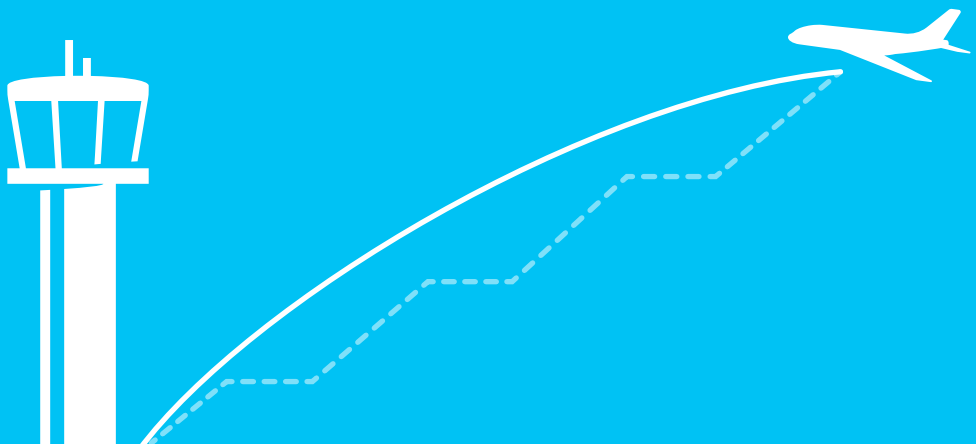
A GUIDE TO CONTINUOUS DESCENT OPERATIONS

For controllers and pilots, by controllers and pilots.

Sustainable Aviation is an alliance of the UK's airlines, airports, aerospace manufacturers and air navigation service provider, working together to deliver **cleaner, quieter, smarter aviation.**



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SUSTAINABLE AVIATION
Cleaner. Quieter. Smarter.

Increasing CDO achievement across the UK by an average of just 5% will deliver over 30,000 quieter arrivals and save over 10,000T CO_2 emissions and £2million in fuel costs.

To help meet our goals of reducing aircraft noise and CO_2 emissions, the UK aviation industry is working together through Sustainable Aviation to deliver a step change in the achievement of continuous descents.

Continuous descents are of course not new; they have been delivered successfully for decades at airports across the UK. But while continuous descent achievement is very good at some airports, there remains significant scope to improve performance further, both for low level CDAs as well as CDOs from higher altitudes and ideally from top of descent.

There are many legitimate reasons why CDOs are not always achievable but experience shows that with combined effort across airlines, airports and ATC, significant improvement in operational practice can be achieved. For example, the excellent progress demonstrated by the four major London airports, shown in the table below, was aided by the 2002 publication of the UK Arrivals Code of Practice and subsequent close monitoring and reporting of CDA.

It is this sort of performance improvement that Sustainable Aviation is working, through our current CDO campaign, to replicate nationwide.

In some situations, structural airspace change will be required to achieve maximum performance. This will be delivered in the medium to long term through NATS' airspace change programme. In the short term however, operational improvements delivered jointly by airlines, ATC and airports, can enable more CDO and deliver tangible benefits.

It is important to note that CDOs remain voluntary. While ATC can facilitate CDOs, it is ultimately the responsibility of aircrew to use the information they have to fly CDOs if possible. In all cases safety is paramount and capacity also needs to be maintained.

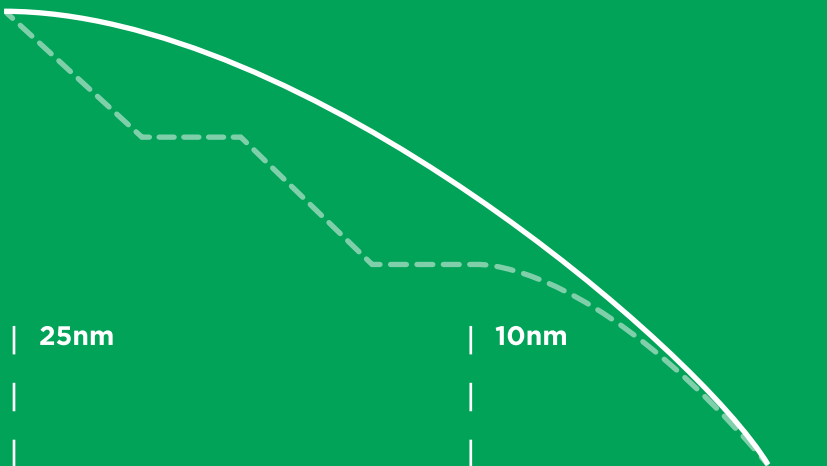
Average CDA of the four London airports versus the average of 15 UK airports

Year	London 4 (Source airport NTK data)	UK 15 Airports (Source NATS FPM data)
2000	66%	N/A
2006	84%	56%
2013	90%	74%

Delivering CDOs requires a little extra thought and input from everyone involved.

