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Request for Information

Annex A

Canadian Forces

CBRN Sensor Integration and Decision Support Requirements

August 2009

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1. INTRODUCTION

1.1 Aim

1.1.1 The ability of Commanders to react to CBRN incidents in an efficient and safe manner is dependent on their ability to collect accurate and verified CBRN information. The integration of reconnaissance data, point and standoff sensor data, intelligence information, and scientific technical analysis into a seamless interface with the Canadian Forces Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR) System(s) that can be accessed by all components, allies and other government departments will enhance operational effectiveness. The system will provide access to CBRN information across all CF and associated domains. CF commanders and staff without detailed CBRN experience will be provided with near-realtime analysed information on all areas free of CBRN contamination and details of all CBRN incidents, including details of hazard areas, protective measures required and resources available to meet a threat. CBRN specialists will be capable of retrieving, analysing, and updating sensor, equipment, situational, and related CBRN data. The system will utilize and integrate existing meteorological, geomatic, geospatial, intelligence, logistics, and unit positional data streams within the Canadian Forces Command and Control Information System(s). A robust CBRN Information Management (IM) capability will provide seamless connectivity from sensors through to end users, encompassing all CBRN related data allows for a complete integration of all such information in order to make up the recognized CBRN picture.

1.1.2 Therefore, the aim of the SI&DS project is to provide CF decision-makers with evaluated CBRN data, both in time and space, on potential and actual CBRN incidents and hazards.

1.2 Objectives

1.2.1 The SI&DS project is to provide at strategic, theatre command and tactical levels the ability to plan and conduct operations through the provision of near real-time CBRN defence information for effective decision-making. Furthermore, the SI&DS system will allow Commanders to make prompt, accurate decisions that will maximize force effectiveness by minimizing the force's time in protective posture. However, predictions made by even highly sophisticated systems are no substitute for confirmed measurements. The objectives of the project, in order of precedence, are to:

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1.2.1.1   Integrate and fuse CBRN sensor data into a local recognized CBRN picture taking into consideration meteorological, geomatic, geospatial sensor data and input to the C4ISR.

1.2.1.2   Activate and disseminate local CBRN hazard warning systems, alert adjacent units of potential hazards and predicted contamination spread (time and space).

1.2.1.3   Acquire, process, disseminate and display CBRN Situation Awareness (SA) information across all CF and associated domains for use in CIS.

1.2.1.4   Provide CBRN defence Decision Support (DS) in different phases of operations.

1.2.1.5   Maintain interface with CF Logistics systems to track, inventory, and source CBRN defence equipment and consequence management support equipment.

1.2.1.6   Provide a 'fail-soft[1]' capability to ensure tactical level data is collected, fused and analysed if operational and strategic links are severed, and provide automated update once connectivity is restored.

1.2.1.7   Provide initial training for personnel utilizing the capability delivered by the project.

1.2.1.8   Acquire Integrated Logistical Support (ILS) for the capability.

1.3   C4ISR Infrastructure

1.3.1   The CF is developing and operating a C4ISR infrastructure to collect and integrate sensor data across to the secure CIS where the data can be analysed, exchanged and correlated to support planning and operations domestically and internationally. Standoff, mobile and fixed site CBRN sensors will be integrated into the system, along with other sensors such as meteorological, oceanographic, and optical to create a real-time database of the absence or presence of CBRN incidents[2]. Analysts, advisors, technical specialists, scientists and command staff will have access to near-realtime information in order to plan for, respond to or avoid CBRN incidents.

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[1] Fail-soft: Used to describe systems that are designed to terminate any nonessential processing when there are hardware or software failures. Systems in fail soft mode are still able to provide partial operational capability. (http://www.webopedia.com/TERM/F/fail_soft.html)
[2] CBRN incident: Any occurrence, resulting from the use of CBRN weapons or devices; the emergence of secondary hazards arising from counter-force targeting; or the release of toxic industrial material into the environment, involving the emergence of CBRN hazards or effects. Note: term may be qualified by words such as ' suspected' or 'confirmed' as appropriate to the situation.

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1.3.2   As a system of systems, the C4ISR Infrastructure will facilitate and host CBRN SI&DS systems, provide the infrastructure for database search and manipulation, provide the conduit for reach back and the ability to retrieve current and historic raw sensor data. SI&DS will provide C4ISR with the tools to receive the sensor data, fuse and analyse the sensor data, manipulate the data into information, protocols for information exchange with allies, and CBRN decision support data.

1.4   Key Assumptions

1.4.1   The following assumptions have been made:

1.4.2   Given the existing CBRN threat, there will be a continuing CBRN information management requirement resulting from any potential defence review.

1.4.3   The CF will exploit new technologies and provide seamless integration of C4ISR backbone, protocols and systems to include all sensors, including CBRN.

1.4.4   CBRN information management is required for both domestic and expeditionary operations.

1.5   Project Background

1.5.1   CF participation in domestic response to a CBRN incident may require military personnel being required to operate in a toxic hazard environment and Canada's participation in international defensive alliances requires the CF to operate in areas of the world where the potential use of CBRN weapons or devices plays an important role in defensive strategies. Traditionally, CBRN defence staff had to evaluate CBRN data, both in time and space, on potential and actual CBRN incidents and hazards and provide commanders recommended course of actions to conduct the mission. This system employed CBRN specialists who worked in parallel to existing C2 systems and only interfaced with commanders at operational and strategic levels. A lack of experience and depth has reduced the number of CBRN specialists and marginalized CBRN warning and reporting to a fragmented concept.

1.5.2   The existing system utilizes stand-alone computer systems that require manual input of sensor data and output information in Message Text Format (MTF), which require CBRN specialists to interpret and explain the data. Domestic and expeditionary C4ISR systems either lack a CBRN Information Management (IM) component or have developed their own independent systems in the absence of a National standard. There remains the problem of passing unclassified CBRN sensor data from the unsecure environment to the C4ISR backbone. Lack of a standardized CBRN IM system across all users serving the entire theatre of operations increases the complexity of W&R

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activities. Hazard prediction does not have the required accuracy to free forces not effectively threatened by the hazard, thereby unnecessarily restricting freedom of action leading to loss of initiative.

1.5.3   There is a need to integrate the new technologies and the new generation of CBRN sensors to analyze and share data for comprehensive situational awareness and support to decision makers before, during and after a CBRN incident.

2. SYSTEM OPERATION

2.1 Missions

2.1.1   <u>Missions</u>. To varying degrees, CBRN defence is required in each of the six broad defence missions enunciated in the Canada First Defence Strategy (June 2008). It is assumed only two CBRN missions will occur concurrently, one that is long term (with personnel rotations), one that is short. The six broad missions are:

2.1.1.1 Conduct daily domestic and continental operations, including in the Arctic and through NORAD;

2.1.1.2 Support a major international event in Canada, such as the 2010 Olympics;

2.1.1.3 Respond to a major terrorist attack;

2.1.1.4 Support civilian authorities during a crisis in Canada such as a natural disaster;

2.1.1.5 Lead and/or conduct a major international operation for an extended period; and

2.1.1.6 Deploy forces in response to crises elsewhere in the world for shorter periods.

2.2 Environment

2.2.1   The SI&DS project will provide a system that will be hosted and operate on the CF C4ISR backbone. Climate and terrain conditions should have minimal impact on the software it will deliver. Connectivity between the sensors and the C4ISR interface will be subject to climate and terrain. The SI&DS system must be capable of autonomous operations in the 'fail soft' mode until connectivity with the C4ISR interface is re-established. The hardware on which the Sub-system is installed must and all sensor integration/interface hardware must provide performance levels stipulated in AECTP 200 – Environmental Conditions for extreme conditions of heat, cold, and humidity particularly leaflet 2311.

2.3 Concept of Operations

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2.3.1 <u>Defence Policy Statement 2005</u>. The CF is mandated to adapt their capabilities and force structure to quickly undertake the domestic operations, the defence of North America and international operations. The Government's "whole of government" approach to peace building will include other government departments and agencies like Foreign Affairs and the Canadian International Development Agency (CIDA). The CF plans to conduct **full spectrum operations** that could involve the encountering an actual or perceived threat of CBRN weapon use or toxic industrial hazard.

