NAV CANADA UPDATE

Rudy Kellar
Vice President, Operations

Northern Air Transportation Association
Annual General Meeting
Whitehorse, YT
18 April 2012

Outline

- Corporate update
- Technological 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

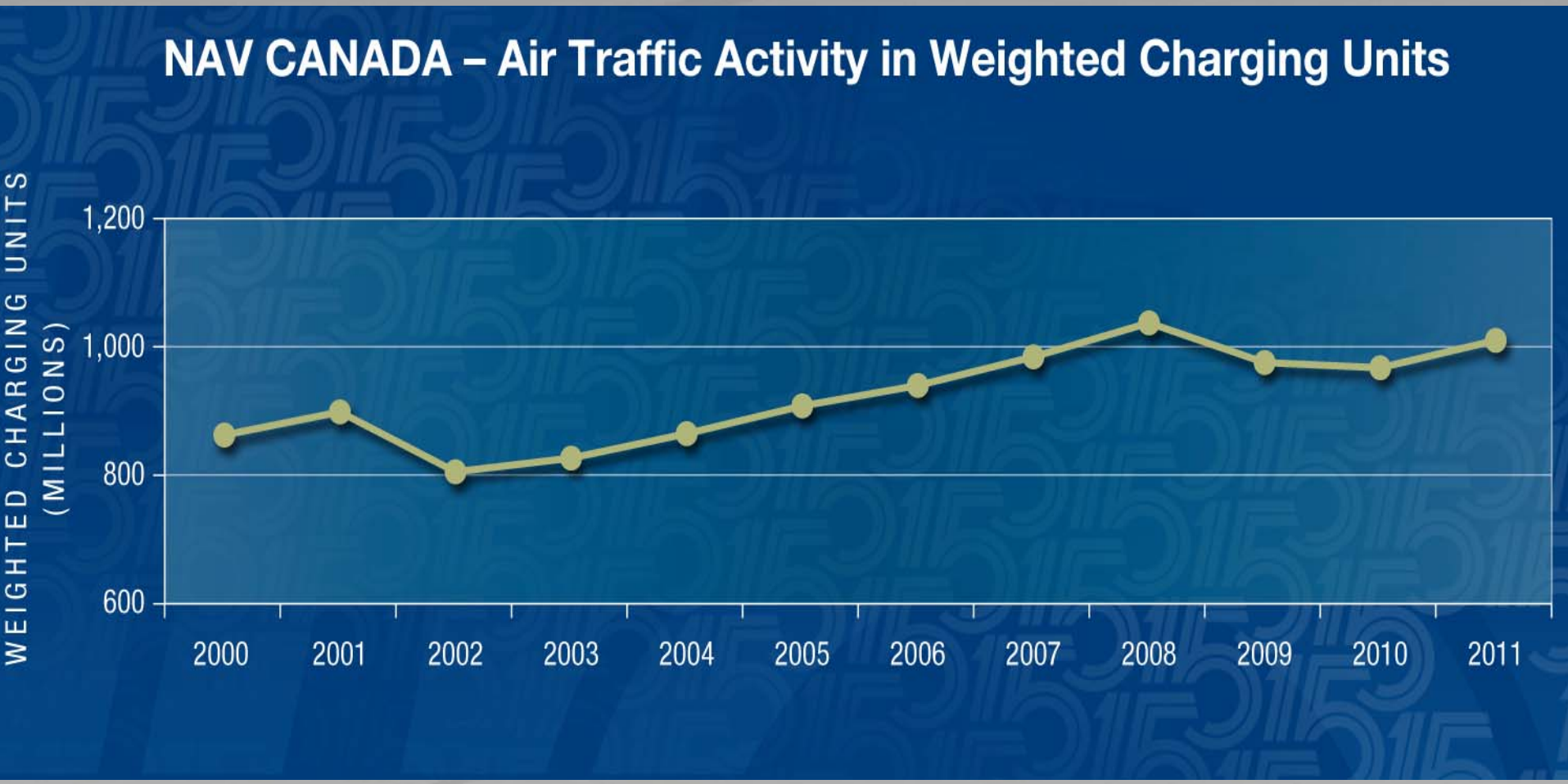
over **15** years

NAV CANADA

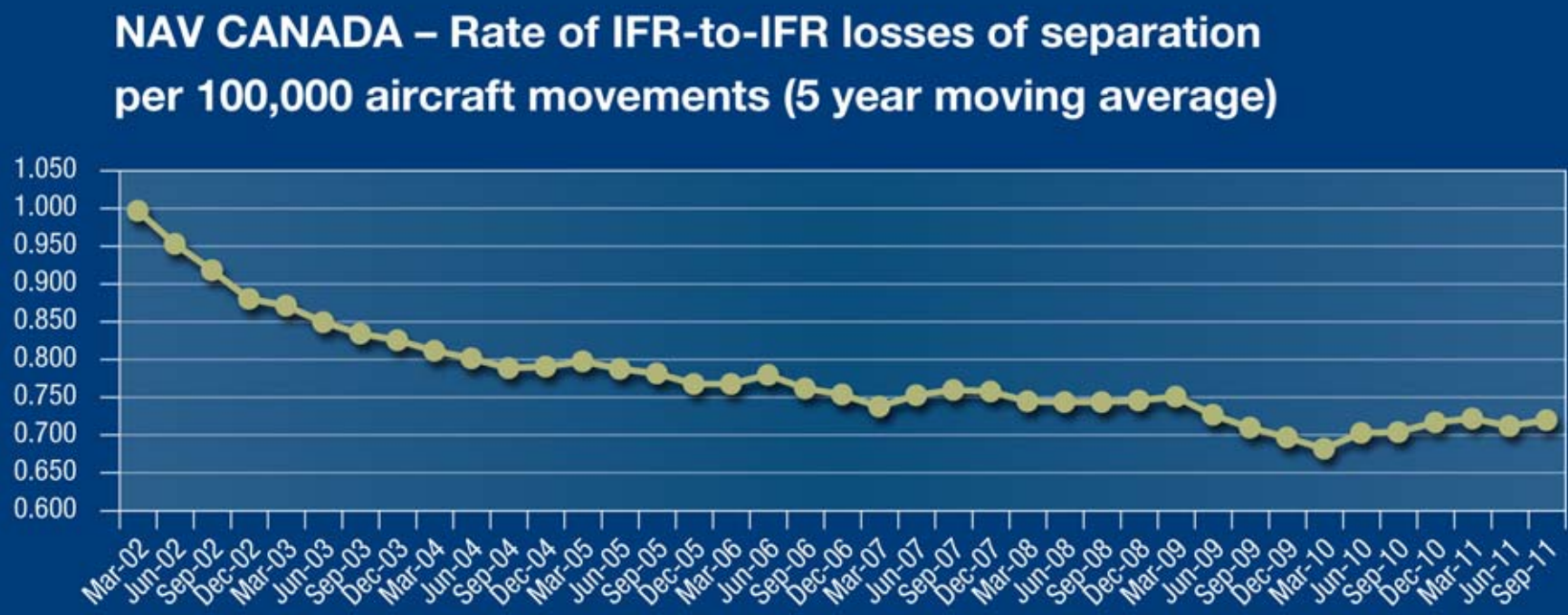
2011/12 Highlights

- 15th Anniversary of NAV CANADA
- Implementation of Reduced Longitudinal Separation on the North Atlantic
- Implementation of ADS-B Oceanic
- Implementation of Windsor- Toronto-Montreal Airspace and Services Review – Phase 1
- Increased deployment of Multi-lateration Surveillance
- Expansion of Transponder Required Airspace
- Expanded deployment of technology - NAVCANsuite in Towers and Flight Service Stations
- Continued modernization/replacement of equipment (ILS, DME, TACAN, AWOS, WXCAMS)
- New collective agreements

Traffic


NAV CANADA – Air Traffic Activity in Weighted Charging Units
WEIGHTED CHARGING UNITS (MILLIONS)
1,200
1,000
800
600
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

Safety


NAV CANADA – Rate of IFR-to-IFR losses of separation
per 100,000 aircraft movements (5 year moving average)
1.050
1.000
0.950
0.900
0.850
0.800
0.750
0.700
0.650
0.600
Mar-02
Jun-02
Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
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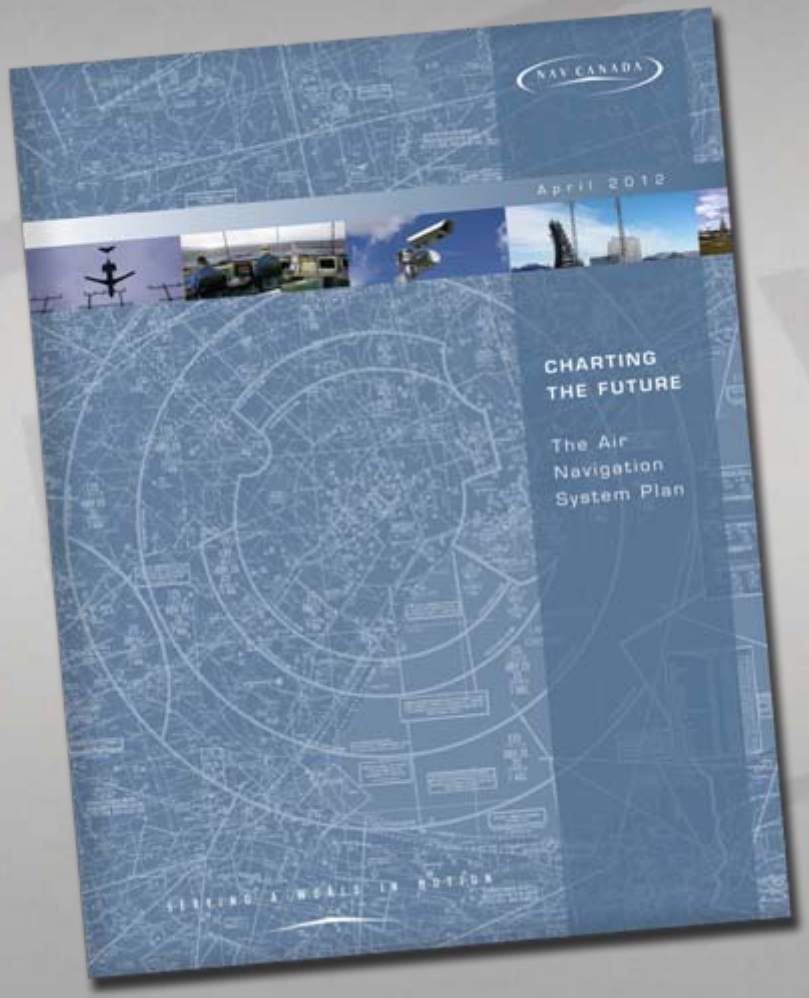
Jun-10
Sep-10
Dec-10
Mar-11
Jun-11
Sep-11

Charting The Future:
The ANS Plan



Background:

- initiatives aimed at meeting customers' requirements;
- mapped to ICAO Aviation System Block Upgrades

Sections:

- Performance Based Navigation
- Communications
- Surveillance,
- Air Traffic Management,
- Aeronautical Information Management,
- Aviation Weather

Timeframes:

- Short-Term (2012-2014)
- Near-Term (2015-2019)

Publication Date:

- April 2012
- (updated every three years)

CIFER
Collaborative Initiatives For Emissions Reductions
STATUS UPDATE 2012

20.6 Million

Metric tons of achievable greenhouse gas emissions reductions 1997-2020

$7 Billion

Projected achievable fuel savings 1997-2020

NAV CANADA ONBOARD

MLAT ADS-B WTM PROJECT ABOUT THIS WEBSITE Français

Windsor Toronto Montreal Airspace Project

NAV CANADA is enhancing the efficiency of operations in this corridor. View charts, phraseology and more.

