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Communications Interoperability Technical Report

TR-16-2008

National Capital Region Interoperability Project

April 2008

Prepared by:

Planetnetworks Consulting Corporation on behalf of:

Ottawa Police Service

For the:

**Communications Interoperability Technology Interest Group
Canadian Police Research Centre**

Acknowledgements

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CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP

And

OTTAWA POLICE SERVICE

NATIONAL CAPITAL REGION INTEROPERABILITY PROJECT
(Phases 1 & 2)

REPORT
VERSION 1.0

PRESENTED BY



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**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

LIST OF ACRONYMS

3G	: Third Generation Cellular
4G	: Fourth Generation Cellular
APCO	: Association of Public Safety Communications Officials
AVL	: Automatic Vehicle Location
BGAN	: Broadband Global Area Network
CAD	: Computer Aided Dispatch
CDMA	: Code Division Multiple Access
CITIG	: Canadian Interoperability Technology Interest Group
CoW	: Cell-site on Wheels
Ec	: P25 Console Subsystem Interface
Ef	: P25 Fixed Station Interface
EDACS	: Enhanced Digital Access Communication System
EMS	: Emergency Medical Services
EOC	: Emergency Operating Centre
ESMR	: Enhanced Specialized Mobile Radio
ETSI	: European Telecommunications Standards Institute
EV-DO	: Evolution Data Only (optimized version of CDMA 2000)
FCC	: Federal Communications Commission (USA)
FM	: Frequency Modulation
GEO	: Geosynchronous Earth Orbit
GIS	: Geographic Information System
GPS	: Global Positioning System
GSM	: Global System for Mobile Communications
HF	: High Frequency
HPC	: High Probability of Completion
ICP	: Incident Command Post
iDEN	: Integrated Digital Enhanced Network
IEEE	: Institute of Electrical & Electronics Engineers
IP	: Internet Protocol
IPO	: Initial Public Offering
IPSU	: Integrated Public Safety Unit
ISSI	: P25 Inter-Subsystem Interface
ITS	: Intelligent Transportation Systems
ITU	: International Telecommunications Union
LAN	: Local Area Network
LEO	: Low Earth Orbit
LMR	: Land Mobile Radio

**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

LIST OF ACRONYMS

LTR	: Logic Trunked Radio
MEO	: Medium Earth Orbit
MESA	: Mobility for Emergency and Safety Applications
MIMO	: Multiple In Multiple Out
MS	: Microsoft
MSS	: Mobile Satellite Services
MSV	: Mobile Satellite Ventures
NCR	: National Capital Region
OCC	: Operations Control Centres
OFDMA	: Orthogonal Frequency Division Multiple Access
P25	: Project 25 (APCO)
P34	: Project 34 (APCO)
PAD	: Priority Access Dialling
PC	: Personal Computer
PTT	: Push to Talk
QoS	: Quality of Service
RCC	: Restricted Common Carrier
RF	: Radio Frequency
RoIP	: Radio Over IP
SAFECOM	: US Department of Homeland Security's Office for Interoperability and Compatibility
SAR	: Search and Rescue
SDR	: Software Defined Radio
SWOT	: Strength, Weaknesses, Opportunities and Threats
TETRA	: Terrestrial Trunked Radio
TIA	: Telecommunications Industry Association
UHF	: Ultra High Frequency
UWB	: Ultra Wide Band
VHF	: Very High Frequency
VoIP	: Voice over Internet Protocol
VPN	: Virtual Private Network
VSAT	: Very Small Aperture Terminal
Wi-Fi	: Wireless Fidelity
WiMAX	: Worldwide Interoperability for Microwave Access
WPS	: Wireless Priority Service
XML	: eXtensible Mark-up Language

**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

PREAMBLE

Per SAFECOM's definition, "communications interoperability refers to the ability of emergency response agencies to talk across disciplines and jurisdictions via radio communications systems, exchanging voice and/or data with one another on demand, in real time, when needed, and as authorized".

While the above statement defines the end requirement very concisely, there are many aspects that must be addressed in concert to develop and deploy a truly interoperable system. In assessing the attributes of alternative wireless solutions it is important to support the interoperability project and to not unduly limit or restrict the interoperability options available.

The purpose of this study is to develop a roadmap framework to enhance public safety interoperability levels throughout the National Capital Region. The long term goal is to define and map out steps and actions that can be initiated to close major gaps and improve interoperability between all public safety organizations serving the region. This study should become a living document that is critically reviewed annually and completely recast every three to five years.

Morrison Hershfield and Planetworks Consulting Corporation were retained by the Ottawa Police Service, in part via a grant from CITIG to prepare this study. Planetworks would like to thank the Canadian Interoperability Technology Interest Group (CITIG), Ottawa Police Service, and the survey and interview respondents for their time, effort and resources contributed towards the creation of this study.

1.0 INTRODUCTION

The objective of the project is to develop an interoperability strategic plan for the National Capital Region Members and the OPS that establishes approved work items/objectives for the 2008-2010 timeframe. The scope includes requirements for interoperability between the serving agencies and public safety partners.

