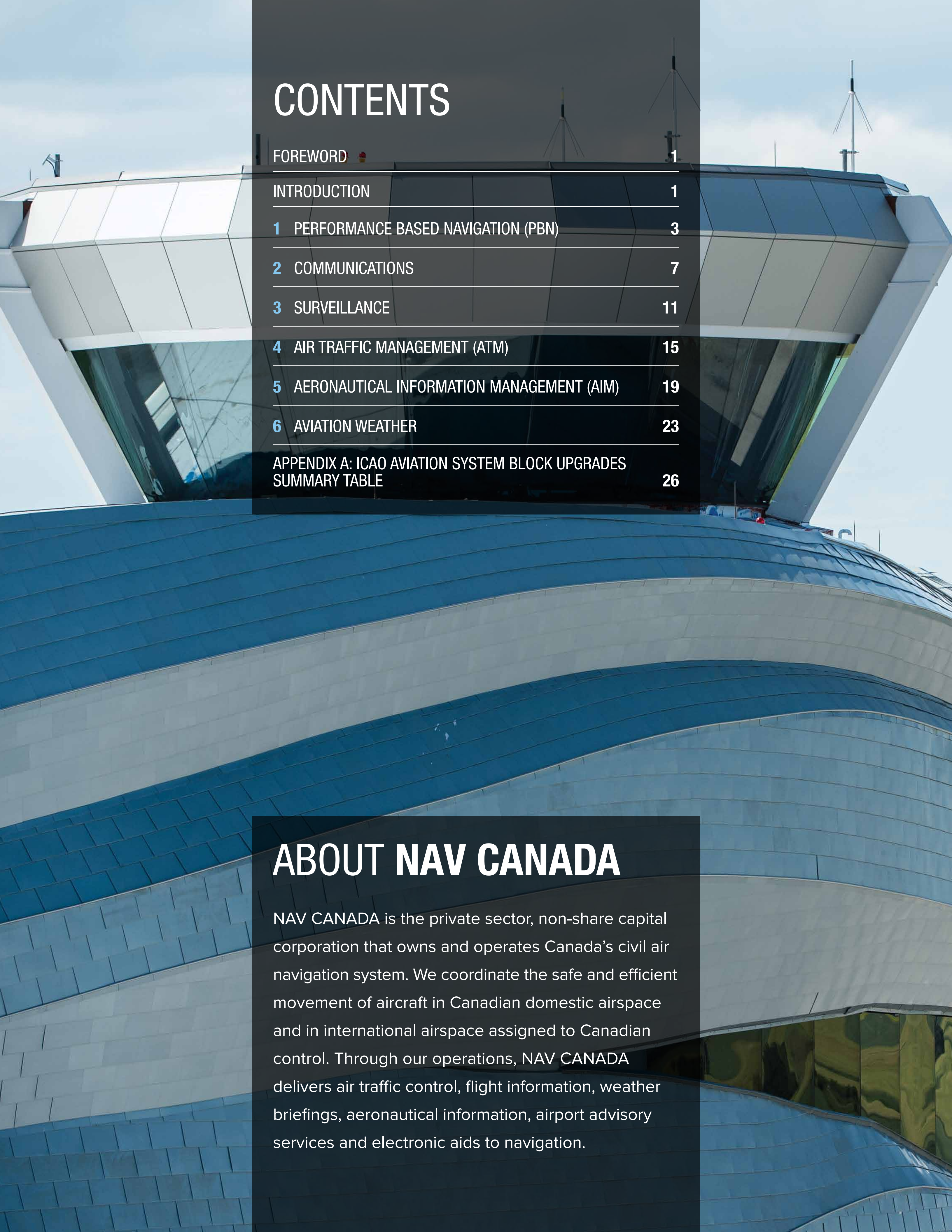
NAV CANADA

CHARTING THE FUTURE

The Air Navigation System Plan

SEPTEMBER 2015

SERVING A WORLD IN MOTION



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ABOUT **NAV CANADA**

NAV CANADA is the private sector, non-share capital corporation that owns and operates Canada's civil air navigation system. We coordinate the safe and efficient movement of aircraft in Canadian domestic airspace and in international airspace assigned to Canadian control. Through our operations, NAV CANADA delivers air traffic control, flight information, weather briefings, aeronautical information, airport advisory services and electronic aids to navigation.

FOREWORD

I'm pleased to provide an update on NAV CANADA plans for future ANS system development. This installment of Charting the Future: The Air Navigation System Plan details key technological initiatives that will enhance services and deliver value to our customers.

Many of these activities will be transformational, providing for significant increases in safety, efficiency and reliability.

More often than not, they take place in the global context, where benefits increase as more ANSPs, customer groups and other industry stakeholders make strategic choices to engage in the process of change, to implement new technologies or to refine procedures. There is no single formula to determine when it becomes the ideal time to make these changes, but it is the goal of NAV CANADA to do so in a timely manner – working towards alignment in the industry and staying ahead of key areas of customer need.

As a direct reflection of that endeavour, activities being planned in this document are mapped to the global harmonization activities of the International Civil Aviation Organization (ICAO) through the ICAO Aviation System Block Upgrades.

None of these initiatives would be possible without the input and collaboration of our customers and other key stakeholders. As always, we look forward to working towards new objectives with – and for – you.

John W. Crichton
President and Chief Executive Officer

INTRODUCTION

The Air Navigation System (ANS) Plan describes NAV CANADA's short-term and medium-term initiatives aimed at meeting customers' requirements. It provides an outlook to generate discussion among customers, employees and other stakeholders, with the goal of choosing the most beneficial path to the ANS of the future. NAV CANADA will continue to communicate and collaborate with customers through this plan and other documents such as Direct Route and websites such as OnBoard.

Structure

The ANS Plan is organized into the following sections:

- Performance Based Navigation (PBN)
- Communications
- Surveillance
- Air Traffic Management (ATM)
- Aeronautical Information Management (AIM)
- Aviation Weather

Timeframes

The content in each section is presented in two timeframes in calendar years:

- Short-Term 2015–2017
- Medium-Term 2018–2022

Content

The content of each section is supported by supplementary information contained in text boxes, a timeframe graph with callout boxes highlighting key milestones and an acronym table.

Mapping to ICAO Aviation System Block Upgrades

NAV CANADA initiatives in the ANS Plan are mapped to the ICAO Aviation System Block Upgrades. This links the modernization initiatives of NAV CANADA to the global harmonization activities of ICAO. In the timeframe graph, NAV CANADA initiatives in each callout box are mapped, when applicable, to the summary table of the ICAO system block upgrades contained in Appendix A (i.e., **B0-FRTO** maps to module Block number 0 (B0) thread Free Route Operations (FRTO)).

Update Schedule

The ANS Plan will be updated every three years coinciding with the short-term time frame.

Questions Comments

To provide comments or for more information on the ANS Plan please contact NAV CANADA Customer Service at service@navcanada.ca or 1-800-876-4693.

1 PERFORMANCE BASED NAVIGATION (PBN)

Overview

Advances in navigation defined performance and functionality have enabled changes in airspace design, separation minima, route spacing, airport access, procedure design and air traffic management. PBN provides a list of navigation specifications that have applicability to one or more types of airspace (terminal, enroute, and remote/oceanic) and is only one of several enablers (Surveillance, Communications and Air Traffic Management) of an airspace concept. The use of PBN will enhance the reliability and predictability of approaches resulting in improved airport accessibility. As with all changes to the ANS, PBN will be implemented where feasible, based on a positive business case.

> **PBN** provides the basis for a regulatory framework that addresses today's and tomorrow's navigation requirements for safety, efficiency, capacity, accessibility and the environment.

Short-Term 2015–2017

In the enroute environment Jet, Victor and LF airways will progressively transition to Q, T and L routes. In terminal airspace additional RNAV SIDs will be introduced, some vector SIDs will remain, and all non-RNAV STARs will be withdrawn. Existing RNAV STARs and SIDs will be designated as RNAV 1, RNAV 2 or RNP 1 procedures. Approach operations will continue to be developed and implemented with LNAV and Baro VNAV or LPV. Based on the regional GNSS implementation program RNAV (GNSS) procedures will be developed to each IFR runway end with at least one lateral-only DA (LNAV) and one lateral and vertical DA (LNAV/VNAV, LPV, or RNP and Baro VNAV). RNP AR approach procedures will be implemented for the parallel runway operations at Montreal, Toronto, Calgary and Vancouver. RNP AR approach procedures will also be implemented at airports that do not have suitable access due to the obstacle environment. New non-RNAV approach procedures will be limited to new ILS installations. Retention of ground-based navigation aids will be addressed as part of the national strategy for the GNSS backup system and procedures.

> **Q routes** are RNAV routes above FL180.
> **T routes** are RNAV routes below FL180 in controlled airspace.
> **L routes** are RNAV routes below FL180 in uncontrolled airspace.

> **The regional GNSS implementation program** has subdivided Canada into seven areas based on customers' route structures and geography. Implementation priority will be established in consultation with our customers by region commencing with areas A and B which includes NU, NWT, YT and selected northern sites in SK, MB and ON.

Medium-Term 2018–2022

Canadian high level airspace (above FL180) is planned to be identified as area navigation required with either RNAV 2 or RNP 2. The development of ATS routes will continue where structured flows are required. Opportunities for closely spaced parallel routes, enhancing climb, descent and overtake scenarios, will be pursued. A combination of static and dynamic waypoints will be introduced enabling point-to-point preferred routes. NAT oceanic airspace will transition to RNAV 10 (RNP 10) or RNP 4. In the terminal environment dependence on RNP will enable tighter aircraft containment and narrower obstacle clearance areas, resulting in greater airport accessibility. A-RNP will be deployed to manage high density traffic. Lateral and vertical terminal corridors will be introduced. An appropriate level of airport access will be ensured by both lateral and vertically guided approach designs. The possibility of introducing GBAS to provide CAT I/II/III operations will be investigated in terms of technical, operational and financial viability. The regional GNSS implementation program will be completed.

