



WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

- Agenda Item 3: Air Navigation System Performance Improvement**
3.1: Proposals to improve the efficiency of air navigation services contributing to LTAG

FUEL SAVINGS THROUGH IMPROVED AIRSPACE CAPACITY

(Presented by Japan)

EXECUTIVE SUMMARY

The purpose of this paper is to present a Japanese case study on the conference theme, "Promoting Sustainability through Performance Improvement." We share our thoughts that fuel savings can be achieved even with measures which is not for sustainability but for increasing capacity of aircraft operation, and these actions can lead to solutions to problems in environment field. This will allow States to contribute solving the global environmental issues that aviation sector faces, to show that it is sustainable, and also to meet the increased traffic demand that may arise in the future.

Action: The Conference is invited to agree on the recommendation set out in paragraph 3.3.

1. INTRODUCTION

1.1 In Japan airspace (Fukuoka FIR), due in part to the economic development of Asian States, traffic volume had continued to increase steadily before COVID19 pandemic, and the smooth traffic flow has been maintained by implementing countermeasures on a case-by-case basis.

1.2 While meeting the increasing aviation demand promotes economic development, the reduction of CO₂ emissions as a countermeasure against global warming is an urgent issue, and measures in the field of aircraft operation have been called for.

2. DISCUSSION

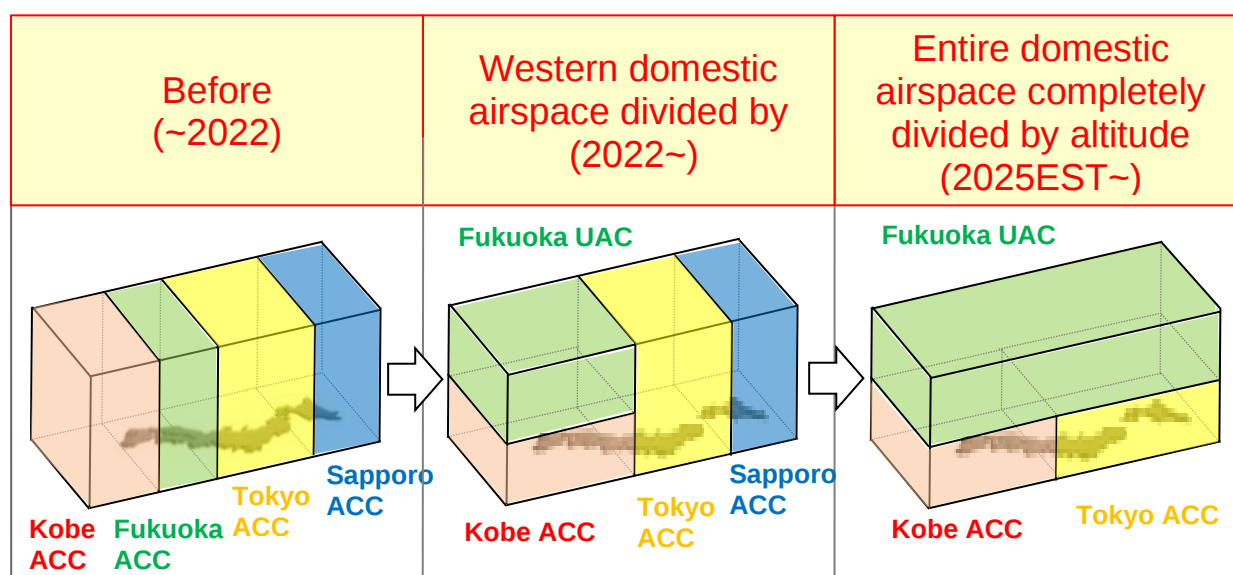
2.1 Challenges of dividing sectors in horizontal planes

2.1.1 Traditionally, Japan Civil Aviation Bureau (JCAB) has responded to increasing traffic by dividing sectors in the horizontal plane of airspace. However, following challenges exist with sectoral division in the horizontal direction only.

- a) the sectoral division increases the number of transfers between the sectors and increases the workload of air traffic controllers and pilots for communication transfers; and
- b) partial optimization of aircraft operations, but it becomes difficult to achieve total optimization when the entire flight path is considered.

2.2 Vertical separation of airspace

2.2.1 To resolve above issues, JCAB is moving forward with the separation of airspace into upper and lower levels. The airspace, which was previously divided horizontally and governed by four Aeronautical Control Centres, will be separated vertically and reorganized into three area control centres (ACCs): one ACC governs high altitude area, and two ACCs govern low altitude area.



2.2.2 The vertical separation of western Japan airspace was completed by 2022, and the vertical separation of the entire air route airspace is scheduled to be completed by 2025.

2.2.3 The effect of the vertical separation of airspace is as follows.

- a) at high altitude area, time-critical communications are less frequent and controller-pilot data link communications (CPDLC) is easier to implement; and
- b) free flight planning at high altitude area not restricted by existing air route design with the introduction of CPDLC.

2.3 Free routing at high altitude area

2.3.1 For the Western Japan airspace where the vertical separation was completed, a plan to fly in a direct route not depending on existing air routes is possible in certain sections. JCAB plan to expand the section to have aircraft fly in a direct route after the completion of the vertical separation of the entire airspace.

2.3.2 In parallel with the expansion of the direct route flight section, JCAB plans to introduce free-route airspace that will allow airspace users to freely plan their flight paths. By setting up free-route airspace, airspace users can enjoy benefits such as shortened flight paths and flexible bad weather avoidance.

2.3.3 In the current implementation of the direct route of the flight plan routes in the Western Japan airspace, the reduction in flight distance from the existing flight plan routes is negligible. As the airspace available for direct route flights or free-route airspace expands, the range of flight distance reductions will also increase.

2.3.4 JCAB has already introduced offshore free-route airspace with the United States, and is considering coordination for its introduction with neighbouring states.

2.3.5 This accumulated reduction in flight distance is expected to reduce fuel consumption during flights and to reduce the amount of fuel to be loaded when preparing a flight plan. JCAB believes that this will reduce aircraft CO₂ emissions and contribute to the realization of a sustainable aviation industry.

2.3.6 The free-route airspace created by the airspace realignment, together with the long-range-air traffic flow management (ATFM) that will be introduced in the future, will not only improve the efficiency of gate-to-gate operations, but will also contribute to further reductions in CO₂ emissions through synergistic effects.

3. CONCLUSIONS

3.1 Introducing free-route air space allows airlines to choose their own preferred routes, which improves operational efficiency. Improving operational efficiency not only reduces fuel consumption, but also reduces on-board fuel, creating a positive cycle of benefits for airlines in reducing their CO₂ emissions.

3.2 CO₂ emissions in aviation sector are not so large in terms of total emissions. However, contributing to the environment is important and a challenge that States must address. In Japan, there is a saying: “If a little dust piles up, it becomes a mountain”. It is a saying of our ancestors that means that even the smallest action, if continued over time, will eventually lead to impressive results. It is precisely the right word for the situation we are in at the moment, where improving the efficiency of our global operations can significantly reduce our CO₂ emissions.

3.3 In light of the above, the Conference is invited to agree on the following recommendation:

- a) recognize that improved operational efficiency contributes not only to increased throughput but also to reduced fuel consumption;
- b) recognize that even small initiatives can lead to a big achievement when implemented by everyone; and
- c) request ICAO to contribute to the expansion of free-route airspace initiatives in coordination with neighboring States and regions.

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