

Performance
through
Innovation



Mitigating the climate impact of non CO₂: EUROCONTROL MUAC Live Trial 2021

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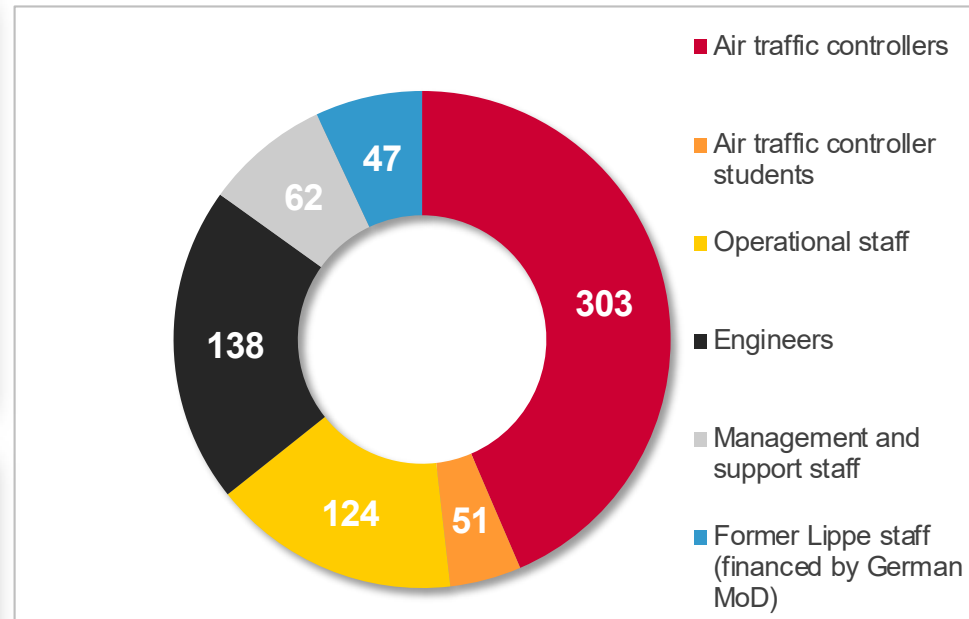
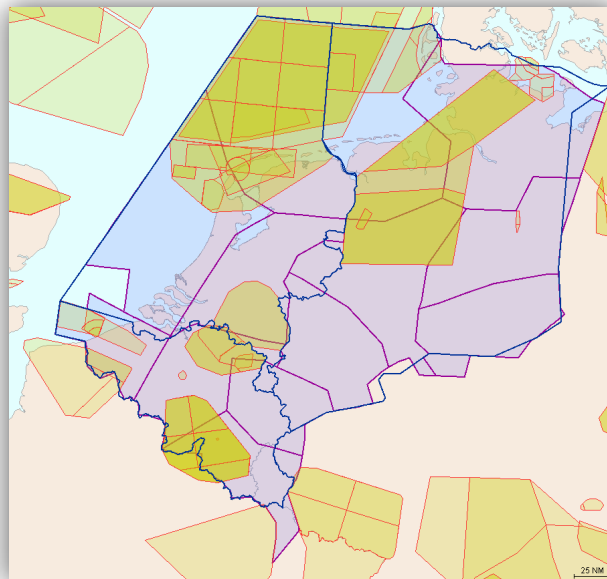
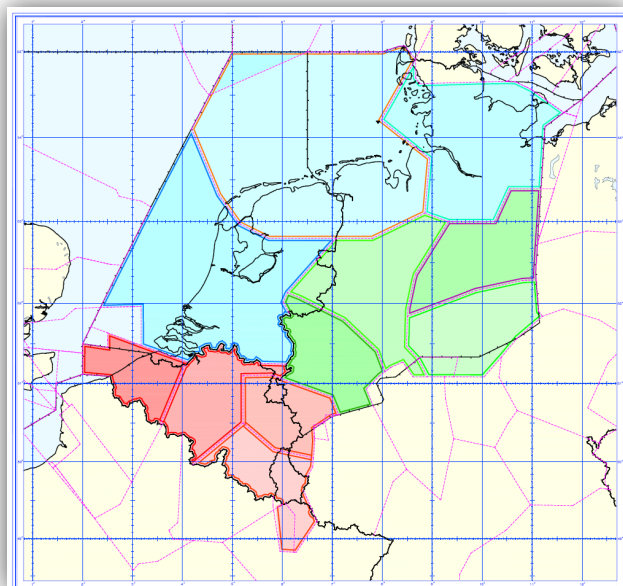
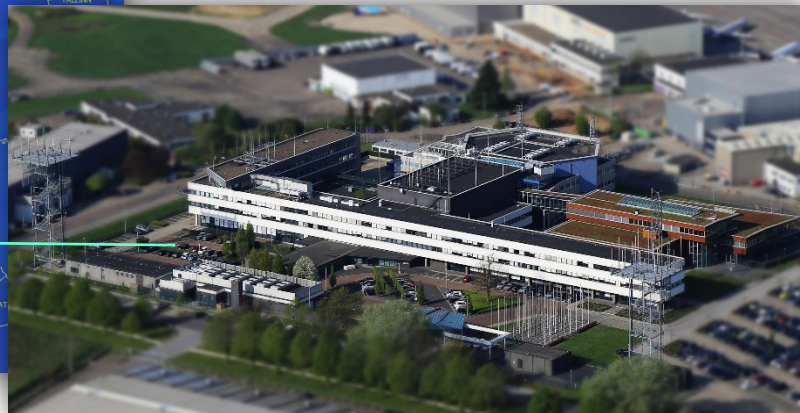
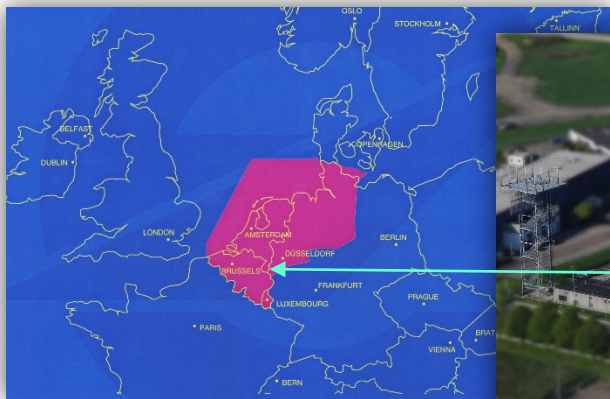
Objectives

