



September 20, 2018

Airspace Improvements at Quebec Jean Lesage International Airport

This document provides notice of upcoming changes to instrument approach procedures being implemented by NAV CANADA at Quebec Jean Lesage International Airport (CYQB) on November 8, 2018.

NAV CANADA will implement new arrival procedures for aircraft utilizing Runways 11/29 and 06/24. These updates will help ensure the airspace structure best meets operational safety and efficiency requirements, improve how the traffic mix is integrated and ensures clearance from restricted airspace.

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 continuous descent. Initially, only a small percentage of aircraft – approximately 5 per cent – will be equipped to fly an RNP arrival procedure at Jean-Lesage International Airport.

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 tonnesⁱ resulting from fuel savings of 160,000 litres each year.

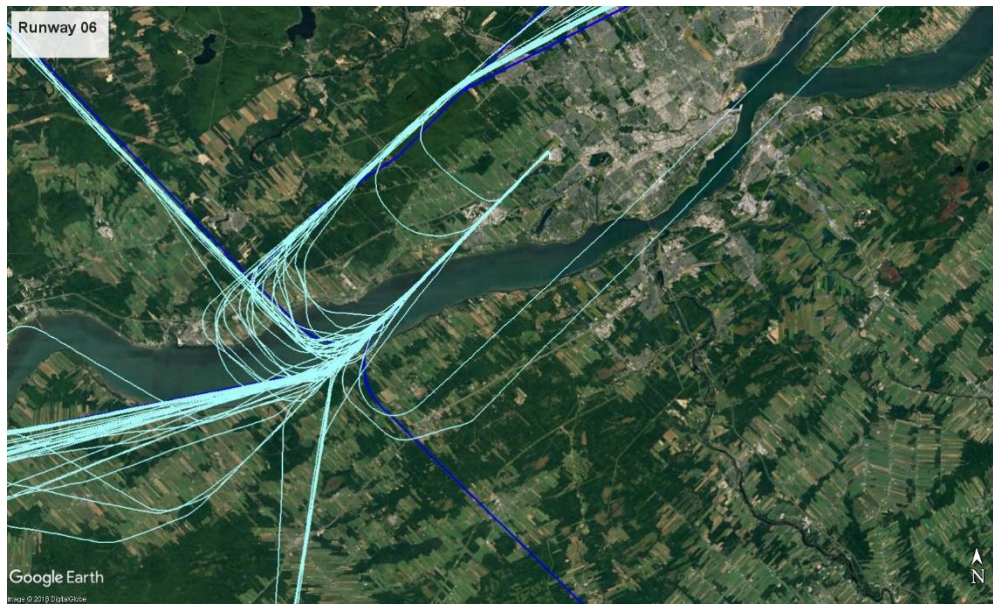
Please note that changes will have no impact on:

- Noise Exposure Forecasts (NEF)
- The amount or type of aircraft operating to and from CYQB
- 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 06 Instrument Approach Procedure Updates

Runway 06 received approximately 35% of arrival traffic at the airport in 2016-2017. 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 updated flight paths (RNAV) in blue. The new structure provides an approach option from the southeast.



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 if arriving from northwest, northeast and southeast.



1.2 Runway 29 Instrument Approach Procedure Updates

Runway 29 received approximately 21% of arrival traffic at the airport in 2016-2017. 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 updated flight paths (RNAV) in dark blue. The approaches from the north and south will help improve traffic integration.

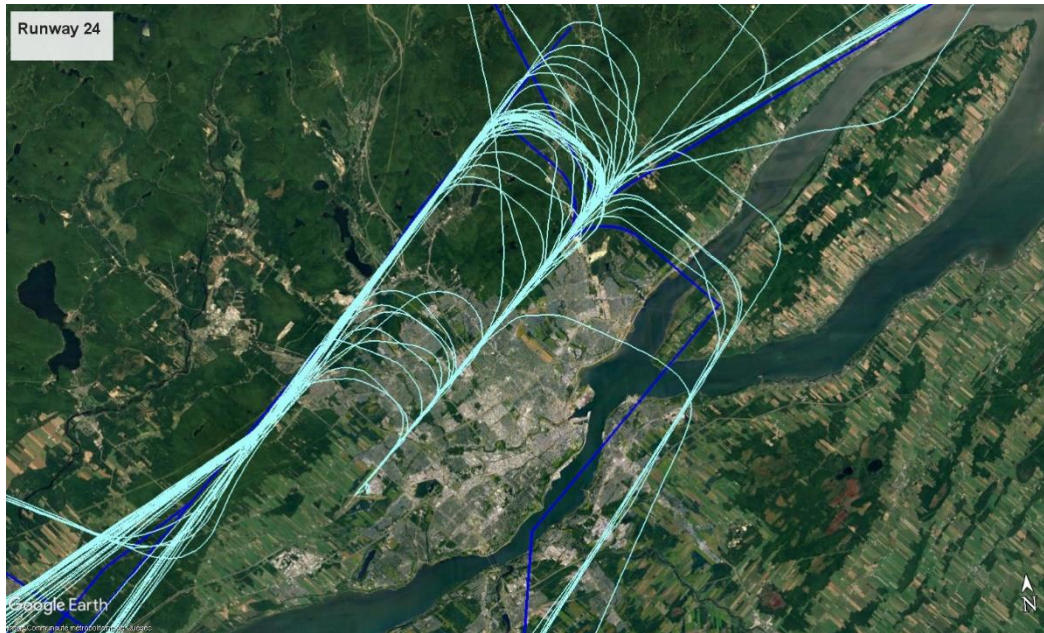


The map below shows 24 hours of traffic (light blue tracks) as flown on a sample day as well as a composite of the new RNP flight paths in dark blue. Appropriately equipped aircraft will be able to turn towards the airport sooner and employ a shorter route.

