Collaborative Operational Improvements

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NAV CANADA
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- Safety is number one
- Programs and projects to improve air navigation system efficiency
- Leverage emerging technology
- Upgrades to systems, equipment, infrastructure of $1.4 billion since 1996
What is CIFER?

- Programs that support improved efficiency and reductions in GHG emissions
- Progress report
  - identifies reductions in CO$_2$e equivalents and fuel savings from 1996 to 2008
  - Forecasts GHG reductions and fuel savings from 2009 to 2016
  - Living document – updated annually
Avoided CO$_2$e Emissions from NAV CANADA programs since 1996

- Total cumulative reductions by year out to 2016
- 4.35 million metric tons of CO$_2$e emissions have been avoided to date

Source: NAV CANADA
Avoided Fuel Costs since 1997

• 2008 annual avoided fuel costs estimated to be CAD $331 million

• 2008 annual GHG emissions reduced by ~ 1 million metric tons

Total avoided fuel costs equates to 10,000 B-777 flights around the world

Source: NAV CANADA
Putting Programs in Place

*Efficiency in En route Operations*

**ADS-B Hudson Bay**
- Provides radar-like surveillance for equipped aircraft
- Allows better and more flexible routing and reduced separation.

- **Total Benefits 2009 - 2016**
  - GHG 547,000 t CO$_2$e
  - CAD $195 Million in avoided fuel costs

**ADS-B Oceanic**
- Will extend the range of surveillance south and east of Greenland,
- Will permit reduced separation, earlier climbs and more direct routings

- **Total Benefits 2009 - 2016**
  - 131,000 t CO$_2$e
  - CAD $50 Million in avoided fuel costs
Putting Programs in Place

**Efficiency in Enroute Operations**

### Northern Radar Program
- Seven new radars in North
- Enhanced capacity, efficiency and safety for traffic on polar routes, in domestic airspace and enroute to Europe and Asia

- **Total Benefits to 2016**
  - 1,107,000 t CO₂e
  - CAD $392 Million in avoided fuel costs

### Northern Organized Track System
- Provides most efficient routing for aircraft departing Europe for cities in middle and western North America
- After ADS-B Phase II, will no longer be required

- **Total Benefits to 2016**
  - 168,000 t CO₂e
  - CAD $55 Million
Putting Programs in Place

Efficiency in En route Operations

**RVSM**
- Increased capacity of available airspace by reducing vertical aircraft separation requirement from 2,000 feet to 1,000 feet between Flight Level (FL) 290 and FL 410 inclusive

  - **Total Benefits to 2016**
    - 3,970,000 t CO₂e
    - CAD $1,256 Million in avoided fuel costs

**Polar Routes**
- Significantly reduces flight times and the need for connecting flights or refuelling stops

  - **Total Benefits to 2016**
    - 3,577,000 t CO₂e
    - CAD $1,143 Million
Putting Programs in Place

Improving Efficiency

**Canadian Automated Air Traffic System (CAATS)**

- Leading-edge flight data processing system
- Enables collaborative decision making in flight planning
- Improved functionality enhances fuel saving capabilities.

**Gander Automated Air Traffic System (GAATS)**

**Scheduling and Sequencing System (SASS)**

- Arrival manager
- Generates arrival schedules that optimize traffic flow
- Cost savings accrue to operators

**Total Benefits to 2016**

- 550,000 t CO$_2$e
- CAD $178 Million
Performance Based Navigation

Area Navigation (RNAV)

- RNAV equipped and certified aircraft have better access to and flexibility for point to point operations

- Total Benefit to 2016
  - 1,759,000 t CO₂e
  - CAD $440 Million in avoided fuel costs

Required Navigation Performance (RNP)

- RNP terminal procedures reduce the number of minutes flown and can include constant descent approaches

- Total Benefit to 2016
  - 231,000 t CO₂e
  - CAD $82 Million in avoided fuel costs
Looking to the Future

• Implement new capabilities
• Be cognizant of international developments
• Apply a systematic and balanced approach
• Collaborate with employees, customers and stakeholders
• Focus on:
  – Performance Based Navigation
  – Enroute surveillance and communications in remote and oceanic airspace
  – Airport operations improvements and decision support tools
  – Airspace utilization
CIFER

Collaborative Initiatives for Emissions Reductions

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