



February 7, 2019

## Airspace Improvements at Thunder Bay International Airport

This document provides notice of upcoming changes to instrument approach procedures being implemented by NAV CANADA at Thunder Bay International Airport (CYQT) on February 28, 2019.

NAV CANADA will implement new arrival and departure procedures for aircraft utilizing Runways 07/25 and 12/30. These updates will help ensure the airspace structure best meets operational safety and efficiency requirements and improve how the traffic mix is integrated.

Existing standard arrival procedures are being updated while new satellite-based procedures are being added (often referred to as RNAV procedures). Required Navigation Performance (RNP) is a new navigation technology that combines satellite-based positioning with modern flight management systems, enabling an aircraft to fly a precise route. This allows for the design of shorter flight paths that provide a quieter continuous descent. Initially, only a small percentage of aircraft will be equipped to fly an RNP arrival procedure at Thunder Bay International Airport, while most can fly RNAV procedures.

The proposed flight paths are estimated to save up to three minutes flying time for some arrivals, with greenhouse gas emission reductions estimated at 140 metric tonnes<sup>i</sup> resulting from fuel savings of 160,000 litres each year.

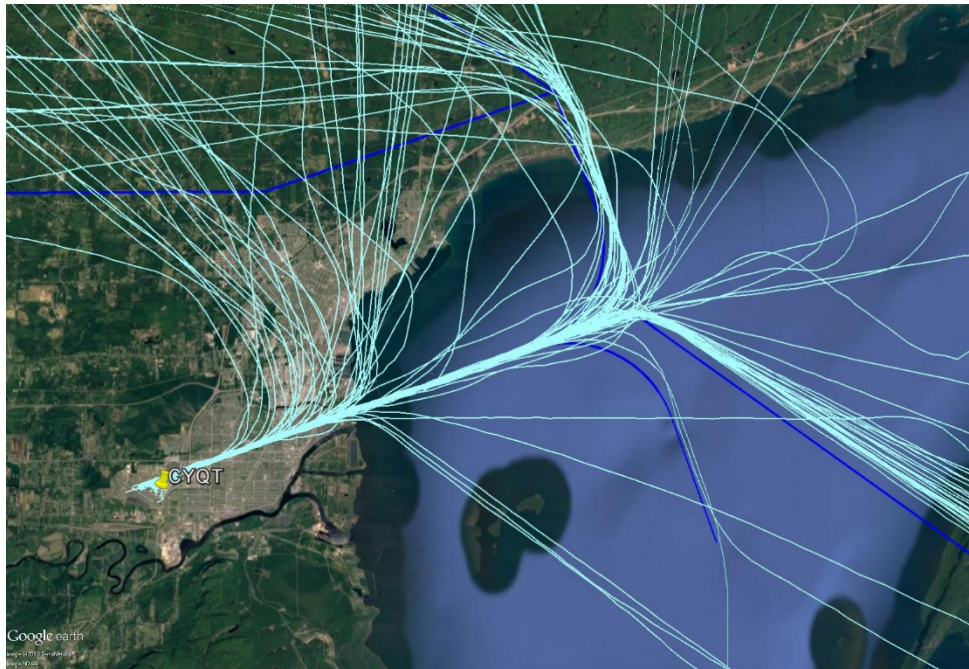
Please note that changes will have no impact on:

- The amount or type of aircraft operating to and from CYQT
- Visual Flight Rules (VFR) procedures or local traffic patterns (e.g. flight training operations, general aviation)

*The following section shows the improvements, looking first at changes to standard arrival routes and then new RNP procedures, on a runway-by-runway basis.*

### 1.1 Runway 25 Instrument Approach Procedure Updates

Runway 25 received approximately 48% of arrival traffic at the airport in 2017. The map below shows 32 hours of traffic (light blue tracks) as flown on over two busy days as well as a composite of the new updated flight paths (RNAV) in dark blue.



