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Contributions of EU-funded projects managed by CINEA towards climate neutrality of aviation

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Europe's Vision for Aviation "Flightpath 2020" [1] and the European Green Deal [2] have set ambitious goals for the aviation sector, towards its climate neutrality. The aviation industry is thus faced with multiple challenges, including the need for a sustainable recovery in the aftermath of the global pandemic. The aforementioned challenges also give rise to opportunities for the development of disruptive technologies, which will accelerate the decarbonisation of aviation. To this end, advanced numerical tools and digitalisation are key to facilitating the testing, certification and deployment of the necessary game-changing technologies.

The cutting edge research and innovation (R&I) funded by the Horizon 2020 programme has significantly contributed to the aforementioned high level objectives, comprising of the development and application of advanced computational methods for modelling, simulation, optimization and validation of technologies necessary to render aviation climate neutral.

The European Commission's European Climate, Infrastructure and Environment Executive Agency (CINEA) is currently implementing a broad portfolio of collaborative R&I projects, funded under Horizon 2020, aimed at reducing aviation's climate impact. Within these projects, innovative computational methods are key to achieving emissions reduction in all areas of aviation and in all phases of the aircraft lifecycle. These include multi-fidelity modelling and multi-disciplinary computational tools (for fluid dynamics, aerodynamics, aero-acoustics, combustion, emissions, and climate impact among others), robust design and optimization processes, advanced structure mechanics and composite material manufacturing technologies. Such methods also leverage on recent advances in data-driven tools and artificial intelligence, as well as on highly-parallel computing. State of the art applications include, among others, disruptive aircraft architectures, novel propulsion systems and airframe technologies, composite materials and structures, and supersonic aircraft concepts.

The portfolio of EU-funded projects managed by CINEA is expected to be further enhanced by upcoming calls for proposals within the work programme of Horizon Europe Cluster 5: Climate, Energy and Mobility, with a focus on the advancement of low-mid TRL technologies, aimed at green, safe and competitive aviation.

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