2.3.2 <u>Domestic Operations</u>. The CF regular component and reserves have a nation-wide presence and possess CBRN defence expertise. The CF intends to use this asset upon request from the Government of Canada civilian authorities when responding to domestic emergencies.

2.3.3 <u>Defence of North America</u>. In the context of the defence of North America, the GOC has decided to explore ways to work out new military-to-military arrangements with the United States for supporting of civilian authorities during crises and emergencies. Under the NORAD agreement, the CF is mandated to participate in a comprehensive CBRN warning and reporting network for incidents across all North America, to monitor and provide assistance to US NORTHCOM/CANADA COM and US Department of Homeland Security/Public Safety Canada. The CBRN SI&DS system must integrate and provide seamless information exchange across systems supporting these organizations.

2.3.4 <u>International Operations</u>. The CF will maintain their contributions to international institutions such as the United Nations (UN) and the North Atlantic Treaty Organization (NATO) and participate in less formal coalitions of like-minded states. The CF must be capable of combating threats to Canadian security as far beyond Canadian borders as possible, particularly in failed and failing states, where these threats often originate.

2.3.5 <u>Support to Operations</u>. To support CF operations and in line with the principles of CBRN defence[3], the following are applicable to CBRN SI&DS sub-system:

2.3.5.1 The CBRN threat can be diverse and wide ranging so the Joint Task Force (JTF) response needs to be flexible in application. As such, CBRN IM is to embrace all CBRN aspects of the threat, both resulting from CBRN attacks to accidental releases. A current, comprehensive and accurate intelligence assessment of the CBRN threat and hazards in a Joint Operations Area (JOA) provides the essential underpinning or foundation for all other measures. The C4ISR infrastructure will host CBRN IM, which includes Warning and Reporting (W&R), which is an integral part of this

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[3] The principles of CBRN defence are: Force Preparation, Risk Management, Flexibility, Integration and Co-ordination, and Sustainability. CF CBRN Defence Operations (B-GJ-005-311/FP-010)

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overall assessment and is performed by managing the CBRN information and predicting CBRN hazards, based on standardized incident and hazard areas[4] that are to be updated either regularly or continuously, enabling appropriate CBRN defence capabilities and measures to be selected.

2.3.5.2   A complete response to the wide range of potential CBRN risks is unrealistic and therefore, the JTF is to adopt risk management rather than risk elimination. In doing so, risks need to be anticipated, planned for, recognized and managed so that freedom of action can be maintained across the JOA. The C4ISR system will serve the purpose of providing Commanders with the appropriate CBRN information to support this risk management process.

2.3.5.3   The CBRN IM element of the JTF needs to be well prepared in terms of the appropriate doctrine, equipment, personnel, procedures, organization and training. CBRN IM needs to be established before deployment of the Force so that the necessary operational capability is readily available and integrated into the national C4ISR system. Such preparations will contribute to deterring potential adversaries from considering the use of CBRN weapons or devices.

2.3.5.4   That said, CBRN incidents may place additional burdens on the sustainability of the JTF. In order to mitigate the degradation of its capabilities, the priority of C4ISR is the dissemination of timely warnings to all elements of the Force, potentially affected by a CBRN threat or hazard, to preserve the fighting capability of the Force and to ensure the freedom of action of the JFC. The CBRN IM system must be robust enough to remain effective in a CBRN environment.

2.3.5.5   In addition, CBRN IM needs to be coherent across all components of the JTF and utilize the standardization and connectivity inherent in the C4ISR backbone, including the ability to readily receive information from higher HQs, remains flexible while maintaining close co-operation and co-ordination between units, as well as responds to a rapidly changing CBRN environment[5]. It needs to take account of different JTF Component (Maritime, Land and Air) capabilities. Standardized CBRN IM procedures must be adopted for automated use. Where possible, CBRN IM integration needs to embrace the Other Government Departments (OGD), Host Nation (HN) and other agencies in-theatre CBRN related information and vice versa.

2.3.5.6   In addition, the following specific principles should be taken into account:

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[4]   Predefined plotting-areas for CBRN incidents
[5]   Conditions found in an area resulting from immediate or persisting effects of CBRN releases.

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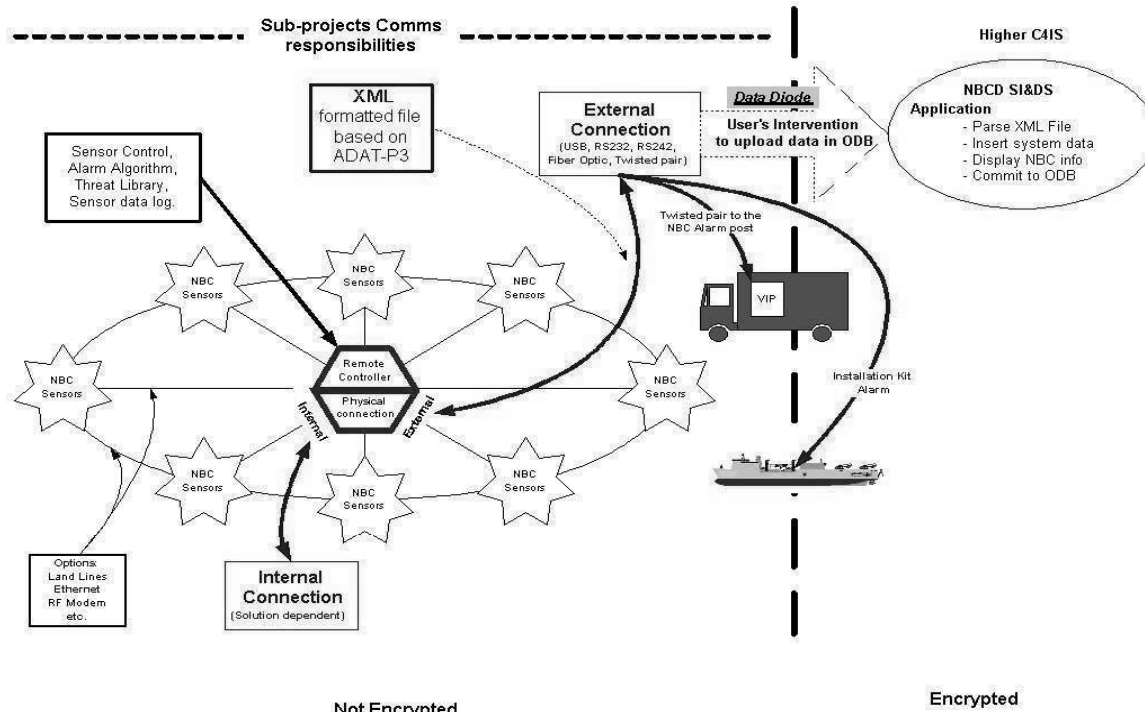
2.3.5.6.1 The ideals of accuracy and rapidity are not mutually exclusive. Commanders and designers of systems must ensure that systems and procedures balance these ideals in the most efficient manner.

2.3.5.6.2 The CBRN W&R process requires every simplified prediction to be refined, using a detailed and/or an enhanced prediction.

2.3.5.6.3 A CBRN W&R capability is to be provided to all operational and tactical levels of Command within the JTF.

2.3.5.6.4 A clear separation between prediction of CBRN hazard areas and detected hazard areas must be made.

2.3.5.6.5 Information from CBRN hazard prediction is to be part of the preparation of the JTF Intelligence Preparation of the Battlespace (IPB) and vice versa.

2.3.5.6.6 To be useable within the CBRN W&R process, meteorological, Order of Battle[6], topographical, geographical and land-use data is to be accurate, readily available, geographically relevant and compatible.

2.3.5.6.7 For interoperability purposes, data are to be exchanged in a standardized format, using common communication protocols[7]. Furthermore, the use of standardized CBRN symbols[8] is required for the unambiguous common understanding of their meaning.

