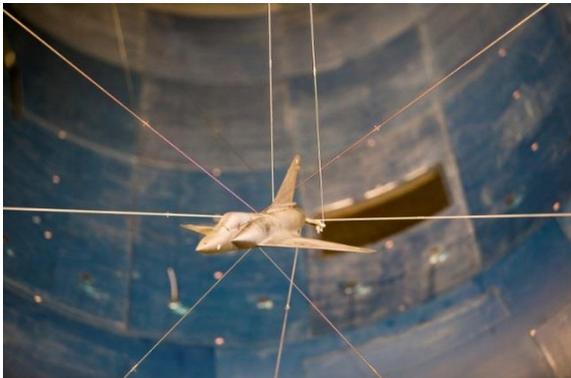
Horizontal wind tunnel L1 to test aerodynamic configurations



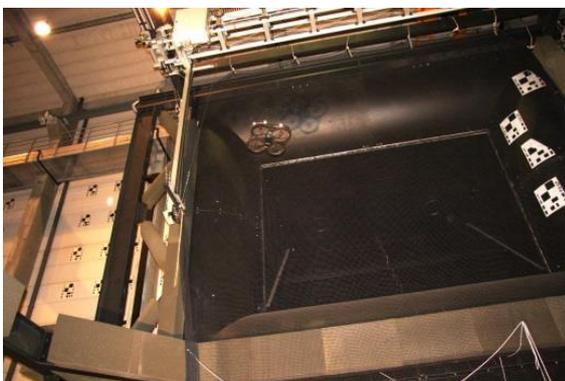
Bench dedicated to the study of rotor/rotor interaction

2- Flight mechanics : controlling objects in motion

Flight mechanics is an applied discipline by excellence, and progress is driven by the need to solve new problems in relation to evolving aircraft design, safety requirements and flight conditions. Lille's researchers make a major contribution to this field through the development of new tools and methods, capable of handling even the most complex phenomena, including very-large aircraft flexibility, flight in turbulence, spins, etc. They call on an unmatched array of test facilities (free flight laboratory, vertical wind tunnel, etc.), which enable them to reproduce and study every single phase of flight.



Vertical tunnel SV4 to investigate dynamic behaviours and spin testing



Mini-drone in the free flight laboratory B20 with a gust generator

3- Structural mechanics, for enhanced vehicle performance and safety

Researchers combine experimentation and simulation to better understand the damage and destruction mechanisms affecting structures. Using this approach, they can provide industry with the data and models needed to improve vehicle performance and safety, while also cutting production and operating costs.



Crash tower to test the structures' resistance

4- Models, a key to understanding complex phenomena

The Lille-based Model Design and Manufacturing department makes models for customers both within ONERA and outside. These are sophisticated scale models, designed for use in wind tunnels or other test labs, where they reproduce the phenomena demanding specific loading and high-precision embedded instrumentation.



Mounting a wing model in workshops

5- Diversification strategy

Working for the aerospace industry, where performance and safety are critical, our Lille researchers have built up a broad base of test system expertise that could also benefit many other sectors. Our technology know-how has already been transferred to industries as diverse as land and maritime transport, construction and civil engineering, heating, ventilation and cooling, machine tools and agrifoods.



The L2 large wind tunnel with its atmospheric boundary layer