

June 18, 2019

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# CONTINUOUS DESCENT OPERATIONS MONITORING

At Toronto Pearson International Airport

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# ABOUT NAV CANADA

NAV CANADA is a private not-for-profit company, providing air traffic control, airport advisory services, weather briefings and aeronautical information services for more than 18 million square kilometers of Canadian domestic and international airspace. The Company manages 3.3 million flights annually and has over 40,000 customers. NAV CANADA is internationally recognized for its safety record and innovative technology used by Air Navigation Service Providers (ANSPs) world wide.

# BACKGROUND

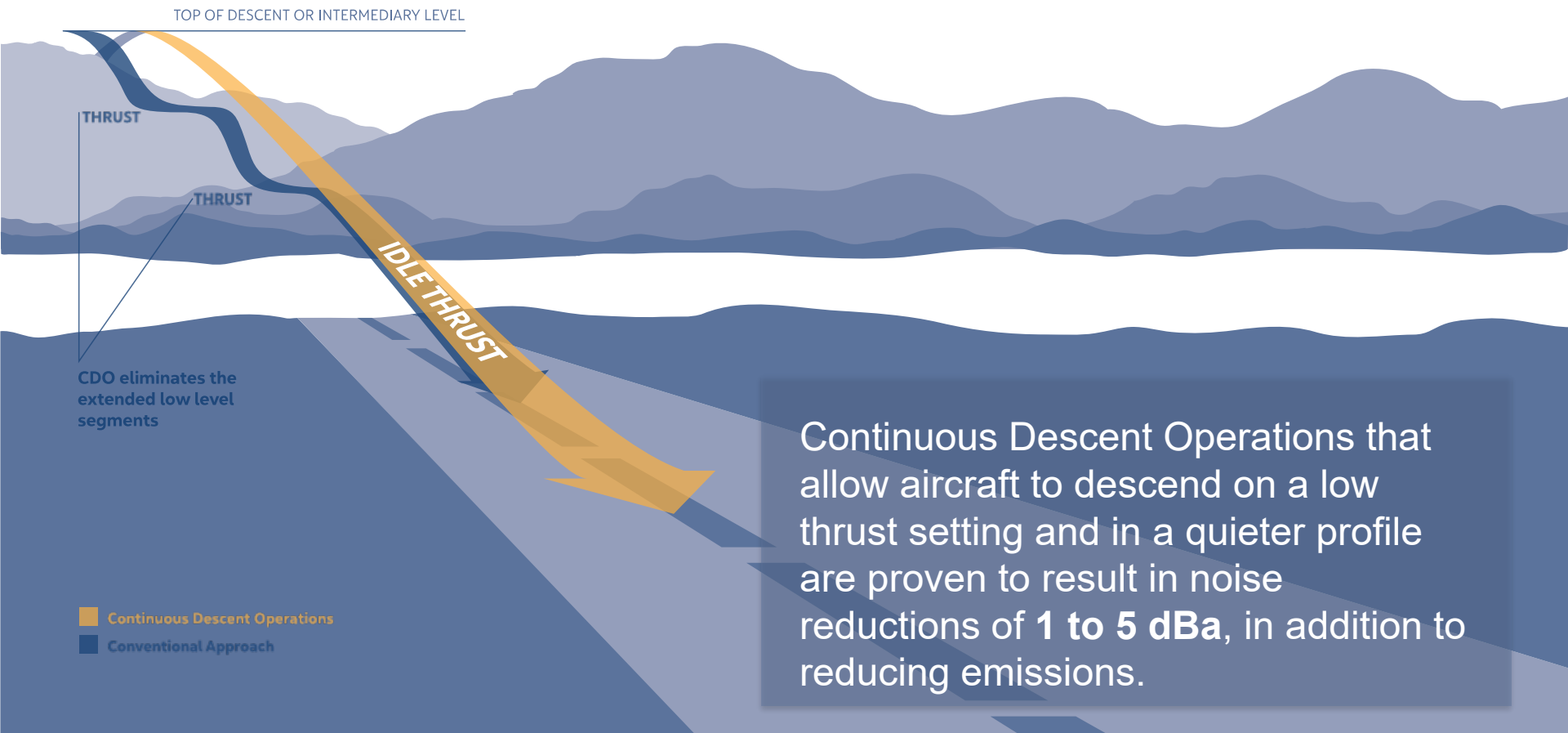
- › In summer 2016, NAV CANADA announced a review of Toronto airspace to determine whether all reasonable actions to reduce aircraft noise were being considered with respect to design and operation of the Toronto area airspace for aircraft operating in and out of Toronto Pearson. NAV CANADA responded and accepted or partially accepted all of the recommendations from the report. One of those recommendations was to publish the percentage of arrival flights achieving Continuous Descent Operations (CDO) performance at Toronto Pearson. CDO helps reduce the noise impacts on communities as a result of the aircraft descending on reduced thrust and in a quieter profile.
- › Achieving CDO is a multifaceted effort that requires a mix of navigation procedures, aircraft operating procedures and front line awareness to help move the performance yardstick. The ***Quieter Operations: A Guide for Pilots and Controllers***, a cross-industry effort that promotes effective pilot-controller communications to enable increased use of CDO, is an important tool to help increase awareness of good practices.
- › In order to analyse CDO operations, NAV CANADA developed a custom tool to process large volumes of flight data.