Weather, wind, track miles, speed, altitude and air pressure all need to be considered. The following tips, gathered from air traffic controllers and pilots, may help when planning CDOs.

CDOs offer noise benefits right along the approach path from about 25nm to joining the ILS at around 10nm



Tips for CDO Success

FOR CONTROLLERS:

En-route:

» Pass expected top of descent point early to pilots to allow descent planning to facilitate CDO.

» Advise pilots if the descent will deviate significantly from the flight planned or STAR routes to enable pilots to manage the revised descent profiles.

Approach:

» Give accurate track distance-to-touchdown on first descent clearance and any time the distance needs to change, so the crew can manage their profile.

» The earlier the better - big or late track changes are harder for pilots to manage.

» The 10% rule - changing track miles by more than 10% can make CDO harder to manage.

» Give distance to touchdown twice if possible – an update is especially helpful for CDOs from higher levels.

» Use the 3x rule - but be cognisant of wind and aircraft speed and vary the track distance provided as required. Similarly, on a high pressure day aircraft may need a couple of extra miles to lose height and on a low pressure day the opposite would apply.

» Next descent – when appropriate consider using "expect further descent in x miles" to help pilots adjust rate of descent.

» Speed control – when appropriate use minimum clean speed control early e.g. 220kts.

» Speed versus distance - where appropriate use minimum clean speed control early to reduce extended track miles.

ATC Managers:

» Work with the airport operator to ensure the wording in AIP clearly describes local procedures, expectations and definition of CDO.

» Where feasible, consider including CDO procedures in the Standard Arrivals Route (STAR) and ideally linking this procedure to the lower level approach procedure.

» ATC approach units should begin an internal awareness programme, reviewing, and if necessary improving, the procedures in place at the airport, and highlighting the benefits in terms of noise and fuel burn, to its ATCO community. A Sustainable Aviation Continuous Descent briefing pack is available to support this.

» Consider publishing a summary of local procedures and expectations for CDO. Monitor CDO performance by Watch and encourage consistent delivery of accurate distance-to-go information.

FOR PILOTS:

- Plan for a low power, low drag descent from as high as possible to minimise fuel use, emissions and noise.
- Avoid levelling off in anticipation of starting a CDO as this can negate fuel and emissions benefits.
- Consider energy management: speed reduction, wind (head or tail) and height verses track miles, and plan the descent accordingly. If required, ask early for extra track miles, a request too late may be very hard to accommodate.
- Adhere to ATC speed control - when appropriate use either minimum clean or first stage speed control early e.g. 220kts.
- Speed versus distance - where appropriate use either minimum clean or first stage speed control early to reduce extended track miles.
- Intercept localiser and glide path simultaneously.
- Meet the stabilised criteria by 1000' aal.
- Avoid thrust increase until final descent path i.e. when in the landing configuration.

Airline Managers:

- The airline should begin an internal CDO awareness programme, outlining the procedures in place at the airport, and the benefits in terms of noise and fuel burn, to its pilot community.

  A Sustainable Aviation Continuous Descent briefing pack is available to support this.
- Provide regular feedback to pilots on their CDO performance.

CDO from FL200 can save up to

3 TONNES OF CO_2

and one tonne of fuel, worth around £650

CDO from 6000ft can save up to

QUARTER OF A TONNE OF FUEL

for a four-engine heavy aircraft, worth around £170

FOR AIRPORT OPERATORS:

- Work with ATC to ensure the wording in the AIP clearly describes local procedures, expectations and definitions for measuring CDO.
- Where feasible, consider including CDO procedures in the Standard Arrivals Route (STAR) and ideally linking this procedure to the lower level approach procedures.
- Actively engage airlines in reviewing CDO performance.
- Monitor successful and non-successful arrivals and agree a data set and interval for timely transfer to the airline station manager.
- Report performance collectively to airlines - performance tables can help motivate improvement.
- Also provide tailored reports for individual airlines to the airline station manager and pilot representative.
- For pilots, especially long haul, who may not return to the airport for some time, the data should ideally be passed on the next day to ensure the pilot receives his/her data before they depart.

CDOs from 6000ft can

REDUCE NOISE BY 1 TO 5dB PER AIRCRAFT.

Whilst individually these reductions may seem small, collectively they can significantly reduce the noise footprint of an airport

A 1db reduction in average noise can

REDUCE AN AIRPORT NOISE CONTOUR BY 20%

while a 3db reduction can reduce a contour by 50%

Be a smooth operator

Whether you are an air traffic controller, a pilot or work in any other role where you can support CDOs, our request is that you redouble your efforts to achieve the best possible performance.

Continuous Descent Operations (CDO) relate to continuous descent from cruising altitude. In the UK, CDO is more commonly known as Continuous Descent Approach (CDA), which typically starts from an altitude of 6,000 feet (amsl) and is thus a subset of a CDO.

NATS

Produced by NATS on behalf of Sustainable Aviation.