



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**MIDDLE EAST OFFICE**

**ICAO MID WORKSHOP ON THE CONTINUOUS CLIMB OPERATIONS (CCO) /  
CONTINUOUS DESCENT OPERATIONS (CDO) IMPLEMENTATION**

*(Abu Dhabi, UAE, 13 – 14 June 2022)*

**SUMMARY OF DISCUSSIONS**

## 1. INTRODUCTION

1.1 The ICAO MID Workshop on the Continuous Climb Operations (CCO) / Continuous Descent Operations (CDO) Implementation was successfully held in Abu Dhabi, UAE from 13 to 14 June 2022.

1.2 The Workshop's objective is to address the followings:

- a) provide the participants with a better understanding of the CCO/CDO operations and the benefits of implementation;
- b) provide in depth analysis for the planning and implementation issues related to the CCO/CDO operations;
- c) provide necessary knowledge about the related ICAO provisions on the subject and share experience and best practices on CCO/CDO implementation by States/ ANSPs/ Airspace users; and
- d) address the CCO/CDO operations challenges/opportunities and obtain Users' requirements and views.

1.3 The Workshop served also as a platform for States, ANSPs, international organizations and industries to share their experiences and lessons learned regarding CCO and CDO implementation.

1.4 The Workshop was attended by a total of thirty-four (34) participants from five (5) States, one (1) International Organization, and three (3) representatives from Industry. The list of participants is at **Attachment A**.

## 2. OPENING REMARKS

2.1 Mr. Ahmad Amireh, Regional Officer ATM/SAR, ICAO Middle East Regional Office welcomed the participants and thanked the GCAA/UAE for hosting the event; and providing enormous assistance and support in organizing and conducting this important regional event.

2.2 Mr. Amireh recalled that the Nineteenth meeting of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG/19), held in Riyadh, Saudi Arabia (14-17 February 2022), and in particular Conclusion 19/10, that a Workshop on CCO/CDO implementation be organized in 2022, in collaboration with MID FPP, to provide necessary knowledge about the ICAO provisions on the subject and share experience and best practices on CCO/CDO implementation by States/Airspace users.

2.3 Accordingly, and noting that a significant challenge for the MID Region involves the implementation of the CCO/CDO, this Workshop is taking place as capacity building activity. It is organized by experts from the MID Region, with participants and the support of the ICAO Secretariat, MID FPP, Industry, International organizations and champion States.

2.4 Through such a forum, participants will have the chance to exchange experience from each other related to the successes and lessons learned in the CCO/CDO implementation, understand better the various aspects of implementation guidance, including ICAO model processes for implementing CCO and CDO as laid down in Doc 9931 and Doc 9993, and capture the benefits and challenges from Airspace users.

2.5 The Workshop received with appreciation the participation of a substantial number of experts from a range of Airspace users, Industry and States as well as the delivery of various presentations on the theme of CCO/CDO.

### **3. LANGUAGE**

3.1 Discussions were conducted in English and documentation was issued in English.

### **4. WORK PROGRAMME**

4.1 The Workshop programme is organized into 7 sessions that total ten-hours of material delivery, divided into two working days:

- Session 1: Continuous Climb/Descent operations overview
- Session 2: CCO/CDO implementation processes
- Session 3: CCO/CDO phraseology, publications and charting
- Session 4: CCO/CDO Database Coding & Charting Aspects
- Session 5: CCO/CDO Airspace users, Industry, States experience and challenges (PPT presented by: UAE GCAA, DANS, GANS, UK NATS, UATS, Etihad and IATA)
- Session 6: CCO/CDO Case study groups work presentations and exercises
- Session 7: Wrap-up and Closing

4.2 The Workshop's materials including, presentations and this Summary of Discussion are available at: <https://www.icao.int/MID/Pages/2022/CCO-CDO%20Wksp.aspx>

### **5. DISCUSSIONS**

#### **5.1 *Continuous Climb/Descent operations overview***

5.1.1 This session was provided in PPT/1 presented by Mr. Radhouan Aissaoui, Regional Officer, Information Management, ICAO MID Cairo, Egypt.

