

# ARCHIVED REPORT

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## ATC - Canada

### Outlook

- COVID-19 pandemic is resulting in massive declines in air traffic and substantial budget shortfalls
- Air traffic declined 34.1 percent through September 2020 versus FY19
- NAV CANADA responded to revenue shortfalls by laying off or eliminating 900 employees, restructuring its financing agreements, and issuing new debt
- In June 2021, as air traffic continued to recover from 2020's lows, NAV CANADA canceled the surplus notices to 41 air traffic controllers

### Orientation

**Description.** Air navigation services in Canada are provided by NAV CANADA, a private company founded by a cooperation of public and private interests in 1996.

NAV CANADA is governed by a 15-member board of directors elected in the following manner:

- Four directors elected by commercial air carriers through the National Airlines Council of Canada
- One director elected by business and general aviation interests through the Canadian Business Aviation Association
- Three directors elected by the Canadian government
- Two directors elected by employee unions

- Four independent directors elected by the board through the director member
- One president and chief executive officer

#### Sponsor

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**Status.** Air navigation services are continuously provided by NAV CANADA.

**Application.** Canada's ATC efforts are designed to increase the safety of air navigation, decrease the environmental impact of air navigation, and facilitate commerce through domestic and international transit.



## ATC - Canada



NAV CANADA's Toronto Area Control Centre

Source: Copyright NAV CANADA

## Technical Data

**Design Features.** NAV CANADA is a private corporation that owns and operates Canada's civil air navigation service. It coordinates the safe and efficient movement of aircraft in Canadian domestic airspace and in international airspace assigned to Canadian control. The company's air navigation infrastructure includes the following:

- Area control centers
- Stand-alone terminal control units
- Control towers
- Flight service stations
- Radar sites
- Ground-based navigational aids

**Area Control Centers (ACCs).** ACCs provide air traffic control (ATC), information services, and alerting services for aircraft within a designated area. ACCs normally divide their assigned airspace into sectors that are controlled by a controller or team of controllers.

Control services are provided by a combination of radar, information technology, and voice communication. Personnel apply strict separation criteria to ensure safe, consistent separation and orderly, efficient flow of traffic from origin to destination.

**Terminal Control Units (TCUs).** TCUs provide control, advisory, and alerting services to arriving, departing, and transiting flights within the terminal control area that surrounds and overlies major airports. Traffic beyond the terminal area is handled by area controllers. An airport's TCU is generally located within an ACC.

**Air Traffic Control Towers.** Air traffic controllers working in control towers provide pilots who are approaching and departing busy airports with clearances and instructions to ensure that aircraft have sufficient horizontal, lateral, and vertical separation from each other. Tower controllers provide flight information to aircraft operating within designated airspace around airports. At busier airports, ground movements are monitored using ground surveillance radar systems.

**Flight Service Stations (FSSs).** FSSs provide resources for flight planning, access to briefings on weather and other preflight information, and aeronautical information. Additional services include en route and airport advisory services, vehicle control services, navaid monitoring, VHF/DF assistance, and Search and Rescue Center alert of overdue aircraft.

**ATC - Canada**

**Community Aerodrome Radio Stations (CARS).** CARS are equipped with meteorological instruments and communications equipment for the provision of weather and flight information to pilots. CARS are operated by observers/communicators who are usually recruited locally. Each CARS is assigned to a designated FSS.

**Remote Communications Outlets (RCOs) and Remote Aerodrome Advisory Services (RAASs).** RCOs are remote transmitters/receivers set up to extend the communications capabilities of FSSs. They allow flight service specialists to provide flight information services to remote areas and aerodromes without a staffed NAV CANADA facility. When an RCO is used to provide airport advisory services at a remote aerodrome, the service is referred to as a RAAS.

**Landing and Navigational Aids.** Landing aids and related facilities directly support aircraft and assist during departure, en route, and upon arrival.

The Instrument Landing System (ILS) is the primary precision approach system approved by the International Civil Aviation Organization (ICAO). It provides navigational guidance signals and information on a cockpit display that guides pilots to the point of landing in reduced visibility.

**Radio Navigation Facilities.** Radio navigation facilities are installed on defined flight tracks for use in the en route phase of flight. They are also installed at aerodromes, where they can be used to perform nonprecision approaches under Instrument Flight Rules (IFR) conditions. Normally, two or more types of

navigational aids are located at a site to provide a combination of functions and to ensure reliability.