Project will contribute to the mitigation of the non-CO₂ effects of aviation according to the objective

- To establish and test a procedure that avoids persistent contrails in the MUAC area of responsibility

Requires answering the following questions

- Can we organise air traffic such, that areas, which allow the formation of persistent contrails, can be avoided?
- Can we predict contrails with reasonable skill?
- Can we **predict** persistent contrails with sufficient skill for deviating air traffic?
- Can we **detect** ice super-saturated regions and avoid them in real-time?



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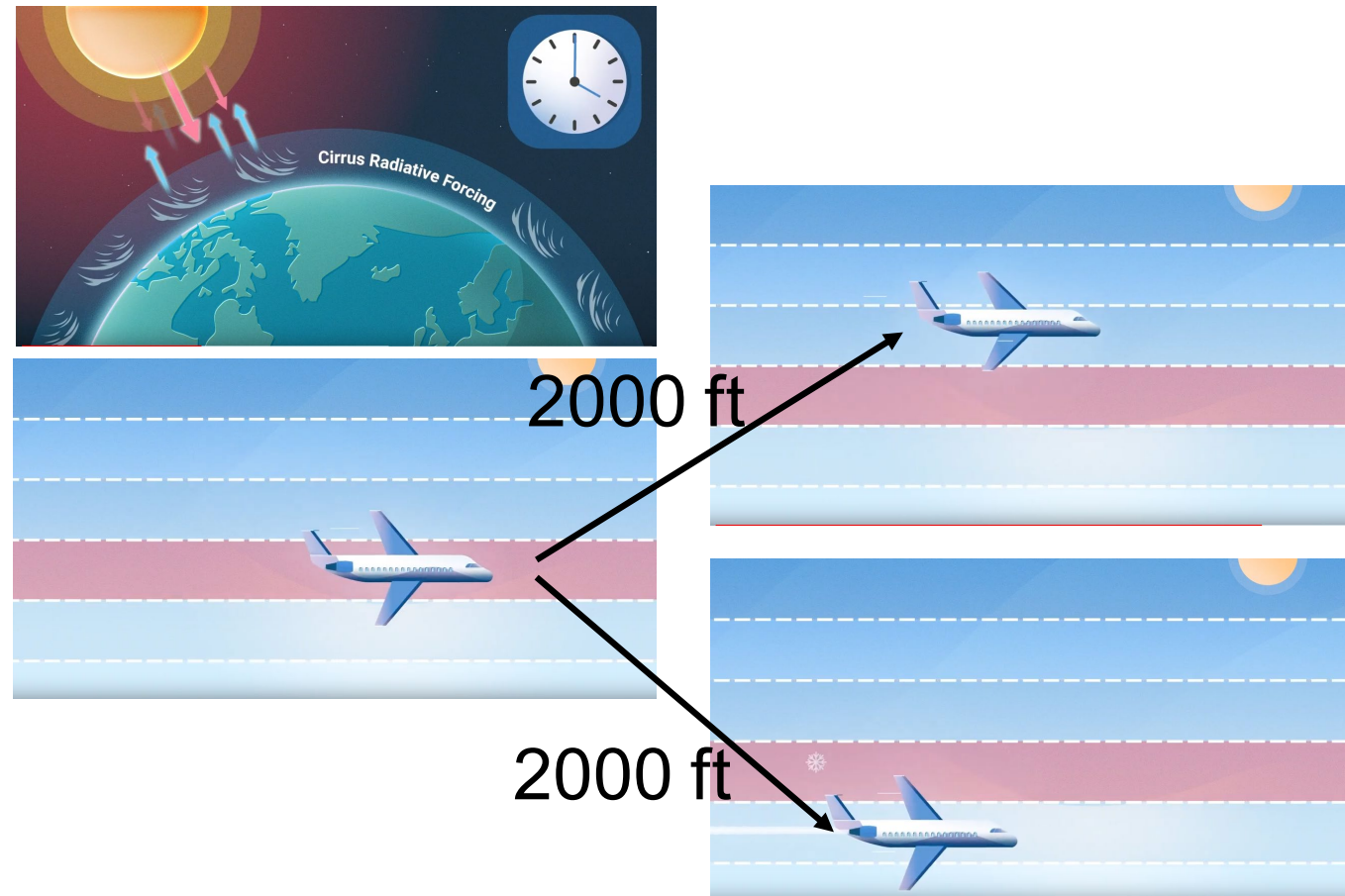
Operations – NOTAM January

