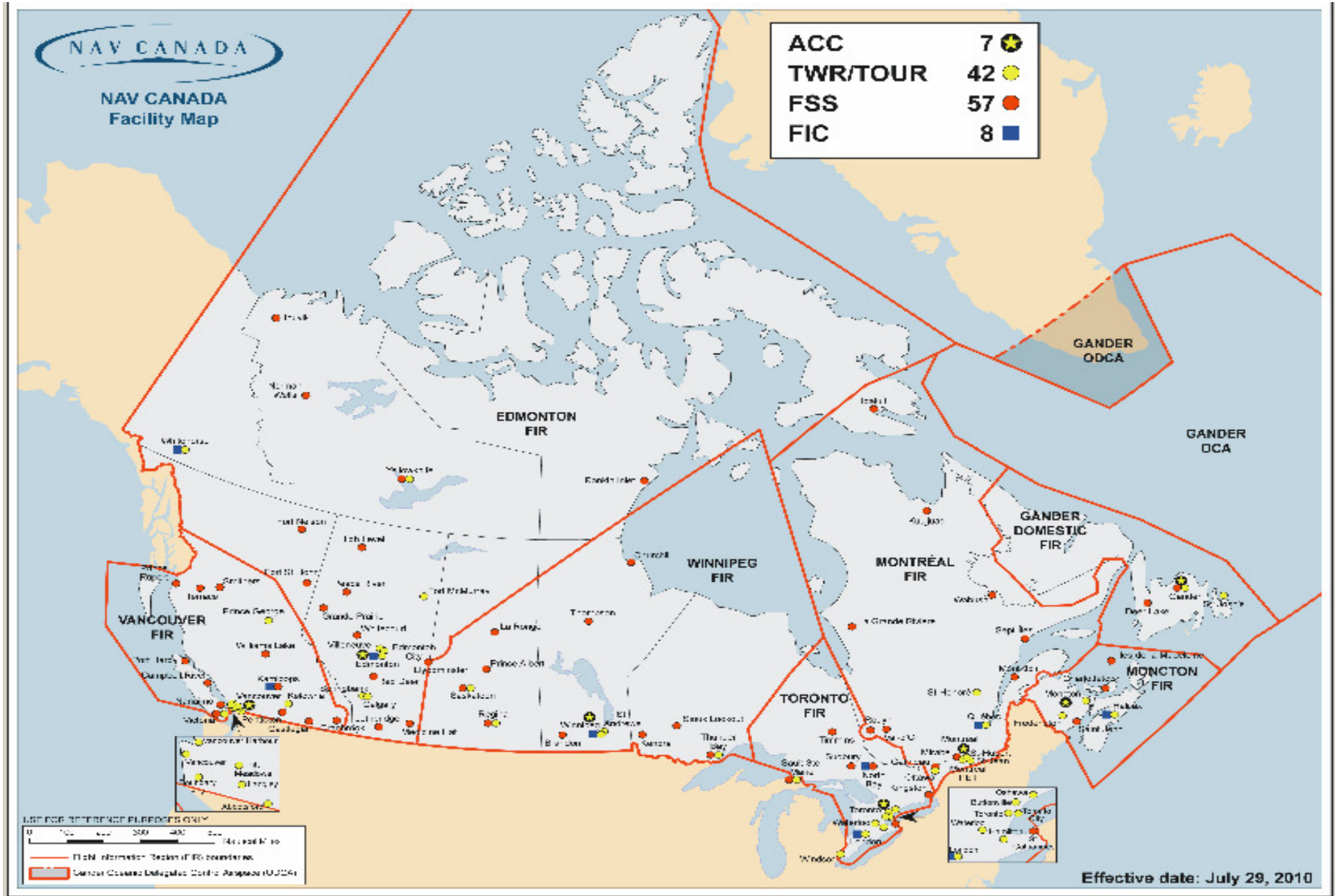
NAV CANADA UPDATE

Dave Mastel
General Manager, Edmonton Flight Information Region
Brian Stockall
Manager, Level of Service

Northern Air Transportation Association
Annual General Meeting
Yellowknife, NT
10 April 2013


NAV CANADA
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Facility Map
ACC 7
TWR/TOUR 42
FSS 57
FIC 8
EDMONTON FIR
WINNIPEG FIR
VANCOUVER FIR
TORONTO FIR
MONTREAL FIR
GANDER OCA
GANDER ODCA
GANDER DOMESTIC FIR
MONCTON FIR
Effective date: July 29, 2010

Outline

- Corporate update
- Technology Update
- Performance Based Navigation & Aeronautical Information
- Level of Service
- Summary

4800 people managing

12 million aircraft movements/year

for some **40,000** customers,

collaborating with stakeholders and partners and leading the way in safety, service and efficiency for

over **16** years

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2012/13 Highlights

- Implementation of Reduced Longitudinal Separation on the North Atlantic
- Implementation of CPDLC
- Implementation of MTCD
- Implementation of Alberta Airspace and Services Review – Phase 1
- Increased deployment of Multi-lateration Surveillance
- Expanded deployment of technology - NAVCANsuite in Towers and Flight Service Stations
- Continued system modernization
  - replacement of equipment (ILS, DME, TACAN, AWOS, WXCAMS)
  - Design and publication of RNAV (GNSS) IAP

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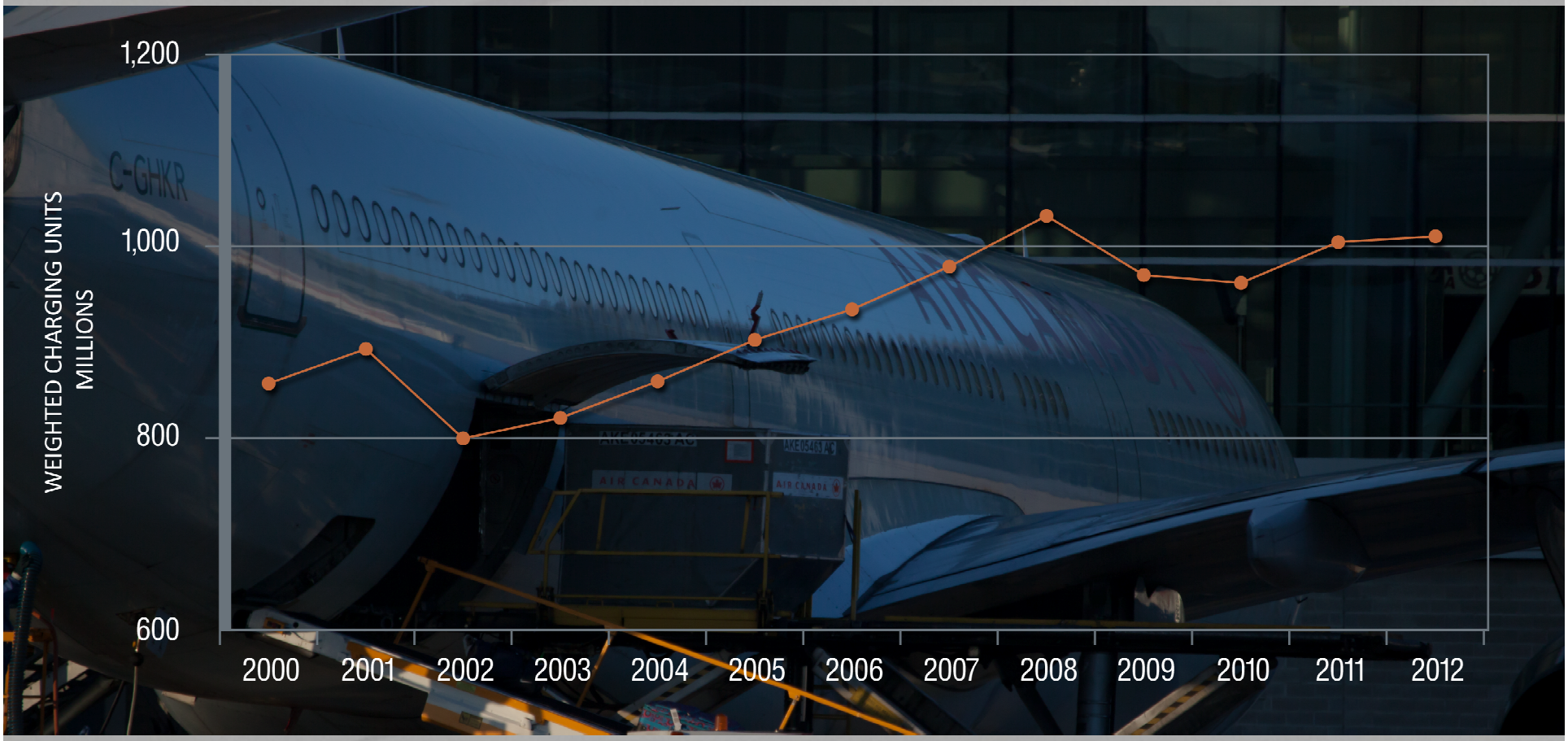
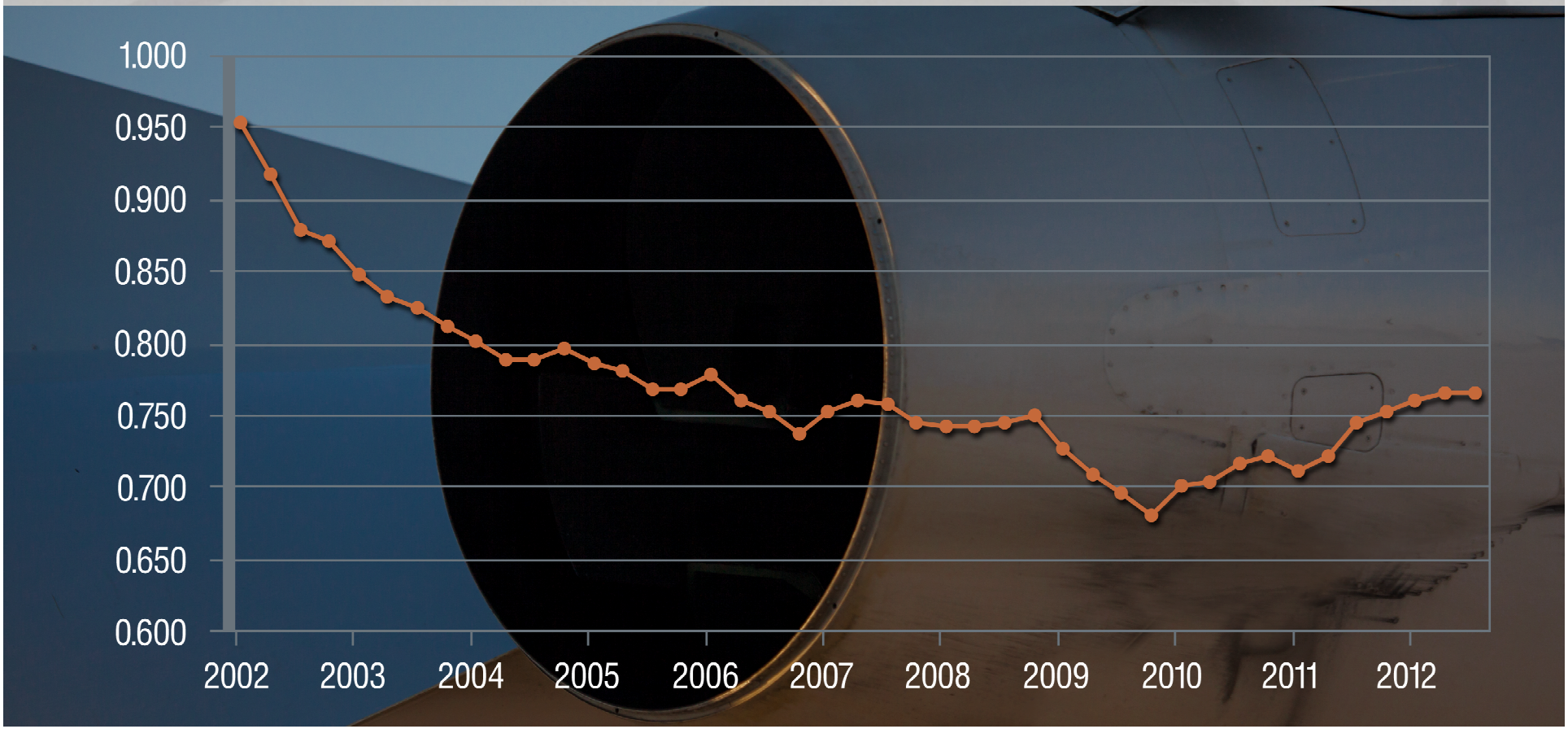
Traffic

