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**SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

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Signature	Date

The amendment 009 is raised to answer questions from potential bidders and update the RFP if necessary.

1- Questions from Potential Bidders and Answers from Canada:

Q55

Reference: Annex D, ITB Terms and Conditions

Detailed transactions may have activities that apply to more than one Value Proposition (VP) category (i.e., Direct Transactions that involve the Small and Medium Business category or Research and Development that involve a Canadian company and/or SMB as well as a post-secondary institution). Although for each transaction type defined in the terms and conditions the credit assignment is clear, it is unclear in the terms and conditions as to how crediting of achievements within these multi-category transactions will be assessed. Will the Crown clarify how credits will be attributed for multi-category transactions?

A55

A transaction may meet more than one VP criteria pillar, however the obligor does not automatically receive full points for each pillar. VP credits are awarded based on how much of the transaction value is attributable to each VP pillar. Decisions in this area are informed by the descriptions provided in the transaction sheet regarding the nature of the activity, the role of the participants and any alignment with VP pillars.

For example, if a transaction is determined to simply involve Direct Work being performed by a Canadian SMB supplier on the project, then 100 percent of the Canadian Content Value (CCV) may be applied in credits toward the obligor's commitments in the Direct Work VP pillar and SMB VP pillar. Using a different example, if a transaction involves a cash investment for R&D of which 50 percent goes to a Canadian post-secondary institution and 50 percent goes to a Canadian SMB, then 100 percent of the CCV of that transaction would apply towards the obligor's achievement against its R&D Commitment, and 50 percent of the CCV would go towards the obligor's SMB Commitment. This example scenario does not factor in multiplied credits. Multipliers may apply to the credits in accordance with the terms included in the RFP documents.

Q56

Reference: Appendix 6 to Annex A Labour Categories, 2.6 Software Systems Requirements Analyst

Can Canada to broaden the allowable disciplines for the university education for the Software Systems Requirements Analyst. Specifically will Canada allow a University undergraduate degree in mechanical engineering accompanied by relevant experience?

A56

See amended Appendix 6 to Annex A.

Q57

Reference: Appendix 6 to Annex A Labour Categories, 2.10 Technical Writer

“The TW must have:

University undergraduate degree in software engineering, systems engineering, electrical engineering, computer engineering, information systems or computer science;

College diploma in an information technology (IT) related program; or

On-job training (OJT) through work experience in technical writing and hold a recognized professional or college certification in technical writing.”

Can you recognize someone with experience in technical writing and having a degree in the French language and professional writing (B.A.)?

A57

See answer to question 23.

Q58

Section 4.1.2 of the SOW (Annex A) for the LEISC, LTSSC and CSES RFPs all state the same text:

“4.1.2 Systems Engineering Schedule

The Contractor must prepare, submit and maintain the System Engineering Schedule in contractor format.

The purpose of the Engineering Schedule is to describe and synchronize the Security Engineering program of work.”

Whereas section 4.1.2 of the ISTAR RFP SOW (Annex A) states:

“4.1.2 Systems Engineering Schedule

The Contractor must prepare, submit and maintain the System Engineering Schedule in contractor format.

The purpose of the Engineering Schedule is to describe and synchronize the Engineering program of work.”

Please confirm that the text for section 4.1.2 for the LEISC and LTSSC SOWs should read as per the ISTAR SOW.

A58

See amended Annex A.

Solicitation No. - N° de l'invitation
W8486-184111/C
Client Ref. No. - N° de réf. du client

Amd. No. - N° de la modif.
009
File No. - N° du dossier

Buyer ID - Id de l'acheteur
038qd
CCC No./N° CCC - FMS No./N° VME

Q59

Reference: Appendix 6 to Annex A Labour Categories, 2.11 Training Developer

Can Canada broaden the allowable disciplines for the university/college education for the Training Developer, specifically a Bachelor of Arts University Degree?

A59

See amended Appendix 6 to Annex A.

All other terms and conditions remain unchanged.

ANNEX A

TO CONTRACT

W8486-184111

LAND C4ISR

TRANSITION SOFTWARE SUPPORT CONTRACT

STATEMENT OF WORK

29 January 2018

Version 4.1

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Appendix 6	Labour Categories

1 INTRODUCTION

1.1 Aim

This Statement of Work (SOW) defines the work to be undertaken under a Support Contract (SC) to provide Software Support services for the in-service support of the Land Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance System (Land C4ISR System).

