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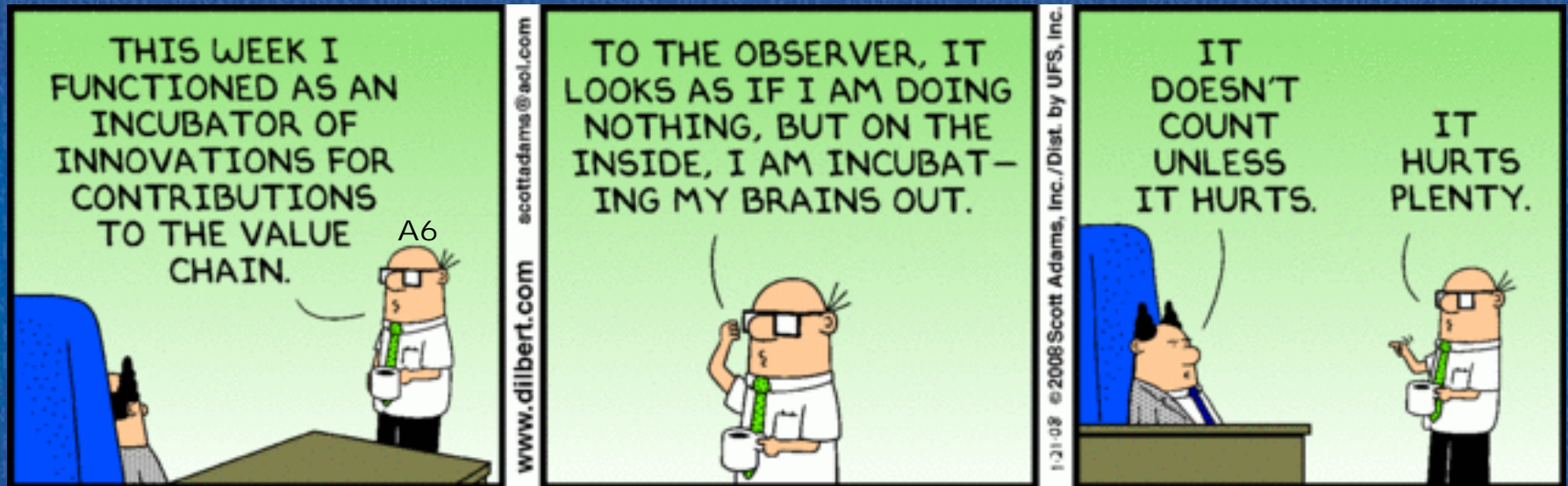
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RCAF HF Update

Maj Ron Lee / 1 CAD HQ A6 RCS



A Day in the Life of A6



Outline

- RCAF Top Cover
- MACS Services
- RCAF Supported Missions
- Challenges
- RCAF SOR
- Way-Ahead

RCAF Top Cover

Ref: Comd 1 CAD Letter – 29 Aug 13

- SATCOM is RCAF system of choice for BLOS
- Not all RCAF platforms SATCOM enabled
- Air Forces will continue to operate in SATCOM denied Arctic

RCAF Top Cover – Con't

- Sovereign, proven, reliable & relatively inexpensive long range comms essential
- HF radio serves this purpose
- RCAF has persistent & increasing reqr for strategic HF Radio comms