# WHAT IT IS AND THE BENEFIT

In busy airspace such as that surrounding Toronto Pearson, level flight segments can be necessary to safely manage and sequence aircraft. In order to keep aircraft at a level altitude, pilots must increase thrust and drag which can create more noise.

While noise from aircraft operations cannot be entirely eliminated, Continuous Descent Operations (CDO) that reduce the need for low altitude level flight segments have been shown to reduce aircraft noise by up to 5 decibels compared to aircraft on a level segment. Continuous Descent Operations reduce aircraft noise by enabling arriving aircraft to fly on a continuous descending path while minimizing level flight segments. Reducing level flight segments to a minimum reduces the need for aircraft engine thrust, thereby decreasing engine and airframe noise.

# Continuous Descent Operations



Continuous Descent Operations that allow aircraft to descend on a low thrust setting and in a quieter profile are proven to result in noise reductions of **1 to 5 dBa**, in addition to reducing emissions.

# ANALYSIS CONSIDERATIONS



## What's considered a CDO operation?

A Continuous Descent approach is achieved when the aircraft descends with no segment of level flight greater than 2.0 nautical miles.



## What areas are we capturing?

Our analysis begins at the downwind entry points defined in the RNAV arrival routes in the Canada Air Pilot (CAP) aeronautical publication and extend approximately 25 nautical miles. (Aircraft on the final approach, when they are lined up with the runway, already achieve CDO due to ILS guidance.)

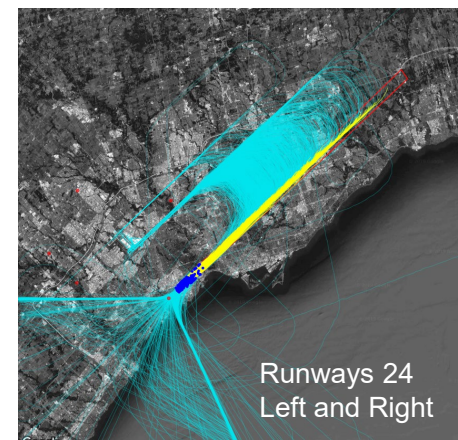
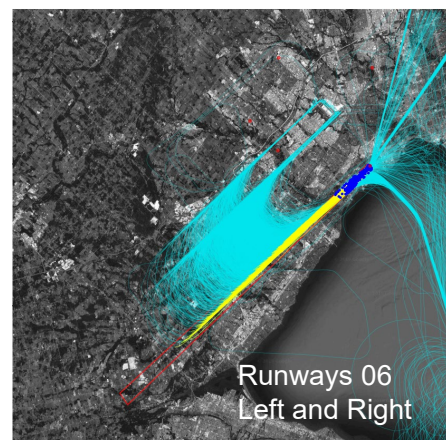
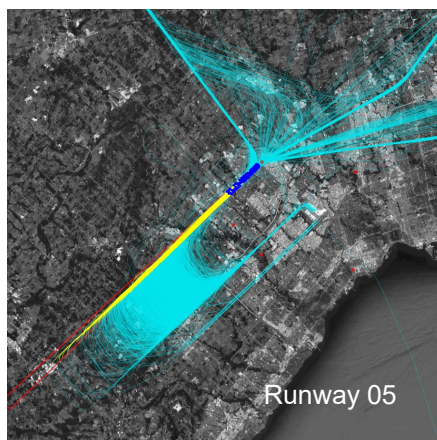
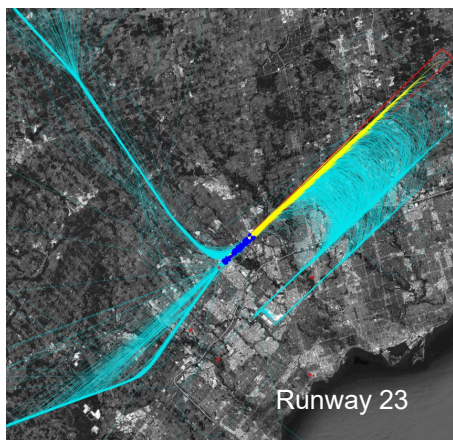


