



## INTERNATIONAL CIVIL AVIATION ORGANIZATION

**Seventh Meeting of the APIRG Infrastructure and Information Management Sub-Group (IIM/SG7)***Dakar, Senegal, 5 - 8 August 2024***Agenda Item 5 : Other Air Navigation initiatives**

WP3.5B Green air traffic management towards net-zero 2050

*(Presented by South Africa)***SUMMARY**

This paper outlines the green Air Traffic Management (ATM) approach towards net-zero 2025. Responding to the global, national and industry's commitment towards addressing the growing call for action in reducing emissions and combating effects of climate change.

The long-term global aspirational goal (LTAG) for international aviation initiative has been adopted by the sector, to support the goal of net-zero carbon emissions by 2050 in support for the United Nations Framework Convention on Climate Change (UNFCCC)'s Paris Agreement 2015 of limiting the increase in temperatures to the threshold of 1.5 degrees Celsius above the pre-industrial period.

Action by the meeting in paragraph 3

**REFERENCE(S):**

- 41st ICAO Assembly resolution A41-21: Consolidated statement of continuing ICAO policies and practices related to environmental protection — Climate change
- ICAO Doc 10178 - Report of the high level meeting - LTAG
- ICAO LTAG report

This working document relates to ICAO Strategic Objectives: Environmental Protection, safety and air navigation capacity and efficiency

**1. INTRODUCTION**

- 1.1 The world is already experiencing its impact through intensified droughts, worsening water shortages, devastating wildfires, rising sea levels swallowing coastlines, floods turning cities into lakes, melting polar ice caps, catastrophic storms of unprecedented ferocity, and a decline in the variety of life on Earth, all of which has implications on the world economies as well as on societal wellbeing.
- 1.2 To limit the impacts of climate change and preserve a liveable planet, global temperature increase needs to be limited to 1.5°C above pre-industrial levels as called for in the Paris Agreement 2015. The earth is already 1.1°C warmer than in the late 1800s and emissions continue to rise.

- 1.3 The aviation industry's contribution to global gas/particle emissions may account for only 3.5% and approximately 2% of carbon emissions, however with the anticipated growth in air traffic due to increases in demand and economic growth, the need to decarbonise the sector, through reducing its impact on climate change, remains critical.
- 1.4 The environmental impacts of the aviation sector are evident through aircraft emissions, aircraft noise and fuel burn, air quality impacts, and environmental risks created by on-the-ground facilities and operations and most recently contrails or non-CO2 emissions.
- 1.5 The ATM ecosystem is expected to equally play their role in improving operational efficiencies of the air traffic services and ensure environmental sustainability is embedded in their holistic core business service offerings.
- 1.6 This paper outlines the green Air Traffic Management (ATM) approach towards net-zero 2025. Responding to the global, national and industry's commitment towards addressing the growing call for action in reducing emissions and combating effects of climate change.

## **2. DISCUSSIONS**

- 2.1 The aviation sector's commitment to reducing CO<sub>2</sub> emissions and combating climate rest upon the implementation of market-based measures, such as operational improvements (ATM) and infrastructure, technological advancements in aircrafts, sustainable alternative fuels (SAFs) and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) which is being adopted at varying levels by states.
- 2.2 According to studies, efficiency improvements in airspace management and operations, specifically, is anticipated to deliver 6-10% reduction in aviation emissions which require more collaboration from airports, airlines and ANSPs. While the transition to new efficient aircraft and production of SAF requires huge initial financial investments.
- 2.3 The 41st ICAO Assembly, adoption of the resolution on the long-term global aspirational goal (LTAG) for international aviation was taken, which promotes the goal for net-zero carbon emissions by 2050 in support for the United Nations Framework Convention on Climate Change (UNFCCC)'s Paris Agreement.
- 2.4 Organisations such as CANSO have developed an environmental accreditation programme, GreenATM Programme, to provide ANSPs with an independent, industry-endorsed, accreditation for their environmental efforts and aims to objectively assess the maturity of relevant programmes supporting the industry's objective of Net-Zero emissions by 2050.
- 2.5 ATNS has adopted the GreenATM accreditation programme as a key performance area and a significant step towards achieving net-zero for the organisation.
- 2.6 The GreenATM accreditation programme focusses on areas in which an ANSP can materially contribute towards carbon emission reduction from its own respective operations as well as those of other airspace stakeholders. The programme comprises four (4) categories namely, improved governance, improved air traffic management, infrastructure and utilities and other environmental opportunities.

