Funded by the European Union

The project has received funding from the European Union`s Horizon Europe research and innovation programme under the Grant Agreement no. 101192301.

A4CLIMATE

A4CLIMATE

Advancing Aeronautics and Aerosol research to Accelerate CLIMATE neutral aviation

DLR Deutsches Zentrum für Luft- und Raumfahrt

MAX-PLANCK-INSTITUT FÜR CHEMIE

IMPERIAL

University of Reading

UNIVERSITY OF LEEDS

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

INCAS National Institute for Aerospace Research "Elie Carafoli"

Deutscher Wetterdienst Wetter und Klima aus einer Hand

SUPPORTING EUROPEAN AVIATION

EUROCONTROL

TUI

FLIGHTKEYS

Breakthrough Energy

to70

sopra steria

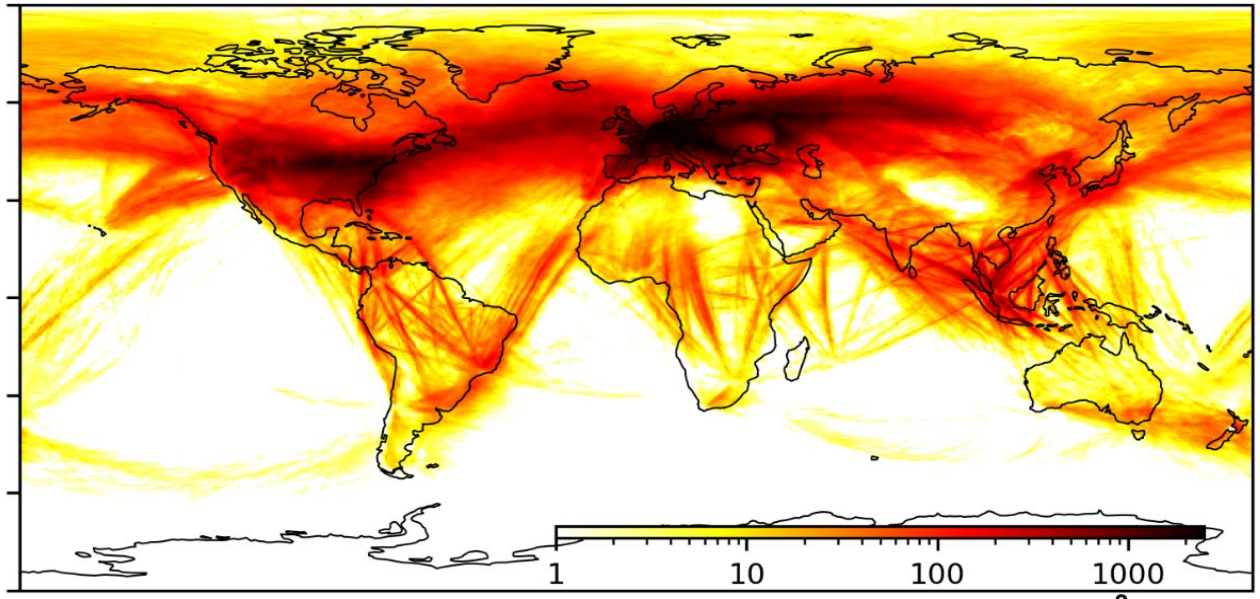
PNO INNOVATION

ETH zürich

A4CLIMATE in a nutshell

Reducing contrails could halve the effective radiative forcing from aviation within a decade.
A4CLIMATE tackles this contrail challenge by advancing the understanding of engine emissions, contrails, and their climate impact.

A4CLIMATE will accelerate the evidence-based implementation of contrail mitigation measures through contrail management, engine and fuel design to promote aviation competitiveness.