Air Traffic Activity – Weighted Charging Units



Safety

Rate of IFR-IFR losses of separation per 100,000 aircraft movements (5 year moving average)



Technology Upgrades

Flight Service Station (FSS) Systems

- 38 sites use NAVCANsitu radar display
- More than 10 sites use NAVCANstrips
- Modernization project recently initiated:
  - Aims to deliver the NAVCANsuite to all Flight Service Stations in Canada.
    - Inuvik, Norman Wells, Rankin Inlet & Iqaluit – complete
    - Whitehorse & Yellowknife – summer 2013
  - Initial configuration will include many standard NAVCANsuite components, including NAVCANstrips, NAVCANinfo and NAVCANsitu.

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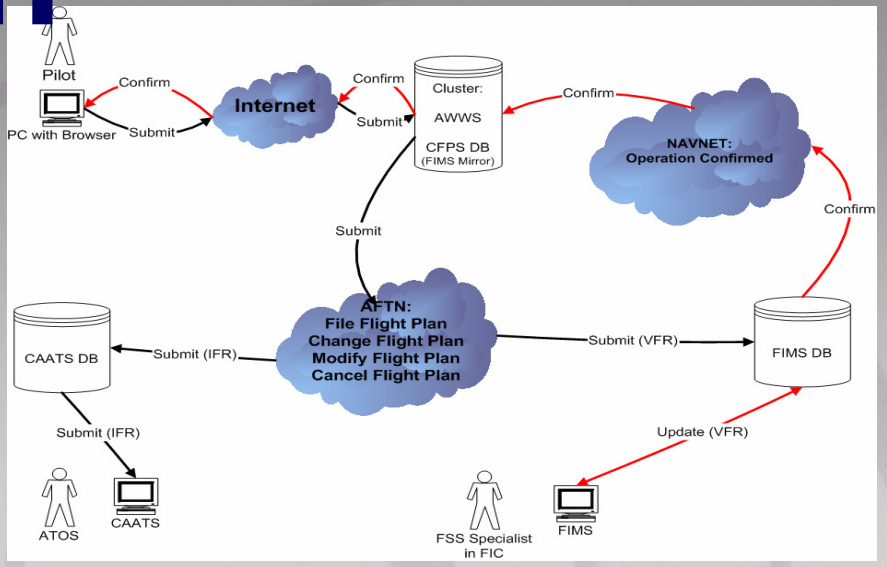
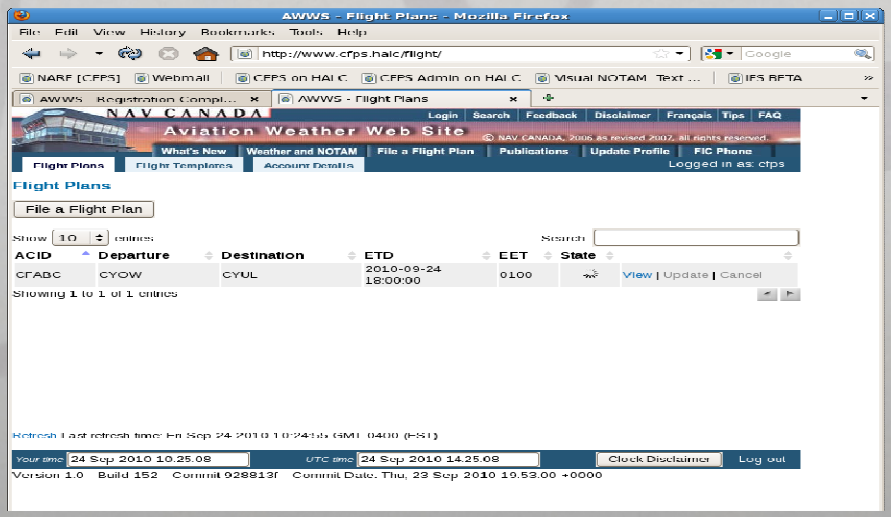
NAVCANplan

- Collaborative Flight Planning System (CFPS)
- Improvement to existing capability (2004)
- BETA testing now completed
- New url site available 17 Nov 11
  - plan.navcanada.ca