5.1.2 The presentation covered the following topics:

- CDO and CCO in the GANP
- what CDO and CCO are
- the benefits of CCO/CDO
- the factors that affect CCO/CDO
- the impact of airspace/procedures design on CCO/CDO
- the advantages and disadvantages of open and closed STARs
- Basic and enhanced CCO design example
- Integrating CCO and CDO Designs

5.1.3 The following were highlighted:

- CCO / CDO can be facilitated by ATC, airspace and procedure design.
- CCO / CDO have substantial fuel / emissions / noise / monetary savings.
- A Pilot should be enabled to identify his optimal ToD/ToC position and let the FMS then follow the optimal descent/climb profile. ATCOs should try to enable this to the extent possible.

- ATCOs should understand and be aware of how aircraft energy, speed and descent management are influenced by ATCO tactical interventions.
- ATC and Crew Training is paramount for the safe conduct of CCO CDO.
- CCO CDO require specific operational training and knowledge. Controllers should gain a thorough understanding of the operational benefits and consequences with regard to the conduct of CCO CDO procedures and the profiles associated with CCO CDO.

## 5.2 *CCO/CDO implementation processes*

5.2.1 This session was provided in PPT/2 presented by Mr. Ahmad Amireh, Regional Officer, ATM/SAR, ICAO MID, Cairo, Egypt.

5.2.2 In his presentation, Mr. Amireh:

- Provided an overarching principles of CCO/CDO;
- Highlighted key elements of implementation overview and prerequisites; and
- Presented the Implementation roadmap with details of each phase.

## 5.3 *"CCO/CDO phraseology, publications and charting"*

5.3.1 It was recalled that MIDANPIRG/19 through Decision 19/11: tasked a CCO/CDO AD HOC WORKING GROUP:

- to develop guidance related to the publication of CCO/CDO information (text and Charts) in the AIP, in coordination with the relevant MIDANPIRG and RASG MID subsidiary bodies; and
- to present their outcome during the AIM SG/8 and PBN SG/7 meetings before endorsement by MIDANPIRG/20.

5.3.2 The following proposal of harmonized AIP location structure and content was presented and discussed:

- ENR1.5 for high level content; and
- AD2.21 / 2.22 for Airport specific content.

5.3.3 The Workshop was also appraised of CCO/CDO elements to be charted and type of charts to be published.

## 5.4 *CCO/CDO Database Coding & Charting Aspects*

5.4.1 This session was provided in PPT/4 presented by Mr. Sorin Onitiu, MID FPP Manager, Abu Dhabi, UAE.

5.4.2 In his presentation, Mr. Onitiu covered the CDO/CCO Database Coding and Charting Considerations with description of each RNAV Path Terminator for CDO/CCO. The presentation also included charting samples for illustrating how States implementing CDO STARs and CCO SIDs respectively are following the CDO/CCO publication requirements.

## 5.5 *CCO/CDO Airspace users, Industry, States experience and challenges*

5.5.1 The presentations during the Workshop spanned a wide range of topics including:

- Measuring environmental inefficiency to drive performance (CCO/CDO):

A presentation was provided by Mr. Andy Foxhall, NATS Head of International Business Solutions and Mr. Chris Allan, Head of Accounts & Partnerships (APAC) on measuring environmental inefficiency to drive performance (CCO / CDO).

- Continuous climb and descent operation (CCO/CDO): Etihad airways and IATA vision

A presentation was provided by Etihad and IATA AME, presented by Mr. Issa Al Rawahi and Mr. Jehad Faqir, about the different fuel efficiency programme towards net Zero emission target by 2050, including the implementation of CCO/CDO.

- DANS FTS supporting CCO/CDO local implementation plans.

A presentation was provided by DANS, presented by Mr. Rovshan Sultanov, Manager of Airspace Design and Development, DANS; about the use of FTS to support CCO/CDO implementation in Dubai International Airport.

- DANS CCO Implementation: IFP design case at Dubai INTL

Another presentation was provided by DANS, presented by Mr. Manuel Martin, Senior Specialist Airspace and Procedure design about the CCO implementation at Dubai International Airport

- GCAA UAE Implementation of CCO/CDO in Emirates FIR

A presentation was provided by UAE, presented by SZC Team, on CCO/CDO implementation within Emirates FIR, and the calculated benefits and savings.