Canadian Airspace is divided into Northern and Southern domestic airspace with further classification into CMNPS and RNPC. Navigation performance requirements in Canada are classified as meeting either of these unique Canadian standards. These designations will be replaced by PBN Navigation Specifications.

ACRONYM TABLE

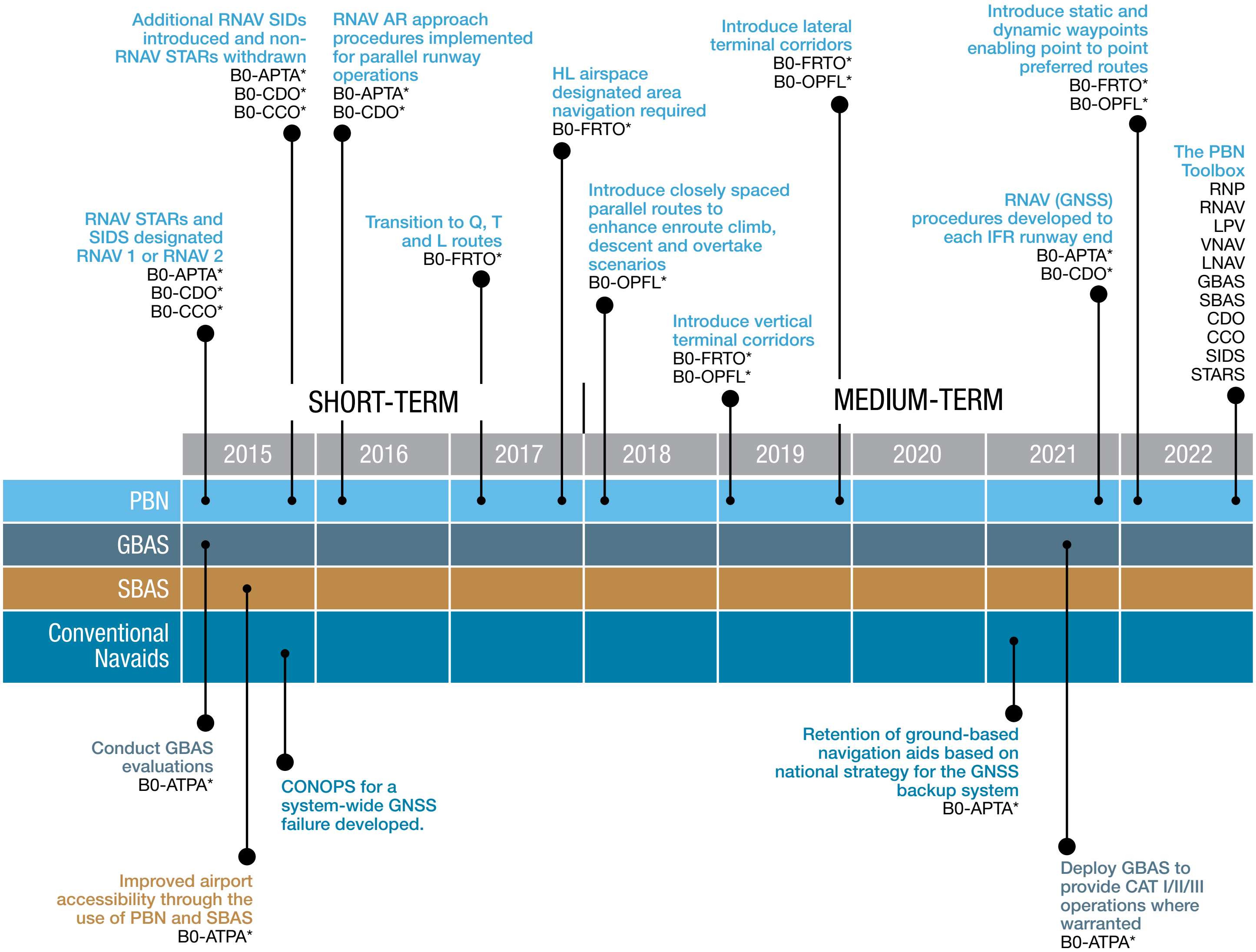
ADS-B	Automatic Dependent Surveillance-Broadcast
ANS	Air Navigation System
A-RNP	Advanced Required Navigation Performance
ATS	Air Traffic Services
BARO	Barometric
CAT	Category (of instrument landing system)
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
CONOPS	Concept of Operations
CMNPS	Canadian Minimum Navigation Performance Specifications
CPDLC	Controller-Pilot Data Link Communications
DA	Decision Altitude
DCPC	Direct Controller-Pilot Communications
FL	Flight Level
GBAS	Ground Based Augmentation System
GNSS	Global Navigation Satellite System
HL	High Level
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical guidance
LF	Low Frequency
NAT	North Atlantic
PBN	Performance Based Navigation
RNAV	Area Navigation
RNP	Required Navigation Performance
RNP AR	Required Navigation Performance Authorization Required
RNPC	Required Navigation Performance Capability
SBAS	Space-Based Augmentation System
SIDS	Standard Instrument Departures
STAR	Standard Terminal Arrival Routes
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System
WAM	Wide Area Multilateration applied in the airborne environment

NAV CANADA supports the extension of the U.S. **WAAS** into Canadian airspace to approximately 70 degrees north. This service supports our application of LPV approaches and where the airport infrastructure and obstacle environment permit, these procedures will have a DA as low as 200 feet above the touchdown zone elevation. WAAS supports high integrity positioning supporting RNP and surveillance applications.

WAAS is the U.S. version of the internationally-used **SBAS**

PBN TIMEFRAME

Implementation will be based on priorities that are cognizant of regulations (current and future) as well as customer requirements and capabilities. The requirement is for a total system capability to enable an air operation and therefore implementation will be aligned with advancements in communications (DCPC, CPDLC), surveillance (space-based and terrestrial ADS-B, WAM) and Air Traffic Management. PBN implementation projects will meet stakeholder requirements and a viable business case.



Note: *See explanation of mapping to ICAO Aviation System Block Upgrades on page 1.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2 COMMUNICATIONS

Overview

Communications are an integral element of navigation, surveillance and ATM initiatives. There will be a significant increase in the use of data link with the benefit of high speed, high integrity data transfers, reduced frequency congestion and improved message clarity. However, voice communications, will remain as an efficient method of achieving DCPC. The use of existing CPDLC message sets will be expanded.

Short-Term 2015–2017

The VHF radio replacement program will continue to its completion. SATCOM voice usage will continue to be increased by identifying equipped aircraft and communicating to them through SATCOM. The International AFTN links are planned to be migrated towards IP using the AMHS protocol and arrangements with International partners to transition to AMHS are in progress.
AFTN will remain status quo for domestic IP services. AFTN serial (communication protocol) will be decommissioned domestically in 2015 which means customers will no longer be able to use their legacy AFTN serial software and will require AFTN IP software to continue to receive AFTN service from NAV CANADA. ADS-C will be implemented at domestic facilities which involves an enhancement of CAATS to receive ADS-C waypoint reporting through the ACARS datalink instead of AFTN. ADS-C will be used to increase periodic reporting through contracts which will help to further reduce separation. Further AIDC development will be undertaken in the CAATS system to facilitate communications and coordination with the FAA. North Atlantic Common Co-ordination (NATCC) is a form of AIDC used in the Gander FIR. NATCC is implemented with all ANSPs adjacent to Gander airspace. Enhancements to GAATS+ and NATCC, including in addition to the initial estimate, multiple modifications to estimates and electronic acceptance by the receiving ANSP, were implemented in 2014. Enhancements to CPDLC will include full route messages and DCL messages to aircraft. Communications between the AOCC and ATC using automated systems for flight planning purposes will be developed.

The eight year NAV CANADA VHF radio replacement program will be completed in 2016. Over 2,000 VHF radio pairs, fully compatible with all current and planned future analog and digital voice and text message formats, will be installed at some 320 sites across the country. All radios will be capable of future international standards either VDL digital communications or 8.33 kHz spacing. The radios will be configured for 25 kHz frequency spacing, matching current frequency assignments in Canada and the USA.

