SESAR	Active						APT
ENV01	Continuous Descent Operations (CDO)						
REG	ASP	MIL	APO	USE	INT	IND	NM

Subject matter and scope

A continuous descent operation (CDO) (1) is an aircraft operating technique, enabled by airspace design, procedure design and ATC clearances in which arriving aircraft descend without interruption, to the greatest possible extent, by employing minimum thrust in order to optimise the descent profile in terms of fuel burn. The optimum vertical profile takes the form of a continuously descending path.

Operating at optimum flight levels is a key driver to improving fuel efficiency and minimise carbon emissions as a large proportion of fuel burn occurs during the climb phase.

Many major airports now employ PBN procedures which can enable both CDO and continuous climb operations (CCO) and, in a large number of cases, judicious airspace and procedure design has resulted in significant reductions in environmental impacts. This is particularly the case where the airspace design has supported CCO and CDO.

CDO does not adversely affect safety and capacity and will produce environmental and operational benefits including reductions to fuel burn, gaseous emissions and noise impact.

It is important that monitoring and measuring of CDO execution is defined across ECAC using harmonised definitions to avoid misleading interpretations of performance measurement. It is equally important that CDO execution is measured across ECAC, as far as practicable, using a harmonised methodology and parameters. Whilst reporting can be undertaken at the local level according to local legislation and requirements, when CDO execution is reported on an international basis, this measurement should always be based upon a harmonised method, parameters and metric. The proposed methodology (4) identified by the European TF on CCO/CDO is detailed at http://www.eurocontrol.int/articles/continuous-climb-and-descent-operations.

Notes:
(1) Since the publication of ICAO Doc 9931, the term Continuous Descent Operations (CDO) has generally replaced the term CDA (Continuous Descent Approach).
(2) In principle, it is not required to implement CDO on a 24/7 basis, but it should be facilitated to the extent possible, according to local conditions.
(3) As a reference guidance the expected date for deployment of Block 0 modules in the ICAO GANP, to which this objective is linked through ASBU B0-CDO is 2013-2019, and for Block 1, linked through B1-CDO, is from 2019-2025.
(4) At the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.

NOTE FOR MILITARY AUTHORITIES: It is the responsibility of each military authority to review this Objective IN ITS ENTIRETY and address each of the SLoAs that the military authority considers RELEVANT for itself. This has to be done on top and above of the review of "MIL" SLoAs which identify actions EXCLUSIVE to military authorities.

Applicability Area(s) & Timescale(s)

Applicability Area	See list of airports in MP Level 3 Implementation Plan - Annexes		
Timescales:	**From:**	**By:**	**Applicable to:**
Initial operational capability	01/07/2007		Applicability Area
Full operational capability		31/12/2023	Applicability Area

References

European ATM Master Plan

OI step -	[AOM-0701]-Continuous Descent Approach (CDA)								
	Enablers -	None							
OI step -	[AOM-0702-A]-Continuous Descent Operations (CDO)								
	Enablers -	PRO-029							

Legend:	WXYZ-001	Covered by SLoA(s) in this objective	WXYZ-002 zzz	Covered by SLoA(s) in another objective Objective covering the enabler	WXYZ-003	Not covered in the Implementation Plan

Applicable legislation

ENV01	Continuous Descent Operations (CDO)

Regulation (EU) 598/2014 of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC (as from 16/06/2016).
EC Directive 2002/49/EC, dated 25.06.2002 relating to the assessment and management of environmental noise.
EC Directive 2008/50/EC, dated 21.05.2008 on ambient air quality and cleaner air for Europe.

