

# WINGS

WEB EXCLUSIVE

A safer approach

## *Pursuit of flight efficiency pays green dividend for air navigation system customers*

Written by NAV Canada

July 7, 2010 – For a world grappling with rising energy costs, finding ways to use fuel more efficiently is a top priority. So it's no surprise that NAV CANADA, the owner and operator of Canada's Air Navigation System (ANS), has been helping its airline customers reduce fuel consumption. The company estimates that new technologies and procedures to improve flight efficiency saved airlines \$331 million in fuel costs in 2008.



This isn't new for NAV CANADA. The company has been working to improve flight efficiency while maintaining safety since assuming responsibility for the ANS in 1996. In the process, it has helped its airline customers reduce fuel consumption significantly. The company estimates that, in its nearly 14 years in business, it has helped airlines save \$1 billion in fuel costs.

### **Emissions Savings**

But what may be surprising is that the pursuit of flight efficiency with its resulting reduction in fuel consumption has paid a significant green dividend, in a world

increasingly concerned about climate change. That dividend is a significant savings in aviation-related GHG emissions.

Although commercial aviation accounts for just two-to-three per cent of worldwide GHG emissions, airlines, airports, air navigation services and aircraft manufacturers have been working together to reduce fuel consumption, saving on GHG emissions in the process.

In 2008, the same technologies and procedures that saved \$331 million in fuel costs also helped avoid 932,000 metric tons of GHG emissions. Since 1996, NAV CANADA's pursuit of flight efficiency has helped to achieve 4.3 million metric tons of avoided emissions.

It gets better.

Between 2009 and 2016, NAV CANADA's twentieth anniversary, the company expects to help airlines achieve another 8.4 million metric tons of avoided emissions. That's almost twice the savings of the company's first 14 years, bringing total avoided emissions over 20 years to 12.7 million metric tons. That's on top of saving airlines \$3 billion in fuel costs.

"Improving flight efficiency safely is a key objective," says John Crichton, President and CEO, "but no one should overlook the contribution that we and our aviation partners are making to cutting greenhouse gas emissions. We all contribute to a greener industry."



### **CIFER Report**

In 2009, the company released a progress report on its Collaborative Initiatives for Emissions Reductions (CIFER), in which it detailed the new technologies and procedures, many of them leading edge, which lie behind these gains in efficiency.

Replacing legacy systems and equipment, updating procedures, and building additional flexibility into air routes offers the greatest potential to move traffic more safely and cost-effectively than ever before. Since 1996, the company has invested over \$1.4 billion in system and equipment upgrades, capital improvements and innovative technologies.

### **Surveillance Technology**

One approach to improving flight efficiency is to reduce separation, the distance needed between aircraft to maintain safety. This increases airspace capacity as well as the number and availability of fuel-efficient routes. New technology has made it possible to reduce this distance

without compromising safety.

For example, Automatic Dependent Surveillance-Broadcast (ADS-B) implemented in 2009 allows air traffic controllers to separate ADS-B equipped aircraft by five nautical miles, down from the previous standard of 80 nautical miles, in the airspace over Hudson Bay. This affects some 35,000 flights per year.

To date, almost 600 aircraft from 19 carriers are certified for ADS-B in Hudson Bay airspace and the company expects 85 per cent of the traffic using this airspace to be certified by the end of 2010.

NAV CANADA estimates that, as airlines equip more aircraft to use



ADS-B, they will save \$195 million in fuel costs and reduce GHG emissions by about 547,000 metric tons between 2009 and 2016. The company is now installing ground stations in the eastern Arctic and southern Greenland to extend ADS-B surveillance to the North Atlantic, the world's busiest oceanic airspace.

A related program will soon see NAV CANADA using Department of National Defence Radars to provide an additional 40 minutes of surveillance for aircraft not equipped or certified for ADS-B, flying westbound over the Atlantic Ocean. The preferred altitude and routing permitted by this surveillance will result in reduced CO<sub>2</sub>e emissions from fuel consumption.

### **Air traffic management procedures**

Updating air traffic management procedures also offers significant improvements in efficiency with resulting GHG reductions. For example, Area Navigation (RNAV) allows more direct flight paths. Over the 20 years between 1996 and 2016, this innovation alone will help save airlines \$440 million in fuel costs, while reducing GHG emissions by 1.8-million metric tons.

Reductions in fuel consumption and GHG emissions are also expected from Required Navigation Performance (RNP), a procedure that permits “short-run” approaches. These feature constant descent, a technique that eliminates less efficient step-down approaches.



### **Air traffic management technologies**

NAV CANADA has developed and implemented new air traffic management (ATM) technologies that help make the international air navigation system better integrated and more efficient, improving both safety and flight efficiency.

For example, the Gander Automated Air Traffic System (GAATS) is one of the most advanced oceanic air traffic control systems, and its technology is operating on both sides of the North Atlantic. It automates flight data processing and integrates ADS position reports and Controller-Pilot Data Link Communication (CPDLC), resulting in faster response to customer requests. CPDLC and ADS-C allow for the phased implementation of reduced separation in the North Atlantic which will enhance efficiency.

The Canadian Automated Air Traffic System (CAATS), a highly advanced aviation-data-processing system, is almost fully deployed in Canada’s domestic airspace. CAATS enables collaborative decision making in flight planning which will result in operator’s flying preferred routes more often, supporting flight efficiency and further improving fuel conservation.

Other ATM technologies developed by NAV CANADA include the Scheduling and Sequencing System (SASS), which helps sequence arrival times and can apportion potential landing delays when traffic exceeds an airport’s capacity.

The Converging Runways Display Aid (CRDA) allows controllers to safely space aircraft arriving on converging approaches. This increases airport capacity and reduces weather delays.

Finally, the Airport Performance Monitor (APM) provides metrics to airports and airlines, including gridlock monitor, arrival-and-departure rates, ground-movement monitor and runway activity. Each of these technologies contributes to flight efficiency, fuel savings and GHG reductions.

### **The Challenge**

The growing complexity and volume of world air traffic require NAV CANADA and other air navigation services providers to continue to re-examine their practices to find ways to improve efficiency while maintaining safety.

In addition, the need to conserve energy and reduce costs will require all aviation partners to continue working to maximize operational efficiency, reducing GHG emissions in the process.



### **Future Development**

Looking forward, the company’s attention is also focused on the following areas:

- Performance Based Navigation (PBN), a key enabler to providing both

- enroute and terminal efficiencies;
- Enroute Surveillance and Communications with increased coverage making operations in remote and oceanic airspace more efficient;
  - Airport Operations improvements such as advanced decision support tools, and new surveillance capability like MLAT improving service and reducing delays, and
  - Airspace Utilization making improvements through airspace redesign.

Whether it's designing optimal routes, minimizing ground delays, or increasing airspace and airport capacity, NAV CANADA's pursuit of flight efficiency will continue, generating cost savings for airlines while reducing aviation's impact on the environment – a green dividend well worth pursuing.