ENGAGING AIRLINES AND AIRPORTS ON CONTINUOUS DESCENT OPERATIONS

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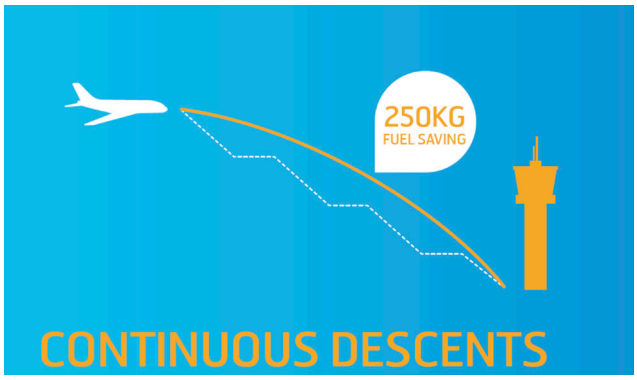
In 2014, the United Kingdom (UK) Sustainable Aviation (SA) coalition launched a campaign to improve continuous descent operations across the UK. The goal was to increase this by 5% and to deliver 30,000 individual quieter flights, as well as save around 10,000 tonnes of CO_2 emissions and achieve fuel savings of GBP2 million, as part of a wider sustainability programme to reduce noise and CO_2 emissions.

Continuous Descent Operations (CDOs) is a descent technique that reduces noise, fuel burn and CO_2 emissions. A number of London airports have traditionally been successful in managing CDOs, supported in 2002 by an Arrivals Code of Practice and subsequent close monitoring and reporting of performance. To date, continuous descent performance has been promoted only at UK airports where a significant noise issue already exists. Building on the success at these airports, the UK aviation industry is seeking to drive further improvements by expanding the number of airports actively managing CDOs and monitoring performance from higher altitude.

In the UK, the increase of CDOs by 5 per cent would save around 10,000 tonnes of CO_2 emissions



Historically in the UK, CDOs have focused on reducing noise when aircraft are descending below 6,000 ft. Continuous descents are achieved when aircraft remain in a smooth continuous descent profile, instead of descending in a series of steps. This means an aircraft is higher for longer above the ground and is quieter. It is also more fuel and environmentally efficient than a stepped descent. Sustainable Aviation is delivering improvements to aircraft descent profiles from cruise to ground.

Planning for the CDO campaign began over a year before launch. Two Sustainable Aviation sub-groups worked closely with NATS to establish initial points of contact in the airlines and airports and gain their formal agreement to participate. The communication materials to support the campaign, including a video, booklets and posters, were then developed over the subsequent months. These targeted air traffic approach controllers, pilots and airport environmental performance managers. The video[1] was watched by thousands of aviation professionals, while 50 pilot crew rooms displayed campaign posters, and 10,000 booklets were distributed to pilots and controllers, in addition to face-to-face briefings with more than 500 NATS controllers and 7,000 pilots. The Continuous Descent Campaign encouraged best practice across 15 Air Traffic Control Units, 23 airports and eight airlines (including airports where NATS does not provide a tower service). The unique aspect of this campaign was the large-scale simultaneous effort across air traffic control units, airlines and airports to jointly deliver a step change in performance.

SA members worked closely to prepare for monitoring CDO performance from the traditional 6,000ft level, as well as from 10,000ft and 20,000ft. The latter will be possible once future planned airspace improvements are deployed. In the meantime, the campaign was focused on realising short-term improvements from wider adoption of best operational practice. Many airports and airlines had only limited experience with CDOs and so NATS worked with them to develop their systems and policies. Being able to measure is of course the first step to improving – and that has been a key outcome of the campaign.

In the UK, Continuous Descent Operations is more commonly known as Continuous Descent Approaches, which typically starts from an altitude of 6,000 feet, whereas CDO applies from the cruise.

