



EXAELIA

Flying Testbeds for Novel Long-Range Aircraft

24 January 2025

Launch of EU-funded project EXAELIA

EXperimental Aircraft for European Leadership In Aviation

Flying test beds for novel long-range aircraft.

The need for disruptive aircraft to address climate change

At the COP29 summit recently held in Baku, Azerbaijan, ICAO council president Mr. Salvatore Sciacchitano highlighted the 193 ICAO Member States' commitment to achieving net-zero carbon emissions by 2050, while international aviation continues to play a pivotal role in global connectivity and economic growth. At the same time, as highlighted in the recent Draghi report, it is also imperative that the EU maintains its position as industrial market leader.

The EU funded Clean Aviation program targets aircraft and propulsion technologies with primary focus to regional and short-mid range aircraft. Based on scale-up of its technologies for aircraft with sustainable aviation fuel as energy source, Clean Aviation foresees a reduction of 30% of the CO₂ emissions of long-range aircraft, with entry into service (EIS) after 2040. Complementary to Clean Aviation, more radical changes in long range aircraft configurations and propulsion concepts are needed to cut carbon emissions of long-range flights by 50 to 100%. Such radical aircraft concepts are the focus of the EXAELIA project, which aims to accelerate their development to enable entry-into-service by 2045-2050.

Flying test beds to accelerate de-risking disruptive aircraft

Developing radically-changed aircraft concepts comes with high investments and risks. The objective of EXAELIA is to evaluate flying test beds that are needed for de-risking the development of those disruptive future long-range aircraft. Novel flying test beds will thus help to accelerate the reduction of all aviation emissions and its climate and environmental impacts by 2050. EXAELIA will predesign flying test beds for the most critical flight test challenges for the disruptive long-range aircraft, with the additional objective to enable re-use of the flying test beds for additional flight test needs.

Driven by potential emissions reduction and critical uncertainties

EXAELIA investigates, through advanced multi-disciplinary digital methods, the potential emissions reduction of long-range air traffic offered by promising blended wing body aircraft configurations and by hydrogen-powered tube-and-wing configurations with associated, disruptive propulsion concepts, and including their constituting radical new technologies. Critical uncertainties are identified, in particular those requiring flight validation for de-risking the future aircraft development, such as unknowns related to low-speed flight dynamics and control.

For those flight test requirements that go beyond the capabilities of existing assets, novel flying test beds are developed towards their preliminary design, efficiently combining flight test needs in potentially costly large-scale modular flying test beds. Roadmaps, but also operational and business plans, are prepared for the further development of the EXAELIA flying test beds and the use of these assets in the development of the future long-range aircraft.

The partnership

The EXAELIA consortium consists of the major European aviation research centres, academia and four SMEs. Nine partners are members of the Association of European Research Establishments in Aeronautics [EREA]. The consortium has a strong record in future aircraft conceptual design and analysis, flight testing, and flying test bed development. The partners are spread over thirteen European countries, which represent a significant portion of Europe's aviation industry base.

STICHTING KONINKLIJK NEDERLANDS LUCHT - EN RUIMTEVAARTCENTRUM (NLR)	NL
OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES (ONERA)	FR
DEUTSCHES ZENTRUM FUR LUFT - UND RAUMFAHRT EV (DLR)	DE
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UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II (UNINA)	IT
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An **Advisory Board**, including European aircraft and engine manufacturers and further industries will provide guidance to achieving the objective and to obtaining their support to the roadmaps: Airbus, Safran, Rolls-Royce, MTU, GKN Aerospace, Collins Aerospace, Honeywell Aerospace Technologies, Piaggio Aerospace, KLM Royal Dutch Airline, ITP Aero.

Key facts

EXAELIA is a **42 months** research and innovation action funded by the European Commission under the Horizon Europe Programme (GA n°101191922) with a total budget of **16** million Euros, involving 23 partners. The project official kick-off meeting was held on 22 January 2025, at NLR in Amsterdam.

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