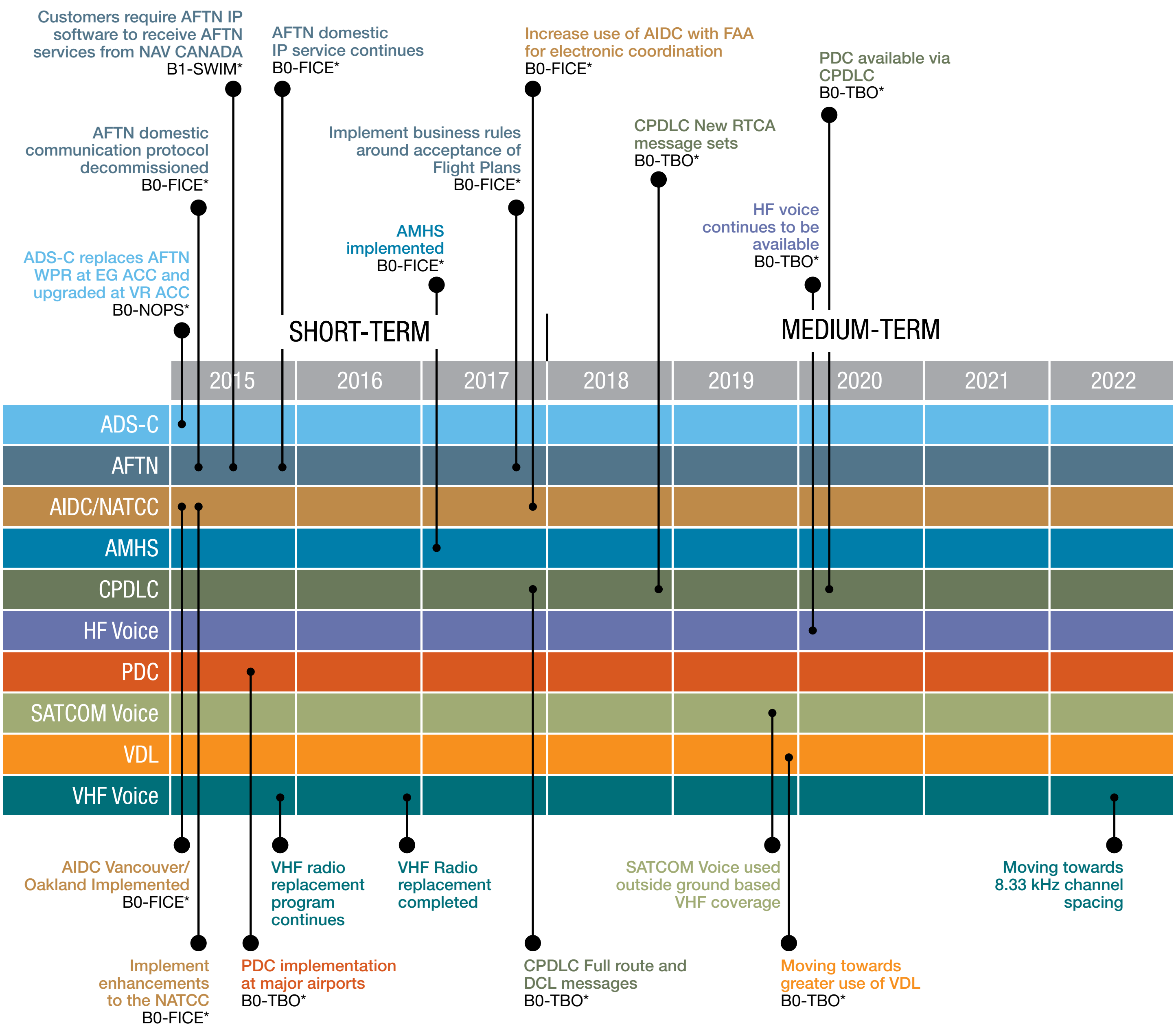
AMHS is a modern electronic messaging system used to transfer and deliver ground to ground data such as flight plans, NOTAM and weather information amongst the members of the global air traffic control community.

Medium-Term 2018–2022

Consideration will be given to expand CPDLC to include new message sets created by RTCA SC-214 based on a positive business case. PDC will be available via CPDLC. According to current Regulatory documentation, HF voice will continue to be available at a minimum until 2028. All radios will be capable of VDL digital communications or 8.33 kHz channel spacing. NAV CANADA will continue to modernize our telecommunications infrastructure to accommodate future technology advances and associated customer requirements.

CPDLC is a means of communications between controller and pilot using data link for ATC communications. It enables controllers in ACCs and pilots in suitably equipped aircraft to communicate using standardized text-based messages instead of voice. It provides less chance of error and relieves radio frequency congestion. National implementation of CPDLC above 29,000 feet was completed in 2014.

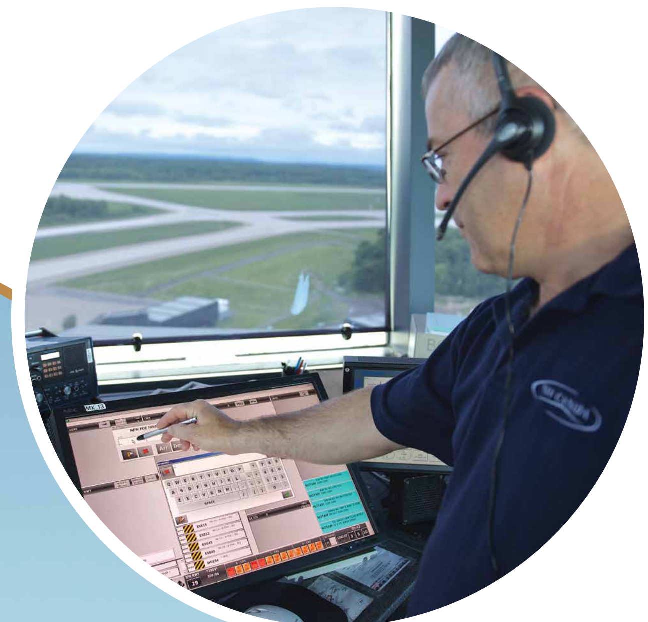
COMMUNICATIONS TIMEFRAME



Note: *See explanation of mapping to ICAO Aviation System Block Upgrades on page 1.

ACRONYM TABLE

ACARS	Aircraft Communications Addressing and Reporting System
ACC	Area Control Centre
ADS-C	Automatic Dependent Surveillance – Contract
AFTN	Aeronautical Fixed Telecommunications Network
AIDC	ATS Interfacility Data Communication
AMHS	Air Traffic Services Message Handling System
ANSP	Air Navigation Service Provider
AOCC	Airline Operations Control Centre
ATC	Air Traffic Control
ATM	Air Traffic Management
CAATS	Canadian Automated Air Traffic System
CPDLC	Controller Pilot Data Link Communications
DCL	Departure Clearance
DCPC	Direct Controller Pilot Communications
FAA	Federal Aviation Administration (United States)
FIR	Flight Information Region
GAATS	Gander Automated Air Traffic System
HF	High Frequency
IP	Internet Protocol
NATCC	North Atlantic Common Co-ordination
NOTAM	Notice to Airmen (pilots)
PDC	Pre-departure Clearance
RTCA SC	Radio Technical Commission for Aeronautics – Special Committee
SATCOM	Satellite Communications
VDL	Very High Frequency Data Link
VHF	Very High Frequency
WPR	Waypoint Reporting



3 SURVEILLANCE

Overview

Today's surveillance technology includes Primary and Secondary Radar, Airport Surface Detection Equipment, ground-based Automatic Dependent Surveillance-Broadcast, Multilateration and Video images as well as related surveillance fusion processing. NAV CANADA, in partnership with other ANSPs and stakeholders, is pursuing space-based ADS-B through a venture called Aireon which will see ADS-B receivers hosted on Iridium NEXT constellation of 66 cross-linked LEO satellites, enabling a global surveillance service. Space-based ADS-B supports global ATM through information sharing and collaborative processes enabled by improved situational awareness (i.e. SWIM) and enhanced interoperability. Space-based surveillance will support a more flexible air operator-centric operating environment in oceanic, remote and polar airspace, increase safety and accelerate the harmonization of aviation.

ADS-B equipped aircraft automatically transmit their GNSS position data via data link. These messages can be received by ground stations or satellites and routed to ATC facilities for use in ATM. ADS-B messages contain a large quantity of information including aircraft position, altitude, speed and trajectory.

Short-Term 2015–2017

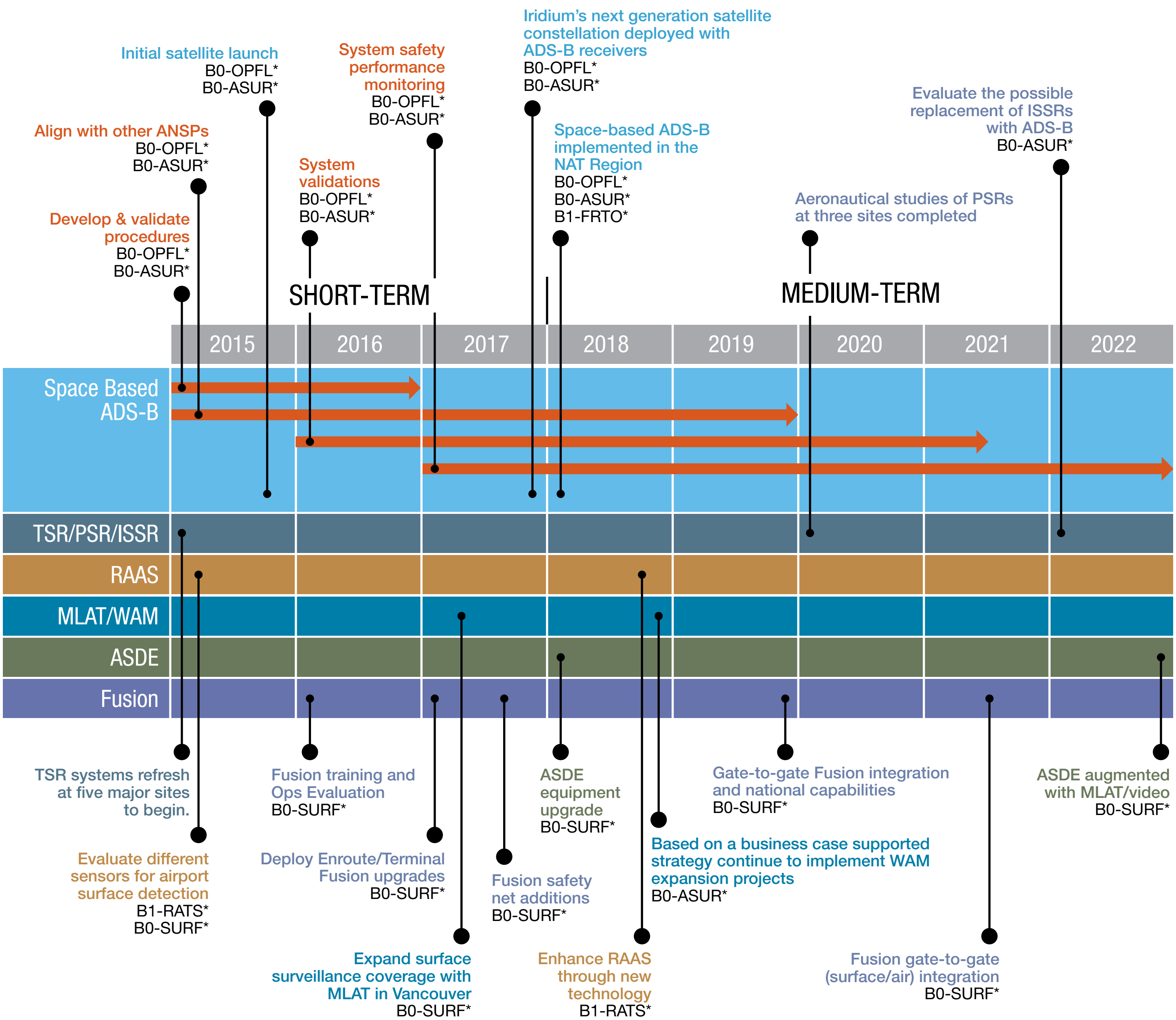
NAV CANADA will expand surveillance in the North Atlantic using space-based ADS-B. The satellites are scheduled to be launched from late 2015 until mid 2017. The operational use of space-based ADS-B data in 2017 will evolve, in a stepped approach, to the provision of 15 nautical mile surveillance separation by 2018. TSR equipment will be upgraded at five major sites between 2015 and 2020: Toronto, Vancouver, Calgary, Montreal and Hamilton. Surveillance processing systems will be upgraded to employ fusion tracking technology through regional (air fusion) programs. Fusion combines data from multiple sources so that the resultant information for use in the provision of ANS services is more accurate, consistent and timely. Fusion takes on a number of forms. Fusing data for ATC display is one form utilized in ATM display systems. In the case of A-SMGCS and surveillance fusion systems, surveillance data, including aircraft-derived, ground-based and safety alert information, is fused enhancing airport and gate-to-gate traffic management services respectively.

