SE	SAR		Active LOC/APT							
ENV03				c	ontinuous	Climb Oper	rations (CC	0)		
REG	ASP	MIL	APO	USE	INT	IND	NM	MET	AIS	USP

Subject matter and scope

A continuous climb operation (CCO) (1) is an aircraft operating technique, enabled by airspace design, procedure design and ATC clearances in which departing aircraft climb without interruption, to the greatest possible extent, by employing optimum climb engine thrust at climb speeds until reaching the cruise flight level. The optimum vertical profile takes the form of a continuously climbing 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 CCO and continuous descent operations (CDO) 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.

CCO 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 CCO execution is defined across ECAC using harmonised definitions to avoid misleading interpretations of performance measurement. It is equally important that CCO 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 CCO 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 9993, the term Continuous Climb Operation (CCO) has generally replaced the term CCD (Continuous Climb Departure).

(2) In principle, it is not required to implement CCO on a 24/7 basis, but it should be facilitated to the extent possible, according to local conditions.

(3) Being a Local objective to be applied at individual airports according to their local needs, this objective does not have a mandatory implementation deadline. As reference guidance the expected date for deployment of Block 0 modules in the ICAO GANP, to which this objective is linked through ASBU B0-CCO, is 2013-2019.

(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 (Subject to local needs and complexity)			
Timescales:	From:	By:	Applicable to:
FOC used for Analytics functioning only - not for implementation planning	01/01/2013		Applicability Area
FOC used for Analytics functioning only - not for implementation planning		01/01/2030	Applicability Area

References

European ATM Master Plan

OI step -	[AOM-0703]	-Continuous Climb Depart	ure				
	Enablers -	PRO-ENV-15					
		-					
Legend:	WXYZ-001	Covered by SLoA(s) in this objective	WXYZ-002 zzz	Covered by SLoA(s) in another objective	WXYZ- 003	Not covered in the Implementation Plan

Applicable legislation

ENV03

- 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

Airport and TMA performance		

SESAR Solution

ICAO GANP - ASBUs

APTA-B0/5	CCO (Basic)
APTA-B1/5	CCO (Advanced)

Deployment Programme

- none -

European Plan for Aviation Safety

- none -

Operating Environments

Airport Terminal Airspace

Stakeholder Lines of Action (SLoAs)

SloA ref.	Title	From	Ву
ENV03-ASP01	Implement rules and procedures for the application of CCO techniques		
ENV03-ASP02	Train controllers in the application of CCO techniques		
ENV03-ASP03	Monitor and measure the execution of CCO		
ENV03-APO01	Monitor and measure the execution of CCO		
ENV03-USE01	Include CCO techniques in the aircrew training manual wherever possible		
D 1.11 (0) (1) (1)			

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:	CCOs contribute to reducing airlines operating costs including a reduction in fuel consumption by the flying of optimised profiles (no vertical containment required). If the CCO is flown as part of a PBN procedure, the predictability of the vertical profile will be enhanced for ATC. CCOs 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 17kg per flight for those flying CCO over those flying non-CCO. In addition, studies have indicated that due to lower drag and thrust facilitated by CCO, over certain portions of the arrival profile, noise may be reduced. Studies are currently ongoing to gauge such noise reductions.				
Security:	urity: -				
	Detailed SLoA Descriptions				
	Implement rules and procedures for the application of CCO	From:	By:		
ENV03-ASP01	techniques	-	-		
Action by:	ANS Providers				

ENV	03
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Continuous Climb Operations (CCO)

