

AVIATION SUSTAINABILITY BRIEFING

News and views on
how we can **make aviation
sustainable together**



**Interview with
Jérémy Caussade,
CEO of electric
aircraft manufacturer
AURA AERO**

The new EUROCONTROL-ECAC map
on sustainable aviation fuels

Interview with Reynir Sigurdsson,
Executive Director of Borealis Alliance

Latest news on EUROCONTROL's work
on sustainability

Sustainable aviation news from around
the world

Editor's note



Marylin Bastin

Head of Aviation Sustainability
EUROCONTROL

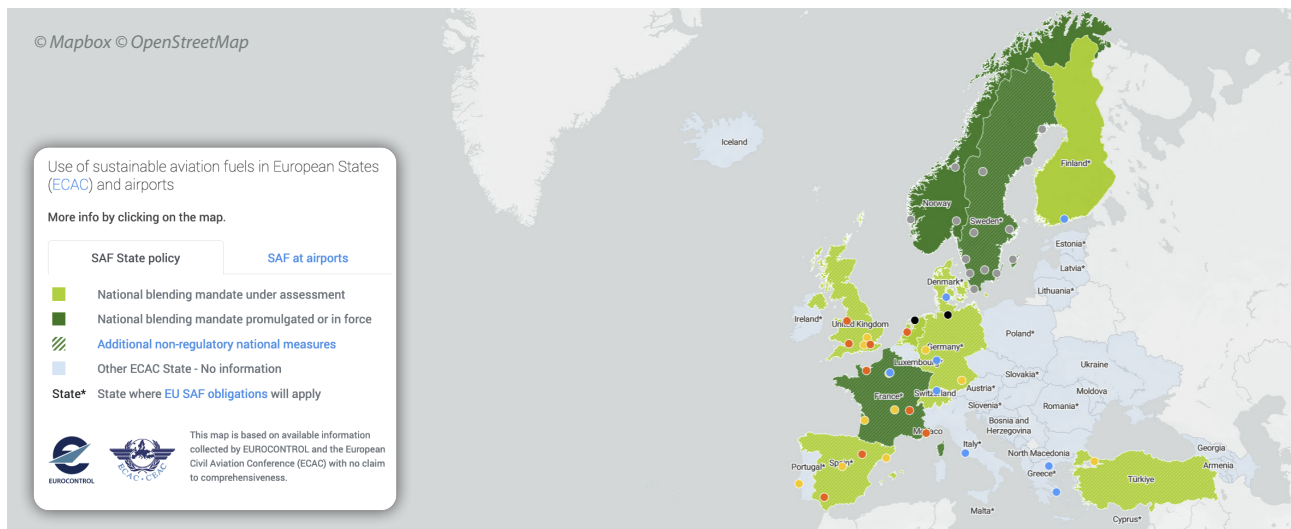
Contact:

sustainability-briefing@eurocontrol.int

Dear readers,

In October, the 41st ICAO assembly agreed on a long-term aspirational goal for international aviation of net-zero carbon emissions by 2050. It was a much longed for, important signal which contributes to providing certainty to the international aviation sector, investors and states. It is yet another confirmation of the importance of the work we are doing as we seek to contribute to this goal.

I am delighted that for this 7th edition of the EUROCONTROL **Aviation Sustainability Briefing** we are able to tell the story of remarkable people, such as electric aircraft pioneer **Jérémy Caussade, CEO of AURA AERO** and **Reynir Sigurdsson, Executive Director of Borealis Alliance**, who work tirelessly with their teams and their business partners to put change for sustainability firmly in place.



"As we are going through this transformative process together, the uptake of **sustainable aviation fuels** by the industry remains one of the key solutions for decarbonisation"

As we are going through this transformative process together, the uptake of sustainable aviation fuels by the industry remains one of the key solutions for decarbonisation. It is important to keep track of the latest developments and this is why EUROCONTROL has joined forces with the European Civil Aviation Conference (ECAC) to provide a map on the use of sustainable aviation fuel in European States and airports. We hope that you will find it useful and we are looking forward to your feedback.