Per SAFECOM's definition, "*communications interoperability refers to the ability of emergency response agencies to talk across disciplines and jurisdictions via radio communications systems, exchanging voice and/or data with one another on demand, in real time, when needed, and as authorized*". While this statement defines the end requirement very concisely, there are many aspects that must be addressed in concert to develop and deploy a truly interoperable system. In assessing the attributes of alternative wireless solutions, it is important to support the interoperability project and to not unduly limit or restrict the interoperability options available.

It is noted that implementing interoperability involves addressing a number of procedural elements and system components including governance, standard operating procedures, technology, training and exercises, and usage. Each of the preceding elements is interdependent and the development of an interoperability plan must take into account these dependencies and impacts in order to be effective and viable.

The study deliverables include:

- *Identification of Stakeholders and Requirements*: This deliverable will document the list of stakeholders involved in the interoperability plan and the collect the stakeholder information and requirements necessary to develop the plan.
- *Interoperability Scenarios*: This deliverable will develop the interoperability scenarios necessary for the GAP analysis.
- *Definition of Requirements*: This deliverable will document the results of the needs analysis component of the study.
- *Draft and final roadmap*: A consolidated report with the roadmap and its full substantiation.

This report encompasses phases one and two of the project and provides the first deliverable in the above list.

The following sections of this report are organized as follows:

- Scope and objectives
- Stakeholder list and interview process
- Interview Results
- Summary of stakeholder data

As noted at the outset, due to the short time available to undertake this study, there was limited time to survey and consult all public safety and public service agencies as to existing communications facilities, planned enhancements, and interoperability status. Instead, a combination of personal interviews and on-line surveys were conducted across subset of representative of public safety groups. This survey information, together with in-house data, was used to formulate the recommendations and conclusions, noting where necessary that additional information should be collected.

**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

2.0 SCOPE

The study has been divided into six phases as illustrated in the following work breakdown chart. This specific report deal with the first two phases of the project, namely: Initiation and Information Gathering

The understanding and consideration of the following factors and issues is critical to the success of the project outcome.

- *Operating Procedures:* Implementing consistent operating procedures between the included public safety organizations is a critical element of the interoperability plan. These operating procedures must support and allow interoperability in order to be effective. The early identification of the interoperability stakeholders and the development of interoperability scenarios is critical to the success of this project.

- *Technology:* Technologies and message protocols should be open standards based and system designs should consider integration with other public safety and public service agencies. Coordination with the decisions made by NCR agencies with respect to 2-way voice and wireless data communications is essential

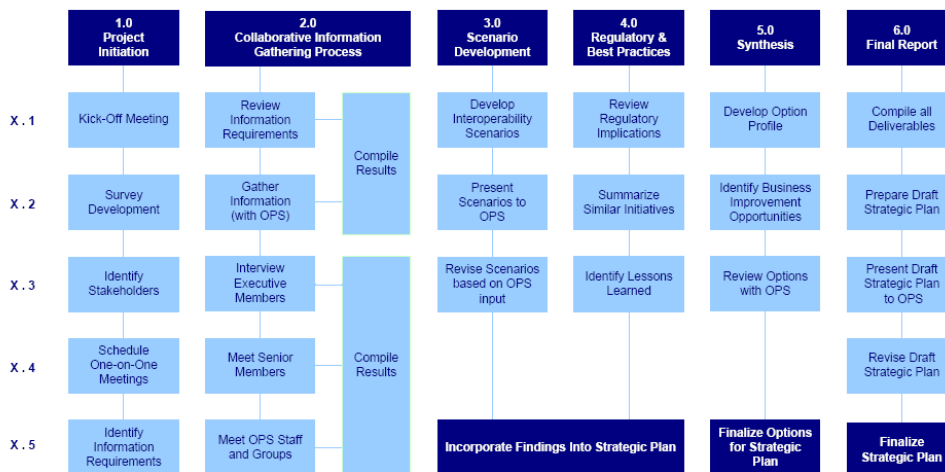
- *Spectrum:* The in-depth understanding of the availability of spectrum and future directions is important to the overall interoperability strategic plan.

- *Training and Exercises:* Familiarity and experience with the communications technologies and usage is critical to the effective development of a cohesive interoperability plan.

2.0 SCOPE

The study has been divided into six phases as illustrated in the following work breakdown chart. This specific report deal with the first two phases of the project, namely: Initiation and Information Gathering

Work Breakdown Structure



The objective of this phase of the study is to collect the necessary stakeholder information so that a comprehensive interoperability roadmap can be developed. Both of these activities form the initial phases of the development of a comprehensive strategic communications interoperability plan (SCIP) for the region. This information collected in this phase and the roadmap developed in the next phase roadmap should be folded into the SCIP as one component. The consultation and process involved in preparing the SCIP is an important part of gaining stakeholder commitment and participation. This commitment and participation is, of course, essential in order for the plans to be realized.

Consistent with best practices, this study takes an all hazards approach and therefore considers both public safety (first responders) and critical infrastructure agencies/organizations.

A high level overview of the SCIP process is included in Appendix I.

