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. Politecnico di Milano Aerospace Science and Technology Department (DAER)

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DIPARTIMENTO DI SCIENZE E TECNOLOGIE AEROSPAZIALI

SCIENTIFIC LAB

SIAMS - Structural Integrity of Advanced Materials and Structures

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
- FMSlab 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

SIAMS

STRUCTURAL INTEGRITY OF ADVANCED MATERIALS AND STRUCTURES

Advanced Mission Analysis; robust GNC design; space objects detection and orbit propagation (Debris,NEOs); robotics for Active Debris Removal and Debris Mitigation; Space Situational Awareness; flexible systems for space applications; visual navigation and precision landing; robotics for exploration.



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ONGOING ACTIVITIES

- Damage tolerance analyses of composite structures: the activity is based on the application of an efficient modeling technique developed in the past years to model multiple delaminations in structural components.
- Ceramic Matrix Composites: a multi-scale approach has been developed for short-fiber reinforced ceramic materials based on a meso-scale representation of material structure.
- Improvement and validation of cohesive approaches: cohesive zone models have been improved to model fiber bridging phenomena and embedded fiber optic sensors have been used to validate the prediction of strain fields in the vicinity of interlaminar cracks.

FUTURE PLANS

- Regarding the structural integrity of components in fiber reinforced plastics, the activity planned for the next years will be organized according to the following goals:
 - improvement of the constitutive laws for modeling matrix cracking in polymeric matrix composites;
 - application of the numerical tools developed in various scenarios;
 - improvement and application of the constitutive laws developed to the study the dynamic propagation of fractures and dynamic phenomena at the structural level.
- The activities related to ceramic matrix composite will be continued in order to extend the approaches to other types of materials and to thermo-mechanical analyses.
- Moreover, it will be explored the possibility to activate co-operations regarding the application of the numerical tools.

ERC KEYWORDS

PE8_9 Materials engineering (biomaterials, metals, ceramics, polymers, composites, etc.) PE5_1 Structural properties of materials PE8_4 Computational Engineering PE8_1 Aerospace Engineering

FREE KEYWORDS

- Composite materials
- Structural integrity