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AGENDA ITEM 7: AVIATION AND ENVIRONMENT

REGIONAL COLLABORATION FOR SUSTAINABLE AVIATION TECHNOLOGIES

(Presented by the Republic of Korea and Japan)

SUMMARY

This paper underscores the importance of developing and introducing new technologies to meet ICAO's carbon neutrality goals. It highlights the need for collaboration between states, academia, and industry within the Asia-Pacific region, focusing on the creation of globally harmonized standards and regulatory alignment. The discussion includes the challenges faced in this endeavor and the necessity of overcoming these barriers through collective efforts. The paper concludes by recommending stronger regional partnerships and enhanced information exchange as vital to advancing these technologies effectively.

REGIONAL COLLABORATION FOR SUSTAINABLE AVIATION TECHNOLOGIES

1. INTRODUCTION

1.1 In support of its Long-Term Aspirational Goal (LTAG) to achieve net-zero carbon emissions by 2050, ICAO has outlined three critical strategies: advancing technology, adopting Sustainable Aviation Fuels (SAF), and optimizing operational procedures. Among these, the necessity of technological innovation is emphasized, as it directly addresses emissions at the source. The development of advanced propulsion systems, next-generation aircraft designs, and innovative materials is essential to reducing the aviation sector's carbon footprint and ensuring the long-term sustainability of global air transport in a rapidly changing environmental landscape.

1.2 The integration of hydrogen and electric propulsion systems into existing and future aircraft is crucial for achieving carbon neutrality, particularly for medium- and long-haul flights. While eVTOL aircraft present a promising solution for urban mobility, they are limited to short-distance travel. Hydrogen and electric propulsion technologies, however, have the potential to transform longer flights by significantly reducing emissions. Current research is focused on overcoming technical challenges such as energy density, storage, and distribution, which are critical to making these technologies viable for mainstream aviation. Furthermore, extensive research and development efforts are being undertaken by academia, industry, and government institutions, many of which already show promising results that bring us closer to the widespread adoption of these advanced propulsion systems.

1.3 This Discussion Paper emphasizes the importance of collective efforts within the Asia-Pacific region to drive the commercialization of hydrogen and electric propulsion technologies. By fostering collaboration, advancing research, and developing supportive policies, our region can play a pivotal role in overcoming the challenges and accelerating the adoption of these technologies. The success of this endeavor will not only contribute to achieving ICAO's environmental goals but also position our region as a leader in sustainable aviation.

2. DISCUSSION

2.1 The development of hydrogen and electric propulsion systems in aviation is currently confronted with several significant technical and logistical challenges. One of the primary issues is the energy density of current battery technologies, which limits the range and payload capabilities of aircraft. Additionally, the integration of these systems into existing aircraft often results in increased weight, further impacting performance. There is also the need for advanced infrastructure, such as battery charging and hydrogen refueling stations, to support the widespread adoption of these technologies. While progress is being made through various research initiatives, the path to commercialization remains complex and requires coordinated efforts across multiple sectors.

2.2 To address the technical challenges identified, collaboration between academia, industry, and government is essential. By working together, these sectors can pool their resources and expertise to tackle complex problems more effectively than they could independently. Joint research initiatives and pilot projects are already demonstrating the potential of this collaborative approach, providing valuable insights and accelerating the development of hydrogen and electric propulsion systems. Moreover, the sharing of knowledge and resources across these sectors is critical in ensuring that advancements are made efficiently and are quickly translated into practical applications.

2.3 State collaboration within the Asia-Pacific region is crucial for overcoming the challenges associated with hydrogen and electric propulsion systems. By fostering regional cooperation, states can work together to share broad information, align policies, and develop unified strategies that support the development and adoption of these technologies. The ultimate goal of commercialization is the establishment of international standards and the harmonization of regulations across the region. These efforts are essential to ensuring that new technologies can be integrated smoothly and safely into the global aviation industry. Information sharing plays a vital role in accelerating research and preventing duplication of efforts, while collaborative initiatives enhance the effectiveness of national

and regional strategies.

2.4 The Republic of Korea and Japan have been holding a Korea-Japan Aviation Cooperation Conference since 2023, and especially for technologies contributing to environmental protection, established Korea-Japan Environmental New Technology Working Group in 2024. This is a bilateral working group for sharing information and exchanging opinions on the latest technologies and standardization activities, trends for aircraft and equipment as well as potential needs for standardization. The first meeting of the working group was held with great success, and both states are willing to continue collaboration. Although this is a bilateral framework, it can be a good example of state collaboration within the Asia-Pacific region.

2.5 In conclusion, the successful integration and commercialization of new technologies in aviation will require coordinated efforts across multiple sectors and regions. Hydrogen and electric propulsion technologies are prime examples of these innovations. To accelerate their adoption, it is crucial to foster collaboration between states, academia, and industry, while establishing international standards and harmonizing regulations. Moving forward, continued commitment and collaboration will be essential to achieving ICAO's carbon neutrality objectives and ensuring the sustainable future of aviation.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

a) Emphasize the importance of collaboration between academia, industry, and government to tackle complex problems more effectively, and international collaboration between member states to share information, align policies, and develop unified strategies that support the development and commercialization of hydrogen and electric propulsion technologies.;

b) Recommend that the ICAO Asia-Pacific Regional Office facilitate opportunities for collaboration by organizing workshops, conferences, and other events, enabling stakeholders across the region to share knowledge and best practices.

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