2.1 Study Activities

The main activities in this study are:

- *Kick-off meeting:* This meeting will initiate the study by confirming the scope, tasks, deliverables, and milestone dates. Available documentation will be identified and if available collected. The interview and meeting schedules should be discussed and as appropriate contacts identified and/or tentative dates set.
- *Gather and review information:* Documentation includes: (i) current and proposed Business Plans; (ii) current and proposed Operational Plans; (iii) existing internal and external stakeholders; (iv) interoperability scenarios; and (v) relevant information on existing information systems and plans.
- *Develop Stakeholder List:* Documentation is to include the initial list of public safety agencies that will be used for plan development.
- *Develop questions for interviews:* Agendas and questions will be prepared and submitted in advance of the interviews and meetings. These meeting will be focused on needs analysis including current and emerging requirements as well as existing operational issues and constraints.
- *Interview Executive members:* In-person or telephone interview of executive members.
- *Survey Stakeholders:* On-line survey to collect stakeholder requirements.

3.0 STAKEHOLDERS AND INTERVIEW PROCESS

The National Capital Region (NCR), which includes the City of Ottawa and Ville de Gatineau, provides some unique interoperability challenges as it

- spans two Provinces,
- includes the nation's parliament and Senate,
- includes 118 embassies,
- and is the scene of many state visits, national celebrations, and demonstrations.

All of the above factors contribute to the need and benefits of strong and cohesive interoperability plans as well as a varied stakeholder list.

3.1 NCR Stakeholder List

The following stakeholder list was developed for the purpose of this study:

- Ottawa Police Service
- Royal Canadian Mounted Police
- Ontario Provincial Police
- Surete du Quebec
- Service de police de Gatineau
- Canadian Forces
- Ottawa Fire Services
- Service d'incendie de la Ville de Gatineau
- Ottawa Paramedic Services
- Gatineau Ambulance Service
- City of Ottawa
- Ville de Gatineau
- Canadian Border Services Agency (Ottawa Airport)
- Ottawa Hazardous Materials Response Team
- Gatineau Hazardous Materials Response Team
- Canadian Environmental Assessment Agency

3.2 Stakeholder Interview Process

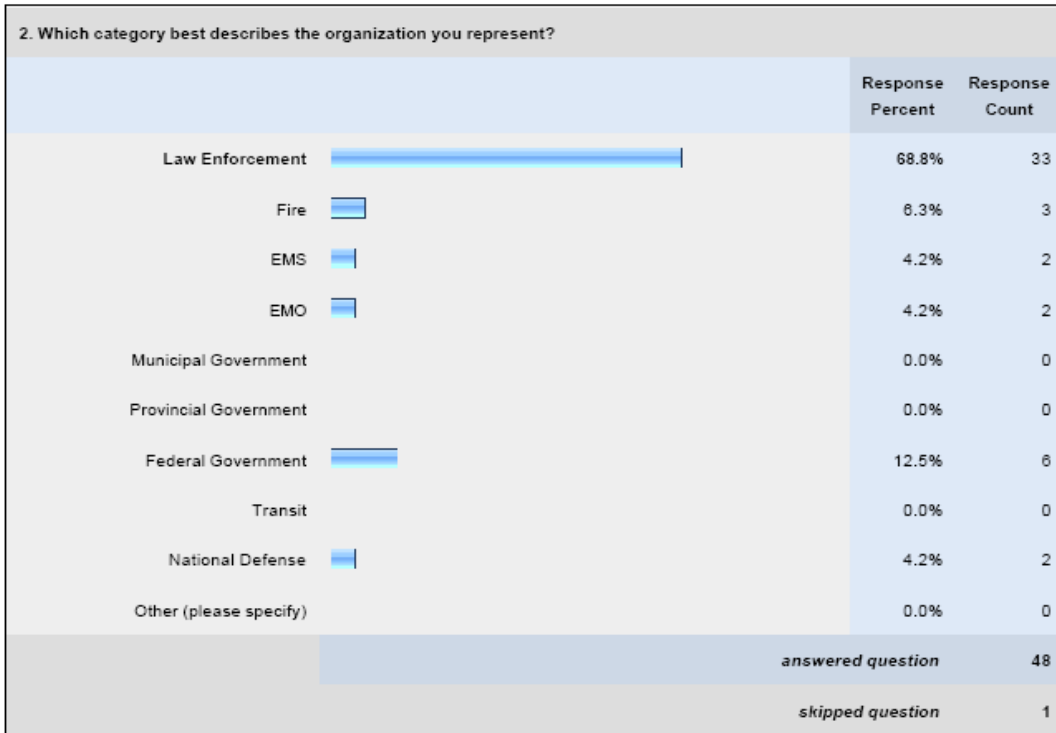
To collect the necessary information in the limited timeframe available a combination of on-line and telephone interviews were conducted.

Appendix II contains the participant's interview guide that was utilized for the 11 telephone interviews that were conducted.

The stakeholder information was collected using an online survey tool. The survey request was distributed to 80 potential respondents with 49 replies received.