**Nondirectional radio beacons** transmit a nondirectional radiation pattern on a low frequency.

**Distance measuring equipment** responds to aircraft queries for cockpit display of the distance to the DME facility from a suitably equipped aircraft.

**VHF omni-directional range/distance measuring equipment** consists of a ground-based, short-distance radio that provides continuous azimuth information in the form of 360 usable radials to or from a station. It serves as the basis for most of the civil airways structure in North America.

The **Tactical Air Navigation (TACAN) system** is used to define the azimuth lines between the aircraft and the transmitter, as well as the distance from the aircraft to the transmitter. The air navigation system uses radar surveillance for both terminal and en route control. TACAN is supplied by the military and is operated and maintained by NAV CANADA.

Surface aircraft and vehicle traffic is monitored at airports using **Airport Surface Detection Equipment (ASDE)** radar. Monitoring is generally performed during periods of reduced visibility.

**Technical Systems Center (TSC).** The TSC provides air navigation system development and operational support, including repair facilities and calibration and test equipment. Through integration and testing, the TSC ensures that new equipment will function properly and safely in the field and that its installation will not adversely affect existing systems.



## ATC - Canada



Control Room at NAV CANADA's Winnipeg Area Control Centre

Source: Copyright NAV CANADA

## Program Review

On November 1, 1996, the responsibility for Canada's air navigation service (ANS) network and facilities was transferred from Transport Canada, part of the Canadian federal government, to NAV CANADA, a private sector company, for CAD1.5 billion. This occurred because NAV CANADA was created through the collaborative efforts of employees, unions, pilots, airlines, government officials, and other members of the aviation sector who shared concerns over the ability of the ANS to meet Canada's future air navigation challenges.

Under the Civil Air Navigation Services Commercialization Act, NAV CANADA is allowed to charge for air navigation services. Service charges levied on airlines and aircraft operators are designed to recover the costs incurred by NAV CANADA in providing air traffic control, flight information, and other air navigation services. The full implementation of service charges means that NAV CANADA now operates independently of government funding.

### **1997 - 2009**

NAV CANADA made one of its first moves to modernize air navigation in Canada when it officially opened its new air traffic control tower on June 26, 1997 in Quebec City (located at Jean Lesage International Airport). In addition, NAV CANADA set up a new flight information center in Quebec City. NAV CANADA opened its \$5.7 million Air Operations Center in Saskatoon on August 27, 2001.

In July 2002, NAV CANADA opened its new \$5 million ATC tower at Springbank Airport in Calgary, Alberta. Later, in February 2003, NAV CANADA announced that it had completed the installation of a new \$1 million Instrument Landing System at Kelowna International Airport in British Columbia. In January 2004, NAV CANADA announced that it had completed the modernization of its Montreal Area Control Center and its ATC tower located at Montréal-Pierre Elliott Trudeau International Airport.

**ATC - Canada**

NAV CANADA announced on July 19, 2006 that it would switch to new satellite-based position technology for air traffic control, known as Automatic Dependent Surveillance-Broadcast. The ADS-B equipment consists of an antenna, a receiver, a target processor, and telecommunications links to send information back to the appropriate NAV CANADA Area Control Center. In May 2008, NAV CANADA announced that, in conjunction with Park Air Systems Ltd and SolaCom Technologies Inc, it would replace the VHF radios that provide the air-ground-air links in Canada's ANS under an eight-year, CAD50+ million upgrade program. Under the program, over 2,000 aging Garrett VHF radios at some 320 sites across the country would be replaced with modern technology provided by Park Air Systems and SolaCom Technologies.

NAV CANADA announced on January 28, 2009, that it and Aéroports de Montréal would be jointly investing in a new multilateration surface surveillance system, called Multistatic Dependent Surveillance, to improve aircraft and vehicle visibility on the runways and airport apron at Montreal-Trudeau Airport. MDS uses multiple sensors to triangulate aircraft location based on transponder signals from aircraft.

**2010 - 2013**

In June 2010, NAV CANADA acquired a majority interest in Searidge Technologies Inc, a provider of video solutions to air traffic control and airport markets. According to NAV CANADA, the company's investment in Searidge would enhance its strategy of allowing other Air Navigation Service Providers (ANSPs) and airports around the world to take advantage of its ATM technology solutions, which it has provided to customers on three continents.

In June 2010, NAV CANADA announced that its air traffic controllers who direct aircraft as they transit across the North Atlantic had begun employing the Gander Automated Air Traffic System Plus (GAATS+). The controllers using this technology are based at the Gander Area Control Center in Newfoundland.

