

# The Sustainability of Aviation – Update

A Statement by the Chief Technology Officers of seven of the world's major aviation manufacturers.

London, 26 October 2021

## A Shared Commitment

More than a decade ago the aviation industry was the first global sector of its time to set ambitious emission reduction targets which continue to be met today. In June 2019 we first came together as a unified group of Chief Technology Officers (CTOs) to express our commitment towards more sustainable aviation – a commitment that serves our industry, planet, and future generations. Today, we come together again to strengthen that commitment, emphasize the continued progress towards decarbonizing air transport, and share our customers' ambition to achieve net zero carbon emissions by 2050.

The development of fuel-efficient technologies that significantly reduce carbon emissions is an important lever to achieve our targets and has been a priority for the aviation industry for over 50 years. As a result, flying has become increasingly sustainable, using 80% less fuel per seat<sup>1</sup> than fifty years ago, such that prior to the COVID-19 pandemic, aviation accounted for merely approximately 2.5% of all man-made CO<sub>2</sub> emissions while generating around 4% of global GDP and supporting 88 million jobs.

The importance of global connectivity enabled by aviation goes beyond its direct economic impact: it fosters rich exchange and unity across borders and allows rapid deployment of crucial goods and services, such as international aid -- and more recently, COVID-19 vaccines -- when and where it is most needed. To secure the sustainable future we want for aviation, such that it continues to deliver these benefits to society while meeting the broader Paris Agreement climate targets, bolder action on emissions reduction is urgent.

This is why our companies are steadfast to deliver the technical solutions required to decarbonize aviation through our work in three areas:

- Advancing the state-of-the-art in aircraft and engine design and technology
- Supporting increased availability and adoption of Sustainable Aviation Fuel and investigating hydrogen as a fuel of the future
- Continuing to mature novel technologies that will eventually enable net-zero carbon aviation while maintaining the safety and quality standards of the industry.

**AIRBUS**

**BOEING**

**DASSAULT**  
AVIATION

**GE Aviation**

**ROLLS**  
**ROYCE**

**SAFRAN**

**GO BEYOND**

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<sup>1</sup> Aircraft fuel burn per passenger seat, see Waypoint 2050, *Air Transport Action Group (ATAG)*

## **Advancing aircraft and engine design and technology**

Our companies have a long history of working to improve the fuel efficiency of aircraft and engines to reduce CO<sub>2</sub> emissions. Over the years these efforts have delivered meaningful results: the transition from one generation of aircraft and engine to the next has improved fuel efficiency by up to 20%<sup>2</sup>.

The pursuit of the next generation of technology breakthroughs continues: our companies have spent over \$75B in R&D combined over the past five years, and a significant portion of this spending is focused on improving the fuel efficiency of aircraft and engines. This relentless push for fuel efficiency is essential to meet aviation's decarbonization targets, and for this reason our companies remain focused on achieving similar or greater levels of efficiency gains in the coming years.

Our companies also contribute to aviation's decarbonization by providing innovative technologies and services that support optimal operation of aircraft. Services such as advanced mission planning, improved fuel planning, and improved on-wing engine maintenance technologies support airlines and operators in reducing emissions. We also work closely with our customers and air traffic control authorities to improve air traffic management, yielding greater operational efficiency and further emissions reductions.

## **Sustainable Aviation Fuel**

Increasing the availability and adoption of Sustainable Aviation Fuel (SAF) offers the potential to reduce overall CO<sub>2</sub> life cycle emissions by 80% compared to petroleum-based aviation fuel<sup>3</sup>. The challenge to meaningfully increase the availability and affordability of SAF is significant but not insurmountable. A joint effort that spans the complete sustainable fuels supply chain is required for SAF to become available at scale and at a competitive price – and our companies are committed to supporting this effort.

Current aviation fuel certification standards enable the use of SAF as blends in proportions of up to 50% with conventional jet fuel. Our companies are also committed to removing aircraft and engine technical barriers to the adoption of 100% SAF, enabling our industry to maximize the CO<sub>2</sub> reduction potential of SAF. We are taking an active role in establishing the certification requirements for aviation fuels comprised of 100% synthesized hydrocarbons to allow the phase out of fossil fuels. We will also contribute to the certification of new SAF production pathways to increase the supply of affordable SAF.