READ MORE

Welcome to NAV CANADA's OnBoard website where we feature tips and best practices that help you benefit from airspace changes. Click on a project to see what you need to know.

WTM PROJECT

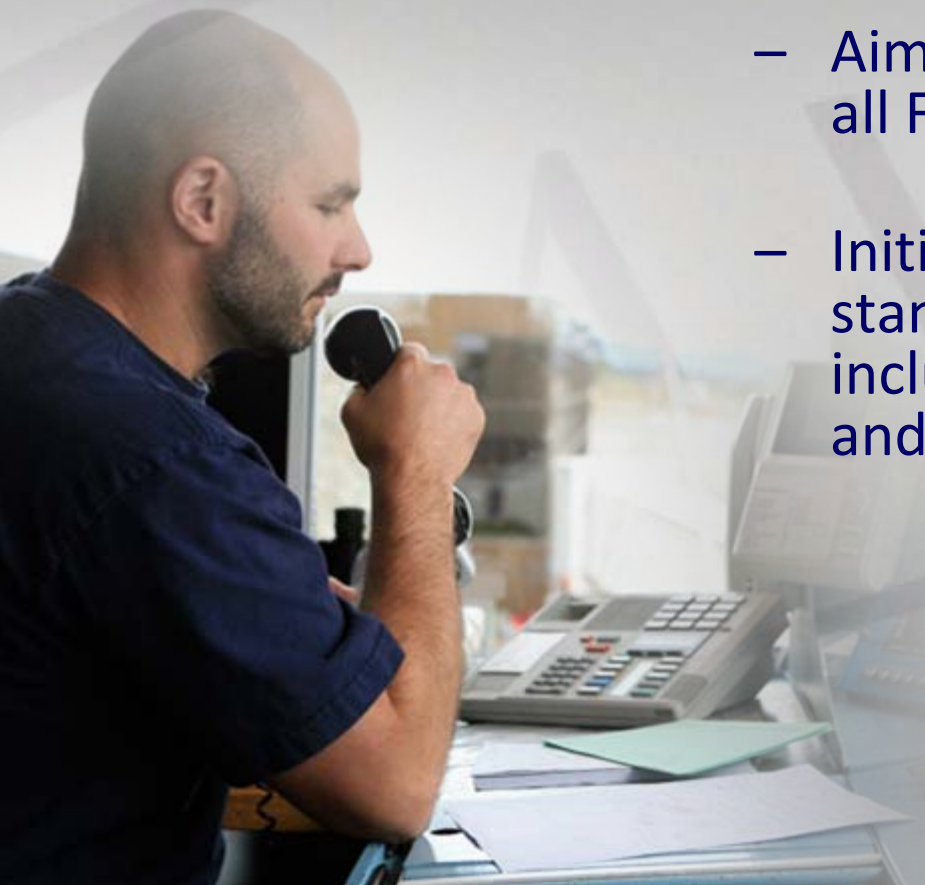
ADS-B

MLAT

Technological Upgrades

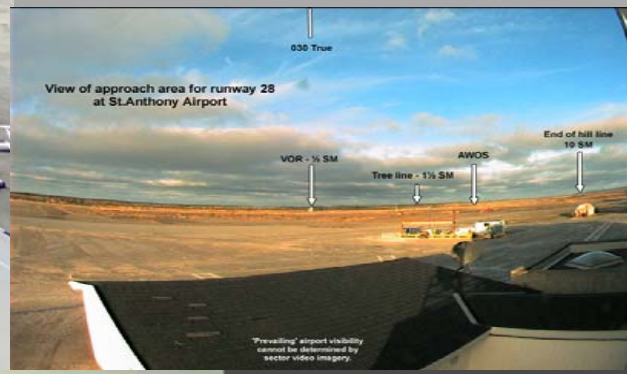
Flight Service Station (FSS) Systems

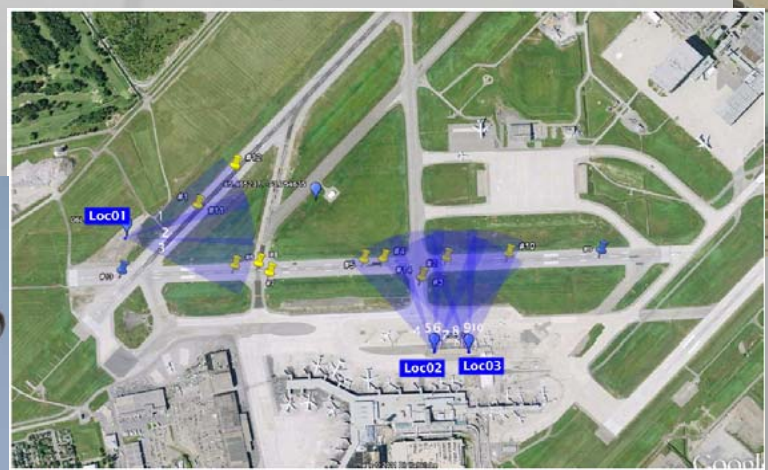
- 38 sites use NAVCANsitu radar display
- More than 10 sites use NAVCANstrips
- Modernization project recently initiated:
  - Aims to deliver the NAVCANsuite to all Flight Service Stations in Canada.
  - Initial configuration will include many standard NAVCANsuite components, including NAVCANstrips, NAVCANinfo and NAVCANsitu.



Video Surveillance Applications

- Standard video
  - obstructed view
- Visibility enhancements
- Pan, Zoom, Tilt – “Out the Window View”
- Ground Surveillance – ASDE using Video



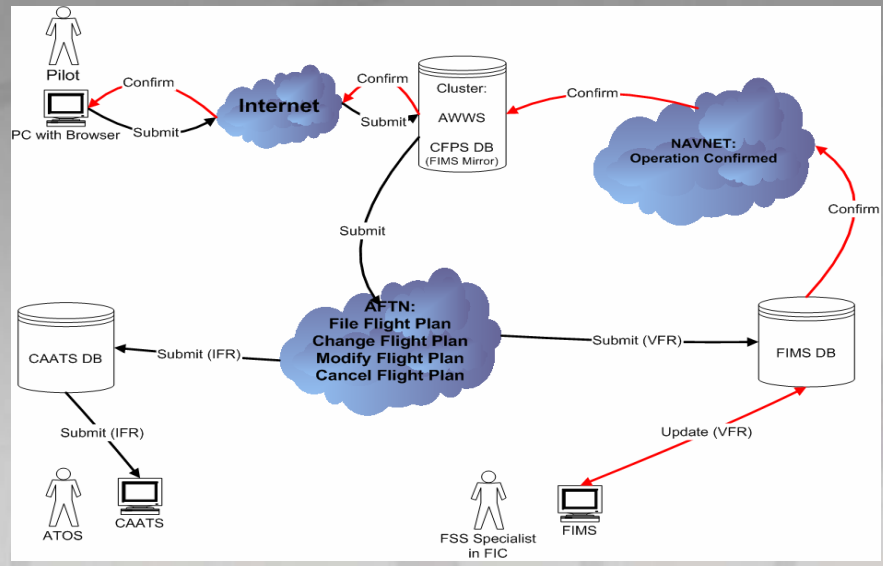


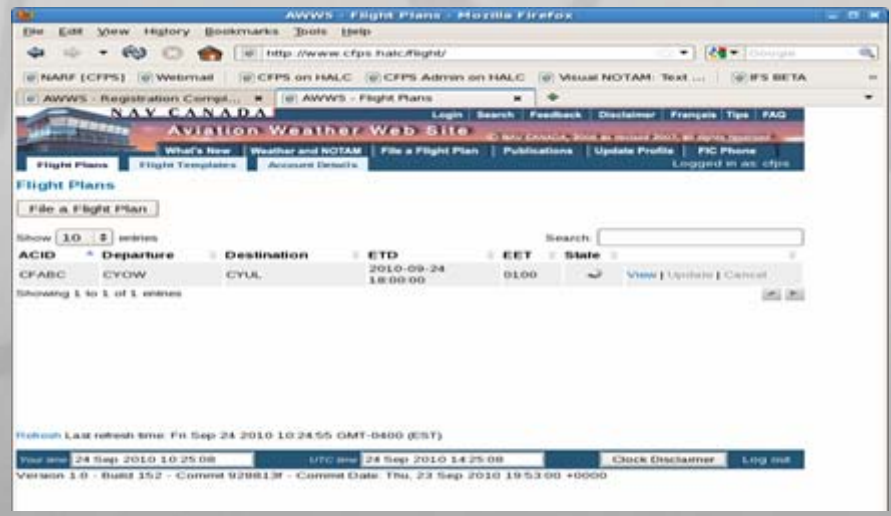
Flight Plan 2012

- International Initiative
- On target for November 2012 implementation
- NAV CANADA Software updates underway
- FPL Changes to Field 10 and 18
- More Information will be made available

