It takes a lot of ingenuity and dedication to build a complex system which simultaneously enhances safety and improves service for customers, while facilitating productivity improvements and increasing situational awareness of the frontline professionals that use it every day.

That kind of system is usually the backbone. “At NAV CANADA, that system is the Canadian Automated Air Traffic Management System (CAATS),” says Rudy Kellar, Executive Vice President, Service Delivery. “CAATS is one of the most advanced and integrated flight data processing systems in the world, and it’s the foundation for the Company’s air traffic management system for the next quarter century.”

In use at all seven Area Control Centres in the country since December 2009, CAATS automates flight profile monitoring and extends conflict prediction and detection into non-radar airspace. It also processes and distributes flight data information to other NAV CANADA and international systems, enabling collaborative decision-making in flight planning which in turn results in operators flying preferred routes more often.

CAATS also simplifies the flight management process for air traffic controllers and other operational staff by automatically updating flight information coming from other centres, computing flight estimates and processing flight plans.

The elimination of many manual processes – such as the need to verbally “hand off” aircraft – improves safety by increasing the time controllers have available to focus on separating aircraft.

“The impact CAATS has had on the safety and efficiency of both our own and our customers’ operations is considerable,” says Kellar. “But we are just beginning to tap into CAATS’ full potential.”

Two steps ahead of conflict

Air traffic controllers are known for their ability to anticipate what the traffic picture in their sector will look like in the foreseeable future – staying a step ahead of conflict, and backstopped by integrated conflict prediction tools built into processors on the ground and in the air.

With the new Medium Term Conflict Detection (MTCD) feature currently being deployed, air traffic controllers will be able to peer further into the future, augmenting the current capability, and staying two steps ahead of potential conflict,” says Bill Crawley, Director, ATS System Integration.

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to communicate efficiently and accurately with air traffic controllers,” says Crawley.

CPDLC helps reduce frequency congestion by decreasing the need for voice communications. It also enhances safety and efficiency by using standardized messages and reducing the likelihood of read-back and hear-back errors.

NAV CANADA, in collaboration with customers, is examining opportunities to ensure that communications via CPDLC are as efficient as they can be. As a result of this, the Company is working on an enhancement that will support the automated issuance of a CPDLC welcome message to pilots that will advise them when they’ve transitioned between the airspace of two ACCs.

“The welcome message explicitly confirms which air traffic control authority the pilot will be in communication with, and the acknowledgement of the message by the pilot confirms to the controller that both parties are on the same page,” says Crawley.

**Positioned to perform: ADS-C**

Safety and efficiency benefits are closely intertwined with the planned, ANS-wide implementation of Automatic Dependent Surveillance-Contract (ADS-C) position reporting.

Automatic Dependent Surveillance-Contract is a surveillance technique in which aircraft automatically provide, via a data link, data derived from on board navigation and position-fixing systems, including aircraft identification and four-dimensional position.

“These geo-positioning and reporting technologies are changing the way aircraft operate over the North Atlantic, providing more opportunities for customer-preferred and efficient flight profiles,” says Crawley.

“Now, apply that to remote areas of domestic airspace, where procedural control is the norm, such as in the north, and there is a good opportunity to generate fuel savings for customers while improving safety.”

Domestic implementation of the surveillance capability will commence in 2014 with the Edmonton and Vancouver ACCs.

With better position reporting providing controllers with clearer picture of traffic,

NAV CANADA will evaluate opportunities to gradually reduce separation for aircraft with the right mix of technologies.

NAV CANADA intends to use ADS-C on an interim basis, until satellite-based ADS-B surveillance comes online. A new joint venture, known as Aireon, will install Automatic Dependent Surveillance - Broadcast (ADS-B) receivers on a constellation of Low Earth Orbit (LEO) satellites, expanding air traffic surveillance coverage to the entire planet. The ADS-B receivers will be built into Iridium NEXT, the second generation satellite constellation that will be launched by Iridium starting in 2015 with planned use of the capability starting in 2018.

ADS-B will provide opportunities for further flight efficiencies, through near real-time provision of position reports, as opposed to ADS-C which provides position reports only periodically.

**Adaptability the key to leading the way**

CAATS was inherently built as an adaptable system, and NAV CANADA’s ongoing investment in developing and enhancing the software over the past several years has paid dividends. It can be customized to the specifications of an individual control centre while at the same time integrating data and exchanges from other centres.