The map below shows 24 hours of traffic (light blue tracks) as flown on a sample day as well as a composite of the new RNP flight paths in dark blue. The RNP procedure enables appropriately equipped aircraft from northwest of the airport to turn towards the airport sooner.



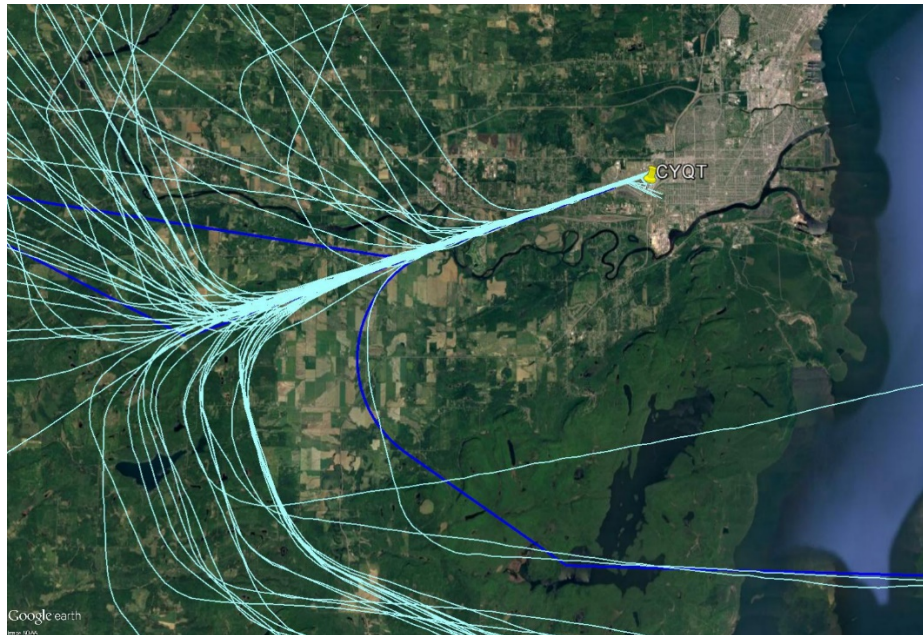


## 1.2 Runway 07 Instrument Approach Procedure Updates

Runway 07 received approximately 27% of arrival traffic at the airport in 2017. The map below shows 36 hours of traffic (light blue tracks) as flown over two busy days as well as a composite of the new updated flight paths (RNAV) in dark blue. The downwind leg for arrivals from the south moves somewhat closer to the airport. And the approaches from the north and south will help improve traffic integration.