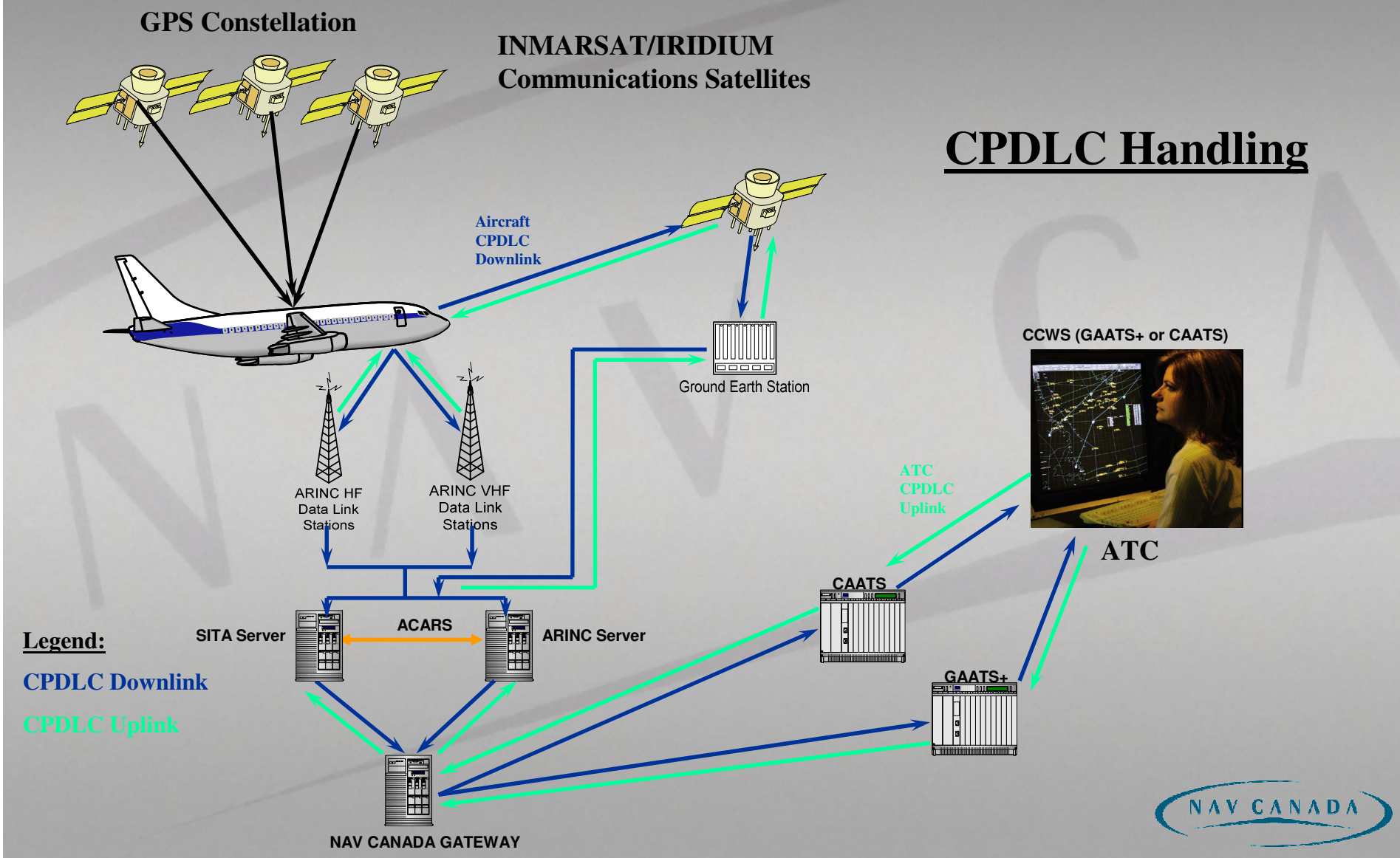




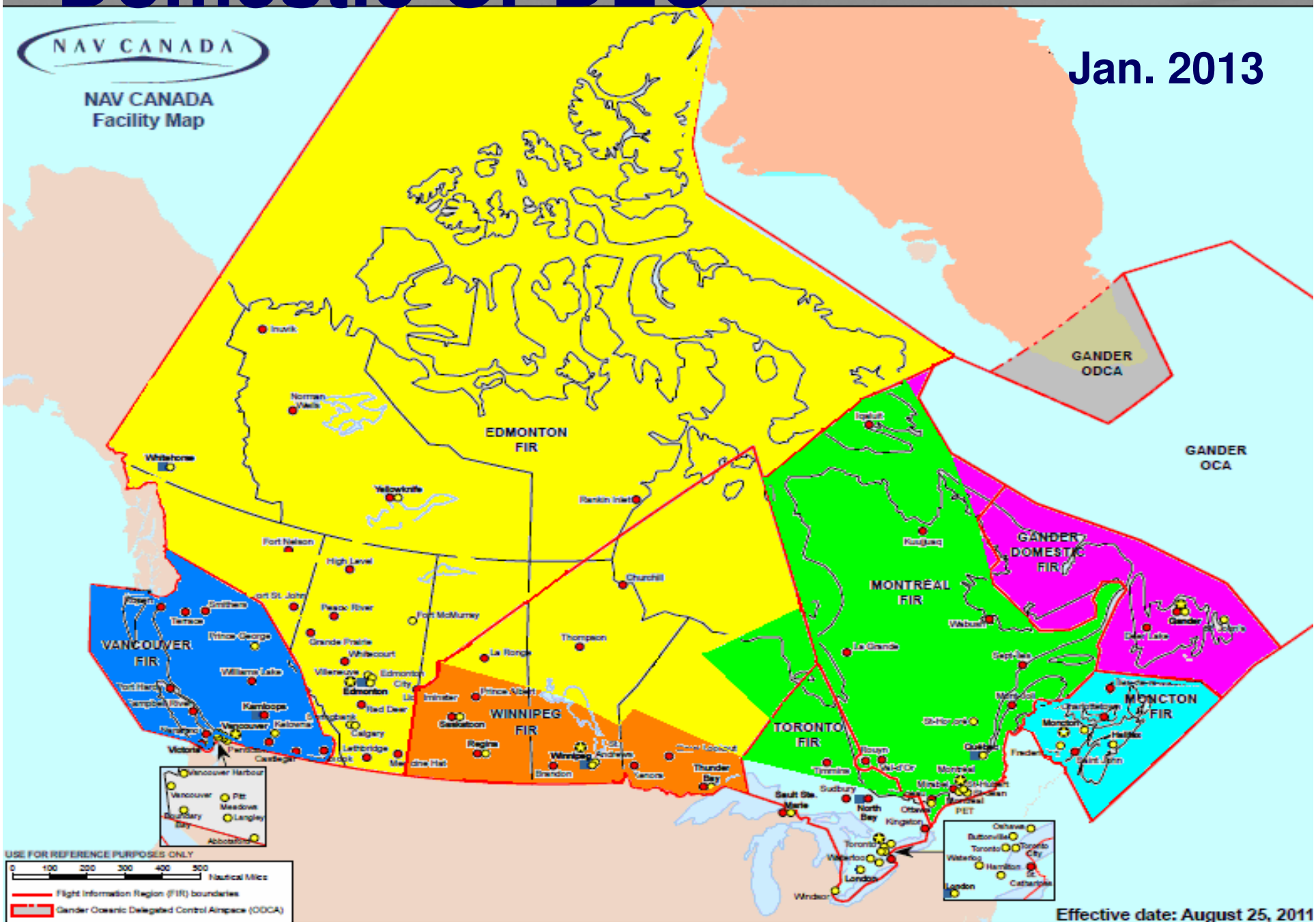
CPDLC Implementation

- Controller Pilot Data Link Communications
- Domestic Implementation in All ACC(s) planned
- Montreal – Implemented Dec 2011
- Edmonton – Implemented Jan 2012
- Winnipeg – Implemented Feb 2013

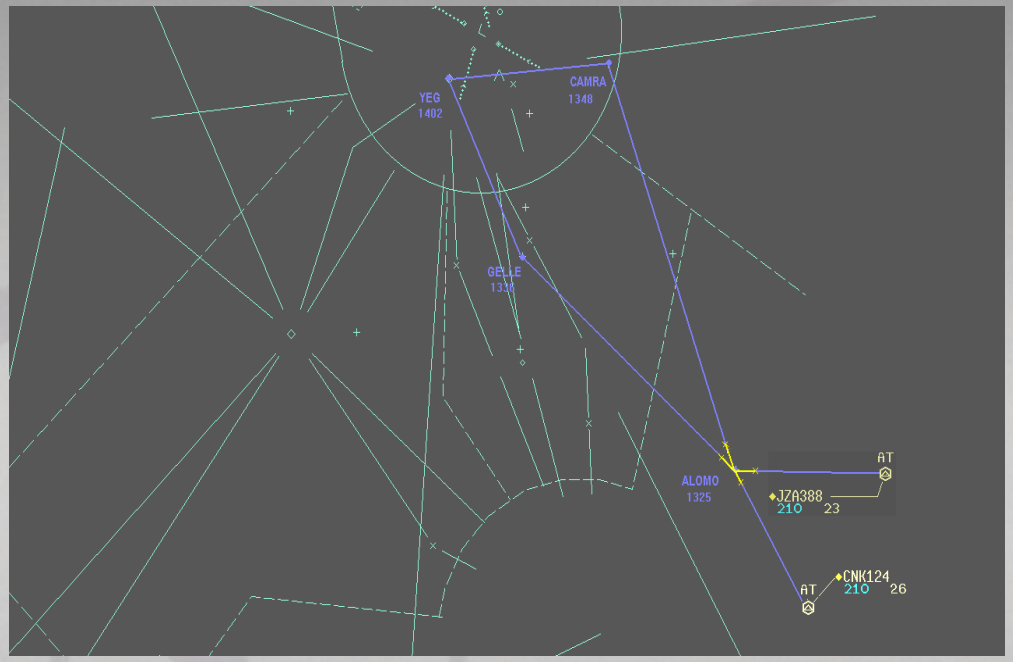
CPDLC Handling



Domestic CPDLC



MTCD – Medium Term Conflict Detection



- MTCD field in data tag corresponds to the highest priority MTCD conflict associated with this flight
- yellow for warning status and red for alert
- Active MTCD shows conflicting routes in solid purple lines; the conflict area is indicated in colour corresponding to the conflict status: yellow for warning, red for alert
- MTCD conflict list shows all suppressed and non-suppressed conflicts in the sector

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Level of Service Changes

RCO Redesign Project

- Primary safety goal – reduce congestion on 126.7
- Use discrete freq's for Flight Information Service Enroute (FISE)
- Convert 126.7 to 'on demand' for broadcast of safety messages (SIGMET, AIRMET) and comm searches – published as 126.7(bcst)
- NWT, Nunavut & Yukon RCO's scheduled for completion in 2013
- See NAV CANADA website for Notices on changes and up-to-date RCO maps