1.2 Scope

This SOW specifies the required activities to provide Software Support for the Land C4ISR System. The scope is based on items identified in SOW appendix 3. As the Software elements of C4ISR are part of a continuously evolving system, it is expected the items in appendix 3 will change throughout the contract.

The principal elements of Software Support required are:

- a. Software systems engineering management;
- b. Software systems requirements and architecture;
- c. Software component design and construction;
- d. Software systems integration and verification;
- e. Software baseline and patch management;
- f. Life cycle application management, including software obsolescence management;
- g. Software problem resolution, including root cause analysis as well as corrective, adaptive and perfective maintenance;
- h. Tactical Systems Integration Laboratory (TSIL) support services;
- i. TSIL Integrated Product Team (IPT) activities; and
- j. Support to Software Baseline Integration and Testing (SWBIT) and System-of-Systems (SoS) integration and testing.

Further Software Support can include tasks to deliver:

- a. Information technology service management (ITSM) support to episodic mission networks;
- b. Technical investigation and engineering studies;
- c. Field support and mentoring during training and operations; and

d. Fielding support.

Appendix 3 identifies the Land C4ISR System hardware and software system elements as requiring either a SoS or a Full level of support. It is anticipated that this list of Land C4ISR System elements will change over time as the system evolves. Also, the level of support may change over time. Canada reserves the right to amend the level of support and list of supported systems and system elements from time to time as deemed necessary by the Technical Authority (TA) or Technical Office of Primary Interest (Tech OPI).

The SoS level of support means that the Contractor must have an understanding of the system element in terms of its functionality at the SoS level, including understanding its use in the Land C4ISR System and all of its technical interfaces, so as to be capable of performing SoS engineering, integration, testing and maintenance for the system element.

The Full level of support means that the Contractor must have in-depth knowledge of the system element over and above that required for the SoS level of support. For any system element subject to the Full level of support, the Contractor may be tasked to perform corrective, perfective, adaptive and emergency maintenance or provide additional in-service support (ISS) activities beyond that provided for in Core Work. In the case of software, the Contractor will be provided with source code and detailed design documentation as appropriate. In all cases, DND will provide the appropriate licenses or right to use technical data or source code.

1.3 Background and Land C4ISR High Level Description

The Government of Canada (GoC) has given the Canadian Armed Forces (CAF) clear direction concerning its vision for defence, in which Canada is:

- a. **Strong at home**, its sovereignty well-defended by a Canadian Armed Forces also ready to assist in times of natural disaster, other emergencies, and search and rescue;
- b. **Secure in North America**, active in a renewed defence partnership in NORAD and with the United States; and
- c. **Engaged in the world**, with the Canadian Armed Forces doing its part in Canada's contributions to a more stable, peaceful world, including through peace support operations and peacekeeping.

In order to meet these objectives, Canada needs an agile, multi-purpose, combat-ready military, operated by highly trained, well-equipped women and men. At any given time, the Government of Canada can call upon the Canadian Armed Forces to undertake missions for the protection of Canada and Canadians and the maintenance of international peace and stability. The Canadian Armed Forces must be prepared to:

- a. Detect, deter and defend against threats to or attacks on Canada;
- b. Detect, deter and defend against threats to or attacks on North America in partnership with the United States, including through NORAD;
- c. Lead and/or contribute forces to NATO and coalition efforts to deter and defeat adversaries, including terrorists, to support global stability;

- d. Lead and/or contribute to international peace operations and stabilization missions with the United Nations, NATO and other multilateral partners;
- e. Engage in capacity building to support the security of other nations and their ability to contribute to security abroad;
- f. Provide assistance to civil authorities and law enforcement, including counter-terrorism, in support of national security and the security of Canadians abroad;
- g. Provide assistance to civil authorities and nongovernmental partners in responding to international and domestic disasters or major emergencies; and
- h. Conduct search and rescue operations.

Further, the Canadian Armed Forces will be prepared to *simultaneously*:

- a. Defend Canada, including responding concurrently to multiple domestic emergencies in support of civilian authorities;
- b. Meet its NORAD obligations;
- c. Meet commitments to NATO Allies under Article 5 of the North Atlantic Treaty;
- d. Contribute to international peace and stability through:
 - 1) Two sustained deployments of ~500-1500 personnel, including one as a lead nation;
 - 2) One time-limited deployment of ~500-1500 personnel (6-9 months duration);
 - 3) Two sustained deployments of ~100-500 personnel;
 - 4) Two time-limited deployments (6-9 months) of ~100-500 personnel;
 - 5) One Disaster Assistance Response Team (DART) deployment, with scalable additional support; and
 - 6) One Non-Combatant Evacuation Operation, with scalable additional support.