## Which runways are being monitored for CDO use?

Performance was monitored on the downwind portion of final descent to the East/West runways (05/23, 06L/24R, 06R/24L) at Toronto International Airport.





# CONTINUOUS DESCENT MONITORING

## Downwind flight profile



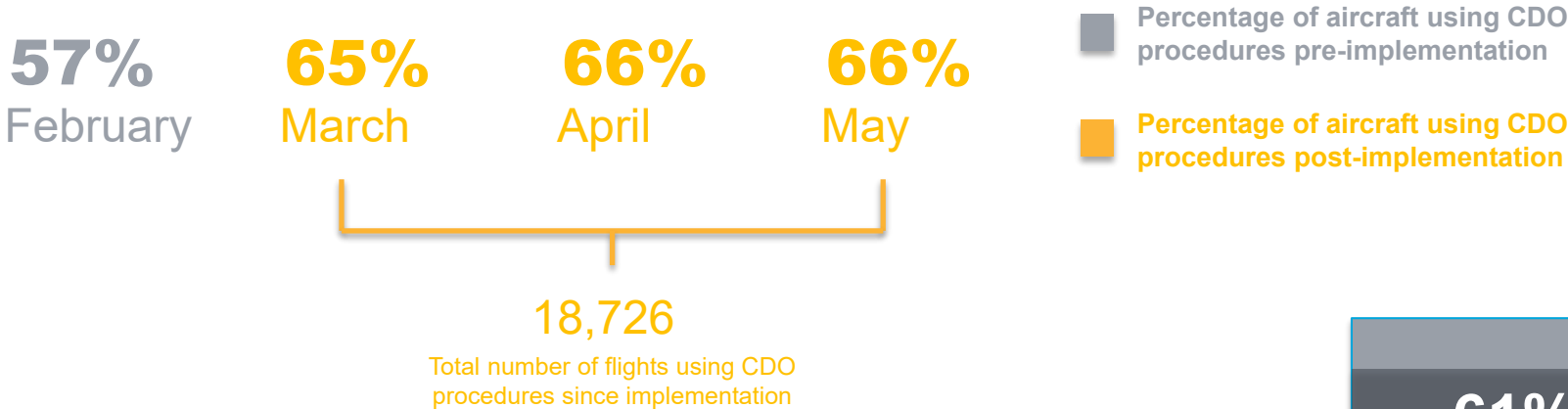
*Flights highlighted in light blue represent data over a month long period in 2019.*

**Aircraft not employing the downwind have been filtered out for the purpose of this analysis.**

-  Radar Tracks
-  Downwind Capture Area
-  Capture Area Radar Tracks
-  Capture Area Entry Points

# CONTINUOUS DESCENT OPERATIONS PERFORMANCE

New CDO arrival procedures for the downwind segments were implemented February 28, 2019.  
Current traffic levels and seasonality may influence usage of CDO.