Description & purpose:	Coordinate activities and implement rules and ATC procedures for the application of CCO 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 factical and operational situational awareness support to allow aircrew to apply CCO.					
Supporting motorial(a):	ICAO Dec 0003 Continuous Climb Operations (CCO) Manuel Editio	n 1 / 11/2012	·•			
Supporting material(S).	ICAO - Doc 9993 - Continuous Climb Operations (CCO) Manual - Edition 1 / 11/2013					
	CURPCIONTROL EUROCONTROL CRO/CCO Curporting Material		. <u>par</u>			
	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: <u>http://www.icao.int/publications/Pages/catalogue.aspx</u>					
	EUROCONTROL - European CCO/CDO Action Plan					
	Url : <u>https://www.eurocontrol.int/publication/european-continuous-climb-</u>	and-descent-operations-	action-plan			
	ICAO - Doc 9613 - Performance-based Navigation (PBN) Manual - Editi	on 4 / 03/2013				
	Url : <u>https://store.icao.int/en/performance-based-navigation-pbn-manual</u>	<u>-doc-9613</u>				
	ICAO - Doc 4444 - Air Traffic Management - Edition 16 / 11/2016					
	Url : <u>https://store.icao.int/</u>					
	EUROCONTROL - CCO / CDO Performance dashboard					
	Url : https://www.eurocontrol.int/dashboard/continuous-climb-and-desce dashboard	nt-operations-performan	ce-monitoring-			
ATM Master Plan	[PRO-ENV-15]-ATC Procedures and LoA with adjacent ATS units to ens	sure that airspace is des	igned to permit the			
relationship:	aircraft continuous climb in order to avoid the unnecessary noise and excessive fuel emissions from non-optimal					
Finalisation criteria:	 CCO procedures have been published in the local/State AIP. CCOs are made available to airspace users, whenever practicable. 					
	Turin controllars in the condication of CCO techniques	From:	By:			
ENV03-ASP02	Train controllers in the application of CCO techniques	-	-			
Action by:	ANS Providers					
Description & purpose:	Train controllers in the application of CCO 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 9993 - Continuous Climb Operations (CCO) Manual - Edition 1 / 11/2013					
	Url : https://cfapp.icao.int/tools/ATMiKIT/story content/external files/10260008117raft en CCO.pdf					
	EUROCONTROL - IANS-ENV-INTRO - Introduction to Environment -e-learning training course 12/2012					
	Url : https://trainingzone.eurocontrol.int/					
	FUROCONTROL - FUROCONTROL CDO/CCO Supporting Material					
	Url: https://www.eurocontrol.int/concent/continuous-climb-and-descent-operations					
	FUROCONTROL - CDO refresher course for ATCs					
	Litt : https://trainingzone.eurocontrol.int/ilp/pages/coursedescription.isf?courseld=8117320&catalog/d=232380					
	FLIROCONTROL - CCO / CDO Performance desbloard					
	Lirl : https://www.eurocontrol.int/dashboard/continuous-climb-and-desce	nt-operations-performan	ce-monitoring-			
	dashboard	ni-operations-periornan	ce-monitoring-			
Finalisation criteria:	1 - Approach controllers have been suitably trained in the application of	CCO techniques				
		From:	Bv:			
ENV03-ASP03	Monitor and measure the execution of CCO	-	-			
Action by:	ANS Providers					
Description & purpose:	In cooperation with airports, monitor and measure CCO execution, wher	e possible based upon a	a harmonised			
	methodology and metrics. The methodology should be used also to identify the cause of any restrictions to CCO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed to facilitate CCOs, in order to enhance vertical flight efficiency. Provide any feedback to airports, aircraft operators and the NM on the level of CCO execution together with any other tende above and by the CCO proference mentions.					
	Note :At the time of publication of this document, the methodology relea	sed in 2016 by the CCO	CDO TF1 is currently			
L	being reviewed by the CCO/CDO TF2.					