CFPS

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

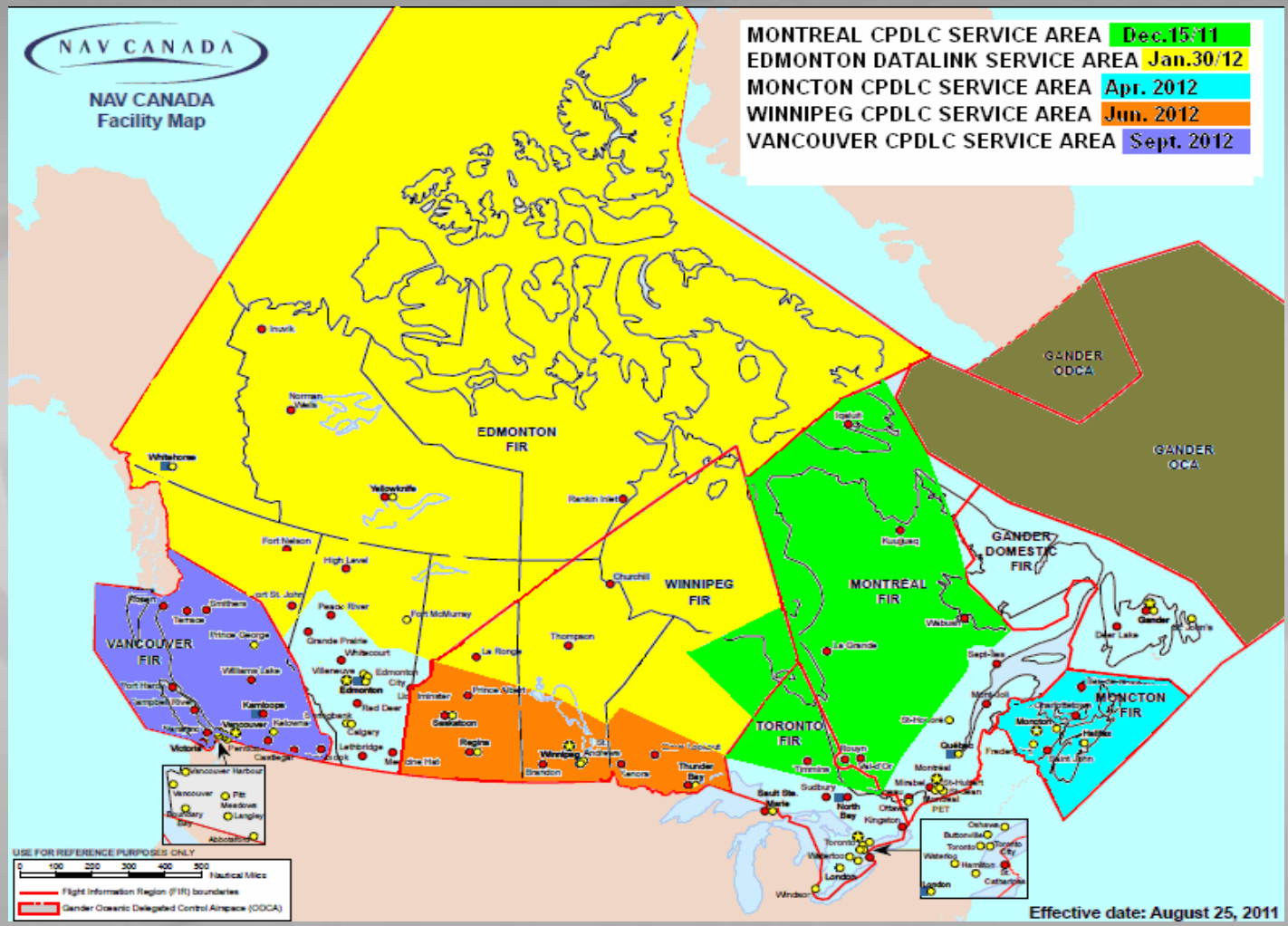




CPDLC Implementation

- Controller Pilot Data Link Communications
- Domestic Implementation in All ACC(s) planned
- Montreal Implemented Dec. 15, 2011
- Edmonton Implemented Jan. 30, 2012

CPDLC Implementation (2)



AWOS/LWIS Replacement

Continuing with replacement of legacy systems

- Legacy AWOS/LWIS units over 20 years old.
- Obsolete technology approaching end of service life. All 82 Legacy AWOS will be replaced with systems that meet CAR 804 exemption requirements

Replacement Schedule

Installations – NU

2012

Arviat, Hall Beach, Cape Dorset – July 27

Pangnirtung (LWIS) – November 15

2013

Clyde River, Gjoa Haven, Pond Inlet, Qikiqtarjuaq – January 10

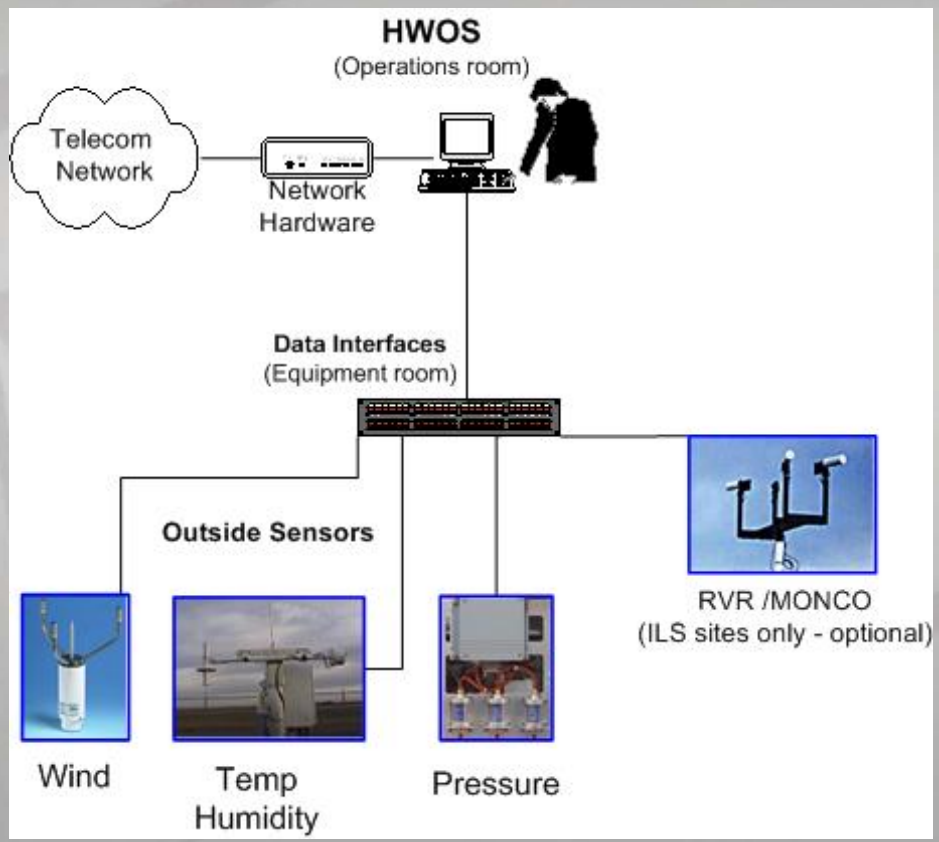
Installation – NT

2012

Wekweètì – November 15

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

Possibility to adjust capability to provide automatic information outside of operating hours of FSS, CARS or CWO.

NAV CANADA

HWOS Installation Schedule

2012

- Yellowknife, NT – 01 June 2012
- Inuvik, NT – 01 Jul 2012
- Norman Wells, NT – 01 Jul 2012
- Kuujuaq, QC – 01 Aug 2012
- Whitehorse, YT – 01 Sep 2012
- Rankin Inlet, NU – 01 Sep 2012

2013

- Baker Lake, NU – 01 Sep 2013
- Chesterfield Inlet, NU – 31 Oct 2013
- Dawson City, YT – 31 Oct 2013

Weather Cameras

Good news story – popular with customers

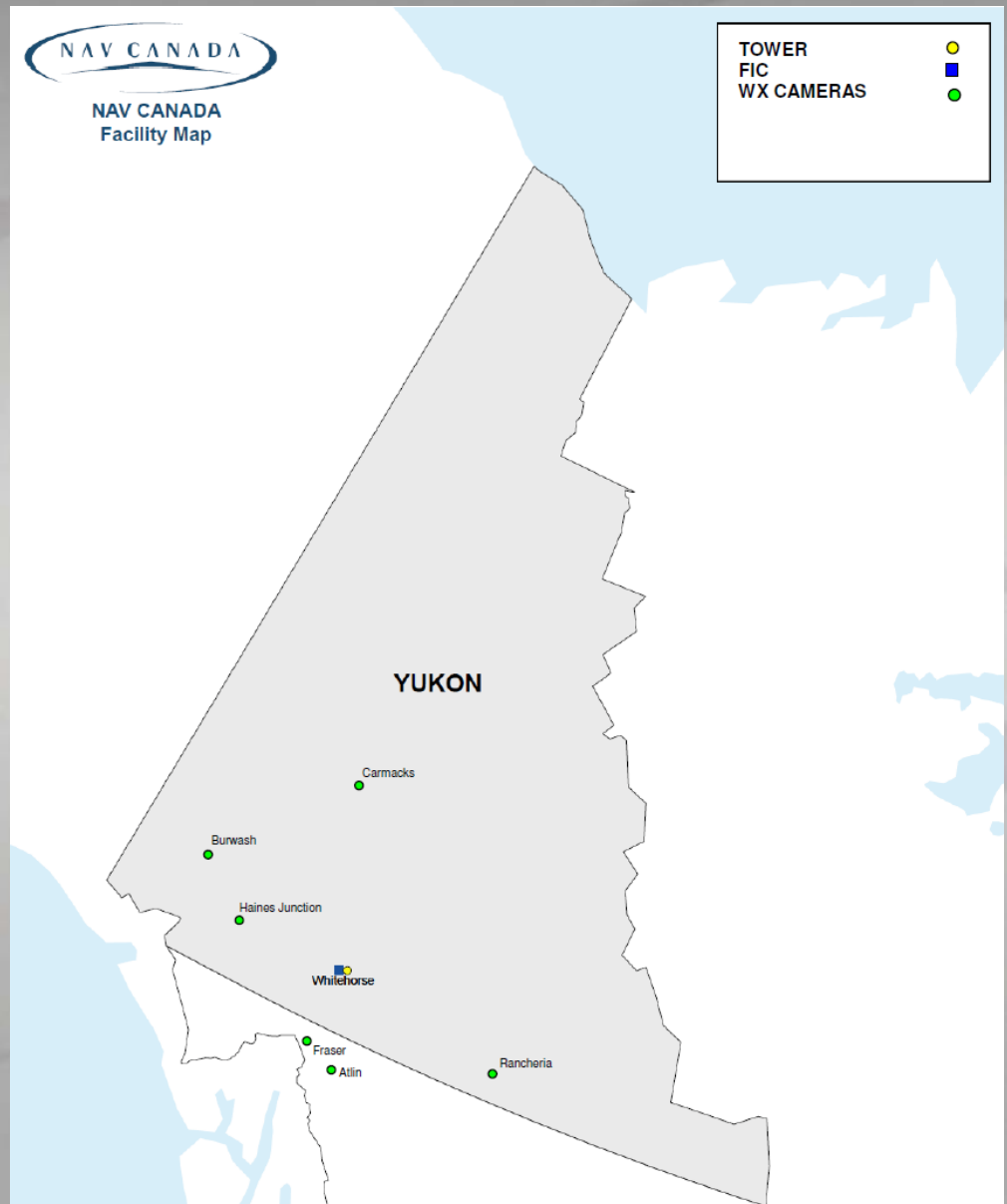
Currently over 130 sites across Canada with installations

