<u>14:40-15:30</u> Showcase Part 2:

Last two of four companies working hands-on with contrail management present their practical solutions: Thales & Estuaire





Julien Lopez Head of Green Operations, Thales



Maxime Meijers Co-Founder & CEO, Estuaire

ESTUAIRE

Solving half of aviation's climate impact this decade

Questions from the aviation industry

- What are non-CO2 effects?
- What should I put in the monitoring plan?
- Is the data 100% validated ?
- What is my potential liability if this goes in the ETS?
- What about my competitors?
- If I reroute flights, will I necessarily burn extra fuel?
- Is SAF good for contrails ?

Contrail monitoring





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Aviation Impact 2024 vs 2023



CONTRAIL IMPACT BY ORIGIN-DESTINATION



Example : Iberia contrail exposure

IBERIA 🥻

2023 Statistics

Operations	Number Flights	101,267
Operations	Distance Flown	274,137,400 km
Energy Forcing	Contrail Energy Forcing	6,171 PJ
	Energy Forcing per distance	0.225 J/m
Exposure Total	CO2 Emissions	5,132 ktCO2e
	Contrail Impact	1,742 ktCO2e
	Radiative Forcing Index	x1.34 (1.36 wo Leap)
Exposure EU-ETS Reduced	CO2 Emissions	1,023 ktCO2e
	Contrail Impact	114 ktCO2e
	Radiative Forcing Index	x1.11



*Lean-burn engine are currently not properly modelled by COCIP (Leap, GEnx...)

Open source Contrail opportunity index on estuaire.dev

Geostationary Satellite EUMETSAT MSG

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Geostationary Satellites EUMETSAT MTG



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Source : Reuniwatt

Compute contrail emissions of your fleet





Prepare for EU MRV regulations and gain time

Deep dive into most important flights...

...to understand what to report



Data	Sensitivity	Difficulty
Aircraft mass Passenger load factor	+	+
Engine configuration	++	-
Fuel Composition	+++	+++
Flight Trajectory	+	++

Contrail mitigation

Strategic levers



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Overall, current SAF regulatory mechanisms **may** result in **artificial lower SAF price**

Breakdown of price in M€ after SAF deployment, over a year, for the top 7 airlines departing airport A, including EU-ETS savings for CO2 and non-CO2

	Assumptions	
Jet A-1 ¹	785 €/tonne	
eSAF	4 500 €/tonne	
EU-ETS CO2 ³	70 €/tonne CO2	
EU-ETS non- CO2 (hyp) ⁴	70 €/tonne CO2e	
SAF supply ⁵	5 080 t	
EU Free Allowances ⁶	70 %	



¹28th feb 2025 price defined by <u>IATA</u>, converted using a EURUSD rate of 1.07

³ Estimate based on the value for 28th feb, 2025 https://tradingeconomics.com/commodity/carbon

⁴ Assumption made for the purpose of the study, directly derived from the EU-ETS price of CO2 (see ³)

⁵ Using the rule-based allocation, defined in this presentation

⁶ ETS allowances for SAF, as a percentage of "Price of SAF - Price of Kerosene - EU-ETS CO2 Expenses" - November 2023 - DG CLIMA B.4, European Commission

Reduce contrails

We identify "big hits" flights and suggest a rerouting



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End to end contrail management



Coming next from ongoing scientific studies

- Modeling of lean burn engines considering vPM activation
- Direct RF inference from satellite images
- ML-based replacement of Schmidt-Applemann criteria
- Joint SAF and rerouting CONOPS
- NWP agnostic calculations, forecast or reanalysis product, in line with MRV decisions

Many levers are available to reduce aviation impact

New gen aircraft

Electric - Hydrogen



Sustainable Fuels



Contrail mitigation



Traffic management



Airport efficiency



Carbon offsets



Flight sobriety



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