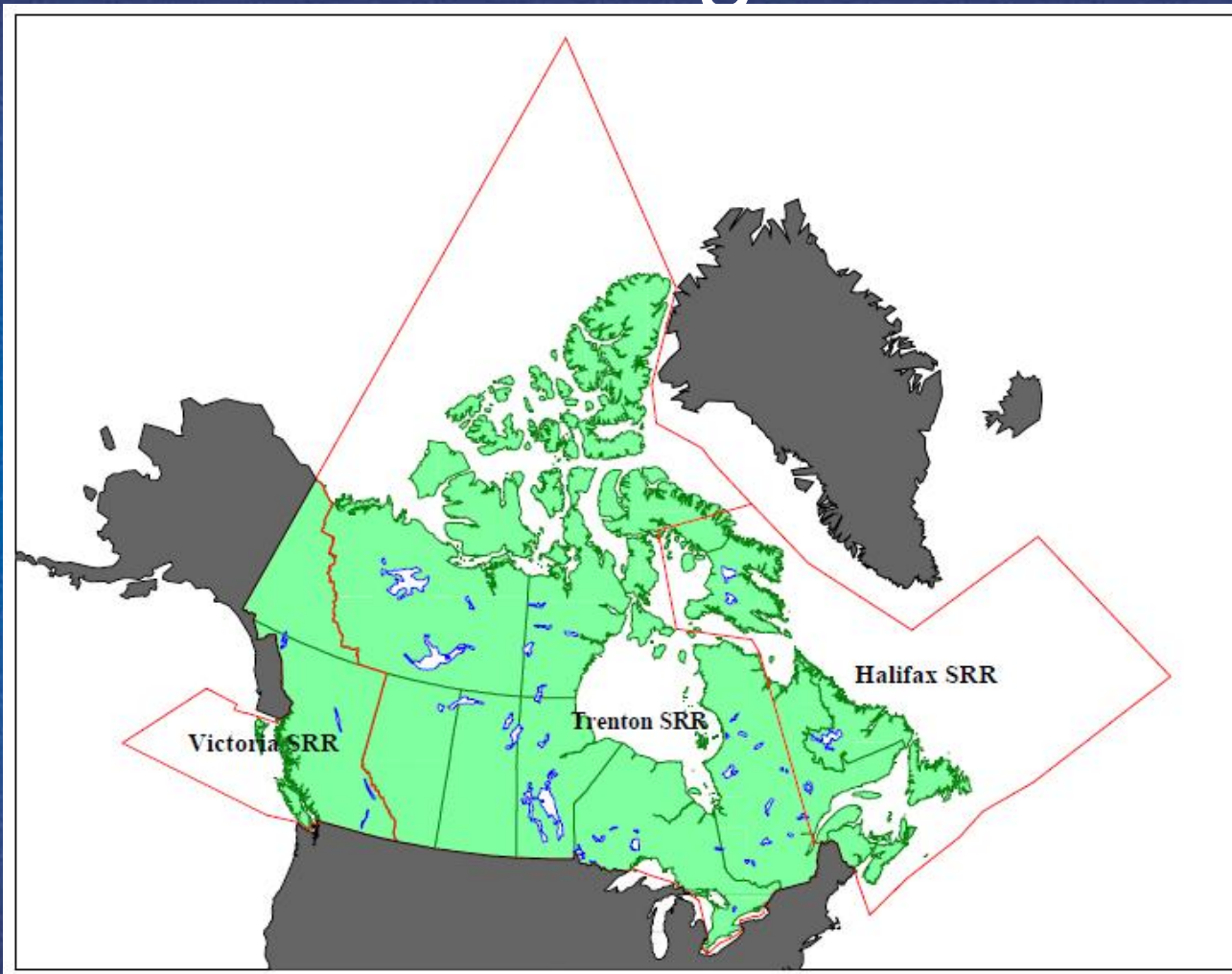
Military Aeronautical Comms System (MACS)

- Mission critical system
- Supports C2 of deployed air forces
- Provides non-tactical AGA radio comms
- Supports a number of fleets
- Provides numerous services

MACS Services

- SAR frequency monitoring
- Flight Following frequency monitoring
- Backup NRL for 8 ACCS deployments
- Scheduled aviation wx broadcasts
- Alternate comms for C2 of NORPAT a/c
- Phone Patch service
- AGA comms for AWACS ops
- NRS Backup for RCN (AGA only)
- ADDN Messaging Gateway

SAR Regions



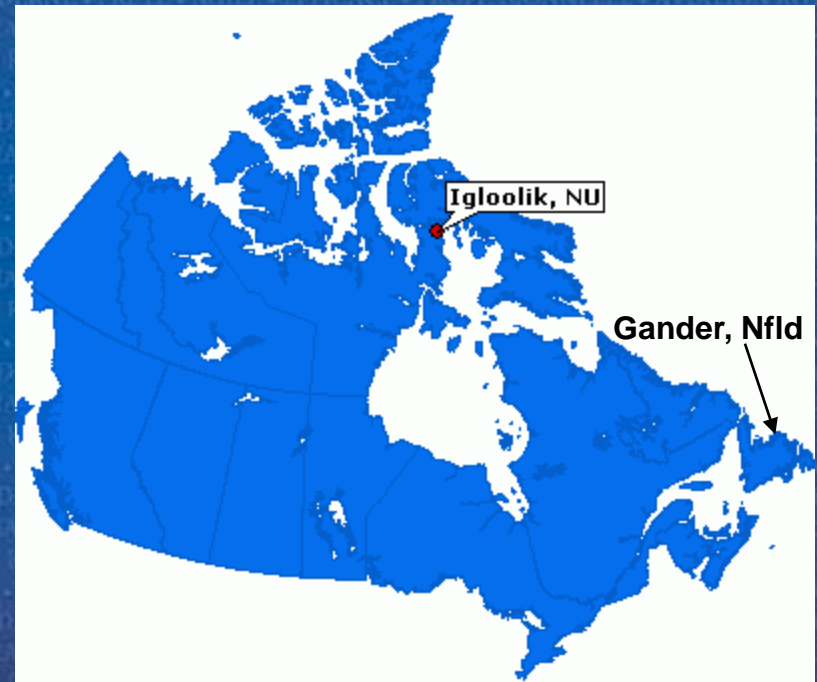
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SAR Ops

