International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Sixteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/16)
Punta Cana, Dominican Republic, 28 March – 1 April 2011

Agenda Item 3: **Performance framework for Regional Air Navigation Planning and Implementation**

3.1 Global, inter-regional and intra-regional activities concerning air navigation systems in the CAR/SAM Regions

CONTINUOUS DESCENT ARRIVAL (CDA)

(Note presented by IATA)

SUMMARY

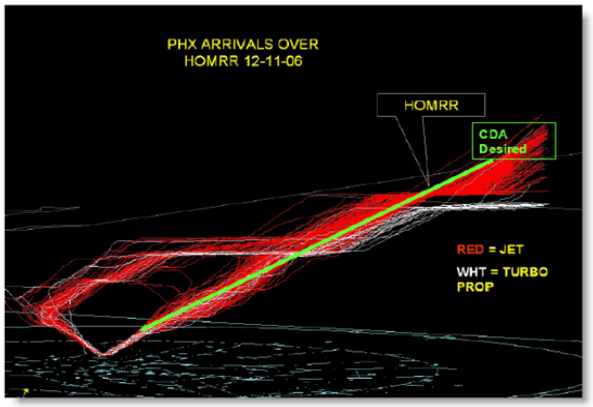
This working paper presents information on the efficiencies of Continuous Decent Arrivals (CDAs) vs. "Dive & Drive

1. Background

1.1 Aircraft should burn the least amount of fuel during the descent phase of flight. This is due to the smooth and unimpeded descent profile that the aircraft is capable of flying with engines running at an idle or near-idle speed. The ideal descent also starts at the highest possible altitude (top-of-descent) where the less dense and colder air helps with fuel efficiency.

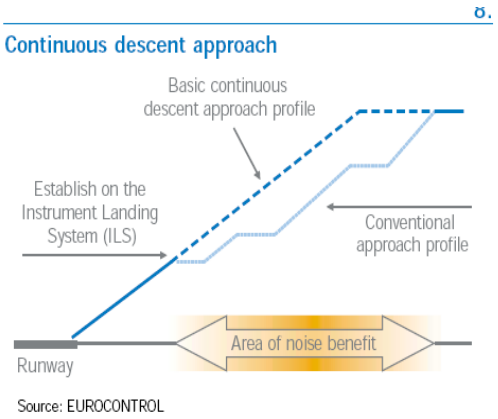
Reduced engine and airframe drag through Continuous Descent Arrival (CDA) also reduces the noise footprint anywhere from 4-6 decibels from a conventional approach. An MIT study found that "a three-decibel difference is appreciably noticeable to the human ear while a 10-decibel reduction equates to 50 percent less noise".

CDA's also reduce nitrogen oxides (NOx) pollutants by 30% at 3000 feet and below. In today's arrival procedures, it is not unusual for a pilot to receive anywhere between 4 - 10 step-down altitude assignments by air traffic control (ATC). In busy airspace, these step-down clearances allow controllers to manually sequence and space flights at relatively low altitudes and slower speeds. Each time the aircraft levels off at its altitude assignment, there is the noisy "spooling up" of engines to maintain level flight – resulting in additional fuel burn.



2 Benefits

2.1 CDA's save 50-200 kg fuel per flight - for a Boeing B767 around 165 kg fuel or 525 kilos CO_2 per arrival. The noise footprint is reduced anywhere by 3 to 6 decibels and the pilot workload decreases significantly. For safety reasons, the NTSB actively recommends that all airlines incorporate a constant-rate-of-descent technique in flying non-precision approaches (NPA's). As an example, a study was done at Chicago's O'Hare International Airport (ORD) using Analysis of FOQA Data from arrival aircraft.



Analysis has shown significant savings by reducing 1 minute of level flight

- ORD arrivals average 9.7 minutes of level flights
- Per one minute reduction / lbs of fuel saved by aircraft type
  - Airbus – 31 lbs (67% of level flights in ORD occur with the Airbus)
  - B747 – 112 lbs
  - B767 – 55 lbs
  - B777 – 82 lbs
- Annualized savings would equate to 53 million lbs of CO2 savings / 17 million lbs of fuel

3 Suggested action

3.1 There is an easy way to implement CDA's today – it's a simple clearance by ATC instructing individual flights to at "pilot's discretion descend and maintain [assigned altitude]" in a way that does not force the aircraft to level off at an interim altitude assignment. This will allow the pilot to start descent at the profile that is optimum for fuel savings.

3.2 CDA's as a standard instrument arrival procedure for all aircraft is somewhat more complicated to develop. However, IATA recommends that ANSP's start developing CDA procedures where they can be relatively easy to accomplish – at low-density airports or after hours at the more busy airports. The communities below would be most grateful - as implementing CDA's over their homes will significantly reduce aircraft noise.

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