Enjoy reading this edition!

“Every part of AURA AERO's aircraft is developed from the start with **sustainability** in mind.”



Jérémy Caussade
CEO AURA AERO

AURA AERO is an innovative electric aircraft manufacturer determined to disrupt regional aviation as it is today. The company is wholeheartedly committed to contribute to the objective of reducing emissions by 55% in 2030 and reaching carbon neutrality in 2050. Established as a start-up in 2018 in Toulouse AURA AERO is led by Jérémy Caussade – an aerospace engineer passionate about sustainability.

What is AURA AERO and why are its products different from other aircraft manufacturers?

The level of ambition set by the European institutions to decarbonise aviation is inherently AURA AERO's: we provide to the industry a range of electric/hybrid aircraft to reach this target in due time. AURA AERO currently develops a two-seater electric aircraft for pilot training and aerobatics, INTEGRAL, and has plans for a regional electric aircraft, ERA, a 19-seater with an entry into commercial service foreseen by 2027. Every part of our aircraft is developed from the start with sustainability in mind. For instance, we use recyclable batteries, wood for the cabin that is 80% bio-sourced, and low-carbon energy for manufacturing. We also aim at differentiating ourselves through our industrial approach. We see ourselves not only as a start-up developing innovative aircraft but also as an industrial integrator; it is only by combining the innovations brought by complementary industrial partners that one can succeed.

How do you see the market evolve - also with regards to the technological decisions investors are making?

Aviation serves human mobility across the world. As an essential mode of transport, it will not disappear but it will transform to become sustainable. An industrial revolution is underway as the whole aircraft fleet worldwide will have

“Sustainable Aviation Fuel (SAF) is only a tactical solution; in parallel to SAF, we need to develop immediately these disruptive aircraft: electric, hybrid, and even hydrogen.”

to be renewed. Europe must be ready on time to seize this opportunity if it wants to maintain its leadership and create jobs locally. It would be a mistake to focus only on decarbonising long-haul flights: regional aviation will be the first segment to decarbonise its operations, which will generate new markets for transversal connectivity. Be they national or cross-border intra-EU, shorter direct flights will be offered, independent from the hubs, which will accelerate the ramp-up of decarbonised seats. Transversal mobility will also benefit from Europe's dense network of regional airports, which are often under-utilised. Furthermore, when it comes to electric or hybrid aircraft, there is no need for heavy infrastructure but only charging stations. We believe all low-carbon propulsion modes will have an application in aviation; all must be developed in parallel, including hydrogen for the mid-range segment.

What are the biggest challenges for AURA AERO?

We have the agility of a start-up and we are attracting brilliant talents passionate about aviation decarbonisation. However, a start-up aircraft built out of start-up equipment cannot work. Technologies for electric propulsion require long years of research and development, so we need to build from the experience of the front-runners. For instance, we have a strategic partnership with Safran on the electric propulsion of the aircraft, and on the high voltage distribution systems to be deployed at regional airports.

As an integrator, we have to set directions for our partners, but it is equally important for us to listen to the innovations they are bringing; it is a two-way process. Our first challenge is to keep this balance between innovation and industrialisation, to remain agile while working in close exchange with our industrial partners, who are global players. As I like to say to my teams: *"We aim at achieving the verticality of Dassault, the size of Pilatus and the integration capabilities of Tesla"*. The second main challenge is, as for any other start-up, raising venture capital.

