“The Test of Time” offers an in-depth look at NAV CANADA and its unique governance model, focusing on why the model was chosen and how it works, while assessing its effectiveness since 1996 when the Company became the owner and operator of Canada’s civil Air Navigation System (ANS).

The Route to Privatization

On November 1, 1996, NAV CANADA, a private sector company, became owner and operator of the Canadian civil ANS, purchasing the system from the Government of Canada for $1.5 billion. Today, NAV CANADA remains one of the only fully private companies in charge of air traffic control, flight information, weather briefings, aeronautical information, navigation aids and the many other services typical of an ANS provider.

There is no longer any substantive debate about the effectiveness of the NAV CANADA model as the organizational and corporate basis for managing what is the world’s second-largest ANS in terms of air traffic movements. But there is still some confusion about the model itself and how it works, and what lessons can be drawn from the Company’s experience.

This article focuses on the essential elements that make up the NAV CANADA model; how these elements interact to support a safe, efficient and cost-effective Air Navigation Service; and why they make as much sense today as they did in 1996.
The Need for Change

A good place to start is to look at some of the problems the Company was designed to solve. Simply put, by the 1980s, Canada’s ANS was not working well.

While there were areas of excellence, such as its operational people and its safety record, infrastructure was in need of renewal and major system projects were falling further and further behind with escalating costs. Delays and decreasing service levels had become unacceptable to the various operators in the system, especially commercial airlines. The cost of the system was high and increasing at a faster rate than revenue from the ticket tax, which did not cover all ANS costs. There were air traffic controller shortages and government wage freezes, and there was an inherent conflict of interest with the service provider essentially regulating itself in respect of safety.

All of the stakeholders including airlines, employees, and the government itself were unhappy. Change was needed, and needed soon.

Canada’s commercial airlines set out to analyze the issues and to decide what could be done about them. What they found was a government department with highly skilled and motivated people, operating under traditional bureaucratic rules and constraints, attempting to deliver an absolutely essential service, in real time, to a vital and hyper-competitive sector of the economy. Quite simply, it could not keep up. Nor in fairness, was government designed to deliver this type of service.

Old Model Inadequate

There were many reasons for this, but perhaps the best can be found in an analogy from the business world. It is now accepted that the old model of a diversified conglomerate – with a few exceptions – failed to deliver on its original promise, because this kind of firm is not worth the sum of its parts.

The same analysis can be applied to a large government department trying to run a variety of disparate “lines of business”. Such an organization runs into the problems economists have observed about conglomerates, in which “the central management...cannot keep fully informed about all the different markets in which it is operating... so it will have a greater market valuation if it is split up.” (Lipsey & Chrystal, Economics 11e).

At the time, Transport Canada was responsible for a national railway company, most of the nation’s airports, the air navigation system, other transportation infrastructure services such as ports, not to mention the development of transportation policy and the regulation of the entire system.

In the Canadian case, the needs of the ANS could not be fully met for a host of reasons, none of them having to do with the people operating the system – who performed valiantly under the constraints of a diversified government department that was itself only one element in the vast federal government machinery.
Like any other government program, the ANS was subject to the budgetary approval process within Transport Canada and the federal government as a whole. It had to compete with demands for health care, pensions, social security, defense and other core government services.

Furthermore, when budget cuts are distributed in government, it is generally done on a gross expenditure basis. The ANS represented – whether in human resources terms or in overall spending levels – about 25 per cent of Transport Canada’s annual budget. Thus when the budget cuts came, they were allocated based on gross expenditures.

As a consequence, the ANS became chronically underfunded. The result was an inability to manage the system so that it lived up to its potential as an essential, 24/7 high tech service – a critical enabler to the air transportation sector and all who depended on it.

Compounding the impact of budget cutbacks were the costs added by rigid government procurement practices. At the time, these costs were estimated to add between 25 and 50 per cent to the purchase of major systems and equipment in Canada.

One example was a major technology project, known as the Canadian Automated Air Traffic System (CAATS) that was hundreds of millions over budget and years behind schedule at the time of the transfer to NAV CANADA. This project was turned around and is now complete on a national scale, providing an essential technology foundation for the future.