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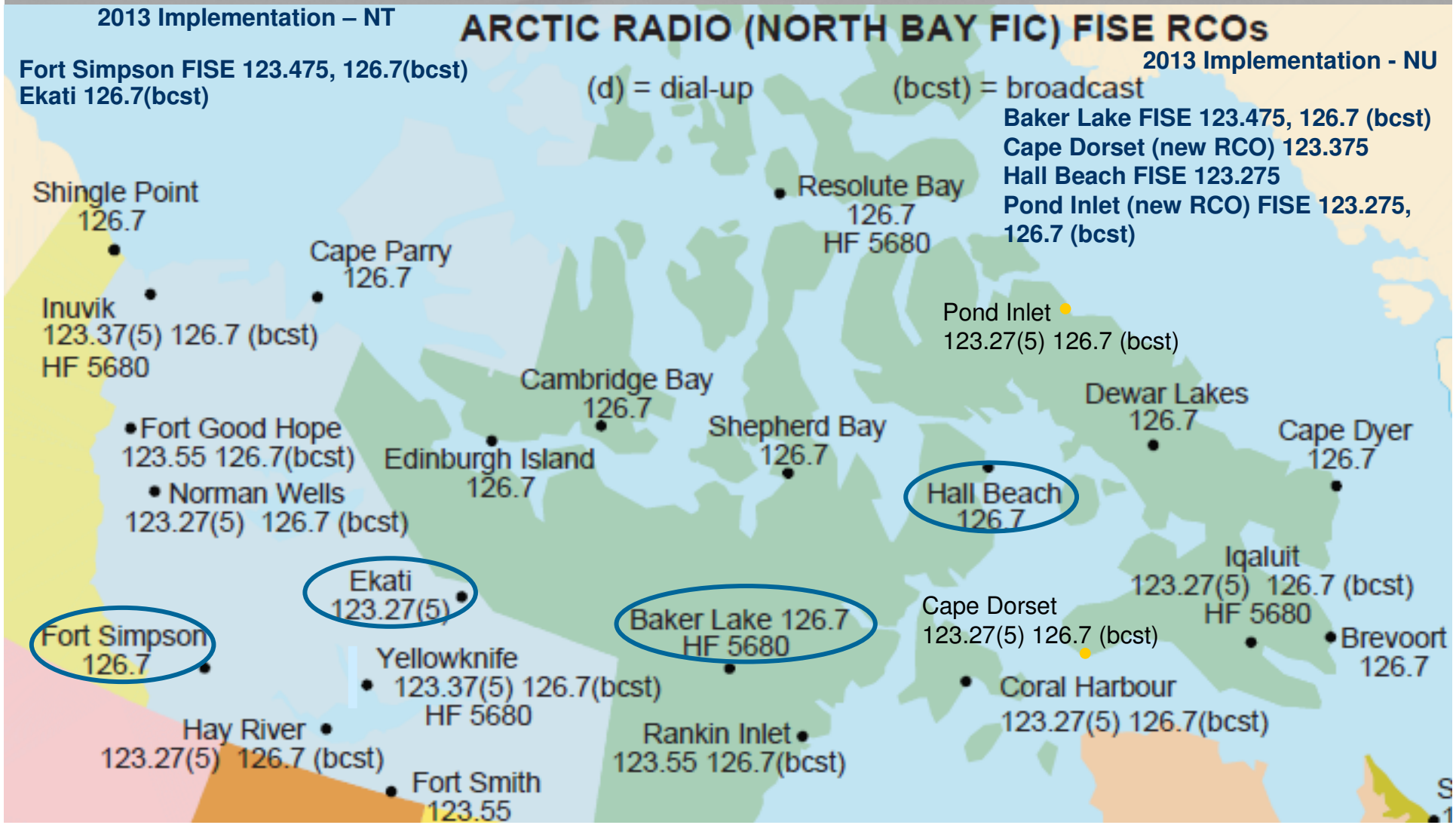
RCO – North Bay