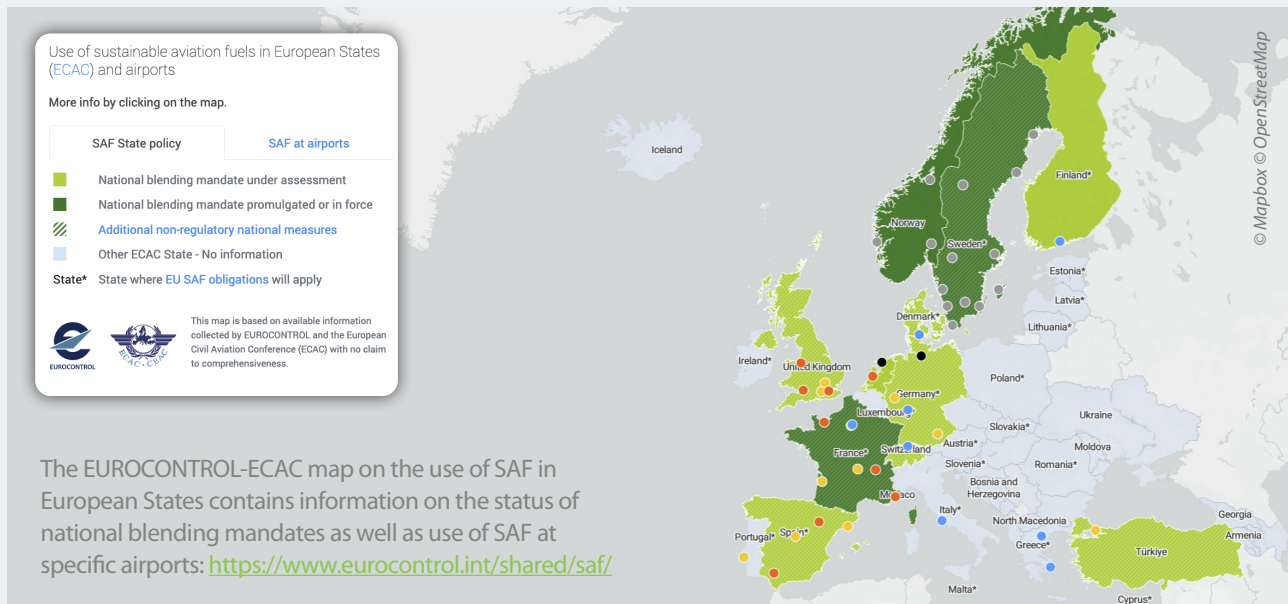
In your opinion, what can aviation actors, from airspace users to airports, policy-makers and EUROCONTROL, do to make aviation more sustainable faster?

We primarily need from policy makers that they facilitate this industrial revolution, including for the provision of electricity, the deployment of the infrastructures at airport level, and that they free up the necessary public and private funds. It is indeed the whole European economy that is at stake with the energy transition, aviation alone is helpless. At European level, we consider there is still too much focus on research programs and not enough on industrialisation. We are now at a stage where industrialisation can and needs to be organised. This is a challenging task as it is necessarily multi-sectorial and it will require massive investments, a task that only public institutions can lead. For instance, the "France 2030" plan includes low carbon aircraft as one of its ten objectives. This initiative would deserve to be extended at European level. Policy makers must involve small actors in this cross-sectorial industrial planning: we are the only



ones who can bring agility and counterbalance outdated concepts, provided we are allowed to grow from start-ups to mid-size companies. Concerning ATM, we expect EUROCONTROL to act for making ATM modernisation a reality, as promised by the Single European Sky. The time is now, as these new low-carbon aircraft will also incorporate disruptive navigation technologies, which will enable more dynamic trajectory changes in response to ATM requirements and even support self-separation between aircraft. The US Federal Aviation Association (FAA) has initiated discussions with the industry to converge the roadmaps for low-carbon aircraft with new navigation/ATM capabilities. In Europe as well, we should seize this opportunity to improve drastically the capacity and the cost of air navigation services, while achieving decarbonisation.

Sustainable aviation fuels (SAF) in Europe: EUROCONTROL and ECAC cooperate on SAF map



EUROCONTROL and the European Civil Aviation Conference (ECAC) have entered into a cooperation for a map on sustainable aviation fuels in Europe depicting national regulatory measures as well as the status of SAF use at specific airports, including also a selection of unique trial cases. With EU and national rules currently being worked on and put in place for aviation, the map provides an overview on the current status on SAF and is expected to evolve over the coming months and years.

