

**57TH CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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AGENDA ITEM 7: AVIATION AND ENVIRONMENT

**IMPLEMENTATION RESPONSIBILITY AND OPERATIONAL
IMPROVEMENT MEASURES FOR INTERNATIONAL
AVIATION GHG REDUCTION**

Presented by the Republic of Korea

SUMMARY

GHG reduction in the international aviation sector has been led by international organizations and is differentiated from regional or national efforts. According to the Republic of Korea's experience, the fuel-saving effects of flight management and flight operation are significant. Improving aircraft operation technology is a feasible and cost-effective option to achieve carbon neutrality in the international aviation sector. The improvement of aircraft operation technology is an important means of carbon reduction for countries and airlines, which is why it is necessary to form a consensus on sharing the best practices and establishing a mutual cooperative system.

IMPLEMENTATION RESPONSIBILITY AND OPERATIONAL IMPROVEMENT MEASURES FOR INTERNATIONAL AVIATION GHG REDUCTION

1. INTRODUCTION

1.1 Article 2 of the Kyoto Protocol¹(adopted in 1997, enforced in 2005) under the United Nations Framework Convention on Climate Change(UNFCCC) stated that Annex 1 Parties pursue limitation or reduction of greenhouse gases(GHG) not controlled by Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively. The Paris Agreement², adopted in 2015, stated that all countries should work to reduce GHG emissions by submitting nationally determined contributions (NDC), which reflect the ambition of each country. However, there was no further mention of the GHG reduction in the international aviation sector. In other words, GHG emission reduction in the international aviation sector was differentiated from national or regional GHG reduction efforts, and instead, the ICAO has been the focal point in facilitating the GHG reduction, supported by the consultation and efforts of the related stakeholders and representatives in the aviation sector.

1.2 The ICAO established the goals of a 2% improvement in fuel efficiency every year by 2050 and carbon neutral growth from 2020(CNG2020) at the 37th General Assembly in 2010³. In particular, the ICAO uses the measures such as developing aircraft technology, improving operational efficiency, and promoting the use of sustainable aviation fuel, in addition to CORSIA (Carbon offsetting and reduction scheme for international aviation) establishment in an effort to achieve CNG2020.

1.3 In October 2021, the International Air Transport Association (IATA) approved a resolution for the global air transport industry to achieve net zero carbon emissions by 2050⁴, which is aligned with the Paris Agreement goal of limiting global temperature rise to 1.5°C. For this, cooperation of the overall aviation industry, including airlines, airports, navigation service providers, and manufacturers is required, along with the active support from the government.

1.4 According to the Committee on Aviation Environmental Protection(CAEP), ICAO analysis of the post pandemic outlook, the carbon emissions in the aviation industry may go back to the level of 2019 after three years at the earliest. In addition, in 2050, it is expected to increase by 2.2 times, compared to the level of 2020.

1.5 In March 2022, the CAEP published a report that reviewed the feasibility of the Long Term Aspirational Goal (LTAG) as requested by the Council at the 40th Assembly. This report is divided into aircraft technology, fuel and operations, and proposes three scenarios, with 2018 as the baseline year, depending on the readiness and achievable levels. These scenarios reflect growth in the aviation sector and the potential impacts on noise and air quality, as well as the impacts on carbon emissions, costs and investments.

1.6 Among the means to achieve the net zero goal of the IATA and the means to reduce GHG emissions in the international aviation sector presented in CAEP's LTAG report scenario, aircraft technology improvement is limited in terms of having to rely heavily on aircraft manufacturing technology and the countries that have the technology. Alternative fuels, such as sustainable aviation fuel (SAF), have the greatest reduction potential, but cannot be used immediately in most countries due to the high cost, as new technologies and facilities are needed to produce the raw materials and utilize the fuels.

¹ <https://unfccc.int/resource/docs/convkp/kpeng.pdf>

² https://unfccc.int/sites/default/files/english_paris_agreement.pdf

³ https://www.icao.int/environmental-protection/37thAssembly/A37_Res19_en.pdf

⁴ <https://www.iata.org/contentassets/dcd25da635cd4c3697b5d0d8ae32e159/iata-agm-resolution-on-net-zero-carbon-emissions.pdf>

1.7 ICAO has been operating ACT_CORSLA (Assistance, Capacity Building, and Training for CORSLA) since 2018 to establish a measurement, reporting, and verification system to ensure that the GHG emission information in the international aviation sector is concrete and transparent. ACT_CORSLA is implementing cross-border cooperation programs and sharing educational materials and best practices through a designated website. In addition, in early June last year, a program for information sharing and capacity building, called ACT_SAF, was launched in relation to alternative fuels.