It’s scalable, allowing for area control centres to implement the features they need most, when they need them most. Soon, the implementation of a new data distribution service will lead to further enhancements in automation and integration of flight data between NAV CANADA facilities, surveillance sources and other systems.

“What will fundamentally keep CAATS at the forefront of air traffic management systems for years to come is its adaptability and our ability to mold it to the requirements of any operation,” says Kellar. “That is made possible because of the capacity of our employees to
innovate and prioritize the changes that will have a lasting and meaningful impact for our customers.”

With each enhancement implemented, NAV CANADA is incrementally improving the air traffic management environment for those coordinating the 12 million aircraft movements that occur every year through the second largest airspace in the world.

More importantly, it’s showing its commitment to find ways to deliver value to the people behind each and every one of those movements – its customers.

“Few systems are as operationally proven and reliable as CAATS” says Kellar. “It’s no wonder that it is being offered to our counterparts internationally, as NAVCANTrac.”

NAV CANADA has been working to enhance its aeronautical information products by providing them in a format that gives today’s connected pilot new and more flexible options.

From simpler-to-access electronic versions of publications, to working with partners on mobile solutions, there have been some positive developments on this front over the past two years.

“We are seeing a continued shift in preferences towards digital acquisition and consumption of aeronautical information,” says Tracy Beeman, Director, Customer and Commercial Services. “NAV CANADA has made significant progress evolving its offerings to meet the demand and is committed to continuing to adapt.”

Aeronautical publications go digital

**First of its kind in Canada: Digital VNCs**

One of the more recent and anticipated changes to the provision of aeronautical information products came to fruition as a result of an agreement with ForeFlight, a leading developer of mobile applications for pilots.

On July 8, 2013, ForeFlight announced that the complete set of NAV CANADA charts were available for purchase using its ForeFlight Mobile application developed for the iPad and iPhone.

As a result, pilots using the mobile application can access flight planning capabilities, weather information (METARs, TAFs, Environment Canada Radar) and navigation charts – including Visual Navigation Charts and the Canadian Flight Supplement– on their mobile devices.

“We are happy and fortunate to have expanded our relationship with NAV CANADA to provide pilots digital access to Canadian aeronautical information and charting products via ForeFlight Mobile,” says Tyson Weihs, CEO of ForeFlight. “Pilots who use digital charting report that chart updates are simpler, locating airport and navigation information is faster, and the overall simplicity of a paperless cockpit makes flying more enjoyable.”

And the application comes with another clear benefit: reduced cost. The complete set of IFR en route and terminal, Canada Air Pilot, CFS, VNCs, and VTAs are available at a significant cost reduction from the printed equivalent.

“We’ve seen a positive response to the ForeFlight application – especially from our General Aviation customers,” adds Beeman. “NAV CANADA and the ForeFlight team worked closely to enable the delivery of this new product while ensuring that quality standards were maintained.”

**The first forays into electronic publications**

While the ForeFlight product is among the most popular recent offerings, some smaller - yet important - advancements came earlier.

“It all started with the launch of the online store in 2011,” says Beeman. “This gave pilots the option to acquire their hard copy publications directly from NAV CANADA over the internet.

“It was only natural that the next step would be to make publications available for digital download.”

**President’s Point of View**

On December 7th the aviation industry around the world marked international civil aviation day. As we note the important contribution that aviation makes to economies and societies the world over, it is important to remember that we are part of an industry whose collective success relies on a steady flow of innovation, adaptability and unwavering determination.

Tomorrow’s accomplishments can never be taken for granted.

That’s why it’s so important that all components of the industry focus the evolution of their businesses on supporting the safe and efficient functioning of our respective customers’ operations.

A commitment to implementing solutions – both technological and procedural – that enhance safety and improve efficiency, and a general disposition to leaving no stone unturned will be essential to our collective ability to meet the challenges of the 21st century.

This industry has played a vital role in our collective social and economic development. Whether it be enhancing our quality of life, improving our economic futures, facilitating response to world disasters, or enhancing global understanding, aviation has been crucial to our progress.

As we look to the future, global harmonization of technology deployment, reducing the environmental impact of aviation activity and preserving safety while we meet global growth demands will be the dominant factors affecting our success in this century.