2.3.6 <u>Project Concept</u>. To meet the needs of a wide user community, SI&DS provides connectivity through the C4ISR infrastructure. The capabilities are envisioned as follows:

2.3.6.1 <u>Sensor Integration</u>:

2.3.6.1.1 Fixed, mobile and standoff CBRN sensor send an alarm and raw sensor data to the sensor controller. The information is fused with other sensors (meteorological, GPS, etc) and converted to a CBRN message as an XML file. The operator manning the sensor controller authenticates the alarm and sends the XML data packet from the unsecure side to the secure side using the means provided by the C4ISR interface and point-of-presence (POP) gateway. Figure 1 provides a graphic depiction of the process model.

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[6] **Order of battle (ORBAT) -** The identification, strength, command structure, and disposition of the personnel, units, and equipment of any military force. (AAP-6)

[7] Joint Command, Control and Consultation Information Exchange Data Model (JC3IEDM) Extended CBRN domain

[8] Military symbols for Land-based systems (STANAG 2019 - Allied Procedural Publication (APP-6)

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2.3.6.1.2 Single sensor information or merged sensor data will provide input to the Coalition Shared Database (CSD) via the C4ISR backbone. Once the data is resident in a CSD, it can be analysed and accessed by all users across the C4ISR network. Information, analysed and raw data no longer needs to be re-entered into the system and further data or analysis can be correlated and accessed across the network.

2.3.6.1.3 Not all units will have the same facilities, but relevant CBRN information, when adequately defined, is to be passed to all units, regardless of the fact that the whole JTF may not have the same CIS facilities. A common operating picture will be maintained, with both manual and automated analysis of data taking place as it becomes available. Protocols will be put in place to permit users to have access to the material consummate with their knowledge and skill. Generic users will receive warnings and be provided with basic information, while CBRN specialists and technical advisors will be able to manipulate and enhance data.

2.3.6.1.4 If a unit uses entirely manual sensors (e.g. hand-held, non-system connected) and/or manual prediction methods, they are still to integrate into the CBRN SI&DS system organizational structure, but with less granular information available.

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Figure 1: Sensor Integration Process Model

2.3.6.2   <u>Situational Awareness and Decision Support</u>:

2.3.6.2.1   As the warning message passes through theC4ISR backbone, the CBRN IM sub-system at the tactical level helps generate the hazard template for warning endangered personnel. The CBRN staffs at the theatre level uses the CBRN IM sub-system to compile and analyze the messages and generate a more accurate hazard area. The hazard area is displayed on the Mission View. For those at the tactical level who do not have access to the Mission View, the hazard area is passed to the Component CIS in a suitable format for display. Commanders and staff at the higher level access the Mission View through the Command View. Figure 2 provides a graphic depiction of the SI&DS system model.

2.3.6.2.2   Depending upon the accessibility of the relevant databases, contextual data is extracted for CBRN defence planning and analysis.

2.3.6.2.3   Pending establishment of C4ISR infrastructure, separate instances of the SI&DS system operate at the strategic, theatre command level and Joint/Environmental CIS. Once an integrated communication system is established for the CF, the SI&DS system will be installed on the Command Net allowing operators at all levels to contribute directly to the CBRN picture and access the current situation.

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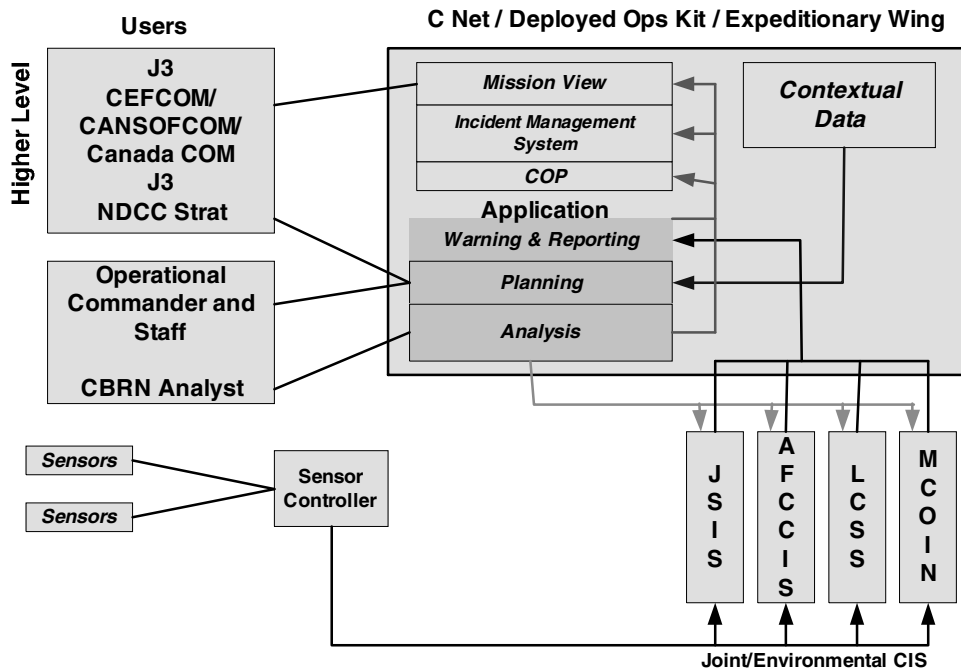
Figure 2: Situational Awareness and Decision Support System Model

2.4 Concept of Support

2.4.1 The support for the SI&DS system will be organized as follows:

2.4.1.1 The local tech support organization will be responsible for first-line support.

2.4.1.2 Assistant Deputy Minister (Information Management) ADM(IM) will ensure that the system remains compatible with the evolving host C4ISR CIS.

2.4.1.3 The Original Equipment Manufacturer (OEM) or vendor in conjunction with ADM(IM) will be responsible for second and third line support.

2.4.1.4 Sensor connectivity software for static CBRN and meteorological sensors, mobile and standoff systems employed across the entire CF, including maritime and air force sensors will be maintained by Land Software Engineering Centre (LSEC).

2.4.1.5 The host environment will manage all disaster recovery.

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2.5   Key Roles

2.5.1   The CBRN SI&DS system will provide the Commander with incident DS, local SA and a theatre-wide recognized CBRN picture, including CBRN information on hostile capabilities and possible threat locations and information on own forces' CBRN defence capabilities, required to execute a complete threat analysis and risk reduction analysis. In addition, supporting scientific information about CBRN substances need to be available to the commander before a CBRN incident. The CBRN SI&DS system will provide the ability to display all CBRN (pre-, during- and post-incident) information on a Joint operation.

2.5.2   The CBRN SI&DS system will be interoperable, providing a seamless passage of information between both the command elements [CBRN Warning and Reporting (W&R)] and the CBRN staffs (CBRN information) within the CF, NATO, and coalition C4ISR systems. It should also be interoperable with other government departments (OGD), CIMIC and other information sources.

2.5.3   The CBRN SI&DS system will provide Commanders and staffs at all levels a capability to assess the impact of CBRN incidents on their plans and decisions on the basis of timely, accurate and evaluated CBRN information. Collection, evaluation and exchange of information on CBRN incidents are significant contributors to effective CBRN defence.

2.5.4   The CBRN SI&DS system will ensure timely provision of the most accurate data on CBRN incidents and the resulting hazard areas. After a CBRN incident, reports from the areas and forces involved need to be received and collated by all Headquarters (HQs) involved. This information is needed to allow the CBRN W&R system to establish:

2.5.4.1   The time and place of the CBRN incident, including correlation with local meteorological weather, geomatic terrain data, and geospatial position (GPS) data of friendly units.

2.5.4.2   The type of CBRN delivery means and substance used, or the source of Toxic Industrial Material (TIM) release, and the likely hazard which will result.

2.5.5   In concert with consequence assessment and joint assessment of catastrophic events sub-systems, the CBRN SI&DS system, with an integrated hazard prediction capability, will then predict the probable area of destruction from blast or catastrophic event (earthquake, tornado, tsunami, etc), the likely CBRN hazard and the extent of any downwind spread of contamination. The results then will be passed to forces in possible downwind hazard areas, other CBRN Centres and the JTF staff so that an estimation of the effect of CBRN hazards may have on operations can be made.

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2.5.6   The system will be capable of allocating operator and administrator roles to users at the strategic, theatre command and tactical levels, customizing their privileges and access rights to their needs. These roles will be specific to a mission/exercise.