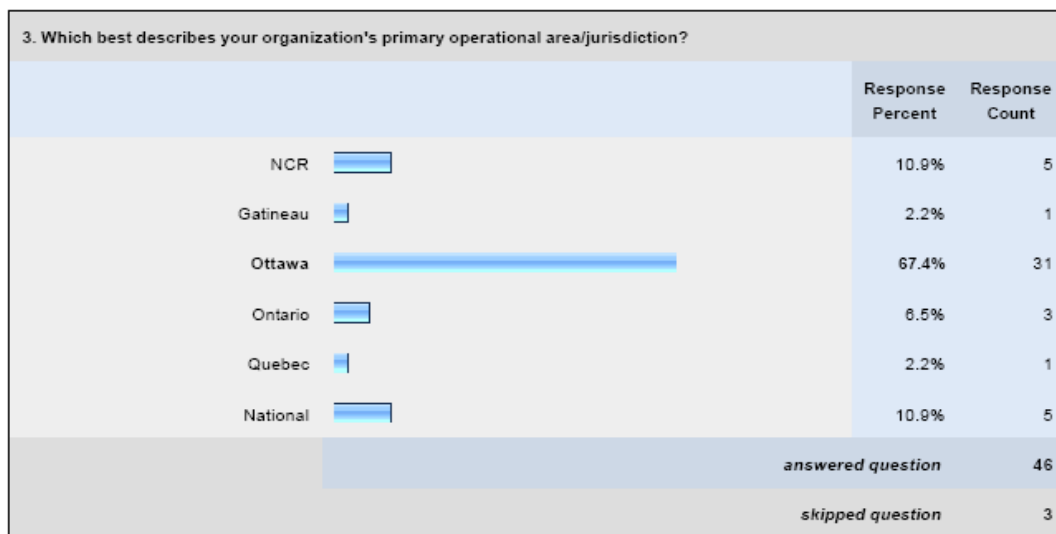
**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

The following figure shows the high-level breakdown of respondents for the on-line survey.



It should be noted that municipal government within the NCR was covered off using telephone interviews with both the City of Ottawa and Ville de Gatineau. Based on the known number of agencies within this region the survey methods provided good coverage of the defined stakeholders.

In terms of geographical distribution, the survey process obtained good coverage throughout the region as shown in the following figure.



4.0 STAKEHOLDER INTERVIEW RESULTS SUMMARY

This Section provides a summary of the Stakeholder interview results. It should be noted that the experiences, concerns and comments voiced by the survey participants (both telephone and interview) were extremely similar.

A full summary of the survey data is included in Appendix III.

4.1 Stakeholder Summary

The following summarizes the key comments raised by both the telephone interviewees and those responding to the on-line survey.

In general, communications interoperability across all levels of public safety personnel was seen as a critical requirement for both planned and unplanned events as well as routine operations. This is summarized by the survey results.

5. For each of the cases below, how important is communications interoperability with other agencies in the NCR?							
	Extremely	Moderately	Somewhat	Not Important	N/A	Rating Average	Response Count
Routine Operations	27.7% (13)	40.4% (19)	21.3% (10)	10.6% (5)	0.0% (0)	3.85	47
Planned Events	85.1% (40)	12.8% (6)	2.1% (1)	0.0% (0)	0.0% (0)	4.83	47
Disasters/Emergencies	97.9% (46)	2.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)	4.98	47
<i>answered question</i>							47
<i>skipped question</i>							2

A general theme in all of the surveys is that, while planned events requiring extensive interoperability have generally been a success in the past, the methods and process used to ensure interoperability have been somewhat ad hoc and have relied heavily on the knowledge and experience of operational personnel. This view is supported by the survey results regarding documentation, effectiveness, understanding and use of interoperability plans.





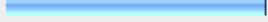
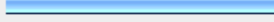

13. Please indicate your agreement with the statements below regarding the current status of communications interoperability in the NCR.						
	Strongly Agree	Agree	Disagree	Strongly Disagree	n/a	Response Count
Is well documented	2.4% (1)	33.3% (14)	38.1% (16)	16.7% (7)	9.5% (4)	42
Is highly effective	4.8% (2)	16.7% (7)	52.4% (22)	16.7% (7)	9.5% (4)	42
Is well understood	0.0% (0)	19.0% (8)	59.5% (25)	14.3% (6)	7.1% (3)	42
Is regularly used	2.5% (1)	37.5% (15)	40.0% (16)	10.0% (4)	10.0% (4)	40
<i>answered question</i>						42
<i>skipped question</i>						7

**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

A second major theme was the ability for public safety to communicate when operating outside of their normal regions. A large number of respondents indicated concerns with their communications ability, and in particular computer dispatch communications ability as shown in the survey results.

