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REIVON

Reduction of the Environmental Impact of aviation via Optimisation of aircraft size/range and flight Network

Reduction of the Environmental Impact of aviation via Optimisation of aircraft size/range and flight Network - REIVON

Research and Innovation Actions, RIA; Programme Area: TE

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EU CLEAN SKY 2 TECHNOLOGY EVALUATOR PROJECT REIVON

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Summary

This paper provides an introduction to the EU Clean Sky 2 Technology Evaluator project REIVON, with a focus on how specific tasks in the project could contribute to the CAEP/13 MDG/FESG work items in the GHG Task Group and DLR Model Review.

1 Introduction

1.1 REIVON (Reduction of the Environmental Impact of aViation via Optimization of aircraft size/range and flight Network) is an EU Clean Sky 2 Technology Evaluator funded project (https://reivon.eu/). The research consortium is led by ENVISA SAS (France), with other participants from TAKS B.V. (Netherlands), Hamburg University of Technology (Germany) and Manchester Metropolitan University (UK). The project began in January 2021 and is expected to end in June 2023.

1.2 The project aims to investigate to what extent CO_2 emissions of global aviation can be reduced through the optimization of aircraft size/range and flight network. To achieve this, three alternative options will be considered:

- splitting long-haul flights into shorter legs or intermediate stop operations (ISO) with new aircraft optimised for the appropriate range and seat capacity
- reducing the frequencies on busy routes that are serviced by small aircraft with new range-optimised larger aircraft at reduced frequencies (LARF)
- combination of both ISO and LARF.

1.3 The main task within REIVON is to calculate global CO_2 emissions of a baseline air traffic network and fleet, and comparing the results with the CO_2 from the optimised alternatives. Other tasks include:

- impact assessment on stakeholders: local (airport) level impacts such as airport constraints, air quality and noise; and network (air transport system) level impacts such as passenger travel time, ticket prices, airline demand etc.
- identifying potential measures to support implementation: regulatory and operational measures, incentivisation and compensation schemes, etc.

2 Tasks relevant to CAEP/13 MDG/FESG work item

2.1 The global CO_2 and NO_x emissions calculation will be conducted by MMU using the CAEP approved model, FAST.

2.2 Several sensitivity/uncertainty studies will be performed as part of REIVON and those that may inform work within GHG TG are:

- impact of load factors on full-flight CO_2 and NO_x emissions
- difference in LTO CO_2 and NO_x emissions calculated using ICAO time-in-mode/EEDB and performance-based (PIANO)

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- difference in CO_2 and NO_x taxi emissions calculated using ICAO time-in-mode and airport-level taxi-in/out times for selected airports.

2.3 REIVON will be using base year operations data from OAG 2014. The 2035 and 2050 pre-Covid operations data were generated by DLR with their forecast model, which is under review by FESG in CAEP/13. The data are available for both constrained and unconstrained forecasts, and therefore CO_2 and NO_x emissions will be generated for both set of forecasts. These results will provide an indication as to how constraints may affect global full-flight and LTO CO_2 and NO_x emissions, such as those reported in the Environmental Trends work.

2.4 Results from these tasks will be reported at future MDG/FESG meetings when they are available.

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