Continuous Climb Operations (CCO)

Supporting material(s):	EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material						
	Url : https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations						
	EUROCONTROL - European CCO/CDO Action Plan						
	Url : https://www.eurocontrol.int/publication/european-continuous-climb-	and-descent-operations-	-action-plan				
	EUROCONTROL - CCO, CDO harmonised definitions, metrics and para	ameters					
	Url : <u>https://youtu.be/PdeNroWY8Y0</u>						
	EUROCONTROL - CDO refresher course for ATCs						
	Url: https://trainingzone.eurocontrol.int/ilp/pages/coursedescription.jsf?c	courseld=8117329&cata	logId=232380				
	EUROCONTROL - CCO / CDO Performance dashboard						
	Url: https://www.eurocontrol.int/dashboard/continuous-climb-and-desce	nt-operations-performan	<u>ce-monitoring-</u>				
Finalisation criteria:	1 - In cooperation with the airport operator, the monitoring and measure	ment of CCO execution	is performed and				
i mansation ontena.	available.						
	2 - Arrangements are in place to provide feedback of CCO performance	to the airport operator, t	the NM and the local				
	community where practicable	From	Dur				
ENV03-APO01	Monitor and measure the execution of CCO	-					
Action by:	Airport Operators						
Description & purpose:	In cooperation with the ANSP, monitor and measure CCO execution, whether the ANSP is a second s	ere possible based upo	n a harmonised				
	methodology.	ctions to CCO (such as i	nefficient LoAs				
	(reflecting older more inefficient aircraft types and their corresponding ve	ertical profiles)). Route c	hanges should then be				
	proposed, by the ANSP, to facilitate CCOs, in order to enhance vertical	flight efficiency.					
	Provide any feedback to the ANSP, aircraft operators and the NM on the level of CCO execution together with any other trends observed by the CCO performance menitoring						
	Note : At the time of publication of this document, the methodology released in 2016 by the CCO/CDO TE1 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 - European CCO/CDO Action Plan						
	Url : https://www.eurocontrol.int/publication/european-continuous-climb-and-descent-operations-action-plan						
	EUROCONTROL - CCO, CDO harmonised definitions, metrics and parameters						
	Url : https://youtu.be/PdeNroWY8Y0						
	EUROCONTROL - CDO refresher course for ATCs						
	Url: <u>https://trainingzone.eurocontrol.int/ilp/pages/coursedescription.jsf?courseld=8117329&catalogId=232380</u>						
	EUROCONTROL - CCO / CDO Performance dashboard						
	Url : https://www.eurocontrol.int/dashboard/continuous-climb-and-descent-operations-performance-monitoring- dashboard						
Finalisation criteria:	1 - In cooperation with the ANSP, the monitoring and measurement of C	CO execution is perform	ned and available.				
	2 - Arrangements are in place to provide feedback of CCO performance to the ANSP, the NM and the local community						
	where practicable	1					
ENV03-USE01	Include CCO techniques in the aircrew training manual wherever	From:	By:				
211100 00201	possible	-	-				
Action by:	Airspace Users						
Description & purpose:	Provide suitable training, ensure awareness of and encourage application	on of CCO techniques.					
Supporting material(s):	ICAO - Doc 9993 - Continuous Climb Operations (CCO) Manual - Editio	n 1 / 11/2013					
	Url : https://cfapp.icao.int/tools/ATMiKIT/story_content/external_files/10260008117raft_en_CCO.pdf						
	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						
	EUROCONTROL - European CCO/CDO Action Plan						
	Url : https://www.eurocontrol.int/publication/european-continuous-climb-	and-descent-operations-	action-plan				
	EUROCONTROL - CCO, CDO harmonised definitions, metrics and para	ameters					
	Url : <u>https://youtu.be/PdeNroWY8Y0</u>						
	EUROCONTROL - CDO refresher course for ATCs						
	Url: https://trainingzone.eurocontrol.int/ilp/pages/coursedescription.jsf?courseId=8117329&catalogId=232380						
	EUROCONTROL - CCO / CDO Performance dashboard						
	Url : https://www.eurocontrol.int/dashboard/continuous-climb-and-desce	nt-operations-performan	ce-monitoring-				
	dasnboard						

ENV03	Continuous Climb Operations (CCO)

Finalisation criteria: 1 - CCO techniques have been integrated in the aircrew training manual.