

The graphic features a green and blue background with a stylized globe on the left and a smaller globe on the right. A white airplane is shown flying over the globe on the left, with yellow wavy arrows indicating emissions. Another white airplane is shown flying over the globe on the right. The sun is visible in the top left corner. The text is centered in white.

ICAO Symposium on Non-CO₂ Aviation Emissions

16 — 18 September 2024
Montréal, Canada

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Speaker

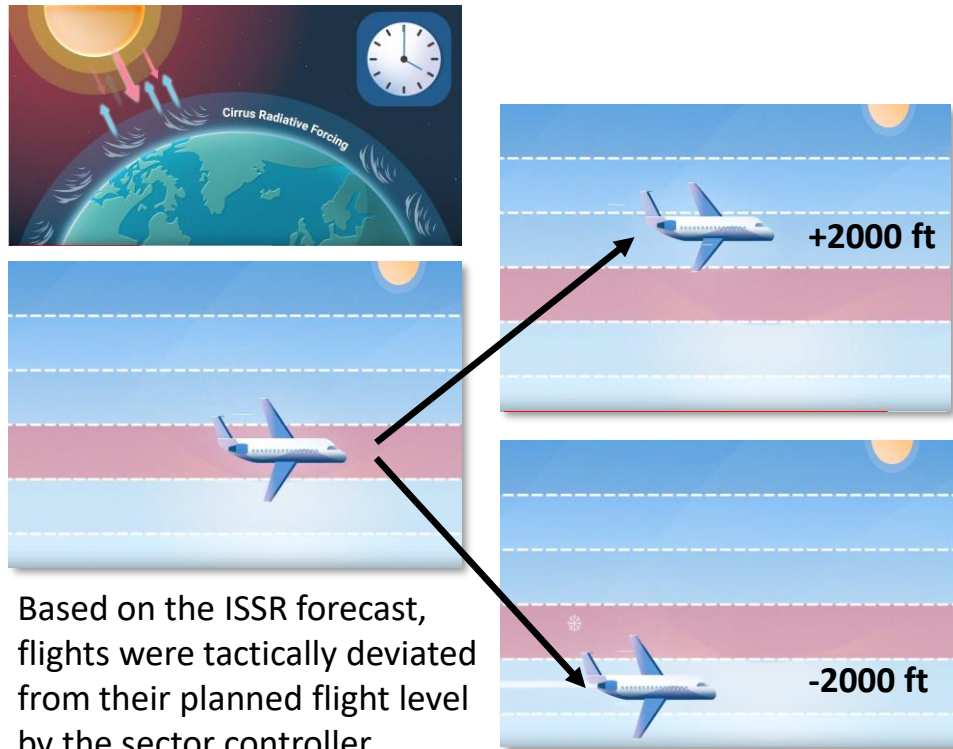
Session 4: Partnerships to act on (Part II) **Implementing
Mitigation Measures**

MUAC airspace covers 260,000 km over Belgium, Luxembourg, the Netherlands and north-west Germany



- 17% of all flights passing through Europe use MUAC's airspace
- 350 Air Traffic Controllers
- 190 million passengers safely transported each year
- 5,700 aircraft controlled on busy days
- 80% of traffic is climbing and descending

Contrail Prevention Live Trial 2021



MUAC in partnership with the German Aerospace Center (DLR) 25 January 2021- 22 October 2021 during the night

Results:

- Statistical analysis showed that contrails were avoided
- Operational procedures were established for contrails prevention in MUAC AoR
- Ice Super Saturated Region (ISSR) prediction is not fully reliable
- Verification of contrails via geo-stationary satellite images is difficult
- Effect of contrail prevention vs Co2 emissions needs to be investigated

Real-time Simulation 2023

Objective: Simulate moderate traffic with contrail avoidance to assess pre-tactical and tactical operation limits and their impact on capacity

Set up: 3 days, 21 air traffic controllers (ATCOs), various traffic levels blocked

The Results

- Reduced capacity (at least 20%) for safety reasons
- Complexity increased exponentially depending on the number of flight levels blocked
- Workload increased substantially for the Coordinator Controller (CC)
- Pre-tactical avoidance is the preferred option
- Knock-on effects for neighbouring centres



MUAC-Google Live Trial 2024

- Prediction of contrail prone areas by Google based on machine learning
- Decision support at MUAC:
 - When is contrail prone area in airspace
 - At which levels
 - Can the operational live trial be conducted under predicted demand
- Live identification of contrails in cameras with neural networks
- Mapping with live radar traffic and contrail-aircraft tracking
- Verification against contrail prediction tools