Finally, the Canadian ANS was suffering from the fact that it was subject to government-wide human resource policies in respect of staffing levels, training and labour relations. When cuts in person-years were made, the ANS was also subject to them, regardless of the adverse impact on service levels. The impact on employee morale and customer service was predictable.

Reinventing Government

The air carriers quickly realized that they had a major challenge – reinventing a government service. The ANS was an essential infrastructure provider to the airlines and all aircraft operators, and would remain so for the foreseeable future. They could not afford to ignore it.

The air industry contemplated what to do about the problem and came up with the following conclusions:

- Band-aid solutions by government wouldn’t work: a fundamental paradigm shift was needed.
- The ANS was actually a commercial service provided to commercial businesses which should be operated and guided by commercial, not government principles.
- While safety was recognized as a genuine issue of political and public perception, it was in reality a red herring. If one assumed that all operational functions in the field of aeronautics could only be entrusted to government, then all of the airlines and aircraft manufacturers should be owned and operated by governments. There was, and is, no reason that the ANS could not, or cannot operate safely through independent safety regulation by government, just as airlines do.
- The Canadian government, throughout the 1980s and especially by the early 1990s, was grappling with its own significant financial issues. In the future it would not be able to fund the ANS deficits (with the old Air Transportation Tax almost always being insufficient to cover the costs of the system). This meant airlines and air passengers would be forced to pay all of the costs through much higher ticket taxes.

This thinking led the ANS customers to the conclusion that if they had to pay all of the costs, they should have some degree of control over those costs. This was, as a practical matter, not achievable in a government structure.

In fact, some other countries, notably New Zealand, had begun to move their ANS structure out of direct government operation, thus a “political” precedent was being set and one which was proving quite successful.

As the air industry went about this process, it discovered some potential allies, notably air traffic controllers and airline pilots. Apart from sharing the common concern about delays, the controllers and airline pilots both had other concerns which led them to believe it was time for a change. Obviously, their support was crucial to a successful change in structure, just as their opposition might cause failure.
Establishing a New Structure

Early on, it was clear that these three groups were central to the collaboration that led to the privatization – commercial aviation management, airline pilots, and air traffic controllers. Together, they made fundamental decisions that proved to be the cornerstone of the Canadian ANS commercialization process.

These decisions were:

- The ANS had to be taken out of government.
- The key stakeholders had to have a significant voice in the new operational entity – whatever it was to be.
- Each group had to work together for the common goal and respect the others’ legitimate but sometimes differing interests at all times.

This alliance grew over time to embrace other stakeholders such as business aviation, general aviation and the bargaining agents of other ANS employees. The alliance proved to be a powerful force, in terms of influencing government and the financial markets. But how did the alliance do that?

The initial preference of the government was to place the ANS into a government-owned, or, as it is known in Canada, a Crown corporation. The alliance was opposed to this, seeing it as a cosmetic change, but not addressing the fundamental issues.

A Crown corporation would still be controlled by government, and be subject to many governmental policies and political interference by the government of the day. The opposition by the alliance to the Crown corporation option – along with the eventual concurrence of the political leadership of the day – caused this option to be removed from the table.

NAV CANADA: Corporate Governance

NAV CANADA represents a unique consensus among the major stakeholders in the air navigation system – the Government of Canada, the commercial air carriers, general aviation and the Company’s employees. Our governance structure reflects this consensus. All four of these major stakeholders are Members of the Company.

There are several factors to note about the NAV CANADA Board of Directors and its corporate governance framework.

- The structure and composition of the Board and its committees have been designed to ensure that the Board functions independently of management.
- No one may be elected to the Board who is an elected official or an employee of any level of public government in Canada.
- No one may be elected who is an officer, director or employee of a significant ANS customer or supplier, or who is an active union officer.
- As a prerequisite to joining the Board, all Directors must execute and abide by a Code of Conduct and Conflict of Interest Guidelines.
- While appointees to the Board are elected by specific stakeholder interests, they do not represent those interests, and they must abide by the common-law fiduciary duty to act honestly, in good faith and in the best interests of the corporation.
Non-Share Capital Corporation

What was needed was a constructive alternative that would at once meet everyone’s needs while addressing in some form everyone’s concerns. Thus the non-share capital corporation option was born. It satisfied the aviation industry because it would be a private sector business corporation totally independent from government, with a business Board and management.