1.8 The purpose of this paper is to share the information on the technologies and best practices for efficient aircraft operation to fulfill the responsibility of the international aviation sector in reducing GHG emissions and to discuss building a cooperative system between countries to improve operational efficiency as a means that can be applied immediately.

2. DISCUSSION

2.1 The carbon emission in the international aviation sector is from movement between countries, and it should be separated from the GHG emission responsibility of individual countries or regions, which is why cooperation between countries is necessary.

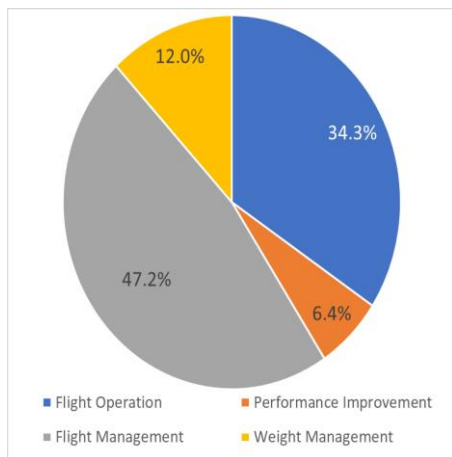
2.2 Improving operational efficiency is expected to deliver 3% of the IATA's net zero carbon emission goal. The ICAO's LTAG report also states the percentage of GHG reduction that can be achieved through operational efficiency improvement by 2050 compared to 2018; it has been analyzed to be about 4 to 11%. Although this is a relatively small amount compared to the amount that can be reduced by improving aircraft technology or utilizing alternative fuels, it is a technology that should be deployed first, considering the input cost and application timing.

2.3 Traditionally, safety has been and should be the top priority when adopting new aircraft operating technology. In addition, it is necessary to note that efficient aircraft operating technology is a valuable asset for airlines in reducing costs, and the related information that can be disclosed to the public is very limited. Aircraft operating technologies for reducing GHG emissions are largely divided into flight operation, performance improvement, flight management, and aircraft weight management.

2.4 In 2021, compared to 2020, the Republic of Korea achieved a 3.2% improvement in fuel efficiency as the volume of air cargo saw a significant increase in international aviation operations. Nevertheless, the Republic of Korea has continuously worked to reduce GHG emissions through reduction measures, whose impact has been significant.

2.5 The flight management technology saved the largest amount of fuel, followed by flight operation, weight management, and performance improvement. The followings are the technologies that were relatively effective at reducing emissions: changes in restrained takeoff and landing procedures; engine cleaning in performance improvement technology; shortened route and optimal cost operation in flight management technology; and reduction of effective load deviation and aircraft strip repainting in weight management technology. As an individual reduction method, shortened routes were most effective, accounting for 15% of the total reduction effect.

<The top 10 technologies that save fuel classified by the fields, Rep. of Korea, 2021>



LIST OF TOP 10 MEASURES ADOPTED IN ROK		
Category	Measure	The ratio of total savings (%)
Flight management	Short route	15%
Flight Operation	Optimization of APU usage	11%
Flight management	Cost Index optimization	9%
Performance improvement	Engine washing	8%
Weight management	Payload optimization	7%
Flight management	Contingency fuel minimization	7%
Flight management	New route	6%
Flight Operation	Reduced takeoff and landing flap	6%
Flight Operation	Low noise low drag approach	5%
Flight management	Use of economic route	5%

2.6 The fuel efficiency of the Republic of Korea improved by 3.2% year over year in 2021, which is higher than the ICAO's annual efficiency improvement goal of 2% and operational improvement is expected to make a sufficient contribution as a means of reducing GHG emission in the international aviation sector. In particular, cooperation between countries, such as creating shortened routes and new routes, and sharing best practices and know-how, including information on flight operation technology, should be considered as a way to improve fuel efficiency.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) Recognize the GHG emissions from international aviation are not limited to each State or region and require cooperation among the States; and
- b) Encourage the Regional Member States to share their experiences and challenges in improving operational efficiencies and actively cooperate with one another to reduce GHG emissions from international aviation; and
- c) Encourage Asia Pacific Region (APAC) to request ICAO to establish additional guidance and information sharing scheme for improving operational efficiency for effective GHG reduction implementation.

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