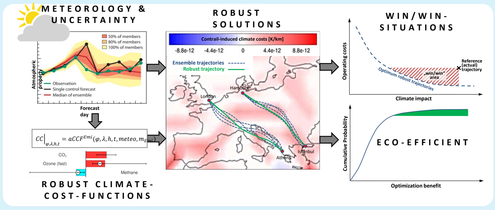
FlyATM4E

Flying Air Traffic Management for the benefit of environment and climate

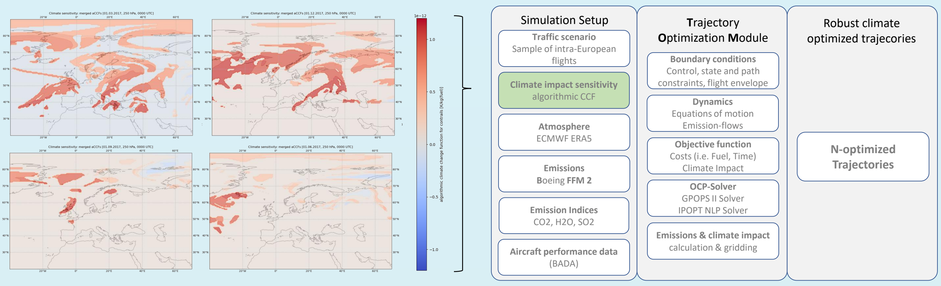
DLR | TU Delft | uc3m Universidad Carlos III de Madrid | TUHH Technische Universität Hamburg

SESAR Innovation Days 2023 - Sevilla

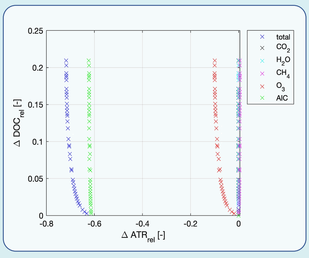
FlyATM4E developed a concept to identify climate-optimized aircraft trajectories which enable a robust and eco-efficient reduction in aviation's climate impact expanding on approved climate-assessment methods and optimization approaches. Applying state of the art climate impact quantification methods for aircraft emissions, robust climate-optimized flight planning in trajectory-based operations is investigated.

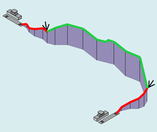


Algorithmic Climate Change functions (aCCFs) allow for the fast quantification of climate impact, for CO2 and non-CO2 effects, induced by aircraft emissions as a function of emission location and time. Provided as a high-resolution MET-service to flight planning, they are a major driver for the optimization algorithm.

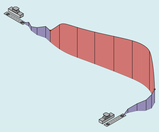


Trajectory optimization methods applied are based on an optimal control approach to optimize aircraft trajectories considering operating costs (including fuel and time) and climate impact (by means of aCCFs) in terms of future near-surface temperature. The mitigation efficiency is assessed by means of Pareto-frontiers, quantifying the trade off between cost increase and climate impact mitigation potential.

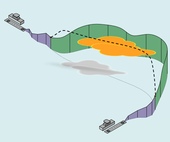




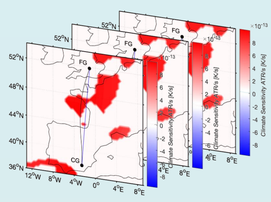
Lateral routing



Profile optimization



Climate-optimized trajectory design



D-KULT

Ongoing research focused on the operational feasibility and technical implementation of eco-efficient flight planning is performed in the German LuFo-project D-KULT coordinated by DLR. Climate impact quantification methods are integrated in operational MET-services and implemented in state of the art flight planning software.

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Project Information

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- 1st June 2020 – 30 November 2022
- Budget: 999765€

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