Phase I program completed

WX Cameras - Phase I Sites

Yukon

- **Burwash**
- **Carmacks**
- **Haines Junction**
- **Rancheria**



NW BC

- **Fraser**
- **Atlin**

Performance Based Navigation

and

Aeronautical Information

PBN Strategy

- Active participant with ICAO
- Collaboration with Customers and Employees on PBN strategy
- Implementation of new design criteria
- Continued implementation of RNAV and RNP procedures
  - 700+ RNAV procedures
  - 70+ RNP procedures

New Design Criteria

- Canadian version of FAA Order 8260.54A

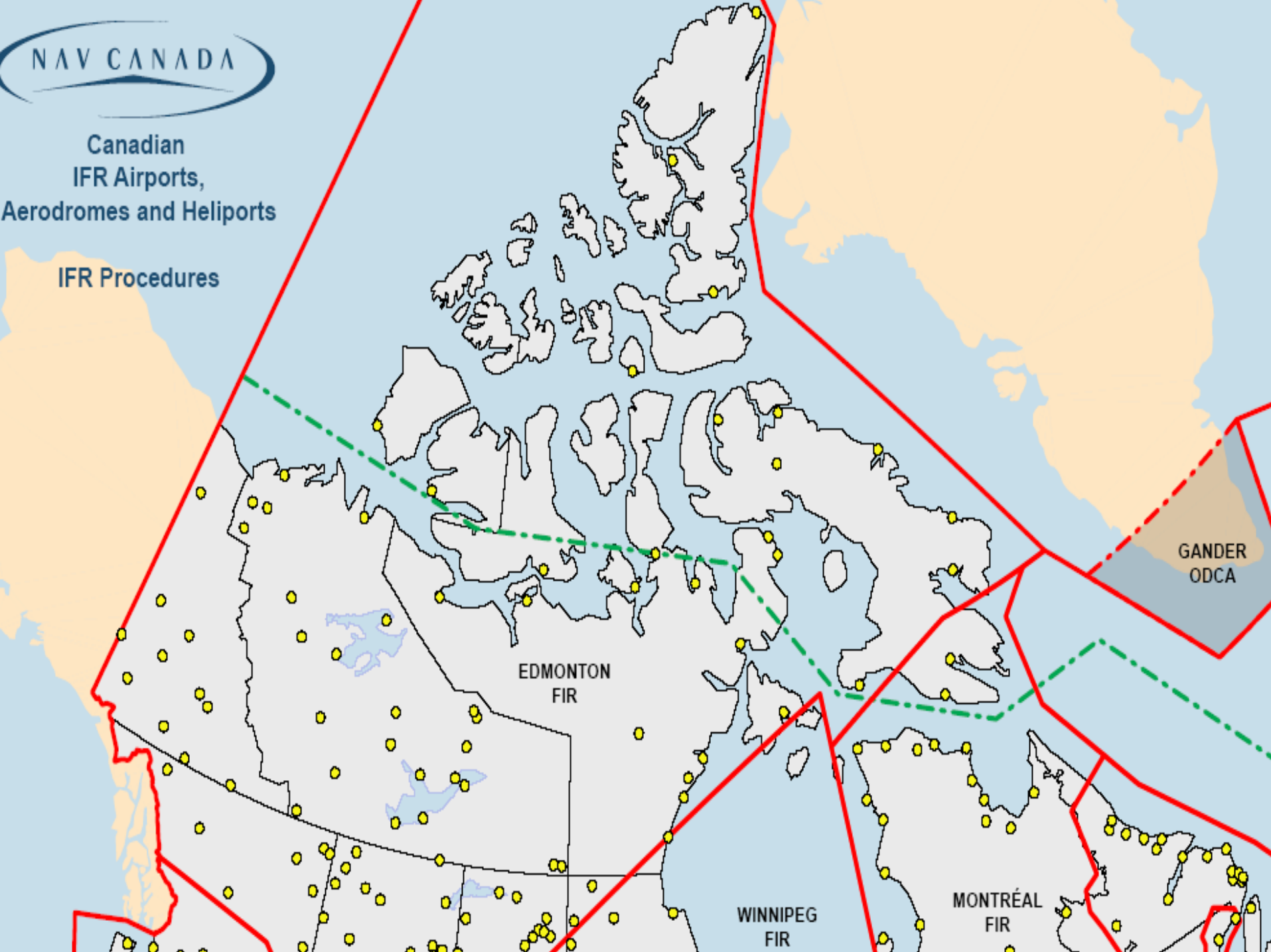
- New criteria allows:
  - Cleans up issues with the old rules
  - RNP 1 in terminal applications
  - Public Use of RF (radius to fix) legs with RNP 1
  - RNP SID and STAR options

- NAV CANADA training and depiction standards will be developed in early 2012 for RNP

NAV CANADA

Canadian IFR Airports, Aerodromes and Heliports

IFR Procedures



RNAV (GNSS) Update

- Grise Fiord – RNAV A True – published (RCAP)
- Meadowbank – RNAV 12T & 30T – published
- Doris Lake – RNAV 17T & 35T – published (RCAP)
- Watson Lake – RNAV 08 – May 2012
- Fort Providence – RNAV 13 & 31 – Nov 2012
- Jean Marie River – RNAV 10 & 28 – Nov 2012
- Trout Lake – RNAV 13 & 31 – Nov 2012
- Nahanni Butte – RNAV 33 – Nov 2012
- Burwash – RNAV 28 – Jan 2013
- Ft. Good Hope – RNAV 06 & 24 LPV – Jan 2013
  - Initially published – now under re-design due to runway data changes

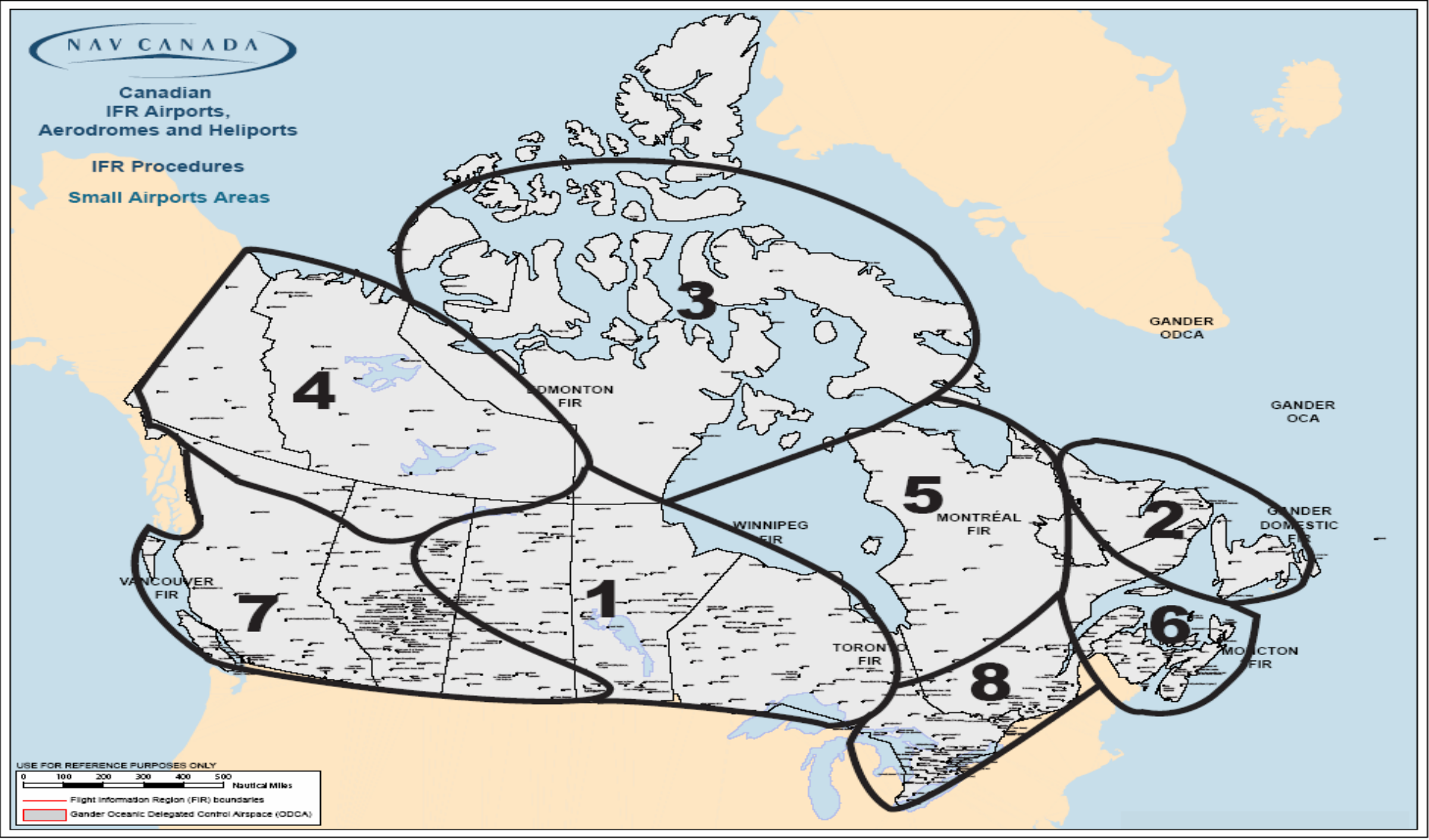
AIS Publishing Statistics

	Number of CAP & RCAP Pages			
Pub Date	Removed	New	Revised	Total
Feb 2012	63	84	313	460
Apr 2012	19	54	580	653
May 2012	34	30	471	535

Cherry picking all across the country is not working

AIS GNSS Programs

- Expanded use of PBN
- Large Terminal Projects
  - Windsor to Montreal & Alberta
- Regional Airport Program
  - Business Case
  - Customer Routes
  - Representative Airlines
  - Plan for its own resources



