ICAO MID

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

CCO-CDO Workshop

ICAO MID Workshop on the Continuous Climb Operations (CCO) / Continuous Descent Operations (CDO) Implementation

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CDO/CCO
Publications and charting

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Outline

- Publication
- Charting
- Phraseology

Need for Publication

ICAO recommends that :

→ that the specific information relating to the CDO be published through established channels to ensure that all stakeholders are aware. The provision of distance-to-go information will provide assistance to the pilot in planning the trajectory to achieve CDO (Doc 9931, Part A. Chapter 2, 2.2.6)

→ specific information relating to the CCO be published through established channels to ensure stakeholder awareness. (Doc 9993 Part A. Chapter 2, 2.1.5)

However, NO guidance

AIP Publication- Regional Approach

- An analysis undertaken revealed that current MID States AIPs does not contain details on CCO/CDO availability at airports.

- MIDANPIRG DECISION 19/11 : ESTABLISHMENT OF 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;

  - present their outcome during the AIM SG/8 and PBN SG/7 meeting before endorsement by MIDANPIRG/20.

AIP Publication- Regional Approach

- In line with a proposal from the European CCO / CDO Task Force
- CCO/CDO AD HOC WORKING GROUP is working on a same recommendations for harmonized AIP material on CCO / CDO.
- Harmonized AIP location structure and content.
  - ENR1.5 for high level content
  - AD2.21 / 2.22 for Airport specific content
- The content consists of a set of text proposals that should be adapted to local environment.
- This proposal will be reviewed by AIM and PBN SGs and endorsed by MIDANPIRG.

Recommended AIP structure and content : ENR 1.5

- In accordance with appropriate ATC clearances, CDO can start from the TOD when an ACFT is cleared to a waypoint or via a combination of waypoints for direct routing/shortcut andthe horizontal trajectory is defined up to and including the FAP. Thus, the exact distance to RWY is known and the descent profile can be readily calculated by the appropriate onboard system (FMS) prior to start of the CDO.
- CDO is available on a published procedure basis / by being tactically applied / both.

Recommended AIP structure and content : ENR1.5

- In every airport, where operationally feasible, RNAV STARs will be published in order to facilitate CDO procedures. Where the publishing of CDO procedures is not available, CDO will be provided on a tactical basis wherever possible.
- Therefore, all aircraft are expected to fly a CDO profile to the extent possible. Compliance with CDO procedures is recommended provided they are compatible with ATC instructions and weather conditions are favorable.
- For more detailed information for each airport, see section 2.21 in the AD section of each aerodrome.

AIP structure and content : AD 2.21 / 2.22

Availability of published STAR procedures :

- When the traffic situation permits and subject to ATC instructions, inbound aircraft are expected to fly a CDO profile during the hours of operation of each CDO arrival procedure to maintain as high an altitude as practical and adopt a low power, low drag, continuous descent approach profile.
- Outside of the published hours of operation and if the traffic situation allows, crews can ask specifically to perform CDO profiles and to maintain the speed as appropriate to facilitate the CDOs. This authorization will be given whenever possible outside of those hours.

  RWY XX and RWY YY RNAV for noise abatement reasons, continuous descent approach (CDA), for jet aircraft will be used between 2130-0530 (2030-0430).

  Or

  During night hours (from xxxx to xxxx), arrivals procedures in continuous descent (CDA)shall be authorised for noise abatement reasons.

AIP structure and content : AD 2.21 / 2.22

CDO conditions:

- CDO STARs are authorized only when the following conditions are respected (examples of restrictions that could be used, No adverse weather conditions exist that may affect CDO, No system degradations exist that may affect GNSS, DME/DME, or ILS operation, .etc).