- On 27 Oct 12 a Cormorant from 103 SAR Sqn Gander was tasked with rescuing two hunters stranded on an ice flow in the Arctic sea near Igloolik, Nunavut (69N)
- A distance of 2,780 km from Gander, Nfld



Search & Rescue



- Cormorants operated by RCAF Transport & Rescue Sqns (Comox, Greenwood and Gander) are HF & SATCOM fitted
- CC130 Hercs utilized by 435 Tpt & Rescue Sqn Winnipeg are not SATCOM equipped
- They rely solely on HF Comms as a lifeline while operating in arctic and oceanic airspace
- For the CC130 Loss of HF would limit SAR effectiveness to non-Arctic continental NA severely limiting ability to conduct SAR and Northern Sovereignty ops in areas where it is most required
- CH 146 Griffons operated by 424 Tpt & Rescue Sqn Trenton are only HF fitted
- Loss of HF would put lives at risk

Air Transport

- HF Comms is vital to air transport ops
- Serves as primary backup to Satphone
- Transport aircraft use HF on a regular basis while operating in the north due to the challenges using Satphone
- During Op NEVUS HF used to talk to Polar Shelf sp pers, Parks Canada in Resolute Bay, Tanquary Fiord and Lake Hazen airstrips
- HF is the only comms net for transiting into and out of Thule, Greenland (Op BOXTOP staging)



Air to Air Refuelling

- HF is the primary means of comms used during Air to Air Refuelling ops in the high arctic and Oceanic airspaces
- Loss of HF comms would have a serious impact
- Without HF the CC130 Tanker would be limited to operation in North America & experience greater difficulties operating in the far north



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RCAF Impact: Strategic HF Radio Loss / Degradation						
LOO	Aircraft		S. Canada		Arctic (>N70°)	Usage
SAR	Cormorant					Voice with Joint Rescue Coord Centre (JRCC) – search instructions, SA, reports & weather
	Griffon					
	Hercules					
	Buffalo					
Transport	Hercules					Voice with WOps, including trans-Atlantic comms – Flight Following, SA, orders, reports & weather
	Globemaster					
	Airbus					
	Twin Otter					
Tactical Aviation	Griffon					Alternate to VHF/UHF LOS voice comms with Army (CA)
	Chinook					
Maritime	Aurora					Voice & Radio teletype with WOps during Long Range Patrol (Arctic)
	Cyclone					Voice comms-ships & shore (NRS)
Impact:	Low		Medium		High	

Challenges / Pressures

- Convincing operators of HF value-added
- Edmonton MACS
 - Riverbend Rx Site Land Encroachment
- Trenton MACS
 - PYs
 - Cct upgrades
 - Other (IRCM testing)
- Authorities (Op & Tech) Ref: 2004 MOA – Army, Navy, Air Force & ADM(IM)

RCAF HF RADIO SOR

- Preliminary Statement of Operational Requirement (SOR)
- Need to continue effort to fully define, prioritize, fund and sustain RCAF HF requirements
- Close coordination with and endorsement of operators

Way-Ahead

- Paradigm Shift
 - need to re-operationalize HF from the perspective of the operational community
 - Slow progress
 - Comd 1 CAD Letter rekindled discussion
- RCAF CONOPS + IERs = SOR
- Joint SOR

Bottom-line

- HF communications remains an RCAF essential operational requirement
- Fiscal pressures to reduce cost & PYs
- Loss or degradation of HF would weaken the RCAF's ability to conduct:
 - Search & Rescue Missions
 - Northern Sovereignty operations (NORAD)
 - Air to Air Refuelling (Projecting Power)

Questions?





