Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) Operations Plan

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Foreword

Dear Customers and Stakeholders,

I am pleased to present to you this latest edition of NAV CANADA's Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) Operations Plan. This document represents not only our commitment to advancing CNS/ATM services in Canadian airspace but also our dedication to tailoring those services to best work with customer and stakeholder capabilities.

The goals listed in the following pages reflect our drive to support the growing demands of the aviation industry. Substantive changes between the first 2020 edition and this edition of the Plan include:

- deleting goals that have been fulfilled since the first edition was published;
- eliminating goals associated with improving procedural separations, which are no longer necessary due to the increased use of Automatic Dependent Surveillance – Broadcast (ADS-B) in Class A and Class B airspace;
- removing goals to explore Point-in-Space-Approaches (PINSA) for fixed-wing operations, as well as RNP 0.3 for rotary-wing operations; and
- adding new goals including publication of ILS Special Authorization (SA) CAT I approaches, investigation of a Canadian waypoint grid system, improvements to localizer frequency/signal protections, and developing a proposal for future airspace structures that support NAV CANADA's strategic direction.

I want to extend my deepest gratitude to all those who have contributed to this effort. Your expertise, insights, and commitment are vital to our shared vision. I look forward to the collective accomplishments and advancements that lie ahead.

Regards,

Jeff Dawson
Assistant Vice President, Operational Support

Outline

Welcome to the second edition of NAV CANADA's CNS/ATM Operations Plan. This edition reflects our ongoing efforts to enhance the performance of Canada's air navigation system, integrating new CNS/ATM technologies and evolving best practices to meet the dynamic needs of the aviation industry. In this update, you will find goals, operational enhancements, and key initiatives designed to support the growing demands of air traffic and improve the overall flying experience. Our focus remains on simplifying the system, optimizing the use of airspace, and continuing to help reduce the number of track miles flown during each flight.

NAV CANADA's CNS/ATM Operations Plan is designed to assist the aviation community in planning future transition and investment strategies. Aircraft operators can use this plan to forecast future CNS/ATM equipage and capability investments. As customers upgrade their avionics, greater air traffic management opportunities will be presented with the potential for future seamless gate-to-gate operations.

During transitions, there will be periods of mixed mode operations that will be necessary as new technologies are deployed to existing operations. NAV CANADA's goal is to continue the CNS/ATM service philosophy of "most capable, best served". This philosophy allows for early return on investment in CNS/ATM technology by customers, while avoiding being overly punitive to customers who choose to equip later in the transition.

The CNS/ATM Operations Plan also helps NAV CANADA allocate the resources necessary to achieve each of the goals identified. Unplanned CNS/ATM goals sometimes become necessary, but we will do our best to avoid delaying the goals we have agreed to undertake as part of this plan, which was drafted in collaboration with customers and stakeholders on the CNS/ATM Strategy Working Group. We thank all those who together have helped develop our shared goals.

Timeframe

This document details NAV CANADA's CNS/ATM goals from now until the end of 2029, and will be updated at a minimum every three years to ensure it remains current and continues to meet our customers' requirements.

Operational Communication Goals

Operational communications are key to any navigation and/or surveillance initiative. Very High Frequency (VHF) voice radiotelephony continues to remain the predominant method of communications across domestic airspace, but the next generation of communication will focus on increased use of data link, with the benefits of high speed/high integrity data transfers, reduced frequency congestion and improved message clarity. The following goals will help us develop our operational communication capabilities:

Dial-up Remote Communication Outlets (DRCO) connect pilots, on-request, with a flight information centre through use of a commercial telephone line. Replacing the few remaining DRCO in Canada with standard Remote Communications Outlets (RCO) would simplify pilot procedures and standardize the communication process.
Goal: Validate feasibility of replacing remaining DRCOs with RCOs, amending publications and guidance material accordingly.

Two-way datalink systems allow controllers and pilots to transmit electronic messages as an alternative to voice communications. Canada has already implemented Controller Pilot Data Link Communications (CPDLC) above FL290 resulting in numerous benefits including a reduced probability of miscommunication.
Goals: 1) Develop a Concept of Operations to expand airborne CPDLC deployment in Canadian Domestic Airspace, including implementation of a single CPDLC log on. 2) Develop a Concept of Operations to use CPDLC-DCL clearances prior to departure similar to the FAA, and determine a list of sites for deployment.

Very High Frequency (VHF) Data Link (VDL) is a means of sending information between aircraft and VHF ground stations. The next-generation VDL Mode 2 network is a high-speed digital communications network offering increased message capacity and could be more cost efficient than today's VHF Aircraft Communications Addressing and Reporting Systems (ACARS).
Goal: Investigate the possibility of NAV CANADA implementing VDL Mode 2.