Norway and Sweden are already leading the way in Europe when it comes to SAF. Norway established a blending obligation to aviation fuel suppliers for a 0.5% minimum content of advanced biofuel. The goal is to reach 30% by 2030 and the Norwegian government has stipulated that the biomass to produce it should come from wastes and residues. Sweden has put in place a greenhouse gas emissions reduction obligation for jet fuel suppliers to promote the use of SAF. SAF blend ratios in Sweden are required to increase from 1% by volume in 2021 to 30% in 2030. In the European Union, lawmakers are currently discussing the expansion

“Sustainable aviation fuels are one of the most promising solutions when it comes to lowering aviation’s environmental impact. Going through this transformative process, it is important to keep track of the latest developments, so we hope this joint EUROCONTROL–ECAC map delivers value to all the aviation stakeholders participating in the transformation towards greater sustainability.”

Marylin Bastin,
Head of Sustainability, EUROCONTROL

of the list of feedstocks from which SAF can be produced and the proportion of future blending mandates. At the moment, it is expected that, from 2025 onwards, aviation fuel must include 2% SAF rising to between 63% and 85% by 2050 depending on the outcome of negotiations at EU level.



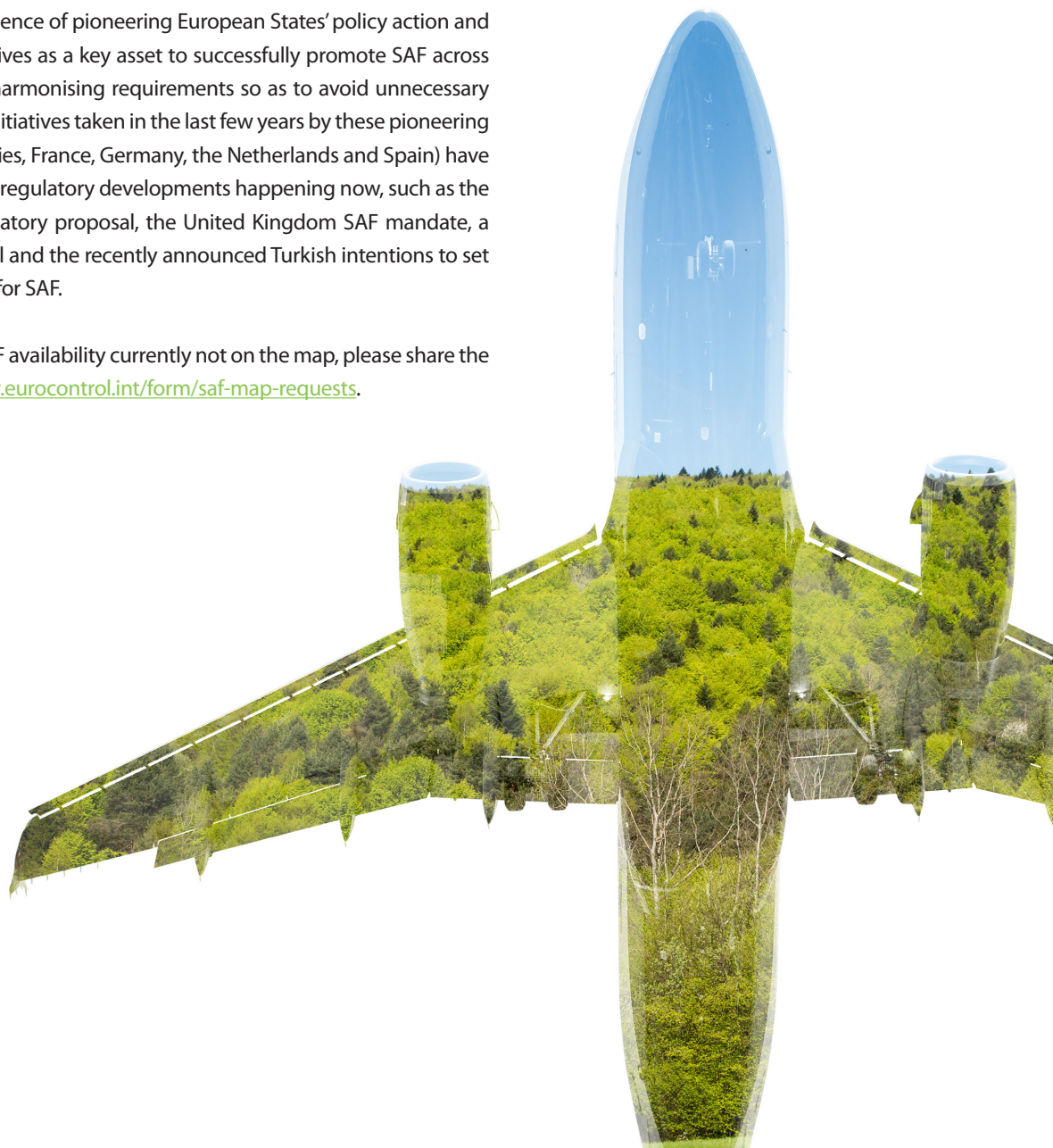
“With this SAF map, and other initiatives such as the SAF guidance material currently under development in ECAC, **we aim to provide valuable information and resources to contribute to the ambitious long-term global aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050**, recently adopted by the 41st ICAO Assembly”

