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WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 2: Timely and safe use of new technologies
2.1: Evolving aircraft technologies contributing to LTAG

COLLABORATION OF INDUSTRY, ACADEMIA AND GOVERNMENT TOWARDS APPLICATION OF NEW TECHNOLOGIES

(Presented by Japan)

EXECUTIVE SUMMARY

To achieve a collective global long-term aspirational goal for international aviation (LTAG), ICAO and its Member States are encouraged to work together with industry to strive to achieve the maximum possible level of progress on the implementation of aviation in-sector CO2 emission reduction measures (e.g., new technologies, operations and fuels). In particular, in order to promote the practical application of new technologies, it is important for industry, academia and government to collaborate to develop globally harmonized safety standards. Therefore, in order to realize and accelerate this collaboration, Japan organized public-private committee on new technologies toward decarbonization of aircraft. Japan believes that sharing of each Member State's best practice, including Japan's efforts, will be helpful for Member States to make efforts for decarbonization to achieve LTAG.

Action: The Conference is invited to:
a) note the contents of this working paper; and
b) encourage Member States to share experiences of efforts for decarbonization through application of new technologies.

1. INTRODUCTION

1.1 The Paris Agreement, which was adopted by the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015, stipulates to pursue limit the average temperature increase to within 1.5°C and the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report (AR6) indicates that achieving zero CO2 emissions by 2050 could limit the average temperature increase to within 1.5°C and reduce the frequency of natural disasters.

1.2 Furthermore, the Glasgow Climate Pact, which was adopted by the Conference of the Parties to the UNFCCC in November 2021, resolves to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, ICAO and its Member States are expected to provide continuous leadership to international civil aviation in limiting or reducing its emissions that impact to global climate change.

1.3 The 41st Session of the ICAO Assembly held from 27 September to 7 October 2022, adopted a global long-term aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050. Section 22 of adopted Resolution A41-21: *Consolidated statement of continuing ICAO policies and practices related to environmental protection — Climate change* encourages the Council and Member States to keep abreast of innovative aircraft technologies in order to enable timely certification.

2. DISCUSSION

2.1 Utilization of innovative aircraft technologies, in other words introduction of new technologies into aircraft and equipment is essential to achieving LTAG. While discussing ways to promote it, Japan categorized the technologies into three areas where Japanese industry and academia are working on research and development and their cooperation were expected: electrification of aircraft, hydrogen powered aircraft and weight reduction and efficiency improvement. The electrification of aircraft covers motor, inverter, battery and other broad electrification-related technologies for aircraft equipment and propulsion system. The hydrogen powered aircraft includes technologies such as hydrogen combustor, hydrogen fuel cell, liquified hydrogen tank and hydrogen supply system. The weight reduction and efficiency improvement stand for technologies such as further weight reduction of structural components with carbon fiber composite materials and further weight reduction of engines with ceramic-based composites.

2.2 In order to promote the practical application of these new technologies, and to promote environment measures in the aviation sector, it is important for industry, academia, and government to collaborate to develop globally harmonized safety standards. From this viewpoint, Japan established “Public-Private Committee on New Technologies toward Decarbonization of Aircraft” to discuss challenges to formulate globally harmonized safety standards related to these new technologies and to contribute to decarbonization in the global aviation sector. The public-private committee consists of industries (suppliers, airlines and airports), academia, ministries and research institutes in Japan.

2.3 One of the challenges recognized was the needs of enhancing the environment to promote international standardization and certification activities in Japan. In response to this, Japanese government is increasing the participation in committees of international standardization bodies in order to lead Japanese industry’s participation. Also, Japan is working on an establishment of a new consultation body as a forum of collaboration between Japanese industry, academia and government, where suppliers in Japan can share their knowledge of standardization activities each other not only within aircraft industry but also with suppliers from other industries and encourage suppliers to take part in international standardization bodies. Moreover, through this consultation body, Japan is expecting to involve academia, which is not a direct stakeholder but has related scientific knowledge, in standardization activities. Their knowledge will be greatly appreciated when tackling technical challenges: for example, during discussions at the pubic-private committee, we noticed that realization of electrification of aircraft requires withstanding unique phenomenon occurs when high voltage is applied in high-altitude environment, which has never been found in any other modes. The new consultation body is to be established by March 2026, and Japan is still discussing specific functions and systems of it at the public-private committee.

2.4 Although Japan’s aforementioned efforts are middle-of-the-road, Japan recognizes that they are useful examples for other States to consider contributing on international standardization. Since new technologies such as electrification and hydrogen are still under development and those are not just an extension of existing aircraft industry, more new players are needed to participate in standardization activities. Bringing together knowledge and expertise and developing international standards will be great help for introduction of new technologies. Japan would like to contribute to the international standardization, to the introduction of new technologies, and to the achievement of LTAG.

3. CONCLUSION

3.1 In order to implement decarbonization through introduction of new technologies into aircraft and equipment, the establishment of a public-private committee and consultation body could be beneficial in light of creation of a place for collaboration between stakeholders: industry, academia and government is important.

3.2 Moreover, sharing such knowledge and experience of each State with other States is beneficial for implementing decarbonization in the aviation sector, especially in implementing works towards achievement of a LTAG.

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