The connected aircraft concept is founded on a seamless exchange of information through digital data communications links between aircraft and ground systems to improve decision-making and operational awareness. The benefits of shared and analysed connected aircraft data for aviation include opportunities to improve aviation's reliability, security, operations, and customer experience, therefore making it critical to successful Trajectory Based Operations realization.
Goal: Support the International Civil Aviation Organization (ICAO) in the development of the Connected Aircraft concept.

Navigation Goals

The International Civil Aviation Organization (ICAO) laid out the Performance-Based Navigation (PBN) concept in the ICAO PBN Manual (Doc 9613) and urged all States to outline their strategies to implement PBN as expeditiously as practicable. Completion of the following navigation goals will help Canada fulfil that assignment:

NAV CANADA and the Canadian Airports Council have outlined their commitment to transparency and effective engagement with communities potentially affected by proposed changes to airspace in the Airspace Change Communications and Consultation Protocol (ACCCP). Recognizing that airspace changes can impact communities in material ways, our aim is to minimize these impacts while ensuring we continue to provide the necessary critical infrastructure as the demand for air travel continues to grow.
Goal: Consider aircraft noise and potential environmental impacts when designing procedures to ensure they are as environmentally responsible and fuel conscious as practical.

Operational requirements predicate where Standard Instrument Departures (SIDs) are published, but future efficiencies could be gained by designing additional SIDs that use area-navigation. Vector SIDs make best use of the separation standards available, while area-navigation based SIDs are used when better adherence to track guidance may be beneficial.
Goal: Design and publish additional SIDs that use area-navigation.

ICAO recommends that States implement the most appropriate PBN Navigation Specification needed to meet the demands of the airspace. Defining the level of accuracy needed by publishing an appropriate navigation specification can increase cockpit efficiency for air operators.
Goal: ICAO Navigation Specifications will be published on all instrument procedures.

Magnetic heading references are no longer required in aircraft that use True North in navigational computations. True North heading reference in a PBN operation would simplify aircraft operation and reduce costs going forward, eliminating magnetic variation work from air navigation service providers, aircraft operators, airport operators, database providers, and greatly simplifying the navigation systems.
Goal: Support ICAO in the development of the True North concept.

Established on RNP AR (EoR) is a new concept for parallel approach operations that integrates RNP AR approaches into busy parallel runways. This concept is in use at Calgary International and leverages the accuracy of the approach to allow greater flexibility when managing the final approach segment, leading to significant reduction in track miles for both equipped and non-equipped aircraft.
Goal: Implement EoR at additional major airports with parallel runways and explore expanding the concept to incorporate other approach types.

Instrument Landing System Special Authorization Category I and Category II (ILS SA CAT I and ILS SA CAT II) approaches are ILS CAT I approaches that under certain conditions can safely permit lower decision heights and/or and Runway Visual Range (RVR) values. Air operators authorized to fly ILS SA CAT I and ILS SA CAT II approaches may benefit from increased airport accessibility during poor weather conditions.

Goals: 1) Begin publication of ILS SA CAT I approach procedures once Transport Canada has published the necessary amendments in the Canadian Manual of All Weather Operations. 2) Continue working with airport authorities to publish ILS SA CAT II approaches where feasible.

RNP AR Departure Procedures have highly predictable and repeatable trajectories and have recently been added to the procedure design criteria used in Canada. Allowing reductions to lateral protection areas, RNP AR Departure Procedures could reduce and/or eliminate the departure divergence currently required at airports with parallel runways.

Goal: Continue collaborating with stakeholders and Transport Canada through the Canadian Performance-based Aviation Action Team (CPAAT) to develop documentation necessary for introduction of RNP AR Departure Procedures.

The ICAO navigation specification Advanced RNP (A-RNP) provides for a single assessment of aircraft eligibility that will apply to more than one navigation accuracy requirement and multiple applications across all phases of flight. The advantage in utilizing a designation of A-RNP for a flight operation is the combined performance and functionality of a range of Navigation Specifications encompassing all phases of flight.

Goal: Continue collaborating with stakeholders and Transport Canada through the Canadian Performance-based Aviation Action Team (CPAAT) to develop documentation necessary for introducing the Navigation Specification A-RNP.

