Aireon project to extend ADS-B surveillance throughout globe

A new joint venture to install Automatic Dependent Surveillance – Broadcast (ADS-B) receivers on a constellation of Low Earth Orbit (LEO) satellites will expand air traffic surveillance coverage to the entire planet.

This initiative will greatly improve efficiency and capacity for carriers crossing the oceans, the polar regions and flying in remote areas, which in turn saves fuel costs and reduces greenhouse gas (GHG) emissions.

The formation of Aireon LLC, a joint venture with Iridium Satellite LLC, (a subsidiary of Iridium Communications Inc.) was announced on June 19, 2012 at a news conference in Washington D.C. The agreement finalizing the terms of NAV CANADA's participation in Aireon was signed in November.

Iridium Communications Inc. is a satellite communications company which operates 66 cross-linked LEO satellites providing global voice and data communications coverage. The ADS-B receivers will be built into Iridium NEXT, the second generation satellite constellation that will be launched by Iridium starting in 2015.

NAV CANADA estimates that this new capability will result in fuel savings for customers on the North Atlantic alone of over $100 million per year as well as reduced GHG emissions of 263,000 metric tons. The North Atlantic is the busiest oceanic airspace in the world with over 1,200 flights per day. NAV CANADA and NATS, the ANSP in the United Kingdom, control the western and eastern halves respectively.

"ADS-B is a proven technology with proven benefits," said John Crichton, NAV CANADA President and CEO. "The level of future savings to airlines and aircraft operators will quickly recoup our planned investment, providing this project with a strong business case based on customer and environmental benefits."

The agreement provides for NAV CANADA to purchase up to 51 per cent of the equity of Aireon with an aggregate total investment of up to US $150 million.

This investment will be made in phases between now and late 2017 with each phase dependent on the achievement of performance milestones. Currently, the NAV CANADA

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FLIGHT PLAN 2012

CHANGES TO ICAO FLIGHT PLAN

NAV CANADA adopts ICAO flight plan changes

NAV CANADA, along with other air navigation service providers, has phased-in the International Civil Aviation Organization's (ICAO) new, standardized flight plan format as part of an initiative called Flight Plan 2012.

The updates, which were fully implemented on November 15, are designed to address current and future status of aviation and air traffic management technology.

"This initiative aligns with other ICAO member states and provides customers with a common flight plan format wherever they operate," says Rudy Kellar, Executive Vice President, Service Delivery.

The changes affect the alpha numeric string codes; in particular equipment type codes and remark suffixes used for filing flight plans.

"Flight Plan 2012 delivers a global flight plan format for customers to communicate what capabilities they have on board, and provides more specific identification of recent technologies such as ADS-B, CPDLC, RNAV and RNP," says Kellar. "This results in a more accurate picture for controllers of the capabilities on board, and assists them in traffic and flow management processes."

On September 15, NAV CANADA sites across Canada started accommodating both the old and new flight plan formats. This was a transitional step towards full implementation of Flight Plan 2012 on November 15 when only the new flight plan format became available.

"NAV CANADA has been preparing for this transition for more than a year," says Dave Rose, Manager, ATS System Implementation and project manager for the transition. "We needed to ensure that ATM systems were ready to receive and display the new information and to ensure air traffic operations specialists and controllers received the right training."

The company updated Canadian Automated Air Traffic System (CAATS) software to allow the system to accept both legacy and new flight plan formats during the transition phase.

"Flight data processors were updated to recognize and accept both formats so that they continued to associate flight plans to targets with accuracy and integrity during the transition phase as well as manage conflict prediction as it relates to new aircraft equipment indicators," says Rose.

New equipage indicators needed to be added to the flight strips and flight data lists that display information to air traffic controllers.

Rose says that it's important for customers to familiarize themselves with the new flight plan format.

"On a tactical level, customer understanding of these changes can help ensure that they get cleared onto the most efficient profiles based on an accurate indication of their equipage," says Rose.

The phased implementation was designed to give customers a window to adapt their own systems to the new format before the November 15 date.

"Customers have been expecting this change and will now be seeing it on a global level," says Rose.

Full details of Flight Plan 2012 changes and additional resources for customers are available at **www.navcanada.ca/onboard**.

