Continuous Descent Operations

Implementation in Europe

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Description and Concept of CDO

Why CDO – the benefits

European Implementation – the drivers

The current situation and the issues

Questions
CONTINUOUS DESCENT OPERATION (CDO) ....

.... is an operation, enabled by airspace design, procedure design and ATC facilitation, in which an arriving aircraft descends continuously, to the greatest extent possible, by employing minimum engine thrust, ideally in a low drag configuration, prior to the final approach fix.
**CDO Concept**

Top of Descent or Intermediary Level

THRUST

IDLE THRUST

THRUST

CDO eliminates the extended low level segments

- Continuous Descent Operations
- Conventional Approach
“Ideally, to maximize the benefit of a CDO it should start at the top of descent and continue through to the final approach fix (FAF)/final approach point (FAP) or establishment on the landing guidance system.....”

“However, CDO carried out with appropriate ATC clearances and within the constraints of existing STAR or approach procedure designs, and over shorter sections of the descent, can provide significant benefits”.

“CDO facilitation methods should be selected and designed with the goal of allowing the highest percentage of use during the broadest periods of air traffic operations”.

ICAO DOC 9931- DESCRIPTION OF CONTINUOUS DESCENT OPERATIONS
REALITY - CURRENT CDO PROFILES

Hold/fix, airspace boundary, level restriction, etc...

CDO

Limitations

CDO

FAF

Airfield
Why CDO?

- Urgent action is required to **reduce fuel burn** and make emissions savings
  - financial – to reduce operating costs to airlines
  - environmental - to reduce the release of greenhouse gas emissions

- Imperative to reduce aviation noise impact of our industry on the public in general

- CDO implementation is vital to enable activities necessary to implement the European ATM Master Plan
CDO Benefits - General

The nature and extent of the benefit will vary (local situation):

- **significant** noise, fuel and emissions reduction in the areas *prior* to the point at which the ILS is acquired
Benefits – Noise Reduction

- The main noise benefit
  - experienced between 25 and 8 NM from touchdown (depending on local circumstance)
  - up to 5dBA SEL noise reduction over conventional approaches.
- A significant reduction in the noise contour area can be expected
- Noise - re-surfaced as a major issue
CDO and the ENVIRONMENT

- Environmental Issues HAVE to be addressed:
  - CO$_2$ can be reduced by over 300 kg per flight
  - NOx reduction
  - Emissions Trading
Benefits – Fuel Reduction

- CDO can reduce fuel costs for airlines
  - Trials – Significant fuel savings have been demonstrated
  - Actual savings depend on a number of factors:
    - eg aircraft type and the level at which the CDO is commenced.
Published CDO Trials

- Schiphol Airport: AIRE-II Final Result Report: Trajectory Based Night Time CDO’s (March 2012) - CDO plus Planned Time of arrival from TOD
  - Approximately 74kg per flight (A330 – B747 and B777)
- Groningen Airport Eelde: NLR fuel consumption is about 25-40% lower during the last 45 km of the flight.
  - About 55kg for a Boeing B737-300/400
- Madrid: RETA-CDO - Reduction of Emissions in TMA using CDO (September 2009 at night) – FROM FL210
  - Average fuel burn savings per flight: A320: 85kg
  - Average fuel burn savings per flight: A340: 258kg
- AIRBUS (FAST47): Minimum CO2 in Terminal Area (MINT) project - Curved noise abatement approach (RNP AR 0.3) CDO from cruise level (with NOVAIR – A321)
  - 145kg per arrival
EUROPEAN CDO Implementation
Brief History

- CDO (CDA) Techniques had been around for a long time but ...
  - Few airports in Europe offering CDO and
  - Not harmonised throughout Europe

- 2007 - Stakeholders, particularly airline associations, calling for widespread implementation of harmonised, capacity friendly CDO techniques throughout Europe
  - European Implementation Guidance document published

- EUROCONTROL tasked to support implementation programme
  - Dedicated CDO implementation team established
‘Flight Efficiency Plan’, jointly signed by EUROCONTROL, IATA and CANSO in Aug 2008

- Officially launched in Spring 2009.
- Seeks rapid deployment of CDA.
- Remains valid – update planned early 2013
CDO in The European ATM Masterplan

The European ATM Master plan states:

“Amongst the Deployment Baseline changes, Continuous Descent Operations (CDO) must be implemented if the Essentials of Step 1 SESAR are to be realised”.

- Any delay or inactivity in CDO implementation will have a major adverse affect on the ability to implement the Master Plan.

- It is vital to establish a CDO ‘culture’ throughout Europe in preparation for the establishment of the 4D trajectory that is fundamental to the successful deployment of SESAR.
Environmental restrictions are now in place at most European airports - likely ... restrictions will continue to grow, resulting in a negative impact on the optimum network performance.

One major mitigation measure is the implementation of the CDO technique offers an early opportunity to minimise the environmental impact of aircraft operations.

The rapid deployment of CDO throughout Europe, even on a limited basis (limited by hours of operation and commencement height), will empower the network to respond to the environmental challenges.

Response will be enhanced by evolving CDO to be enabled with more frequency and from higher levels (the ultimate aim being from Top of Descent).

This will be achieved by changes to the airspace architecture ...

and the widespread availability of harmonised support tools for controllers, which will ensure lateral and/or vertical segregation without impeding the optimum profile.
Environmental restrictions are now in place at most European airports - likely restrictions will continue to grow, resulting in a negative impact on the optimum network performance.

“Therefore, the EUROCONTROL CDO implementation team is working with stakeholders to maximise the CDO benefits achievable in the current ATM framework, whilst also supporting the facilitation of more advanced CDO throughout the network that will result from the deployment of future ATM tools and procedures”.

NOP Target: Implementation of CDO by the end of 2014 at 200 airports.

This will be achieved by changes to the airspace architecture ... and the widespread availability of harmonised support tools for controllers, which will ensure lateral and/or vertical segregation without impeding the optimum profile.
European CDO implementation programme

- The European CDO implementation programme is an industry-wide collaborative effort
  - EUROCONTROL supporting with dedicated CDO implementation team – initial target is the establishment of CDO at 100+ airports by end 2013 (NOP +200 by end 2014).
  - To date over 115 airports have declared that they offer CDO.
  - Get CDO established from whatever flight level is possible at some point during daily operations – getting the culture established
  - Longer term - to facilitate CDO from higher levels (Top of Descent being the ultimate aim)
  - ... and for more periods of the day: constant operation being the target
- Vital to establish a CDO ‘culture’ throughout Europe in preparation for the establishment of the 4D trajectory that is fundamental to the successful deployment of SESAR.
Issues

- CDO facilitated but not flown
- No harmonised or specified publication requirements/guidelines (needed to ensure predictability)
- No specific or harmonised phraseology (is it required?)
- Individual airline SOPs/Cost Indexes differ – different approach speeds and profiles
3rd EUROPEAN CDO WORKSHOP

18 - 19 March 2013 at EUROCONTROL HQ Brussels

Aim is to achieve consensus on best practices to drive CDO implementation and compliance forward

Harmonisation of facilitation through:

- Publication
- Phraseology
- ATC/Pilot interaction and collaboration
CDA Interactive Map Facility
You are logged as bday

Welcome Statistics News FAQ About

- Established (117 airports)
- Committed (27 airports)
- Trial (5 airports)
- TBC (21 airports)
- Visited (16 airports)