2.5.7   The SI&DS system will be used to fulfill the following roles:

2.5.7.1   The staffs of National Defence Headquarters (NDHQ) and operational commands will use the system to monitor ongoing operations and plan CBRN defence for new missions.

2.5.7.2   The staffs of Regional Joint Task Force (RJTF) headquarters across Canada, down to unit level, will use the system to monitor their respective task force area for possible CBRN incidents and effect a coordinated response if an incident were to occur, exchange sensor data with Regional Public Safety Canada organizations, and to train their staff in CBRN defence;

2.5.7.3   The staffs of the three Environmental Chiefs of Staff, e.g. HQ Maritime Forces Pacific (MARPAC), the Army Area Headquarters, and 1 Canadian Air Division, and their subordinate headquarters: Air Force Wings, Land Force Regional Commands, Base and Formation Headquarters will use the system to monitor their respective garrison units for possible CBRN incidents and effect a coordinated response if an incident were to occur, feed sensor data into the C4ISR network, and to train their staff in CBRN defence;

2.5.7.4   The staffs of Canadian Special Operations Forces Command (CANSOFCOM) and its subordinate units, in particular the Canadian Joint Incident Response Unit (CJIRU) - CBRN will make operational use of the system and provide input into the C4ISR network;

2.5.7.5   The staffs of CF Joint Task Force (JTF) headquarters in missions abroad down to unit level will use the system for CBRN defence in all phases of their operations.

2.5.7.6   CBRN defence training school will use the system to run courses. They will assess the observations recorded by the system during operations and exercises to update the CBRN defence training;

2.5.7.7   Defence Research and Development Canada (DRDC) establishments may develop and integrate improved functional modules for the system.

2.6   Key Tasks

2.6.1   The CBRN system will perform the following key tasks:

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2.6.1.1   Provide current and comprehensive SA to staff across the network by the fastest possible means;

2.6.1.2   Make hazard predictions and monitor through its integrated sensors CBRN hazards on ground;

2.6.1.3   Provide continuous monitoring of sensor status and provide situational awareness of coverage areas and alert staff to gaps in coverage.

2.6.1.4   Provide decision support to commanders and staffs and high level situational awareness to senior command, ministers, allies and civil agencies.

2.6.1.5   Enact command, control and co-ordination of detection, identification and monitoring, physical protection, hazard management and medical countermeasures and support.

2.6.1.6   Obtain and manage CBRN reach back such as scientists and laboratory support for SIBCRA.

2.6.1.7   Create and close-out missions and exercises and record observations on the conduct of CBRN defence activities and performance of the system; and

2.6.1.8   Provide self-training.

2.6.1.9   The CBRN SI&DS system information exchanges and processes are shown diagrammatically (with sensor data fusion aspects in italics) using populated data bases, multimedia or direct input of current information:

2.6.1.9.1   <u>Intelligence</u>. Information on the adversary's CBRN capability (e.g. weapons, production facilities, storage sites, delivery means, doctrine and intentions). This database is to be continuously updated as new information becomes available.

2.6.1.9.2   <u>Environment</u>. Obtain information from other disciplines e.g. medical, Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR), imagery, meteorological, unit locations, topographical data, as well as information on potential TIM.

2.6.1.9.3   <u>Force Readiness</u>. Friendly force information on equipment holdings and defensive capabilities and preparedness of the force to conduct operations in a CBRN environment.

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2.6.1.9.4   Logistics. Interface with logistics sub-systems to manage CBRN and consequence management equipment.

2.6.1.9.5   Reference Materials. Policy, doctrine (including SOPs) and battle procedure tools (e.g. CBRN Annex templates, orders for CBRN Reconnaissance, survey and monitoring, as well as sample taking).

2.6.1.9.6   Historical Data. Scientific data (CBRN properties and human performance), Toxic Industrial Hazards (TIH), medical intelligence, meteorology, topography, geography and lessons learned.

2.6.1.9.7   Sensor Input. Inputs from smart sensors, point detectors to space based surveillance systems will provide real-time accurate information that accounts for terrain and meteorological conditions to assist in hazard prediction that can be easily overlaid on the operational situation in order to enhance awareness by providing a multidimensional portrayal of the CBRN situation.

2.6.1.9.8   Hazard Prediction and CBRN Warning and Reporting (W&R). Rapid hazard prediction capability coupled with an automated CBRN W&R system, able to pass alarms, warnings and reports to subordinate and flank units or formations, as well as reports CBRN information to HQs.

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2.6.1.10 CBRN SI&DS process:
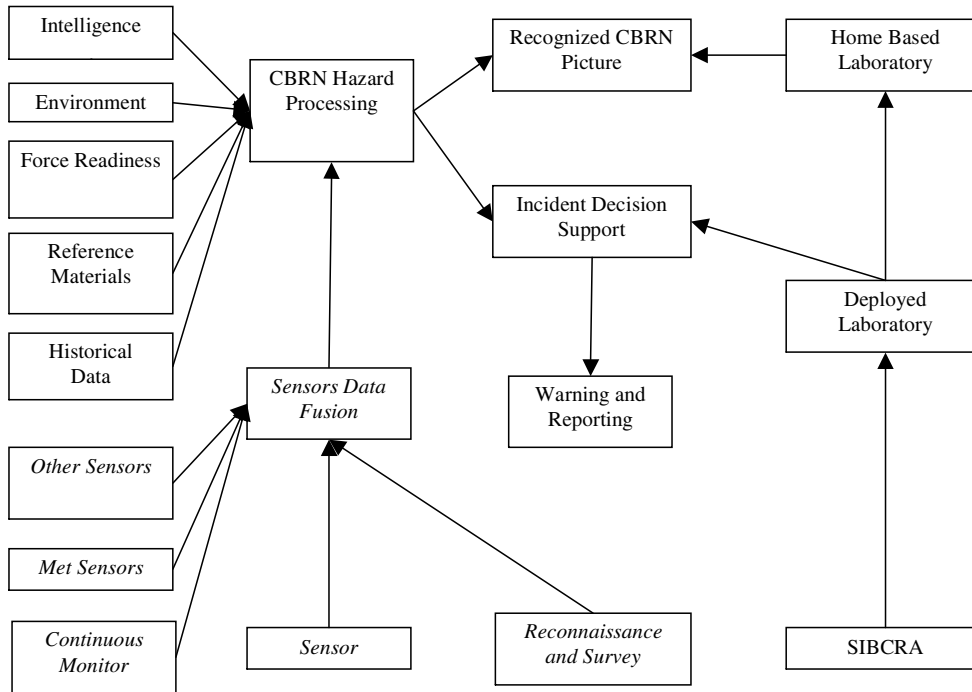
Figure 3 - CBRN SI&DS Process Model

2.7   User Characteristics

2.7.1   The users of the SI&DS system are likely to have the following characteristics:

2.7.1.1   Personnel at the sensor controller level would be duty NCMs at sub-unit command posts with training on the deployed sensor and the sensor integration function;

2.7.1.2   Operators at the unit/garrison command level are likely to be duty officers with no formal CBRN defence training;

2.7.1.3   Operators at the Operational command level are likely to be duty officers with no formal CBRN defence training;

2.7.1.4   Operators at the Strategic/theatre command level are likely to be duty officers with no formal CBRN defence training;

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2.7.1.5   Operators at the tactical level are likely to be officers or NCMs trained in unit level CBRN defence; and

2.7.1.6   Strategic/theatre level administrators are likely to be qualified in a CBRN defence course;

2.7.1.7   Personnel using the system could be wearing Individual Protective Equipment.

3.   DESIGN AND CONCEPT GUIDANCE

3.1   Capabilities of the SI&DS System

3.1.1   Be capable of being modular in design to allow:

3.1.1.1   Addition and removal of functionalities as a plug-and-play feature;

3.1.1.2   Tailoring of data to needs of each mission;

3.1.1.3   Connectivity with the full spectrum of current and future generation sensors; and

3.1.1.4   Customized access for each role.

3.1.2   Be capable of operating within the C4ISR Infrastructure;

3.1.3   Be capable of interfacing with other sub-systems within the C4ISR domain, to include logistics, geospatial, geomatics, intelligence, alert & warning, etc;

3.1.4   Be capable of outputting data to allied and GoC C2 systems;

3.1.5   Be capable of operating in a 'fail soft' mode in the event of connectivity or system disruptions and capable of updating system databases once connectivity is restored;

3.1.6   Be capable of allowing data mining and retrieval of current and archival data;

3.1.7   Be capable of allowing access to raw sensor data by technical specialists outside the tactical operations area to support reach back analysis;

3.1.8   Be capable of maintaining an activity log and data storage certified to standards set for legal evidence in a court of law;

3.1.9   Be capable of being operated in both English and French;

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3.1.10 Be capable of functioning in two separate and distinct modes: Mission and Exercise;

3.1.11 Be capable of providing the same functionalities in mission and exercise modes;

3.1.12 Be capable of providing a modifiable/upgradeable library facility for storing reference documents;

3.1.13 Be capable of employing CBRN warning technology which will collect, analyze, identify, locate, report and disseminate data about CBRN threats and TIM hazards.