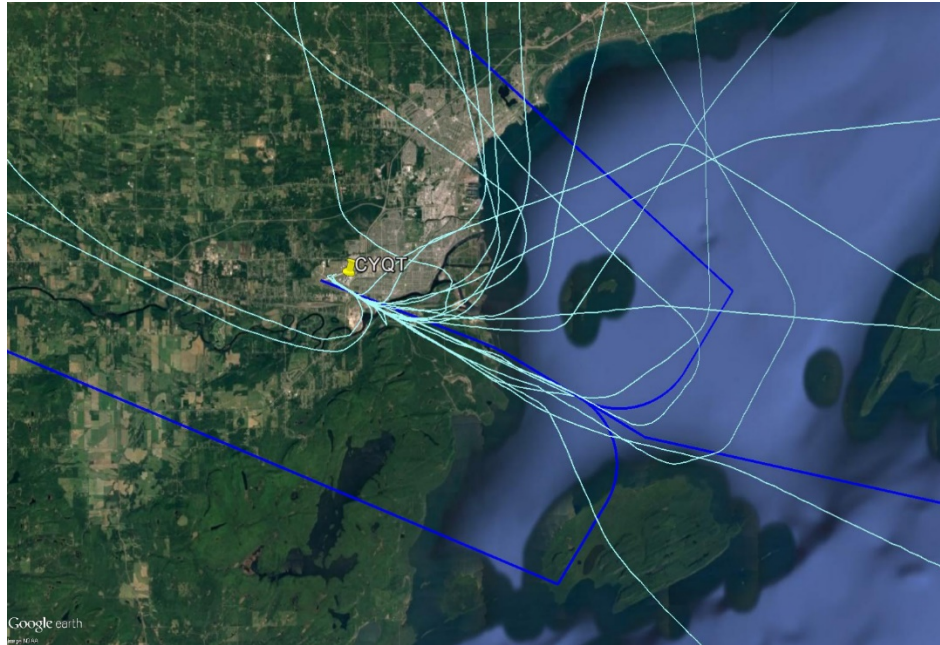


The map below shows 24 hours of traffic (light blue tracks) as flown on a sample day as well as a composite of the new RNP flight paths in dark blue. Appropriately equipped aircraft will be able to turn towards the airport sooner and employ a shorter route.



### 1.3 Runway 30 Instrument Approach Procedure Updates

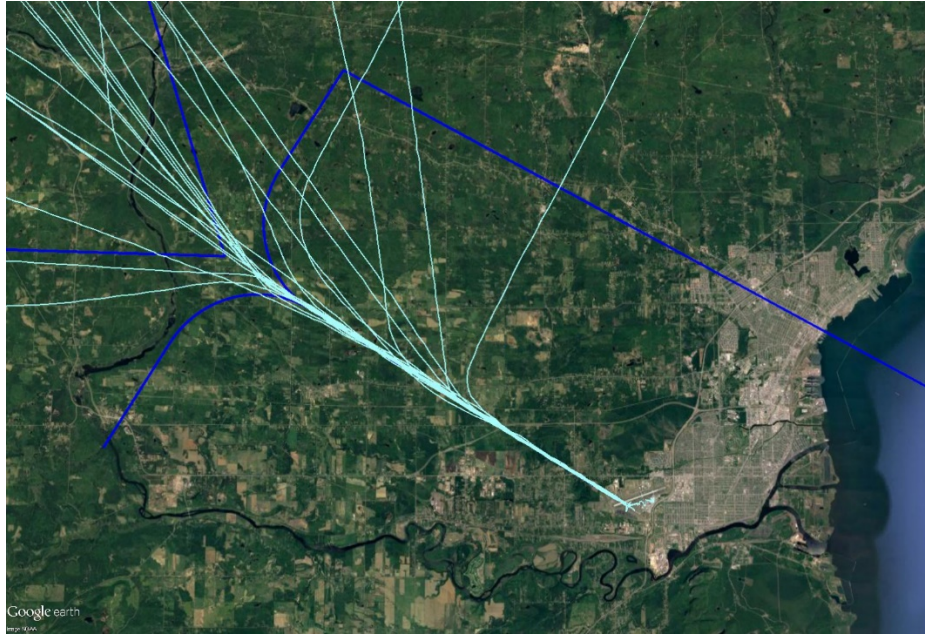
Runway 30 received approximately 12% of arrival traffic at the airport in 2017. The map below shows individual flights (light blue tracks) over a few days as well as a composite of the new updated flight paths (RNAV) in dark blue. The main changes are the new downwind legs for arrivals coming from north or west of the airport. A new LP approach will improve future accessibility of this runway.





#### 1.4 Runway 12 Instrument Approach Procedure Updates

Runway 12 handled approximately 13% of arriving traffic at the airport in 2017. The map below shows individual flights (light blue tracks) over a few days as well as a composite of the new updated flight paths (RNAV) in dark blue. The primary change is a new downwind leg which heads northwest before reaching the base leg.



### **1.5 Standard Instrument Departures - All Runways**

Updates to Standard Instrument Departures, which will lever aircraft RNAV capabilities, will see aircraft climbing on runway heading as they do today.

### **1.6 Summary of Expected Outcomes**

The implementation of RNP will result in reductions in flying time, fuel burn, and associated greenhouse gas emissions for appropriately equipped aircraft operating to Runways 07/25 and 12/30. Performance-based navigation also helps ensure airport access in poor weather conditions while reducing the need for holding patterns, diversions, and delays. Improvements to the broader airspace ensure that this important piece of aviation infrastructure is prepared for future capacity demands – by aircraft operators and the passengers they serve – in accordance with navigation standards and technologies being adopted globally.