CDOs are enabled by airspace and procedure design, as well as tactical air traffic control and pilot procedures in which an arriving aircraft continuously descends from cruise to landing. Achieving a smooth continuous descent requires extra effort from pilots and air traffic controllers as they need to liaise with each other more closely to manage the aircraft's speed, thrust and landing settings against external factors, e.g. wind and air traffic routing requirements.

One example of the collaborative approach in the campaign was when a British Airways pilot reported difficulty achieving

Figure 1. BA flight achieving CDO at Manchester Airport

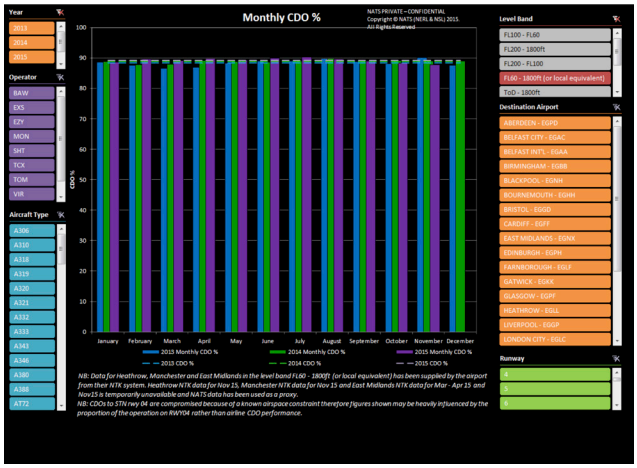


Figure 2. Flight Profile Monitor

continuous descent into Manchester Airport, a NATS controller accompanied the pilot in the cockpit during a subsequent flight and identified an inconsistency in the approach procedure. As a result, BA changed their standard operating procedure and NATS made a procedural change which better enabled CDOs on that route.

A world-first launched in 2005, Sustainable Aviation (SA) is a unique alliance of UK airports, airlines, engine and airframe manufacturers, and air traffic management. SA is a long-term strategy set up to tackle the challenge of ensuring a sustainable future for our industry.

A number of tools and reporting dashboards were created for the benefit of all the SA members working on the CDO campaign. For example NATS developed a new controller tool called FLOSYS (**Figure 1**), which allows controllers to review individual flights and their descent profile. This provides immediate feedback on a controller's interaction with pilots and the resulting flight profile. It is highly engaging for controllers and brings the whole programme to life in a live operational environment.

A "Flight Profile Monitor" reporting tool was developed to support airline CDO operations and help monitor CDO performance at airports. This data is regularly shared with all the participants to identify problems and by working collaboratively, solutions are found and implemented.

The return on the investment for the CDO campaign helps airlines reduce fuel consumption, cut costs and make their businesses more efficient and sustainable. It also helps reduce aircraft noise for communities around airports. This supports both SA's noise and CO_2 roadmaps.

At a national level, CDOs have increased from an average of 56% of arrivals in 2006 to 77% in 2015, which is an exceptional achievement. This has been a long-standing area of focus with SA organisations since the launch of an Arrivals Code of Practice. The campaign outcomes included:

- Being able to measure CDO performance at a national scale is a world first;
- Change in absolute number of CDOs across all airlines at 22 participating airports is 68,321 additional CDOs since 2013;
- These increases are in the context of traffic growth of around 10%;

The campaign will continue to operate and in 2015 was recognised by Business in the Community annual awards, with NATS receiving the "Engaging customers on sustainability" award.

In 2016 the Sustainable Aviation CDO campaign was reaccredited for the "Engaging customers on sustainability" award.

We look forward to building on the outstanding success of the campaign and thanks all those in the Sustainable Aviation coalition who made it possible.

References

1. https://www.youtube.com/watch?v=UX-Vxb_9-bQ
2. https://www.youtube.com/watch?time_continue=9&v=JmCtQxlcH9Y
3.http://www.bitc.org.uk/our-resources/case-studies/nats-continuous-descent-campaign#sthash.qHzS3xfN.dpuf