Additionally, our companies are engaged participants in the SAF ecosystem, continuing to evaluate opportunities to incorporate SAF into daily activities such as engine or flight tests and aircraft deliveries, and partnering with fuel producers to speed up the development of a robust supply chain. Moreover, the major

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<sup>2</sup> At aircraft level, see Waypoint 2050, ATAG

<sup>3</sup> Current estimates of SAF life cycle emissions reduction stand at 80% because of the use of fossil fuels in agriculture and transport, plus energy use in feedstock processing. As the rest of the world decarbonises by 2050 – grids, freight and manufacturing equipment – this could approach 100%.

improvements in fuel efficiency from the next generations of aircraft and engines will decrease the gap between SAF demand and supply, thus reducing the supply chain investments.

We support the deployment of appropriate regional policy mechanisms and positive incentives that stimulate the production of SAF to enable the industry to meet its ambitious SAF utilization targets. Government support and policy incentives are critical to enable a transition towards large-scale adoption of SAF. Regulatory and financial incentives for the investment, research, development, deployment, and distribution of SAF should be a priority.

We firmly believe that hydrogen will play a key role in the sustainable future of aviation as a source of cleaner energy, regardless of its final application. Our companies are currently exploring a variety of such potential applications: burning hydrogen as a fuel in propulsion systems, using it to power fuel-cell electric aircraft, or leveraging it as a component of SAF. Securing an abundant supply of green hydrogen<sup>4</sup> for use in aviation must be a priority.

### **Novel Technology Development**

There are multiple promising technologies progressing through the technology maturation process: we expect many of these to enable new aviation products that will continue to deliver the worldwide benefits of air transportation while significantly reducing its environmental impact. As our companies work on maturing these novel technologies, our commitment to maintaining the safety and quality standards and our collective track record as the safest mode of transportation remains unchanged.

Our companies welcome the opportunity to accelerate development of new technologies by collaborating across the public sector, industry, and academia. The success of existing programs has demonstrated the value and importance of such cross-industry collaboration over the past decade. A renewed focus is now required to increase the scale and duration of our collaboration to provide aviation manufacturers with stable support over the long and complex technology development process.

Beyond the development phase, the introduction of the next generation of aviation technologies will require the support of other stakeholders such as suppliers, infrastructure operators and fuel providers to mature supply chains and support infrastructure, and a globally harmonized regulatory framework will be vital to accelerate this collective effort.

It is just as important that we remain as inclusive as possible in this collaboration. The development of novel technologies for aviation is a technical challenge that will require the creative energies of the future generation of aerospace engineers. We will continue to work with universities to foster an inclusive development of STEM<sup>5</sup> curricula, reinforcing the diverse pool of talent required for this endeavor.

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<sup>4</sup> Produced from renewable energy and non-fossil fuel sources

<sup>5</sup> Science, Technology, Engineering and Mathematics

## Call to action

For aviation to continue to deliver its benefits to society, we need to embrace the sustainability challenge and solve it with technology, transparency and cooperation. Despite the unprecedented impact of the COVID-19 pandemic on the aviation industry, our companies are mobilizing significant resources to improve the efficiency of engines and airframes, remove barriers to the widespread adoption of sustainable aviation fuel, and mature novel technologies that will significantly reduce emissions.

Policymakers have the chance to accelerate these processes by providing sustained and predictable support to the multi-year development of novel technologies, and by stimulating the ramp-up of SAF and green hydrogen production capacity. Further, a globally consistent approach to regulation and certification standards would create a level playing field for the industry, thereby accelerating the adoption of novel technology.

Beyond governments, other stakeholders will need to mobilize alongside aviation manufacturers: the collaboration of research institutions and aerospace suppliers is required in the development of the new technologies, fuel producers will need to invest in SAF production capacity, and airport operators will need to deploy the infrastructure required to support novel aviation technologies. The aviation industry plays a pivotal role in modern life, connecting companies, economies, families, and countries. We are convinced that it has a sustainable future, but an industry-wide mobilization is required to make it happen.



**Sabine Klauke**  
Chief Technical Officer  
Airbus



**Bruno Stoufflet**  
Chief Technology Officer  
Dassault Aviation



**Francis R. Preli**  
Vice President, Technology  
Pratt & Whitney



**Eric Dalbies**  
Chief Technology Officer  
Safran



**Naveed Hussain**  
Chief Technology Officer  
Boeing



**Christopher Lorence**  
Chief Engineer  
GE Aviation



**Paul Stein**  
Chief Technology Officer  
Rolls-Royce