Essential Operational Changes

- none -

SESAR Solution

ICAO GANP ? ASBUs

B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs)
B1-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs) using VNAV

Deployment Programme

- none -	

European Plan for Aviation Safety

- none -	

Operating Environments

Airport
Terminal Airspace

Stakeholder Lines of Action (SLoAs)

SloA ref.	Title	From	By
ENV01-ASP01	Implement rules and procedures for the application of CDO techniques	01/07/2007	31/12/2023
ENV01-ASP02	Design and implement CDO procedures enabled by PBN	01/01/2018	31/12/2023
ENV01-ASP03	Train controllers in the application of CDO techniques whenever practicable	01/07/2007	31/12/2023
ENV01-ASP04	Monitor and measure the execution of CDO	23/03/2018	31/12/2023
ENV01-APO01	Monitor and measure the execution of CDO	01/01/2018	31/12/2023
ENV01-USE01	Include CDO techniques in the aircrew training manual and support its implementation wherever possible	01/07/2007	31/12/2023

Description of finalised and deleted SLoAs is available on the eATM Portal @ https://www.eatmportal.eu/working/depl/essip_objectives

Expected Performance Benefits

Safety:	-
Capacity:	-
Operational Efficiency:	CDOs contribute to reducing airlines operating costs including a reduction in fuel consumption by the flying of optimised profiles (no vertical containment required). If the CDO is flown as part of a PBN procedure, the predictability of the vertical profile will be enhanced for ATC. CDOs are also a proxy for Vertical Flight Efficiency (VFE) and should be monitored according to harmonised definitions and parameters in order to measure efficiency.
Cost Efficiency:	-
Environment:	Reduction of fuel burn (and consequently, atmospheric emissions) has been estimated to be 51kg per flight for those flying CDO over those flying non-CDO. In addition, studies have indicated that due to lower drag and thrust facilitated by CDO, over certain portions of the arrival profile, noise can be reduced by up to 5dB.
Security:	-

ENV01	Continuous Descent Operations (CDO)

Detailed SLoA Descriptions

ENV01-ASP01	Implement rules and procedures for the application of CDO techniques	From: 01/07/2007	By: 31/12/2023
Action by:	**ANS Providers**		
Description & purpose:	Coordinate activities and implement rules and ATC procedures for the application of CDO techniques in the TMA, whenever practicable. Coordination should be, in all circumstances, undertaken with adjacent ATS units, the NM, aircraft operators and airport operators. Provide the tactical and operational situational awareness support to allow aircrew to apply CDO.		
Supporting material(s):	ICAO - Doc 4444 - Air Traffic Management - Edition 15 / 11/2010 Url : https://store.icao.int/ ICAO - Doc 9613 - Performance-based Navigation (PBN) Manual - Edition 4 / 03/2013 Url : http://store1.icao.int/ ICAO - Doc 9931 - Continuous Descent Operations (CDO) Manual - Edition 1 / 12/2010 Url : https://store.icao.int/ EUROCONTROL - European Joint Industry CDA Action Plan Url : https://www.eurocontrol.int/publication/european-joint-industry-cda-action-plan EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material Url : https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations ICAO - Doc 9426 - Air Traffic Services Planning Manual - Edition 1 / 12/1992 Url : http://www.icao.int/publications/Pages/catalogue.aspx		
Finalisation criteria:	1 - CDO procedures have been published in the local/State AIP 2 - CDOs are made available to airspace users, whenever practicable		

ENV01-ASP02	Design and implement CDO procedures enabled by PBN	From: 01/01/2018	By: 31/12/2023
Action by:	**ANS Providers**		
Description & purpose:	Deploy performance-based airspace and arrival procedures that allow the aircraft to fly a continuous descent approach taking into account airspace and traffic complexity This enhances vertical flight path precision during descent, arrival, and enables aircraft to fly an arrival procedure not reliant on ground-based equipment for vertical guidance.		
Supporting material(s):	ICAO - Doc 4444 - Air Traffic Management - Edition 15 / 11/2010 Url : https://store.icao.int/ ICAO - Doc 9613 - Performance-based Navigation (PBN) Manual - Edition 4 / 03/2013 Url : http://store1.icao.int/ ICAO - Doc 9931 - Continuous Descent Operations (CDO) Manual - Edition 1 / 12/2010 Url : https://store.icao.int/ EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material Url : https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations ICAO - Doc 9426 - Air Traffic Services Planning Manual - Edition 1 / 12/1992 Url : http://www.icao.int/publications/Pages/catalogue.aspx		
ATM Master Plan relationship:	[PRO-029]-ATC Procedures to build a sequence and coordinate with other AoR in order to facilitate CCO/CDO		
Finalisation criteria:	1 - CDO procedures enabled by PBN have been published in the local/State AIP 2 - CDOs enabled by PBN are made available to airspace users, whenever practicable		

