International Civil Aviation Organization
South American Regional Office

FIFTH WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP (SAM/IG/5)
REGIONAL PROJECT RLA/06/901

Lima, Peru, 10 to 14 May 2010

Agenda Item 3: Implementation of performance-based navigation (PBN) in the SAM Region

CONTINUOUS DESCENT OPERATIONS (CDO), Doc 9931

(Presented by the Secretariat)

SUMMARY	
The purpose of this working paper is to provide an update to States on the status of the ICAO Continuous Descent Operations (CDO) Manual.	
ICAO strategic objectives:	A: *Safety* C: *Environmental Protection* D: *Efficiency*

1. INTRODUCTION

1.1 ICAO Continuous Descent Operations (CDO) manual that provides guidance on the development and implementation is now available on ICAONET. The Manual contains guidance material on the airspace design, instrument flight procedures, ATC facilitation and flight techniques necessary to enable Continuous Descent (CD) profiles. It therefore provides background and implementation guidance for:

a) Airspace and procedure designers;
b) Air traffic managers and controllers;
c) Service providers (Airports and Air Navigation Service Providers (ANSP)); and
d) Pilots.

1.2 Key objectives of the manual are to improve the:

a) Overall management of traffic and airspace in order to enable uninterrupted continuous descents, without disrupting departures;
b) Understanding of continuous descent procedures and profiles;
c) Harmonization and standardization of associated terminology.

2. DISCUSSION

2.1 Continuous Descent Operations

2.1.1 Continuous Descent is one of several tools available to aircraft operators and ANSPs to increase safety, flight predictability, and airspace capacity, while reducing noise, ATC/Pilot communications, fuel burn and the emission of greenhouse gases. Over the years, different route models have been developed to facilitate CDs and several attempts have been made to strike a balance between the ideal of environmentally friendly procedures and the requirements of a specific airport or airspace.

2.1.1.1 Future developments in this field are expected to allow different means of realising the performance potential of CD without compromising the optimal Airport Arrival Rate (AAR). The core CD definition and the concept at the heart of the manual will also apply to these increasingly sophisticated methods of facilitating CD operations.

2.1.1.2 Continuous Descent Operations are enabled by airspace design, procedure design and ATC facilitation, in which an arriving aircraft descends continuously, to the greatest possible extent, by employing minimum engine thrust, ideally in a low drag configuration, prior to the Final Approach Fix (FAF)/Final Approach Point (FAP). An optimum CD starts from the Top of Descent and uses descent profiles that reduce ATC/Pilot communication, segments of level flight, noise, fuel burn and emissions, while increasing predictability to ATC/Pilots and flight stability.

2.1.1.3 Maintenance of safety during all phases of flight is paramount - nothing in the guidance shall take precedence over the requirement for a safe operation and control of aircraft at all times. For the avoidance of doubt, all recommendations are to be read as "subject to the requirements of safety". Before any CD trials or operations commence, the proposed implementation should be the subject of a local safety assessment.

2.1.2 **Standardization and Harmonization.** Terminology and procedural standardization are important for flight safety. From the pilots' and air traffic controllers' perspective, flight procedures and pilot communications should be unambiguous. For the procedure designer, it is important to understand the flight characteristics, limitations and capabilities of aircraft expected to perform CDs, as well as the characteristics of the airspace and routes where it will be used. For airport operators and environmental entities, it is important to understand, the extent and limitations of environmental benefits, aircraft performance, and airspace limitations when proposing to introduce CD operations. Considering the high cost of fuel and growing concerns about the environment and climate change, collaborating to facilitate CDs is an operational imperative where all stakeholders benefit.

2.1.2.1 To standardize and harmonize the development and implementation of CD operations, the airspace and instrument flight procedure design and ATC techniques should all be employed in a cohesive manner. This will then facilitate the ability of flight crews to use in-flight techniques to reduce the overall environmental footprint and increase the efficiency of commercial aviation. The implementation guidance in the Manual is intended to support collaboration among the different stakeholders involved in implementing these Continuous Descents:

a) Airspace and procedure designers,
b) Air traffic managers and controllers,
c) Service providers (Airports and Air Navigation Service Providers (ANSP)); and
d) Pilots.

2.1.3 **CDO Manual contents.** Some of the content found in the manual follows:

Facilitating CD Operations
- Benefits

Concepts of Operation

Continuous Descent Operations
- Less noise at intermediate distances (10-30 NM) from the runway
- Lower emissions
- Reduced fuel burn
- Maximum Benefit

Design Options
- Closed Path Designs
- Open Path Designs
- Sequencing Methods
- Basic Design Examples
- Closed path CDO layout
- Developing a CD concept of operations

Specific Stakeholder Issues
- Procedure Design
- Airspace Collaboration and Standardization
- Speed Restrictions
- Transition Level
- Database Coding
- Charting issues

Flight operation
- Cockpit Workload
- Pilot Training
- ATC Techniques
- Transition Level
- CD, Optimal AAR and ATFM considerations
- ATC Training
- ATC workload
- Different CD options
- Sequencing Techniques in Relation to CD and Optimal AAR

CD Implementation Overview and Pre-Requisites
- The Importance of Effective Collaboration
- Community Relations and Consultation
- Policy Context
- Implementation Steps

Prepare an Outline CD Case

Establish Collaborative CD Implementation Group
- Planning

Joint Preliminary Assessment

Consider Options and Jointly Agree on Preferred Implementation Options

Design Preferred CD Facilitations Option(s)

Strategic Planning
- Implementation

Simulate and validate

Decision Point (go-no-go)

Make CD Operational and implement Iterative improvements

Assessment

Training, Marketing and Awareness Material

2.1.4 **Conclusion**

2.1.4.1 In light of the completion of the ICAO CDO manual which will standardize and harmonize the development and implementation of CD operations, States are encouraged to consult the CDO Manual during their STAR implementations. Recognizing the efficiency, environmental and other benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, the meeting is invited to adopt the following conclusion:

Conclusion SAM/IG/5-X Implementation of Continuous Descent Operations

That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.

3. **ACTION BY THE MEETING**

3.1 The Meeting is invited to review and consider continuous descent operations and how they may be useful when designing PBN arrivals/approaches in their State and endorse the Conclusion at para. 2.1.4.

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