While there are minor changes to the lateral location of flight paths, flight paths were optimized to target non-residential areas where possible; the availability of multiple approaches to each runway end also distributes traffic. The changes will result in benefits today from the use of new navigation methods while ensuring the airspace structure is prepared for future growth in demand by airlines and the passengers they serve.

*Any questions or comments regarding improvements to the airspace structure surrounding Thunder Bay International Airport can be sent to [service@navcanada.ca](mailto:service@navcanada.ca).*

*For more information on NAV CANADA, the country's air navigation services provider, please visit [www.navcanada.ca](http://www.navcanada.ca).*

*For more information on Thunder Bay International Airport, visit <http://www.tbairport.on.ca>.*

## APPENDIX 1 - About Arrival Flight Paths

Aircraft can approach an airport using several navigation methods. On days where visibility is good, aircraft will often conduct “visual” approaches. Pilots will navigate visually towards the runway according to Canadian Aviation Rules (CARs). Aircraft can also be directed by an air traffic controller, using “vectors”. In both cases, the aircraft will not be flying on a specific, established route. While entirely safe, there can be a significant variation in flight track from flight to flight.

In addition to these options, most airports have published arrival procedures. These are made available in aeronautical publications used by pilots and usually programmed into aircraft flight management systems (the computer that assists pilots with operating the aircraft). Some use Area Navigation (RNAV) while others use Required Navigation Performance (RNP) for some segments; both technologies lever satellite-based positioning. RNP allows for aircraft to follow a very precise route using continuous descent. It allows for the design of shorter routes that reduce flying distance and time with associated reductions in greenhouse gas emissions. Since RNP approaches allow for continuous descent and reduced power settings, they are also the quietest type of approach. RNAV does allow for aircraft to fly a predictable route but may have some variation depending of the flight segment.

Figures 1 and 2 below show the lateral and vertical profiles of various approaches. The yellow flight track shows a visual approach, the blue flight track shows an RNP approach, and the red track shows an RNAV approach. The yellow track can be shorter as the pilot takes a direct route to the runway. However, the vertical profile of this example shows the aircraft flying long level segments at a low altitude. The red flight track shows a typical RNAV approach. While essential for managing and sequencing traffic at a busy airport such as Thunder Bay International Airport, the flight path can require that an aircraft fly longer distances to reach a runway. Finally, the blue track shows an RNP approach. The flight path is both short and supports continuous descent and is optimal in terms of flying times for the public, emissions and noise as well as predictability for pilots and controllers.

For more information on RNP, watch the [information video](#).