Continued on Page 6 ➔

President's Point of View

Global economic uncertainty in key markets affecting our traffic continues to result in sluggish overall revenue performance.

So is now a time to restrict technology investments?

This is a question we often ask ourselves, and like our airline customers, we often conclude that, despite continued uncertain economic conditions, now is the right time to make targeted investments in areas of the business that will drive performance. Technology investments improve service, drive down costs and have long lead times.

That is why we have decided to partner with Iridium in a venture to put ADS-B receivers on a network of Low Earth Orbiting Satellites. The venture, called Aireon, will then sell ADS-B surveillance data to air navigation service providers around the world, beginning in 2017.

This ambitious initiative promises to enable increased capacity and more fuel efficient routings in airspace currently beyond the reach of ground based surveillance. With increasing ADS-B equipage mandates globally, many of the world's airlines are already equipped or have plans to do so in the near future.

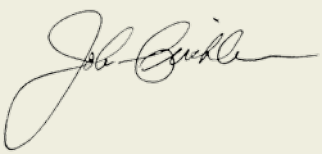
As a service provider in some of the world's busiest unsurveilled airspace in the North Atlantic, this investment offers NAV CANADA the opportunity to improve safety and efficiency for our customers. The anticipated fuel savings for our customers in the NAT alone make the business case for the investment.

But a game changing technological leap like ADS-B through satellites is applicable not just to the NAT, but literally to the entire globe.

We fully expect other air navigation service providers to avail themselves of the service, delivering the same kinds of benefits in vast reaches of airspace over other oceans and remote terrain which today are confined to inefficient procedural separation. The more ANSPs that take advantage of this opportunity, the better the business case, especially for our common customers.

As a private non share capital company, NAV CANADA is an ideal partner for Aireon. All of our revenues get recycled back into the business and therefore indirectly, back to our airline customers. Furthermore, as a manager of a large portion of international airspace, our customers are a reflection of the global industry.

We are honoured to be a part of this initiative and are excited about the opportunities it brings.



Runway surface condition reporting goes digital

NAV CANADA is digitizing the submission process for Aircraft Movement Surface Condition Reports (AMSCRs), further simplifying the procedure for airports and providing a means of getting important information to our customers sooner.

"Our new, fully-digitized process allows for the uploading of AMSCRs directly into NAV CANADA systems," says Chuck Montgomery, Director, Aeronautical Information Services (AIS). "It enhances safety by putting the most recent information in the hands of customers, as soon as it's reported on the Aviation Weather Web Site (AWWS) and Aeronautical Fixed Telecommunications Networks (AFTN)."

Until now, runway surface condition reports have been transmitted to NAV CANADA via a faxed AMSCR form, or through advanced reporting systems used by major airports. Regardless of the tool used by the reporting authority, the result has been a fax at the receiving Flight Information Centre that is then manually entered into NAV CANADA's Flight Information Management System.

Reporting authorities can now submit the reports directly into NAV CANADA systems using the advanced interfaces developed by companies such as Tradewind and Team Eagle or using a new web application developed by NAV CANADA, called SNOWiz.

"In both instances, the transmission of the surface condition report is automated and instantly available to customers and air traffic services," says Montgomery.

SNOWiz Web Application

SNOWiz provides airports with a new option to submit runway surface condition reports to NAV CANADA through a fixed desktop computer with internet access. Using drop-down fields, users enter standardized surface condition information on a web form that is then automatically made available to customers.

"SNOWiz has an extremely intuitive and user-friendly interface – and the airport only needs an office computer and internet connection," says Montgomery.

The web application, which was launched in October, is offered alongside the traditional fax-based method of submitting AMSCRs.

"SNOWiz will benefit both legacy and new processes," says Montgomery. "As more people transition to it, less manual entries will be received which in turn will mean the ones we do receive can be processed more quickly."

Airport authorities can request a free login by sending an email to **service@navcanada.ca**. With the login, users receive a training package to help them get started.

Consultation and collaboration

The SNOWiz solution is borne out of feedback from both customers and airports.

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Calibrating the Country

By Anthony MacKay, Manager, Flight Operations, NAV CANADA

Note: This article is part of a new recurring feature called Chief Pilot's Corner by NAV CANADA's Manager of Flight Operations Anthony MacKay.