In this edition of Direct Route, we highlight some of our efforts to build on our success, through technological enhancements to systems such as CAATS, the delivery of aeronautical information in new formats to better serve customers and responsiveness to regulatory change.

I hope you enjoy this edition.

As always we welcome your feedback at directroute@navcanada.ca.

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New website aims to improve GA safety

NAV CANADA has been working with the developers of a new website dedicated to recreational flight safety in Canada.

SmartPilot.ca, launched in May 2013, provides a centralized source for a variety of educational information including articles, videos and interactive programming, all aimed at helping pilots be safer in the air. The website is designed to be used by pilots as well as provide information that can be used by aviation instructors.

Developed by Play Safe Productions, the creation of the website was initiated by the Civil Air Search and Rescue Association (CASARA) with financial support from the National Search and Rescue, New Initiatives Fund.

Some of the material on the website was safety information that already existed in a variety of places and has now been amassed in one convenient location with an easy navigation. But a great deal of new information has been created for the website. One of the new elements is “Ask ATS,” a video series in which NAV CANADA air traffic controllers and flight service specialists answer common pilot questions on safety related issues.

Four videos are already on the site exploring topics such as flight plan filing, runway surface condition reporting, and PIREPs. More topics have already been filmed, so expect to see additional videos added over the coming months.

The “Ask ATS” feature also includes a form that pilots can use to submit their own questions. We have agreed to take those submissions and formulate written or video answers to common topics.

“This was a great opportunity to address in a straightforward way many of the questions and misconceptions that pilots sometimes have and to put a face to the voice behind the mic,” said Trevor Johnson, Assistant Vice President Service Delivery. “And by tackling common issues we can hopefully improve safety practices across the industry.”

The website includes information on diverse topics affecting safe flight including weather, airmanship, navigation, communication practices, human factors and regulatory issues. Links to dates for Transport Canada aviation safety seminars and computer based training modules are also included.

NAV CANADA will be sharing some of the safety promotional and educational materials we have developed for posting on the site.

“The more we can share safety information across the industry the better. Smart Pilot promises to be not just a great resource but a smart idea,” said Trevor.

The website can be found at smartpilot.ca.

NAV CANADA introduces pilot-controller communication component to Webster Trophy

The long-standing Webster Memorial Trophy Competition is an annual cross-country contest to determine the top amateur pilot in Canada. There are nine Webster regions, based primarily on aviation activity, from which nine finalists are selected. The competition consists of practical flying tests, written exams, and the Redbird Flight Training Device portion.

This year, in addition to being a sponsor of the Webster Trophy, NAV CANADA introduced a new challenge for finalists: an exam that tests their understanding of pilot-controller communications as well as airspace and aircraft operations at and near airports.

The exam was developed and administered by NAV CANADA’s Operational Training group.

The NAV CANADA Webster Trophy was presented to Yurey Wu, Western Ontario
On July 4, 2014, most turbine powered aircraft operated in Canada with six or more passenger seats will require a Terrain Avoidance Warning System (TAWS). While many air carriers have had TAWS in their aircraft for some time to meet FAA regulations, for some Canadian operators this will be equipment they are using for the first time.

For many first time users of this equipment, you may feel that you are getting spurious or incorrect warnings on approach about terrain or obstacles. As a pilot your first action should be to react to the warning as trained by your company and consider the validity of the warning once the aircraft is in a safe location.

NAV CANADA Flight Operations does check for TAWS warnings while flight checking instrument approach procedures. If we find that the procedure design is prone to TAWS warnings because the approach design is at the edge of a specific TAWS warning envelope, we will send it back to the approach designers to see if the procedure can be modified to reduce the likelihood of warnings.

It is important to remember that these are valid warnings. With tweaks to the design we are hoping to reduce or eliminate them.

As TAWS warnings vary due to the configuration of the aircraft (the configuration of the aircraft dictates which warning envelope and mode is being used), we flight check for TAWS warnings with the aircraft fully configured to land using stabilized approach techniques.

The aircraft is configured to land two miles prior to the FAF (RNAV approaches cycle to the approach mode at two miles prior to the FAF) and flown to 50' above the runway threshold at approach speed and then we execute a missed approach.

The TAWS warning envelope in the final approach phase of flight is very close to the approach design protection areas. If the aircraft is operated outside of these parameters, TAWS warnings may be triggered.