The lack of shareholders and share equity, while novel, was accepted on the basis that the ANS is a natural monopoly which should not be motivated to create wealth, but rather to provide a service to aviation. The significant customer presence on the Board would ensure that the Company would be service oriented and customer focused.

From the standpoint of the key labour stakeholders, the absence of direct shareholders and the structural balance on the Board (which included union appointees), provided considerable comfort that the corporation would be strongly motivated to focus on its operational mission without the preoccupation of the profit motive for individual investors.

From the government’s viewpoint, they saw the non-share capital model in a politically favorable light for similar reasons including:

• no perceived sell-out to private interests;
• balanced participation for key stakeholders;
• a high degree of ongoing motivation to run the system safely and efficiently;
• seats at the Board table for government to oversee the general public interest; and
• a private sector entity acknowledged by the financial markets, and thus able to be financed without government support.

Monopoly Status

The acceptance of the non-share capital model by all of the stakeholder community also made it relatively easy for the federal government to grant the system an effective air traffic control monopoly in the enabling legislation, the Civil Air Navigation Services Commercialization Act (the ANS Act).

This monopoly is largely self-regulating due to the significant involvement of the customers or “payers” in the management of the Company through the Board and the statutory charging principles. It is also a monopoly which, in the eyes of the ever-competitive airline industry, is seen as neutral because of its non-share capital nature, and the ability of airlines to elect a significant number of Directors to the Board. The ANS monopoly is different than a typical utility in that its customers are relatively large and organized and are fully capable of representing themselves.

In the NAV CANADA non-share capital model, profits are used to either pay down debt, finance capital expenditures or reduce customer charges.

Annual Meeting

The Company must hold an annual meeting, open to the public, where it presents its financial statements and reports from management and the Board. In addition, the Company must make available an adequate amount of time to allow stakeholders to raise issues and question management and the Board.

NAV CANADA, as a public issuer of debt securities, must operate in an open and transparent manner with full and complete information disclosure to all stakeholders in a manner similar to the obligations of a publicly traded company to its shareholders.

Advisory Committee

The Company’s by-laws provide for a 20-member Advisory Committee appointed by aviation stakeholders.

The role of the Advisory Committee is to study and report, making recommendations, on any matter relating to the ANS as it may determine in its sole discretion. The activities of the Advisory Committee are paid for through a budget established each year by the Board.
To understand how NAV CANADA operates and economically self-regulates, the non-share-capital model needs closer examination.

A non-share capital corporation is structured and operates just like any other business corporation except that it does not have shareholders or share equity. Instead, NAV CANADA has “Members” who perform many of the traditional duties of shareholders such as electing directors, amending by-laws and appointing public accountants (auditors).

The five Members of NAV CANADA elect directors as follows:

- Airlines – elect four people to the NAV CANADA Board, the most of any single member;
- Federal Minister of Transport – on behalf of the federal government, elects three people to the NAV CANADA Board;
- ANS Unions – together elect two people to the NAV CANADA Board;
- the Canadian Business Aircraft Association – elects one director to the Board; and
- the Director Member – on behalf of the Board as a whole, elects four directors, who must be unrelated to any ANS stakeholder.

The President and CEO is also a director. The result is a board of directors where all stakeholder interests are represented but none dominates.

In order to ensure the Board’s independence from management, the offices of Chair of the Board, and that of the President and CEO, cannot be held by the same person.

**Regulatory Oversight**

Even though customers of the ANS have a significant presence on the NAV CANADA Board and a direct influence on management policies, further provisions have been introduced to protect the aviation community and to ensure that NAV CANADA is responsive to their wishes.

The legislation governing NAV CANADA activities stipulates numerous principles with which the Company must comply. For example, service charges must not be set at a level that exceeds the Company’s financial requirements including debt service, and those amounts needed to maintain prudent financial reserves and credit ratings.

Service charges, based primarily on aircraft weight and distance flown, must be set in accordance with a methodology that is developed in consultation with customers and published. The structure of the charges follows principles set out in the legislation, and which reflect International Civil Aviation Organization (ICAO) guidelines.

