

AEROSPACE ENGINEERING

MUR DM 117/Leonardo - Life Cycle Assessment of Aircraft

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Context of the research activity	<p>The aim of the research program is to deliver innovative methodologies and tools to support Life Cycle Assessment of civil and military aircraft developed by Leonardo Company. This constitutes a tangible action towards technological and digital innovation to target Industrial Sustainability through solid scientific and technical bases, in line with the United Nations (UN) Sustainable Development Goals (SDGs).</p> <p>Progetto finanziato nell'ambito del PNRR – DM 117/2023 - CUP E14D23001970004</p>
Objectives	<p>The research program deals with the development of methodologies and digital tools for the Life Cycle Assessment of civil and military aircraft. Specifically, the analysis focuses on those vehicles already developed, manufactured and operated by Leonardo Company.</p> <p>The methodologies for Life Cycle Assessment pursue the estimation of chemical emissions, both pollutant and green-house gases emissions throughout the entire life cycle of aviation products, which encompasses design, development, manufacturing, operations and services, and disposal. The emissions' estimation allows for the definition of the carbon footprint of the aircraft and consequently to predict its impact onto air quality (at local and regional level) as well as on climate (global scale). It is worth noting that, in a Life Cycle Assessment, the emissions' estimation is complemented by a Life Cycle Cost assessment, i.e. a quantification of the committed and expended monetary resources required in all product phases, from the design to the disposal.</p> <p>To introduce a Life Cycle Assessment at Company level, the advancement in scientific understanding and modeling of the aircraft life cycle shall be coupled with the development of ad-hoc flexible and modular digital tools. Once developed, these digital tools will be extensively used to assess the environmental and economic sustainability of company's products, providing</p>

clear and precise indications about the most critical life cycle phases as well as to test the effect of innovations such as the exploitation of different materials, engine technologies, fuels, etc... This approach allows Leonardo Company to contribute to the United Nations (UN) Sustainable Development Goals (SDGs), through innovations and digital tools.

The proposed topic therefore fits perfectly within the PNRR Mission 4C2 "From Research to Business", Investment 3.3. Furthermore, the proposed theme is in line with Mission 1 of the PNRR "Digitalization, Innovation and Competitiveness in the Production System", promoting the digital transition of design processes of complex systems.

Skills and competencies for the development of the activity

Environmental and economic sustainability of aircraft. Development of innovative design methods and tools to assess the carbon footprint of the aircraft throughout its life cycle.