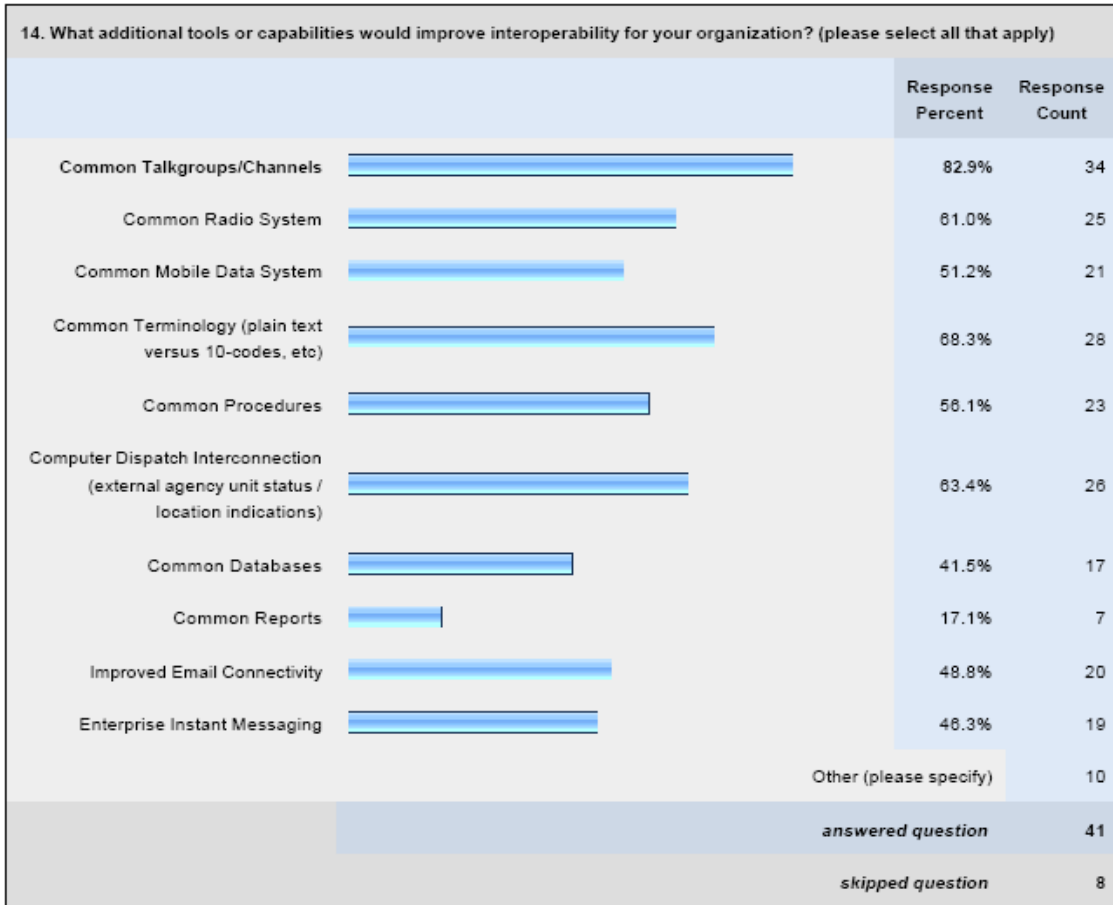
8. When operating outside of your normal jurisdictional area, please rank your communication issues/concerns for each of the following services?					
	No Issue - Our normal communications service extends into these external areas	No Issue - I have an alternate service for these external areas	Area of Concern - We do not have communications in these external areas	Don't require communications in these external areas	Response Count
Voice	32.4% (12)	18.9% (7)	45.9% (17)	5.4% (2)	37
Computer Dispatch	11.4% (4)	11.4% (4)	71.4% (25)	8.6% (3)	35
Email	56.8% (21)	16.2% (6)	18.9% (7)	10.8% (4)	37
Database access	14.3% (5)	17.1% (6)	57.1% (20)	11.4% (4)	35
<i>answered question</i>					37
<i>skipped question</i>					12

The method of communications to support interoperability was primarily indicated to be via cellular phones with two-way radio, pagers and email also utilized.

6. What communications methods do you currently use to interoperate with other agencies when you are within your normal jurisdictional area? (Please select all that apply)			
		Response Percent	Response Count
2-way radio		60.9%	28
Cell phones		95.7%	44
Mobile Data Terminal		6.5%	3
Telus Mike		13.0%	6
Blackberry email		50.0%	23
Pagers		52.2%	24
SMS/Instant Messaging		8.7%	4
No communications capability		0.0%	0
<i>Other (please specify)</i>			9
<i>answered question</i>			46
<i>skipped question</i>			3