3.1.14 Be capable of developing "what-if" situations for contingency and operational planning.

3.1.15 Be capable to provide access to and dissemination of information held within higher formations, pertaining to the local CBRN situation.

3.1.16 Be capable of providing a data repository for storing contextual data for missions and exercises;

3.1.17 Be capable to provide pre-determined exercise area and contextual data for self-training;

3.1.18 Be capable of providing archival database for closed missions and exercises; and

3.1.19 Be capable of operating on any CIS with no loss of functionality.

4.   SYSTEM EFFECTIVENESS REQUIREMENTS

4.1   General Requirements

4.1.1   Security. The system must:

4.1.1.1 Provide one-way connectivity between the sensors and the CIS, employing the security measures in place;

4.1.1.2 Provide secure two-way connectivity between the systems;

4.1.1.3 Operate at the unclassified level for training, exercises and operations;

4.1.1.4 Either run in Mission Mode or Exercise Mode but not in both concurrently on any workstation; and

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4.1.1.5   Restrict the self-training module to only unclassified information.

4.1.2   Help. The system must provide:

4.1.2.1   Contextual help; and

4.1.2.2   Interactive help.

4.1.3   Official Languages. The CBRN SI&DS system must comply with the Official Languages Act and the associated Federal and Departmental regulations.

4.2   Operability

4.2.1   Performance Capability. The SI&DS system capability will be useable in:

4.2.1.1   Domestic operations;

4.2.1.2   Expeditionary operations;

4.2.1.3   Garrison operations;

4.2.1.4   Inter-departmental operations;

4.2.1.5   Field exercises;

4.2.1.6   CFNBCS instruction;

4.2.1.7   Command Post Exercises (CPX); and

4.2.1.8   Self –Training.

4.2.2   Interface Design. The system:

4.2.2.1   Must exchange CBRN data in standardized format, IAW Joint Command, Control and Consultation Information Exchange Data Model (JC3IEDM) associated Data Exchange Mechanism (DEM) and Message Exchange Mechanism (MEM) to enable the interoperability at, as a minimum, Degree 3 (DEM and MEM) and functions at NATO Level 5 system interconnection;

4.2.2.2   Must be capable of exchanging information with CBRN defence systems used by allies in international operations, in conformance with ADatP-3 information exchange protocols;

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4.2.2.3   Must be capable of exchanging information with CBRN defence systems used by
           NORAD;

4.2.2.4   Should be capable of exchanging information with CBRN defence systems used by
           OGD in domestic operations, in conformance with established information exchange
           protocols;

4.2.2.5   Should be capable of exchanging CBRN incident data with Other Government
           Departments (OGD) including Environment Canada, Health Canada, DRDC
           laboratories, provincial and municipal Environmental Management Systems (EMS)
           and provide a module for the Emergency Response Guidebook On-line (ERGO)[9]
           software;

4.2.2.6   Must output data in formats compatible with all selected CF C4ISR infrastructure;

4.2.2.7   Must use ADatP-3 for rules, constructions and vocabulary for standardized character-
           oriented MTF;

4.2.2.8   Must conform to the current version of the ATP-45 and AEP-45; and

4.2.2.9   Will be interoperable with Joint Effects Model (JEM), Joint Warning and Reporting
           Network (JWARN), Hazard Prediction and Assessment Capability (HPAC)
           Consequences Assessment Tool Set (CATS), Joint Assessment of Catastrophic
           Events (JACE) and the Bruhn NEWTECH NBC Analysis software.

4.2.3   <u>User Interface</u>. The user interface:

4.2.3.1   Will have a common look and feel similar to that of Government of Canada (GoC)
           standard operating environment;

4.2.3.2   Must have a consistent look and feel throughout the system;

4.2.3.3   Must provide a clear indication of the current mode (mission /exercise) of the system;

4.2.3.4   Must use standardized military symbol with the capability to create new icons based
           on APP-6 for unambiguous common understanding;

4.2.3.5   Will make information about the icons and screen buttons easily accessible; and

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[9] The Emergency Response Guidebook is developed jointly by Transport Canada (TC), the U.S. Department of
Transportation (DOT), the Secretariat of Transport and Communications of Mexico (SCT) and with the
collaboration of CIQUIME (Centro de Informaciòn Quìmica para Emergencias) of Argentina.

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4.2.3.6   Interface will make allowances for the limitations imposed on the user wearing Individual Protective Equipment (IPE) in accordance with ATP-65.

4.2.4   <u>User Acceptance</u>. User acceptance testing:

4.2.4.1   Will be evaluated by C4ISR network management for compatibility and certification for use within C4ISR Infrastructure;

4.2.4.2   Will be conducted as a CPX exercise on the selected network;

4.2.4.3   Exercise will be created using the functionality provided by the system;

4.2.4.4   Exercise will test the following:

4.2.4.4.1   Assistance provided by the system in assessing the requirement for CBRN defence assets for the exercise;

4.2.4.4.2   Assistance provided by the system in theatre activation; and

4.2.4.4.3   System functionalities starting with the detection of sensor-generated CBRN message in sensor controller software through to incident management.

4.2.4.5   Participants will use the system for recording and collating their observations on the performance of the system and the correctness of the Tactics, Techniques and Procedures (TTP);

4.2.4.6   Some part of the exercise will be conducted with personnel in IPE; and

4.2.4.7   Must receive satisfactory rating of the user interface by at least 80% of the participants.

4.3   Survivability

4.3.1   The effectiveness of the system is dependent on:

4.3.1.1   The survivability of the host CIS;

4.3.1.2   Connectivity to data sources; and

4.3.1.3   Coverage provided by the host C4ISR backbone to the user base.

4.4   Maintainability

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4.4.1   The maintenance of the system must be in accordance with the Concept of Support.

4.5   Availability

4.5.1   The system must be capable of operating 24/7.

4.6   Reliability

4.6.1   The system will be capable of:

4.6.1.1   Running at the following levels of efficiency:

4.6.1.1.1   At full efficiency when connectivity to host CIS is available;

4.6.1.1.2   When connectivity to host CIS is lost the system will be capable of accessing contextual data available at the deployed location; and

4.6.1.1.3   In its minimum configuration, the system must be capable of functioning in a stand-alone configuration for a single user.

4.6.1.2   Restoring the required level of efficiency with minimum delay when connectivity is restored.

4.7   Environmental Sustainability

4.7.1   Environmental sustainability is not an issue for the software developed by or for this project.

4.8   Safety and Health

4.8.1   There is no safety or health related concern in the software delivered under this project. However, TTPs produced by the project may require personnel to operate in hazardous environment. Health and safety of personnel will be a primary consideration while developing the TTPs.