In March 2012, NAV CANADA reached an agreement with DFS Deutsche Flugsicherung, the air navigation service provider in Germany, to purchase air traffic surveillance fusion and flight-tracking technology for implementation in the Canadian air navigation system. During the same month, NAV CANADA announced that it had extended its ATC surveillance of Canadian airspace to cover a 1.3-million-square-kilometer area over the North Atlantic.

NAV CANADA announced in May 2013 that its air traffic controllers had begun handling flights at Edmonton International Airport from a new air traffic

control tower. Edmonton's new control tower is equipped with the latest NAVCAN ATM technology, including NAVCANstrips, an advanced electronic flight strips system.

In July 2013, NAV CANADA disclosed that its air traffic controllers at Calgary International Airport had begun handling flights from a new air traffic control tower. At over 300 feet high (270 ft at eye level in the cab), it is the highest freestanding tower of its kind in Canada. Air traffic controllers officially moved into the new facility on May 27. The new cab, at 60 square meters, is roomier than the previous facility and has eight operational positions for air traffic controllers, compared to five in the old tower. According to NAV CANADA, the new tower's height gives controllers the ability to view holding bays, taxiways, approach and departure paths, and airborne traffic patterns.

**2014 - 2016**

In June 2014, NAV CANADA revealed that its nationwide ILS replacement program was approaching completion, with the company acquiring an additional 15 ILS from Indra Navia AS. Following this final phase of the program, more than 110 ILS will have been acquired to replace legacy systems and provide the capability in new locations. Indra Navia would supply the 15 NORMARC 7000B ILS over the next three years under the fourth phase of the program.

NAV CANADA announced in July 2014 that Canadian airspace had undergone safety and efficiency enhancements with completion of the national implementation of Controller Pilot Data Link Communications. CPDLC enable controllers in ACCs and pilots in suitably equipped aircraft flying above 29,000 feet to communicate via datalink or text-based messages.

NAV CANADA's construction of a new air traffic control tower at Region of Waterloo International Airport was announced in June 2015. The new structure would replace the existing tower built over 45 years ago. Work was scheduled to begin in June 2015 and be completed by summer 2017. At 19.4 meters (64 ft) high, the new tower would be almost 5 meters (16 ft) taller than the current structure – a 33-1/3 percent increase. The larger cab would expand the controllers' workspace from the current 24 square meters (260 sq ft) to 32 square meters (345 sq ft). The four-story building would be equipped with an elevator.

In December 2015, NAV CANADA announced that aircraft flying over the North Atlantic would be spaced closer together as part of a project to increase airspace capacity, cut fuel burn, and reduce carbon emissions. The project – called Reduced Lateral Separation, or



## ATC - Canada

RLat – is an ICAO initiative being jointly introduced by U.K. air traffic services company NATS and NAV CANADA. Also in December, NAV CANADA revealed a multiyear project to upgrade terminal surveillance radar (TSR) at 12 sites. The project is being phased in starting with five major airports, with work underway at Toronto, Vancouver, Calgary, Montreal, and Hamilton. The investment in this infrastructure renewal project will total more than \$125 million.

On November 1, 2016, NAV CANADA announced that it planned to invest \$170 million in capital expenditures on infrastructure in fiscal year 2017 – \$40 million more than the company's annual average. Much of the capital expenditure from 2017 through 2019 was focused on key facilities, including ACCs, ATC towers, and flight service stations. In addition to the expansion, refurbishment, or replacement of these facilities, NAV CANADA would continue to upgrade power systems and make important investments in air traffic management technology and new business systems.

A significant part of the investment is also being devoted to modernizing critical elements of the communications, navigation, and surveillance infrastructure, including continued investment in space-based ADS-B, which is set to revolutionize global air traffic surveillance.

### 2017

NAV CANADA announced in October 2017 that several employees had been recognized for outstanding achievements in the development, operation, or maintenance of the worldwide air traffic control system. Awards in three categories were presented to NAV CANADA by the Washington, DC, based Air Traffic Control Association (ATCA) on October 18 during the ATCA Conference and Exposition held in National Harbor, Maryland.

In December 2017, NAV CANADA issued a reminder that citizens be cautious when installing decorative laser lights during the holiday season. It said that laser projectors that shine festive displays on houses must be aimed at solid surfaces and not toward the sky. Skyward beams can enter the cockpit of an aircraft and pose a risk to pilots. NAV CANADA said that residents who live within 10 kilometers of an airport should check the angle of the laser's projection to ensure the display does not extend in the sky beyond their home.