National
Défense

Défense
nationale

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Backup Slides

13/11/2013

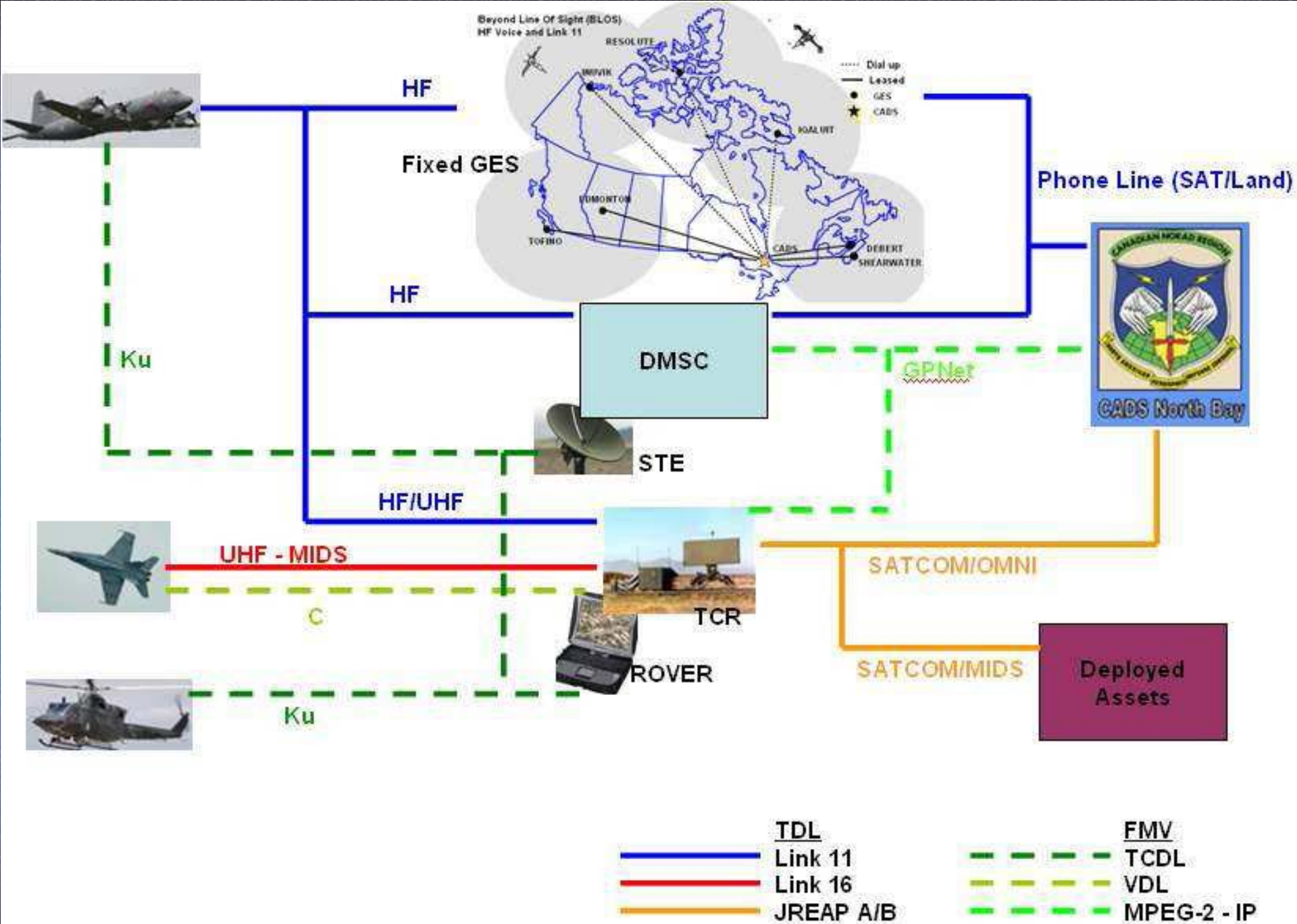
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Additional Requirements

- NORAD BLOS
- FOL BLOS
- Tactical / Deployable HF
- Training

BLOS INFORMATION EXCHANGE REQUIREMENTS (IERs)

