

HISTORY OF THE DEPARTMENT

The University "Politecnico di Milano" was founded in 1863. Its mission is to teach technologies and educate students to become researchers. The University is continuously updating its tradition as a school that focuses on quality and innovation in teaching and research. Scientific research at Politecnico di Milano has always been oriented toward innovation and quality, always seeking a strong relationship with the industrial world through technology transfer. Attuning to the needs of the industrial sector helps research to continuously explore new areas and stay at the leading edge of science and technology.

The scientific community of Politecnico di Milano is made of more than 1,300 professors and research fellows, with 38,200 students (2013 update). According to QS World University Rankings 2012/2013, Politecnico di Milano ranked 28th worldwide in the area of Engineering and Technology. On a worldwide scale, it is the first Italian university entering the QS ranking among the top 30 technical universities. Furthermore, Politecnico di Milano participates in the coveted "club" of universities ranked in the top 100 in the world in the most prominent international rankings, along with only 15 other European universities.

Politecnico di Milano is currently articulated in 12 departments, where research is co-ordinated and carried out, and 6 schools, where education is co-ordinated and implemented. Several service Centres provide support for technical and administrative purposes.

DIPARTIMENTO DI SCIENZE E TECNOLOGIE AEROSPAZIALI

The Dipartimento di Scienze e Tecnologie Aerospaziali (Department of Aerospace Science and Technology, DAER-PoliMi) was established within Politecnico di Milano as an autonomous institute in the 1950s. The personnel of DAER-PoliMi currently consists of 43 faculty, 27 technical and administration staff, 70 research assistants and Ph.D. students. The main activity within the Department is scientific research.

The Department itself is the main reference body for the B.Sc. (Laurea) course in Aerospace Engineering, the M.Sc. (Laurea Magistrale) course in Aeronautical Engineering and Space Engineering, and the Ph.D. (Dottorato di Ricerca) course in Aerospace Engineering. M.Sc. and Ph.D. courses are offered in English. Each year, about 250 students complete the B.Sc., 180 the M.Sc., and 15 the Ph.D. In parallel, DAER-PoliMi staff is strongly involved in several research activities with academia, industries and research bodies worldwide.

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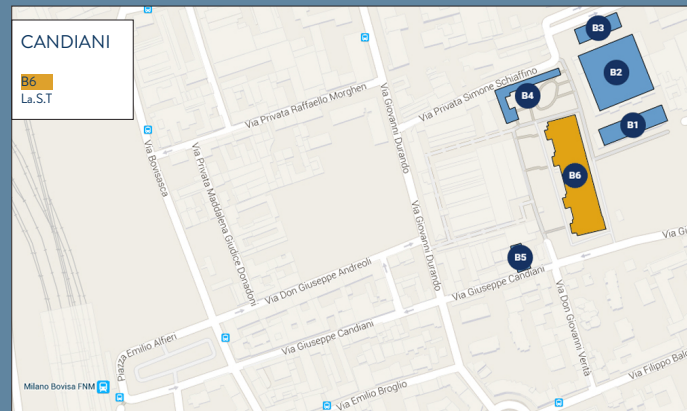
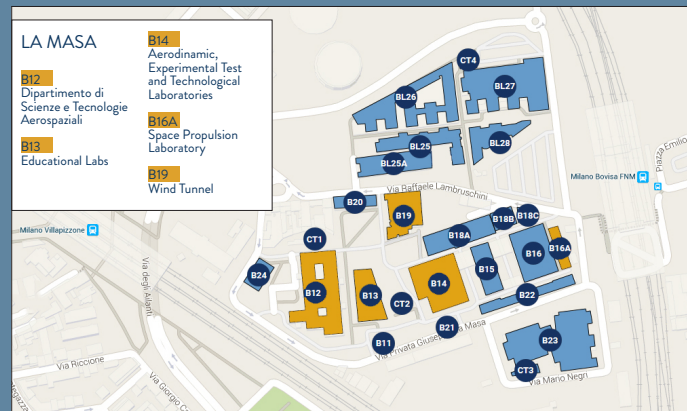
POLITECNICO
MILANO 1863

DIPARTIMENTO DI SCIENZE
E TECNOLOGIE AEROSPAZIALI

SCIENTIFIC LAB

PFDLab - Physical Fluid
Dynamics Lab

DOVE SIAMO CAMPUS BOVISA - La Masa e Candiani



SCIENTIFIC LABS

DEPARTMENT OF AEROSPACE SCIENCE AND TECHNOLOGY (DAER)

Research activities within the Aerospace Science and Technology Department (DAER) of Politecnico di Milano are organized in scientific laboratories. These laboratories represent the core of the research competences developed at DAER over the years. They are highly specialized, agile and vital competence centers.