Cesar Velarde

Climate Change and Capacity Building Specialist at
the European Civil Aviation Conference (ECAC)

The ECAC sees the experience of pioneering European States’ policy action and industry voluntary initiatives as a key asset to successfully promote SAF across the ECAC region, while harmonising requirements so as to avoid unnecessary barriers. The regulatory initiatives taken in the last few years by these pioneering States (the Nordic countries, France, Germany, the Netherlands and Spain) have paved the road for major regulatory developments happening now, such as the ReFuel EU Aviation regulatory proposal, the United Kingdom SAF mandate, a Swiss SAF quota proposal and the recently announced Turkish intentions to set up regulatory incentives for SAF.

If you wish to report a SAF availability currently not on the map, please share the details here: <https://www.eurocontrol.int/form/saf-map-requests>.



INTERVIEW

borealis
ALLIANCE

Reynir Sigurdsson

Executive Director Borealis Alliance

“In ATM everyone is doing their utmost individually to deliver increased performance, but a collaboration like the Borealis Alliance can bring so much more collectively.”

Bringing together Air Navigation Service Providers (ANSPs) from Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Norway, Sweden and the UK, the Borealis Alliance has been a pioneer in delivering cross-border Free Route Airspace. We spoke to **Borealis Executive Director Reynir Sigurdsson** about how the Alliance transforms the way airlines fly through Northern Europe, achieving more efficient and more sustainable air traffic operations.

What was the purpose of setting up the Borealis alliance?

In 2012 our nine ANSPs joined into a business alliance that enables its members to drive better performance for stakeholders through business collaboration, to improve efficiency and reduce costs and environmental impact on Europe's major transatlantic gateway. The Alliance enables us to share the expertise between our members, create synergies and progress in a way any of us individually would not be able to. The implementation of the cross border Free Route Airspace (FRA) among our nine members is one of our biggest success stories.

What are the environmental benefits recorded so far by the cross-border Free Route Airspace implementation and how much is there still to come and when?

We have calculated the real and verified environmental achievements with the help of the SESAR Deployment Manager and EUROCONTROL, and the first deliverables of the FRA implementation show real benefits from the North European FRA: based on actual traffic for 2018, the savings are 1.7m nautical miles gained by flying shorter routes, 15kt reduced fuel burn and 44kt less CO₂ emissions. Now extrapolating towards the future and a full implementation, the estimates based on EUROCONTROL STATFOR forecasts will amount in 2026 to 4.7m NM gains in shorter routes, 30kt of reduced fuel burn and 94kt CO₂ emission savings per annum. When the Alliance came together, some members were already well ahead of what was required by EU rules: the Irish/DK-SE FAB Free Route Airspace was already in place in 2012 and, in 2015, the North European Free Route Airspace (NEFRA) followed. Iceland's and the UK's airspace then followed in steps and finally, we are moving towards a single cross border area of Free Route Airspace covering nine North European countries.