4.9   Delivery Requirements

4.9.1   The system:

4.9.1.1   Software will be delivered to 764 Communication Squadron for inclusion in the selected CIS baseline;

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4.9.1.2   Standalone version will be delivered to 764 Communication Squadron for installation on any unit capable of secret computing capability;

4.9.1.3   Documentation will be delivered to the designated ADM(IM) Life Cycle System Management (LCSM / Life Cycle Application Manager (LCAM); and

4.9.1.4   Documentation for sensor connectivity will be delivered to the LCAM at LSEC.

5.   SUB-SYSTEM EFFECTIVENESS REQUIREMENTS

5.1   Sensor Integration

5.1.1   The sensor integration software must:

5.1.1.1   Establish essential connectivity between CBRN sensors and the C4ISR infrastructure;

5.1.1.2   Establish essential connectivity between CBRN sensors and the following legacy CIS:

5.1.1.2.1   CF CSNI;

5.1.1.2.2   CANSOFCOM Joint Staff Information System (JSIS);

5.1.1.2.3   Army CIS;

5.1.1.2.4   Navy CIS;

5.1.1.2.5   Air Force CIS; and

5.1.1.2.6   NORAD CIS;

5.1.1.3   Record all sensor generated data and CBRN messages;

5.1.1.4   Validate all CBRN messages;

5.1.1.5   Submit sensor generated CBRN messages to the appropriate CIS automatically or at the command of the operator;

5.1.1.6   Activate local CBRN alarms;

5.1.1.7   Monitor and report sensor status;

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5.1.1.8   When set to submit at the command of the operator, submit sensor generated CBRN messages automatically to the appropriate CIS if the operator does not attend to the alarm within 20 seconds; and

5.1.1.9   Log all CBRN message transactions.

5.2   Situational Awareness

5.2.1   The system:

5.2.1.1   Must be able to process geomatic products including digitized maps, photographic overlays, and 3D modeling products in use within the CF;

5.2.1.2   Must be able to provide the capability to define the area for the mission or exercise;

5.2.1.3   Must be able to process meteorological data from stand-alone and networked subsystems and those available through CF and coalition Meteorological and Oceanographic Services;

5.2.1.4   Must be capable of generating the hazard area in the horizontal plane; and

5.2.1.5   Should be capable of generating the hazard area in the vertical plane.

5.2.2   Library

5.2.2.1   Retrievable reference documents to be stored in the library should include at least the following types:

5.2.2.1.1   Emergency Response Guidebook (ERG);

5.2.2.1.2   B-GJ-005-311/FP series of CBRN defence doctrine manuals;

5.2.2.1.3   Relevant STANAGs;

5.2.2.1.4   CF CBRN defence equipment user guides;

5.2.2.1.5   CF CBRN defence equipment maintenance guides;

5.2.2.1.6   Copy of CF CBRN defence training resources from the Distributed Learning Network;

5.2.2.1.7   Medical preventive and counter measures SOPs and guidelines; and

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5.2.2.1.8   Characteristics of CBRN hazards to include:

5.2.2.1.8.1   Persistence;

5.2.2.1.8.2   Concentration level harmful to humans;

5.2.2.1.8.3   Duration of exposure to concentration lower than harmful that could prove harmful;

5.2.2.1.8.4   Weight as compared to atmosphere;

5.2.2.1.8.5   Safe means of dissipating agent; and

5.2.2.1.8.6   Safe means of neutralizing agent.

5.2.3   **Data Repository**

5.2.3.1   The system:

5.2.3.1.1   Must be able to provide the following contextual data specific to the mission/exercise:

5.2.3.1.1.1   Allocated CBRN defence resources; and

5.2.3.1.1.2   Geomatic data of the selected operational/exercise area;

5.2.3.1.2   Should be able to provide the following contextual data specific to the mission/exercise:

5.2.3.1.2.1   Geospatial location and availability of CBRN assets;

5.2.3.1.2.2   Geospatial locations of friendly and known neutral and enemy

5.2.3.1.2.3   Geospatial locations of environmental and industrial sites that could present a hazard to

5.2.3.1.2.4   Geospatial location of hazardous material transportation routes (road, rail, maritime);

5.2.3.1.2.5   Diseases endemic amongst the local population and their immunity to biological pathogens that could prove dangerous to CF;

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5.2.3.1.2.6 CBRN threat posed by the potential adversary by type, agent and ability;

5.2.3.1.2.7 2D urban models and models of buildings in the selected mission/exercise area;

5.2.3.1.2.8 3D urban model and models of buildings in the selected mission/exercise area; and

5.2.3.1.2.9 Wind rose for specific locations;

5.2.3.1.3 Will be capable of retrieving following contextual data from relevant databases subject to accessibility:

5.2.3.1.3.1 Availability CBRN defence assets;

5.2.3.1.3.2 Probability of casualties and equipment/infrastructure contamination resulting from a CBRN incident; and

5.2.3.1.3.3 Actual casualties and equipment/infrastructure contamination resulting from a CBRN incident;

5.2.3.1.4 Will be capable of automatically updating retrieved contextual data from relevant databases that permit access to record of changes in a given time interval;

5.2.3.1.5 Will allow query on repositories, including archived repositories;

5.2.3.1.6 Will allow the user to easily select data in the repository for export;

5.2.3.1.7 Should be capable of pushing selected data to a target system;

5.2.3.1.8 Should allow a trusted system to pull predetermined data;

5.2.3.1.9 Will allow the user to export scalable images of the predicted hazard area; and

5.2.3.1.10 Will allow the user to export vector data of the predicted hazard area.

5.2.4 **Digitized Map Display**

5.2.4.1 The system:

5.2.4.1.1 Must be capable of displaying digitized maps of selected mission/ exercise area;

5.2.4.1.2 Will be capable of plotting the following on digitized maps:

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5.2.4.1.2.1 Location of deployed sensors;

5.2.4.1.2.2 Location of reconnaissance / survey elements;

5.2.4.1.2.3 Location of friendly, adversary and neutral units;

5.2.4.1.2.4 Location of CBRN and HAZMAT incidents;

5.2.4.1.2.5 Location of CBRN W&R centres and their respective areas of responsibility;

5.2.4.1.2.6 Areas where contamination is suspected;

5.2.4.1.2.7 Areas where contamination is confirmed;

5.2.4.1.2.8 Wind Rose;

5.2.4.1.2.9 Generated ATP-45 template;

5.2.4.1.2.10 Detailed hazard prediction generated by the modeling tool;

5.2.4.1.2.11 Enhanced hazard projections made by Environment Canada; and

5.2.4.1.2.12 Type and location of sources of CBRN hazards including TIM facilities and transportation routes;

5.2.4.1.3 Should be capable of displaying the following operational status of deployed sensors:

5.2.4.1.3.1 Active;

5.2.4.1.3.2 Inactive; and

5.2.4.1.3.3 Non-functional;

5.2.4.1.4 Should be capable of displaying the coverage area of deployed fixed, standoff, and mobile sensors;

5.2.4.1.5 Should be capable of shading the areas within the range and arcs of coverage of deployed standoff sensors that are hidden from their field of vision;

5.2.4.1.6 Should be capable of displaying the availability of CBRN reconnaissance/survey elements indicating:

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5.2.4.1.6.1 Assigned; and

5.2.4.1.6.2 Available;

5.2.4.1.7 Should be capable of tracking the location of CBRN defence mobile elements on digitized maps where CF track management function is available;

5.2.4.1.8 Should be capable of accepting unit positional data from Blue Force Tracker Application; and

5.2.4.1.9 Will be capable of hiding/displaying elements on the digitized map.

5.2.5 **Hazard Prediction**

5.2.5.1 The system:

5.2.5.1.1 Should be capable of collating CBRN data/messages to ascertain if they have a common origin;

5.2.5.1.2 Must be capable of linking the hazard model to the CBRN message on which it is based;

5.2.5.1.3 Will require the operator to record the rationale for the change if, within the modeling tool, the operator changes the parameters obtained from the CBRN message;

5.2.5.1.4 Should assist in determining:

5.2.5.1.4.1 The point of release of the contamination;

5.2.5.1.4.2 Type of release: instantaneous or continuous; and

5.2.5.1.4.3 Likely concentration of the hazard at the source;

5.2.5.1.5 Hazard dispersion model will be based on:

5.2.5.1.5.1 The assessed point of release;

5.2.5.1.5.2 Characteristics of the identified hazard;

5.2.5.1.5.3 Type of release - instantaneous or continuous;

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5.2.5.1.5.4 Terrain;

5.2.5.1.5.5 Vegetation;

5.2.5.1.5.6 High resolution met data for the altitude at which the release took place; and

5.2.5.1.5.7 Met forecast for the period of the prediction;

5.2.5.1.6 Will be capable of predicting time bound hazard area applying the weather prediction for the respective time slot;

5.2.5.1.7 Should be capable of applying changed met conditions to an existing hazard prediction model; and

5.2.5.1.8 Should be capable of restricting the hazard prediction to the area in which it is likely to be effective as a hazard.