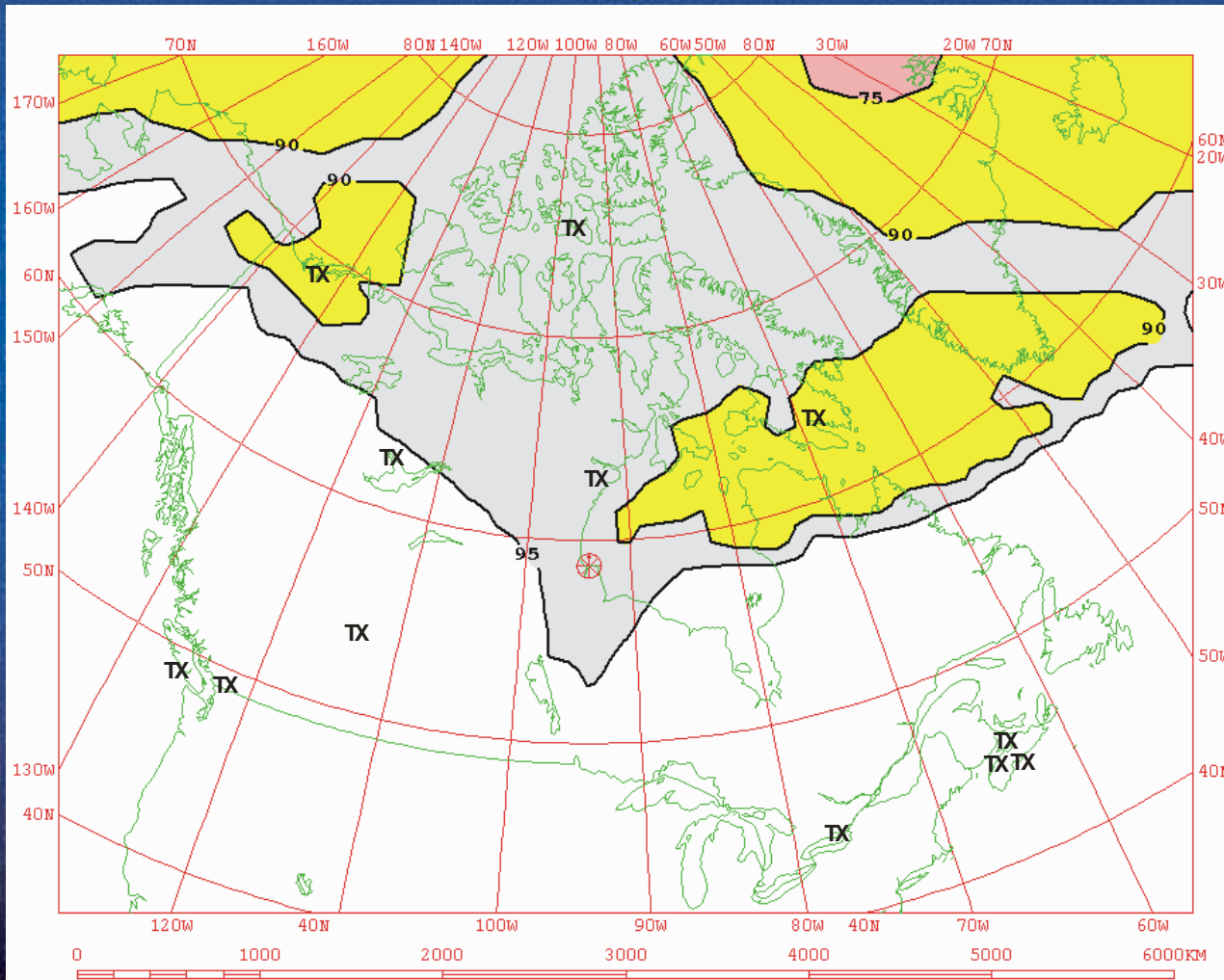
- **Note: Need to differentiate IERs for RCAF platforms and RCAF C2 Nodes + common IERs (Platform unique, Node unique and common reqrs)**
- Service Type (email, fax, chat, messaging/message handling (ADDN Gateway), data, voice, phone patch – HF to PSTN interface, Selective Call (SELCAL), simplex vs duplex)
- Availability
- COMSEC reqrs (e.g. OTAR - Over the air rekeying)
- Region (corridors and zones; primary and alternate) – prep an ideal coverage / Air Operations AOO map
- Criticality
- Notice of Use
- Number
- Standards (Regulatory Compliance)
- Security Classification
- Data Rates
- Quality of Service (QoS) – ALE, minimal re-connect time, responsiveness – low latency, etc.
- Human Factors / User Interface / Ease of Use (intuitive operator interface, push-to-talk, etc)
- Frequency of Service (Continuous vs On Demand service)
- Interoperability (Joint, combined and inter-agency)
 - Open standards (facilitates vendor/contractor competition) i.e. No proprietary applications
- Associated Integrated Logistics Support (ILS) (Supportability / Maintainability / Sustainment)
- Operating frequency range (within 3 – 30 MHz)
- Accessibility / Assess Control – CIA (Digital Signature and encryption)
- Multicast vs Unicast routing
- Concurrent voice / data transmission
- Apps that need to be supported (e.g. ACP 142 email; X400 messaging - military mail over SMTP)
- High MTBF / Low MTTR
- IP connectivity (for ground sites)
- Link 11 reqrs
- Integrated Communications System (ICS – single location for all comms mgt) integration
- Scalable / Upgradable (forward compatible)
-