NOTAMN CYQX GANDER
CYQX FLT INSPECTION OPS 3 NM EITHER SIDE EXTENDED RCL 13 FM 18NM TO THR 13 SFC TO 5000 FT MSL. 1208081700 TO 1208082100

You may have seen one of these NOTAMs as you fly around the country. They are published to let aircraft operators know that non-standard flight operations will be occurring at an airport during the times listed. These NOTAMs are published for the low level ILS flight inspections that many of you have seen occur with one of our two CRJ 200s or our DH8 100.

The requirement to measure the radiated signal from the ILS and VOR in very specific positions means that the aircraft cannot conform to the regular circuit pattern at an airport during flight inspection. As this is a hazard to aircraft operators, a NOTAM is published.

All three NAV CANADA aircraft are equipped with specialized equipment to measure, analyze and calibrate electronic signals in space used for communication, navigation and surveillance within Canadian airspace.

Each VOR and ILS in Canada receives two inspections per year to ensure proper accuracy and integrity of the signal. If a navigation aid suffers a failure or requires repair, it is inspected again prior to being released for public use.

Minimizing the impact of flight inspections on normal operations

The act of calibrating navigation aids can affect

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By the Numbers

- Average age of Flight Inspection Pilot – 44
- Average flight experience – 10,500 hours
- Background – Small and large domestic and international air carriers and military
- ILS Systems in Canada – 132
- VOR/TACAN Systems in Canada - 156

NAV CANADA investment to improve surveillance at Fredericton airport

Starting in spring 2013, NAV CANADA will begin installing six wide area multilateration (WAM) sensors around the Fredericton area. The sensors will expand surveillance coverage beyond that provided by the Moncton radar. The system is expected to be operational by the end of 2013.

Currently, surveillance coverage from the Moncton radar does not enable air traffic controllers in Fredericton to track aircraft below approximately 1,500 ft AGL in the vicinity of the airport. With a significant amount of the traffic at Fredericton being local circuits from the Moncton Flight College, this limitation often makes increased controller-pilot communications necessary to ensure the safe and efficient management of traffic.

Multilateration sensors installed in the area will function much like a secondary surveillance radar, determining aircraft position through the triangulation of signals from aircraft transponders on Mode 3/A, C and S and ADS-B. The data will then be fused with radar data and presented to controllers seamlessly on their workstation situational displays.

By augmenting existing surveillance coverage, the system will provide controllers with enhanced overall situational awareness. This will in turn reduce communications and pilot and controller workload related to aircraft identification and position reports. Automatic flight movement processing through the Extended Computer Display System (EXCDS) in the Tower will also be improved.

During overnight hours when the control tower is closed, the Saint John Flight Service Station (FSS) provides remote aerodrome advisory service at Fredericton airport. The FSS will have access to the improved surveillance through an auxiliary display.

NAV CANADA will be reviewing airspace design in the area to determine if there is a need to change airspace classification of the control zone or make certain areas of the Class E airspace transponder required prior to the system becoming operational. Consultation with customers and stakeholders will take place beginning in 2013.

New international competency standards for Aviation Meteorologists

by: Aaron McCay (CMAC), Natalie Werbitski (CMAC), & Kent Johnson (MSC)

The World Meteorological Organization (WMO) in coordination with ICAO has recently adopted a set of competency standards for all Aeronautical Meteorological Forecasters (AMFs).

These newly established competencies complement the standards currently in use by the Meteorological Service of Canada (MSC) at the Canadian Meteorological Aviation Centre (CMAC), which provides weather forecasts and warnings to NAV CANADA.

The international aviation industry is regulated to ensure the highest safety standards are met. Weather, both forecast and observed, is a major contributing factor when determining where and when to fly or even whether or not to fly.

Until now, there has been no internationally consistent regulation with respect to certification of the individuals who deliver aviation weather forecasting duties.

While the MSC has already instituted a high standard for aviation weather forecasting through its intensive and continuous training, the MSC must now demonstrate that its aviation forecasters meet the international competency standards established by the WMO and ICAO.

By December 2013 every aviation weather forecaster will be certified to have met the following competencies:

1. analyse and monitor continuously the weather situation;
2. forecast aeronautical meteorological phenomena and parameters;
3. warn of hazardous phenomena;
4. ensure the quality of meteorological information and services; and
5. communicate meteorological information to internal and external users.