For non-Canadian airlines this is important as it has the effect of importing established international principles into Canadian domestic law and enhancing their enforceability.

Service charges can only be changed after advance notice and consultation with customers and are subject to appeal to an independent tribunal on the grounds that the notice periods were not complied with or that one or more of the charging principles in the legislation was breached. (There have been two occasions when a proposed increase in charges was appealed to the Canadian Transportation Agency. The appeals were denied.)

**Service Delivery Oversight**

Subject to safety regulatory oversight by Transport Canada, the Company is free to alter its levels of service and may reduce, expand or close facilities, provided that material changes are first the subject of consultation with affected customers.
In practice, the corporation consults closely with customers and stakeholders prior to embarking on any major initiatives, be they technical or financial. Consultations take place on a regular basis through the Air Transport Operations Consultation Committee (ATOCC) and the Air Navigation Services National Advisory Committee (ANSNAC).

In addition, discussions on key issues and plans are held with employees, leading industry associations, and with customers directly at the executive and operational levels. One relatively recent example of this approach was the decision to proceed with deployment of Automatic Dependent Surveillance-Broadcast (ADS-B) to enhance surveillance in Northern Canadian airspace.

A variety of options were evaluated, including continued radar expansion, but the business case and customer preferences clearly came down in favour of ADS-B, which provides the same or better levels of safety when compared to radar, at a fraction of the cost. Our people have proven equal to the task of making this important change.

The NAV CANADA model has proven to be a constructive approach to air navigation system governance and management. The lack of shareholders and share equity is accepted on the basis that the ANS is a natural monopoly which is not motivated to create wealth, but rather to provide ANS services. Customers provide the critical financial backing to the corporation through the revenue stream for these services. Since there are no shareholders, there is no distribution of profits, and the customer presence on the Board (five Directors out of fifteen) helps ensure investments are directed at enhancing customer value. Time has demonstrated that this approach obviates the need for prescriptive economic regulation.

Looking at the system as a whole, new technology and other infrastructure investments since 1996 have totaled more than $2.0 billion and will continue to be a priority. Technology development and renewal, much of it done by NAV CANADA people who have embraced the opportunity to innovate, has focused on automating tasks, improving data transfer and management, and providing decision support and data analysis tools in the operational environment.

A key element of our modernization drive has been the direct involvement of operational staff in the design, development and deployment of new automated systems, especially in the world of air traffic management. Based on our early and continued success with this approach, it has become an essential element of how we do business, with air traffic controllers, flight service specialists, engineers and software developers working together on the same team on major projects from beginning to end.

Delivering Results
Improvements – System and Service
The NAV CANADA integrated tower automation system, which includes key products such as Electronic Flight Strips (NAVCANstrips) has changed the face of flight data management in NAV CANADA tower and terminal environments. NAVCANstrips is only one of many products in the NAVCANatm Business Development program, which offers advanced Air Traffic Management (ATM) technology to other Air Navigation Service Providers.

Other projects are directed at optimizing service delivery where issues or opportunities for improvement have been identified. For example, installing equipment such as multilateration allows enhanced surveillance in areas where there is no low-level coverage, and making procedural changes such as the introduction of Reduced Lateral Separation Minima allows equipped carriers to optimize their flight profiles, if requested, to reduce fuel burn and greenhouse gas emissions. Additional highlights of the Company’s modernization program are described in “The NAV CANADA Track Record”.

Operating as a Business

Part of the original promise of NAV CANADA was that the Company would work together with its employees to focus on the needs of its customers. This is reflected in the organization’s mission “to facilitate the safe movement of aircraft, efficiently and cost effectively, through the provision of air navigation services on a long-term sustainable basis”. Supporting this mission are a series of overarching objectives in safety, service charges, delivering value to customers, cost management, technology, employee relations and the environment.

A key element of meeting customer needs was the realization that the Company had to be run as a business, with people at its heart and with the same focus on costs, consistent with safety, as its customers. In fact, in many ways the Company’s customers are the “notional” shareholders of the business, due to their continual investment in the Company through the payment of service charges.