HF Integrated Tx Coverage (Best Case)

ALL TRANSMITTING SITE COMBINED
RELIABILITY (%) for VOICE - GROUND TO AIR

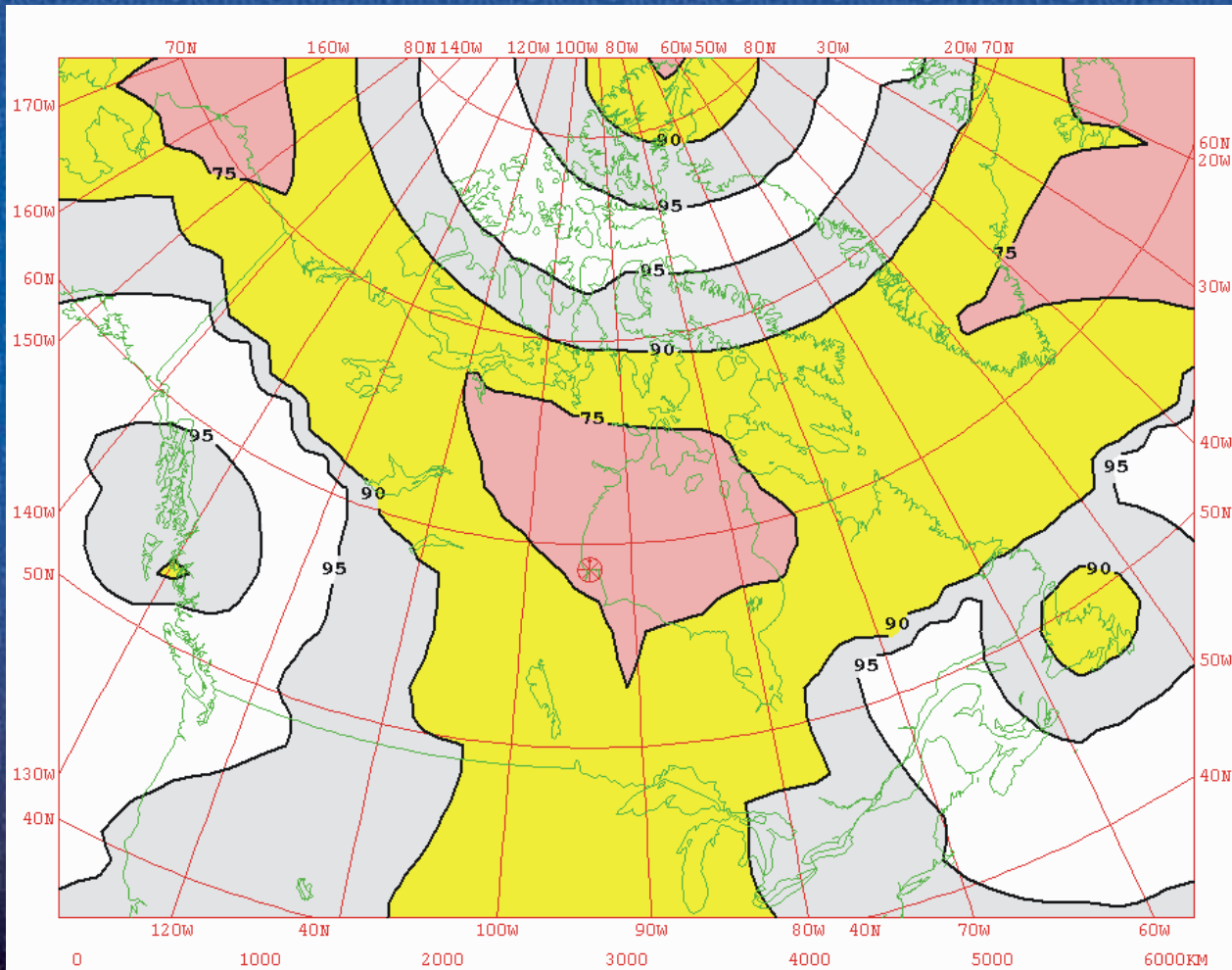
Voice
Reliability
Combined Tx
Sites
Ground to Air