## 2.7 Infrastructure and utilities

- 2.7.1 Some initiatives continue to realise opportunities to support the efficient flow of air traffic and enhance innovation of the ATM system.
- 2.7.2 Within the context of infrastructure and utilities, the aviation industry understands that optimising ATM infrastructure and the associated efficiencies is critical to assess viable alternatives to traditional energy use from fossil fuels. ATM ecosystem to explore measures related to energy management, power procurement, and production which include the implementation of an energy management system and the use of Hydrogen fuel cell technology, amongst other renewable solutions to power communication, navigation and surveillance (CNS) infrastructure to address the organisation's environmental footprint and performance.
- 2.7.3 ATNS has deployed renewable solutions to power CNS infrastructure addressing the energy efficiency requirements which includes studies and piloting of solar deployments. Current plans are underway to investigate further solutions such as i.e., hydrogen power solutions.
- 2.7.4 Unlike diesel generators, hydrogen fuel cells don't directly generate energy through combustion. Instead, hydrogen acts as an energy carrier, efficiently storing, transporting, and delivering clean energy derived from renewable sources like solar or wind. When used in a fuel cell, hydrogen reacts with oxygen to produce electricity, with only water vapor as a byproduct. This makes hydrogen fuel cells a clean and sustainable alternative for backup power generation.
- 2.7.5 Fuel cell systems offer high efficiency compared to conventional distributed energy systems, as shown in Table 1 ((Nahar & Kendall, 2011; Larminie & Dicks, 2003; Winter & Brodd, 2004).

Table 1: Comparison of fuel cell with other power generating systems

	Reciprocating engine: Diesel	Turbine Generator	Photovoltaic	Wind turbine	Fuel Cells
Capacity Range	500 kW-50 MW	500 kW-5 MW	1 kW -1 MW	10 kW -1 MW	200 kW -2 MW
Efficiency	35%	29-42%	6-19%	25%	40-85%
Capital cost (\$/kw)	200-350	450-870	6600	1000	1500-3000

- 2.7.6 This approach not only benefits the environment but also unlocks significant financial advantages for the entire aviation industry. This can be achieved by reducing reliance on fossil fuels, lowering operational costs and potentially airlines, and attracting eco-conscious customers. Ultimately, these efforts contribute to a more sustainable and financially robust future for the aviation sector
- 2.7.7 The aviation industry to measures and monitors its carbon footprint, of which electricity consumption (Scope 2 emissions) contributes the most, therefore the need to focus on reduction measures pertaining to Scope 2 will make the most impact. At present, the lack of clear visibility into energy consumption is a major hurdle in decarbonisation efforts for the organisation creating a challenge in the setting of a clear baseline and subsequently reduction targets.

2.7.8 The implementation of an energy management system tackles this challenge head-on, providing the data and insights needed to make informed decisions and drive successful decarbonisation strategies.

## **2.8 Environmental opportunities**

2.8.1 The aviation industry's ambitious goals for decarbonising the sector and achieving net-zero by 2050 requires significant changes and collaboration to ensure that the transition is realised. Aligning efforts will accelerate investment into opportunities to mitigate climate change providing for the required skills as well as financial and technological resources. Thus, state action plans, developed by all stakeholders, are crucial in reinforcing government prioritization and acceleration of key partnerships and implementing the required initiatives. Collectively, environmental opportunities for the sector present themselves in the below ways:

- a. Increasing the adoption of sustainable alternative fuels which are anticipated to have the potential to contribute approximately 65% of the reduction in aviation emissions
- b. Introduction of future aircraft powered by different fuel sources such as hydrogen and electricity will contribute to decarbonizing aviation, which will be critical to meeting the LTAG objectives
- c. Implementation of environmental considerations in operational improvements (ATM) and other operational procedures, has the potential to reduce fuel burn by between 8% and 18% which demonstrates how climate objectives can be advanced by innovative ATM efficiencies
- d. Additional participation in carbon offsetting programmes that aim to address unavoidable emissions is a key consideration as the sector transitions

## **3. ACTIONS BY THE MEETING**

3.1 The meeting is invited to:

3.1.1 Note that the aviation industry has a crucial role to play in achieving the ICAO's net zero carbon emissions goal by 2050 as outlined above. Africa is making strides in ensuring that an African perspective through collaboration amongst regional players and trials being conducted, is highlighted.

3.1.2 Collaborating in advancing climate objectives by ensuring the ATM system that is efficient in all aspects is critical to ensure the achievement of the broader sustainability objectives in the sector.

3.1.3 Embed the necessary infrastructure and utilities measures, the aviation industry should aim to accelerate the following:

- a. Energy management strategy development that will enable the achievement of multiple organisational objectives: reduced energy costs, increased efficiency, improved uptime and reliability, and a reduced carbon footprint.
- b. An energy management system that facilitates compliance obligations and employee education initiatives.
- c. Incorporate environmental benefits into the current CNS/ATM Strategy (how the environmental impacts of CNS deployment, maintenance and decommissioning, will be reduced)

**3.2 Draft IIM/SG7 Conclusion /Decision 7/xx : Title of Conclusion/Decision**

**That;**

- a) Encourage collaboration with industry to realise the efforts required to implement ICAO's basket of measures and LTAG to support the state's commitments to the UNFCCC.
- b) Establish a working group, representing all stakeholders (ANSPs, Regulator (SACAA), DOT, Airline Operators and associations) within the AFI region:
- c) To enable better planning and implementation of broader industry environmental objectives,
- d) ensure the integration of the broader industry environmental objectives in strategy documents, TORs and efficiency projects as well as the measurement of environmental benefits in such areas,
- e) Develop energy management strategies to transition to clean backup power using renewable technologies and sources,
- f) Share data to support the development of AFI efficiency metrics, and
- g) Increase joint lobbying for the funding mechanisms required to realise climate adaptation and mitigation measures for the aviation sector.

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