PRESS RELEASE

CETEST and CEIT, hand in hand with AIRBUS, work towards a reduction in emissions in the aeronautic sector in the framework of the European CleanSky 2 project TR4EMACS

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Over the last few decades, much research has been carried out with the aim of replacing Aircraft (A/C) hydraulic actuation with the use of electrically powered equipment. The latest research programs have evolved into the concept of 'all-electric aircraft'.

CETEST and CEIT, in the framework of the European Cleansky 2 project, TR4EMACS, and with the leadership of AIRBUS as topic manager, have recently completed the development of four modular and flexible test rigs for the on ground validation of this kind of electromechanical actuators (EMAs) and their corresponding control units that would replace other systems, more complex and heavier, therefore, contributing to less fuel consumption, and thus less contaminant emissions. While hydraulic actuation is a time-tested and proven solution, it is essential to ensure that new electric actuators meet all requirements and provide similar or improved performance.

The mentioned test benches were tailor made for the CleanSky 2 Regional Flight Test Bed 2 (FTB2) demonstrator. Novel test bench architecture is proposed that allows not only EMAs to be tested against their hydraulic counterparts, but also the performance of several surface EMAs to be tested together (ailerons, flaps, spoilers, winglets, etc.), in stand alone mode and also with real A/C control systems and electrical sources (integrated mode). The stand-alone mode allows for new equipment or new subsystem individual validation, verification, and certification, while the integrated mode allows for high-level multi-system verification (iron bird) to carry out fully representative A/C tests. The modular conception makes it easy to build testing setups for one or two complete wings.

The test rigs allow for a complete evaluation and validation of EMAs under realistic flight conditions: real static and dynamic loads on A/C control surfaces and representative stiffness and inertias to reproduce equivalent antagonist loads. They will also be used to assess the performance of EMA control systems and validate their electrical consumption their impact on the A/C electrical network.

The test rigs incorporate a main control and acquisition system, which was developed to control every test bench individually or all at the same time and to be integrated into external (A/C or simulator equipment) and the electrical system. The control system is able to monitor, record, and analyze relevant parameters on the test benches.

The aforementioned benches were used to perform several tests for the verification and validation process for the FTB2 demonstrator primary flight control system, allowing for early detection of integration issues. In these tests the flexibility of the benches proved to be the key to ensuring the verification and validation objectives.

In the near future, the proposed system provides EMA and control unit manufacturers with a necessary tool for improving their products (mechanical interfaces, mechanical design, control units, control algorithms, electrical drives, etc.) and evaluation and validation of products, reducing costs and marketing time.

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