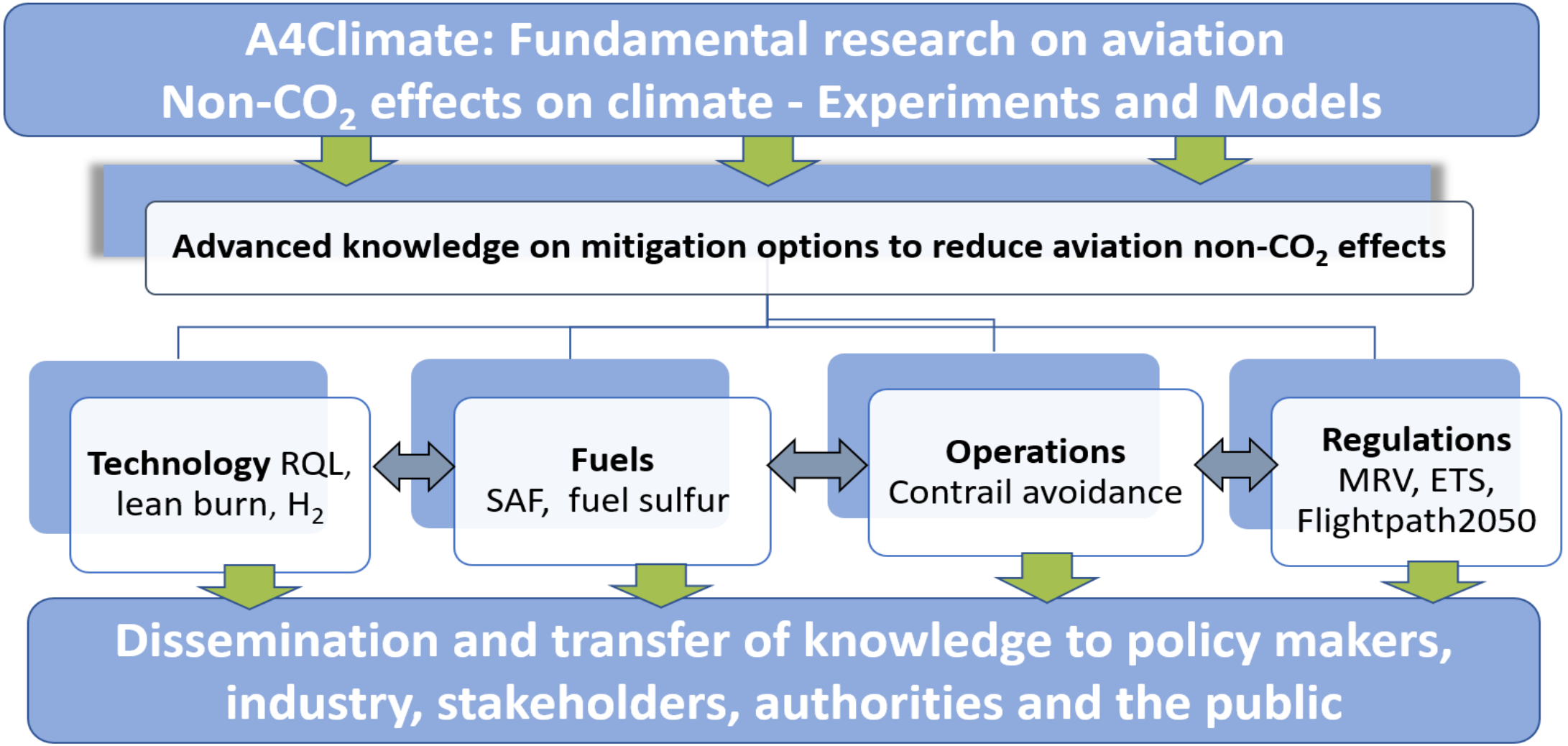
2019 annual mean contrail radiative forcing (mW/m^2)