- Region 3 and 4 have 87 airports
- 45 airports have GNSS approaches

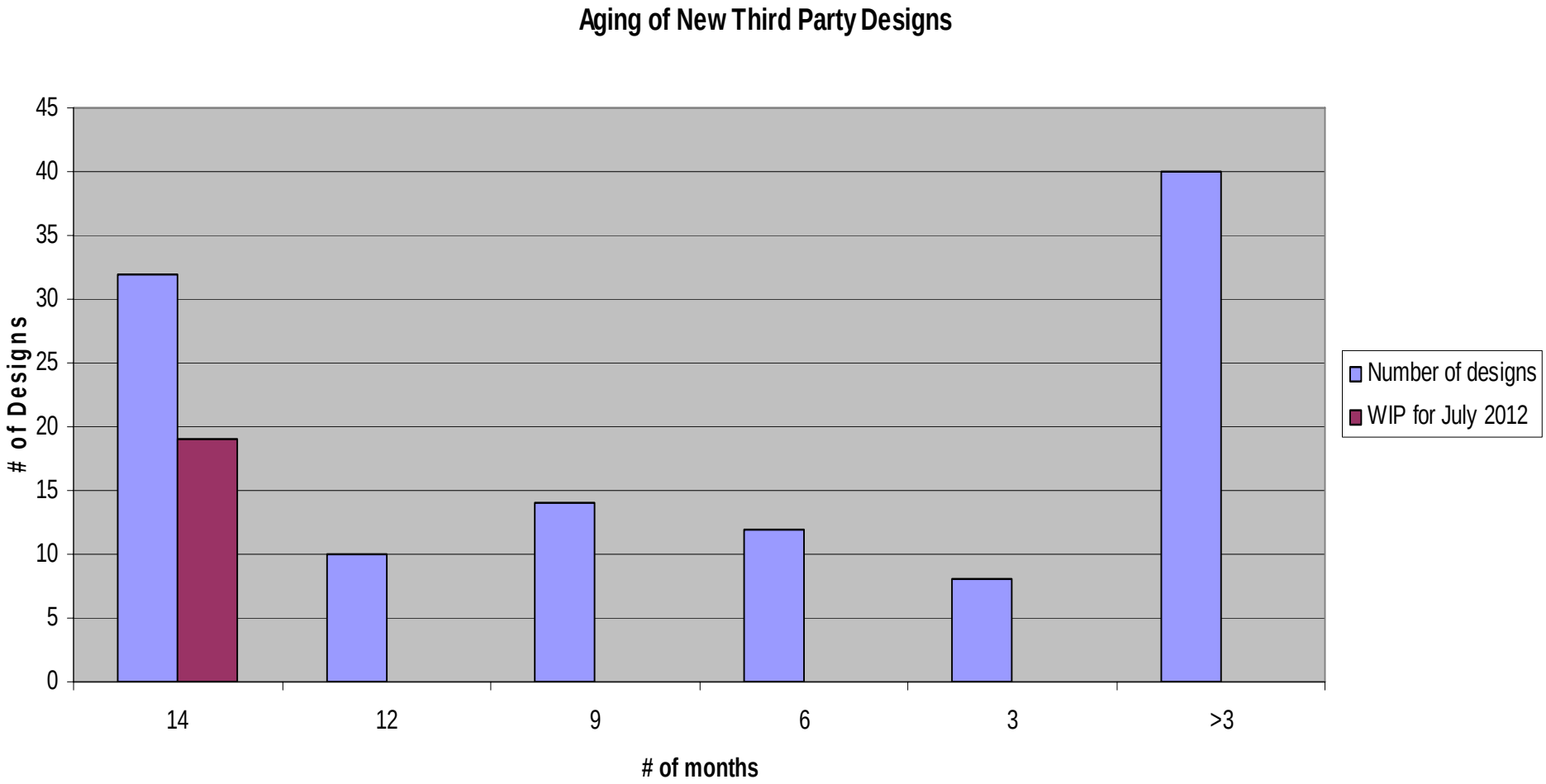
Develop only what is Needed

- There will be conventional procedures
  - CARs
  - CARAC PBN WG will address the future
- In the meantime:
  - Eliminate waste
  - Do not introduce waste with GNSS procedures

Third Party Overview

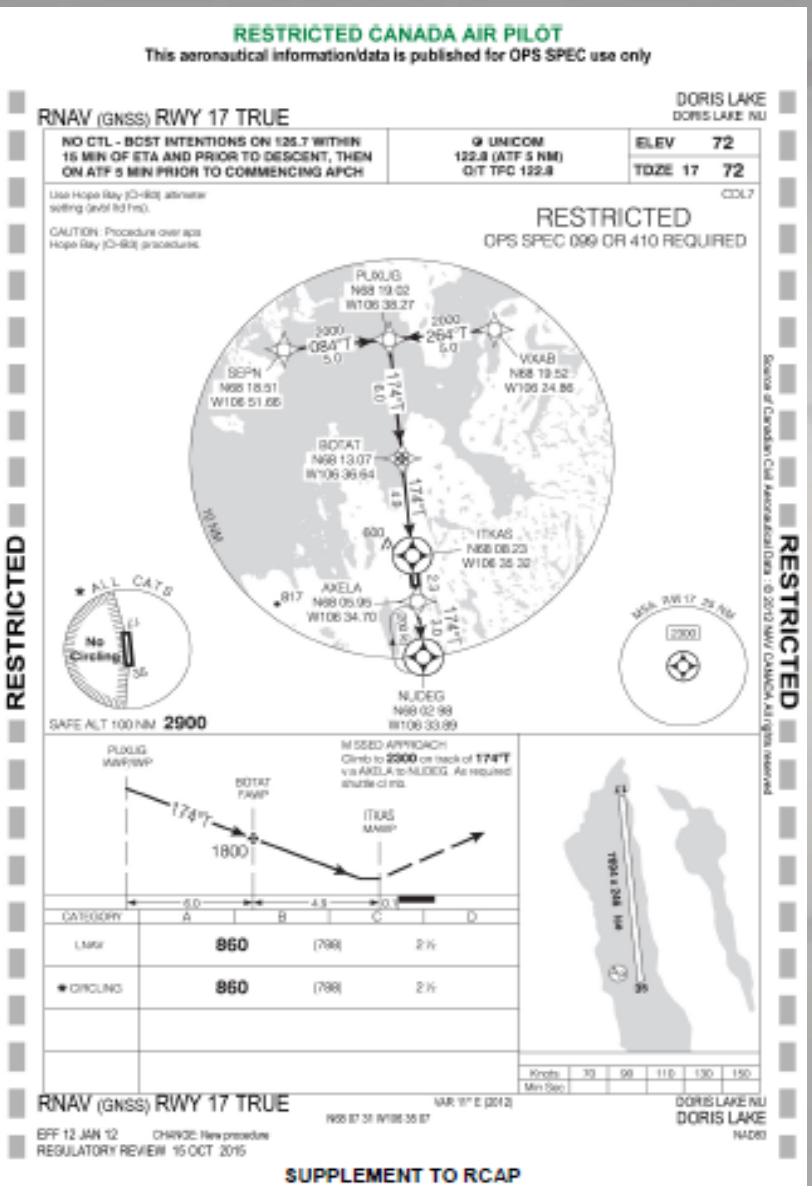
- Old TC Route Manual
  - No Formal Process
  - TC identified the need to have structure
- No regulatory oversight of Third Party design organizations (No Certificate)
- Each organization has its own design process
- We have been advised that QA is our obligation and we must control our own risk

Third Party Quality Assurance



Adding Resources

IFR Operations to Ice Runways


RESTRICTED CANADA AIR PILOT
This aeronautical information/data is published for OPS SPEC use only

DORIS LAKE
DORIS LAKE NU

RNAV (GNSS) RWY 17 TRUE

NO CTL - BCST INTENTIONS ON 126.7 WITHIN 15 MIN OF ETA AND PRIOR TO DESCENT, THEN ON ATF 5 MIN PRIOR TO COMMENCING APCH

@ UNICOM 122.8 (ATF 5 NM) O/T TFC 122.8

ELEV 72
TDZE 17 72

RESTRICTED
OPS SPEC 099 OR 410 REQUIRED

PLOUG N68 19.02 W106 38.27
SEPN N68 18.91 W106 51.66
VIXAB N68 19.52 W106 24.86
BOTAT N68 13.07 W106 36.64
ITKAS N68 08.23 W106 35.32
AXELA N68 05.96 W106 34.70
NUDEG N68 02.99 W106 33.89

SAFE ALT 100 NM 2900

MISSED APPROACH
Climb to 2300 on track of 174°T via AXELA to NUDEG. As required shuttle cl mtg.

CATEGORY	A	B	C	D
LNAV	860	(798)	2¼	
CIRCLING	860	(798)	2¼	

RNAV (GNSS) RWY 17 TRUE
DORIS LAKE NU
DORIS LAKE
NAD83

EFF 12 JAN 12 CHANGE: New procedure
REGULATORY REVIEW 15 OCT 2015

SUPPLEMENT TO RCAP

RESTRICTED

- Temporary Aerodrome Standard is now in place
- Doris Lake operated this season
- NAV CANADA is only authorized to use the normal AIRAC process

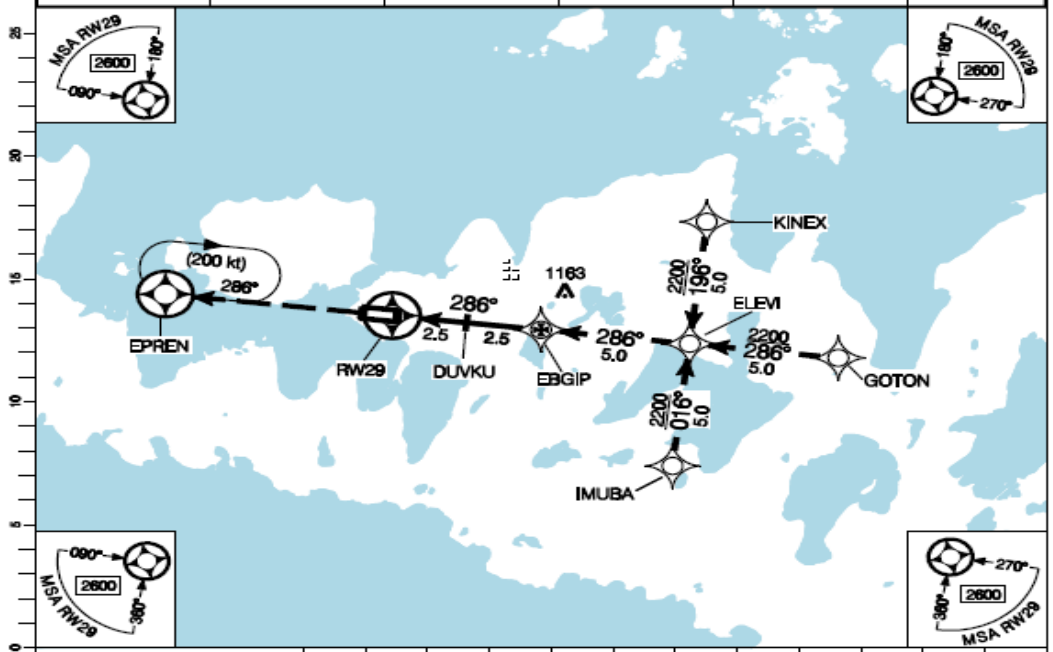
GORE BAY-MANITOULIN, ON

RNAV (GNSS) RWY 29

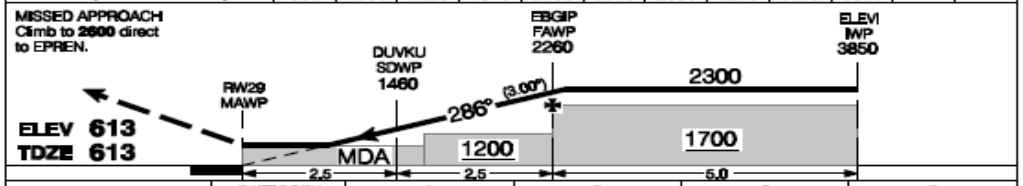
N45 52 54 W82 34 06 VAR 9°W (2008)