A-SMGCS (Advanced Surface Movement Ground Control System) consists of multiple sensors that are combined (fused) to provide a more reliable/accurate target. Sensors that can be combined to make up this system include ASDE, MLAT, cameras, VeeLo and any other sensor that can be used to detect a target to contribute to the overall picture.

Medium-Term 2018–2022

RAAS will be enhanced through the incorporation of video technology. This will include visual and thermal. Site selection is underway for proof of concept to validate technology requirements, procedures, regulatory approval and training. Testing is ongoing in Sudbury and London on the use of fusion and video to enhance airport surface detection in the RAAS environment. Aeronautical studies of the requirement for PSR will be conducted for Regina, Sault Ste. Marie and North Bay. Deployment of WAM and airport MLAT systems will be used to expand surveillance coverage in southern Canada at specific locations to improve operations. Expanding the use of fusion to include airport surface detection technology will provide gate-to-gate as well as central/national capabilities such as low-level and terminal airspace implementation, additional DAP data (i.e. TCAS RAs) and space-based ADS-B integration. Safety net upgrades will include conflict alerting into the lower flight levels and approach path monitoring. Consideration will be

SURVEILLANCE TIMEFRAME



Note: *See explanation of mapping to ICAO Aviation System Block Upgrades on page 1.

given to replacing existing ASDE and providing additional ground surveillance at new airports with ADS-B and MLAT. The application of ADS-B In will continue to be monitored.

It is envisaged that both radar and WAM will be assessed for conversion to ADS-B surveillance provided customer ADS-B equipage reaches an acceptable level. Space-based ADS-B will provide a viable alternative for radar and WAM.

MLAT is a method of position sensing using at least three receivers. The location of an aircraft or vehicle is determined by performing a time difference of arrival analysis on signals from vehicle and aircraft transponders. MLAT is used for airport ground control and WAM is used for airborne control.

ACRONYM TABLE

ADS-B	Automatic Dependent Surveillance-Broadcast
ANS	Air Navigation System
ANSP	Air Navigation Services Provider
ASDE	Airport Surface Detection Equipment
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATC	Air Traffic Control
ATM	Air Traffic Management
DAP	Downlinked Aircraft Parameter
FUSION	Surveillance Fusion System
GNSS	Global Navigation Satellite System
ISSR	Independent Secondary Surveillance Radar (ISSR is a site with SSR and no PSR)
LEO	Low Earth Orbit
MLAT	Multilateration applied in the airport surface environment
NAT	North Atlantic
NEXT	Iridium's second generation global satellite constellation
PSR	Primary Surveillance Radar
RAAS	Remote Aerodrome Advisory Service
SSR	Secondary Surveillance Radar
TCAS RA	Traffic Collision Avoidance System – Resolution Advisory
TSR	Terminal Surveillance Radar
VeeLo	Vehicle Locator
WAM	Wide Area Multilateration applied in the airborne environment

IMPLEMENTATION SUPPORTED BY SPACE BASED ADS-B

B0-FRTO	Improved Operations through Enhanced Enroute Trajectories
B1-FRTO	Improved Operations through Optimized ATS Routing
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view
B1-NOPS	Enhanced Flow Performance through Network Operational Planning
B0-OPFL	Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B
B0-SNET	Increased Effectiveness of Ground-based Safety Nets
B1-TBO	Improved Traffic Synchronization and Initial Trajectory-Based Operation.
B1-SWIM	Performance Improvement through the application of System-Wide Information Management (SWIM)
B1-RPAS	Initial Integration of Remotely Piloted Aircraft (RPA) Systems into non-segregated airspace

CURRENT TSR AIRPORTS

1. Calgary – Major
2. Montreal – Major
3. Toronto – Major
4. Vancouver – Major
5. Edmonton
6. Halifax
7. Hamilton
8. London
9. Mirabel
10. Moncton
11. North Bay
12. Ottawa
13. Quebec
14. Regina
15. Saskatoon
16. Sault Ste Marie
17. St. John's
18. Thunder Bay
19. Victoria
20. Winnipeg

ADS-B SITES

1. Brevoort
2. Cape Dyer
3. Churchill
4. Coral Harbour
5. Dewar Lakes
6. Fort Severn
7. Frederiksdal
8. Hall Beach
9. Hopedale
10. Paamiut
11. Prins Christian Sund
12. Puvirnituq
13. Rankin Inlet
14. Saglek
15. Simiutaq

WAM SITES

1. Kelowna
2. Fort St. John
3. BC Lower Mainland
4. Fredericton
5. Springbank

ISSR SITES

1. Big Trout Lake
2. Chibougamau
3. Chisasibi
4. Digby
5. Dryden
6. Fort McMurray
7. Gander
8. Goose Bay
9. Grande Prairie
10. Hearst (Kapuskasing)
11. Holberg (Port Hardy)
12. Iqaluit
13. Kamloops (Mt. Wallensteen)
14. Kuujjuaq
15. La Ronge
16. Lac Brisay
17. Langruth
18. Medicine Hat
19. Prince George
20. Sandspit (Masset)
21. Sept Iles
22. Stephenville
23. Stoney Rapids
24. Sydney
25. Thompson
26. Yellowknife

4 AIR TRAFFIC MANAGEMENT (ATM)

Overview

ATM, the integrated management of air traffic and airspace, will continue to be provided and enhanced safely, economically and efficiently to meet current and future customer requirements. The ATM system must provide collaborative, seamless services supported by communications, navigation and surveillance in a system-wide information management environment that generates and manages information through the use of technology. Systems will be enhanced incrementally to support growth in performance-based services.

A **roadmap** will be produced for the next phase of development and deployment of future ATM **technology** that:

- features a robust and flexible system design;
- establishes baseline standards for theme-based adaptation;
- incorporates safety, efficiency and Human Factors into a user friendly HMI;
- offers technology that will enhance service delivery to customers; and
- considers and facilitates future industry-wide and NAV CANADA specific initiatives.

Short-Term 2015–2017

CFPS integrated weather and Flight Plan data functionality will be implemented in 2016 allowing web-based geo-referenced pilot briefings. Enterprise Service Bus (ESB) technology for NextGen and SESAR compliant flight, weather, NOTAM and aeronautical data exchange between internal systems and with third party systems to support SWIM architecture will be implemented. In 2017 data exchange capability using FIXM will be piloted. The FSS Technology Upgrade Project will be completed in 2015. The ICAO compliant data exchange interface, WXXM, for weather data exchange between CFPS and internal and third party systems will be implemented in 2017. AMAN will be procured and implemented in 2017. On-line coordination with AOCCs will be developed. Phase 1 of RLatSM will be implemented in 2015. If supported by a positive business case, Phase 2 of RLatSM will be implemented in 2016. RLongSM, currently in trial in the NAT, will be implemented when the standard is recognized globally by ICAO. A CONOPS will be developed for the implementation of RLatSM Phase 3 in 2017. Working with industry, Transport Canada and ICAO advance the integration of RPAS into the ANS. A CONOPS that will allow aircraft to land at a suitable airport or continue as directed by ATC in the event of a catastrophic GNSS failure will be developed.

The **FSS Technology Upgrade** project will deploy a standardized IIDS suite, networking and a common adaptation to all 57 FSS, including EXCDS, OIDS and NARDS. This project also coordinates the deployment of HWOS and ADMS/ACS into FSS to replace MIDS.

Phase 2 of RLatSM will reduce the geographical footprint of the OTS from an average band of five whole degrees of latitude (nominally 240NM) to three whole degrees (nominally 120NM) increasing the available airspace for random routing.