4 years duration
02/2025 to 01/2029

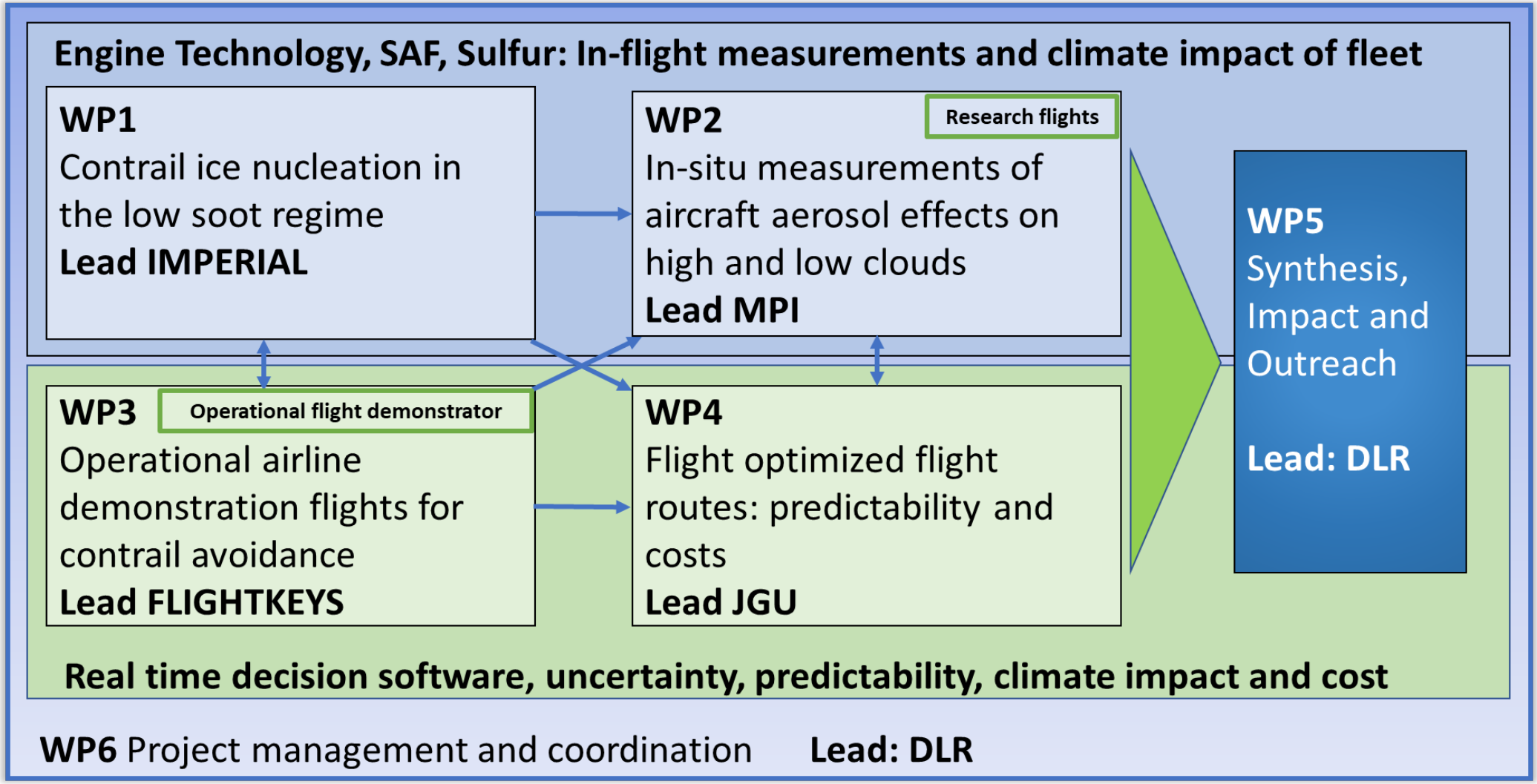
4.8 M€ EU funding
8.1 M € overall budget

17 Partners 9 Countries
- 6 Universities
- 4 Research Institutes
- 3 Industries
- 2 SMEs
- 1 Weather Centre
- 1 European Agency