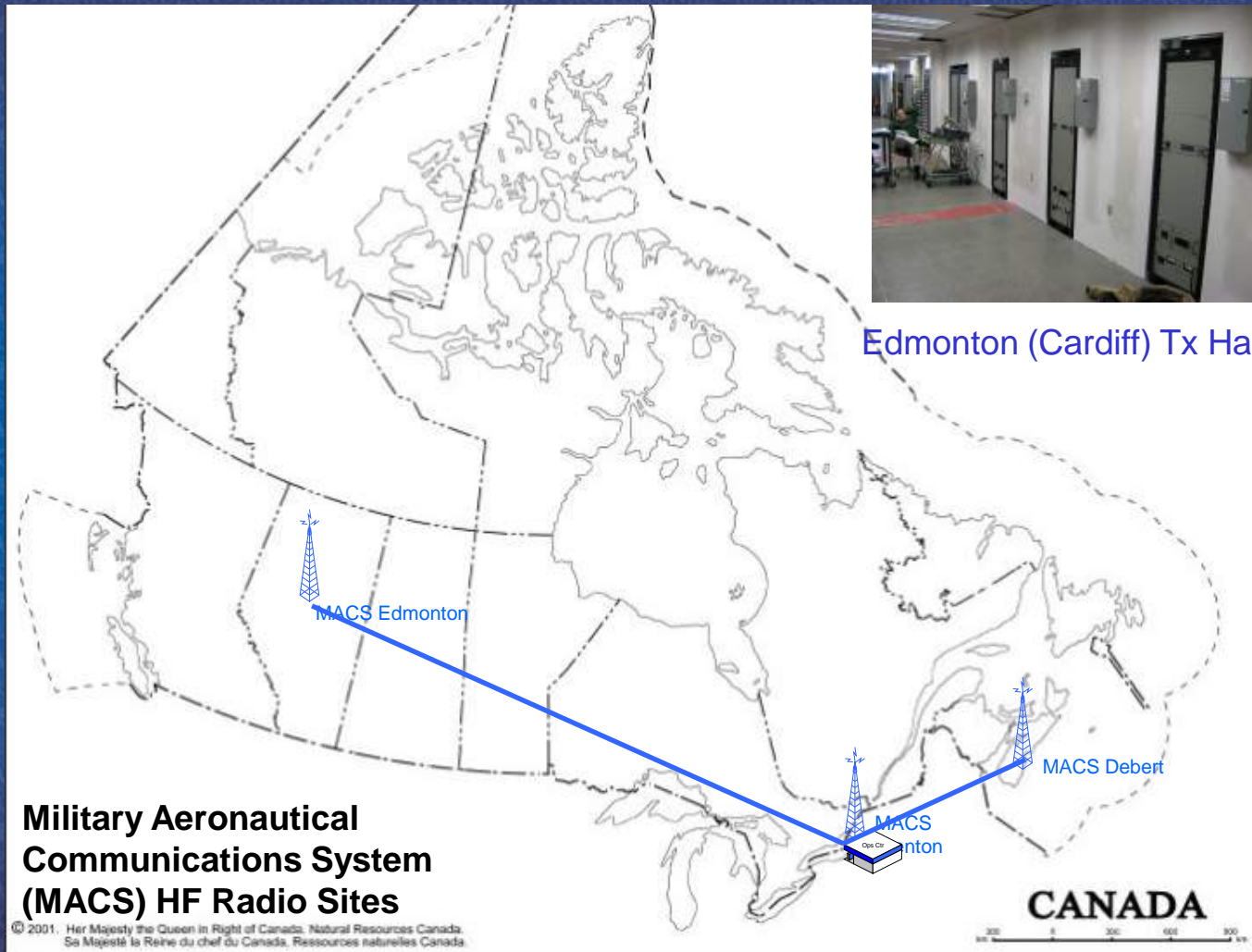
HF Integrated Rx Coverage (Best Case)