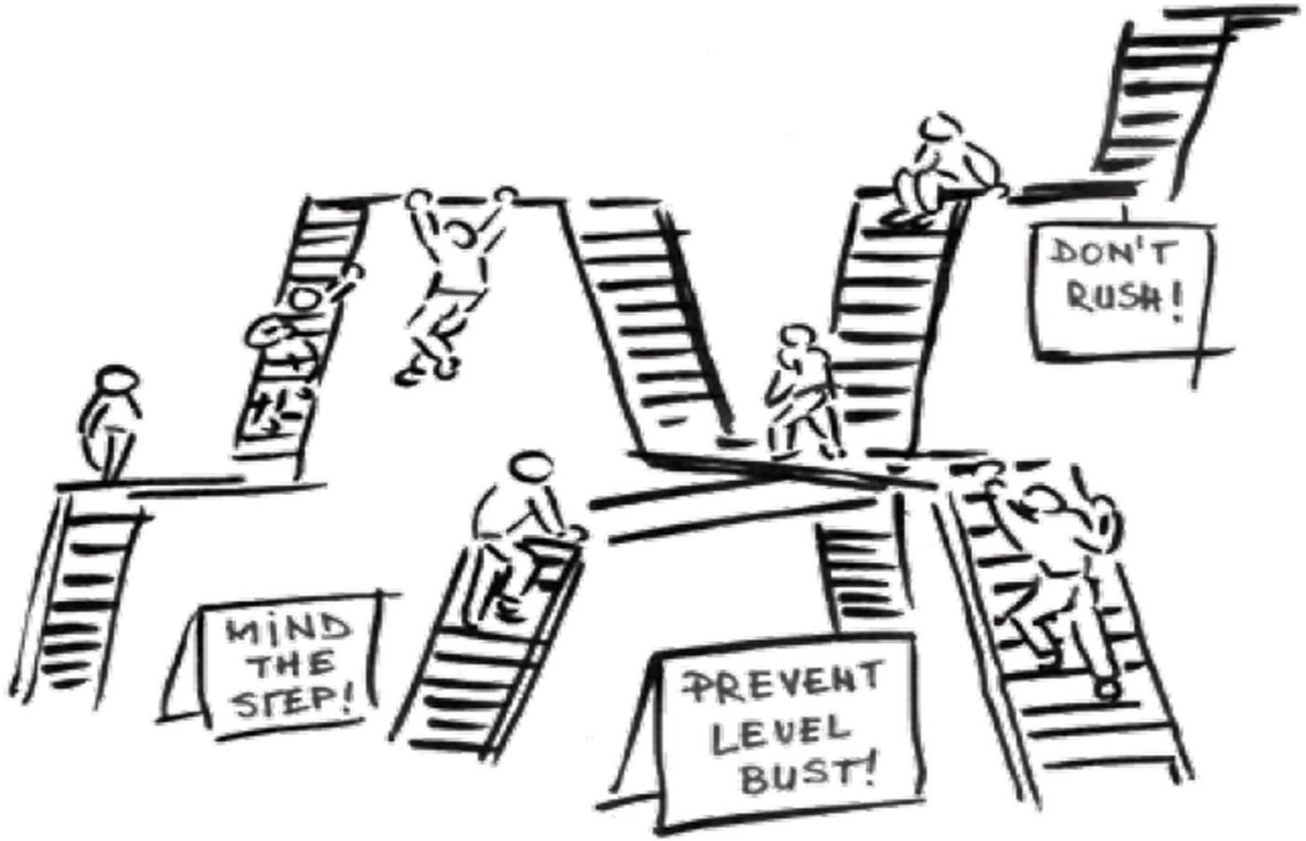
Radar vectoring

- As a portion of the procedure consists of vectoring, the specific distance to RWY threshold is not known to a Pilot prior to start of the CDO. In such cases, ATC will authorize the descent in compliance with the applicable radar vectoring minima. ATC will, as soon as practicable after first call, and as far as practicable prior to expected top of descent, provide the Pilot with an estimate of the flight track-miles to the RWY threshold (touchdown) as 'distance to go' (DTG) information, with regular range updates, if necessary. The Pilot will use this information to determine the optimum descent rate to achieve a CDO.

Tactical CDO

- Upon Pilot request and at ATC discretion, tactical CDO will be provided and facilitated by the use of appropriate phraseology and the provision of DTG upon first contact. DTG will be provided, wherever possible prior to the start of descent and should be requested from ATC if not provided upon first contact.