The CMAC has created a competency assessment team in collaboration with its partner organization, the Defence Weather Services (DWS), which provides weather forecast services to the Canadian Department of National Defence.

Under guidelines established by the WMO, the CMAC and DWS competency assessment team has developed a methodology for conducting assessments of its meteorologists. The team of assessors will utilize various assessment methods in order to determine a forecaster's competency in carrying out his or her duties.

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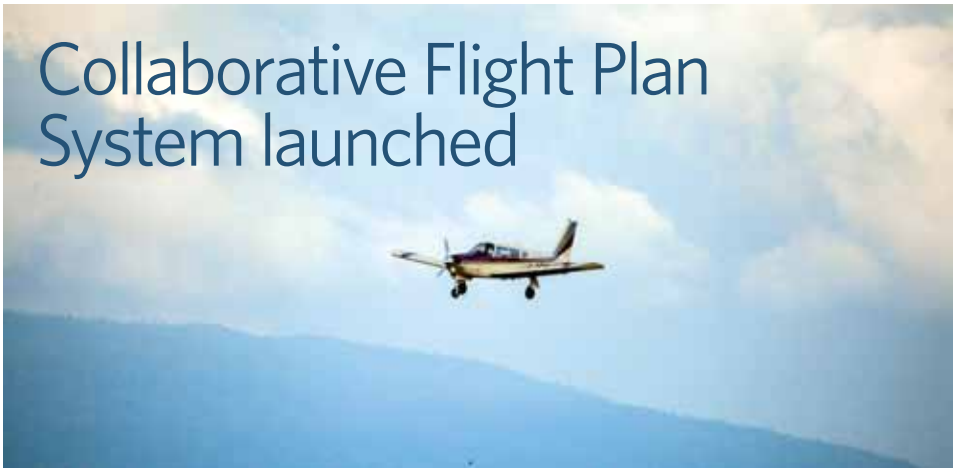
Collaborative Flight Plan System launched



NAV CANADA launched its new Collaborative Flight Plan System (CFPS) in September 2012, providing customers with a new and improved way to file, amend, delay or cancel their flight plans online.

"Our new system was developed with significant customer input during development and trial phases," says Rudy Kellar, Executive Vice President, Service Delivery. "The result is a user-friendly and streamlined flight planning process that enhances collaboration between pilots, dispatchers and air traffic services."

NAV CANADA originally launched an internet flight planning system in 2004, but the system lacked a two-way flow of information. This meant customers did not receive a clear confirmation following a transaction and amendments to a flight plan would require a call to the ACC or to the FIC.

Now, changes made by customers to a flight plan are automatically reflected on NAV CANADA's systems. Likewise, changes made by air traffic services show up on a customer's account. In addition, the intuitive flight plan form featured in CFPS reduces the need for manual verification of flight plans while automatically flagging flight plans that do not meet standard parameters.

NAV CANADA is looking at implementing features that will further enhance the experience for dispatchers. Soon, dispatchers will be able to manage flight plans and templates while permitting other members of the organization to view and use the same templates, eliminating duplicates and improving information-sharing.

"CFPS is a significant step forward in our efforts to deliver modern solutions to our customers while enhancing air traffic services' ability to focus on the delivery of other services that make our system one of the safest in the world," says Kellar.

Currently, the CFPS supports visual flight rules (VFR) and instrument flight rules (IFR) flight plans, as well as user updates to VFR flight plans. Support for updates to IFR flight plans will be implemented in future product upgrades. These upgrades will include seamless integration of weather and NOTAM information from the Aviation Weather Web Site (AWWS).

Free for all customers, the Company is seeing strong uptake for CFPS, with more than 3,000 subscribers to date and new customers logging in daily.

The CFPS is also the newest product in the NAVCANatm line-up of air traffic management solutions. CFPS and FIMS (Flight Information Management System) will be marketed as part of the NAVCANplan family of flight service products. The application will be available for sale to ANSPs around the world.

Visit plan.navcanada.ca to register for the CFPS flight planning service.