Unique Canadian airspace designations of Canadian Minimum Navigation Performance Specifications (CMNPS) and Required Navigation Performance Capability (RNPC) predate the PBN concept yet contain some of the types of performance parameters found in ICAO's PBN Navigation Specifications. To become ICAO PBN compliant, CMNPS and RNPC airspace need to be redesignated with appropriate Navigation Specifications.

Goals: 1) Develop a Concept of Operations to replace CMNPS with a PBN Navigation Specification. 2) Develop a Concept of Operations to replace RNPC with a PBN Navigation Specification.

Flight planning using latitudes and longitudes can be challenging for air operators and could lead to errors when programming flight management systems. The United States implemented a waypoint grid system using five-character alpha-numeric waypoints across the 48 contiguous states to help improve safety.

Goal: Investigate the feasibility and benefits of introducing a waypoint grid system in Canadian Domestic Airspace.

IFR approach procedures can include a visual path defined by waypoints to promote stabilized approach and prescribed visual maneuvering to a designated runway, known as Visual on a Prescribed Track (VPT). Substituting a visual approach with an IFR VPT approach that contains an Extended Visual Segment (EVS) can improve the safety of the operation by providing track and vertical path guidance, assisting with the safe completion of the approach.
Goal: Explore the feasibility and benefits of aligning Canadian VPT procedure implementation with the EVS concept being used by the FAA.

Newer aircraft incorporate the capability to display localizer indications on Heads Up Guidance Systems as advisory guidance while in the acceleration phase of a takeoff. NAV CANADA does not protect for this use of localizer signals, but aircraft might benefit from localizer guidance for takeoffs under challenging visibility situations.
Goal: Investigate the feasibility of offering localizer signal protection for aircraft taking off, as well as reducing the number of runways where the same localizer frequency is used on reciprocal ends

Ground Based Augmentation System (GBAS) Landing System (GLS) technology can offer instrument approaches with minima equivalent to Instrument Landing Systems (ILS), supplementing precision approach operations. Based on a positive business case, installation of GBAS and publication of GLS approaches at some airports could offer increased airport accessibility for appropriately equipped aircraft.
Goal: Investigate the capability and efficiencies of GBAS Landing Systems (GLS).

Our current airspace structure was conceived over 50 years ago and is generally built around ground-based NAVAIDs and surveillance technology. Starting fresh will allow us to build an airspace structure that continues to put safety first, allows airlines to fly their preferred routes, gives pilots a more seamless interaction with air traffic services along their flight, offers the opportunity for customers to leverage the full capabilities of their fleet, effectively integrates new entrants and enables trajectory-based operations.
Goal: Work with customers and stakeholders to propose a future airspace structure that supports NAV CANADA's strategic direction.

Surveillance Goals

Today's surveillance technology includes radar, airport surface detection equipment, Automatic Dependent Surveillance-Broadcast (ADS-B), multilateration and video images, increasing safety and incrementally allowing customers to take advantage of improved separation standards. The following goals have been established to help harmonize the available sources of surveillance:

There are four main types of ATS surveillance systems currently used by Air Traffic Services: primary surveillance radar, secondary surveillance radar, multilateration and ADS-B. Maintaining the full legacy network of primary and secondary surveillance radars may no longer be necessary, and there may be opportunities to consolidate operations when multiple surveillance sources are available.

Goal: Conduct aeronautical studies of the requirement for individual primary and secondary surveillance radar systems as required.

As of 2024, space-based ADS-B is mandatory in Canadian Domestic Class A and Class B airspace. Availability of ADS-B Out avionics to a broad range of customers and their ability to utilize them without undue restriction will determine the pace of future implementation.

Goal: Conduct an aeronautical study assessing implementation of ADS-B Out mandates in additional classes of airspace (Class C, D, and E), using stakeholder engagement to determine an appropriate approach and timing for implementation.

Air Traffic Management Goals

Trajectory-based operations (TBO) represents a fundamental shift from a system based on regular air traffic services (ATS) intervention to one that takes into account the full picture of a flight from takeoff to landing. TBO is not a single project, but an evolution of capabilities dependent on technology development and extensive collaboration with stakeholders. We are currently collaborating with our customers, stakeholders and employees in the early design stages of this exciting shift towards strategic end-to-end management of air traffic. Carrying out the following goal will help NAV CANADA's customers begin to plan future aircraft investments:

Trajectory Based Operations (TBO) is a concept for optimizing flights through use of time-based management, information exchange between air and ground systems, and the aircraft's ability to fly precise paths in time and space. TBO is expected to result in maximal utilization of available airspace with near optimal flight efficiency.

Goal: Further investigate concepts and technology that could support the evolution of TBO then begin customer and stakeholder consultations.