This represented a major change for them, in that the pre-NAV CANADA system was funded through a tax on passengers, and collected by the airlines. Now the service is paid for directly, so customers have a much greater stake in the outcome.

It is no surprise then that the level of the Company’s service charges is a major focus for the airlines that fly through Canadian airspace.
There was only one period when general service charges had to go up, as traffic volumes plummeted following the 9/11 attacks. But for the most part, service charges have evolved at far less than the rate of inflation. These charges are the primary source of funding for the ongoing operation of the Canadian ANS, generating approximately $1.3 billion annually.

Beyond the revenues from its core business, NAV CANADA has had success in selling technology and related services to other air navigation service providers. And the Company has other smaller lines of business such as third party maintenance and a training and conference centre based in Cornwall, Ontario.

### Bond Financing

The Company is financed through the bond markets, with $1.95 billion in bonds and medium term notes currently outstanding. The Company also makes use of additional financing through bank credit lines.

NAV CANADA continues to receive AA credit ratings due to a variety of factors such as its statutory monopoly, its position in the industry providing an essential safety service, and the underlying characteristics of the airline business, with continued expectations of growth and expansion in the long term.

As a result, and based on the Company’s track record, NAV CANADA continues to enjoy broad debt market access at low rates.

### Financial Challenges

As with most other businesses, the Company has been affected over the years by global economic and financial challenges.

However, the NAV CANADA financial model allows it to incur deficits during downturns, as occurred several times since the 9/11 period, through the use of its rate stabilization account. This mechanism reduces the amount of customer service charge volatility due to cyclical fluctuations in air traffic volume. Of note, service charges did not increase in the period 2004-2015, and there were two reductions in 2006 and 2007.

By the same token, the Company’s rate setting powers do allow for rate increases when these are required to meet its fundamental financial requirements.
Accountability

The NAV CANADA governance model leaves management with a great deal of discretion, and accountability, in dealing with external financial challenges. The Company’s response to downturns in air traffic and revenues has been to apply strict expenditure controls and productivity initiatives that have translated into a measured program of personnel reductions, while ensuring optimal staffing in the Company’s operational facilities.

The bottom line is that management is accountable to the Board and its stakeholders for results in all areas. These results focus on the Company’s core business of delivering safe, efficient air navigation services and providing value to customers.

And, like any private business, a substantial portion of management’s remuneration is based on the achievement of specified goals in the areas of safety, service and cost efficiency.

Original Promise

Has the original promise of NAV CANADA as a constructive alternative to a traditional government function been met? Looking back over the years of experience and achievements since 1996, the answer would be a clear “yes”.

The transition from government to private sector was a major undertaking, not always seamless, and the impact of 9/11 and subsequent events severely tested the Company’s resilience, as it did the rest of the aviation industry.

But there were many valuable lessons learned from those early challenges: the importance of moving swiftly but building incrementally; of examining all programs, projects and procedures for efficiencies while maintaining quality and safety; and of using the three “C”s – consultation, collaboration and communication – to ensure understanding, acceptance and success of key initiatives.

We have also greatly improved the engagement of our people, keeping in mind that they are one of the key founding stakeholders of the Company. We’ve done this by emphasizing the importance of leadership and open, trust-based communication and relationships at all levels of the Company.

Since 1996, this approach has proven its worth. Over the years, perhaps the most tangible recognition of NAV CANADA’s progress was being honoured as a three-time recipient of the International Air Transport Association (IATA) Eagle Award as “Best Air Navigation Service Provider” in just over a decade.

The award recognized collaboration with customers and stakeholders to improve ANS safety and performance, investments in the system and cost control measures, in 2001, 2010 and 2011. We shared this award with employees by highlighting their achievements in every area of the country, in every department, and by emphasizing that they were the ones responsible for building our reputation as global ANS leader.

Today, the Company’s challenge is to maintain its strong track record in the delivery of safe, efficient and cost-effective air navigation services and there is every indication that good things will continue to happen as NAV CANADA faces a new and exciting future.
Air Navigation Service Charges –
A Canadian Approach

In Canada, air navigation services are no longer provided on a taxpayer-funded basis to airlines and the owners and operators of aircraft.