Benefits from Borealis Free Route Airspace are estimated to increase from 2018 to 2026 (per annum) as below:



Seamless Airspace

1.7M NM → 4.7M NM
237K min → 770K min



Cost Savings

dependant on
fuel price fluctuation



Reduced Fuel Burn

15K t → 30K t



Less Emissions

44K t → 94K t CO₂



“Besides safety and efficiency, the next major ATM contribution is to provide optimal traffic flow based on the total climate effect.”

On top of Free Route Airspace, what other operational priorities can Borealis foster to further reduce aviation's environmental footprint in the short term?

Environmental performance is a top priority for the Borealis Alliance Board, as decided in Riga in March 2020. Since then, we have been striving to find opportunities where we can collectively contribute to more environmental performance. We have established an Expert Environmental Performance Group, which closely examines how we can improve our performance, e.g. by identifying new indicators and looking at developing a Borealis “Environmental Performance Improvement Plan”. This will look at both CO₂ and non-CO₂ performance improvements, possibly in the context of SESAR3 potential projects. Other indicators such as Continuous Descent Operations/Continuous Climb Operations (CCO/CDO) over the Borealis Airspace are also being analysed. We participate actively in the work of the EUROCONTROL/EASA ATM/ANS Environmental Transparency Working Group, with five of our Members and the Alliance itself being represented. This is an excellent forum to develop promising ideas and share experiences, which we feed back into the Alliance. With all this, we intend to live up to the expectations of the aviation community and do our part in achieving the common goals, which must be a collective effort.

At European level, what operational initiatives and policies do you consider most relevant to maximise aviation sustainability?

Once FRA has been acknowledged as a European success, the next efforts towards decarbonisation of ATM will probably need to focus on the vertical flight efficiency dimension. CCO/CDO will probably play a role, and we currently ask ourselves whether the 3Di indicator, combining horizontal and vertical flight efficiency and implemented in UK by NATS, could be successful in a cross-border manner. Other potential indicators are currently emerging, based on excess fuel burn, which deserve closer scrutiny. Finally, the importance of non-CO₂ environmental impact and balancing CO₂ and non-CO₂ effects is more and more acknowledged and deserves consideration. We hope to be able to bring forward ideas and proposals in this emerging domain in the coming months and years.

Latest news on
EUROCONTROL's

work on sustainability

EUROCONTROL participates in ICAO's 41st Assembly and contributes to the organisation's Environmental Report

EUROCONTROL participated in the 41st ICAO Assembly as part of "Team Europe" - together with representatives from the European Commission, the European Civil Aviation Conference (ECAC), the European Union Aviation Safety Agency and the SESAR3 Joint Undertaking – contributing to the work on strategic subjects for Europe and coordinating their responses to papers from other States. EUROCONTROL provided significant support and drafting effort on a number of topics, including GNSS resilience, Higher Airspace Operations and Sustainability. EUROCONTROL's contribution on sustainability can be found in ICAO's 2022 Environmental Report, which assesses progress made over the last three years across key areas of ICAO's environmental protection activities. Topics include "Economic Fuel Tankering", "Impacts of COVID-19 on CORSIA implementation", "Climate Change Risk Assessment, Vulnerabilities, and Adaptation Measures" and a summary of all the work delivered by ICAO's Committee on Aviation Environmental Protection (CAEP) Working Group 2 on Airports and Operations.