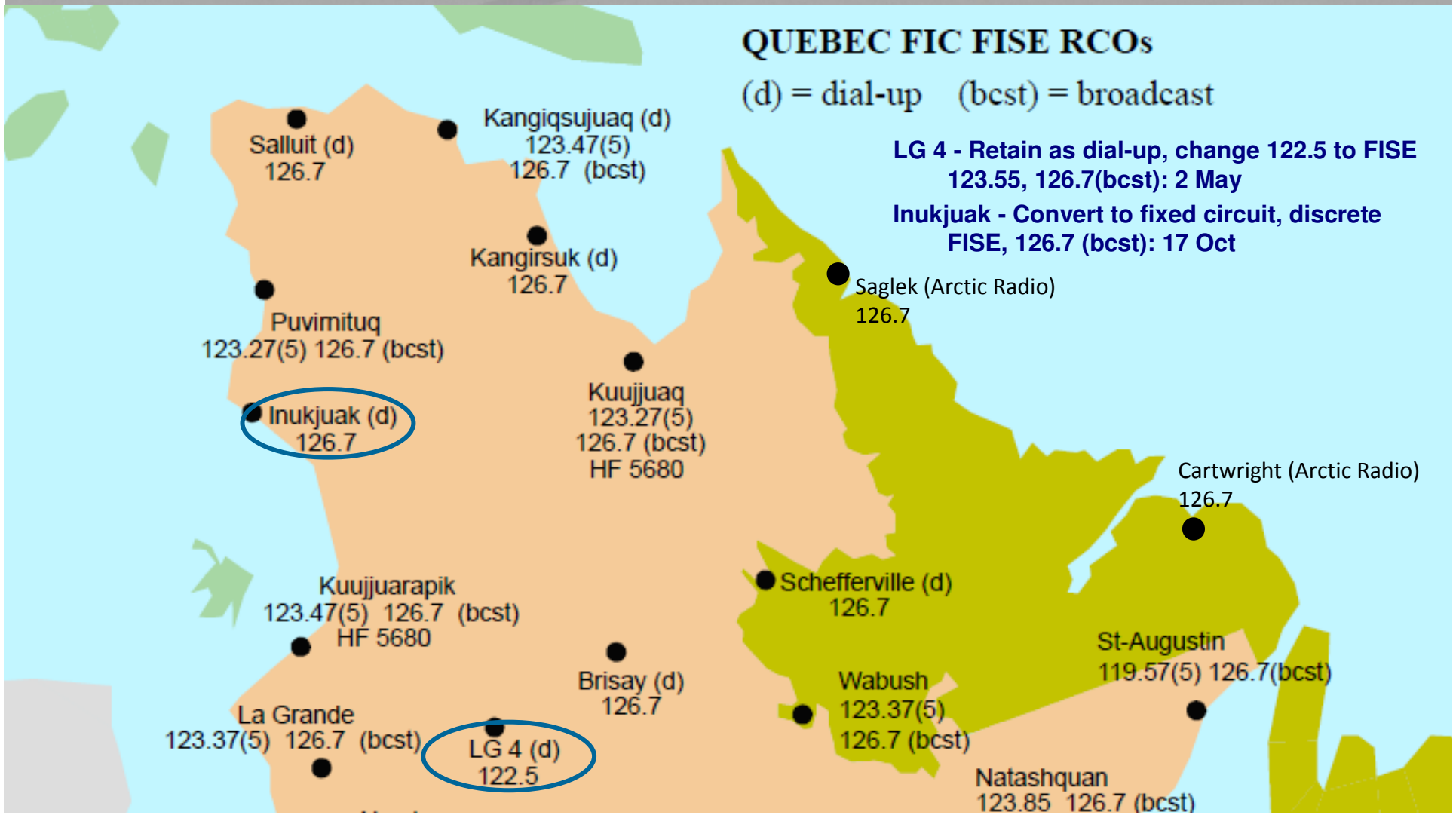
RCO - Whitehorse

2013 Implementation

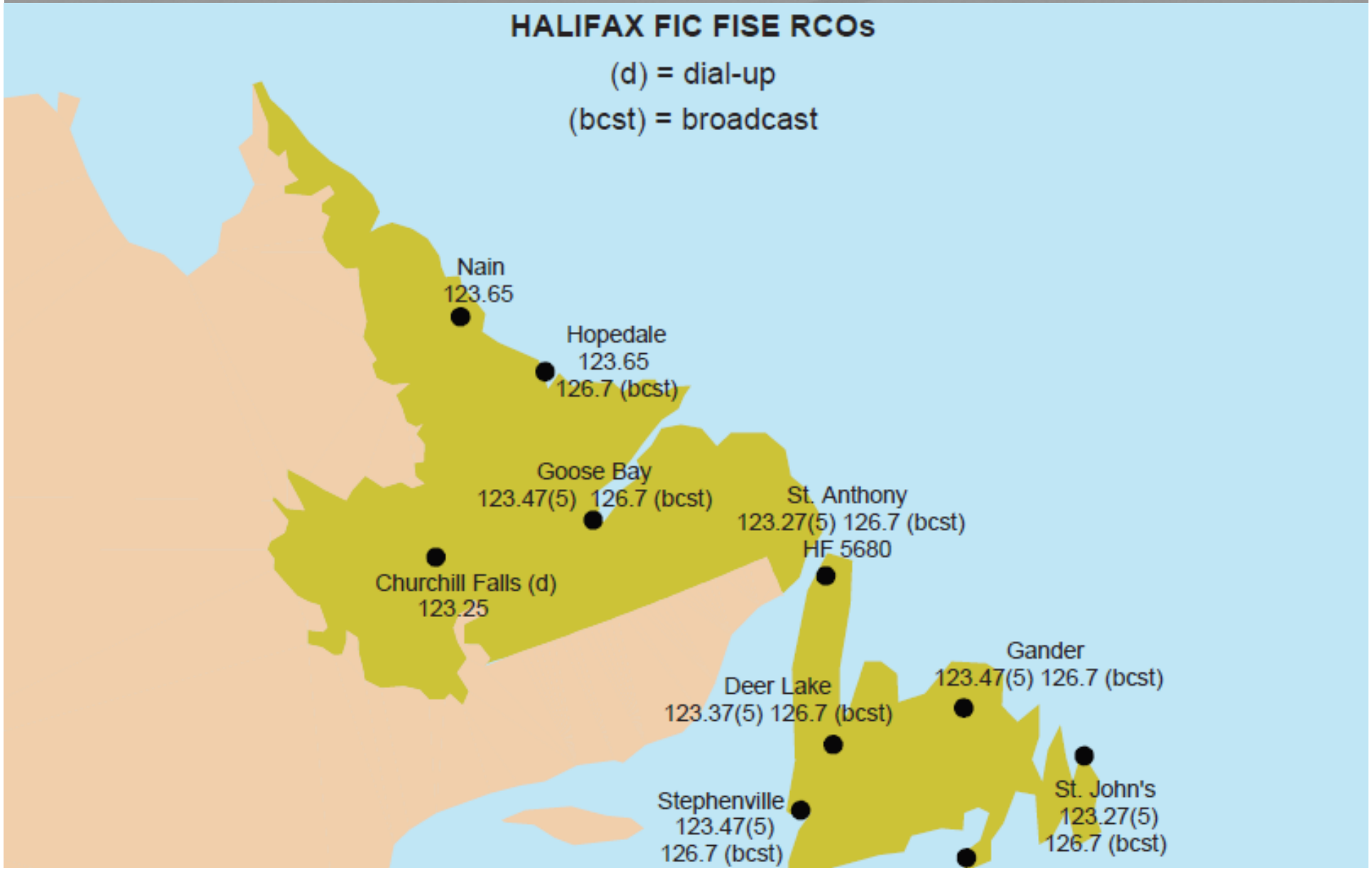
Atlin 123.55, 126.7(bcst)*
Beaver Creek 123.55, 126.7(bcst)*
Dawson 122.55, 126.7(bcst)*
Dease Lake 123.475, 126.7(bcst)*
Faro 123.55, 126.7(bcst)
Fort Ware 123.375, 126.7(bcst)
Haines 123.375, 126.7(bcst)
Mayo 123.475, 126.7(bcst)*
Old Crow 123.475, 126.7(bcst)
Watson Lake 123.375, 126.7(bcst)*

*** 27 June**

RCO – Québec


QUEBEC FIC FISE RCOs
(d) = dial-up (bcst) = broadcast
LG 4 - Retain as dial-up, change 122.5 to FISE 123.55, 126.7(bcst): 2 May
Inukjuak - Convert to fixed circuit, discrete FISE, 126.7 (bcst): 17 Oct
Salluit (d) 126.7
Kangiqsujuaq (d) 123.47(5) 126.7 (bcst)
Kangirsuk (d) 126.7
Puvirnituq 123.27(5) 126.7 (bcst)
Inukjuak (d) 126.7
Kuujjuaq 123.27(5) 126.7 (bcst) HF 5680
Saglek (Arctic Radio) 126.7
Cartwright (Arctic Radio) 126.7
Kuujjuarapik 123.47(5) 126.7 (bcst) HF 5680
Schefferville (d) 126.7
St-Augustin 119.57(5) 126.7(bcst)
Brisay (d) 126.7
Wabush 123.37(5) 126.7 (bcst)
La Grande 123.37(5) 126.7 (bcst)
LG 4 (d) 122.5
Natashquan 123.85 126.7 (bcst)

RCO – Halifax


HALIFAX FIC FISE RCOs
(d) = dial-up
(bcst) = broadcast
Nain
123.65
Hopedale
123.65
126.7 (bcst)
Goose Bay
123.47(5) 126.7 (bcst)
St. Anthony
123.27(5) 126.7 (bcst)
HF 5680
Churchill Falls (d)
123.25
Gander
123.47(5) 126.7 (bcst)
Deer Lake
123.37(5) 126.7 (bcst)
Stephenville
123.47(5)
126.7 (bcst)
St. John's
123.27(5)
126.7 (bcst)

ILS Replacement

New ILS installations do not provide back-course guidance
RNAV (GNSS) approach developed to replace back-course
Installation of new localizer to replace back-course only if positive business case

Completed 2012

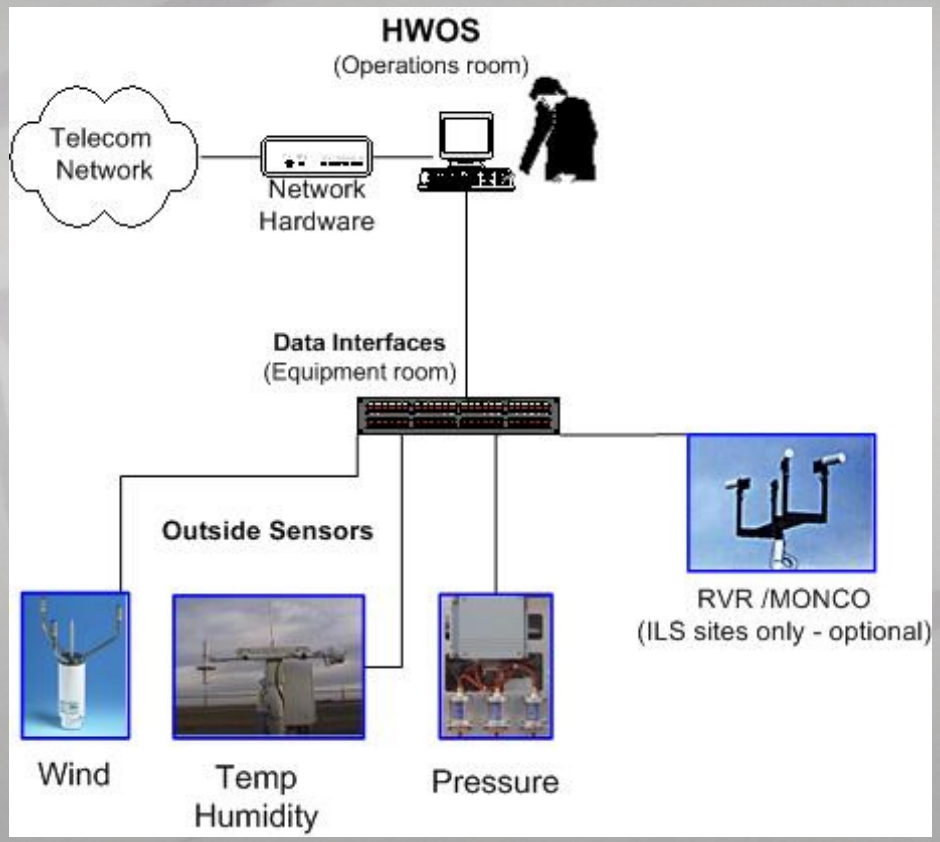
Fort St. John, BC – Jul 2012
Watson Lake, YT – Jul 2012
Fort McMurray, AB – Jul 2012
Yellowknife, NT – Sept 2012

Scheduled 2013

Iqaluit, NU – Jul-Sept
Saskatoon, SK – Sept-Oct
Whitehorse, YT – Jun-Aug

Human Weather Observation System (HWOS) Upgrade

The Human Weather Observation System is to be upgraded at 186 staffed weather sites.



Directly ingests sensor data to eliminate errors with human transcription

Trial project (Red Lake & Pickle Lake) to adjust capability to provide automatic information outside of operating hours of FSS, CARS or CWO.