Rather, ANS customers pay “service charges” to NAV CANADA. These charges are primarily based on weight and distance flown, although there are some flat fees for different customer groups such as recreational aircraft.

These charges were established within the framework provided by the Civil Air Navigation Services Commercialization Act (the ANS Act) and ICAO Policies on Charges for Airports and Air Navigation Services (Doc 9082/6).

The charging provisions in this Canadian legislation are legally binding on the Company. Observing the ICAO policies represents an important conformance with international practice.

Consultation and notification regarding proposals for new or revised charges, along with an appeal mechanism, form an integral part of the charging framework.

Charging Principles

NAV CANADA charges are based on a series of charging principles set out in section 35(1) of the ANS Act as follows:

• charges must be in accordance with a methodology established and published by the Corporation that is explicit and that also includes the terms and conditions affecting charges;

• charges must not be structured in such a way that a user would be encouraged to engage in practices that diminish safety for the purpose of avoiding a charge;

• charges for the same services must not differentiate between domestic and international flights of air carriers;

• charges for the same services must not differentiate among Canadian air carriers or among foreign air carriers;

• charges must differentiate between the provision of services in relation to the landing and take-off of aircraft and the provision of services in relation to aircraft in flight, and must reflect a reasonable allocation of the costs of providing the services in those circumstances;

• charges in respect of recreational and private aircraft must not be unreasonable or undue;

• charges for designated northern or remote services and for services directed to be provided under subsection 24(1) of the ANS Act must not be higher than charges for similar services utilized to a similar extent elsewhere in Canada;

• charges must be consistent with the international obligations of the Government of Canada; and

• charges must not be at a level that, based on reasonable and prudent projections, would generate revenues exceeding the Corporation’s current and future financial requirements in relation to the provision of civil air navigation services.

The legislation further provides that the charging methodology may recognize that the value of the services differs among users.

In addition, a category of users may be charged on a flat-fee basis so long as the charge is otherwise consistent with the charging principles.

Further information on NAV CANADA charges is available through the “Customer Guide to Charges” on the NAV CANADA website: www.navcanada.ca.
The NAV CANADA Track Record

Safety

The NAV CANADA track record begins with safety. At NAV CANADA, safety is fundamental to everything we do. It is our business imperative since no aviation business can afford a loss of public confidence.

The Company has seen a decline in the rate of IFR-to-IFR losses of separation per 100,000 aircraft movements, the industry safety benchmark. That rate has fallen from 1.40 per 100,000 air traffic movements in 1997 to 0.77 per 100,000 in 2014. By far, the majority of these were technical infringements with no risk of collision.

A number of factors are behind this improvement. They include:

• wide-spread use of safety-enhancing technologies;
• an emphasis on getting the basics right, from staffing to procedures to the effective sharing of safety information;
• a deliberate effort to build a just safety culture throughout the organization;
• and above all, the skill, training, dedication and safety commitment of our people

Over the past decade, educational programs have been developed to increase awareness of the importance of proper controller-pilot communications and other safety related issues. As well, collaborative activities with employees, customers, airport authorities and other stakeholders have been initiated to reduce safety-related events such as runway incursions.

Our safety culture and management system are reinforced through the activities of our independent Office of Safety and Quality, in conjunction with our operational groups. At the same time, we have strengthened our reporting culture through joint management/union efforts to encourage early reporting of a broad range of incidents in a supportive environment. These early warnings are instrumental to identifying potential issues and responding before they become a more serious problem.

Employee Engagement

NAV CANADA considers the engagement of its people as a top priority.

While there were early rough patches in labour and employee relations following the transition from government to private sector, the Company’s management and eight different bargaining agents recognize the value of close collaboration based on mutual trust and respect.

In addition to offering excellent salaries and benefits, the Company has a strong focus on its people programs, established to promote employee engagement and strengthen the workplace environment. These programs emphasize leadership, communications, recognition, learning and development and career opportunities. Other supporting efforts include company publications, special events, a National Award program and a contributions program that supports employee involvement in their communities, and in group fundraisers for charity.

Delays Down, Efficiency Up

Since 1996 NAV CANADA has seen steady success in reducing flight delays and improving efficiency.