### 2018

In August 2018, NAV CANADA unveiled a rate revision proposal that would decrease rates by an average of 0.4 percent. This effectively continued the one-year temporary rate reduction that was

implemented on September 1, 2017. On average, NAV CANADA's customers would pay about the same rates in fiscal 2019 as they did in fiscal 2018.

According to a report published in Canadian Daily *The Star* in March 2018, women make up less than 25 percent of the workforce at the Montreal control center. The report stated that NAV CANADA is trying to change this in part by teaming up with Elevate, a volunteer-run network that promotes aviation careers for women.

The traffic in June 2018 increased by an average of 5.2 percent compared to the same month in 2017. NAV CANADA said that traffic over the past year (the 2018 fiscal year running from September 1, 2017 to August 31, 2018) had grown faster than forecast, and the strong traffic results in FY18, coupled with traffic growth projections for fiscal 2019, had, in effect, enabled the company to cancel the 0.4 percent rate increase that was set to begin on September 1, 2018, upon the expiration of the previous year's temporary reduction.

According to a NAV CANADA spokesperson, the next major ATC advance would be a shift to space-based ADS-B, to be available on a global basis in 2019 (discussed above). NAV CANADA would implement space-based ADS-B using the services of Aireon, NAV CANADA's joint venture with Iridium Communications; ENAV of Italy; the Irish Aviation Authority; and Naviair of Denmark.

NAV CANADA released its 2018 end of year performance numbers in January 2019.

In 2018, NAV CANADA reported a 5.1 percent increase in air traffic volumes, up for the fifth consecutive year, and achieved a five-year moving average of only 0.67 IFR-to-IFR losses of separation per 100,000 aircraft movements. The company had 1,600 active flight controller workstations during the period at 114 staffed sites, looking over approximately 3.3 million flights.

### 2019

In August 2019, NAV CANADA announced that it had selected and approved service charge changes. Ultimately, the first phase would result in additional charges of 0.8 percent on overall rate levels. The method of setting the Rate Stabilization Account target balance at 7.5 percent of annual operating costs would also change, taking effect the same day. For the second phase of the service rate changes, NAV CANADA would place a flat-charge-per-flight fee structure for space-based ADS-B surveillance within the North Atlantic oceanic airspace of \$155.03 per flight, beginning on January 1, 2020.

NAV CANADA's effort to implement Aireon's space-based ADS-B surveillance data service added substantial costs to the organization's budget. To ameliorate this, NAV CANADA announced a proposal for service charge increases in June 2019. The proposal would see the charges changed in two phases: first, as indicated above, on September 1, 2019, an average increase of 0.8 percent over base rates would be implemented; and second, on January 1, 2020, charges related to space-based ADS-B in the North Atlantic airspace would be added, with three potential options proposed.

In September 2019, the IATA filed an appeal to the Canadian Transportation Agency (CTA), but in January 2020, the CTA upheld the rate changes. The ruling also upheld the January 1, 2020 Phase 2 rate change, which, as indicated above, increased the North Atlantic en route charge to \$155.03 per flight.

NAV CANADA released its FY19 year-end results in October 2019, revealing \$1.449 billion in operating expenses on \$1.437 billion in revenue. This compared to expenses of \$1.396 billion in FY18 on revenue of \$1.415 billion, going from a net positive in FY18 to a net negative in FY19. Some of the added operating expense was attributable to the addition of space-based ADS-B, which necessitated the rate increases detailed above.

Although Canada had no requirements for ADS-B equipment, NAV CANADA reminded all pilots and air carriers that flights originating or entering U.S. air space require ADS-B Out. The December 2019 announcement was also a reminder of the importance of adding space-based ADS-B coverage to NAV CANADA's capabilities.

In January 2020, NAV CANADA released the figures for its 2019 end-of-year performance.

In 2019, NAV CANADA reported a 1.9 percent increase in air traffic volumes, up for the sixth consecutive year, and sustained only 19.66 IFR-to-IFR losses of separation. The company had 1,600 active flight controller workstations during the period at 109 staffed sites, looking over approximately 3.4 million flights.

The top three fastest growing flight areas were the Caribbean, with 5.5 percent traffic growth; Europe, with 4.2 percent; and the U.S., with 3.3 percent. Intra-Canadian traffic was up only 0.1 percent, illustrating the growing impact of international travel.