CYZE

AWOS - 128.725	RADIO London - 126.7	UNICOM - 122.8 ATF		ARCAL 122.8 (K)
SAFE ALT 100 NM **3500**	RNAV	APCH CRS **286°**	MIN ALT EBGIP **1700**	LDA **5500'**



DIST FROM RW29	1.0	2	3	4	5.1	6	7	8	9	10		
ALT (3.00° APCH PATH)	980	1300	1620	1940	2300	2570	2890	3210	3530	3850		



CATEGORY	A	B	C	D
LNAV	**980** (368) 1¼			
CIRCLING	**1120** (507) 1½		**1120** (507) 2	**1220** (607) 2

Knots	ft/min	Min:Sec
70	370	
90	480	
110	580	
130	690	
150	800	

RNAV (GNSS) RWY 29 CYZE

EFF 30 JUN 11 CHANGE: Example

Comparison

CALGARY INTL, AB

ILS or NDB RWY 28 (GNSS)

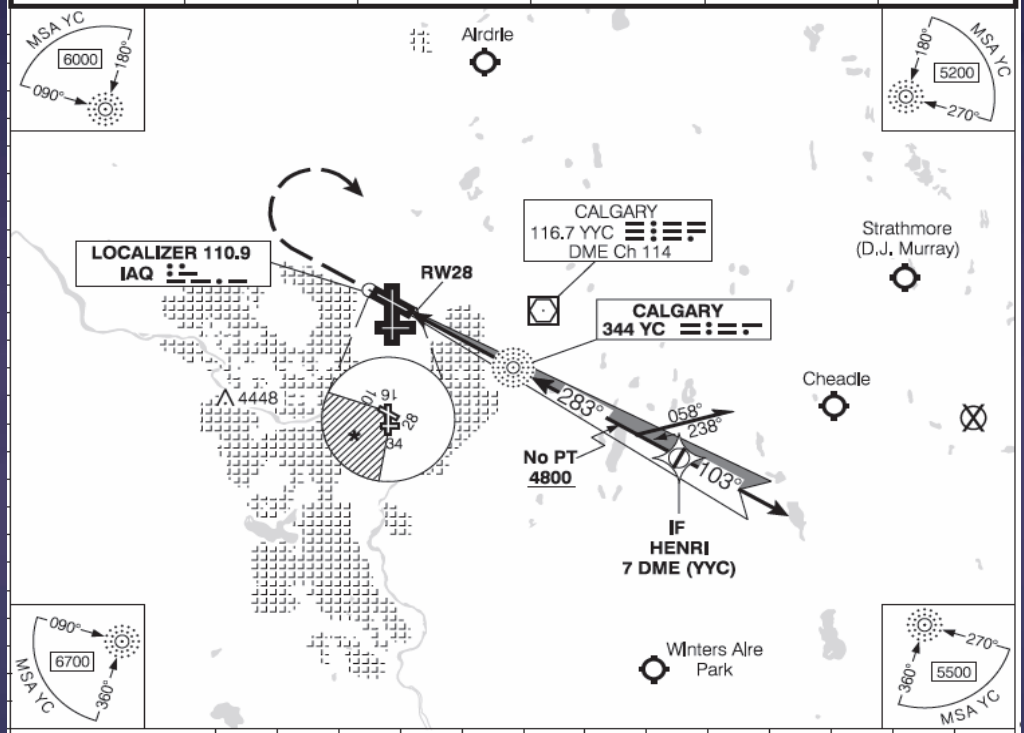
N51 06 50 W114 01 12 VAR 17°E (2003)

CYYC

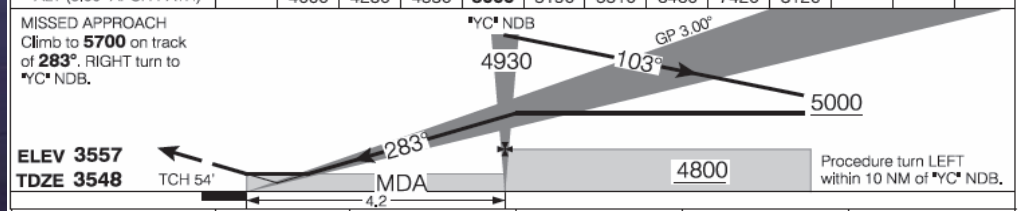
ATIS - 127.2 128.225	CTR - 125.9	TWR - 118.4 236.6	GND - 121.9 (S) 125.35 (N) 275.8

SAFE ALT 100 NM	LOC	APCH	GP	LDA
13,900	IAQ 110.9	CRS 283°	YC 4930	8000'

AN P3



DIST FROM RW28	1.3	2	3	4.4	5	6	9	12	14.2
ALT (3.00° APCH PATH)	4000	4230	4550	5000	5190	5510	6460	7420	8120



"YC" NDB to MAP 4.2 NM		
Knots	ft/min	Min:Sec
70	370	3:36
90	480	2:48
110	580	2:17
130	690	1:56
150	800	1:41

CATEGORY	A	B	C	D
ILS	3750 (202) ½ RVR 26			
LOC	4000 (452) 1 RVR 50			
NDB	4040 (492) 1 RVR 50			
CIRCLING	* 4060 (503) 1 ½	* 4060 (503) 2	* 4160 (603) 2	

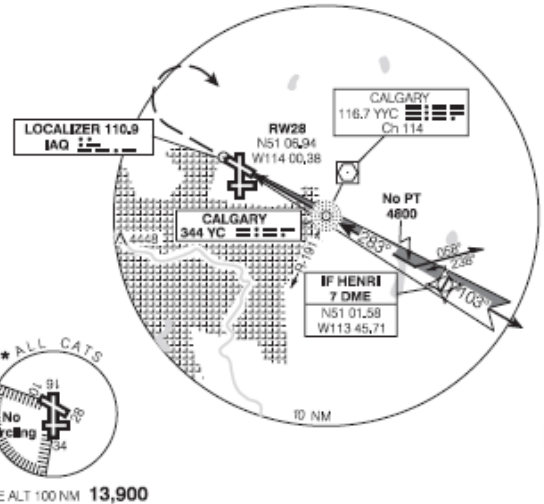
ILS or NDB RWY 28 (GNSS) EFF 30 JUN 11 CHANGE: Example CYYC

CALGARY INTL
CALGARY AB

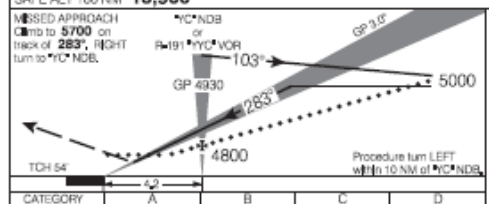
ILS or NDB RWY 28 (GNSS)

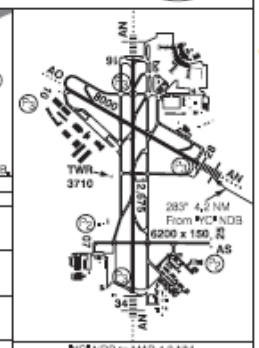
ATIS 127.2 128.225	ARR 125.9	TWR 118.4 236.6	GND 121.9 (S) 125.35 (N) 275.8	DEP 119.8 124.525 255.1	ELEV 3557
					TDZE 28 3548

CYYC



SAFE ALT 100 NM 13,900





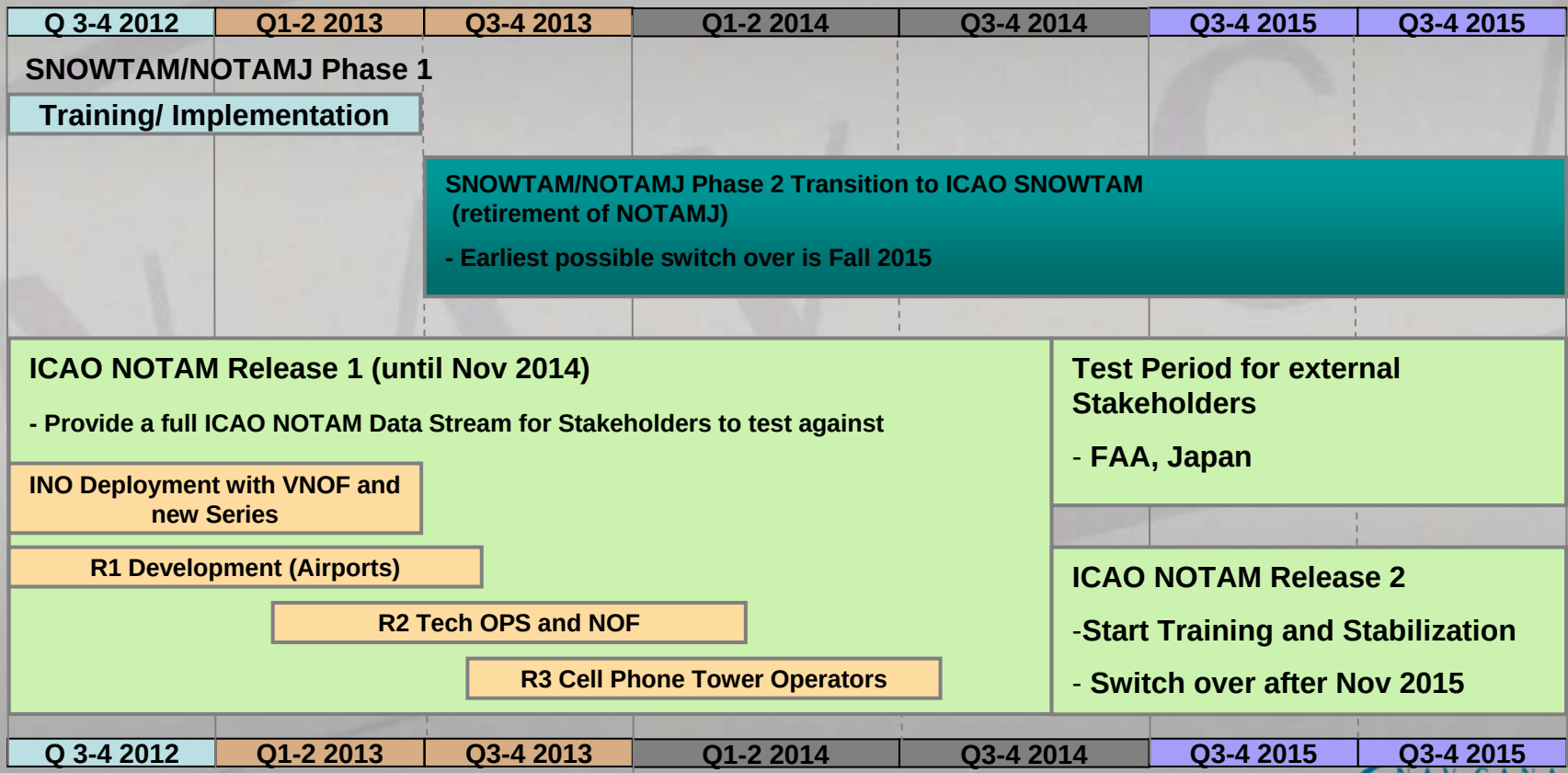
CATEGORY	A	B	C	D
ILS	3750 (202) ½ RVR 26			
LOC LOC/VOR	4000 (452) 1 RVR 50			
NDB	4040 (492) 1 RVR 50			
* CIRCLING	4060 (503) 1 ½	4060 (503) 2	4160 (603) 2	