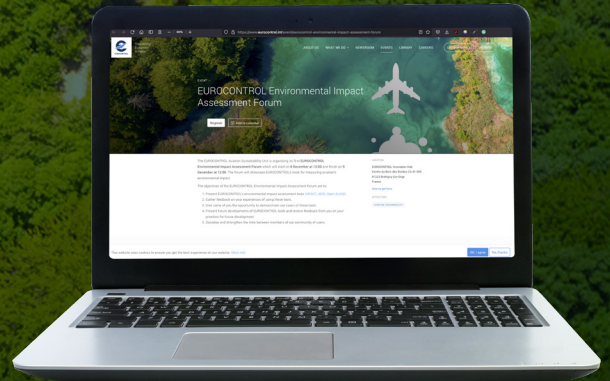
<https://www.icao.int/environmental-protection/Pages/envrep2022.aspx>



EUROCONTROL hosts Environmental Impact Assessment Forum on 8-9 December 2022

The EUROCONTROL Aviation Sustainability Unit is organising its first EUROCONTROL Environmental Impact Assessment Forum which will start on 8 December at 12:00 and finish on 9 December at 12:00. The forum will showcase EUROCONTROL's tools for measuring aviation's environmental impact and is targeted at aviation community members currently using the environmental impact assessment tools or planning to do so in the near future. More information:

<https://www.eurocontrol.int/event/eurocontrol-environmental-impact-assessment-forum>



EUROCONTROL hosts General Assembly of the Alliance for Zero-Emission Aviation with Commissioner Thierry Breton



Preparing the aviation ecosystem for the entry into service of hydrogen and electric aircraft is the goal of the Alliance for Zero-Emission Aviation (AZE), which held its first General Assembly in November at EUROCONTROL. EUROCONTROL joined earlier this year and will contribute its unique air traffic data and state-of-the-art modelling capability to support the integration of zero-emission aircraft into the European network. This will include forecasts to supporting the definition of rollout scenarios, helping identify operational and financial incentives for flights operated by such aircraft, as well as assessing fuelling requirements and green energy needs at the network level. <https://www.eurocontrol.int/news/eurocontrol-hosts-high-level-event-first-general-assembly-alliance-zero-emission-aviation-azea>

Aviation sustainability developments from around the world



ICAO Assembly reaches Long-term global aspirational goal (LTAG) for international aviation

The 41st ICAO Assembly adopted a long-term global aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050 in support of the UNFCCC Paris Agreement's temperature goal. This is a historic agreement that reinforces the leadership of ICAO on issues relating to international aviation and climate change. The LTAG does not attribute specific obligations or commitments in the form of emissions reduction goals to individual States. Instead, it recognizes that each State's special circumstances and respective capabilities (e.g. the level of development, maturity of aviation markets or national priorities of air transport development) will inform the ability of each State to contribute to the LTAG within its own national timeframe. Each State will contribute to achieving the goal in a socially, economically and environmentally sustainable manner and in accordance with its national circumstances.