Level windows set in the vertical profile for SID and STAR



Charted Altitude/Flight Level Restriction

Definition	Representation Altitude	Representation Flight Level
Altitude/Flight level "Window"	17000 10000	FL 220 FL100
"At or above" altitude/flight level	5000	FL70
"At or below" altitude/flight level	5000	FL200
"At" altitude/flight level	3000	FL140
"Recommended" altitude/flight level	4000	FL90
"Expected" altitude/flight level	Expect 6000	Expect FL80

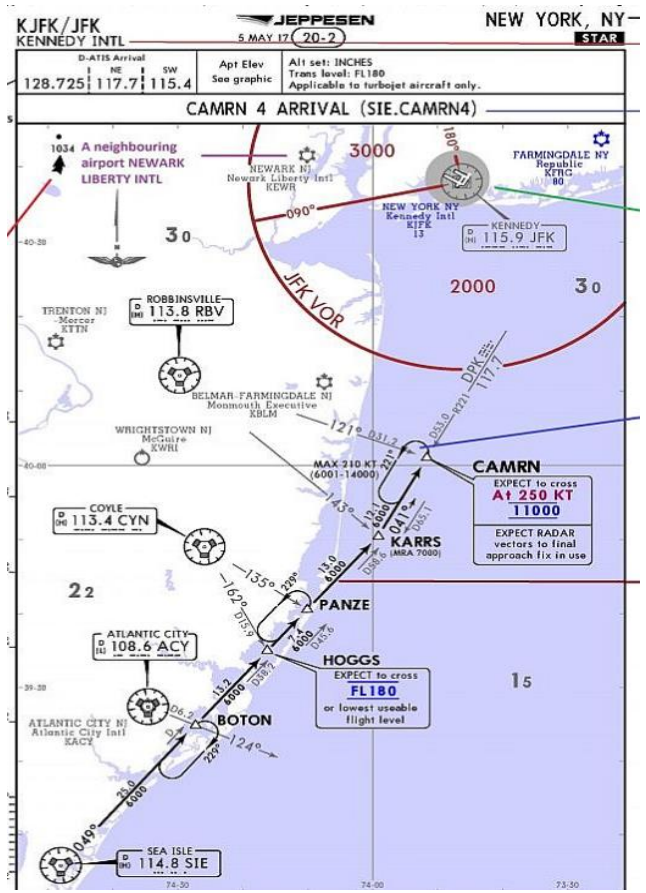
Charting of CCO

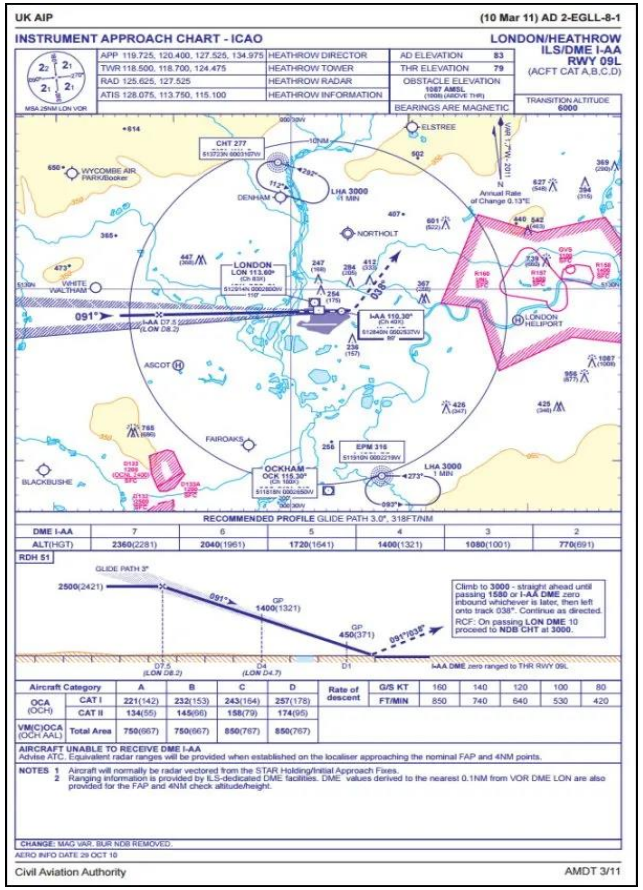
- 2.1.5.2 Unless specifically required as a part of the instrument procedure design, there is no need to provide specific level windows or speed restrictions for CCO on charts.
- 2.1.5.3 Any speed and level restrictions should be clearly depicted on the chart.
- 2.1.5.4 Level restrictions should be expressed using level windows (with minimum and maximum levels), or by “at or above” or “at or below” constraints.

