



# ENV03 — Continuous Climb Operations (CCO)

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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:

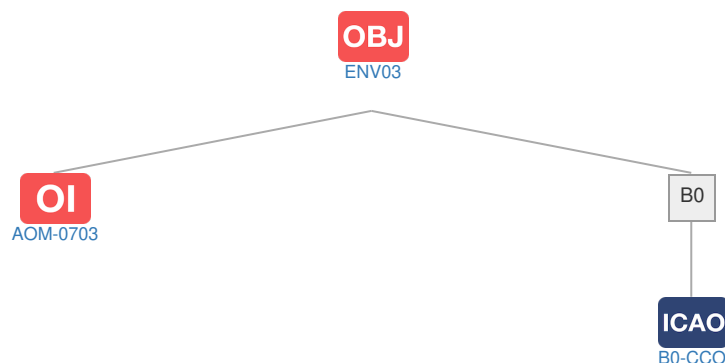
- (1) Since the publication of ICAO Doc 9993, the term Continuous Climb Operation (CCO) has generally replaced the term CCD (Continuous Climb Departure).
- (2) In principle, it is not required to implement CCO on a 24/7 basis, but it should be facilitated to the extent possible, according to local conditions.
- (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.

|                     |   |
|---------------------|---|
| <b>Edition</b>      | 2022  |
| <b>Stakeholders</b> | Air Navigation Service Provider / Airport Operator / Airspace Users |
| <b>Type</b>         | SESAR   |
| <b>Scope</b>        | Local/Airport   |
| <b>Status</b>       | Active  |

## Context

### Related Elements



## Applicability Area(s) and Timescales

**Applicability Area:** (Aerodromes 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 |

## Links to ATM Master Plan Level 2

### Operational Improvment Steps

| Code                     | Title                                      | IOC | FOC | Related Elements  |
|--------------------------|--|-----|-----|---|
| <a href="#">AOM-0703</a> | <a href="#">Continuous Climb Departure</a> | -   | -   |     |



### Links to SESAR Solutions

| Code            | Title | Program | Related Elements |
|-----------------|-------|---------|------------------|
| No record found |       |         |                  |

### Links to PCP ATM Sub-Functionalities

| Code            | Title | Related Elements |
|-----------------|-------|------------------|
| No record found |       |                  |

### ICAO Block Modules

| Designator | Title   | Related Elements  |
|------------|---|---|
| B0         |   |   |
| B0-CCO     | Improved Flexibility and Efficiency in Departure Profiles |   |

## References

### Applicable legislation

- 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.

### Applicable ICAO Annexes and other references

None

### Deployment Programme 2022

-

### Operating Environments


Airport

Terminal Airspace

## Expected Performance Benefits

|                               |  |
|-------------------------------|--|
| <b>Safety</b>                 | -  |
| <b>Capacity</b>               | -  |
| <b>Operational efficiency</b> | 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.<br>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. |
| <b>Cost efficiency</b>        | -  |
| <b>Environment</b>            | 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.  |
| <b>Security</b>               | -  |

## Stakeholder Lines of Action

| Code  | Title   | From | By | Related Enablers  |
|-------|---|------|----|---|
| ASP01 | Implement rules and procedures for the application of CCO techniques    |      |    |  |
| ASP02 | Train controllers in the application of CCO techniques                  |      |    |   |
| ASP03 | Monitor and measure the execution of CCO                                |      |    |   |
| APO01 | Monitor and measure the execution of CCO                                |      |    |   |
| USE01 | Include CCO techniques in the aircrew training manual wherever possible |      |    |   |

## Supporting Material

| Title  | Related SLOs                      |
|--|-----------------------------------|
| EUROCONTROL - CCO / CDO Performance dashboard<br><a href="https://www.eurocontrol.int/dashboard/continuous-climb-and-descent-operations-performance-monitoring-dashboard">https://www.eurocontrol.int/dashboard/continuous-climb-and-descent-operations-performance-monitoring-dashboard</a> | APO01, ASP01, ASP02, ASP03, USE01 |
| EUROCONTROL - CCO, CDO harmonised definitions, metrics and parameters<br><a href="https://youtu.be/PdeNroWY8Y0">https://youtu.be/PdeNroWY8Y0</a>   | APO01, ASP03, USE01               |
| EUROCONTROL - CDO refresher course for ATCs<br><a href="https://trainingzone.eurocontrol.int/ilp/pages/coursedescription.jsf?courseId=8117329&amp;catalogId=232380">https://trainingzone.eurocontrol.int/ilp/pages/coursedescription.jsf?courseId=8117329&amp;catalogId=232380</a>           | APO01, ASP02, ASP03, USE01        |
| EUROCONTROL - EUROCONTROL CDO/CCO Supporting Material<br><a href="https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations">https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations</a>   | APO01, ASP01, ASP02, ASP03, USE01 |
| EUROCONTROL - European CCO/CDO Action Plan<br><a href="https://www.eurocontrol.int/publication/european-continuous-climb-and-descent-operations-action-plan">https://www.eurocontrol.int/publication/european-continuous-climb-and-descent-operations-action-plan</a>                        | APO01, ASP01, ASP03, USE01        |
| EUROCONTROL - IANS-ENV-INTRO - Introduction to Environment -e-learning training course 12/2012<br><a href="https://trainingzone.eurocontrol.int/">https://trainingzone.eurocontrol.int/</a>  | ASP02, USE01                      |
| ICAO - Doc 4444 - Air Traffic Management - Edition 16 / 11/2016<br><a href="https://store.icao.int/">https://store.icao.int/</a>   | ASP01                             |
| ICAO - Doc 9426 - Air Traffic Services Planning Manual - Edition 1 / 12/1992<br><a href="http://www.icao.int/publications/Pages/catalogue.aspx">http://www.icao.int/publications/Pages/catalogue.aspx</a>  | ASP01                             |
| ICAO - Doc 9613 - Performance-based Navigation (PBN) Manual - Edition 4 / 03/2013<br><a href="https://store.icao.int/en/performance-based-navigation-pbn-manual-doc-9613">https://store.icao.int/en/performance-based-navigation-pbn-manual-doc-9613</a>                                     | ASP01                             |
| ICAO - Doc 9993 - Continuous Climb Operations (CCO) Manual - Edition 1 / 11/2013<br><a href="https://cfapp.icao.int/tools/ATMiKIT/story_content/external_files/10260008117raft_en_CCO.pdf">https://cfapp.icao.int/tools/ATMiKIT/story_content/external_files/10260008117raft_en_CCO.pdf</a>  | ASP01, ASP02, USE01               |

## Consultation & Approval

|  |                               |
|--|-------------------------------|
| <b>Working Arrangement in charge</b>                   | Airport Operations Team (AOT) |
| <b>Outline description approved in</b>                 | -                             |
| <b>Latest objective review at expert level</b>         | 05/2018                       |
| <b>Commitment Decision Body</b>                        | Provisional Council (PC)      |
| <b>Objective approved/endorsed in</b>                  | 09/2017                       |
| <b>Latest change to objective approved/endorsed in</b> | -                             |