APPOINTMENT NOTICES

Mr. John W. Crichton, President and Chief Executive Officer of NAV CANADA, is pleased to announce the following executive appointments:

Rudy Kellar, Executive Vice President, Service Delivery

As Executive Vice President, Service Delivery, Mr. Kellar provides leadership and direction for Air Traffic Operations, Technical Operations and Engineering, ensuring effective alignment of these key functions in the provision of safe, efficient and cost effective air traffic services and aeronautical information services.

Mr. Kellar joined NAV CANADA in 2005 as General Manager, Edmonton Flight Information Region, where he worked with Operations staff and customers to significantly enhance service levels. In 2007, he was appointed Vice President Operations and has contributed extensively to the safety and efficiency of aircraft movement within Canadian airspace and international airspace delegated to NAV CANADA. Prior to that, Mr. Kellar was Chief Executive Officer of Air Contractors, a cargo transport airline based in Dublin, Ireland from 2001 to 2005.

Brian Aitken, Executive Vice President, Finance and Chief Financial Officer

As Executive Vice President, Finance and Chief Financial Officer, Mr. Aitken is responsible for providing executive leadership to the Finance function of NAV CANADA.

Mr. Aitken joined the Company in 2002 as Senior Director, Finance, and was promoted to Assistant Vice President, Finance in 2007. In 2008 Mr. Aitken was appointed Vice President, Finance, CFO and Treasurer, responsible for the management of financial resources and risks, while ensuring the effective, efficient administration of financial information and reporting systems for the Company and its pension plans. Prior to joining NAV CANADA, he was Vice President, Treasury at Domtar Inc. and Chief Financial Officer at E.B. Eddy Forest Products Ltd. and Calian Technology Ltd.

Neil Wilson, Executive Vice President, Administration and General Counsel

As Executive Vice President, Administration and

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Aireon project to extend ADS-B surveillance... (cont. from pg. 1)

investment is equivalent to 5.1 per cent of the equity of Aireon.

"With Aireon, a space-based global aviation surveillance system, Air Navigation Service Providers will for the first time have the capability to track aircraft anywhere in the world," said Rudy Kellar, NAV CANADA Executive Vice President, Service Delivery. "Currently, ADS-B receiving units, like traditional radar, are ground-based, which significantly limits surveillance coverage over the oceans and in remote or Polar Regions where it is often impractical and expensive to install.

"ADS-B technology has already brought considerable benefits to many NAV CANADA customers through improved routes and more favourable altitudes. Since 2009, we have added over 4 million square kilometres of ADS-B surveillance in Canada and over parts of the North Atlantic by installing 15 ground stations around Hudson Bay, the Arctic and in Greenland.

"Worldwide surveillance will bring tangible operating improvements for ANSPs and airlines. It allows us to rethink how we provide service in remote areas. It is really a game changer," noted Kellar.

"Aireon will truly revolutionize air traffic management as it exists today," said Crichton. "Despite all the advancements in technology that have enhanced the safety and efficiency of air travel, the vast majority of the globe is without surveillance, requiring air traffic controllers to rely on procedural separation standards.

"Going from procedural separation of approximately 80 nautical miles, to surveillance separation standards over the vast oceans and remaining lands with no radar or ADS-B coverage will have dramatic results," said Crichton.

Iridium estimates potential total fuel savings for airlines from 2017 to 2030 to be between $6-8 billion.

NAV CANADA will not only be a partner in Aireon, the Company also intends to be its first customer.

"As an ANSP that manages the airspace over the northern regions of Canada, the Arctic Ocean as well as the North Atlantic, we stand to provide substantial savings for our customers through Aireon. Space-based surveillance is a natural for us," Crichton concluded.

"I am excited that Iridium will be able to use its unique global satellite network to expand connectivity beyond the limitations of ground-based systems," said Matt Desch, CEO of Iridium.

"Just as we opened the world of personal communications far beyond the ten percent of the Earth's surface that is covered by terrestrial networks, we are now extending the reach of land-based aircraft tracking systems. This will be a ground-breaking use of Iridium NEXT and we are thrilled that our service will make air travel more efficient and safer."