To carry out these missions, the CAF requires a fully integrated tactical network, capable of providing, flexible, multi-role and combat-capable communications and information processing services to the military. It also requires connectivity to other federal government departments, to the governments of other countries, to international organizations, to non-governmental organizations, to private volunteer organizations, and to private business ventures.

The Land C4ISR System is the SoS that supports the command and control (C2) of CAF land operations by providing commanders at all levels with the information services required to make and communicate effective and timely decisions. As such, it enables the CAF to:

- a. Plan and direct operations;
- b. Manage operational information;
- c. Achieve and maintain situational awareness; and
- d. Exchange information with allies and mission partners.

The Land C4ISR System is an interconnected network of digital communication and information systems (CIS) by which the data needed to plan, direct and control tactical land operations is communicated, stored, processed and displayed. Figure 2 shows a high-level diagram of the Land C4ISR System, depicting the installations, vehicles, and dismounted soldiers and the

subnetworks that interconnect them. It should be noted that the Land C4ISR System comprises equipment and systems to provide the services, but does not include the platforms themselves – these are the responsibility of specific platform DND Equipment/Weapon System Management Teams. The Directorate, Land Command System Program Management (DLCSPM), as the Departmental authority for the Land C4ISR System, has Total System Responsibility (TSR) and is responsible for the full life cycle of the Land C4ISR System from Architectural Development through Systems Engineering and Integration, Fielding, In-Service Support and, finally, Disposal.

In order to support its TSR responsibilities DLCSPM will manage support of the Land C4ISR System within an integrated environment led by an Integrated Product Team (IPT). The IPT will be a working level body, DLCSPM led and jointly managed with the Land C4ISR Engineering and Integration (E&I) Support Contractor. Stakeholders will include the operational community, the joint community and all major equipment/component providers to the Land C4ISR system. The IPT will operate in a cooperative and collaborative manner, with members working in good faith under the framework of a relational contract and under the guidance of the IPT lead to ensure the needs of the Land C4ISR are met.

The IPT will be the champion of the Agile development teams and will establish the Capability Intent for the outcomes of each capability development component Sprint Grouping. Canada will maintain TSR while the E&I Support Contractor must provide the core of the IPT as defined in the terms of reference to be provided by DLCSPM. That is, the IPT will operate in a collaborative manner forming the bridge between government and army stakeholders and industry partners. Ultimate responsibility for the relationships up and out to government and Army stakeholders will be held by DLCSPM. The E&I Support Contractor will be responsible for technical support of the overall Land C4ISR SoS by documenting the system architecture, supporting operational analysis, performing system engineering design and performing integration and supporting system level configuration management.

DLCSPM will be responsible for ensuring that the right system is being built while the support contractors must be responsible for ensuring the system is being “built right”. The proposed System Engineering process is depicted at Figure 6.

The proposed separation of System Integration and test responsibility at the IPT level and at the OEM level is depicted at Figure 5.

Doctrinally the Land C4ISR System is divided into the following constituent systems:

- a. **Tactical Command and Control Information Systems (TacC2IS):** TacC2IS are the interconnected Information Systems (IS) that provide an integrated network of computers with specific software applications that deliver information processing support for commanders and staffs at all levels.
- b. **Tactical Communications (TacComms):** TacComms are the physical Communications Systems (CS) that enable commanders at all levels to have access to a fully integrated, secure communications network that provides the capability to exercise C2 through voice and/or data communications. TacC2IS services are transported over TacComms.

- c. **Intelligence, Surveillance and Reconnaissance (ISR):** ISR are the sensors and analysis capabilities used to gather and process tactical information into useful intelligence.

The extant operational concept for CAF land operations is based on *Land Operations 2021* (ISBN: 978-0-662-44742-9) and the evolving *Signals in Land Operations* (B-GL-351-002/FP-001). This concept is sometimes referred to as the Land C4ISR context, which is represented in **Error! Reference source not found.** and Figure 1.