Working collaboratively with the industry, NAV CANADA initiatives range from airspace changes that enable more direct routings, to more significant technological advancements offering considerable improvements in efficiency, capacity and safety.
Our Collaborative Initiatives for Emission Reductions (CIFER) report provides a comprehensive description of our efficiency programs and their benefits to our airline customers, including fuel savings, and reductions in greenhouse gas emissions.

Cost Management

The initial NAV CANADA business restructuring – from 1997 to 2001 – generated hundreds of millions in cumulative savings by reducing administrative headcount, closing regional offices and re-engineering key processes.

Today, the cost management focus continues through consistent control of staffing levels (a reduction of just over 25 per cent from the outset) and ongoing technology and process improvements.

Infrastructure Renewal

The Company has committed to make ongoing investments in infrastructure renewal, from new facility construction, to lifecycle replacement of navigation aids, to the installation of alternate surface surveillance. This renewal program has improved service, and proved to be more cost-effective by reducing maintenance costs and improving system efficiency.

One example is Wide Area Multilateration (WAM) – a system of low cost ground stations that receives signals from aircraft transponders to determine aircraft position. WAM is now in operation at Kelowna International Airport, Vancouver Harbour and Lower Mainland, Fort St. John, Springbank Airport in Alberta and Fredericton, New Brunswick, and is being used for SSR-equivalent surveillance and separation.

Another example of providing better service to customers is the replacement of more than 110 instrument landing systems (ILS) with state-of-the-art equipment, for higher reliability and availability.

In addition, 87 new Automated Weather Observation Systems (AWOS), 157 Human Weather Observation Systems (HWOS) and 149 Digital Aviation Weather Camera sites have been installed as part of the Weather Systems Upgrade program.

There has been extensive facility renewal since 1996, including the construction of the Toronto Tower (the world’s first glass tower, with touch screens replacing paper strips), and more recently Edmonton and Calgary Towers; the development of a new Vancouver Area Control Centre; and the construction of a new Logistics Centre.
Technology and Systems

It is difficult to find an area of the Canadian ANS that has not been subject to our modernization drive. As a result many of the Company’s systems have been consolidated, reducing complexity and improving performance and reliability.

NAV CANADA purchases equipment and systems where practicable, but has expertise within the Company to build or adapt to meet specific operational requirements or improve efficiency – especially with regard to Air Traffic Management (ATM) systems, an area in which it is an acknowledged global leader.

The heart of this technology development model is NAV CANADA people – Air Traffic Controllers, Flight Service Specialists, Engineers, Software Developers and others – working together to identify opportunities for improvement and then turning those ideas into world-leading technology solutions.

Canadian Automated Air Traffic System (CAATS)

CAATS has been the Company’s most ambitious and complex modernization project to date. Now fully operational, it is the ANS backbone flight-data processing system offering key safety, efficiency and time-saving decision-support tools.

CAATS integrates all individual flight information allowing controllers to handle increased traffic more efficiently and safely. It has been enhanced to enable Medium Term Conflict Detection (MTCD), available in the high-level airspace sectors above FL290. MTCD continuously checks correlated flights for any losses of separation and allows controllers to perform trial probes on pilot-requested altitude changes and ensures that clearances are conflict-free.

As part of the Canadian domestic airspace safety and efficiency enhancements, Controller-Pilot Data Link Communications (CPDLC) is now in use in all Canadian flight information regions above FL290. CPDLC enables controllers and flight crews in suitably equipped aircraft to exchange text-based messages via data link, as an alternative to voice communications, eliminating the need for read-back and hear-back instructions, thus significantly decreasing the risk of communications errors.

Growth in the use of CPDLC across the country has been dramatic, as our people have embraced this opportunity to be pioneers in a technology that promises to make significant gains in flight safety and efficiency.
NAV CANADA’s advanced oceanic air traffic management system known as GAATS+ is key to improved flight efficiency for customers who fly the North Atlantic – the busiest oceanic airspace in the world. Our oceanic air traffic services and support staff, together with their engineering and operational support colleagues, have been central to the evolution of GAATS+ over the past 25 years, and continue to be world leaders in oceanic services.