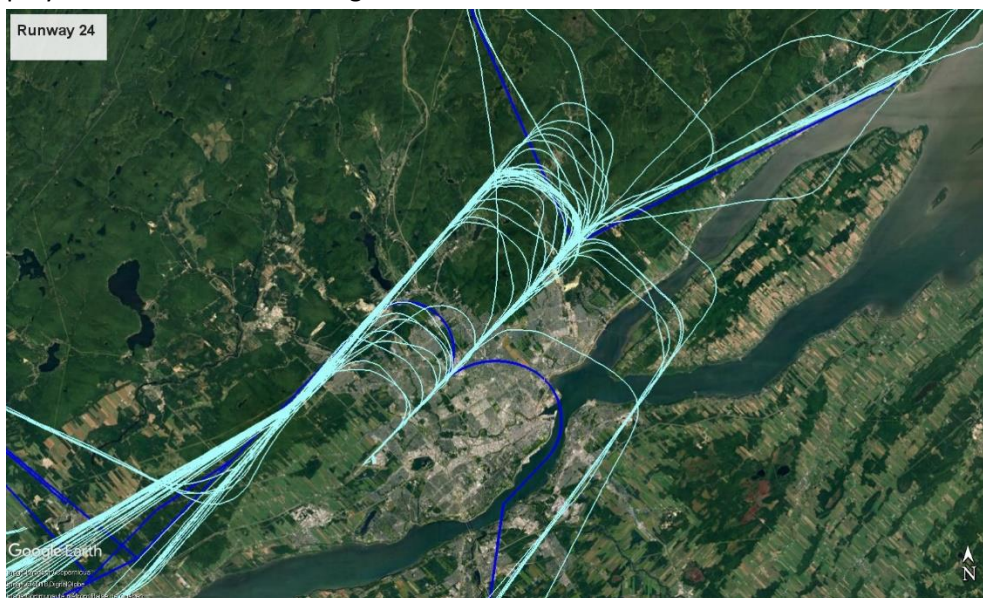


1.3 Runway 24 Instrument Approach Procedure Updates

Runway 24 received approximately 39% of arrival traffic at the airport in 2016-2017. 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 updated flight paths (RNAV) in dark blue. The main change is that the downwind leg for arrivals from the south moves somewhat closer to the airport while most aircraft will be established on final approach about a mile closer to the airport compared to those that use the existing arrival structure (assuming use of standard arrival procedures).

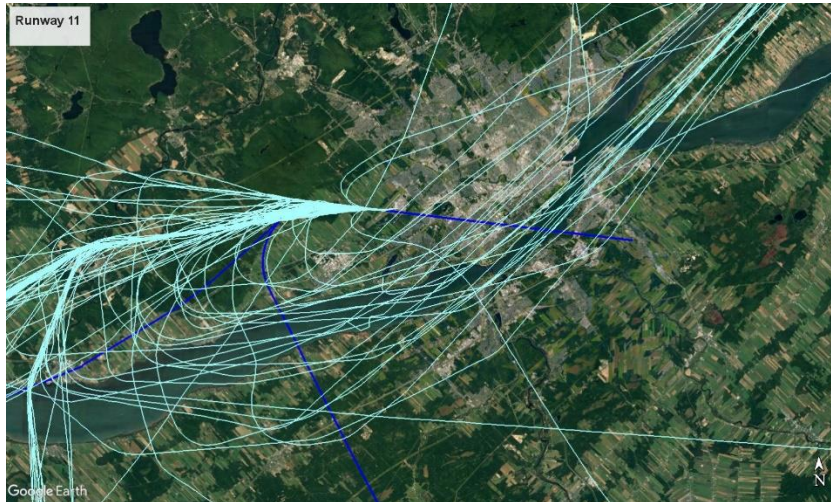


The map below shows 24 hours of traffic (light blue tracks) as flown on a sample day as well as a composite of the new RNP flight paths in dark blue. Appropriately equipped aircraft will be able to turn towards the airport sooner and employ a shorter route if arriving from the east and northeast.



1.4 Runway 11 Instrument Approach Procedure Updates

Runway 11 handled approximately 5% of arriving traffic at the airport in 2017. The map below shows the same 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 arriving from the south or east will be able to turn towards the airport sooner. With restricted airspace to the north of the approach, some procedures types are not available for Runway 11. However, this RNP approach will provide improved access when use of this runway is necessary.



