PRESS RELEASE

23 November 2022

Clean Aviation's Scaled Flight Demonstrator completes its Mission Flight Tests

Between 17 October and 31 October 2022, the Scaled Flight Demonstrator (SFD) developed in the frame of Clean Aviation made 19 flights for a total of 8 flight hours, taking off from and landing at Aeroporto di Taranto-Grottaglie in Italy. During the missions, about 70 automated manoeuvers have been executed in order to carry out parameter identification. This experimental campaign is key for the validation of the Scaled Flight Testing approach as a means to mature future disruptive technologies that will significantly reduce aircraft energy consumption.

In order to achieve a climate-neutral air transport system by 2050 disruptive technologies will need to be developed and tested. To progress through the various development and manufacturing maturity gates before integration on an aircraft, industry relies on analyses and assessments based on numerical simulations, wind tunnel testing and many other ground test facilities. To complete the available capabilities for the acceleration of technology maturation, the Large Passenger Aircraft (LPA) Innovative Aircraft Demonstration Platform (IADP) of the European Clean Aviation programme included a validation of Scaled Flight Testing as a viable and competitive test mean to investigate aircraft dynamic behaviour.

For the demonstration purpose, a partnership of Airbus, CIRA, Royal NLR and ONERA as coordinator developed the Scaled Flight Demonstrator (SFD), a dynamically scaled version of a full scale aircraft that features a wingspan of 4 metres, a take-off mass of 140 kg, and a cruise speed of 85 kts. After completion of the Qualification Flights in Deelen (NL) in April 2022, the complete system has been transferred at Aeroporto di Taranto-Grottaglie (IT) to accomplish the Mission Flight Tests dedicated to data acquisition.

The operational team composed of CIRA and Royal NLR personnel has successfully carried out this experimental campaign: on one hand, Royal NLR who designed, manufactured, integrated and tested the complete SFD system as well as the Flight Test Instrumentation was identified as the SFD operator with its pilots having the final say on the system flight readiness. On the other hand, CIRA was in charge of the Ground Remote Pilot Station (GRPS) and of the Guidance Navigation and Control (GNC) systems design, manufacturing and integration into the SFD. Specifically, the GNC has been designed in order to easy flight experiment execution through a software which performs automated manoeuvres to obtain accurate and repeatable flight test conditions. The GRPS allows an efficient interaction between the Remote Pilot and functionalities of the aircraft on-board systems. CIRA, as leader of the mission flight test campaign, interfaced NLR with Italian Airworthiness Authorities (ENAC) for the Operational Authorization to fly in Italy, organized the logistics aspects and operations before and during the flights, liaising with the airport control tower and airport personnel.

The 19 flights allowed a verification of system functions, the tuning of the GNC, the calibration of the air data system and more important, the recording of the aircraft dynamic responses to many different inputs on the control surfaces to achieve a thorough parameter identification process.

The subsequent analysis of the flight data to be carried out by ONERA with the support of Airbus assesses the dynamic behaviour of the SFD in comparison to a full scale aircraft taking into account the scaling effects and transposition laws. This final evaluation taking place in Q1 2023 will conclude the validation process of the Scaled Flight Testing approach.

Within the Large Passenger Aircraft Innovative Aircraft Demonstration Platform, partners are actively working on a new version of the SFD that will be used to mature distributed electric propulsion, a potential technology for improving the efficiency of the aircraft of tomorrow with flights scheduled in 2023.