For circling approaches, the terrain function of the TAWS may need to be inhibited with the TERRAIN INHIBIT function of the system. As a circling approach is a visual maneuver, it is outside of the protection afforded by most TAWS products.

As an example, during the flight validation of the new LPV approach to runway 33 in Smithers, BC, the flight check crew found a TAWS anomaly that they could not resolve.

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A change in Canadian SIGMET and AIRMET

In November 2013, the aviation community in Canada saw a significant change to several weather products. Canadian in-flight weather warnings (SIGMET) and aviation weather advisories (AIRMET) underwent a number of revisions to make these bulletins ICAO-compliant.

If we step back for a moment, you may recall that with the introduction of the GFA in April 2000, changes were also made to the Canadian SIGMET and AIRMET bulletins, primarily to establish a direct 1-to-1 correlation with the graphic area forecast (GFA). This permitted Canada to use the SIGMET and AIRMET bulletins not only to advise aviators of significant weather conditions but also as a method of updating and amending weather information contained in the GFA.

While this arrangement worked well domestically, it was a different story abroad where several international air carriers were apparently struggling to ingest and manage Canada’s reformatted weather bulletins.

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With 7,000 active customer accounts, NAV CANADA has seen steady demand for its publications over the web. Available for download are all seven volumes of the Canada Air Pilot (CAP), the Restricted Canada Air Pilot (RCAP) and the Water Aerodrome Supplement (WAS). Customers can purchase these products and then print their required pages. These products are official aeronautical publications and suitable for air navigation purposes.

“Shifting to an authorized electronic format allows customers to print only the sections or pages of a publication that they need and to access information through authorized portable devices, which is not only convenient but good for the environment,” says Beeman.

By providing immediate access to downloadable aeronautical publications, pilots planning their flights can obtain the most up-to-date information in a timely manner. Moreover, the publications are made available a full 10 days prior to their effective date. Downloaded products are priced 20 per cent less than their paper equivalents and customers also save on shipping and handling.

Also available at the NAV CANADA Online Store, at no additional charge, are the Canada Air Pilot General pages and a Change Page that allows customers to quickly identify all the aeronautical changes made from one publication cycle to the next.

Moving forward
NAV CANADA is moving forward with some new digital offerings, such as an electronic version of the Canada Flight Supplement with a release targeted for 2014. The Company is also working on an initiative to make the new Collaborative Flight Planning System mobile friendly, allowing for easy completion, update and cancellation of flight plans from mobile devices – functionality that will tie in well for customers using approved digital aeronautical information products. A later phase will integrate weather information specific to the flight plan filed, further simplifying pre-flight planning.

“Solutions such as these are an important part of our commitment to offer safe, useful and accessible tools in a cost-effective manner,” says Beeman. “Customers can expect to see more digital offerings in the future.”

The overall winner of the 2013 Webster competition is Takashi Hirose, the Eastern Ontario regional finalist who is currently enrolled in the Algonquin College aviation program and flies with the Ottawa Flying Club. The runner-up is Stuart Loney, the Central Ontario regional finalist who flies out of the Brampton Flight Centre.

With the national level of competition held in Winnipeg this year, participants were offered the opportunity to tour the Winnipeg ACC. “For many of the finalists, it was their first chance to get a look at a NAV CANADA centre and it was much talked about the following day,” said Amy Foy, National Administrator of the Webster Trophy.

Said Rudy Kellar, Executive Vice President, Service Delivery, “NAV CANADA is proud to sponsor this important competition, in conjunction with Air Canada and other sponsors from across the Canadian aviation community.

“The new NAV CANADA-administered exam provides us with the opportunity to instil the importance of proper pilot-controller communications, which is such an important aspect of aviation safety, both in the skies and on the ground. Congratulations to the trophy winners and to all of the regional finalists.”
They provided the following data to be reviewed for the approach:

1. Aircraft configuration (gear and flaps)
2. Aircraft location (latitude, longitude and altitude)
3. Airport weather for wind, altimeter and temperature
4. Type of TAWS alert and exact message generated by the TAWS system and whether the message was escalating or decreasing

The data was reviewed by NAV CANADA Flight Operations and Honeywell which generated AIC 22-13.