**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
NCR INTEROPERABILITY**

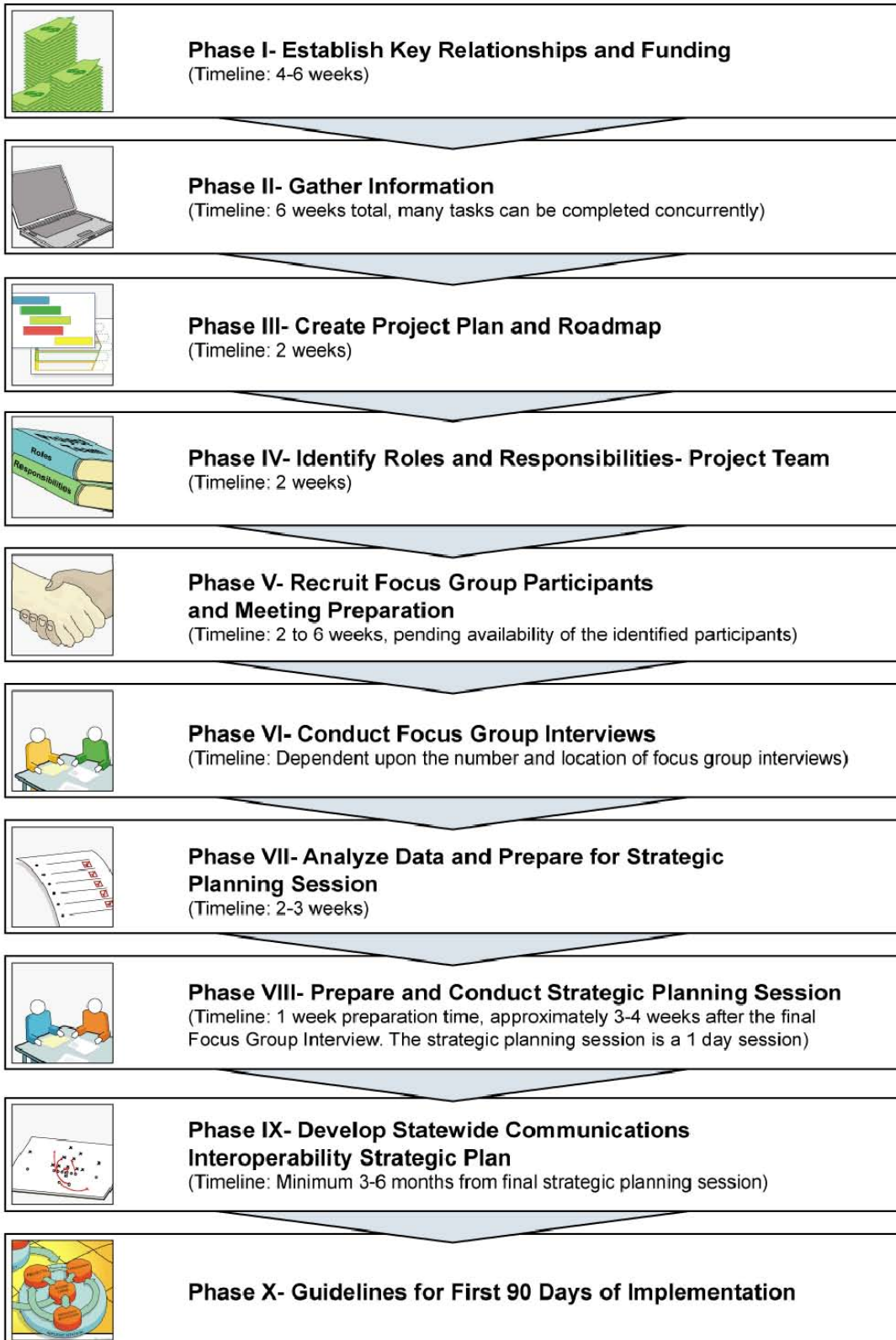
In terms of suggested areas for improvement to interoperability, the use of common channels, common terminology, common CAD systems and a common radio system topped the list as also indicated in the survey.



APPENDICES

APPENDIX I – SCIP METHODOLOGY

COMMUNICATIONS INTEROPERABILITY PLANNING PROCESS



APPENDIX II – PARTICIPANTS INTERVIEW GUIDE

NCR Interoperability Project participant Interview Guide

Project: National Capital Region Interoperability Project

Date:

Time:

Participant:

Background

The Ottawa Police Service Telecommunications Section, with consultants from Morrison Hershfield and Planetworks, will be conducting interviews during the week of March 10-14, 2008 for the National Capital Region (NCR) Interoperability Project.

The purpose of the interviews is to gather public safety interoperability requirements between the agencies serving the region. The interview sessions provide participants with an ability to voice their requirements and needs and are a critical step in the process of developing a viable and effective interoperability strategic plan.

Scope

The scope of the interoperability project encompasses both voice and data communications interoperability.

As background interoperability is defined as the ability of emergency responders to work seamlessly with each other's systems, products, and processes without any special effort. Wireless communications interoperability specifically refers to the ability of emergency response officials to share information via voice and data signals on demand, in real time, when needed, and as authorized. For example, when communications systems are interoperable, police and firefighters responding to a routine incident can talk to each other to coordinate efforts. Communications interoperability also makes it possible for emergency response agencies responding to catastrophic accidents or disasters to work effectively together. Finally, it allows emergency response personnel to maximize resources in planning for major predictable events such as the Canada Day celebrations or political summits, or for disaster relief and recovery efforts.

Interview Objectives

The purpose of the interviews is to gather your ideas and information regarding the:

- current capability for communications interoperability between law enforcement, fire, emergency medical services (EMS), government and other agencies across the NCR.
- strengths and 'things to be considered' related to the current interoperability services.
- areas where improvements to voice and/or data interoperability can be made.
- identify future needs, directions and opportunities.

Interview topics include technical, procedural, and training activities which may be applied to improve inter-agency interoperability. As noted above, the scope of discussion should include both voice and data communications.