1.5 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 11/29 and 06/24. 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 addition of multiple approaches to each runway end also mitigate community impacts. 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 Québec City Jean Lesage International Airport can be sent to service@navcanada.ca.

For more information on NAV CANADA, the country's air navigation services provider, please visit www.navcanada.ca.

For more information on Québec City Jean Lesage International Airport, visit <https://www.aeroportoquebec.com>.

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 Quebec Jean Lesage 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](#).

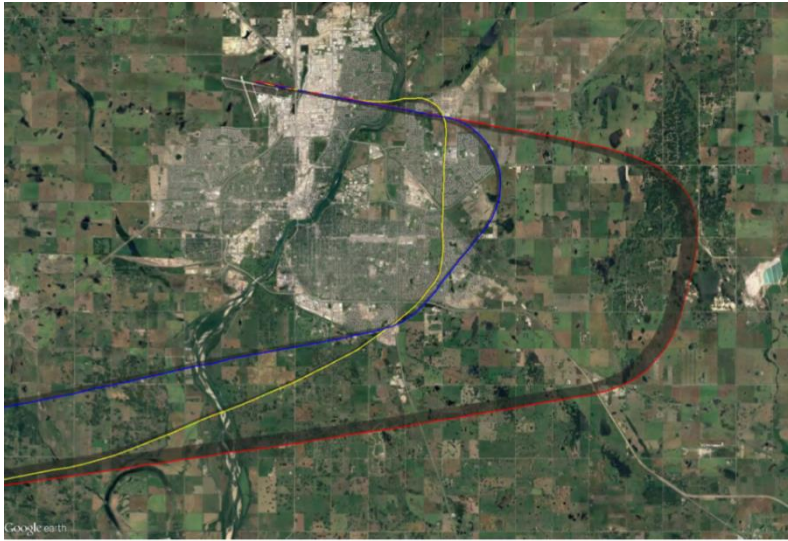


Figure 1 – Approach Types: Lateral Profile

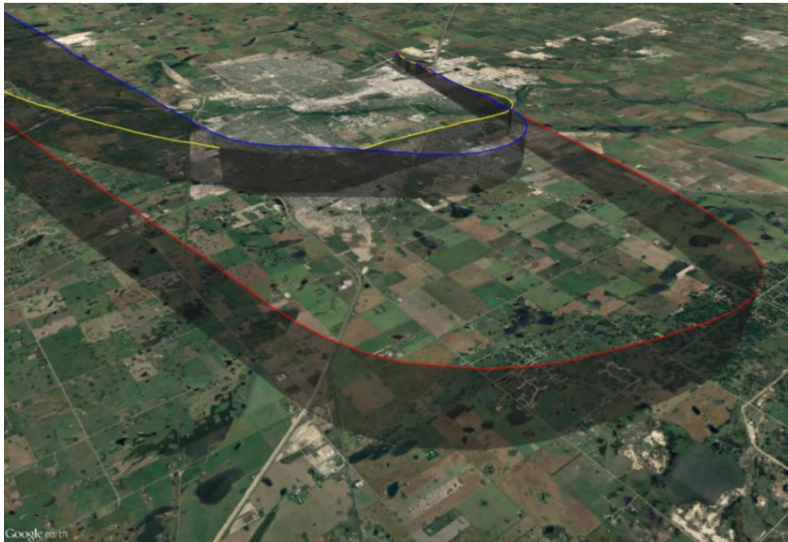
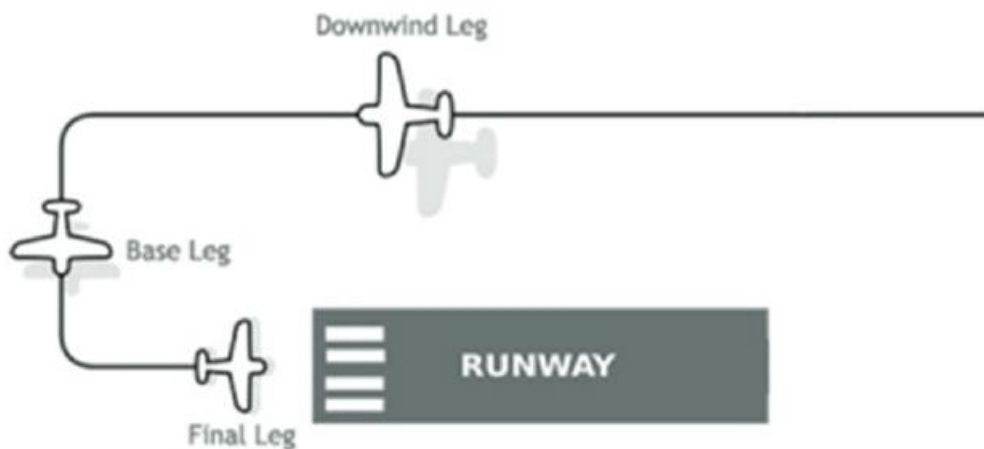


Figure 2 - Approach Types: Vertical Profile

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:



ⁱ Estimate using a 737-800 assuming 50% RNP utilization