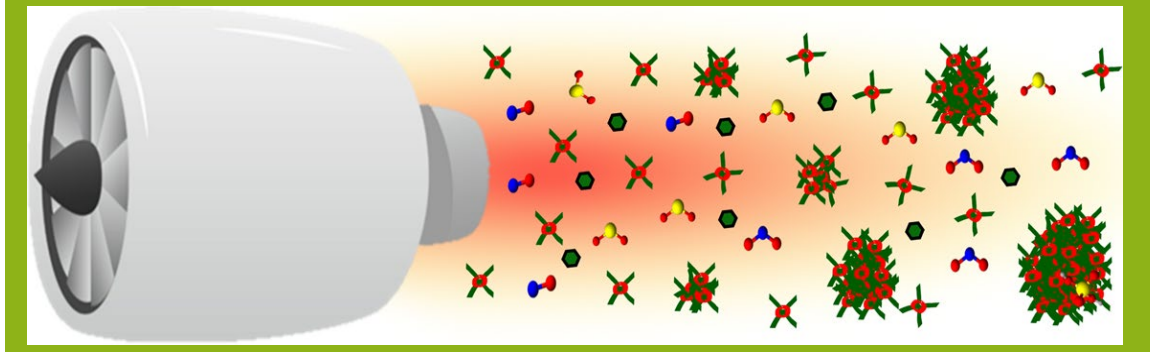
A4CLIMATE will advance contrail mitigation measures



A4CLIMATE's pathway to impact



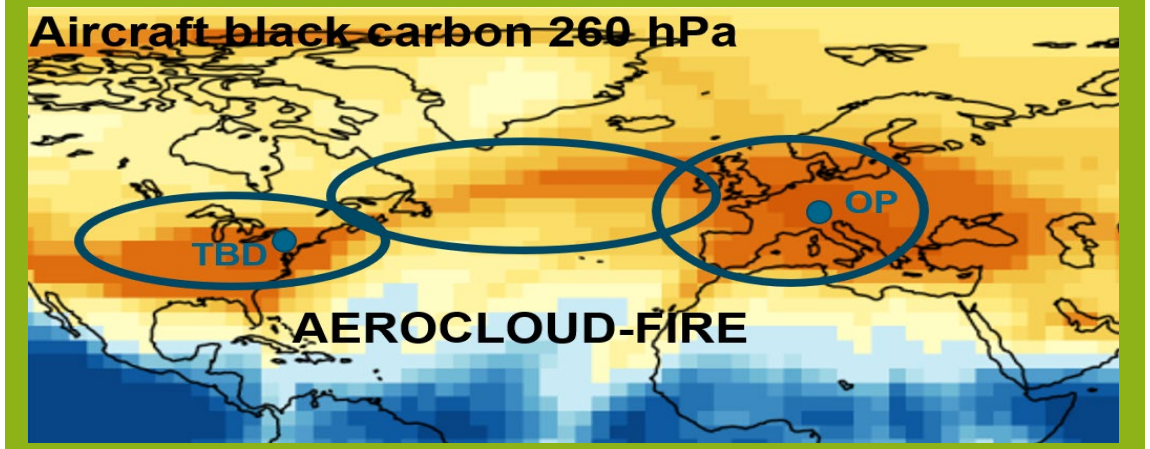
Contrail ice nucleation in the low-soot regime - WP1



- Improve the understanding of the role of aerosols and microphysics on contrail formation
- Perform laboratory and ground engine measurements
- Generate new experimental datasets and open source models for contrail ice formation
- Update the quantification of contrail radiative forcing accounting for volatile particulate matter