Prior to the interview, participants should consider their responses to following questions:

1. Outside of my own organization, who is it important that that I, or my staff, are able to communicate with?

**CANADIAN INTEROPERABILITY TECHNOLOGY INTEREST GROUP
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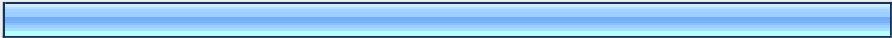
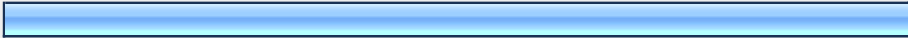
- a. For day-to-day activities
 - b. For planned events
 - c. For unplanned emergencies
2. Is the process of establishing interagency communications well understood?
 - a. How/when is it established
 - b. Are there well defined and commonly named channels/talkgroups or data addresses
 - c. Is there a common nomenclature or data structure
3. What interagency communications are currently working well for my organization or group?
 - a. Are these ad-hoc or documented and defined
 - b. What could be improved
4. What interagency communications are not working well?
 - a. What could be done to improve
5. Which external agencies have expressed a need/desire to improve communications with my organization?
 - a. How would this impact or improve my operations
6. Does your organization/group have all the tools necessary for inter-agency communications?
 - a. Which tools work well
 - b. Which tools would be beneficial to have. Why.
7. Is there ever a need for my organization/group to operate outside of its normal service boundaries?
 - a. How do you communicate when outside your normal boundaries
8. Is there ever a need for external agencies to operate outside their normal boundaries to support my organization?
 - a. How do they communicate when outside their normal boundaries







Interview Agenda – Review and Questions

- Discussion on strategic plan development process
- Review of questions and any associated issues
- Discussion of important interoperability attributes to support your job
- Questions and next steps



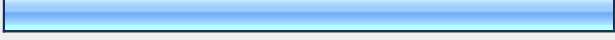


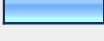
APPENDIX III – ON-LINE SURVEY RESPONSE SUMMARY

National Capital Region Interoperability Survey


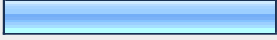
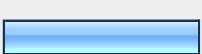
1. Please supply the following information about yourself.			
		Response Percent	Response Count
Name		97.9%	47
Position / Title		97.9%	47
Organization		100.0%	48
		answered question	48
		skipped question	1

2. Which category best describes the organization you represent?			
		Response Percent	Response Count
Law Enforcement		68.8%	33
Fire		6.3%	3
EMS		4.2%	2
EMO		4.2%	2
Municipal Government		0.0%	0
Provincial Government		0.0%	0
Federal Government		12.5%	6
Transit		0.0%	0
National Defense		4.2%	2
Other (please specify)		0.0%	0
		answered question	48
		skipped question	1

3. Which best describes your organization's primary operational area/jurisdiction?

		Response Percent	Response Count
NCR		10.9%	5
Gatineau		2.2%	1
Ottawa		67.4%	31
Ontario		6.5%	3
Quebec		2.2%	1
National		10.9%	5
		answered question	46
		skipped question	3

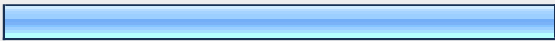


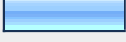
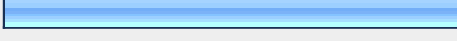
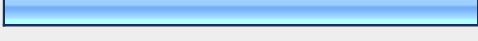

4. How often do you, or your front-line operational staff, require interoperable communications with other public safety or public service agencies in the NCR?


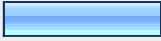
		Response Percent	Response Count
Frequently		48.9%	23
Occasionally		29.8%	14
Only during emergencies / planned events		21.3%	10
Not At All		0.0%	0
		answered question	47
		skipped question	2

5. For each of the cases below, how important is communications interoperability with other agencies in the NCR?

	Extremely	Moderately	Somewhat	Not Important	N/A	Rating Average	Response Count
Routine Operations	27.7% (13)	40.4% (19)	21.3% (10)	10.6% (5)	0.0% (0)	3.85	47
Planned Events	85.1% (40)	12.8% (6)	2.1% (1)	0.0% (0)	0.0% (0)	4.83	47
Disasters/Emergencies	97.9% (46)	2.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)	4.98	47
	<i>answered question</i>						47
	<i>skipped question</i>						2

6. What communications methods do you currently use to interoperate with other agencies when you are within your normal jurisdictional area? (Please select all that apply)

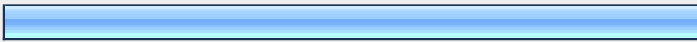
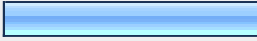
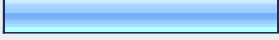

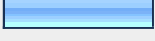


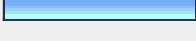

		Response Percent	Response Count
2-way radio		60.9%	28
Cell phones		95.7%	44
Mobile Data Terminal		6.5%	3
Telus Mike		13.0%	6
Blackberry email		50.0%	23
Pagers		52.2%	24
SMS/Instant Messaging		8.7%	4
No communications capability		0.0%	0
		Other (please specify)	9
	<i>answered question</i>		46
	<i>skipped question</i>		3

7. Is there a requirement for your organization to operate outside of its normal jurisdictional area to support other agencies or jurisdictions?				
			Response Percent	Response Count
Yes			83.0%	39
No			17.0%	8
			<i>answered question</i>	47
			<i>skipped question</i>	2