The GAATS+ system automates flight data processing so controllers can manage both random and track-based traffic. Integrated into GAATS+ are CPDLC, ADS-B and ADS-C (Contract), which facilitates reduced separation in the North Atlantic allowing equipped aircraft to request optimal flight profiles.

In an effort to further enhance flight efficiency, the Company also launched the Gander Oceanic Flight Level Initiative (GO-FLI). Through this service, controllers take advantage of the intelligence in GAATS+ to provide pilots with access to higher, more fuel-efficient altitudes when they become available.

The advanced features of GAATS proved attractive enough to NATS in the UK that they bought the system from NAV CANADA. The result is a seamless approach to oceanic air traffic services provision from North America to Europe. At the end of 2014, NATS successfully migrated to the new NAV CANADA GAATS+ baseline at Prestwick Oceanic Control Centre. With GAATS+ fully deployed in Canada and the UK, controllers and customers benefit from improved coordination, greater sharing of system information and greater integration.

NAVCANatm technology has been sold to other Air Navigation Service Providers around the world, such as the UK, Denmark, Australia, Dubai, Hong Kong, Luxembourg, the Dutch Caribbean, Italy and India.

NAV CANADA’s advanced oceanic air traffic management system known as GAATS+ is key to improved flight efficiency for customers who fly the North Atlantic – the busiest oceanic airspace in the world. Our oceanic air traffic services and support staff, together with their engineering and operational support colleagues, have been central to the evolution of GAATS+ over the past 25 years, and continue to be world leaders in oceanic services.

The GAATS+ system automates flight data processing so controllers can manage both random and track-based traffic. Integrated into GAATS+ are CPDLC, ADS-B and ADS-C (Contract), which facilitates reduced separation in the North Atlantic allowing equipped aircraft to request optimal flight profiles.

In an effort to further enhance flight efficiency, the Company also launched the Gander Oceanic Flight Level Initiative (GO-FLI). Through this service, controllers take advantage of the intelligence in GAATS+ to provide pilots with access to higher, more fuel-efficient altitudes when they become available.

The advanced features of GAATS proved attractive enough to NATS in the UK that they bought the system from NAV CANADA. The result is a seamless approach to oceanic air traffic services provision from North America to Europe. At the end of 2014, NATS successfully migrated to the new NAV CANADA GAATS+ baseline at Prestwick Oceanic Control Centre. With GAATS+ fully deployed in Canada and the UK, controllers and customers benefit from improved coordination, greater sharing of system information and greater integration.

NAVCANatm technology has been sold to other Air Navigation Service Providers around the world, such as the UK, Denmark, Australia, Dubai, Hong Kong, Luxembourg, the Dutch Caribbean, Italy and India.
This type of program provides ANSPs and other industry counterparts the opportunity to avoid the costs of duplicate development and quicken technology deployment by using systems with a proven track record. It has also been a golden opportunity for our own staff to meet and master a competitive challenge – which is a continuing source of pride and motivation for them.

**Automatic Dependent Surveillance-Broadcast**

When the Company was faced with a decision to extend air traffic surveillance coverage in the Hudson Bay area, it selected Automatic Dependent Surveillance-Broadcast (ADS-B) to provide radar-like information at a much lower cost than radar.

Since then, ADS-B air traffic surveillance has been further expanded into the Eastern Arctic and over Southern Greenland. Airlines are seeing big savings as a result of more efficient routes and altitudes made available through expanded airspace capacity.

**Aireon**

But this is only the beginning. A new joint venture involves the installation of ADS-B receivers on Low Earth Orbit (LEO) satellites to expand air traffic surveillance around the globe, making a significant difference to safety and efficiency in remote areas including the world’s oceans.

The joint venture – known as Aireon – involves NAV CANADA, satellite services provider Iridium Communications Inc., as well as ENAV of Italy, Naviair of Denmark, and the Irish Aviation Authority. Agreements for Aireon services have been reached with a growing number of ANSPs worldwide.

Through this exciting project, ADS-B sensors are to be included as a hosted payload on the Iridium NEXT constellation of satellites, scheduled to begin launching in late 2015. The resulting expansion in airspace capacity promises to save airlines more than $100 million per year in the North Atlantic alone – a quantum leap in customer benefits.

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