700 MHz Public Safety Broadband Network
From Vision to Action

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Disclaimer

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Communications Interoperability Strategy and Action Plan for Canada

- Strategy approved by federal, provincial, territorial Ministers responsible for emergency management.
- Provides a structure for the creation of national policies, standards, and plans to improve responder communications capabilities.
- ACTION #5: Develop a 700 MHz national spectrum implementation strategy and program for public safety use.
# Key Milestones for the 700 MHz PSBN

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<th>Year</th>
<th>Month</th>
<th>Event</th>
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| 2010 | Dec   | - Industry Canada launches 1st consultation on 700 MHz.  
          - CITIG launches “Call to Action 700”. |
|      | Feb   | - Response to IC: 20 MHz spectrum needed for public safety.                                                                         |
|      | May   | - PS establishes a 700 MHz Project Management Team with multiple stakeholders (DRDC CSS, P/Ts, Tri-Services, CITIG, etc.)          |
|      | Mar   | - SOREM endorses a proposed governance model:  
              Federated regional sub- networks model.  
              - IC allocates 10 MHz of spectrum for public safety broadband.  
              D Block (10 MHz) will the subject of another consultation. |
|      | Aug   | - IC launches second round of consultation on 700 MHz public safety broadband spectrum.                                               |
|      | Oct   | - Public safety stakeholders submit coordinated responses to IC.                                                                       |
|      | Jan   | - DRDC CSS Technical Working Groups recommend a network architecture that supports governance model endorsed by SOREM.            |
|      | May   | - PS and P3 Canada approved a study they commissioned on various deployment options and costs models for the 700 MHz PSBN.        |
| 2013 | Aug   | - CSS publishes PSBN Network Architecture Description.  
          - CSS begins preparing Requirements Documents (Operational, Security, Interoperability) |
|      | TBD   | - Launch Pilot Network                                                                                                             |
Three pillars of the PSBN

• Governance track
• Funding and Legal track

• Technical Track
  • Led by the Centre for Security Science.
  • Supported by Communications Research Centre of Canada and other subject-matter-experts.
  • Published Technical Advisory Notes and the PSBN Network Architecture Description.
### 700 MHz PSBN – landscape of activity

#### Oversight and direction
- FPT Ministers Responsible for Emergency Management
- FPT Deputy Ministers Responsible for Emergency Management
- Senior Officials Responsible for Emergency Management (SOREM)
- Federal/Provincial/Territorial (FPT) Interoperability Working Group

#### Federal Project Management Team
- Public Safety Canada
- Treasury Board of Canada
- Dept. of Finance
- Privy Council Office
- Shared Services Canada
- Industry Canada
- PWGSC
- RCMP, CBSA, DND/CF, CSEC, CRC, DRDC/CSS
- Health Canada
- Environment Canada

#### FPT 700 MHz Project Management Team
- PS, DRDC CSS, CRC, RCMP, DND/CAF
- P/T EMOs
- Canadian Association of Chiefs of Police
- Canadian Association of Fire Chiefs
- Paramedics Chiefs of Canada
- Communications Interoperability Technology Interest Group
- Federation of Canadian Municipalities
- Canadian Advanced Technology Alliance (CATA)

#### CAN-USA Communications Interoperability Working Group (CANUS CIWG)
- **Canadian Members:**
  - PS, DRDC CSS, CRC, RCMP, DND/CAF, IC
- **U.S. Members:**
  - DHS OEC, DHS S&T, State Dept, FEMA, PSCR, NIST
- **Observers:**
  - Law Enforcement Communications Interoperability
  - Joint Wireless Program Management Office
  - National Public Safety Telecommunications Council
  - Communications Interoperability Technology Interest Group
  - National Information Sharing Consortium

#### 700 MHz Technical Advisory Group (TAG)
- DRDC/CSS, CRC
- Simon Fraser University
- F/P/T subject matter experts
Centre for Security Science

- Provides technical support to the Federal, Provincial, Territorial, and Municipal agencies for public safety.
- Sponsor of the Communications Interoperability Research Test and Evaluation Centre (CIRTEC).
- Promotes the creation of “Communities of Practice”.
- 700 MHz Technology Advisory Group focusing on 700 MHz public safety broadband.
  - Conduct research in areas of broadband technology.
  - Publish Technical Advisory Notes on broadband technology for the benefit of the public safety community.
  - Lead the preparation of Requirements Documents for the PSBN.
  - Support Public Safety Canada and other organizations/departments as needed.
Collaboration with US agencies

• Participation on NPSTC work groups.
  • Broadband work group
  • Security work group
  • Public Safety Grade work group

• Memorandum of Understanding in process with PSCR.
  • Technical exchange and coordination.

