

AEROSPACE ENGINEERING

PNRR - Development of flow control methodologies for lifting surfaces of next generation aircraft with hybrid/electric propulsion

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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Context of the research activity	<p>The research activities concern the scientific and technological areas related to the Spoke 1 – Air Mobility within the framework of the National Center for Sustainable Mobility, funded by the National Recovery and Resilience Plan NextGenerationEU (PNRR 2022-2025).</p> <p>The activities will fall within the remits of the Work Package n.2 “Disruptive technologies for electric and hybrid propulsion aircraft” and n.3 “Enabling technologies for next generation air mobility”.</p> <p>The Clean Aviation Programme (Strategic Research and Innovation Agenda, 2020) identifies hybrid and electric propulsions as one of the critical drivers to achieve carbon neutrality by 2050. The need to introduce innovative solutions for the propulsion systems, such as distributed propulsion, poses problems related to the aerodynamic efficiency of the next-generation vehicles.</p> <p>In this sense, determining solutions that can mitigate the interference of integrating the propulsion system in the lifting system, represents a key goal.</p> <p>Progetto finanziato nell'ambito del PNRR - PNRR M4C2, Investimento 1.4 - Avviso n. 3138 del 16/12/2021 - CN00000023 Sustainable Mobility Center (Centro Nazionale per la Mobilità Sostenibile) – CNMS - CUP E13C22000980001</p>
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	<p>The research theme that will be developed will involve the following topics:</p> <ul style="list-style-type: none">• Development and performance evaluation of innovative surfaces for skin friction drag reduction on airborne vehicles, including data-based techniques for the optimization and the prediction of the performance.• Evaluation of the effect of the integration of innovative propulsion systems on vehicles for regional transport, including flow control methodologies to mitigate the impact on the aerodynamics performance;
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Objectives

- Development of non-intrusive methodologies for the evaluation of the convective heat transfer with complex surfaces.
- The research activities fall within the remits of the “National Research Program – PNR 2021-2027”:
- Sector 4.7: Aerospace, art. 1 “Next generation vehicles with rotary wing”; art. 2 “Reduction of the environmental impact and improvement of the wealth in aeronautics”.
 - Sector 4.3: Artificial Intelligence, art. 5 “Artificial Intelligence for the environment and for critical infrastructure”.

Skills and competencies for the development of the activity

Experimental Aerodynamics; Flow Control methodologies; non-intrusive laser diagnostic (PIV).