## 2020

Due to rising air traffic growth at YMX International Aerocity in Mirabel, NAV CANADA began a regional aeronautical assessment in 2017. Based on its findings, NAV CANADA launched air control service for the facility beginning on January 30, 2020. Initial service would start with air control for 16 hours a day supplemented by advisory coverage for the remainder of the day.

In conjunction with Unifly, a strategic partner, NAV CANADA signed an agreement to deploy a national system for digital services for safe operation and management of drone flights. The system would support current regulations, but underscored the rising need to control drone movement in or near flight zones.

## **COVID-19 in 2020**

As with all air navigation service providers worldwide, NAV CANADA confronted near cataclysmic declines in passenger volume due to the COVID-19 pandemic.

NAV CANADA announced its initial reactions in March 2020, which included restricting building access, enhancing cleaning and hygiene measures, and enabling and encouraging those who can work remotely.

The growing devastation to the industry was on display when Air Transport Association of Canada (ATAC), a national trade association for commercial aviation, flight trainers, and industry suppliers, issued an open letter to Prime Minister Justin Trudeau and several other ministers. The letter was an urgent appeal for government financial support for the aviation industry, which saw a severe crisis looming.

Service changes emerged, with NAV CANADA redirecting all international passenger flights to the country's four largest airports: Calgary, Montreal, Toronto, and Vancouver. The March 2020 announcement was followed by further restrictions in May 2020, when NAV CANADA suspended overnight service at 18 air traffic service facilities.

The suspension of overnight service came alongside drastically declining passenger volume, with traffic declining 74.7 percent in April versus the prior year. By August, when NAV CANADA reported its July figures, traffic was still 67.6 percent below the prior year.

Some optimistic news emerged in July 2020, though, with the announcement that NAV CANADA was reopening night service at 12 of the 18 closed facilities. Then in August, the ANSP announced that five more facilities would reopen. In September, the final facility reopened.



## ATC - Canada

With budget shortfalls in FY19 and FY20 looking even worse as revenue declined in conjunction with waning traffic, NAV CANADA announced a proposal for further service charge increases in May 2020. In August, NAV CANADA said that it would proceed with the proposed rate changes, which would result in an average charge increase of 29.5 percent. The company said that it had explored all possible options to avoid the change, including an appeal to the Canadian

government for assistance. Nevertheless, NAV CANADA said that no alternative was found.

With carriers struggling, NAV CANADA hoped to ease the burden of the charges by allowing operators to defer payments over five years of equal payments. The rate increases, NAV CANADA revealed, were part of the agreement signed to secure an \$850 million loan in May 2020.



NAV CANADA Flight Service Station in Saint John, NB

Source: Copyright NAV CANADA

## Funding

NAV CANADA recovers the costs of air navigation facilities and services through a system of service charges levied on aircraft operators.

## Worldwide Distribution/Inventories

NAV CANADA coordinates the movement of aircraft in Canadian domestic airspace and international airspace assigned to Canadian control.

## Forecast Rationale

NAV CANADA, the private corporation that acts as Canada's national air navigation service provider, continues to modernize air traffic control systems assigned to Canadian management.

### News: 2020/2021

NAV CANADA announced the launch of a trial of Searidge Technologies' remote air traffic services technology in September 2020. The trial would integrate Searidge Technologies' Enhanced Airport Vision Display (EAVD) into NAV CANADA's existing operational display suite. The EAVD would be part of

NAV CANADA's Aerodrome Advisory Services at Fredericton International Airport through remote advisory from Saint John, New Brunswick.

In October 2020, WestJet filed an appeal to the increased service charge rate that NAV CANADA had announced in August. The airline and NAV CANADA were reported to be considering mediation. In the meantime, the 29.5 percent increase, which came into effect on September 1, 2020, would remain in effect.

In January 2021, the Canadian Transportation Agency dismissed WestJet's appeal.

**ATC - Canada**

Potentially a result of its increasing budgetary problems, in October 2020, NAV CANADA announced that its president and CEO, Neil R. Wilson, would retire, effective January 30, 2021. Mr. Wilson had been serving the dual role since January 1, 2016.

In December 2020, NAV CANADA revealed that Raymond G. Bohn would ascend to the president and CEO roles, effective February 1, 2021.

Continuing the turnover in its upper ranks, in July 2021, NAV CANADA announced that its vice president and CFO, Alexander "Sandy" N. Struthers, would be stepping down from his positions under a planned retirement. It was revealed that Mr. Struthers would leave NAV CANADA on December 31, 2021.

