Sustainable Aviation: a global challenge

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Keywords: Aviation, climate, environment, international policies

I. INTRODUCTION

Sustainable aviation is high on the political agenda of many countries in the world and is a strategic objective of the sector. The presentation shows how large-scale geopolitical agendas concur on the needed measures. It then focusses on how the Safran Group is engaged in reducing the environment and climate impact of its products in line with the international aviation roadmaps.

II. MEASURES TOWARDS SUSTAINABLE AVIATION

The European Green Deal aims at reducing the total European Union greenhouse gas emissions by 55% in 2030 with respect to 1990 level. The European aviation sector established a roadmap called D2050 to contribute to this objective. In 2022 the United States issued a Sustainable Aviation Fuels (SAF) grand challenge and an increase in R&D activities to demonstrate new technologies that can achieve at least a 30% improvement in aircraft fuel efficiency. The Air Transport Action Group (ATAG), an international aviation industry group, published a roadmap for aviation to reach net-zero CO2 emissions in 2050, as well as the International Civil Aviation Organization (ICAO), which is a United Nations body with 193 Member-States. All roadmaps propose the same combination of needed measures: technology for more efficient aircraft, airlines operations and traffic management improvement, and Sustainable Aviation Fuels (SAF). Offsetting with negative emissions will be needed for fully reaching net-zero.
The Safran Group is fully engaged on mainly two of these levers: technology and SAF. Safran Aircraft Engines is preparing the future with the RISE program, featuring an open architecture aircraft engine which will deliver 20% energy efficiency with respect to the currently best in class engine. All Safran Group companies are working on lightening their aviation equipment, through lightweight materials and processes and electrification of non-propulsive functions. Safran also develops hybrid and electric propulsion solutions for smaller size vehicles. Safran is engaged in the collective effort to develop a SAF market with alternative fuels that will meet strict sustainability criteria.
Through technology, Safran continuously improves the environmental impact of its products, encompassing acoustic performance, reducing air pollution and climate impact. Improving performances on all fronts is a challenge that requires various technology solutions and smart trade-offs. While CO2 is the main greenhouse gas due to fuel combustion, other emissions in altitude contribute to the effective radiative forcing of aviation: nitrogen oxides, particulate matter and water vapour which can develop into contrails and cirrus clouds. While these effects are still understood and quantified with high incertitude, their warming effect is currently evaluated as twice that of aviation CO2. For an aircraft engine manufacturer, it is of utmost importance to improve this understanding and quantification in order to plan and deliver the right technology responses.

III. CONCLUSION AND PERSPECTIVES

Decarbonising aviation is an existential objective from two points of view: 1) to contribute to the Paris agreement objective of limiting global warming well below 2°C; 2) it is necessary for the aviation sector to continue serving worldwide mobility in a sustainable way. The objective needs political alignment at the global scale. It raises complex and systemic questions involving technical, political, geographical, economic and social aspects. The challenge requires action on all grounds: political and regulatory, scientific, technical, industrial and finally individual.