• Beyond the Border Action Plan
  • Canada-US Communications Interoperability Working Group
  • US Department of Homeland Security Office of Emergency Communications (DHS OEC)
Charter statements

• “The CIRTEC will evaluate and test equipment, software and applications in a captive evaluation network environment in collaboration with the public safety community, industry, academia and international laboratories.”

• “The main objective of [CIRTEC] is to help define the requirements and expected performance of a broadband wireless LTE network serving the public safety community in Canada.”

In process of standing up within CRC.

* emphasis added.
Technical deliverables re. PSBN

• Technical Advisory Notes
• Network Architecture
• Operational Requirements
• Security Requirements
• Interoperability Requirements
• Catalogue of Use-Cases
• Integrated Dictionary (of definitions and acronyms)
• Policy-impacting technical recommendations
Technical Advisory Notes

• Mission-critical voice services: a comparison of LTE versus Land Mobile Radio.

• A comparison of communications Network Architectures for a Public Safety Mobile Broadband Network.

• Congestion Management Techniques for Public Safety Mobile Broadband Communications Networks.

• Impact of Network Identifiers on the Governance of a Nation-Wide Public Safety Mobile Broadband Network.

• Priority and Pre-emption mechanisms in LTE Broadband Communications Networks.

• Impact of NG 9-1-1 on the 700 MHz Public Safety Broadband Network – a technical assessment.

• The network architecture for Canada’s 700 MHz Public Safety Broadband Network.

Available on request.
Technical Work Groups

- 95 registered participants
- 20% active participation
- Three Work Groups
  - Infrastructure
  - Operations
  - Technical Requirements
- Active from July 2012 to March 2013.
Network Architecture - key assumption: the Service Delivery Model

Broadband services delivered to end-users through 3 actors:

- National Operating Entity
- Regional Service Delivery Entity
- Public Safety Agencies
Network Architecture (conceptual)
Interfaces between National Entity and RSDE

S6a: user authentication
Rx: QoS information
S5: user plane data.
SGi: information networks
S10: handover info
PSBN Architecture Description

Available on request.

Soon to be available on a CSS web-site. (under construction)
PSBN Operational Requirements

• Accessibility of information networks and applications.
• Operability of the PSBN with external networks and End-User Agency networks.
• Applications.
• Network and Service Management.
• Device Management.
• Congestion Management.
• Public Safety Grade availability and resiliency.
PSBN Security Requirements

PSBN Interoperability Requirements

• Technological interoperability
  o Industry-accepted standards
  o Interface Reference Points

• Architectural interoperability
  o Interfaces external to the PSBN.
  o Interfaces between the National Entity and the RSDE.
  o Interfaces between the RSDE and End-User Agencies.
  o Interfaces between the National Entity and End-User Agencies.

• Information interoperability
Interoperability for Operations Management

Network/Operations Manager(s)

Service APIs

Correlation engine

Common Information Model

NA - A

NA - B

NA - C

EM - A

EM - B

EM - C

Vendor A

Vendor B

Vendor C

User interfaces, OSS applications

Application interface

Intelligence

Parsing, mapping

Network adaptors

Element Managers

Network Elements

3GPP TS 32.101, “Telecommunication management; Principles and High Level Requirements”, and derivative specifications.
Interoperability – Network-as-a-Service

PSBN

Network infrastructure

Network Services

UE location information

Usage information

Identity and Credentials Mgmt

Open Std APIs

Applications

Computer-Aided Dispatch

Rating and Billing

Blue Force Tracking
Policy-impacting technical recommendations

• Focus on…
  o Operability
  o Interoperability
  o Security

• Examples of the types of policies that are required:
  o Applying consistent mapping of QCI levels to MPLS tags.
  o Vetting applications for security and performance.
  o Maintaining deployable systems in a known configuration state by all owners of such systems.
  o Coordinating changes to the PSBN over its life cycle.
  o By-passing access control mechanisms during emergencies.
  o Bring-your-own-devices.
Pilot Network – point of convergence.

- Users
- Use-Cases
- Governance
- PS-MNO Policies
- EUA Policies
- Funding
- Technology

Evaluate the Pilot

Launch Pilot

Operate

Transition to PS-MNOs.
Thank you

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