Medium-Term 2018–2022

Decision support tools such as SARA will be implemented. Implement ICAO compliant data exchange interface, for flight data exchange model (FIXM) between ATM and internal and third party systems. Based on a business case supported strategy the deployment of SARA and other advanced decision support tools will be expanded. The capability and functionality of CAATS, Fusion and GAATS+ will be advanced as warranted. In concert with NextGen and SESAR, the concepts of

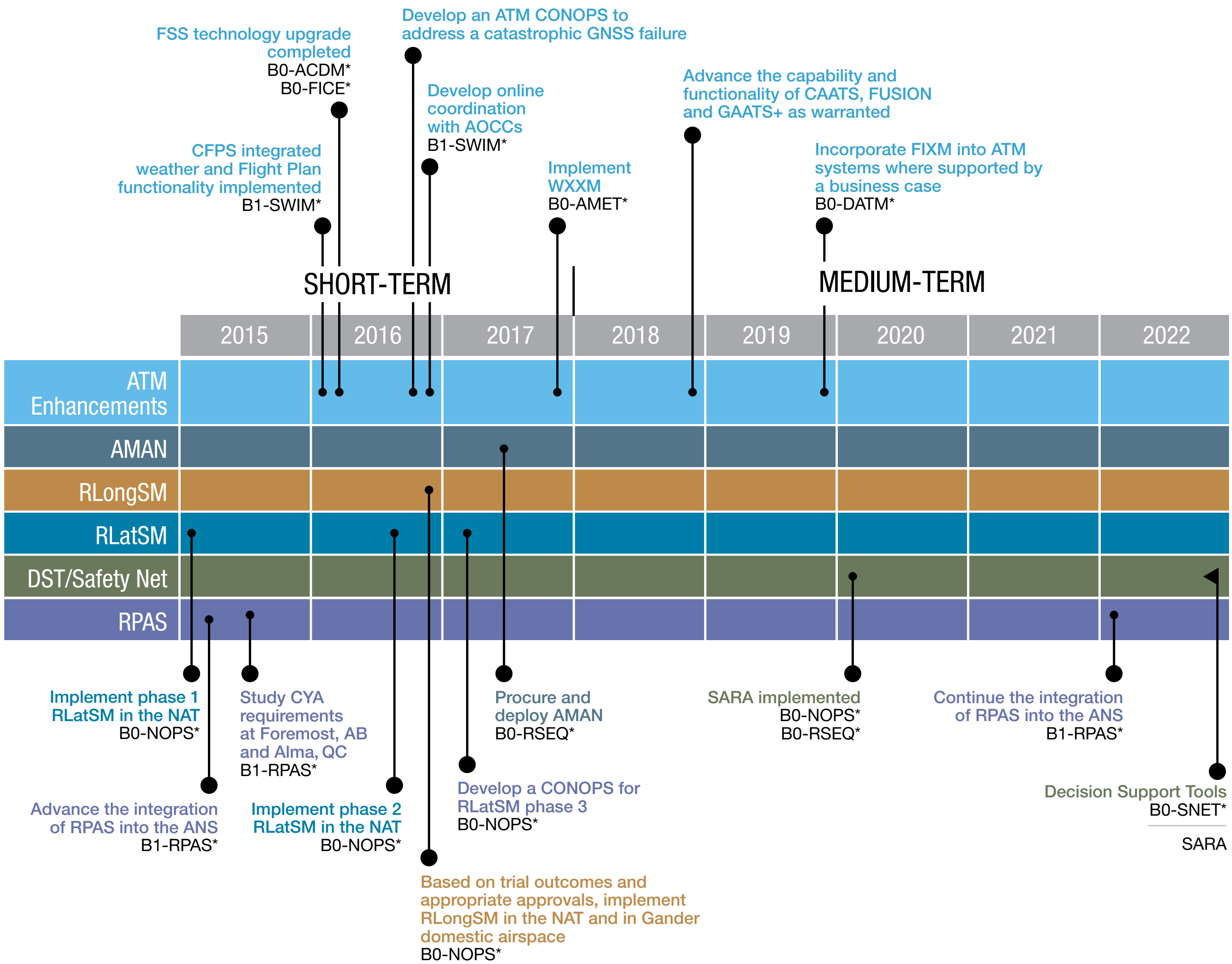
RLatSM REQUIREMENTS

1	RNP4 operations
2	ADS-C reporting
3	CPDLC established

RLatSM IMPLEMENTATION PHASES

Phase 1 [2015]	25 NM lateral separation being applied via ½ degree track spacing between the two core tracks of the OTS from FL350 to FL390 inclusive
Phase 2 [2016] following Phase 1	25 NM lateral separation being applied via ½ degree spacing throughout the entire NAT OTS from FL350 to FL390 inclusive
Phase 3 [CONOPS in 2017]	25 NM lateral separation ½ degree spacing through the entire NAT Region, within vertical limits of NAT Data Link Mandated airspace

ATM TIMEFRAME



Note: *See explanation of mapping to ICAO Aviation System Block Upgrades on page 1.

SARA provides speed and route advisories to assist in ensuring an aircraft's time over a meter fix at a time provided by an arrival sequencing system.

FF-ICE will be researched and implemented when advancements to interoperability, efficiency and capacity can be effectively achieved. The integration of RPAS into the ANS will continue. A common operating platform for CAATS and GAATS will be introduced.

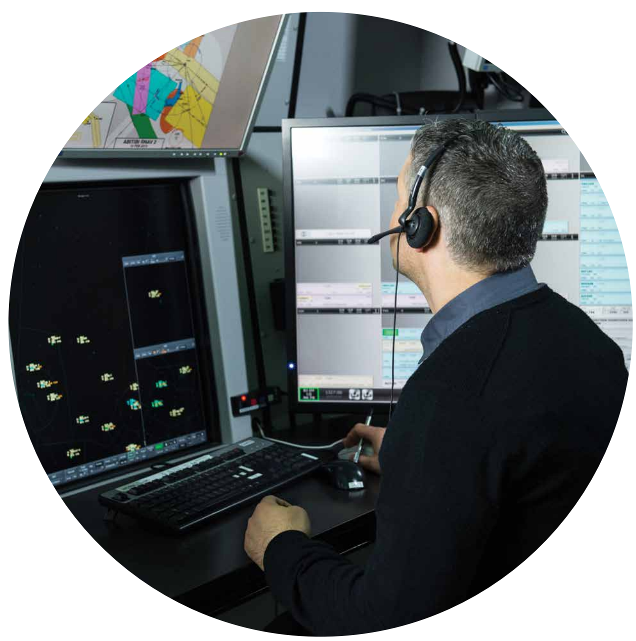
Separation optimizations and related safety net improvements (e.g. Terminal Short-Term Conflict Alert (STCA), Air-Ground Conformance) will be implemented through incremental deployment of data fusion technologies.

Technological advancements in both onboard and ground based systems have enabled the development of reduced separation standards. NAV CANADA will continue to explore and implement improved separation standards as warranted.

It is envisaged that advances in ATFM, including dynamic ATS routing, system wide flow management, and interval management will result in a balancing of demand with capacity. If supported by a business case, Phase 3 of the RLatSM will be implemented in the NAT. The concept of FF-ICE will continue to be pursued.

ACRONYM TABLE

ADMS	Aeronautical Data Management System
ADS-C	Automatic Dependent Surveillance – Contract
AMAN	Arrival Management
ANS	Air Navigation System
AOCC	Airline Operations Control Centre
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
CAATS	Canadian Automated Air Traffic System
CFPS	Collaborative Flight Planning System
CONOPS	Concept of Operations
CPDLC	Controller Pilot Data Link Communications
CYA	Class F Advisory Airspace
DMAN	Departure Management
DST	Decision Support Tools (and Safety Net Functions)
ESB	Enterprise Service Bus
EXCDS	Extended Computer Display System
FF-ICE	Flight and Flow Information for a Collaborative Environment
FIXM	Flight Information Exchange Model
FSS	Flight Service Station
GAATS+	Gander Automated Air Traffic System
GNSS	Global Navigation Satellite Surveillance
HMI	Human Machine Interface
HWOS	Human Weather Observation System
ICAO	International Civil Aviation Organization
IIDS	Integrated Information Display System
MIDS	Multipurpose Information Display System
NARDS	NAV CANADA Auxiliary Radar Display System
NAT	North Atlantic
NextGen	Unites States' Next Generation Air Transportation System
NOTAM	Notice to Airmen
OIDS	Operational Information Display System
OTS	Organized Track System
RLatSM	Reduced Lateral Separation Minimum
RLongSM	Reduced Longitudinal Separation Minimum
RNP	Required Navigation Performance
RPAS	Remotely Piloted Aircraft Systems
SARA	Speed and Route Advisor
SESAR	Europe's Single European Sky ATM Research
STCA	Short-Term Conflict Aleert
FUSION	Surveillance Fusion System
SWIM	System Wide Information Management
WXXM	Weather Exchange Model

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5 AERONAUTICAL INFORMATION MANAGEMENT (AIM)

Overview

AIM is the integrated management of aeronautical information services through the provision and exchange of quality-assured digital aeronautical data. This provision and exchange of data ensures the flow of information necessary for the safety, regularity and efficiency of international air navigation. NAV CANADA is making data available to customers in more standardized forms that can be manipulated for display as products specific to customers' requirements. Electronic publications are now available for download from an e-commerce site and on portable electronic devices.

Short-Term 2015–2017

The ICAO specified content of the AIP including AIP amendments, supplements and circulars will be published in a structured electronic format referred to as the eAIP. Canadian NOTAM will be replaced with the ICAO format and standard including geo-referencing and grouping in series for ease of use by pilot briefings systems. Building on the success of RSC reporting, web-based and automated NOTAM submission will be implemented. NOTAM data will be distributed to internal and external systems including EAD. Automated friction measurement reporting and the interface for manual and automated input of RSC reports will continue to be expanded to additional airports. The eCFS will be available by province. The electronic publications product line and agreements with vendors, for the provision of Canadian aeronautical data on portable electronic devices, will be expanded. The concept of providing downloadable electronic charts enabling improved search and presentation capabilities will be researched. Aeronautical Publications will explore the feasibility of distributing aeronautical information in electronic format only, with a vendor option of print on demand. Electronic submission of aeronautical information/data will be implemented. The process to assess the impact of all man-made obstacles will be automated.

The **eAIP** will replace the AIRAC and paper AIP.