ENV01-ASP03	Train controllers in the application of CDO techniques whenever practicable	From: 01/07/2007	By: 31/12/2023
Action by:	**ANS Providers**		
Description & purpose:	Train controllers in the application of CDO techniques and the benefits that the facilitation of such techniques can provide to airspace users in terms of airspace efficiency together with fuel, emissions and cost savings.		
Supporting material(s):	ICAO - Doc 9931 - Continuous Descent Operations (CDO) Manual - Edition 1 / 12/2010 Url : https://store.icao.int/ EUROCONTROL - European Joint Industry CDA Action Plan Url : https://www.eurocontrol.int/publication/european-joint-industry-cda-action-plan EUROCONTROL - IANS-ENV-INTRO - Introduction to Environment -e-learning training course 12/2012 Url : https://trainingzone.eurocontrol.int/		

ENV01	Continuous Descent Operations (CDO)

Finalisation criteria:	1 - Approach controllers have been suitably trained in the application CDO techniques

ENV01-ASP04	**Monitor and measure the execution of CDO**	From: 23/03/2018	By: 31/12/2023
Action by:	**ANS Providers**		
Description & purpose:	In cooperation with airports, monitor and measure CDO execution, where possible based upon a harmonised methodology and metrics. The methodology should be used also to identify the cause of any restrictions to CDO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed to facilitate CDOs, in order to enhance vertical flight efficiency. Provide any feedback to airports, aircraft operators and the NM on the level of CDO execution together with any other trends observed by the CDO performance monitoring.		
	Note :(4) At the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.		
Supporting material(s):	EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material Url : https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations EUROCONTROL - CCO, CDO harmonised definitions, metrics and parameters Url : https://youtu.be/PdeNroWY8Y0		
Finalisation criteria:	1 - In cooperation with the airport operator, the monitoring and measurement of CDO execution is performed and available. 2 - Arrangements are in place to provide feedback of CDO performance to the airport operator, the NM and the local community where practicable.		

ENV01-APO01	**Monitor and measure the execution of CDO**	From: 01/01/2018	By: 31/12/2023
Action by:	**Airport Operators**		
Description & purpose:	In cooperation with the ANSP, monitor and measure CDO execution, where possible based upon a harmonised methodology. The methodology should be used also to identify the cause of any restrictions to CDO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed by the ANSP to facilitate CDOs, in order to enhance vertical flight efficiency. Provide any feedback to the ANSP, aircraft operators and the NM on the level of CDO execution together with any other trends observed by the CDO performance monitoring.		
	Note :At the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.		
Supporting material(s):	EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material Url : https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations EUROCONTROL - CCO, CDO harmonised definitions, metrics and parameters Url : https://youtu.be/PdeNroWY8Y0		
Finalisation criteria:	1 - In cooperation with the ANSP, the monitoring and measurement of CDO execution is performed and available. 2 - Arrangements are in place to provide feedback of CDO performance to the ANSP, the NM and the local community where practicable.		

ENV01-USE01	**Include CDO techniques in the aircrew training manual and support its implementation wherever possible**	From: 01/07/2007	By: 31/12/2023
Action by:	**Airspace Users**		
Description & purpose:	Provide suitable training, ensure awareness and encourage application of CDO techniques.		
Supporting material(s):	ICAO - Doc 9931 - Continuous Descent Operations (CDO) Manual - Edition 1 / 12/2010 Url : https://store.icao.int/ EUROCONTROL - European Joint Industry CDA Action Plan Url : https://www.eurocontrol.int/publication/european-joint-industry-cda-action-plan EUROCONTROL - IANS-ENV-INTRO - Introduction to Environment -e-learning training course 12/2012 Url : https://trainingzone.eurocontrol.int/ EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material Url : https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations		
Finalisation criteria:	1 - CDO techniques have been integrated in the aircrew training manual.		