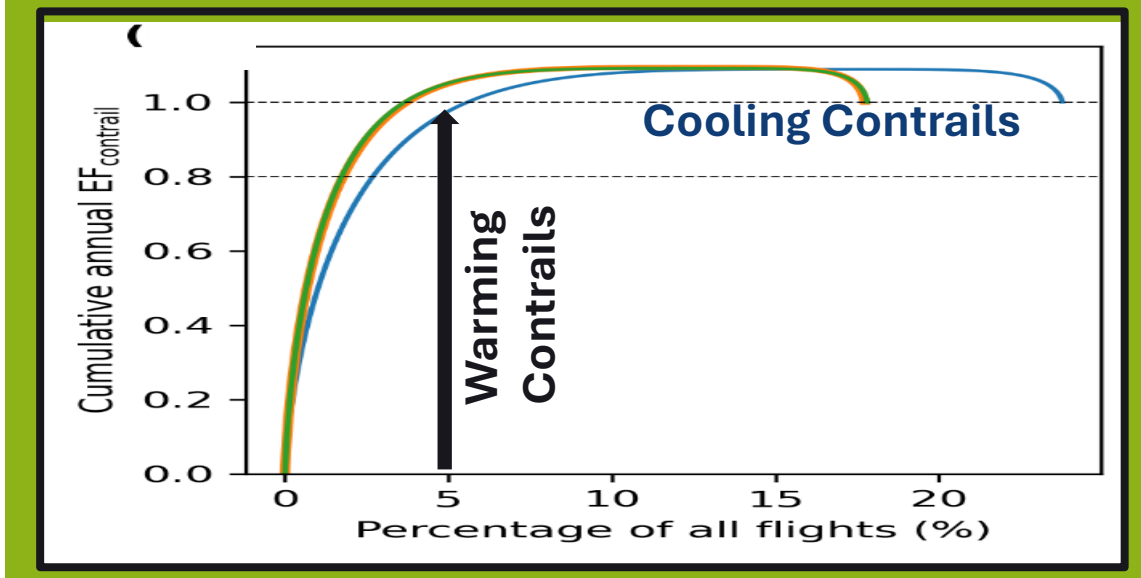
IMPERIAL
UNIVERSITY OF LEEDS
MAX-PLANCK-INSTITUT FÜR CHEMIE
GOETHE UNIVERSITÄT FRANKFURT AM MAIN
DLR Deutsches Zentrum für Luft- und Raumfahrt

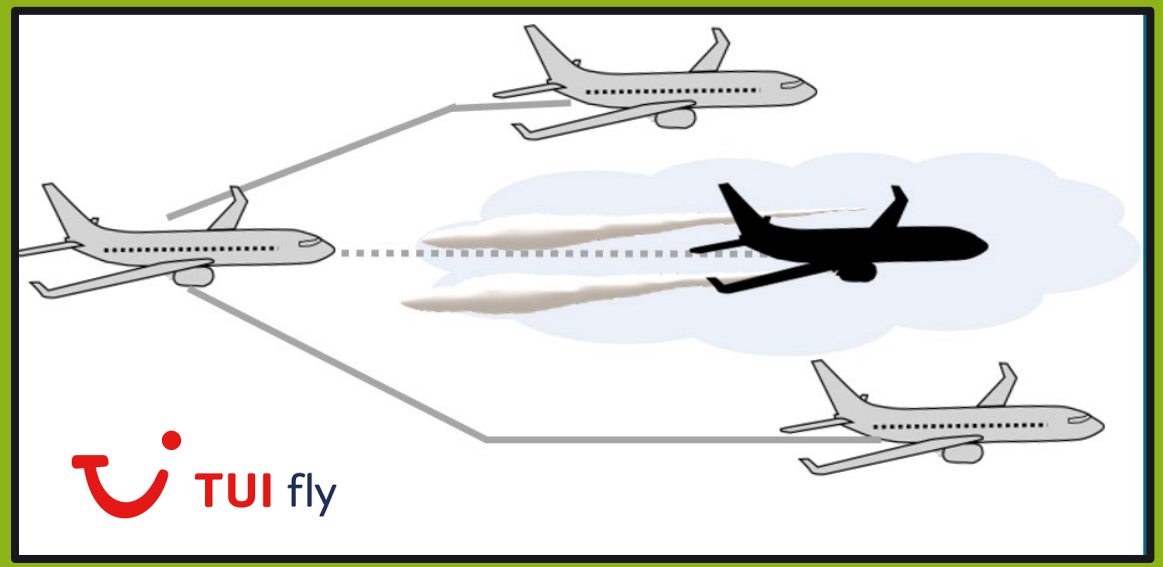
Aircraft measurements of aerosol effects on high and low clouds - WP2



- Perform 4 flights with the research airraft HALO during the AEROCLOUD-FIRE campaign 2027
- Provide new in-flight data on
  - ambient aerosol & humidity,
  - gaseous & particulate aircraft emissions,
  - contrails and contrail cirrus
- Assess impact of aircraft emissions/meteorology on contrail formation and evolution
- Apply plume and global models to link aircraft sulfur and soot emissions to radiative properties of high- and low-clouds