CURRENT ELECTRONIC AERONAUTICAL PRODUCTS

- ePUB CD (reference only)
- RCAP CD
- eCFS
- eCAP
- eRCAP
- eWAS

ELECTRONIC SUBMISSION WILL INCLUDE

- Aerodrome changes
- Survey data
- Obstacle evaluation/proposals
- Instrument Procedure submissions
- Infrastructure changes
- Communications changes
- Airspace/Airway changes
- Navigation Aid changes

Medium-Term 2018–2022

NOTAMJ will be replaced with the ICAO format SNOWTAM. Digital NOTAM will replace the current free text message composition format. Customer eTOD requirements and the associated business case continues to be developed in full collaboration with customers. The availability of eTOD will continue to expand.

NAV CANADA AIM will provide data-dependent systems with high-quality, timely aeronautical information in the form of digital data based on structured databases and geographic information systems enabling improved search and presentation capabilities.

BENEFITS OF ICAO SNOWTAM

- Designed to be data driven
- ICAO standard ensures global recognition
- Reporting by runway thirds
- By definition expires after 24 hours

eTOD APPLICATIONS

- Aeronautical chart production
- Instrument procedure design
- Minimum safe altitude warning systems
- Ground proximity warning systems
- Emergency contingency procedures
- Advanced surface movement guidance and control systems
- Approach path monitoring
- Air-ground automated coordination (trajectory based operations)

The automation of the **land use assessment process**, which determines the impact of man-made obstacles, such as wind turbines, on aviation, will enhance flight safety.

ACRONYM TABLE

AIRAC	Aeronautical Information Regulation and Control
DAH	Designated Airspace Handbook
EAD	European Aeronautical Database
eAIP	Electronic Aeronautical Information Publication
eCAP	Electronic Canada Air Pilot
eCFS	Electronic Canada Flight Supplement
ePUB	Electronic Publications
eRCAP	Electronic Restricted Canada Air Pilot
eTOD	Electronic Terrain and Obstacle Data
eWAS	Electronic Water Aerodrome Supplement
PED	Portable Electronic Device
NOTAM	ICAO format NOTAM (Notice to airmen)
RSC	Runway Surface Condition
SNOWTAM	A NOTAM series addressing snow, ice, slush on movement areas

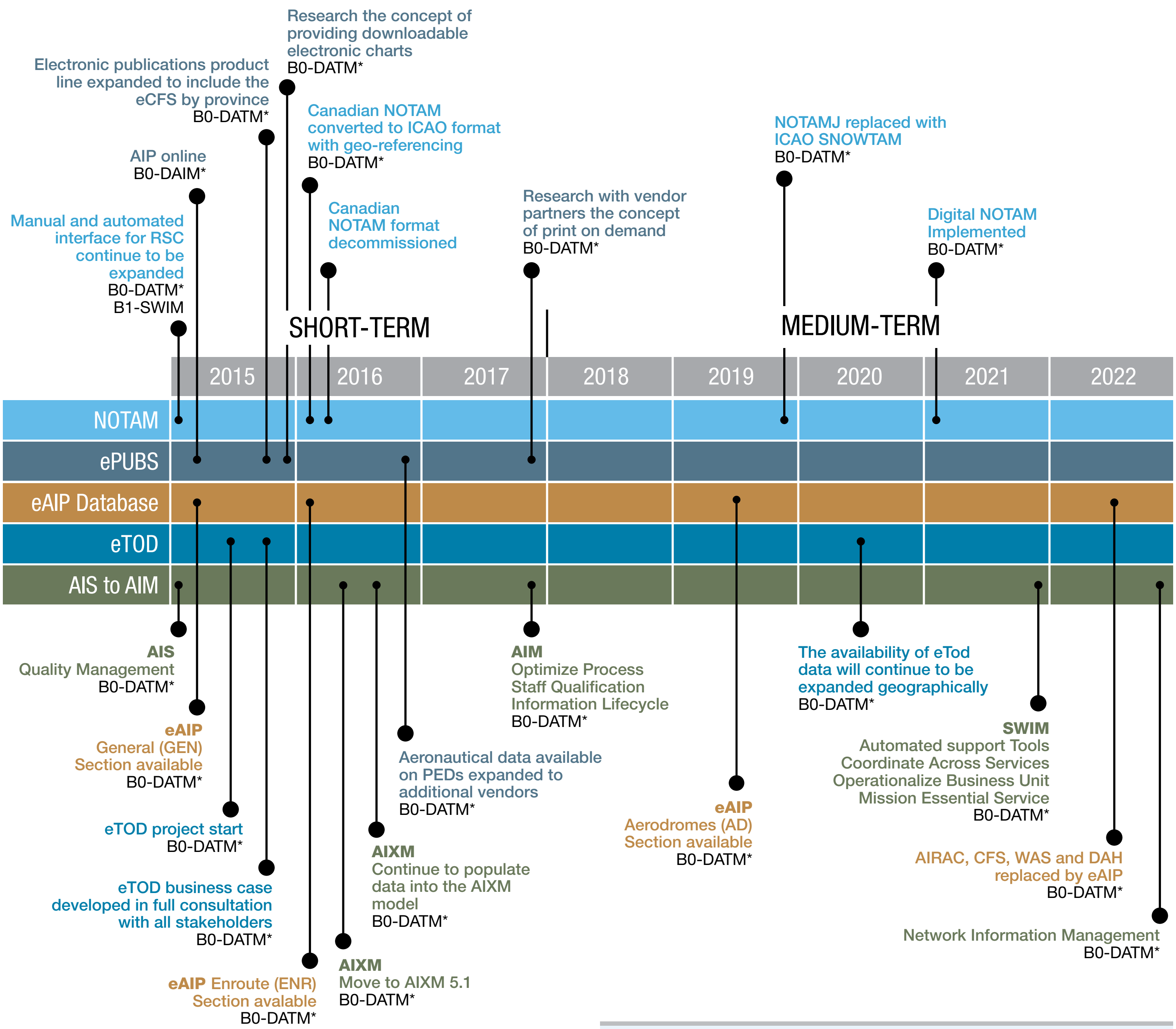
NOTAM SERIES

A	Aerodrome/Movement or Landing Area
B	ATC Facilities and Services
C	Special Uses Airspace
D	Obstruction
E	Airspace
G	GNSS
H	Chart Corrections
J	Special Notices
M	Military Flight Safety
N	NAVAID
O	Other Aeronautical Information
P	Procedural
S	SNOWTAM
V	ASHTAM
W	Database Corrections
Y	Test
Z	Airway

NOTAMJ is a Canadian special-series NOTAM that contains information related to the condition and braking action of runway surfaces in relation to published criteria.

Additions, withdrawals and amendments to published aeronautical information are distributed under the regulated system AIRAC which provides advance notification of changes to aeronautical information based on an established series of common effective dates.

AIM TIMEFRAME



Digital NOTAM will integrate aeronautical data into a comprehensive data management system providing more standardized and consolidated information to our customers.

Note: *See explanation of mapping to ICAO Aviation System Block Upgrades on page 1.

6 AVIATION WEATHER

Overview

NAV CANADA provides aviation weather services through the distribution of aviation weather reports and forecasts prepared primarily by the Meteorological Service of Canada. These products are available through numerous means including the NAV CANADA aviation weather website. Efforts continue to improve pilot awareness and understanding of available enroute and pre-flight weather services, such as digital weather camera information, which is available throughout Northern and remote service areas either online or by contacting the local FIC.

The AWWS is being replaced by CFPS which will be designed to provide weather, NOTAM, aeronautical, weather camera and flight plan information to both internal and external users. Flight service specialists, air traffic controllers, pilots and dispatchers will be able to view, use and share the same weather and flight plan information, allowing for collaboration between all stakeholders.

Short-Term 2015–2017

CFPS data will be displayed as geo-referenced information, allowing users to make decisions using all information for their route of flight. The initial deployment of CFPS, allowing external users to file, cancel, delay, or change flight plans has been completed. The weather elements will be gradually added as CFPS continues to evolve over the next two years. HWOS will be implemented in all human weather observation sites (over 160); including NAV CANADA part time staffed facilities (e.g. CWOs, FICs, FSS and TWRs). The aviation weather forecast production system will gradually introduce semi-automated TAFs by the end of 2016. WX Cams provide images of current conditions at more than 150 sites across Canada, 146 of which are currently available through AWWS. This service is expanding to another 70 sites by 2017. A back-up plan will be developed for AWOS capabilities which focuses on two main strategies: direct access to sensor equipment in the event of an AWOS outage and the provision of back-up to ensure the continuous provision of weather observations or sensor data; and to ensure the weather sensor data continues to be available to ATM systems in the event of other weather system failures.

At part-time units HWOS will soon automatically transmit the same data as that collected by an LWIS (i.e. wind, altimeter, temperature and dewpoint) directly to NAV CANADA systems such as the NAV CANADA weather website, and those used by the FICs and ACCs by issuing an hourly LWIS-type message during the closed hours of these locations.