"YC" NDB to MAP 4.2 NM					
Knots	70	90	110	130	150
Min:Sec	3:36	2:59	2:17	1:56	1:41

ILS or NDB RWY 28 (GNSS) CALGARY AB CALGARY INTL

EFF 20 OCT 11 CHANGE: Landing chart 510650N 1140112W VAR 17°E NAD83

Timeline
ICAO SNOWTAM/NOTAM Transition



AEROPUBS Modernization

Product Plan Road Map

INITIAL STATE

PRODUCTS

- Paper
- CD

DISTRIBUTION

- AEROPUBS 1-800
- Distributors

CURRENT STATE

PRODUCTS

- Paper
- CD
- Canadian Data on Portable Electronic Devices
- Electronic Downloads – Introduce on e-commerce site

DISTRIBUTION

- AEROPUBS 1-800
- Distributors
- E-Commerce Site
- E-Distributors

DESIRED STATE

PRODUCTS

- Canadian Data on Portable Electronic Devices – Expand with additional vendors
- Electronic Downloads – Complete suite of products

DISTRIBUTION

- AEROPUBS 1-800
- Distributors
- E-Commerce Site
- E-Distributors

E-Commerce System

Electronic downloads

- The goal is to offer customers electronic downloads of publications in PDF format via the AEROPUBS e-commerce site

  products.navcanada.ca

- The CAP, RCAP and WAS are now available for download.

- CFS may be broken down into regions, similar to that of the CAP – we are currently exploring the process and timeframe

Portable Electronic Devices

iPad Progress

- Agreements have been signed with ForeFlight and FltPlan.com
- Both vendors have CAPs and Enroute and TAC charts.
- VFR charts should be available this summer.
- Ongoing discussions with other vendors

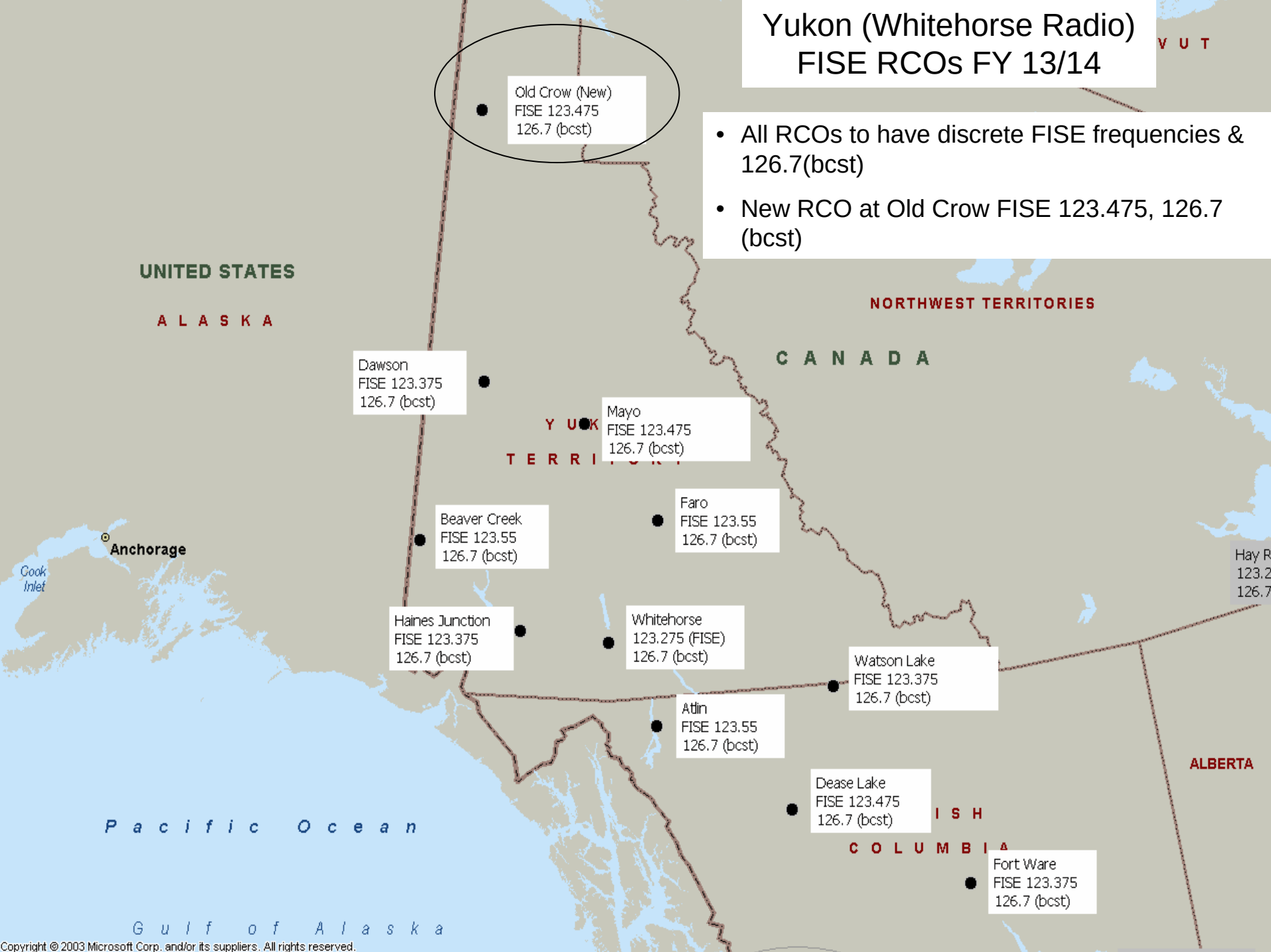
Level of Service Changes

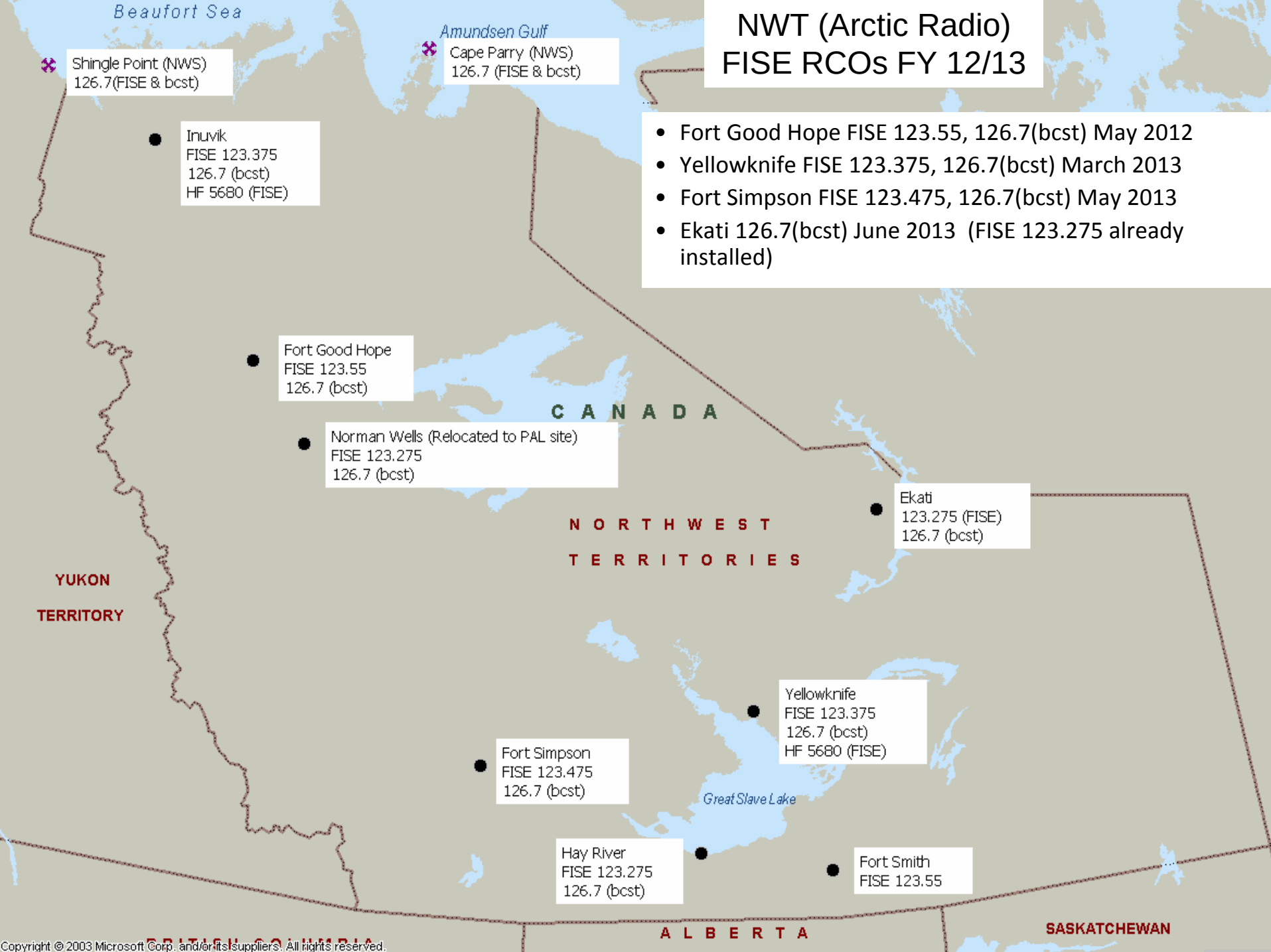
RCO Redesign Project

- 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 & NUNAVAT RCO's scheduled for completion in FY 12/13
- Yukon RCOs to be completed FY 13/14
- See NAV CANADA website for Notices on changes and up-to-date RCO maps

