



ICAO Symposium on Non-CO₂ Aviation Emissions

16 — 18 September 2024
Montréal, Canada



Stella Saldana



Programme Manager
SESAR Joint Undertaking

SESAR – Delivering the Digital European Sky



Smart ✓ Sustainable ✓ Resilient ✓

77 projects in operation

EUR 600 MILLION investment

136 delivered solutions

SESAR projects addressing non-CO₂ emissions

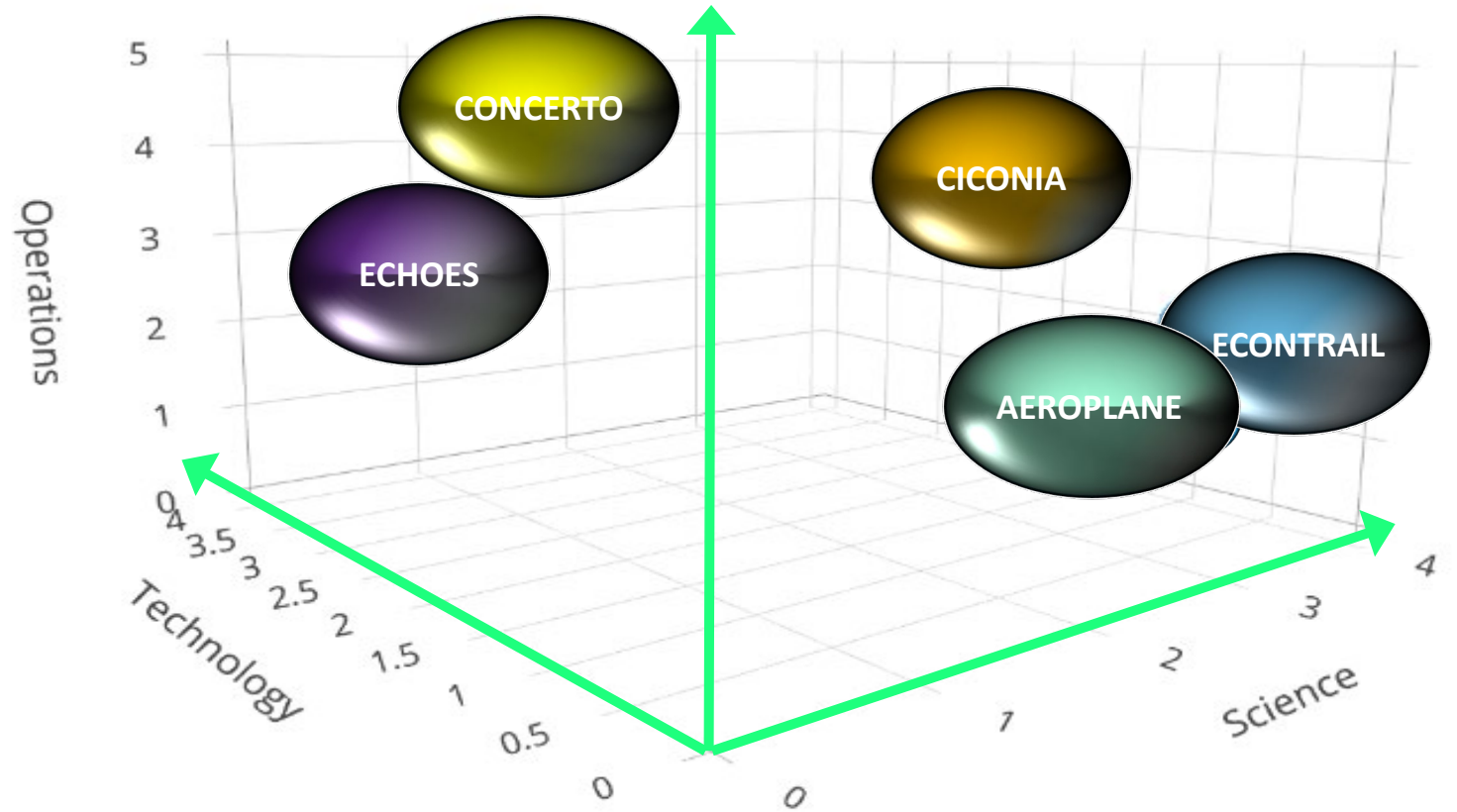
Flagships



Aviation
Green Deal



Non-CO₂ emission
solutions



SAME TOPIC

**DIFFERENT
FOCUS**

**DIFFERENT
APPROACH**

E-CONTRAIL

To develop **artificial neural networks** for the prediction of the climate impact derived from contrails and aviation-induced cloudiness.