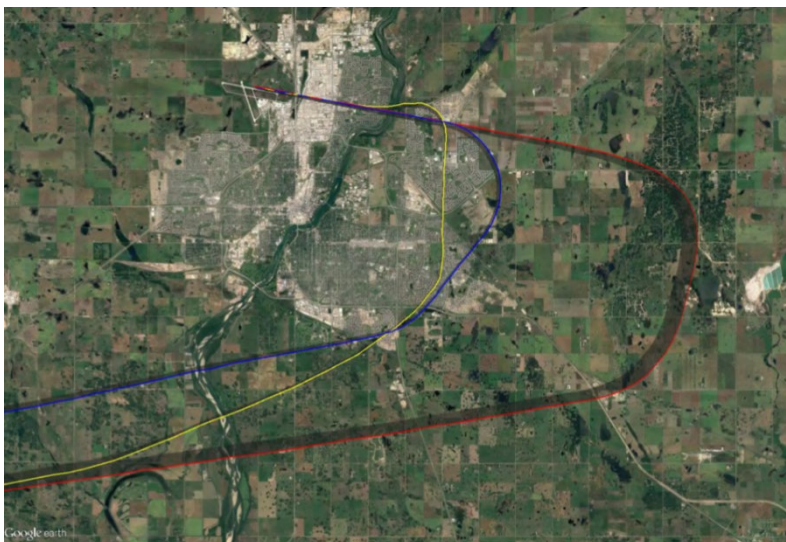


Figure 1 – Approach Types: Lateral Profile

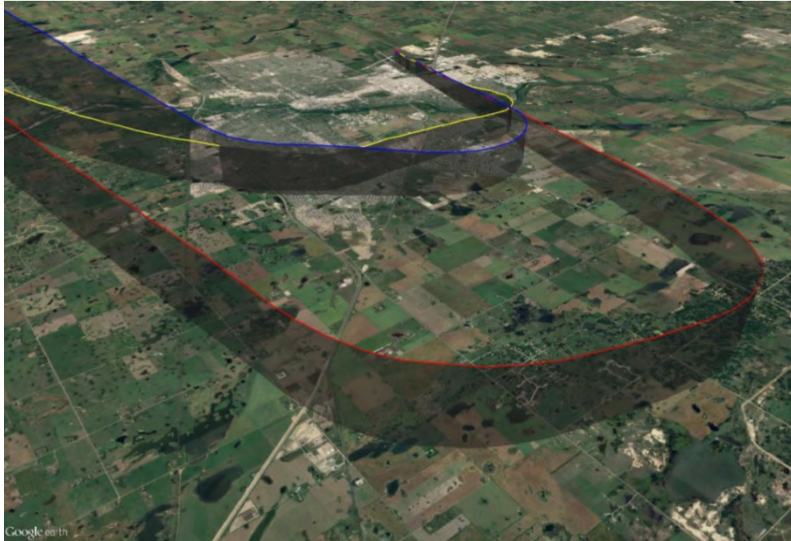
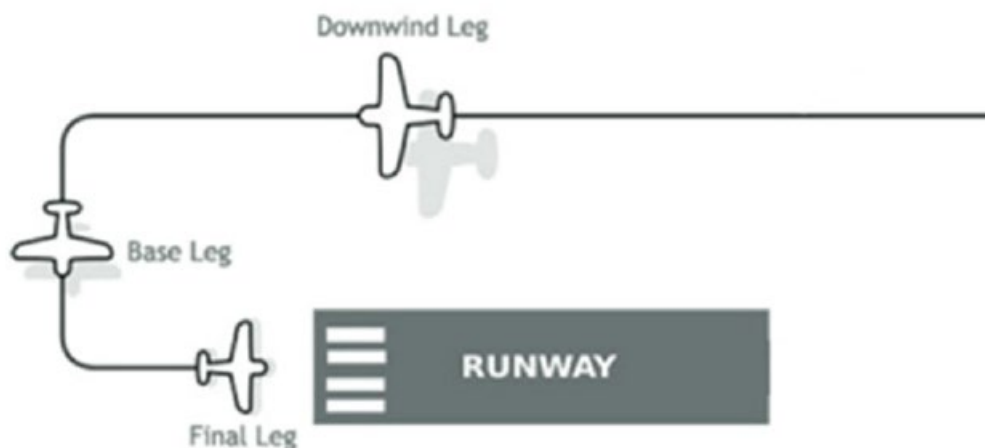


Figure 2 - Approach Types: Vertical Profile

## APPENDIX 2 - Notes About Maps

- Most of the maps show composites of all the approaches to a runway. An arriving aircraft will only employ one of the approaches depicted in the composite.
- Traffic samples show days where each respective runway received the bulk of the day's commercial traffic. Samples are for illustrative purposes and patterns will vary to some extent day-to-day.
- Aircraft often fly a downwind leg, whereby the aircraft flies parallel to the airport before turning towards the final approach. Use of this procedure will depend on the direction the plane is coming from and the runway in use as well as weather and sequencing requirements. The following image illustrates the general procedure:



<sup>i</sup> Estimate using a 737-800 assuming 50% RNP utilization