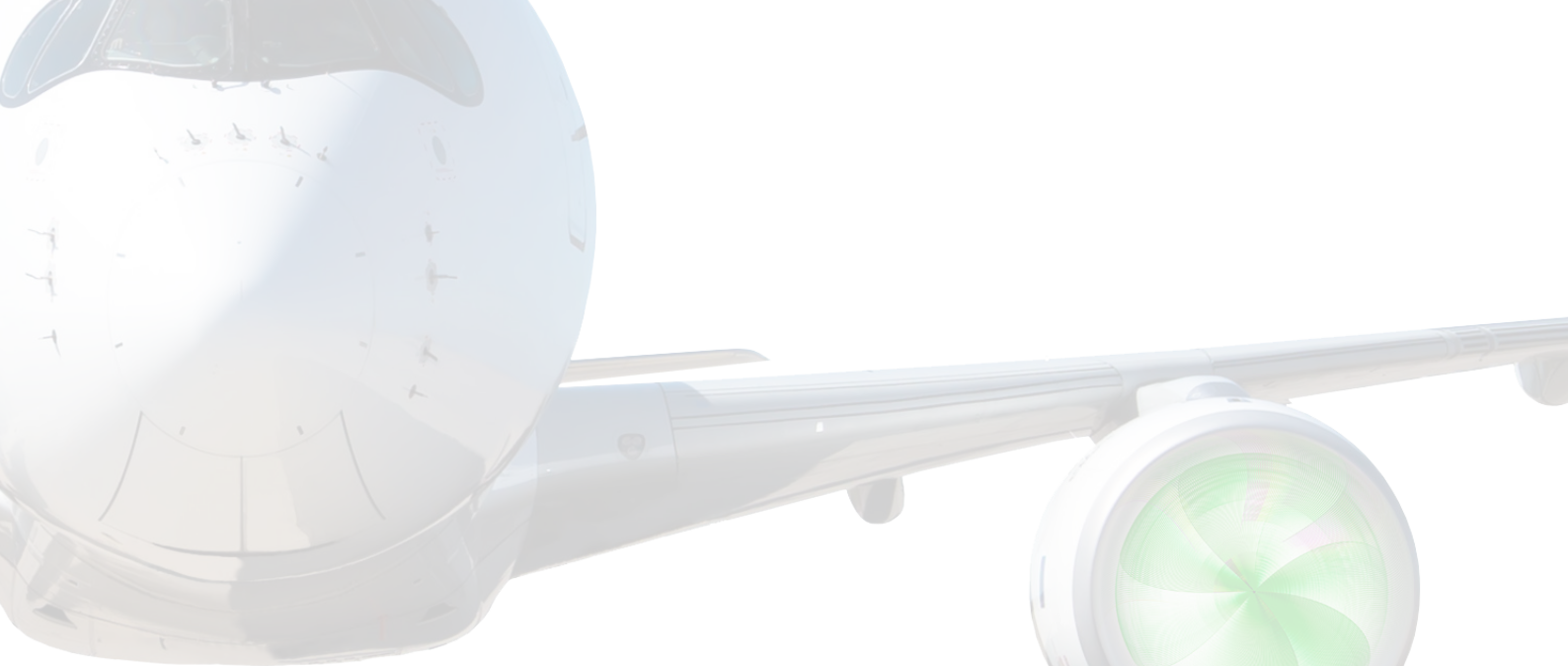
Turkish Airlines signed the Global Sustainable Fuel Declaration, promoted by Rolls-Royce and Airbus.



**TURKISH
AIRLINES**



Turkish Airlines continues its support for the development of Sustainable Aviation Fuels, which play a key role in reducing carbon emissions. Starting to actively use Sustainable Aviation Fuel during its operations as of 2022, Turkish Airlines emphasized the importance of the matter for the company by signing the Global SAF Declaration. The aim of the declaration is to completely decarbonize sustainable aviation fuels. Turkish Airlines plans to increase SAF usage to the highest levels possible consistent with technical, regulatory, safety and financial feasibility.



Lufthansa Technik



SWISS becomes the world's first passenger airline to adopt **carbon-efficient AeroSHARK technology**

SWISS Airlines is the first passenger airline in the world to take advantage of the new AeroSHARK aircraft skin technology to further reduce the carbon dioxide emissions and the fuel consumption of its flight operations. All twelve of the airline's Boeing 777-300ER aircraft will successively have the innovative riblet film (co-developed by Lufthansa Technik and chemicals and coatings manufacturer BASF) applied to their fuselage and engine nacelles. The resulting significant reduction in aerodynamic drag will make SWISS's fleet more than one per cent more fuel-efficient, and this in turn will further reduce its carbon dioxide emissions



SUPPORTING EUROPEAN AVIATION



© EUROCONTROL - November 2022

This document is published by EUROCONTROL for information purposes. It may be copied in whole or in part, provided that EUROCONTROL is mentioned as the source and it is not used for commercial purposes (i.e. for financial gain). The information in this document may not be modified without prior written permission from EUROCONTROL.

www.eurocontrol.int