SCIENTIFIC LABS

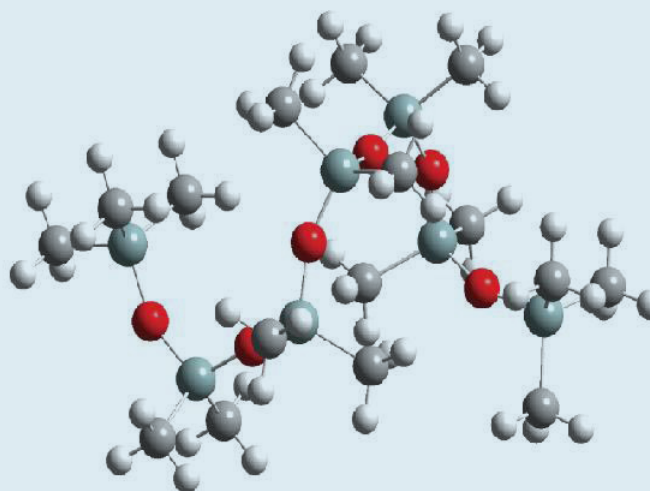
The Department has formed 14 research laboratories, which contribute to the majority of research activities.

- AMATECH - Aerospace MATERIALS and TECHNOLOGIES
- ASCL - Aerospace Systems and Control Lab
- ASDL - AeroSTRUCTURES Design Lab
- AVLab - Aeroelasticity and Vibroacoustics Lab
- CrashLab
- FlowCon - Instability and Flow Control Lab
- FMSSlab - Flight Mechanics & Flight Systems Lab
- FRAME - Fixed and Rotary-wing Aircraft Multidisciplinary Eng.
- PFDLab - Physical Fluid Dynamics Lab
- POLI-Wind - Wind Energy Lab
- RAL - Rotorcraft Aerodynamics Lab
- SIAMS - Structural Integrity of Advanced Materials and Structures
- SME - Space Missions Engineering
- SPLab - Space Propulsion Laboratory and Nanoenergetics

PFDLAB

PHYSICAL FLUID DYNAMICS LAB

Multi-phase And interfacial flows, Fluid Dynamics of dense vapors and supercritical fluids.



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ONGOING ACTIVITIES

- Current research activities on Rarefied gas dynamics focus on modeling of gas flows in devices with micro-scale geometries, on the kinetic approach for the study of capillary flows in micromechanical devices and the feasibility of laboratory plasma jets, free and impinging on magnetic targets.
- In the field of Multi-phase and interfacial flows, a software for the prediction of aircraft icing and design of anti-icing systems, called PoliMIce, is currently under development in collaboration with Alenia Aermacchi.
- Current research activities on Fluid dynamics of dense vapors include a) the investigation of the gas dynamics behavior in the critical-point region b) the numerical simulation of dense gas experiments and c) the influence of the thermodynamic conditions on the onset of shock front instabilities in converging shock waves.

FUTURE PLANS

- Future research activities for Rarefied gas dynamics studies include: the development of hybrid molecular dynamics- DSMC methods for the simulation of rotational and vibrational relaxation in polyatomic gases by semi-classical collision theory, momentum transfer from hypersonic jets to solid bodies and a laboratory plasma jets, free and impinging on magnetic targets.
- In the field of Multi-phase and interfacial flows, the ice prediction code PoliMIce will be further developed in view of the participation to a EU-funded project in collaborations with Alenia Aeronautica and Alenia Aermacchi. The improvement of available molecular dynamics techniques to study the transport of mass, momentum and energy across the vapor-liquid interface of molecular liquids.
- Research activities on Fluid dynamics of dense vapors will be devoted to the study of the non-classical gas-dynamics behavior of mixtures of organic fluids, to the design of turbine blades for Organic Rankine Cycle application and the numerical simulation of the stator-rotor interaction for dense gases.

ERC KEYWORDS

PE3_14 Fluid Dynamics (physics)
PE8_5 Fluid mechanics, hydraulic-, turbo- and piston engines
PE2_5 Gas and plasma physics
PE8_1 Aerospace Engineering

FREE KEYWORDS

- Rarefied- and dense-gas dynamics.
- Interfacial and supercritical flows.