NAV CANADA adopts ICAO flight plan changes (cont. from pg. 2)

Key Flight Plan 2012 changes

The new flight plan addresses functionalities and technologies of air navigation such as global navigation satellite system (GNSS), area navigation (RNAV), required navigation performance (RNP), performance-based navigation (PBN), data links, automatic dependent surveillance-broadcast (ADS-B) and automatic dependent surveillance-contract (ADS-C). These changes are more substantially reflected in the content of fields 10 and 18 of the flight plan form.

Field 10a: Introduces new indicators for communications and navigation equipment and capabilities.

Field 10b: Introduces new indicators for surveillance equipment and capabilities.

Field 18: Introduces new indicators, definitions and requirements for other equipment.

A page from the Flight Plan 2012 quick reference card details the changes to fields 10 and 18 of the new ICAO flight plan format. The complete reference card and details of changes can be found at **www.navcanada.ca/onboard**.

New international competency standards for Aviation Meteorologists (cont. from pg. 4)

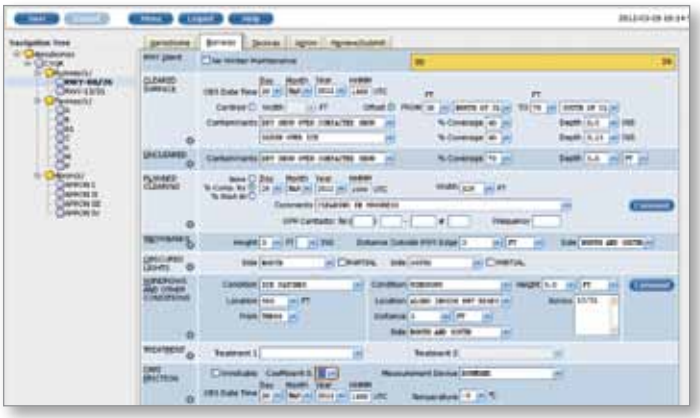
Some of these methods include: direct observation of a forecaster's work, assessing the forecaster's knowledge base by asking exploratory questions, and having the forecaster complete case studies or study published articles.

This competency assessment process is well underway, with over 25 CMAC meteorologists already certified as AMFs.

Through MSC quality management systems any individual shortcomings will be identified and remedied. Any systematic gaps in aviation meteorology expertise at a broader level will also be identified through this assessment process and addressed through targeted recurrence training.

Just as commercial pilots are expected to maintain their skills and expertise through recurrence training, aviation meteorologists are continually developing their skills to help safeguard the ANS and improve its efficiency. With the help of the ICAO and the WMO, the responsibility of aviation forecasters to maintain a high level of proficiency is now global.

Runway surface condition reporting goes digital (cont. from pg. 3)



The SNOWiz interface for desktop computers makes entering runway surface information (AMSCRs) easy for reporting authorities with pre-filled drop down choices.

"From the customer's point of view, speed is the key. Operators need high-integrity runway surface information as quickly as possible," says Olivier Meier, Manager, AIM Projects and Program. "From airport operators, we heard that a computerized solution had a lot of appeal."

SNOWiz helped provide a streamlined solution to delivering what customers and airports wanted. The web app was first used on a trail basis.

"Several airports participated in initial testing, with Timmins, Ontario serving as the launch site," says Meier. "These airports submitted both the traditional form and the web service, which allowed us to compare the integrity of the new system against what was inputted manually."

Next steps

Meier explains that the availability of SNOWiz is just the first phase in a broader initiative to transform runway surface condition reports.

"The next phase will include the transition from Canada's NOTAM J format to the ICAO-endorsed SNOWTAM format," says Meier. "We are aiming for a transition period where both can be used in late 2014, with a complete transition to the SNOWTAM in 2015."

The benefits of this second phase will address customer feedback that shows a strong preference for harmonized formats across ANSPs.

"There's still much work to be done on this front," says Montgomery. "In the meantime, we're delivering a web application that will immediately benefit reporting authorities and customers, and can be adapted to meet future needs."

SNOWiz testing

Airport operators played an essential role in testing SNOWiz. "The Greater Toronto Airports Authority together with Tradewind and the Winnipeg Airports Authority with Team Eagle played a key role in the development. Both airports contributed a lot of time and effort to the success," says Meier.

Additionally, the following sites were among the advance test group:

- Timmins
- St. Andrews
- Saint John
- Grande Prairie
- Fort St. John

NAV CANADA will ensure that the major airport towers in Canada have access to the timely digital information provided by SNOWiz this winter.