SMITHERS, BRITISH COLUMBIA
TERRAIN ON LPV RWY 33 APPROACH
EGPWS DATABASE

During the flight validation of the new LPV 33 approach to Smithers, British Columbia, the flight test aircraft received “CAUTION TERRAIN” and then “TERRAIN TERRAIN PULL UP” messages from the EGPWS system.

Investigation of the issue revealed that the approach was correctly designed but that the terrain database in the Honeywell Mark V EGPWS was using terrain tiles at the Smithers airport that were 30 ARC SECONDS in size. This resulted in terrain west of the final approach path appearing to impinge on the approach within the EGPWS database.

Honeywell has revised their terrain database around the Smithers airport to reduce the size of the tiles to 15 ARC SECONDS, thus clearing the approach of terrain in the EGPWS database. Honeywell released the new terrain database, version 469, for the Mark V EGPWS on June 7, 2013. This new terrain database should be available across the Honeywell EGPWS product line. Operators of other EGPWS equipment should check with their EGPWS manufacturer for the resolution of their terrain database at the Smithers airport.

Just like your flight management system, your TAWS manufacturer provides database updates to correct issues like the one that generated AIC 22-13 on a 26-day cycle. These database updates will also correct airport data where a runway is changed or a new runway is added such as the upcoming 17L/35R in Calgary.

If you receive what you believe are false TAWS warnings during an approach consider the following:

1. Did I compensate for cold temperatures against minimum altitudes?
2. Was I properly configured for the approach (TAWS approach envelop)?
3. Was I at the proper airspeed for the segment being flown?
4. Was I on a straight-in or circling approach?
5. What was the wind, temperature and altimeter setting during the approach?
6. What warnings did I receive and what mode or envelop was the TAWS in?

With this data, contact your TAWS manufacturer to see if they can assist. If it is not an issue with the database, as was discovered in Smithers, we may have to go and take another look.
A Change in Canadian SIGMET and AIRMET (cont. from pg. 5)

Not all countries strictly adhere to all ICAO rules and standards when it comes to their weather information; however, Canada is committed to adopting ICAO meteorological standards where possible. And given the significant nature of the meteorological information contained in SIGMET bulletins – and to a lesser degree, AIRMET bulletins – it shouldn’t come as a surprise to anyone that the decision was made to make the Canadian bulletins ICAO-compliant.

At first glance, the new SIGMET and AIRMET bulletins will appear almost identical to the older ones, but there are a number of differences that you should be aware of.

Frame of Reference
SIGMET and AIRMET bulletins will now be based on flight information regions (FIR) rather than the GFA. This not only affects the bulletin numbering system but also how these bulletins are amended and cancelled. This change will be seen as an improvement by most IFR pilots but it may take some getting used to for VFR pilots.

Parallel Bulletins
Instead of a single SIGMET or AIRMET bulletin, Canada will issue two parallel bulletins; one in a strictly ICAO-compliant format intended for international use and the other in a slightly modified GFA-friendly format, primarily for national consumption.

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Bulletin Header
The international bulletin has a slightly different header to distinguish it from the national version; something that probably has more implications from a system retrieval perspective than it does for an individual pilot.

FIR Identification
SIGMET and AIRMET bulletins now clearly identify the affected FIR in the beginning portion of the message. This is not only an ICAO requirement but will facilitate easier electronic ingestion and management of the bulletins.

Validity Period
Regular SIGMET bulletins (WSCN) continue to be valid for 4 hours; however, volcanic ash SIGMET (WVCN) bulletins and cyclonic SIGMET (WCCN) bulletins are now be valid for 6 hours. AIRMET validity has been changed to 4 hours.

Reference Points
The national version of the SIGMET and AIRMET continues to include reference names as well as the associated geographic coordinates for them. The international version of the bulletins only includes the geographic coordinates for reference points – no names.

Currently, plain language reference points are derived from the Meteorological Reference Map (ref. TC-AIM MET). These are replaced by geo-referenced aviation points (airport identifiers) extracted from the Canada Flight Supplement.

General Content Changes
Minor changes were also made to the order of the weather information in the new bulletins as well as to the format of the geographic coordinates. Again, these are minor changes and shouldn’t affect the overall readability of the bulletins.

The information provided is a very condensed summary of the changes to SIGMET and AIRMET. These changes are important and definitely something that you need know about.

Should more information be required, a presentation containing detailed information is available on the NAV CANADA website at www.navcanada.ca/airmetsigmet.