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HWOS – Limited-hour Sites

- Allows for the production of a LWIS AUTO message outside of published hours of human wx observing program
- Allows for the production of an LWIS AUTO message in the event the unscheduled absence of wx observer
- Temperature, dew-point, wind and altimeter information provided to FIC and available on Aviation Weather Web Site (AWWS)
- Additional 24 hour wx information for forecasters

HWOS Installation

Completed Sites

- Arctic Bay, NU
- Arviat, NU
- Burwash, YT
- Cape Dorset, NU
- Clyde River, NU
- Deer Lake, NL
- Gjoa Haven, NU
- Hall Beach, NU
- La Grande Rivière, QC
- Norman Wells, NT
- Pangnirtung, NU
- Pickle Lake, ON
- Pond Inlet, NU
- Qikiqtarjuaq, NU
- Rankin Inlet, NU
- Red Lake, ON
- Rouyn-Noranda, QC
- Val-d'Or, QC
- Wabush, NL
- Whitehorse, YT
- Yellowknife, NT

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HWOS Installation Schedule

2013

15 Aug:

Inuvik, NT

10 Oct:

Baker Lake, NU, Aklavik, NT, Dawson, YT, Old Crow, YT

14 Nov:

Coral Harbour, NU, Gamètì, NT, Kimmirut, NU, Whale Cove, NU, Thompson, MB, Ft. McPherson, NT, Mayo, YT

12 Dec:

Chesterfield Inlet, NU, Repulse Bay, NU, Flin Flon, MB, Teslin, YT

HWOS Installation Schedule

2014

09 Jan:

Eureka, NU, Grise Fiord, NU, Resolute Bay, NU, Hay River, NT

13 Feb:

Faro, YT, The Pas, MB, Watson Lake, YT, Kuujjuaq, QC

19 June

Old Crow

HWOS Installation Schedule

2014 (cont)

31 Aug

Tuktoyaktuk, NT, Igloolik, NU, Island Lake, MB , Makkovik, NL, Nain, NL, Lourdes-de-Blanc-Sablon, QC

30 Sept

Beaver Creek, YT, Kugaaruk, NU, Paulatuk, NT, Sachs Harbour, NT, Taloyoak, NU, Cambridge Bay, NU, Ft. Resolution, NTG, Kugluktuk, NU, Sanikiluaq, NU, Ulukhatok, NU

31 Oct

Wrigley, NT, Déline, NT, Ft. Good Hope, NT, Ft. Liard, Ft. Simpson, NT, Lutselk'e, NT, Tulita, NT

AWOS/LWIS Replacement

All 82 Legacy AWOS will be replaced with systems that meet CAR 804 exemption requirements by end of 2013

All legacy AWOS in Yukon, NWT, Nunavut, Saskatchewan, Manitoba & Québec have been replaced

AWOS Installations

2012

- Arviat, Hall Beach, Cape Dorset – July 27
- Wekweètì – November 15

2013

- Clyde River, Gjoa Haven, Pond Inlet – January 10
- Pangnirtung (LWIS), Qikiqtarjuaq – March 7

New AWOS Installations

- Only at sites with a benefit to customers or NAV CANADA
- Require an aeronautical study
- AWOS at CARS sites will require a positive business case
- Co-located CARS/AWOS sites only if funded by others (i.e. government, airport operator)

CARS

CARS Performance
March 2012 to February 2013

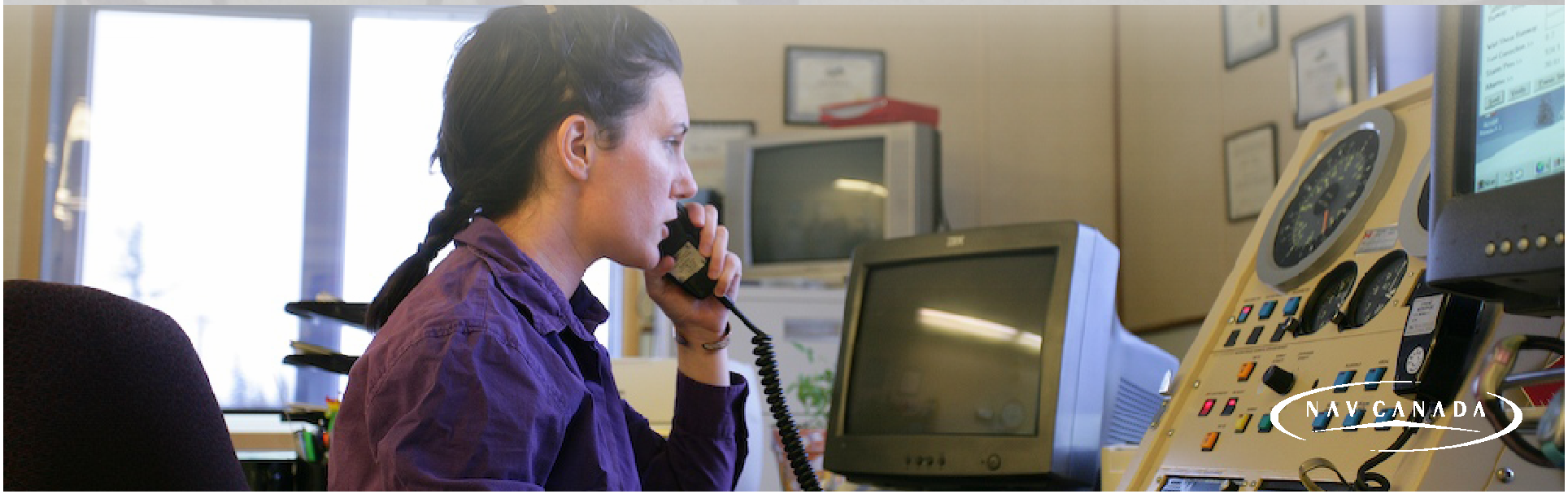
95% for all CARS (217 000 Scheduled Observations)

Nunavut: 96% (104 000 Obs)

→ 3% improvement over 2011

NWT: 92% (75 000 Obs)

Yukon: 99% (41 000 Obs)



Best Performers

- Burwash, YT
- Fort Smith, NT
- Déline, NT
- Fort Simpson, NT
- Tuktoyaktuk, NT

100% of Scheduled Obs Transmitted

- Teslin, YT
- Cambridge Bay, NU
- Dawson City, YT
- Faro, YT
- Mayo, YT

99.7% of Scheduled Obs Transmitted

Worst Performers

- Whale Cove, NU
- Aklavik, NT
- Grise Fiord, NU
- Arctic Bay, NU
- Gjoa Haven, NU

80 to 90% of Scheduled Obs Transmitted

- Wrigley, NT
- Ulukhaktok, NT
- Lutselk'e, NT
- Fort Good Hope, NT
- Clyde River, NU

41 to 80% of Scheduled Obs Transmitted

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Weather Cameras

Currently over 135 sites across Canada with installations

Phase I program completed

Weather Cameras

- Atlin, BC
- Burwash, NU
- Carmacks, NU
- Clyde River, NU*
- Fraser, BC
- Gjoa Haven, NU *
- Haines Junction, YT
- Key Lake, SK
- Kuujjuarapik, QC
- La-Grande 4
- Natuashish, NL
- Norway House, MB
- Pangnirtung, NU*
- Pond Inlet, NU*
- Qikiqtarjuaq, NU*
- Rancheria, YT
- Rigolet, NL
- St. Anthony, NL
- Tadoule Lake, MB
- Wekweètì, NT

* Sites should be on AWWS before end of April 2013

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Aeronautical Studies

Completed

- **Dease Lake, BC CWO**
  - Decommission CWO and install AWOS
  - Implemented – 15 Nov 2012
- **Springbank, AB CWO**
  - Decommission CWO and install AWOS
  - Implementation – TBD
- **Iqaluit, NU – VHF-DF**
  - Decommission VHF-DF
  - Implementation – 2 May 2013
- **Colville Lake, NT – Weather**
  - Review weather requirements
  - Install AWOS
  - Implementation – summer 2014

Aeronautical Studies

Ongoing

- **Uranium Mines Area, SK – ATF**
  - Establish area ATF
- **South Athabasca Oil Sands Area, AB – ATF**
  - Establish area ATF
  - Review airspace classification
- **Rankin Inlet, NU – ANS**
  - Review ANS requirements
- **Central and Southern Alberta Airspace**
  - Review airspace in vicinity of Edmonton
  - Review LF & VHF airway requirement
- **Kuujjuarapik, QC**
  - Decommission CWO and install AWOS
- **Wabush, NL**
  - Reduction in hours of FSS and install AWOS

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Performance Based Navigation

and

Aeronautical Information

PBN Strategy

- Active participant with ICAO
- Collaboration with Customers and Employees on PBN strategy
- Continued implementation of RNAV and RNP procedures

Major Terminal Areas

- New RNP Design Service Vendor
- RNP and large airspace infrastructure changes
  - Requires a separate airspace and business case analysis
- Customer Participation and NAV CANADA simulation
- Progressive Steps

Major Terminals - RNP 2014

- Initially develop a generic vertical profile
  - All current published procedures are B737 NG specific (proprietary)
- Alberta Airspace Project designs
- Some runways at Toronto Pearson