ALL RECEIVER SITES COMBINED
RELIABILITY (%) for VOICE - AIR TO GROUND

Voice
Reliability
Combined Rx
Sites
Air to Ground



MACS HF Radio Sites



Military Aeronautical Communications System (MACS) HF Radio Sites

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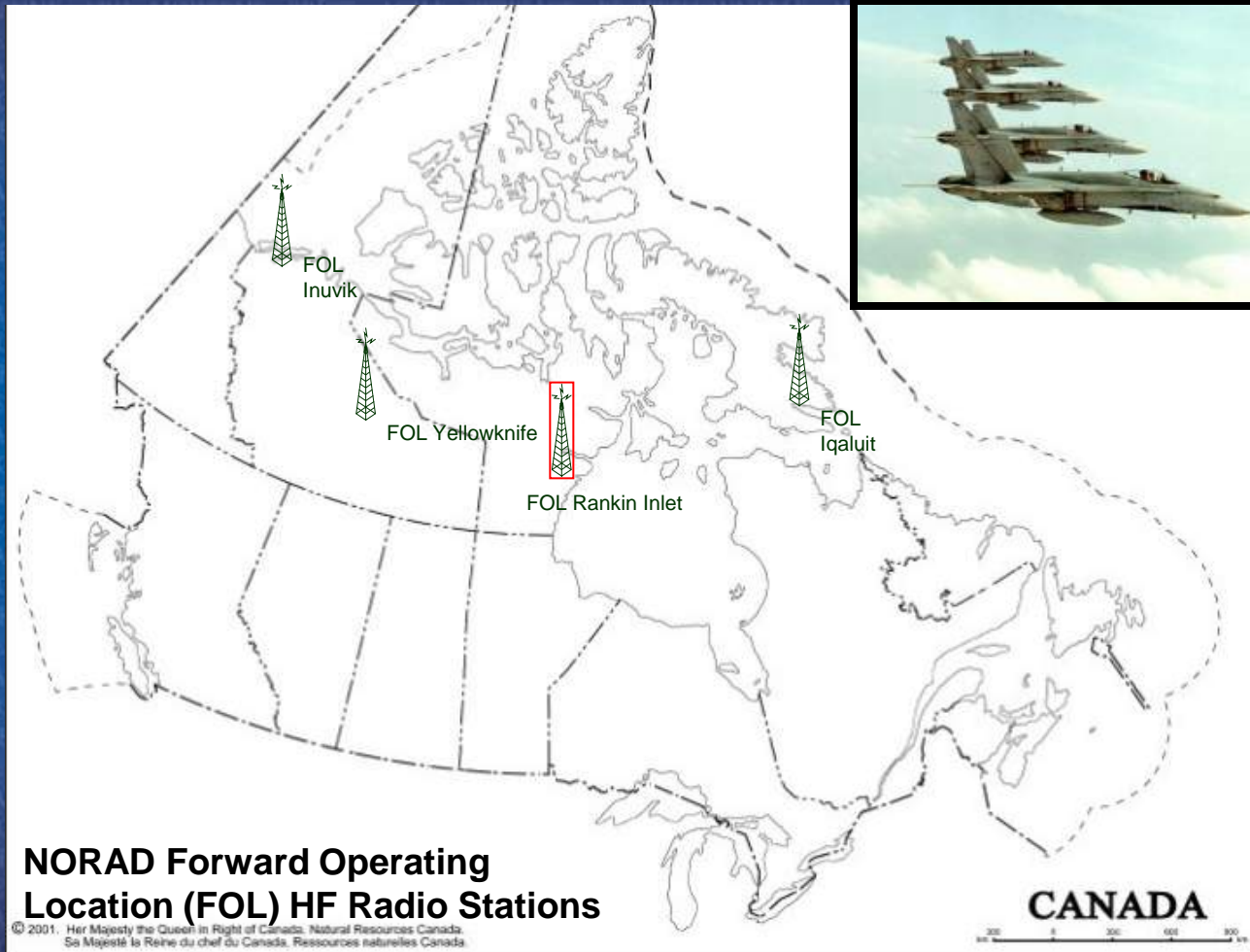
The Military Aeronautical Communications System (MACS) system provides HF communications to assist in the command and control of Canadian military aircraft. It consists of three stations located at Edmonton, Trenton and Debert, all remotely operated from Trenton. MACS also supports Search and Rescue operations and 8 ACCS communication deployments, provides regular scheduled aviation weather broadcasts, alternate HF communications for command and control of Northern Patrol aircraft and assistance for MARCOM operations and air-ground-air communications for AWACS operations. It is a mission-critical systems owned by DND. The majority of the radio equipment and systems at these stations requires replacement because they are at end-of-life. However, the antenna fields and infrastructure have been maintained and can continue to operate indefinitely.

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NORAD FOL HF Radio Stations



The NORAD Forward Operating Location (FOL) HF Radio systems locally support Beyond-Line-Of-Sight command and control of air movements. They are among the mission critical systems owned by DND. The FOLs are located at Inuvik, Yellowknife, Rankin Inlet, and Iqaluit, although Rankin Inlet was not installed with HF capability. Currently, the FOL radio equipment is not serviceable, is no longer supported by the Original Equipment Manufacturer (OEM), and requires replacement. Therefore no HF coverage exists to communicate with deployed NORAD patrol aircraft. This has an impact to Arctic Sovereignty Operations (SOVOP). The antenna fields and infrastructure are in various states of repair, from moderate to good.