Contrail detection

Remote sensing and AI for **aviation-induced and natural clouds discrimination**



Ice cloud radiative forcing quantification

Remote sensing and radiative transfer methods



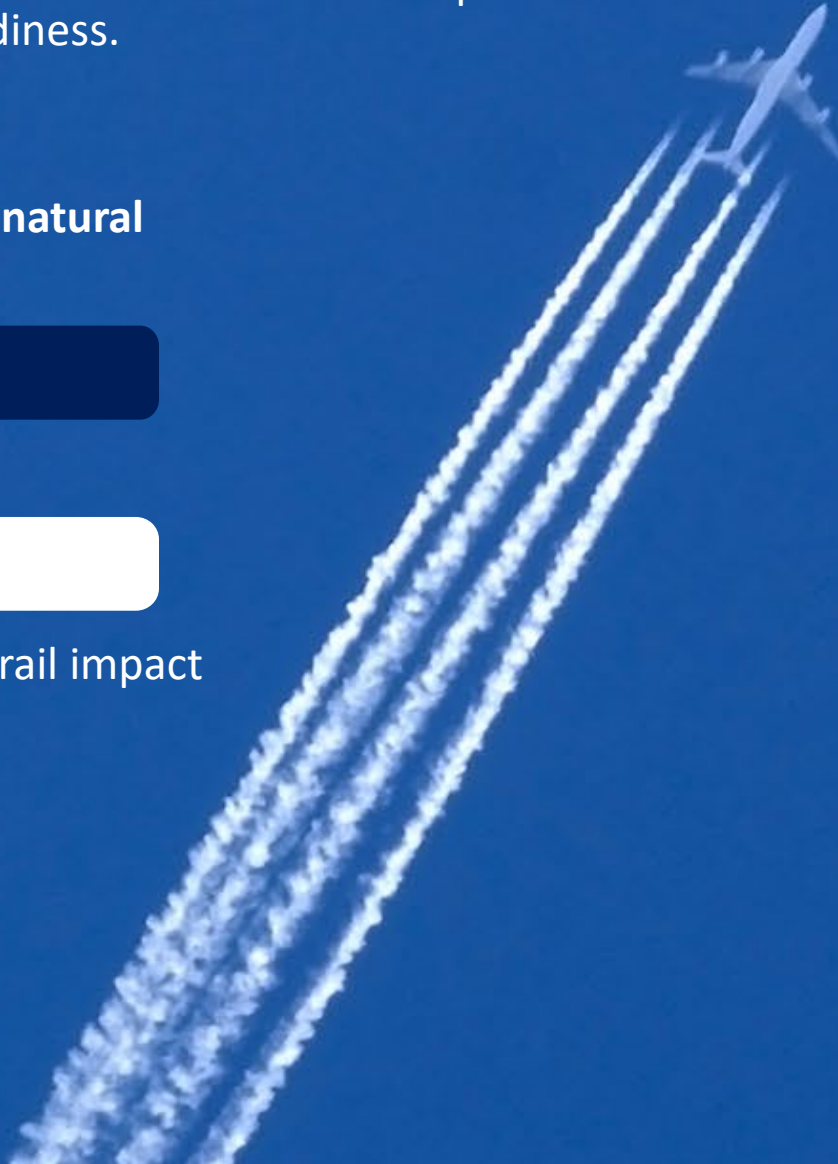
Contrail radiative forcing prediction

Deep learning to predict volumes with high contrail impact and **reducing uncertainties**



Visualisation dashboard

- Detected contrail with RF and other metrics
- Forecasted volumes with high contrail impact



Filter

Time horizon ⌵

20 50 100

Climate metric ⌵

ATR GWP GTP

View climate-impact maps

View alternative routes

View vertical profile

📌 IMY177 (Imaginary Airways)

LHR ————— JFK

5,545 km
Scheduled in 2h

Departing time:
14:10 BST

Estimated arrival:
17:57 EDT

Aircraft Type
BOEING 777-300ER

Planned route
5125N/05914W ENE PARCH3

AEROPLANE



To create proof-of-concept climate services for aviation to improve the sector's resilience to climate change.

Quantify the impact of contrails on cirrus clouds- embedded contrails- and deepen the understanding of aviation non-CO₂ effects on climate

Identify best metrics to assess and predict the aggregated impact of CO₂ + non-CO₂ on climate change

Quantify the impact of climate change on aviation focusing on the impact of higher temperatures on aircraft performance during take-off

ECHOES

To demonstrate the feasibility of **space-based solution** (using low-orbit satellites) for very high frequency (VHF) communications (voice and datalink) in air traffic management.

Space based VHF voice , data link, ADS_B and on-flight high-resolution MET data over the oceans supporting ISSR detection
Live trials

Assess potential reduction of the required minimum separation
between aircraft in oceanic regions

Quantify environmental benefits of disruptive green procedures, such as permanent contrail avoidance or more efficient trajectories

 www.sesarju.eu/projects/ECHOES

CICONIA

To define an efficient climate mitigation operational concept.

Combine science research and operational expertise to develop industry-wide climate impact models, for different engines, fuels and emissions **Live trials**

Improve weather forecasting (humidity sensing, space remote sensing...) for ISSR forecasting

Focus on **operational procedures**, pre-tactical and tactical operations, oceanic and continental



www.sesarju.eu/projects/CICONIA

CONCERTO

To integrate green ATC capacity into the system, with the appropriate level of automation, and support stakeholders in balancing regularity and environmental performance at local and network levels.

Optimise traffic flow based on **CO2, non-CO2 & ATC capacity trade off**

Target high maturity using **available techniques + innovative approach**

Address climate sensitive areas, big hits and mitigation index

Strong ATM component local + network
Focus on Borealis



Update of European ATM Master Plan

Agreed roadmap: Prepared in consultation with all European stakeholders

Content: Vision, Roll-out, Deployment priorities, Development priorities, Benefits and investment needs

Adoption: Foreseen in December 2024

Future research: New calls coming in 2025, including on non-CO2 emissions



Thank you for your attention

Be sure to visit us at **Stand 11**
and our website
www.sesarju.eu/projects/
Follow us!