5.3   Decision Support

5.3.1 **The system:**

5.3.1.1 Should facilitate reaching back for:

5.3.1.1.1 Intelligence advice;

5.3.1.1.2 Logistic advice;

5.3.1.1.3 Geomatic advice;

5.3.1.1.4 Medical advice;

5.3.1.1.5 Technical advice (CBRN, EOD, Security, Engineering, Force Protection, etc);

5.3.1.1.6 Transportation of dangerous goods (CANUTEC) advice;

5.3.1.1.7 Scientific advice; and

5.3.1.1.8 Enhanced hazard prediction from Environment Canada.

5.3.1.2 Must provide a modeling tool to conduct "What if "analysis.

5.3.1.3 Will assist in determining:

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5.3.1.3.1   Requirement of CBRN defence resources for the accomplishment of the mission/exercise;

5.3.1.3.2   Safe location, from the CBRN perspective, for bases/units in the deployment area;

5.3.1.3.3   Optimal placement of CBRN sensors;

5.3.1.3.4   Positioning of CBRN defence assets; and

5.3.1.3.5   CBRN defence training requirements for the mission.

5.3.1.4   Will provide means to open work/rest/water requirements software within the system;

5.3.1.5   Must perform radiac calculator function;

5.3.1.6   Will as consequence of CBRN incident provide:

5.3.1.6.1   Time-phased estimate of casualties; and

5.3.1.6.2   An estimate of equipment/ infrastructure contamination.

5.3.2   **Hazard Management**

5.3.2.1   The system will provide customizable task list templates for reconnaissance, survey, first responder and decontamination teams that:

5.3.2.1.1   Will have an action item against each task;

5.3.2.1.2   Will provide the operator the capability to mark each action item as 'Mandatory' or 'Optional';

5.3.2.1.3   Will be capable of recording the following status for each item on the task list:

5.3.2.1.3.1 To do;

5.3.2.1.3.2 Pending;

5.3.2.1.3.3 Skipped; and

5.3.2.1.3.4 Completed.

5.3.2.1.4   Will be capable of recording against each change of status the following:

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5.3.2.1.4.1 Location of the person / team working on the checklist; and

5.3.2.1.4.2 Date-time group of the status change.

5.3.2.1.5 Will be capable of recording the operator's comments against each item on the task list;

5.3.2.1.6 When completed, will be capable of being stored by incident number; and

5.3.2.1.7 Will be capable of providing relevant extracts of STANAGs for reference.

5.3.3 Decontamination

5.3.3.1 The system will be capable of estimating the decontamination resources and time required to provide decontamination for:

5.3.3.1.1 A specified level: immediate/ operational/ thorough/ clearance decontamination; and

5.3.3.1.2 Specified vehicles, equipment and personnel.

5.3.4 Reports

5.3.4.1 The system:

5.3.4.1.1 Should provide templates for the following reports:

5.3.4.1.1.1 CBRN defence annex to an operations order/plan;

5.3.4.1.1.2 Location, quantity and status of the CBRN defence assets assigned for the mission /exercise down to unit level;

5.3.4.1.1.3 Observations on the conduct of CBRN defence activities and performance of the system in CBRN defence during specific to an incident;

5.3.4.1.1.4 Observations on the conduct of CBRN defence activities and performance of the system in CBRN defence during specific to a mission / exercise;

5.3.4.1.1.5 Comparison between casualties estimated for a CBRN incident and casualties that actually occurred; and

5.3.4.1.1.6 Comparison between equipment/infrastructure contamination estimated for a CBRN incident and contamination that actually occurred.

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5.3.4.1.2 Will automatically populate reports from the data available in the database;

5.3.4.1.3 Must provide the capability to populate of reports manually;

5.3.4.1.4 Must be capable of storing reports; and

5.3.4.1.5 Should facilitate sending of reports as attachments to e-mail.

6. PERFORMANCE MEASURES

6.1 Performance:

6.1.1 The system will meet the following performance measures:

6.1.1.1 Data entry confirmation - 5 seconds.

6.1.1.2 Report generation for current mission - not more than 3 minutes.

6.1.1.3 Plume generation in stand-alone mode - 5 minutes.

6.1.1.4 Refresh rate of display after committing - not more than 5 seconds.

6.1.1.5 Produce ATP-45 hazard templates in not more than 10 seconds after the required parameters are entered.

7. PERSONNEL AND TRAINING REQUIREMENTS

7.1 Personnel – Staffing:

7.1.1 The personnel required to perform specific roles in the system must be trained to carry out their tasks.

7.2 Training:

7.2.1 Principles. Development and delivery of training will:

7.2.1.1 Use the Canadian Forces Individual Training and Education System (CFITES) methodology as described in the CF manuals of Individual Training and Education (IT & E); and

7.2.1.2 Base IT&E requirements on the following principles:

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7.2.1.2.1 <u>Performance Orientation</u>. Focus IT &E on essential skills, knowledge and awareness to meet operational requirements;

7.2.1.2.2 <u>Systems Approach</u>. Ensure that IT & E is planned, produced, delivered and maintained through an iterative and interactive series of steps;

7.2.1.2.3 <u>Optimum Efficiency.</u> Ensure that IT & E is developed and conducted in a manner that prevents or eliminates unnecessary training and uses the most affordable yet effective means.

7.2.2 <u>Control Processes</u>. Development and review of the complete training program will include the following aspects of the CFITES training methodology:

7.2.2.1 An analysis of tasks and performance requirements to produce operator qualification standards;

7.2.2.2 Training program design to produce appropriate training plans;

7.2.2.3 Development of instructional programs including the production of training materials; and

7.2.2.4 Implementation of the training program to include Initial Cadre Training (ICT). The ICT will be role based, designed to train users for effectively performing their roles in the user acceptance exercise. The training deficiencies evidenced in the exercise will be rectified in the training package for regenerative training.

7.2.3 <u>Implementation</u>. The Original Equipment Manufacturer (OEM) or third party contractor will:

7.2.3.1 Produce all aspects of an ICT program in accordance with the CFITES methodology to level two;

7.2.3.2 Deliver ICT at designated locations, as coordinated with DND; and

7.2.3.3 Provide the training package to DND for subsequent use as on-going regenerative training.

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PROJECT REFERENCES

Refs	Title
1	Canada's International Policy Statement - A Role of Pride and Influence in the World - Defence
2	Canada First Defence Strategy
3	Defence Policy Statement 2005
4	The Asymmetric Threat
5	Force Development and Capability Based Planning
6	Future Security Environment 2008-2030 Draft
7	AECTP 200 – Environmental Conditions
8	B-005-311-/FP-000, Canadian Forces Chemical, Biological, Radiological and Nuclear Defence Strategic Doctrine
9	B-005-311-/FP-010 Canadian Forces Chemical, Biological, Radiological and Nuclear Defence Operational Doctrine
10	B-005-311-/FP-020 Canadian Forces Chemical, Biological, Radiological and Nuclear Defence Tactics, Techniques And Procedures
11	B-GJ-005-311/FP-21 Canadian Forces - Chemical, Biological, Radiological and Nuclear Defence Tactics, Techniques and Procedures – Urban
12	B-GJ-005-311/FP-030 Canadian Forces - Chemical, Biological, Radiological and Nuclear Defence Aide-Mémoire
13	B-GJ-005-311/FP-040 Canadian Forces - Chemical, Biological, Radiological and Nuclear Defence Equipment
14	The Army of Tomorrow - Assessing Concepts and Capabilities for Land Operations Evolution "Towards Adaptive Dispersed Operations"
15	CBRN Battle Management Tools: Army Chemical Review US Army
16	DTRA CBRNE Decision Support
17	Canada Command Concept of Operations – Version 3
18	An Emergency Management Framework for Canada

