

Guest article

REDUCING NON-CO₂ EFFECTS TOGETHER

Aviation also contributes to climate change through non-CO₂ effects. The main causes are contrails and cirrus clouds that contribute to atmospheric warming. DLR and Lufthansa are jointly driving research and efforts to address these non-CO₂ effects.

Global aviation accounts for around 3.5 percent of human-induced global warming, with a significant portion attributed to non-CO₂ effects. To better understand these impacts and develop measures to mitigate their climate effects, Lufthansa and DLR are working closely together. One notable initiative is the CARIBIC flying measurement laboratory, which is installed in the cargo hold of a Lufthansa aircraft and gathers data during regular flights. Lufthansa is also actively involved in the EU research project IAGOS, operating three long-haul aircraft as part of the project.

Flying around regions

Non-CO₂ effects can be significantly reduced through technical measures, especially through the use of sustainable aviation fuels (SAF). Another option involves altering flight paths to circumvent regions where the climate-changing contrails and cirrus clouds tend to form. These phenomena only occur in specific areas characterized by extremely cold temperatures and high humidity at cruising altitudes. According to current research, only a small percentage of all flights operating in these regions worldwide are affected.

The challenge lies in predicting these regions as accurately as possible on a daily basis, using weather data and forecasting models such as those provided by the DLR. Although precise forecasting, especially with respect to humidity, remains challenging, it is feasible to make significant contributions to climate protection in global aviation through relatively minor adjustments. However, planning, implementing, and evaluating climate-compatible flight routes within regular flight operations requires extensive research and development. Collaboration between politics, science, and industry is essential in this endeavor.

Lufthansa as a partner in the lighthouse project

The D-KULT (Demonstrator Climate and Environmentally Friendly Air Transport) project, funded in 2022 by the German government's aeronautical research program, is a flagship initiative. Led by the DLR, the project aims to determine climate-optimized flight routes and to seamlessly incorporate them into operational procedures. Lufthansa is a partner in this endeavor, conducting measurement flights (scheduled

flights) to validate forecast data and flight planning software for avoiding regions that affect the climate. The project's progress is monitored by satellite observations.

EU: Reviewing climate impacts

Non-CO₂ effects are also shifting into the spotlight at the European level. In May 2023, the EU decided to incorporate a reporting and verification system (MRV) for non-CO₂ effects to emissions trading (ETS) by the middle of next year. The objective is to gain a reliable understanding of the climate impact of individual flights through the collection and analysis of more data. Airlines will have to comply with this new reporting requirement as early as 2025. The EU Commission plans to conduct an impact assessment by 2027 and issue regulations if deemed necessary.

Targeting non-CO₂ effects

The DLR is currently supporting the EU in establishing this MRV system, emphasizing the need for effective regulatory incentives to identify relevant flights and thereby reduce their climate impact. One-size-fits-all approaches are not helpful in this context. Unlike previous CO₂ regulations in Europe, measures to mitigate non-CO₂ effects should be reinforced in a targeted manner. Important components include supporting the rapid ramp-up and use of SAF and modern flight route optimization systems. The focus should be on practical and pragmatic implementation for flight operations.

Our commitment centers around achieving climate-compatible aviation. A high degree of robustness and accuracy in avoiding climate-affecting contrails will make a significant contribution. To achieve this, we need partners who will continue to work with us, just as we are already taking significant steps together with Lufthansa.



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