Appointment Notices (cont. from pg. 5)

General Counsel, Mr. Wilson is responsible for all legal and corporate service functions as well as Human Resources, and Customer and Commercial Services.

Mr. Wilson joined NAV CANADA as Vice President, General Counsel and Corporate Secretary in 2002. In addition to his continuing role as Chief Legal Officer, Mr. Wilson is also the Company's Corporate Secretary, and oversees Contracting, Logistics & Fleet, Insurance, Environment and Occupational Health & Safety, as well as Corporate Security. Prior to joining NAV CANADA, he was a partner in the Ottawa office of Gowling Lafleur Henderson LLP.

Larry Lachance, Vice President, Operations

As Vice President, Operations, Mr. Lachance is responsible for providing overall direction and guidance to the operational performance of the Company, ensuring the safe, efficient and cost effective management of air traffic services and aeronautical information services.

In 2007, Mr. Lachance was appointed Assistant Vice President, Operational Support and was responsible for ATS Systems Integration, Standards and Procedures, Safety, and Operational Coordination. Before that, he occupied a series of progressively more senior managerial positions in Operations, following a successful early career as an air traffic controller.

Raymond Bohn, Vice President, Revenue and Pension Administration

As Vice President, Revenue and Pension Administration, Mr. Bohn provides leadership and direction to the ANS Revenue team responsible for forecasting air traffic and related revenues, rate setting for customer service charges, collection and analysis of flight data for billing and planning purposes, invoicing service charges to customers and managing credit risk and accounts receivable processes. He also leads the Pension Administration team responsible for the administrative policies, procedures, systems and actuarial valuations related to the operation of NAV CANADA's pension plans.

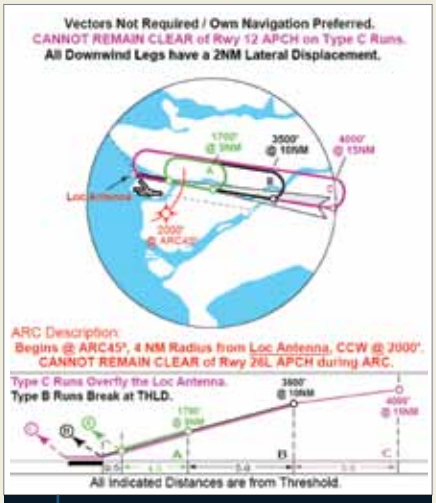
Mr. Bohn joined the Company as Senior Manager, Pension & Benefits in 2000, and was appointed Director, Compensation, Benefits and HR Systems in 2003. In 2005 Mr. Bohn was appointed Assistant Vice President, Human Resources, and in 2008 was appointed Assistant Vice President, Revenue and Pension Administration.

Calibrating the Country (cont. from pg. 3)

the normal flow of traffic in and around an airport. With the larger airports, the flight inspection times are coordinated with the local Terminal Management Units to reduce disruption as much as possible.

Flight tracks are also modified to allow for normal airport operations to the greatest extent possible. This is why the aircraft is turned away from the airport as soon as the last measurement is taken on any given approach. In this manner, ATC can use the crossing runway or the opposing runway to the greatest extent possible allowing for near normal airport operations.

In the example below of flight inspection patterns for Runway 26R in Vancouver, you can see that the flight check aircraft can limit its footprint on most approaches so that only runway 26R is affected. Normal operations on other runways or areas are possible. This same pattern for the flight inspection approaches can be transposed to any runway in the country with left or right hand patterns possible dependant on local traffic. The speed of the aircraft, the patterns flown and the gear and flap settings have been selected to minimize inspection time, aircraft cycles and noise for those on the ground.



Flight Inspection patterns for runway 26R in Vancouver

When Flight Inspection finds a problem

If during the course of a NAVAID inspection we find a problem, we issue a NOTAM to remove the NAVAID from service or modify procedures to allow for safe continued use.

We try and issue to NOTAMs so that the airspace user can use the NAVAID substitution allowances found in AIM (3.15.9, Use of GNSS in Lieu of Ground-based Aids) to the greatest extent possible. In the first NOTAM example below, J540 cannot be used by VOR equipped aircraft only but can be used by aircraft with a GPS based navigation system.

