Clean Sky Technology Evaluator (TE)

The Clean Sky Technology Evaluator (TE) is a subproject and central part of the Clean Sky program. In this large European program (total budget 1.6 billion Euro) environmentally friendly aeronautical next generation aircraft and rotorcraft technologies are developed and validated in so called Integrated Technology Demonstrator (ITD) platforms. Inside the Clean Sky program the task of the Technology Evaluator is to evaluate the environmental impact of these innovative technologies, aircraft and rotorcraft by applying the TE integrated simulation framework and thus to determine the contribution to the ACARE environmental goals (CO₂, NOₓ, noise). The TE is thus a means to show the most efficient combination of technologies at aircraft level and to assess the maximum environmental potential at the air transport system (global fleet) level.

TE assessment levels

Three assessment levels are covered within the TE.

The mission level:

• Here Clean Sky technologies are integrated at the aircraft level into concept aircraft models. The technologies are developed in the ITD industry platforms and validated through demonstrators. The following technology domains are covered: Flight-system technology e.g. optimized trajectories, laminar flow wing technologies and engine technologies e.g. the open rotor engine.

The airport level:

• A number of representative airports are analyzed with respect to their noise impact. Noise footprints for a number of airport fleets are studied and the number of noise exposed people within these footprints determined as well as the noise areas sizes for given noise levels. The airport fleet traffic scenarios are performed realistically based on existing ATC procedures of the respective airports.

The global fleet level:

• The global air transport system is investigated. In view of the ACARE timeframe a 2020 fleet forecast with the base year 2000 is performed. In order to evaluate the potential of the Clean Sky technologies a comparison of a 2020 fleet with and without Clean Sky aircraft is performed to determine the CO₂ delta. To exploit the full Clean Sky technology potential a 100% fleet replacement scenario is applied.

Clean Sky contribution to ACARE environmental goals

The ACARE goals are given for aircraft (-50% CO₂, -80% NOₓ, halving noise) and airports (max 65 Lden) but not for the global fleet. According to the three described assessment levels the noise and emission deltas (i.e. comparisons with and without Clean Sky technologies) are now determined and the contribution to the ACARE goals investigated. These can only be met partially (e.g. up to 40% CO₂ reduction for the Clean Sky short and medium range aircraft).

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