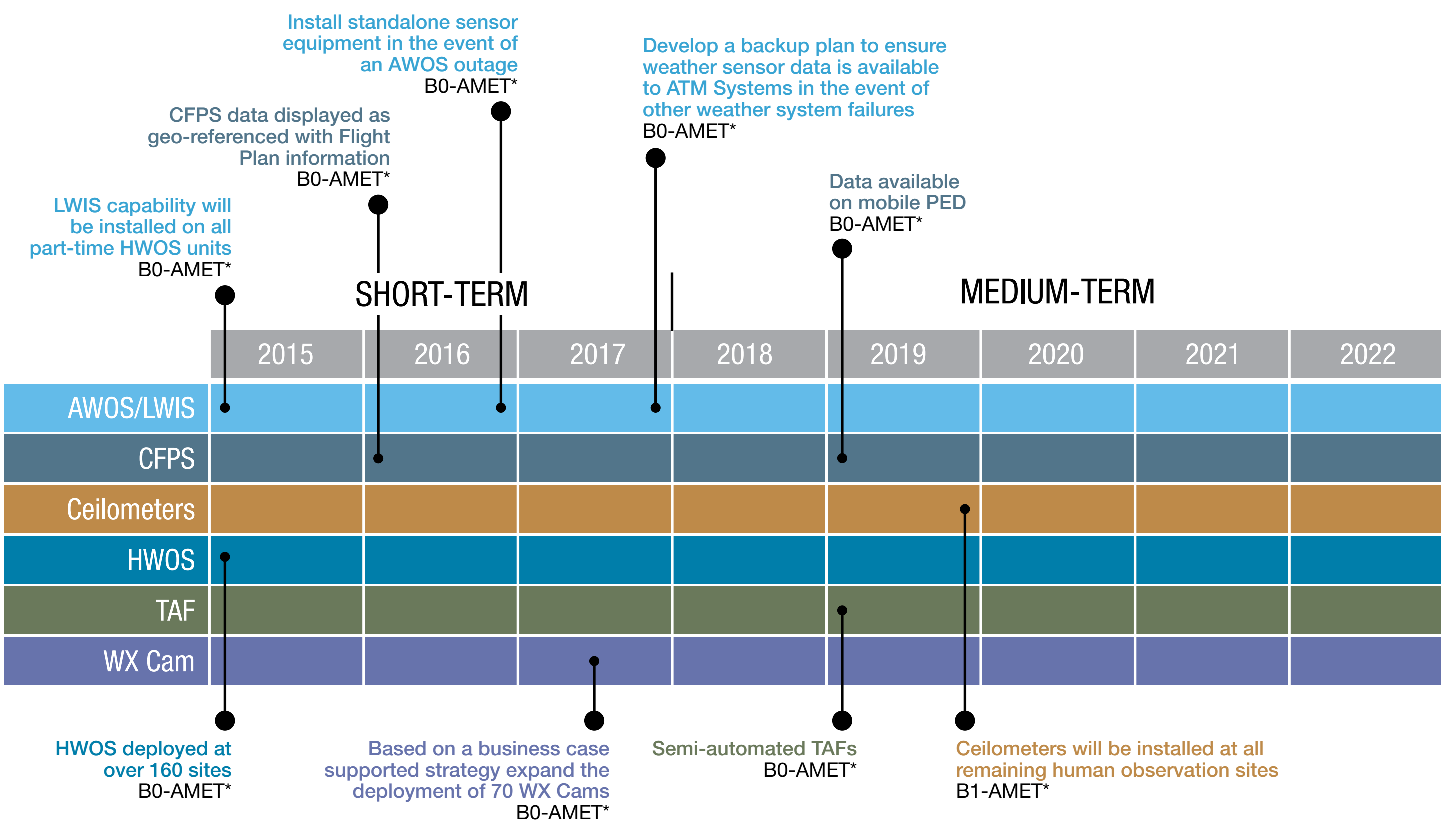
WX Cams provide near real-time images of weather and visibility conditions, accessible through the NAV CANADA weather website. The high resolution, colour image is updated every ten minutes, using a wide-angle perspective, and can be overlaid with height and distance markers that reference key elements of the landscape.

Medium-Term 2018–2022

Once CFPS is fully implemented, AWWS is expected to be decommissioned; at which point those looking to access online weather reporting will require a username and password for CFPS (a pilot, controller, flight service specialist or dispatch credentials or license number will be required). Information and updates will be available using modern technology (e.g. weather and NOTAM updates for enroute aircraft available using a mobile device such as smartphones or tablets). Enhancements to AWOS will be pursued, including applying advances in Wx Camera sensor technology. The HWOS is designed to be expandable, allowing future sensors to connect to the system. The inclusion of voice broadcast to some or all part-time HWOS sites (i.e. LWIS capability) will be assessed. The move towards a fully-automated TAF is an ongoing activity that will proceed as evolving technologies allow and in consideration of customer requirements. Ceilometers are planned to be installed at all remaining human weather observation sites over the next few years, thus replacing the helium balloons which will improve the quality and cloud height accuracy of the weather reports, especially in the northern regions, and improve cost efficiency due to the dwindling helium supply. Included with this is the transfer of responsibility for equipment maintenance from MSC to NAV CANADA.

TAF is a format for reporting aviation weather forecast information. TAFs apply to a five statute mile radius from the center of the airport runway complex and are prepared for approximately 180 aerodromes across Canada and are generally prepared four times daily with periods of validity up to a maximum of 30 hours.

AVIATION WEATHER TIMEFRAME



Note: *See explanation of mapping to ICAO Aviation System Block Upgrades on page 1.

ACRONYM TABLE

ACC Area Control Centre
AWOS Automated Weather Observation System
AWWS Aviation Weather Web Site
CFPS Collaborative Flight Planning System
CWO Contract Weather Office
HWOS Human Weather Observation System
FIC Flight Information Centre
FSS Flight Service Specialist
LWIS Limited Weather Information System
MSC Meteorological Service of Canada
NOTAM Notice to Airmen
PED Portable Electronic Device
TAF Aerodrome Forecast
TWR Tower
WX Cam Digital Weather Cameras

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About ASBU

An Aviation System Block Upgrade designates a set of improvements that can be implemented globally to enhance ATM System performance. A block is made up of modules representing a specific improvement providing a performance benefit. Modules are grouped in blocks based on the date of their availability for deployment as follows:

Block 0: available now
Block 1: available to be deployed globally from 2018
Block 2: available to be deployed globally from 2023
Block 3: available to be deployed globally from 2028 and beyond

It must be stressed that a Block's availability milestone is not the same as an implementation deadline. For example Block 0's availability milestone is set at 2013 but the implementation is expected to be achieved over the 2013–2018 timeframe. This principle applies to all Blocks.

A series of dependent Modules across consecutive Blocks is identified as a "Thread". Thread acronyms are depicted in the following table.

APTA Airport Accessibility
WAKE Wake turbulence Separation
RSEQ Runway Sequencing
SURF Surface Operations
ACDM Airport Collaborative Decision-Making
RATS Remote Air Traffic Services
FICE FF/ICE-Flight and Flow Information for the Collaborative Environment
DATM Digital Air Traffic Management
SWIM System-Wide Information Management
AMET Advanced Meteorological Information
FRTO Free Route Operations
NOPS Network Operations
ASUR Alternative Surveillance
ASEP Airborne Separation
OPFL Optimum Flight Levels
ACAS Airborne Collision Avoidance Systems
SNET Safety Nets
CDO Continuous Decent Operations
TBO Trajectory-Based Operations
CCO Continuous Climb Operations
RPAS Remotely Piloted Aircraft Systems

Modules are identified by a Block number and a Thread acronym as illustrated below.

Module **B0-APTA**

Block Number = **B0**

Thread Acronym = **APTA**

APPENDIX A: ICAO AVIATION SYSTEM BLOCK UPGRADES SUMMARY TABLE

Performance Improvement Area 1: Airport Operations

Block 0 (now)	Block 1 (2018)	Block 2 (2023)	Block 3 (2028 onward)
Airport Accessibility – APTA			
B0-APTA **Optimization of Approach Procedures including vertical guidance** This is the first step toward universal implementation of GNSS-based approaches.	B1-APTA **Optimised Airport Accessibility** This is the next step in the universal implementation of GNSS-based approaches.		
Wake turbulence Separation – WAKE			
B0-WAKE **Increased Runway Throughput through Optimized Wake Turbulence Separation** Improved throughput on departure and arrival runways through the revision of current ICAO wake vortex separation minima and procedures.	B1-WAKE **Increased Runway Throughput through Dynamic Wake Turbulence Separation** Improved throughput on departure and arrival runways through the dynamic management of wake vortex separation minima based on the real-time identification of wake vortex hazards.	B2-WAKE **Advanced Wake Turbulence Separation (Time-based)** The application of time-based aircraft-to-aircraft wake separation minima and changes to the procedures the ANSP uses to apply the wake separation minima.	
Runway Sequencing – RSEQ			
B0-RSEQ **Improved Traffic Flow through Sequencing (AMAN/DMAN)** Time-based metering to sequence departing and arriving flights.	B1-RSEQ **Improved Airport operations through Departure, Surface and Arrival Management** Extended arrival metering, Integration of surface management with departure sequencing bring robustness to runway management and increase airport performances and flight efficiency.	B2-RSEQ **Linked AMAN/DMAN** Synchronised AMAN/DMAN will promote more agile and efficient en-route and terminal operations.	B3-RSEQ **Integrated AMAN/DMAN/SMAN** Fully synchronized network management between departure airport and arrival airports for all aircraft in the air traffic system at any given point in time.
Surface Operations – SURF			
B0-SURF **Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)** Airport surface surveillance for ANSP.	B1-SURF **Enhanced Safety and Efficiency of Surface Operations – SURF, SURF IA and Enhanced Vision Systems (EVS)** Airport surface surveillance for ANSP and flight crews with safety logic, cockpit moving map displays and visual systems for taxi operations.	B2-SURF **Optimized Surface Routing and Safety Benefits (A-SMGCS Level 3-4 and SVS)** Taxi routing and guidance evolving to trajectory based on ground/cockpit monitoring and data link delivery of clearances and information. Cockpit synthetic visualisation systems.	
Airport Collaborative Decision Making – ACDM			
B0-ACDM **Improved Airport Operations through Airport – Collaborative Decision-Making (CDM)** Airport operational improvements through the way operational partners at airports work together.	B1-ACDM **Optimized Airport Operations through Airport – CDM** Airport operational improvements through the way operational partners at airports work together.		
Remote Air Traffic Services – RATS			
	B1-RATS **Remotely Operated Aerodrome Control** Remotely operated Aerodrome Control Tower contingency and remote provision of ATS to aerodromes through visualisation systems and tools.		

Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management

Block 0 (now)	Block 1 (2018)	Block 2 (2023)	Block 3 (2028 onward)
Flight and Flow Information for a Collaborative Environment (FF/ICE) – FICE			
B0-FICE **Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration** Supports the coordination of ground-ground data communication between ATS units (ATSU) based on ATS Inter-facility Data Communication (AIDC) defined by ICAO Document 9694.	B1-FICE **Increased Interoperability, Efficiency and Capacity though FF-ICE, Step 1 application before Departure** Introduction of FF-ICE step 1, to implement ground-ground exchanges using common flight information reference model, FIXM, XML and the flight object used before departure.	B2-FICE **Improved Coordination through multicentre Ground-Ground Integration: (FF-ICE/ 1 and Flight Object, SWIM)** FF-ICE supporting trajectory-based operations through exchange and distribution of information for multicentre operations using flight object implementation and Implementation and Interoperability (IOP) standards.	B3-FICE **Improved Operational Performance through the introduction of Full FF-ICE** All data for all relevant flights systematically shared between air and ground systems using SWIM in support of collaborative ATM and trajectory-based operations.
Digital Air Traffic Management – DATM			
B0-DATM **Service Improvement through Digital Aeronautical Information Management** Initial introduction of digital processing and management of information, by the implementation of AIS/AIM making use of Aeronautical Information Exchange Model (AIXM), moving to electronic AIP and better quality and availability of data.	B1-DATM **Service Improvement through Integration of all Digital ATM Information** Implementation of the ATM information reference model integrating all ATM information using UML and enabling XML data representations and data exchange based on internet protocols with WXXM for meteorological information.		
System Wide Information Management – SWIM			
	B1-SWIM **Performance Improvement through the application of System-Wide Information Management (SWIM)** Implementation of SWIM services (applications and infrastructure) creating the aviation intranet based on standard data models, and internet-based protocols to maximise interoperability.	B2-SWIM **Enabling Airborne Participation in collaborative ATM through SWIM** Connection of the aircraft an information node in SWIM enabling participation in collaborative ATM processes with access to rich voluminous dynamic data including meteorology.	
Advanced Meteorological Information – AMET			
B0-AMET **Meteorological information supporting enhanced operational efficiency and safety** Global, regional and local meteorological information provided by world area forecast centres, volcanic ash advisory centres, tropical cyclone advisory centres, aerodrome meteorological offices and meteorological watch offices in support of flexible airspace management, improved situational awareness and collaborative decision making, and dynamically-optimized flight trajectory planning.	B1-AMET **Enhanced Operational Decisions through Integrated Meteorological Information (Planning and Medium-Term Service)** Meteorological information supporting automated decision process or aids involving: meteorological information, meteorological translation, ATM impact conversion and ATM decision-making support.		B3-AMET **Enhanced Operational Decisions through Integrated Meteorological Information (Medium-Term and Immediate Service)** Meteorological information supporting both air and ground automated decision support aids for implementing weather mitigation strategies.

Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

Block 0 (now)	Block 1 (2018)	Block 2 (2023)	Block 3 (2028 onward)
Free route Operations – FRTO			
B0-FRTO **Improved Operations through Enhanced En-Route Trajectories** To allow the use of airspace which would otherwise be segregated (i.e. military airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn.	B1-FRTO **Improved Operations through Optimized ATS Routing** Introduction of free routing in defined airspace, where the flight plan is not defined as segments of a published route network or track system to facilitate adherence to the user-preferred profile.		
Network Operations – NOPS			
B0-NOPS **Improved Flow Performance through Planning based on a Network-Wide view** Collaborative ATFM measure to regulate peak flows involving departure slots, managed rate of entry into a given piece of airspace for traffic along a certain axis, requested time at a way-point or an FIR/sector boundary along the flight, use of miles-in-trail to smooth flows along a certain traffic axis and re-routing of traffic to avoid saturated areas.	B1-NOPS **Enhanced Flow Performance through Network Operational Planning** ATFM techniques that integrate the management of airspace, traffic flows including initial user driven prioritisation processes for collaboratively defining ATFM solutions based on commercial/operational priorities.	B2-NOPS **Increased user involvement in the dynamic utilization of the network.** Introduction of CDM applications supported by SWIM that permit airspace users to manage competition and prioritisation of complex ATFM solutions when the network or its nodes (airports, sector) no longer provide capacity commensurate with user demands.	B3-NOPS **Traffic Complexity Management** Introduction of complexity management to address events and phenomena that affect traffic flows due to physical limitations, economic reasons or particular events and conditions by exploiting the more accurate and rich information environment of a SWIM-based ATM.
Alternative Surveillance – ASUR			
B0-ASUR **Initial Capability for Ground Surveillance** Ground surveillance supported by ADS-B OUT and/or wide area multilateration systems will improve safety, especially search and rescue and capacity through separation reductions. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.			
Airborne Separation – ASEP			
B0-ASEP **Air Traffic Situational Awareness (ATSA)** Two ATSA (Air Traffic Situational Awareness) applications which will enhance safety and efficiency by providing pilots with the means to achieve quicker visual acquisition of targets: • AIRB (Enhanced Traffic Situational Awareness during Flight Operations). • VSA (Enhanced Visual Separation on Approach).	B1-ASEP **Increased Capacity and Efficiency through Interval Management** Interval Management (IM) improves the management of traffic flows and aircraft spacing. Precise management of intervals between aircraft with common or merging trajectories maximises airspace throughput while reducing ATC workload along with more efficient aircraft fuel burn.	B2-ASEP **Airborne Separation (ASEP)** Creation of operational benefits through temporary delegation of responsibility to the flight deck for separation provision with suitably equipped designated aircraft, thus reducing the need for conflict resolution clearances while reducing ATC workload and enabling more efficient flight profiles.	
Optimum Flight Levels – OPFL			
B0-OPFL **Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B** This prevents an aircraft being trapped at an unsatisfactory altitude and thus incurring non-optimal fuel burn for prolonged periods. The main benefit of in-trail procedure (ITP) is significant fuel savings and the uplift of greater payloads.			

continued on next page

Block 0 (now)	Block 1 (2018)	Block 2 (2023)	Block 3 (2028 onward)
Airborne Collision Avoidance Systems – ACAS			
B0-ACAS **ACAS Improvements** To provide short term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory perturbation and increase safety in cases where there is a breakdown of separation.		B2-ACAS **New Collision Avoidance System** Implementation of Airborne Collision Avoidance System (ACAS) adapted to trajectory-based operations with improved surveillance function supported by ADS-B aimed at reducing nuisance alerts and deviations. The new system will enable more efficient operations and procedures while complying with safety regulations.	
Safety Nets – SNET			
B0-SNET **Increased Effectiveness of Ground-based Safety Nets** This module provides improvements to the effectiveness of the ground-based safety nets assisting the Air Traffic Controller and generating, in a timely manner, alerts of an increased risk to flight safety (such as short-term conflict alert, area proximity warning and minimum safe altitude warning).	B1-SNET **Ground-based Safety Nets on Approach** This module enhances the safety provided by the previous module by reducing the risk of controlled flight into terrain accidents on final approach through the use of Approach Path Monitor (APM).		

Performance Improvement Area 4: Efficient Flight Paths – Through Trajectory-based Operations

Block 0 (now)	Block 1 (2018)	Block 2 (2023)	Block 3 (2028 onward)
Continuous Decent Operations – CDO			
B0-CDO **Improved Flexibility and Efficiency in Descent Profiles (CDO)** Deployment of performance-based airspace and arrival procedures that allow the aircraft to fly their optimum aircraft profile taking account of airspace and traffic complexity with continuous descent operations (CDOs).	B1-CDO **Improved Flexibility and Efficiency in Descent Profiles (CDOs) using VNAV** Deployment of performance-based airspace and arrival procedures that allow the aircraft to fly their optimum aircraft profile taking account of airspace and traffic complexity with Optimised Profile Descents (OPDs).	B2-CDO **Improved Flexibility and Efficiency in Descent Profiles (CDOs) using VNAV, required speed and time at arrival** Deployment of performance based airspace and arrival procedures that optimise the aircraft profile taking account of airspace and traffic complexity including Optimised Profile Descents (OPDs), supported by Trajectory-Based Operations and self-separation.	
Trajectory-Based Operations – TBO			
B0-TBO **Improved Safety and Efficiency through the initial application of Data Link En-Route** Implementation of an initial set of data link applications for surveillance and communications in ATC.	B1-TBO **Improved Traffic Synchronization and Initial Trajectory-Based Operation.** Improve the synchronisation of traffic flows at enroute merging points and to optimize the approach sequence through the use of 4DTRAD capability and airport applications, e.g.; D-TAXI, via the air-ground exchange of aircraft derived data related to a single controlled time of arrival (CTA).		B3-TBO **Full 4D Trajectory-based Operations** Trajectory-based operations deploys an accurate four-dimensional trajectory that is shared among all of the aviation system users at the cores of the system. This provides consistent and up-to-date information system-wide which is integrated into decision support tools facilitating global ATM decision-making.
Continuous Climb Operations – CCO			
B0-CCO **Improved Flexibility and Efficiency in Departure Profiles – Continuous Climb Operations (CCO)** Deployment of departure procedures that allow the aircraft to fly their optimum aircraft profile taking account of airspace and traffic complexity with continuous climb operations (CCOs).			
Remotely Piloted Aircraft Systems – RPAS			
	B1-RPAS **Initial Integration of Remotely Piloted Aircraft (RPA) Systems into non-segregated airspace** Implementation of basic procedures for operating RPA in non-segregated airspace including detect and avoid.	B2-RPAS **RPA Integration in Traffic** Implements refined operational procedures that cover lost link (including a unique squawk code for lost link) as well as enhanced detect and avoid technology.	B3-RPAS **RPA Transparent Management** RPA operate on the aerodrome surface and in non-segregated airspace just like any other aircraft.

S E R V I N G   A   W O R L D   I N   M O T I O N