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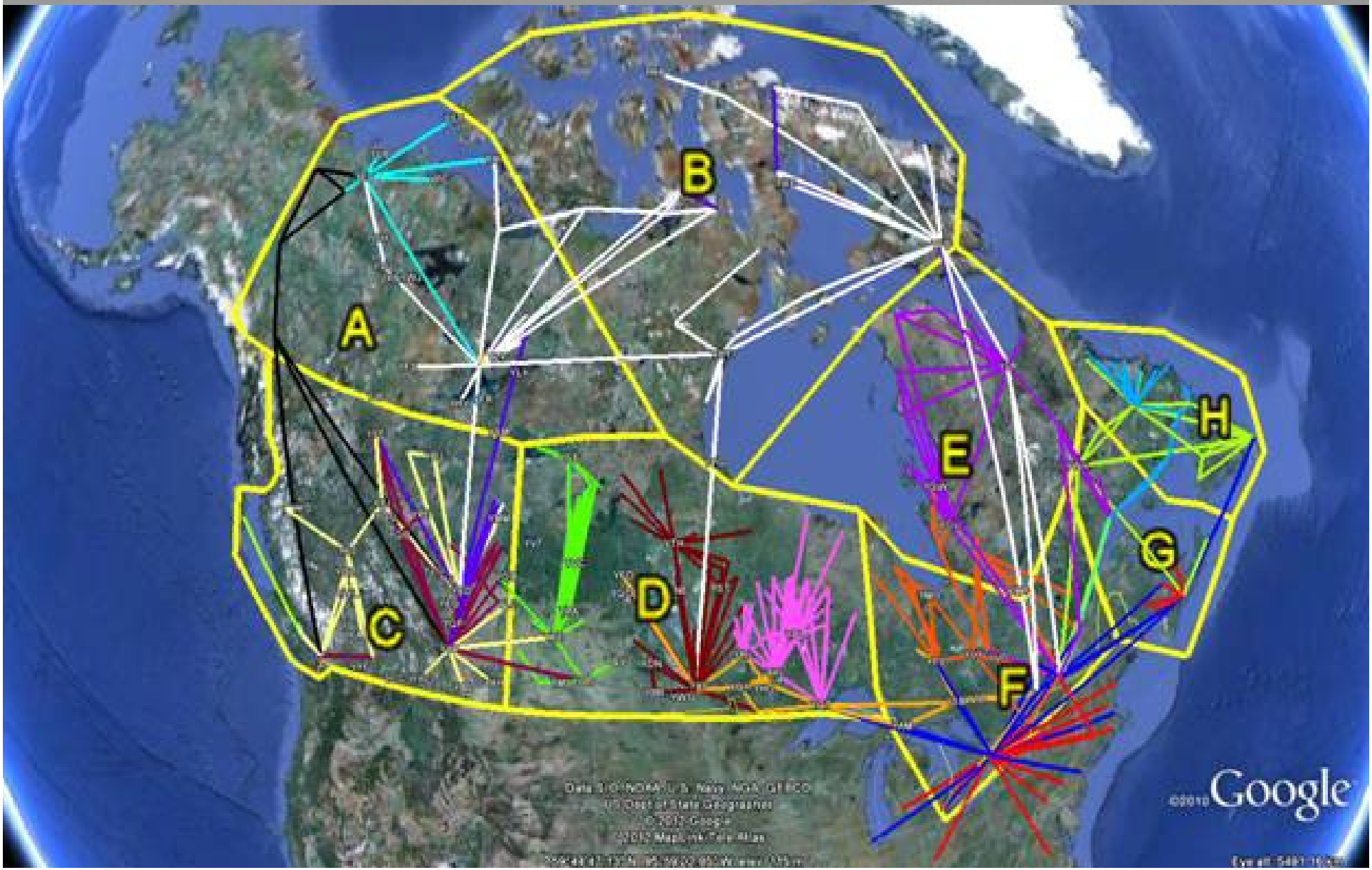
Regional PBN Implementation



Regional Implementation

- Region is equipped to the minimum baseline
- 2 GNSS procedures per runway end
  - 1 LNAV
  - 1 with Vertical Guidance (LNAV / VNAV, LPV, RNP)
- Develop priority principles but accommodate customer requirements that may not be in plan
- Assess the customers' needs with a national route structure separately

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Regional Priorities - GNSS

- Nunavut (B), NWT / Yukon (A), Northern Saskatchewan, Manitoba, Northern Ontario (Northern D)
- Some Northern Quebec, and the Rockies
- Airport data is a critical element for vertical flight path angle
  - Technical information supplied by AIS Data Collection:

    (866) 577-0247

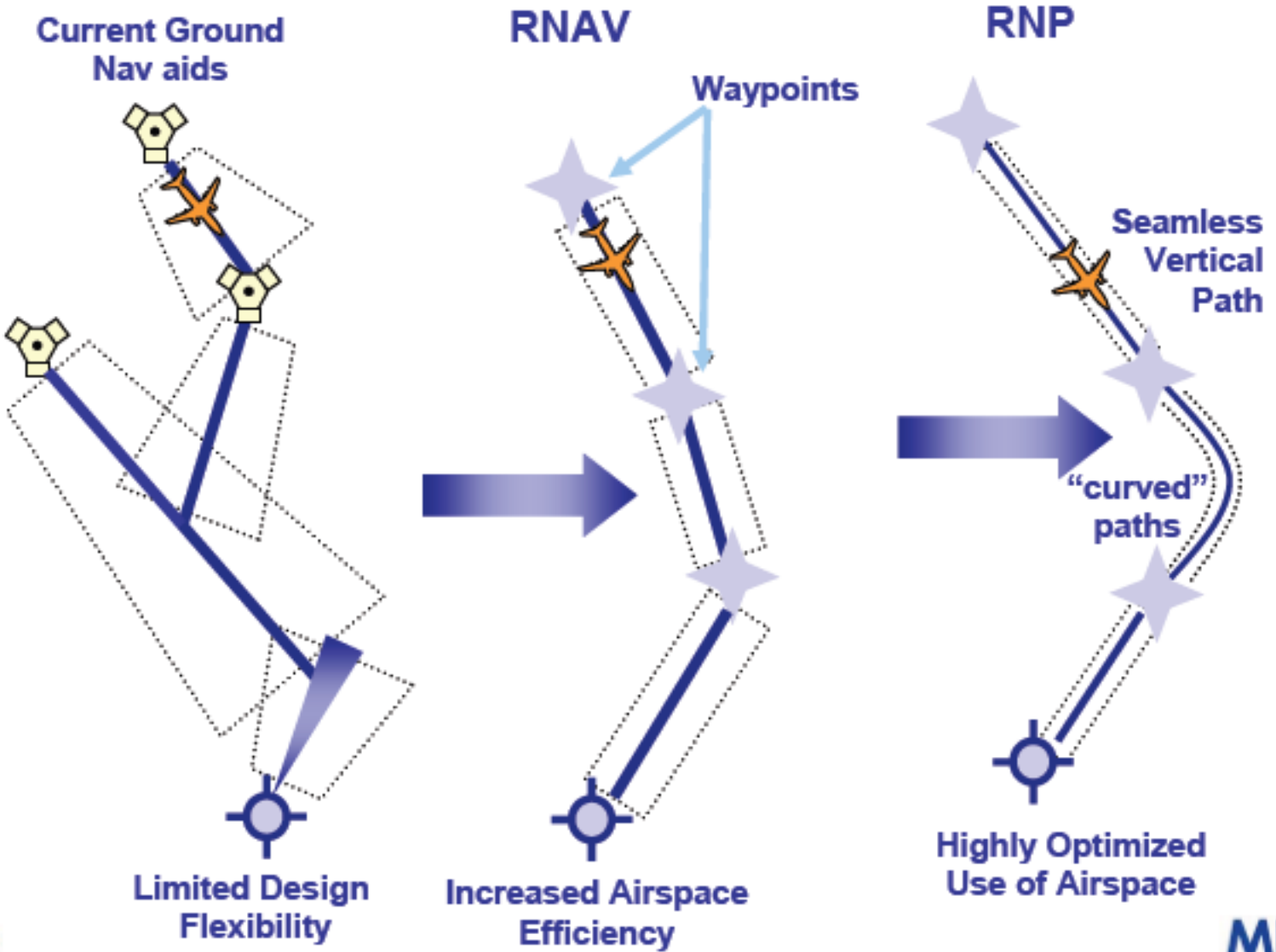
    aisdata@navcanada.ca

Regional Priorities - RNP

- Flight Information Region and Customer input through the NAV CANADA PBN working group
  - Hot spots like: Rockies, Northern Manitoba
- Complete about 15 designs over the next year