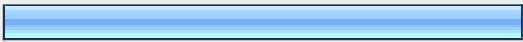
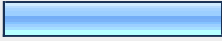
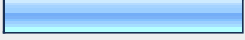
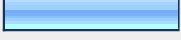
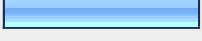
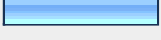
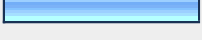
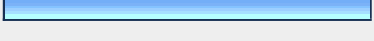
8. When operating outside of your normal jurisdictional area, please rank your communication issues/concerns for each of the following services?						
	No Issue - Our normal communications service extends into these external areas	No Issue - I have an alternate service for these external areas	Area of Concern - We do not have communications in these external areas	Don't require communications is these external areas	Response Count	
Voice	32.4% (12)	18.9% (7)	45.9% (17)	5.4% (2)	37	
Computer Dispatch	11.4% (4)	11.4% (4)	71.4% (25)	8.6% (3)	35	
Email	56.8% (21)	16.2% (6)	18.9% (7)	10.8% (4)	37	
Database access	14.3% (5)	17.1% (6)	57.1% (20)	11.4% (4)	35	
					<i>answered question</i>	37
					<i>skipped question</i>	12

9. Please describe any concerns that you may have with operating outside your normal operational boundaries.		Response Count
		21
		<i>answered question</i>
		21
		<i>skipped question</i>
		28

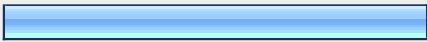
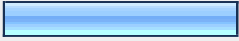
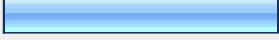
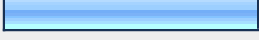
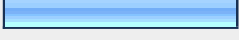
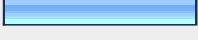
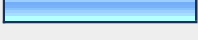
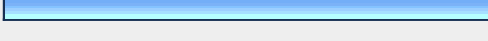
**10. For routine or day-to-day operations, which organizations is it important that you have interoperable communications with?
(Please choose all that apply)**

		Response Percent	Response Count
Law Enforcement		76.7%	33
Fire		27.9%	12
EMS		30.2%	13
EMO		9.3%	4
Municipal		16.3%	7
Transit		7.0%	3
Other		9.3%	4
All of the above		20.9%	9
None of the above		7.0%	3
		<i>answered question</i>	43
		<i>skipped question</i>	6

11. For planned events (Canada Day, summits, etc.), which organizations is it important that you have interoperable communications with? (Please choose all that apply)

		Response Percent	Response Count
Law Enforcement		57.1%	24
Fire		23.8%	10
EMS		26.2%	11
EMO		19.0%	8
Municipal		21.4%	9
Transit		16.7%	7
Other		21.4%	9
All of the above		40.5%	17
None of the above		0.0%	0
		<i>answered question</i>	42
		<i>skipped question</i>	7

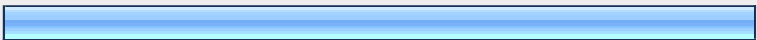


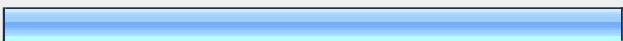
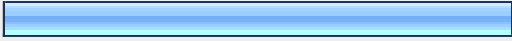
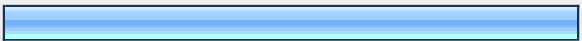
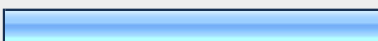
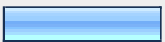


**12. For wide spread emergencies which organizations is it important that you have interoperable communications with?
(Please choose all that apply)**

		Response Percent	Response Count
Law Enforcement		46.5%	20
Fire		25.6%	11
EMS		30.2%	13
EMO		27.9%	12
Municipal		25.6%	11
Transit		20.9%	9
Other		20.9%	9
All of the above		53.5%	23
None of the above		0.0%	0
		answered question	43
		skipped question	6

13. Please indicate your agreement with the statements below regarding the current status of communications interoperability in the NCR.

	Stronly Agree	Agree	Disagree	Strongly Disagree	n/a	Response Count
Is well documented	2.4% (1)	33.3% (14)	38.1% (16)	16.7% (7)	9.5% (4)	42
Is highly effective	4.8% (2)	16.7% (7)	52.4% (22)	16.7% (7)	9.5% (4)	42
Is well understood	0.0% (0)	19.0% (8)	59.5% (25)	14.3% (6)	7.1% (3)	42
Is regularly used	2.5% (1)	37.5% (15)	40.0% (16)	10.0% (4)	10.0% (4)	40
						answered question
						42
						skipped question
						7

14. What additional tools or capabilities would improve interoperability for your organization? (please select all that apply)

		Response Percent	Response Count
Common Talkgroups/Channels		82.9%	34
Common Radio System		61.0%	25
Common Mobile Data System		51.2%	21
Common Terminology (plain text versus 10-codes, etc)		68.3%	28
Common Procedures		56.1%	23
Computer Dispatch Interconnection (external agency unit status / location indications)		63.4%	26
Common Databases		41.5%	17
Common Reports		17.1%	7
Improved Email Connectivity		48.8%	20
Enterprise Instant Messaging		46.3%	19
Other (please specify)			10
		<i>answered question</i>	41
		<i>skipped question</i>	8

15. What aspects of communications interoperability are currently working well for your organization?

		Response Count
		36
		<i>answered question</i>
		36
		<i>skipped question</i>
		13

16. What aspects of communications interoperability could be improved?		
		Response Count
		35
	<i>answered question</i>	35
	<i>skipped question</i>	14

17. What's the single most important item that you think should be addressed to improved communications interoperability within the NCR?		
		Response Count
		36
	<i>answered question</i>	36
	<i>skipped question</i>	13