Blocked levels per sector GMT

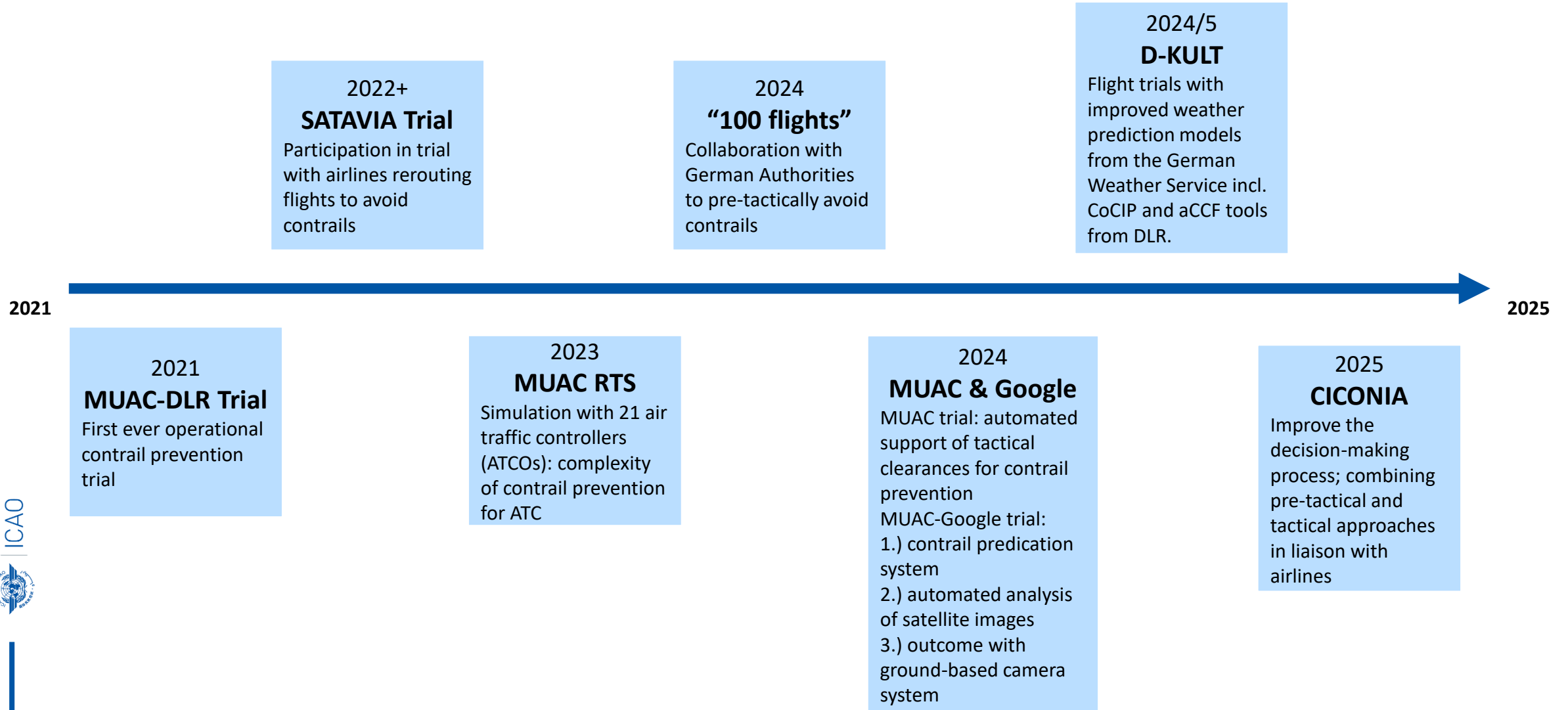
#	15H	16H
KOKSY	320-330	320
NICKY		310-320
OLNO	320	310
LUX		
DELTA	300-340	310-340
JEVER	310-340	300-340
HOLST		340
RUHR	310-330	310-330
MUNST	320	300-350
CELLE		
SOLLIN		310-330

External Tools

- Statuspage
- NocoDB
- Minio
- Manual Contrail detector
- Manual Track Aircraft
- Contrail predictor
- Label Studio
- Original COAV App

Decision support tool for contrail criticality and trial info.

Contrail Project Roadmap



Thank You