(<https://youtu.be/oz4OyEFrD4Q>)

CONTRAIL PREVENTION TRIAL - MAASTRICHTUAC (EDYY) AIRSPACE

IN AN EFFORT TO MINIMISE THE IMPACT OF AVIATION ON THE ENVIRONMENT, MUAC WILL BE RUNNING A CONTRAIL PREVENTION TRIAL FROM 18TH JANUARY 2021 UNTIL 31ST DECEMBER 2021 BETWEEN 1500-0500UTC WINTER (1400-0400UTC SUMMER). FLIGHTS MAY BE TACTICALLY REQUESTED TO DEVIATE FROM THE PLANNED/REQUESTED FLIGHT LEVEL BY THE SECTOR CONTROLLER.

ANY FLIGHT FLYING VIA MAASTRICHTUAC SECTORS BETWEEN THESE TIMES MAY BE CHOSEN. THE TRIAL WILL GO AHEAD DEPENDENT ON THE WEATHER CONDITIONS.



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Opportunities and Risks

Opportunities:

- Aviation industry has to focus on the environmental impact of the business
- Traffic downturn due to the pandemic allows for tuning systems and procedures
 - minimising impact for airline operators
- Readiness to support the traffic recovery at the earliest opportunity
 - incorporating the new environmental constraints

Risks:

- Lateral or vertical prediction of ISSR for contrail prevention not accurate enough?
- Adaptation of operational working processes, whilst avoiding additional workload and impact on ATM capacity, not feasible?
- Environmental benefit of climate effect due to contrail prevention vs additional CO₂ pollution difficult to validate?
- Additional fuel burn and CO₂ emission.
 - CO₂ charging scheme paradoxon

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Issue – Accuracy of ISSR-prediction

Prediction of ice super-saturation regions (lateral and vertical)

- Numerical weather prediction at DWD (Deutscher Wetterdienst - ICON)
 - relative humidity and temperature
- Additional ISSR-model parameters are tuned

But:

- MUAC concepts with tactical air traffic control, i.e. real-time online decision making
- Prefer real-time online ISSR observation system in addition to predictive system
- Can this be achieved?
 - Current generation satellite
 - Ground-based cameras
 - LIDARs
 - Next-gen satellites

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Results And Outlook

Results

- Too early to have validated results
 - 12 weeks of trial, every other day, winter season with low ISSR
- ISSR prediction must be improved
- Improve operational decision making process
- Continue validation with DLR
 - Satellite image analysis



Outlook

- Traffic comes back
- Tune and validate the ISSR prediction
- Alternative validations for ISSR prediction
- **Real-time online ISSR detection**