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Refs	Title
19	AEP-45, Programmers' manual for reporting nuclear detonation, biological and chemical incidents and predicting and warning of associated hazard areas
20	ATP-45, Reporting Nuclear Detonations, Biological and Chemical Attacks, and Predicting and Warning of Associated Hazards and Hazard Areas (Operators' Manual
21	ADatP-3, NATO Message Text Formatting System (FORMETS) Concept of FORMETS (CON FORMETS)
22	AAP-6, NATO Glossary of Terms and Definitions
23	AAP-21, NATO Glossary of Chemical, Biological, Radiological and Nuclear Terms and Definitions English and French
24	APP-6, Joint Symbology
25	AAP-15, NATO Glossary of Abbreviations used in NATO Documents and Publications
26	NATO AmedP-8(A) Volume I – Medical Planning Guide for the Estimation of NBC Battle Casualties (Nuclear)
27	NATO AmedP-8(A) Volume II – Medical Planning Guide for the Estimation of NBC Battle Casualties (Biological)
28	NATO AmedP-8(A) Volume III – Medical Planning Guide for the Estimation of NBC Battle Casualties (Chemical)
29	Glasstone Samuel, and Philip J. Dolan. The Effects of Nuclear Weapons. US Department of Energy, 1977

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GLOSSARY

Term	Definition	Source
Alarm	An indication from any source that a chemical, biological, radiological or nuclear attack or release other than attack may have occurred.	AAP-21
CBRN Area of Observation	A geographical area consisting of several CBRN Zones of Observation, normally equal to a country. Note: Large countries may be divided into a number of CBRN Areas of Observation. Each CBRN Area of Observation has a CBRN ACC.	ATP-45
Communication and Information System (CIS)	Collective term for communication systems and information systems.	AAP-6
Communication system	An assembly of equipment, methods and procedures and, if necessary, personnel, organized to accomplish information transfer functions. Notes: 1. A communication system provides communication between its users and may embrace transmission systems, switching systems and user systems. 2. A communication system may also include storage or processing functions in support of information transfer.	AAP-6
Detailed Procedures	Detailed procedures are those procedures intended to be performed manually or by automated system using one or more messages. The procedures are only as complicated and time consuming as required for essential CBRN W&R capability. The output can be updated on receipt of new information.	ATP-45
Enhanced Procedures	Enhanced procedures are those procedures intended to be performed only by an automated system due to complexity and/or time requirements. These procedures are as complicated as necessary for desirable CBRN W&R capability. The output is immediately updated upon receipt of new data.	ATP-45

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Term	Definition	Source
False Negative	This is where the detector of the CBRN sensor fails to trigger an alarm when it should have.	
False Positive	This is when the detector of the CBRN sensor triggers a false alarm.	
Information system	An assembly of equipment, methods and procedures and, if necessary, personnel, organized to accomplish information processing functions.	AAP-6
Interoperability	The ability of alliance Forces and, when appropriate, Forces of partner or other nations to train exercise and operate effectively together to in the execution of assigned missions and tasks	AAP 6
Mission	The essential activities assigned to an individual, unit, or force. It contains the elements of who, what, when, where, and the why (reasons therefore), but seldom specifies how.	Defence Terminology Bank
Simplified Procedures	Simplified procedures are those procedures intended to be manually performed by the NBC staff immediately upon receipt of a message indicating a new CBRN event. These procedures will be as simple as possible and deal only with the initial message, without taking into consideration recalculation in accordance with upcoming weather periods.	ATP-45
Warning	A command approved statement that a chemical, biological, radiological or nuclear attack or release other than attack has occurred or is presumed to have occurred.	AAP-21
Warning and Reporting	The process by which reports of chemical, biological, radiological or nuclear attacks or release other than attack are forwarded through the chain of command and units are warned of the resulting hazards. The process is co-ordinated by a hierarchical structure of chemical, biological, radiological and nuclear centres.	AAP-21

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Appendix 3 to
Annex A

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AAFC	Agriculture and Agri-Food Canada
AFCCIS	Air Force Command and Control Information System
AEP	Allied Electronic Publication
AF	Air Force
AOR	Area of Responsibility
AoT	Army of Tomorrow
ARGOS	Accident Reporting and Guidance Operational System
ATP	Allied Tactical Publication
AWJ	Authority With Jurisdiction
BV	Battle View
C4ISR	Command Control Communications Computers Intelligence Surveillance and Reconnaissance
Canada COM	Canada Command
CANOSCOM	Canadian Operational Support Command
CANSOFCOM	Canadian Special Operations Force Command
CBRN	Chemical Biological Radiological and Nuclear
CBRN CC	Chemical Biological Radiological and Nuclear Collection Centre
CBRN SCC	Chemical Biological Radiological and Nuclear Sub-Collection Centre
CBRNE	Chemical Biological Radiological Nuclear and Explosives
CBRNERT	Chemical Biological Radiological Nuclear and Explosives Response Team
CBRN-RF	Chemical Biological Radiological Nuclear and Explosives Response Force
CDS	Chief of Defence Staff
CEFCOM	Canadian Expeditionary Forces Command
CF	Canadian Forces
CFD	Chief of Force Development
CFIA	Canadian Food Inspection Agency
CFJSG	Canadian Forces Joint Support Group
CFJSR	Canadian Forces Joint Signal Regiment
CFITES	Canadian Forces Individual Training and Educational System
CIDA	Canadian International Development Agency
CIS	Communications and Information Systems
CJIRU	Canadian Joint Incident Response
CNSC	Canadian Nuclear Safety Commission
COLPRO	Collective Protection

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CONOPS	Concept of Operations
COP	Combined Operational Picture
CPX	Command Post Exercise
CSIS	Canadian Security and Intelligence Service
CT	Conversion Training
CV	Command View
DIM	Detection Identification and Monitoring
DOB	Deployed Operating Base
DRDC	Defence Research and Development Canada
DS	Decision Support
EC	Environment Canada
EMS	Environmental Management System
ERG	Emergency Response Guide
FNEP	Federal Nuclear Emergency Plan
FOB	Forward Operating Base
FOC	Full Operational Capability
FOL	Forward Operating Locations
FPS	Force Planning Scenario
GCCS	Global Command Control System
GoC	Government Operations Centre
GOC	Government of Canada
GS	General Support
HAZMAT	Hazardous Material
HC	Health Canada
HN	Host Nation
HSS	Health Services Support
IAW	In Accordance With
IC	Incident Commander
ICT	Initial Cadre Training
ILS	Integrated Logistics Support
IMS	Incident Management System
IOC	Initial Operational Capability
IPE	Individual Protective Equipment
IRU	Immediate Reaction Unit
IT&E	Individual Training and Education
JC3IEDM	Joint Command, Control and Consultation Information Exchange Data Model
JCC	Joint Control Centre
JEM	Joint Effects Model
JSIS	Joint Staff Information System
JTF	Joint Task Force
LCAM	Life Cycle Applications Manager

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LSEC	Land Software Engineering Centre
LCMM	Life Cycle Material Managers
LCSS	Land Command Support System
LF	Land Force
LO	Liaison Officer
MARPAC	Maritime Forces Pacific
MCOIN	Maritime Command Operational Information System
M&S	Modelling and Simulation
MOB	Main Operating Base
MTF	Message Text Format
MV	Mission View
NATO	North Atlantic Treaty Organization
NC2IS	National Command Control and Information System
NCM	Non-Commissioned Member
NDHQ	National Defence Headquarters
NR Can	Natural Resources Canada
ODB	Operational Database
OEM	Original Equipment Manufacturer
OGD	Other Government Departments
OPCOM	Operational Command
OPCON	Operational Control
OPORD	Operations Order
PHAC	Public Health Agency of Canada
POE	Port of Entry
PS	Public Safety Canada
RCMP	Royal Canadian Mounted Police
RJTF	Regional Joint Task Force
SA	Situational Awareness
SI&DS	Sensor Integration and Decision Support
SJS	Strategic Joint Staff
SOP	Standard Operating Procedure
SOREM	Senior Officials Responsible for Emergency Management
TC	Transport Canada
TIM	Toxic Industrial Material
TTP	Tactics Techniques and Procedures
UCS	Unified Command Suite
W&R	Warning and Reporting