- GANS Airspace design process & AUH case study

A presentation was provided by GANS, presented by Mr. Asim Rizwan, Head AIM & ATM Performance and Mr. Strinivasa Venketsamy, Deputy Manager ATS Global Air Navigation Services (GANS); describing the Airspace change process related to CCO/CDO and the enablers required for the different fuel efficiency airspace implementations.

- UATS Example of CCO/CDO Implementation for Red Sea Airport, KSA, during conceptual design phase

A presentation provided by UATS, presented by Mr. Reda E. Elmadbouly, Flight Procedures Chief Designer, United ATS KSA; about the CCO/CDO implementation and showcase an example of implementation in RED SEA Airport.

- CCO/CDO Case study groups work presentations

A case study of Khartoum Airport, Sudan; prepared by CGX France was presented. Participants split up into small groups and worked out the activities of the case study, where they are asked to:

- ensure a vertical separation between STAR and SID by altitude constraints on key points.
- find the best Compromise between CDO and CCO.
- A groups presentations was followed by a panel discussion on each proposed solution, the differences and convergences.

## **6. WORKSHOP CONCLUSIONS**

### **6.1 Outcomes and Key Results**

- Increased awareness on background and implementation guidance for CCO/CDO.
- Gaining insights on the ICAO model processes for implementing CCO and CDO as laid down in Doc. 9931 and Doc 9993 were underlined and noted as an overriding importance.
- Learning and knowledge acquired of the standardization of CCO/CDO procedures for flight safety and the importance to be designed and presented in an unambiguous manner.
- in-depth knowledge of the design of CCO/CDO and airspace changes that may be needed to facilitate a collaborative process involving the ANSP, aircraft operators, airport operators, the aviation regulator, and through appropriate channels, environmental entities, as necessary.
- Acquire a better understanding of the design process as a collaborative effort, thus focused collaboration between ATCOs and Flight Crews when developing new CCO / CDO procedures or operational changes is vital for the implementation's success and the optimisation of the vertical profiles.
- Training and communication to and within stakeholder groups are the foundation of a successful of CCO/CDO implementation.
- Agreement on the harmonized AIP content related to CDO to ensure that identified good practices are shared and that Flight Crews / Flight Planners should always know where CCO- / CDO-related text may be found in an AIP. A harmonized structure that promotes the sharing of good AIP practices, phraseology, definitions, how CDO is measured etc.
- Identification of a proposal for the harmonized location, structure and content of CCO / CDO material in the AIP, based on current good practices that were identified in the AIPs review. This proposal will be reviewed and agreed by various Working Arrangements such as the AIM SG and PBN SG before MIDANPIRG endorsement.
- Need to further develop guidance material to support and expedite the CCO/CDO implementation in MID region.
- The importance of human factors, training and phraseology of ATC staff, highlighted.
- The need for expertise in FMS performance and flight procedure coding conventions to be included on the design team as CCO/CDO procedures will be stored in a navigation database.
- Understanding how important it is to run Simulation of the CCO/CDO procedure during the design phase or prior to flight trials, for controllers and pilots to better understand the issues and limitations that they each face.
- Identification of MID FPP support to be provided to facilitate the coordinated implementation of the CCO and the CDO in MID Region.
- Gaining knowledge and experience through hands-on practical exercises (group work), Q&A sessions, scenario challenges, etc.
- Stimulated discussions by the participants and enabled.

**6.2 Follow-up Actions:**

- 6.2.1 The outcomes of the CCO/CDO Workshop will be presented to the AIM SG/9, PBN SG/7, ATM SG/8 and MIDANPIRG/20 meetings for further actions, as appropriate.

**6.3 Closing:**

- 6.3.1 On behalf of the organizing team, Mr. Radhouan Aissaoui, Regional Officer, Information Management, ICAO MID Regional Office, thanked all participants for their active participation and fruitful discussion and valuable outcomes. He indicated that from an ICAO perspective, the objectives of the Workshop were met as it was a good platform to share information on the background, requirements and best implementation practices of ICAO Provisions related to CCO and CDO.
- 6.3.2 Mr. Aissaoui expressed his gratefulness to the speakers from UAE GCAA DANS, GANS, UK NATS, UATS, Etihad and IATA.

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**LIST OF PARTICIPANTS**

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