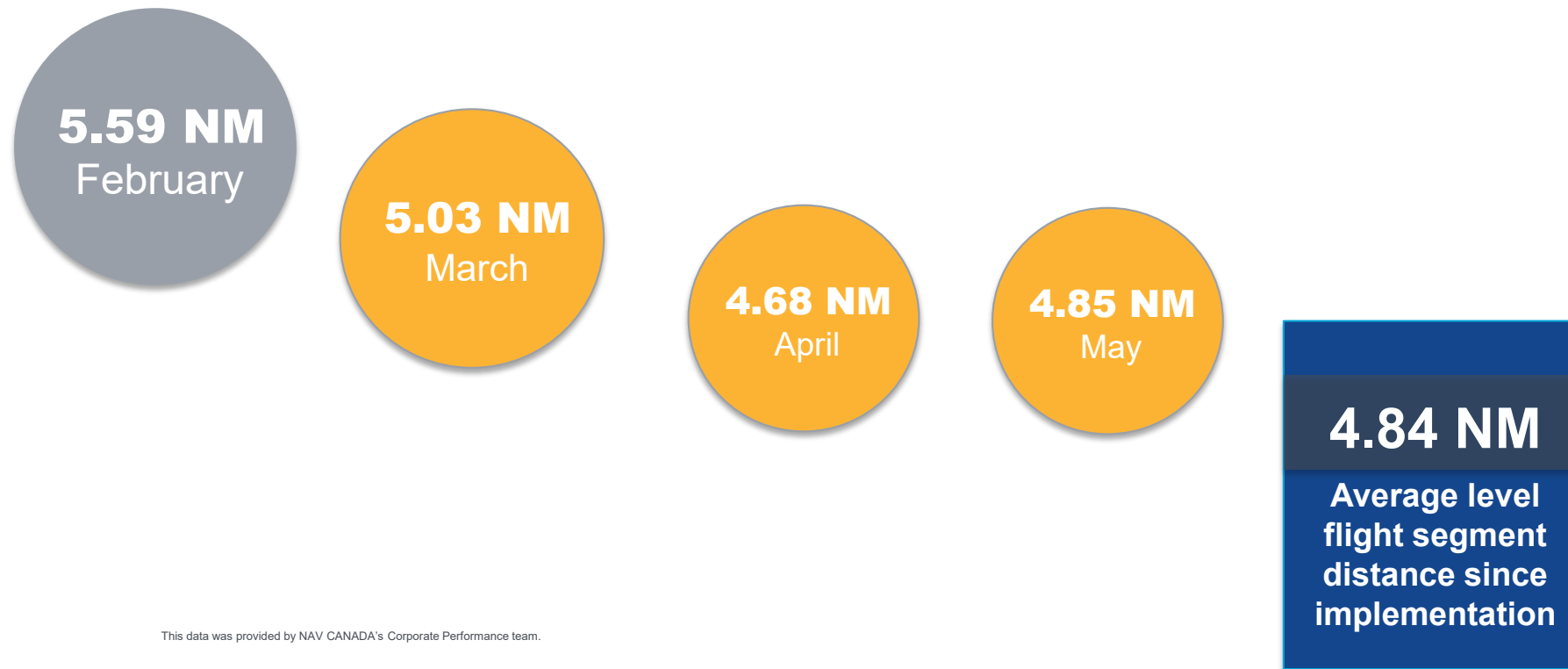


**61%**

Percentage of aircraft using CDO in Q1: January through March 2019

# CONTINUOUS DESCENT OPERATIONS PERFORMANCE

Average level segment distance since implementation



# NEW NIGHTTIME APPROACHES

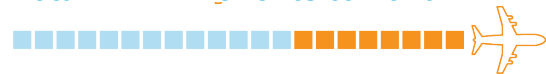
## USING AREA NAVIGATION (RNAV), NEW SATELLITE-BASED TECHNOLOGY

While traffic levels are significantly lower at night than during the day, aircraft noise events can be more noticeable for some residents during these periods as ambient community and household noise levels are typically lower.

Lower demand and fewer aircraft in Toronto Pearson's airspace at night provide the opportunity to employ routes that impact fewer people.