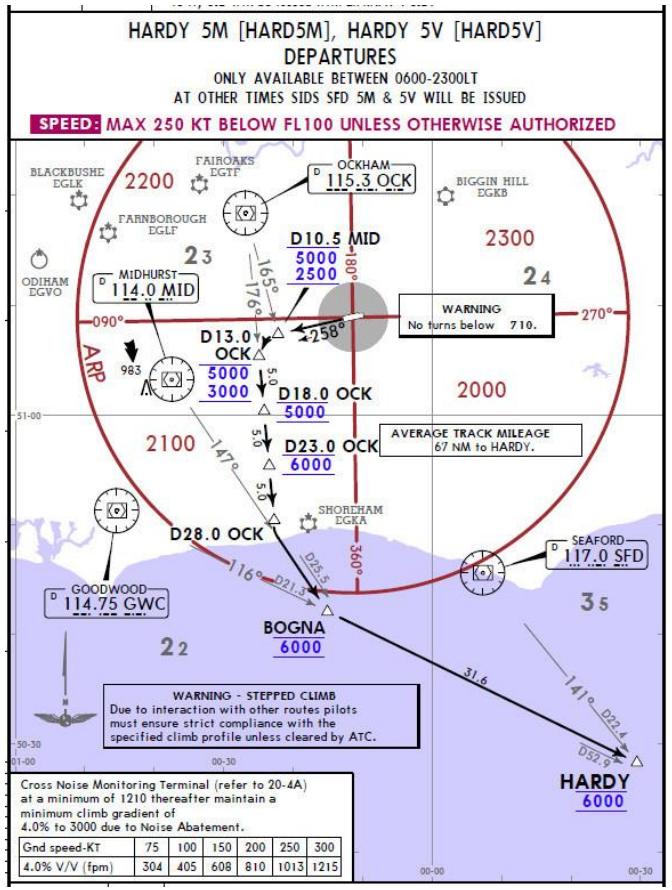
Charting of CDO

- 2.2.6.1……. The provision of distance-to-go information will provide assistance to the pilot in planning the trajectory to achieve CDO.
- 2.2.6.3 Unless specifically required as a part of the procedure design, there is no need to provide specific level windows or speed restrictions for CDO on STAR charts.
- 2.2.6.4 Any speed and altitude restrictions applicable at or beyond the IAF should be clearly depicted on the chart.
- 2.2.6.5 Level restrictions should be expressed using level windows (with minimum and maximum levels), or by “at or above” or “at or below” constraints.
- 2.2.6.6 If CDO is only applicable to a part of a procedure, this should be depicted in an obvious and unambiguous manner, indicating on the chart the beginning and the end of a path where a continuous descent technique may be applied.
- 2.2.6.7 The CDO may be indicated with appropriate text on the chart or by the procedure designation, e.g. KARLAP (CDO).