400 operational contrail avoidance flights – WP3





- Perform > 400 real operational contrail mitigation flights
- Build up database (trajectories, weather) for climate impact and cost assessment
- Test current flight optimization tools and improve their operational application
- Improve numerical weather predictions by data assimilation

TUI

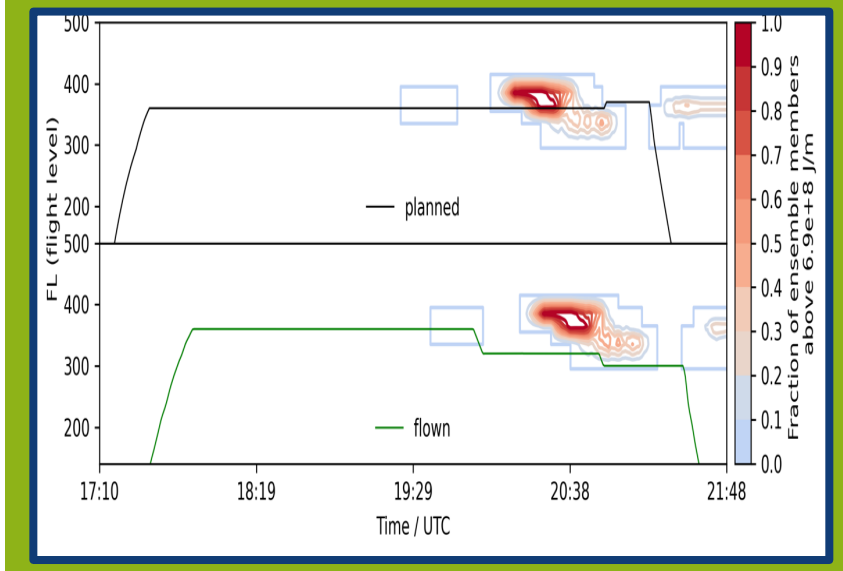
Contrails.org

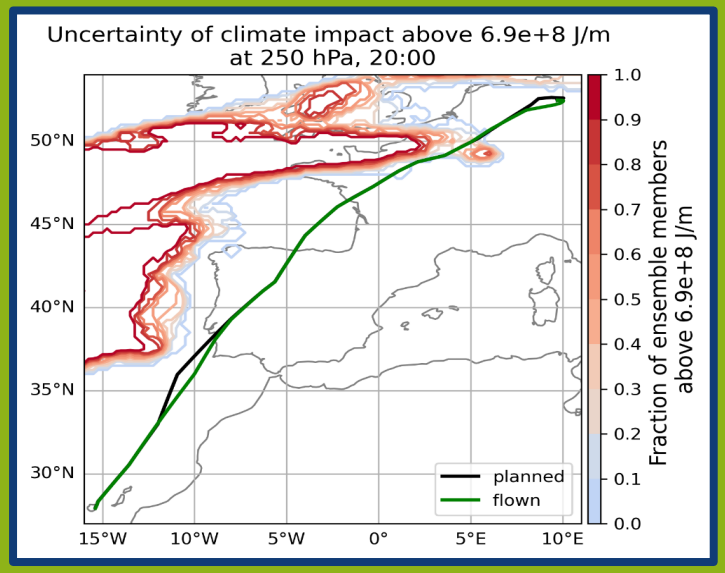
FLIGHTKEYS

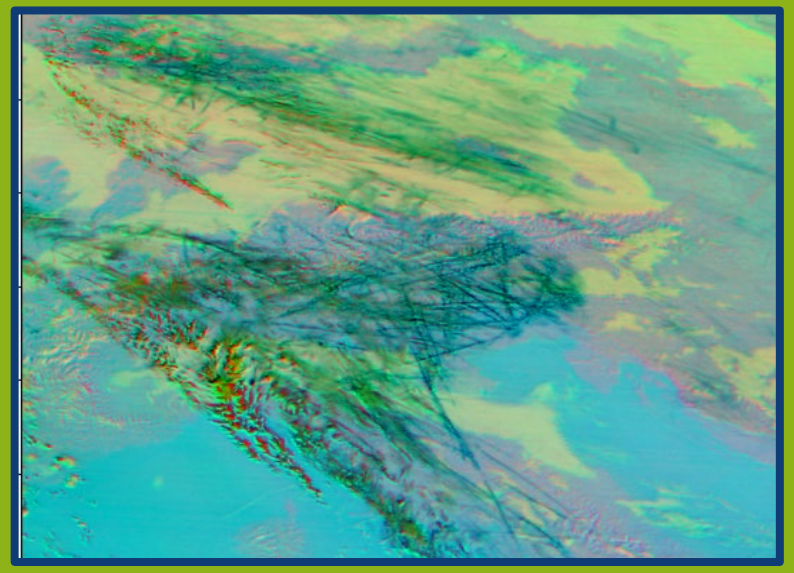
Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DLR Deutsches Zentrum für Luft- und Raumfahrt

Risks and costs of contrail management – WP4

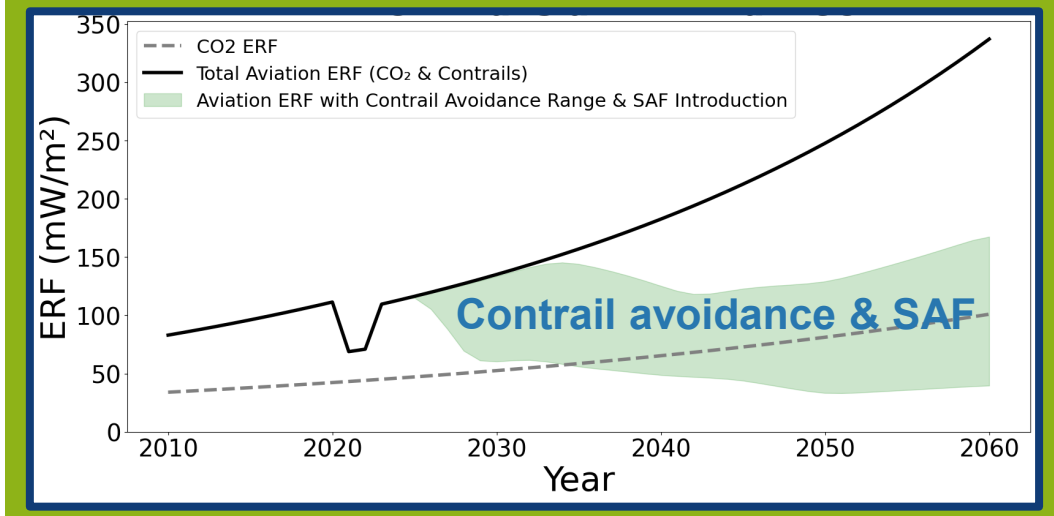






Improve	Quantify	Predict	Evaluate
humidity and clouds in weather prediction models by data assimilation and assess impact of improved initial conditions	the accuracy of probabilistic forecasts of warming contrail regions	Improve contrail forecasts with predictability and uncertainty data	the impact of different CO2e metrics on contrail impact and cost relationship

Synthesis, Impact and Outreach – WP5



- Visualize A4CLIMATE results in real-time decision-support software for airlines & air traffic management
- Calculate change in contrail forcing through lean-burn engine technologies, use of SAF and contrail avoidance
- Provide recommendations for policy measures for cleaner engine technologies, fuels, and contrail management
- Enhance impact through open access publications, contrail software and engagement of stakeholders
- Share results with the public, industry and policymakers to progress towards climate compatible aviation

Funded by the European Union

The project has received funding from the European Union`s Horizon Europe research and innovation programme under the Grant Agreement no. 101192301.

A4CLIMATE

A4CLIMATE will accelerate the evidence-based implementation of contrail mitigation measures through contrail management, engine and fuel design to increase aviation competitiveness.

Thank you

Coordinator
Christiane Voigt, DLR
Christiane.Voigt@dlr.de

Project office
ARTTIC
a4climate_arttic@eurtd.com