On November 8, 2018, NAV CANADA implemented new Area Navigation (RNAV) procedures to enable continuous descent. These new procedures enable aircraft to be higher on portions of the approach to the airport.

### Total RNAV Benefits to 2020



2,084,000 metric  
tonnes CO<sub>2</sub>e reduction



**12:30 a.m.  
– 6:30 a.m.**

**New nighttime  
approaches are  
being used  
between these  
hours (or earlier if  
possible)**

**2,600**

**number of times  
new nighttime  
approaches have  
been used since  
implemented**

# A WORK IN PROGRESS

- › With enhanced procedures that enable Continuous Descent Operations having been implemented in Toronto airspace this past February, the potential of this quieter approach is only at the early stages of being realized.
- › NAV CANADA remains committed to safely managing our country's skies while identifying opportunities to reduce the industry's impact on our communities and the environment. With the creation of this new, custom CDO analysis tool, NAV CANADA will continue publishing CDO rates on a quarterly basis, while looking to enhance insights that can be garnered from the data.



# ADDRESSING AIRCRAFT NOISE FOR RESIDENTS

NAV CANADA has produced a number of recent studies and reports related to noise mitigation:

## Quieter Operations: A Guide for Pilots and Controllers

In December 2018, the Industry Noise Management Board published a cross industry guideline that encourages pilots and air traffic controllers to safely employ noise-sensitive operating practices at Toronto Pearson in consideration of their impacts on communities.

## Independent Toronto Airspace Noise Review\*

In summer 2016, NAV CANADA announced a review of Toronto airspace, to determine whether all reasonable actions to reduce aircraft noise were being considered with respect to design and operation of the Toronto area airspace for aircraft operating in and out of Toronto Pearson.

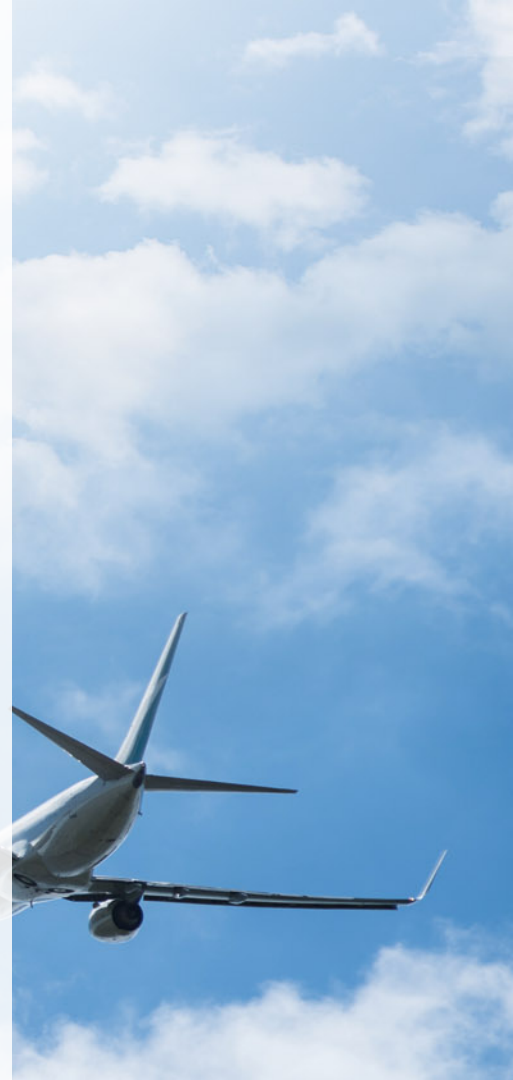
## NAV CANADA Response to Independent Toronto Airspace Noise Review

This document outlines NAV CANADA's response to the recommendations of the Independent Toronto Airspace Noise Review and provides information on implementation plans and timelines.

## Airspace Change Communications and Consultation Protocol (ACCCP)

In June 2015, the Canadian Airports Council and NAV CANADA developed and adopted the Airspace Change Communications and Consultation Protocol, a voluntary framework that ensures broad public engagement is undertaken prior to the implementation of airspace changes.

\*This report was commissioned by NAV CANADA, but the study and report was conducted by a Third Party





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