Yukon (Whitehorse Radio) FISE RCOs FY 13/14

- All RCOs to have discrete FISE frequencies & 126.7(bcst)
- New RCO at Old Crow FISE 123.475, 126.7 (bcst)




NWT (Arctic Radio)
FISE RCOs FY 12/13
Fort Good Hope FISE 123.55, 126.7(bcst) May 2012
Yellowknife FISE 123.375, 126.7(bcst) March 2013
Fort Simpson FISE 123.475, 126.7(bcst) May 2013
Ekati 126.7(bcst) June 2013 (FISE 123.275 already installed)
Beaufort Sea
Amundsen Gulf
Shingle Point (NWS)
126.7(FISE & bcst)
Cape Parry (NWS)
126.7 (FISE & bcst)
Inuvik
FISE 123.375
126.7 (bcst)
HF 5680 (FISE)
Fort Good Hope
FISE 123.55
126.7 (bcst)
CANADA
Norman Wells (Relocated to PAL site)
FISE 123.275
126.7 (bcst)
Ekati
123.275 (FISE)
126.7 (bcst)
NORTHWEST
TERRITORIES
YUKON
TERRITORY
Yellowknife
FISE 123.375
126.7 (bcst)
HF 5680 (FISE)
Fort Simpson
FISE 123.475
126.7 (bcst)
Great Slave Lake
Hay River
FISE 123.275
126.7 (bcst)
Fort Smith
FISE 123.55
ALBERTA
SASKATCHEWAN
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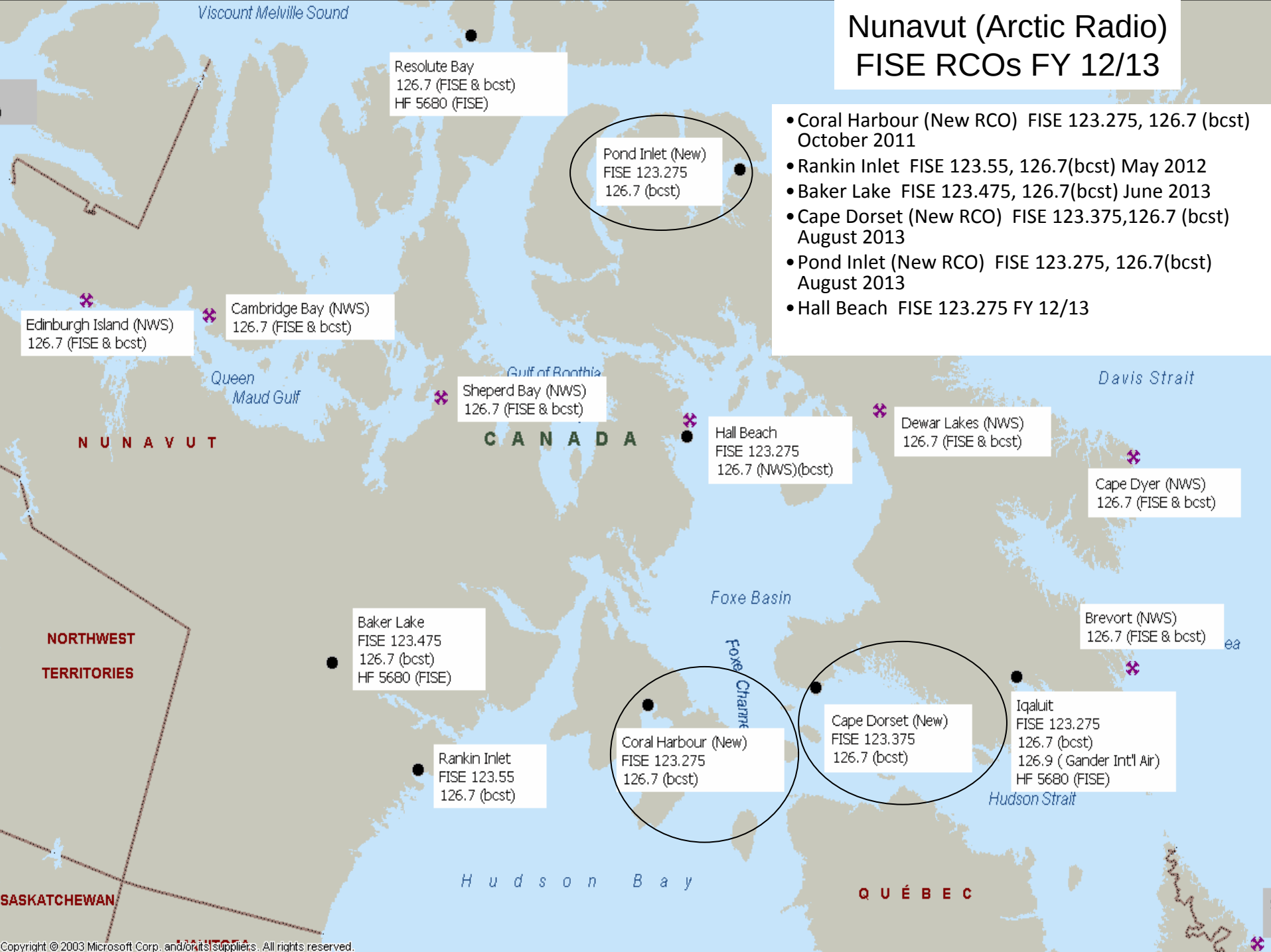
Nunavut (Arctic Radio) FISE RCOs FY 12/13

- Coral Harbour (New RCO) FISE 123.275, 126.7 (bcst) October 2011
- Rankin Inlet FISE 123.55, 126.7(bcst) May 2012
- Baker Lake FISE 123.475, 126.7(bcst) June 2013
- Cape Dorset (New RCO) FISE 123.375,126.7 (bcst) August 2013
- Pond Inlet (New RCO) FISE 123.275, 126.7(bcst) August 2013
- Hall Beach FISE 123.275 FY 12/13



ILS Replacement

Completed 2010/2011

- Hay River, NT – RWY 31
- Fort Nelson, BC – RWY 03

Scheduled 2011/2012

- Watson Lake, YT – RWY 08
- Resolute Bay, NU – RWY 35
- Yellowknife, NT – RWY 33

Scheduled 2012/2013

- Whitehorse – RWY 31L
- Iqaluit – RWY 35

NDB Outages

- May-July
  - Whitehorse (LABERGE), YK
- August
  - Pangnirtung, YXP
  - Kimmirut, YLC
  - Qikiqtarjuaq (BROUGHTON), YJI
  - Hall Beach, UX
- No or limited IFR access to for non-RNAV capable aircraft for all airports

Aeronautical Studies

Completed:

- Watson Lake, BC: Decommission Lakeshore NDB
- Dease Lake, BC; Close CWO and install AWOS & WXCAMs

On-going:

- Iqaluit: Decommission Frobay VOR & install localiser Rwy 17; Decommission VHF-DF
- Rankin Inlet: Review airspace and ATS services

Transfer of Pre-flight Service
Whitehorse to Kamloops FIC

- Transfer all Pilot Briefing Services Flight planning and weather briefing) to Kamloops
  - effective date April 5, 2012
  - walk-in & telephone briefings no longer provided from Whitehorse)
- FISE to remain in Whitehorse
- Overnight AAS and weather observing services remain at Whitehorse

Services – Whitehorse

Previous

- 14 hr/day airport control service
- 10 hr/day overnight airport advisory service
- 24 hr/day pre-flight service **(telephone & walk-in)**
- 24 hr/day weather observations
- 24 hr/day FISE via 10 RCOs

Current

- 14 hr/day airport control service
- 10 hr/day overnight airport advisory service
- 24 hr/day pre-flight service (**telephone from Kelowna FIC)**
- 24 hr/day weather observations
- 24 hr/day FISE via 10 RCOs

CARS Performance
March 2011 to February 2012

- 94% for all CARS (220,000 Sched Obs)
- Nunavut: 93% (104,000 Obs)
- NWT: 93% (75, 000 Obs)
- Yukon: 99% (41, 000 Obs)

Best Performers

- Burwash, YK
- Fort Smith, NWT
- Cambridge Bay, NU
- Hay River, NWT
- Watson Lake, YK

- 100% of Scheduled Obs Transmitted

- Teslin, YK
- Fort Simpson, NWT
- Kugluktuk, NU
- Mayo, YK
- Beaver Creek, YK

- 99.8% of Scheduled Obs Transmitted

Poor Performers

- Wrigley, NWT
- Aklavik, NWT
- Sachs Harbour, NWT
- Tulita, NWT
- Clyde River, NU

- From 42 to 79% of Scheduled Obs Transmitted

- Grise Fiord, NU
- Whale Cove, NU
- Ulukhaktok, NWT
- Fort McPherson, NWT
- Kimmirut, NU

- From 80 to 85% of Scheduled Obs Transmitted

Improvement Initiatives

- Modification of penalty scheme
- Job-Sharing within the Hamlet
- Use of Replacement Staff from other locations
- Additional training module – emphasize the importance of the CARS
- Certificate/Reward Program for employees

Ice Surveillance UAV

- RCAF operation in Gascoyne Inlet (100 NM east of YRB)
- planned for August
- altitude – 1500 feet and below
- temporary Class F airspace prior to daily air operations: information message broadcast on 126.7 MHz
- when UAV's are airborne: broadcast every 15 minutes with intentions.
- air operations will be conducted under VFR only, with a visual watch of the area of air operations.


CYRB
Area A
Prince Leopold
Bird Sanctuary
DEVON

Summary

Three Time Winner

IATA EAGLE

- 2001, 2010, 2011
- Recognizes:
  - customer consultation and satisfaction
  - cost efficiency, productivity improvements
  - reasonable service charges
  - our people and their positive safety, social operational and environmental record

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


NAV CANADA