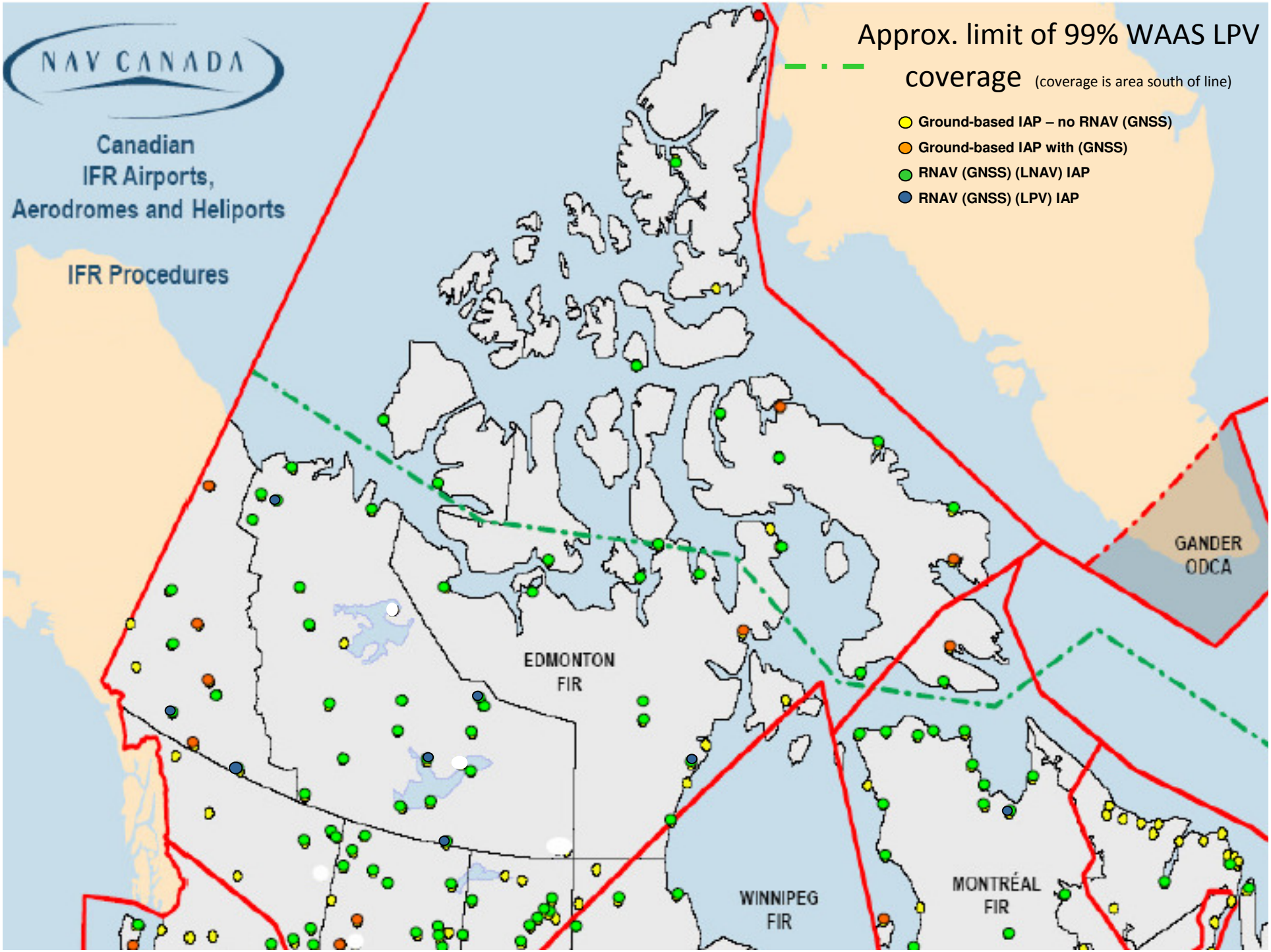
Benefits

Implementation of RNAV and RNP



CAASD

MITRE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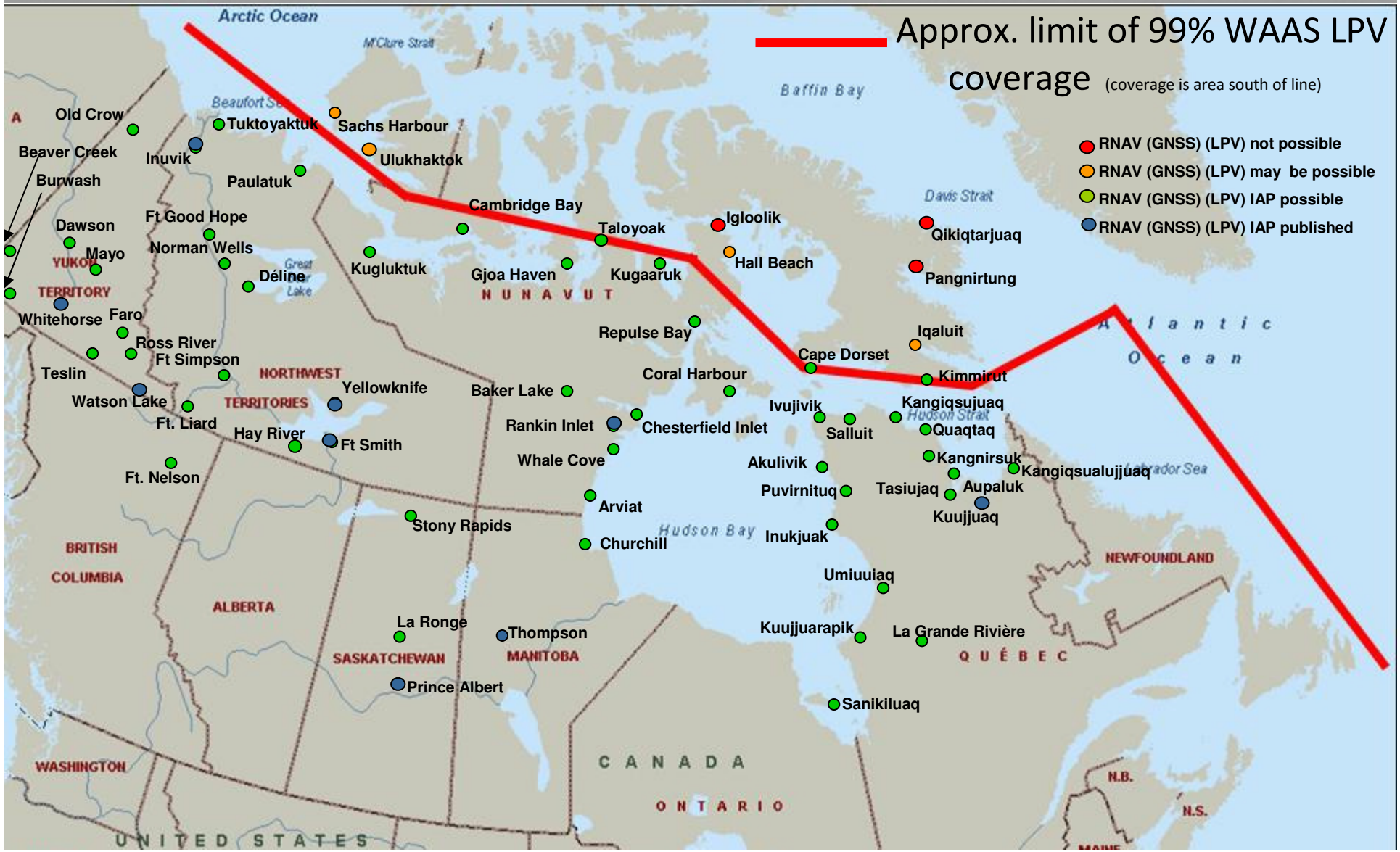
Canadian
IFR Airports,
Aerodromes and Heliports
IFR Procedures
Approx. limit of 99% WAAS LPV coverage (coverage is area south of line)
Ground-based IAP – no RNAV (GNSS)
Ground-based IAP with (GNSS)
RNAV (GNSS) (LNAV) IAP
RNAV (GNSS) (LPV) IAP
GANDER
OCDA
EDMONTON
FIR
WINNIPEG
FIR
MONTRÉAL
FIR

Area of WAAS LPV Coverage



RNAV (GNSS) Update

- Meadowbank, NU: RNAV 12 & 30 (LNAV) – Apr 2012
- Norman Wells, NT: RNAV 09 & 27 (LNAV) – Apr 2012
- Watson Lake, YT: RNAV 09 (LNAV & LPV) – May 2012 & 27 (LNAV) – Nov 2012
- Ft. Good Hope, NT: RNAV 25 (LNAV) – Jan 2013
  - Initially published –re-designed due to runway data changes
- Yellowknife, NT: RNAV 10, 16 & 34 (LNAV, LNAV/VNAV & LPV), VOR 10 & 16, VOR/DME 10 & 16 – 7 Mar 2013
- George Lake, NU RNAV 15 & 33 (ice) (LNAV) Mar 2013
- Goose Lake, NU RNAV 14 & 32 (ice) (LNAV) Mar 2013
- Hayes Camp, NU RNAV 14 & 32 (ice) (LNAV) Mar 2013

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RNAV (GNSS) Update

- Ekati, NT: RNAV (LPV) 02 & 20 – 02 May
- Fort Smith, NT RNAV 12 & 30 (LNAV & LPV) – 02 May
- Jean Marie River, NT: RNAV 11 & 29 (LNAV) – 02 May
- Rankin Inlet, NU: RNAV 13 & 31 (LPV) 02 May
- Wekweètì, NT: RNAV 13 & 31 (LNAV) 27 June
- Nahanni Butte, NT: RNAV 33 – 27 June
- Iqaluit, NU: RNAV 35 – 27 June
- Fort Providence, NT: RNAV 13 & 31 – 17 Oct
- Trout Lake, NT: RNAV 13 & 31 – 17 Oct
- Burwash, YT: RNAV 28 – 17 Oct
- Dease Lake, BC: RNAV 02 & 20 – 17 Oct
- Déline, NT: RNAV 08 & 26 (LNAV) – TBD

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Approach Tolerances
(NATA Resolution No.6)

Transport Canada and NAV CANADA have maintained communication during the base lining of IPs using the new rules.

There have been very few Transport Canada interventions required and none in the north.

Transport Canada has been good with the transition of IPs in BC.

Summary

Summary

- Challenging times continue
- Focus on improving safety, performance, service efficiency and cost-effectiveness in the North
- Improvements in service planned
  - Performance Based Navigation
  - Equipment Upgrades
  - New Technology applications
- Constant evaluation of all services for efficiency gains

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Questions?

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