Prior to the COVID-19 pandemic, air traffic at Red Deer Regional Airport had been rising steadily. To meet the growing demand, which was expected to continue once the outbreak subsided, NAV CANADA revealed that as of November 5, 2020, airport control service would be increased to 16 hours per day. Safety during the remaining eight hours would be provided through the Airport Advisory Service.

In April 2021, even with COVID-19 still affecting the organization, NAV CANADA announced that, following 29 studies launched in the fall of 2020, it would limit service changes across the country. NAV CANADA said that there would be no site closures at ATC towers or flight service stations while also suspending studies related to remote or northern locations.

In July 2021, adding to the suspension of studies related to the remote or northern locations, NAV CANADA said that it would be postponing the completion of all aeronautical studies launched in September and November 2020. The organization said it intended to review the status of the studies in 2022.

Under increasing unmanned aircraft usage – 16,000 RPAS flight authorization requests from June to December 2020, alone – NAV CANADA launched the NAV Drone application for smart phones in June 2021. The app allows unmanned aircraft pilots and operators to clear operation in NAV CANADA airspace, gain awareness of the airspace, visualize where unmanned aircraft pilots can fly, and update and manage flights.

***COVID-19***

As with all air navigation service providers worldwide, NAV CANADA confronted near cataclysmic declines in passenger volume due to the COVID-19 pandemic.

In September 2020, as a result of its ongoing difficulties – marked by a substantial fall in income and a growing budget deficit – NAV CANADA announced

that it would be making workforce reductions permanent. The ANSP revealed that it had 5,100 employees prior to the pandemic, and had subsequently reduced staffing by 720 jobs, or 14 percent of its workforce.

Additional measures to reduce NAV CANADA's expenses were announced in November 2020, with the launch of a review of operations at six ATC towers: Fort McMurray Tower, Prince George Tower, Regina Tower, Sault Ste. Marie Tower, Whitehorse Tower, and Windsor Tower. NAV CANADA stated that it would take into consideration traffic demands prior to and during the COVID-19 pandemic.

In the same month, NAV CANADA, a private, not-for-profit company, announced that it would commence a bondholder and noteholder consent solicitation in an effort to amend the master trust indenture and general obligation indenture governing its bonds and notes, respectively. NAV CANADA said that it was attempting to temporarily relieve the company from complying with the rate covenants and other provisions in respect to its 2021, 2022, and 2023 fiscal years. The meeting was scheduled for December 23, 2020.

A further reduction to NAV CANADA's workforce was announced in December 2020. The company would lay off approximately 180 additional employees in its operational and technology staff.

Some relief to NAV CANADA's financing obligations was announced in December. The company said the results of its bondholder and noteholder consent solicitation were successful. During the virtual meeting, 98.17 percent of bondholders and 96.43 of noteholders approved NAV CANADA's proposal. Under the provisions, NAV CANADA must maintain liquidity of at least \$250 million through the waiver period.

In January 2021, NAV CANADA announced that it would be soliciting additional financing through the private placement of \$300 million in Series 2021-1 general obligation notes. The net proceeds of the offering would be used to repay \$250 million of the company's Series MTN 2011-1 notes maturing February 18, 2021.

As traffic recovered somewhat and operational requirements increased, in June 2021, NAV CANADA announced that it would be canceling the surplus notices to 41 air traffic controllers.

***2020 Performance***

In January 2021, NAV CANADA released the figures for its 2020 end-of-year performance.

In 2020, NAV CANADA reported a 34.1 percent decline in air traffic volumes, down for the first time in



## ATC - Canada

six consecutive years. In its annual report, NAV CANADA did not disclose 2020's total number of air movements. However, if volume was down 34.1 percent from 2019's 3.4 million, around 2.2 million movements were directed in 2020. The organization did disclose that it achieved a new record low of 0.46 IFR-to-IFR losses of separation per 100,000 aircraft movements.

In fiscal year 2020, NAV CANADA operated seven area control centers, 41 control towers, 56 flight service stations, seven flight information centers, 30

maintenance centers, 51 community aerodrome radio stations, 50 contract weather office stations, 46 radar sites, 15 ADS-B receiver sites, 10 multilateration sensor sites, and over 967 electronic aids to navigation.

The 2020 Annual Report revealed that NAV CANADA's revenue fell from \$1,437 million in FY19 to \$1,000 million in FY20. Meanwhile, operating expenses fell by only \$78 million, leading to a net loss of \$612 million before income tax and net movement in regulatory deferral accounts. The company suffered a loss of \$103 million in FY19 under the same statistic.

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