Reporting NAVAID Problems

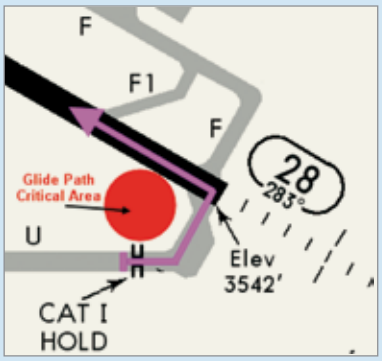
If you suspect a problem with a NAVAID, please report it to the controlling ATC unit or FIC as soon as possible. They will record any details you can provide such as the location of the problem, time and weather conditions and have the problem investigated.

It is important to remember that some issues are inherent in the design of the ground based navigation systems. For example, if you are cleared for a visual approach, ATC is not protecting the critical areas of the localizer or glide path.

If a large aircraft taxis between you and the localizer antenna, you may observe a localizer shift on the flight deck instruments. If an aircraft holding short of the runway is between your aircraft and the glide slope antenna, the glide slope indications may be erratic.

Examples of common issues

- Temperature at CYWG is -25°C. One aircraft reports the glide slope as 200' low at the Final Approach Fix (FAF). All other aircraft report no issues. The altitude correction for -25°C at the FAF is +200'. Likely the reporting aircraft on approach did not temperature correct the altitudes for the procedure.
- Altimeter at CYHZ is 30.22. An aircraft on approach reports the glide slope as 300' low. Preceding and following aircraft report the glide slope as normal and the tower reports the status "green". The reporting aircraft was cruising at FL 210. Likely the aircraft did not reset its altimeters when leaving the standard pressure area.
- Aircraft is cleared for a visual approach and reports glide slope fluctuations on approach to runway 28 in Calgary. The tower has cleared an aircraft for takeoff runway 28 from UNIFORM (Magenta line). The departing aircraft will taxi in front of the glide slope antenna distorting the signal for the aircraft on final approach. If the aircraft on final is flying the visual approach with the autopilot coupled to the ILS, the aircraft could pitch up or down erratically.



120861 CZEG EDMONTON FIR
CZEG J540 BTN YQL AND QW NOT SUITABLE FOR VOR NAV 1206261300 TIL APRX 1209281800

In this example, the charted airway is modified but still usable in its entirety.

120865 CZEG EDMONTON FIR
CZEG V301 CHANGE OVER POINT REQUIRED AT 55 NM FM YZU AND 73 NM FM YQU 1206261300 TIL APRX 1209281800

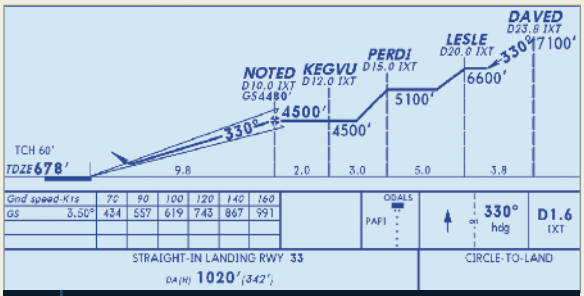
Understanding SERVICE VOLUME

The limit of the usable signal for a VHF NAVAID is defined by standard limits or as restricted by the results of a flight inspection. In Canada, VORs are protected for co-channel interference to a maximum radius of 200nm except for VORs located inside a triangle defined by Quebec City, Windsor and Sault Ste. Marie where the protection is only 150nm. The service volume for each VOR is determined by the charted MEA and change over points on the airway.

For the ILS, the localizers service volume is limited to +- 35° to 10nm and +- 10°out to 18nm. At Toronto and Vancouver, the +- 10° service volume limit is increased to 25nm.

The Glide Path is only flight checked with a corresponding service volume limit to 10 nm from the runway threshold and is considered to provide a usable signal from the charted glide path interception altitude to the charted minimums.

If you experience NAVAID deviations outside of the flight checked service volume we have calibrated and certified, you are attempting to use a NAVAID beyond its certified limits.



In this example, the Glide Path is only valid from NOTED at 4500' down minimums at 1020'.