

**58th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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**AGENDA ITEM 8: CAPACITY DEVELOPMENT
AND IMPLEMENTATION**

**INTRODUCING ALTERNATIVE APPROVED TRAINING
PROGRAMS IN ATO
(APPROVED TRAINING ORGANIZATIONS)
USING AR·VR SIM DEVICES**

(Presented by the Republic of Korea)

SUMMARY

As advancements in IT technology continue, the conditions are ripe for offering more effective aircraft maintenance training through the use of AR·VR devices. This discussion paper intends to:

- a) Discuss the role of Licensing Authority and ICAO in approving alternative training programs utilizing AR·VR SIM devices in ATO for the Aircraft Maintenance.
- b) Share the standards, status and case studies of member states in approving alternative training programs using AR·VR SIM devices in ATO: and
- c) Encourage ICAO and member states to continuously enhance the training quality and competence of aircraft maintenance through the adoption of AR·VR SIM devices.

INTRODUCING ALTERNATIVE APPROVED TRAINING PROGRAMS IN ATO (APPROVED TRAINING ORGANIZATIONS) USING AR·VR SIM DEVICES

1. INTRODUCTION

1.1 Recent advancements in IT technology have facilitated the widespread utilization of AR·VR SIM devices across industries worldwide. The aircraft maintenance sector is also witnessing a growing trend in the use of AR·VR SIM devices.

1.2 The utilization of AR·VR SIM devices for creating AR·VR-based aircraft maintenance training program on various aircraft components, including engines, structures and avionics, suggests a high potential for introducing alternative training programs using AR·VR SIM devices at ATO in the future.

1.3 The adoption of AR·VR SIM devices in ATO is expected to contribute significantly to cost and time savings compared to physical aircraft training. Moreover, it is anticipated to enhance the efficiency of training and improve the competence of aircraft maintenance personnel.

1.4 This paper aims to encourage discussions regarding roles of the Licensing authorities and ICAO in approving training programs using AR·VR SIM devices in ATO and encourage ICAO and member state to keep promoting the utilization of AR·VR SIM devices to enhance aircraft maintenance personnel's competency.

2. DISCUSSION

Utilization of AR·VR Simulator Devices by ATO – Experiences and Challenges

2.1 The Republic of Korea is currently conducting the pilot project (2022~2024) to temporarily ease the criteria for Approved Training Organizations (ATO) utilizing AR·VR devices. During this project, the suitability, effectiveness and safety of training programs using AR·VR SIM devices are being evaluated.

** Note. (Partial relaxation of ATO criteria) From having three real aircraft to having two real aircraft and AR·VR-based training program.*

2.2 A survey of 157 instructors and students from 9 ATO participating the pilot project revealed that over 94% of respondents answered positively to the potential of AR·VR based aircraft maintenance training program to replace physical aircraft training. Additionally, over 81% of students assessed that AR·VR based programs can improve understanding and delivery of training contents.

2.3 The Republic of Korea is considering the relaxation of Approved Training Organization (ATO) criteria to permanently replace 1 real aircraft with AR·VR SIM-based training program, taking into account the positive effects of AR·VR SIM devices in training.

2.4 However, challenges such as the absence of international regulations regarding qualification criteria for AR·VR SIM devices and concerns about potential side effects are hindering the relaxation of ATO criteria for AR·VR SIM device adoption.

Establishment of Qualification Criteria and Guidelines for AR·VR SIM Devices

2.5 While ICAO specifies qualification criteria for flight simulation training devices in DOC 9625, there are no qualification criteria for other simulation devices, including AR·VR-based aircraft maintenance training simulations.

ICAO DOC 9841

6.3.5 ICAO has not published qualification criteria for simulation training devices other than flight simulation training devices. In consequence, a Licensing Authority has the responsibility to establish criteria for the determination of the suitability of a simulation training device, which is not covered by the guidance of Doc 9625, for any approved training programme. For that, the Licensing Authority would consider the training tasks proposed to be conducted utilizing the device, the related credit sought and the capability of the device to achieve the desired training outcome.

2.6 Flight simulation devices have specific technical requirements and qualification standards based on factors such as hardware, software and the purpose of the training (private, commercial, transport, etc.).

2.7 However, no qualification criteria exist for AR·VR SIM devices, leaving Licensing authorities to independently evaluate the suitability of AR·VR SIM-based training programs and devices for training objectives and goals.

2.8 Considering the rapid evolution, diversity and scalability of AR·VR SIM devices, assessing and approving every AR·VR SIM device and program independently at Licensing authority has limitations.

2.9 To address this, fostering collaboration among member states to share experiences and certifications related to the utilization of AR·VR SIM training devices in ATO is crucial to develop specific guidelines.

2.10 ICAO should encourage member states to share experiences regarding the use of AR·VR SIM devices in ATO and consider establishing guidelines for AR·VR SIM device utilization based on member states' cases and incorporating them into documents such as Doc 9868, PANS_TRG, and Doc 9841.

Other Considerations for ATO Using AR·VR SIM Devices

2.11 There is a concern that the replacement of hands-on practical trainings on aircraft maintenance which should be done on physical aircraft with AR·VR SIM devices might cause a decline in practical skills. Balancing knowledge, skills, attitudes and experience is essential to appropriately allocate trainings between AR·VR SIM devices and real-world tasks.

2.12 The widespread application of AR·VR SIM devices in training in various aviation fields, including pilot, aircraft maintenance, Air Traffic Control and ground operations, requires addressing potential issues and devising solutions.

3. ACTION BY THE CONFERENCE

3.1.1 The Conference is invited to:

- a) take note of the information contained in the paper;
- b) encourage member states to actively share experiences of Licensing authorities in certifying the use of AR·VR SIM training devices by ATO and operations of alternative training programs using AR·VR SIM devices;
- c) encourage member states to develop specific guidelines for the use of AR·VR SIM devices through active sharing of cases;

- d) encourage ICAO to facilitate the sharing of experiences by member states regarding AR·VR SIM devices and utilization by Licensing authorities and consider ways to share relevant information, such as the ICAO website; and
- e) encourage ICAO to establish guidelines for the use of AR·VR SIM devices based on member states' cases and incorporate them into ICAO documents such as Doc 9868, PANS_TRG, and Doc 9841.

— END —