Types of charts

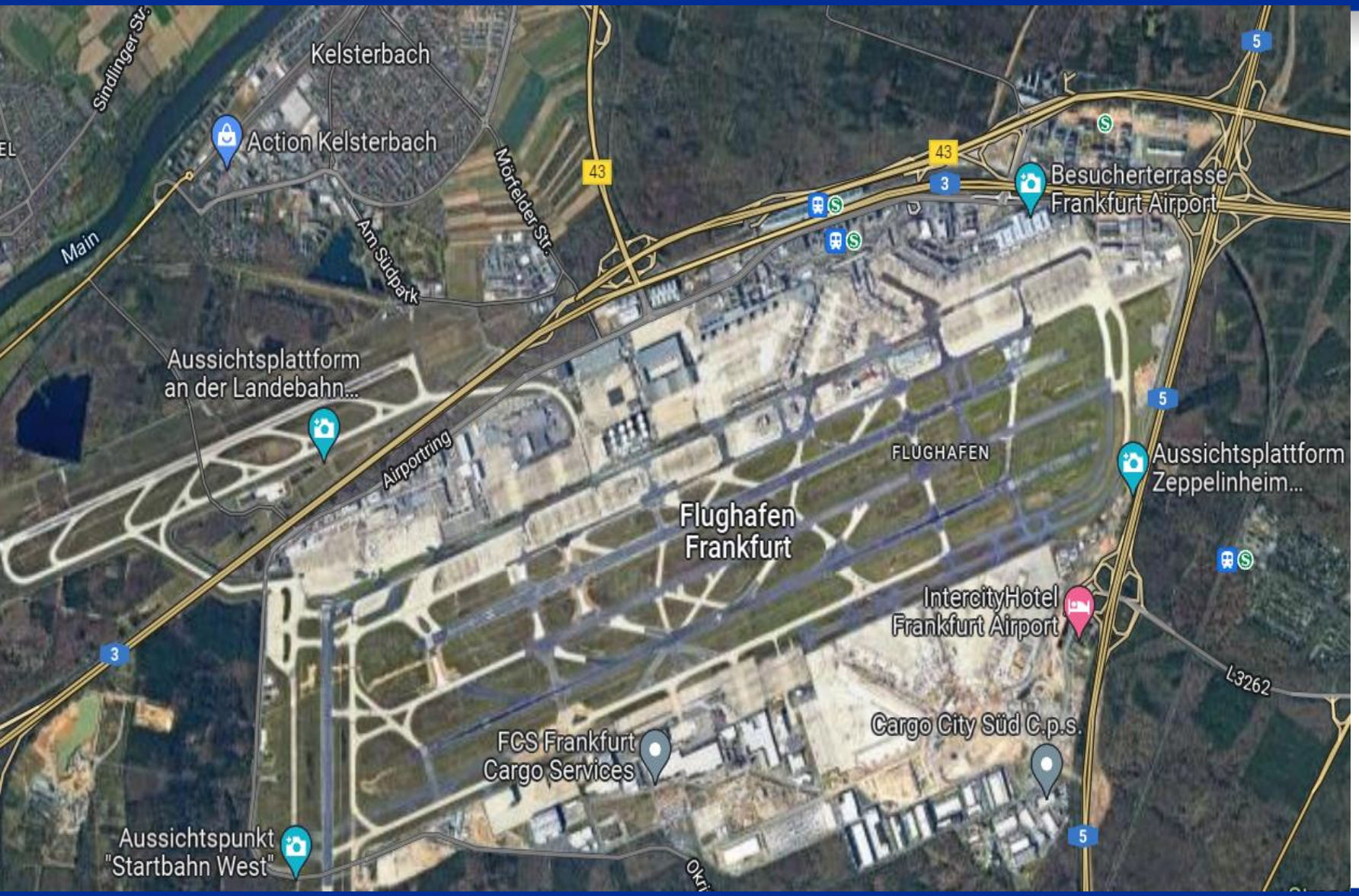






Example

Stockholm Arlanda airport



Example

[Frankfurt Airport]

CDO/CCO

Clearances & phraseology

Clearances & phraseology

- ICAO Amendment 7A phraseology on SID / STAR contains information, which may be safety relevant and needs to be known by ATC/aircrews.
- ICAO does not plan to further review this phraseology.
- ATC training on the SID / STAR phraseology as defined in Amendment 7A to PANS-ATM.
- Such material may be found on the ICAO public website at :

https://www.icao.int/airnavigation/sidstar/Pages/Training-and-Education.aspx.

Phraseology - Basic rules

- A clearance for a STAR with level and / or speed constraints consists of a lateral and a vertical part.
- Adherence to waypoint constraints is mandatory after a “descend / climb via STAR /SID FL (figures) clearance.
- Do not descend below the flight level cleared by ATC
- The term “via” shall not be used for lateral clearances

CORE Phraseology for removal of level and/or speed restrictions:

"Callsign….descend unrestricted FLxxx" e.g. ETD123 descend unrestricted FL100 (ALL restrictions / constraints are cancelled)

- "Callsign….descend via STAR FLxxx, cancel level (or speed) restriction"
- e.g. ETD123 descend via STAR, cancel level restrictions
- e.g. ETD456 descend via STAR, cancel speed restrictions

Special Situations – Part 1: Proceed DCT to point on a STAR/SID with remaining constraints:

"Callsign….proceed DCT XXX….descend via STAR FLXXX" e.g. ETD123 proceed DCT KOVAN descend via STAR FL100

- The speed and level restrictions associated with the bypassed waypoints are cancelled. All remaining published
- speed and level restriction shall remain applicable.

Special Situations – Part 2: Vector an aircraft off the STAR and then back to a point of the STAR with remaining constraints:

"Callsign…proceed DCT….rejoin STAR (designator)…descend via STAR FLXXX"

e.g. ETD123 proceed direct FRANC, rejoin DELTA1B Arrival route, descend via STAR A3000ft.

THANK YOU