Note for editors

For more information:

- https://clean-aviation.eu/clean-sky-2/key-demonstrators/novel-aircraft-scaled-flight-test-demonstration
- Watch the short video illustrating the SFD: https://www.youtube.com/watch?v=CKrj4eB_K1g

Photos can be downloaded free of rights with attribution (credits: CIRA) in the caption form

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Clean Aviation Joint Undertaking

The Clean Aviation Joint Undertaking is the European Union's leading research and innovation programme for transforming aviation towards a sustainable and climate neutral future.
Pulling together the best talent and capabilities of the private and public sectors and developing cutting-edge technologies, and making these available for a transformational leap in aircraft performance in the 2030s, the new Clean Aviation Joint Undertaking will pave the way towards the EU's ambition of climate neutrality by 2050.
Operating at the centre of a broad and diverse eco-system of players across Europe ranging from the aeronautical community, pioneering SMEs, research establishments and academia, it acts as a hub for new ideas and bold innovations.
As a European public-private partnership, Clean Aviation pushes aeronautical science beyond the limits of imagination by creating new technologies that will significantly reduce aviation's impact on the planet, enabling future generations to enjoy the social and economic benefits of air travel far into the future.
Visit our website to find out more about Clean Aviation: www.clean-aviation.eu

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About ONERA, the French Aerospace Lab

ONERA is the French national laboratory for aeronautics and space R&T, staffed by 2000 people. Under the supervision of the French Ministry of Armed Forces, ONERA has an annual budget of 237 million euros, of which more than half comes from commercial contracts. As the French expert in aerospace technologies, ONERA prepares tomorrow's defenses, meets the aerospace challenges of the future, and contributes to the competitiveness of the European aerospace industry. ONERA masters all the disciplines and technologies in its aerospace fields. All major civil and military aerospace programs in France and Europe contain "DNA" from ONERA: Ariane, Airbus, Falcon, Rafale, missiles, helicopters, engines, radars, etc.

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About Royal NLR – Netherlands Aerospace Centre

Royal NLR operates as an objective and independent research centre, working with its partners towards a better world tomorrow. As part of that, NLR offers innovative solutions and technical expertise, creating a strong competitive position for the commercial sector.

NLR has been a centre of expertise for over a century now, with a deep-seated desire to keep innovating. It is an organisation that works to achieve sustainable, safe, efficient and effective aerospace operations. The combination of in-depth insights into customers' needs, multidisciplinary expertise and state-of-the-art research facilities makes rapid innovation possible. Both domestically and abroad, NLR plays a pivotal role between science, the commercial sector and governmental authorities, bridging the gap between fundamental research and practical applications. Additionally, Royal NLR is one of the large technological institutes (GTIs) that have been collaborating since 2010 in the Netherlands on applied research as part of the TO2 federation.

From its main offices in Amsterdam and Marknesse plus two satellite offices, NLR helps to create a safe and sustainable society. It works with partners on numerous programmes in defence and elsewhere, including work on complex composite structures for commercial aircraft and on goal-oriented use of the F-35 fighter. Additionally, NLR helps to achieve both Dutch and European goals and climate objectives in line with the Luchtvaartnota (Aviation Policy Document), the European Green Deal and Flightpath 2050, and by participating in programs such as Clean Aviation and SESAR.

www.nlr.org

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About CIRA - Italian Aerospace Research Centre

The Italian Aerospace Research Centre (CIRA) is a public-private consortium company founded in 1984 whose shareholders include: CNR (National Research Council) 52%; Italian Aerospace Industries 32%; Industrial Consortium of Caserta 16%.
The Italian Government entrusted CIRA for the management of the Italian Aerospace Research Program (PRORA), under the control of the Ministry of University and Research (MUR), to carry out: enhancement of scientific competences and expertise; development and operation of strategic testing facilities; development of strategic research programs.
CIRA is a conceptual link between universities devoted to basic research and aerospace industries, and as such it is mainly involved in the development of enabling technologies.
CIRA participates in cooperative research programs in order to promote the exchange of information and to become involved in the current aerospace research challenges

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About Airbus

Airbus pioneers sustainable aerospace for a safe and united world. The Company constantly innovates to provide efficient and technologically-advanced solutions in aerospace, defence, and connected services. In commercial aircraft, Airbus offers modern and fuel-efficient airliners and associated services. Airbus is also a European leader in defence and security and one of the world's leading space businesses. In helicopters, Airbus provides the most efficient civil and military rotorcraft solutions and services worldwide.

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