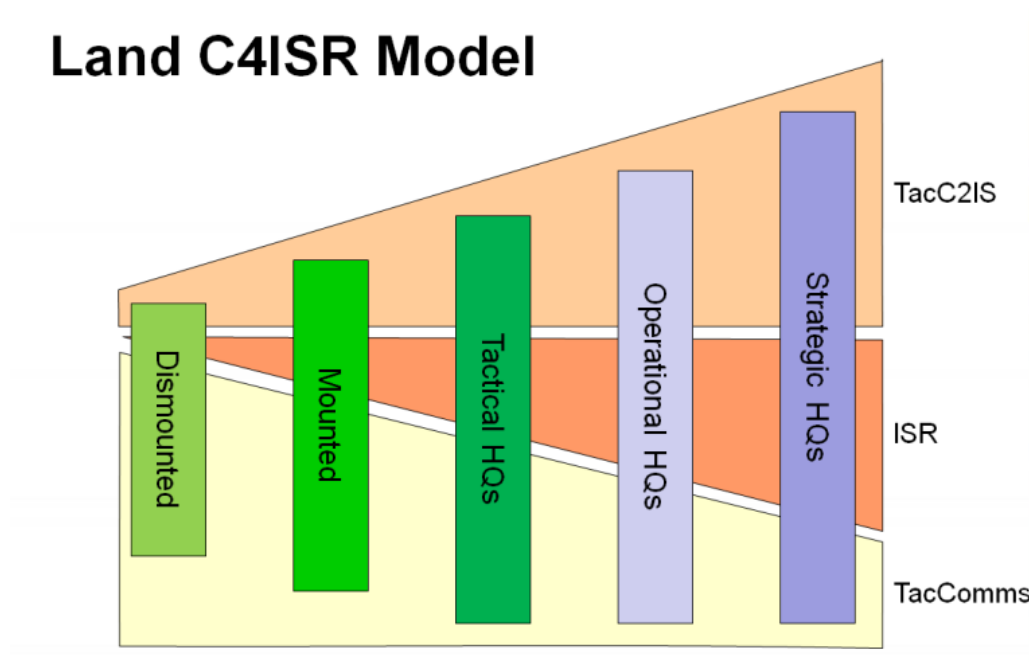


Figure 1 Land C4ISR Model

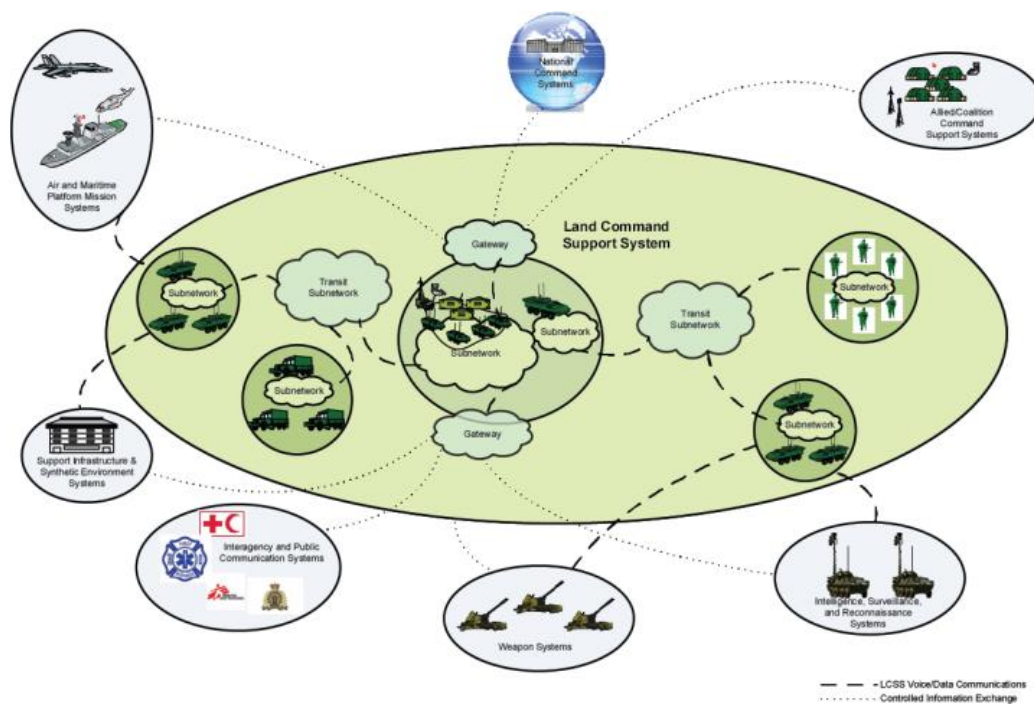


Figure 2 Land C4ISR System Conceptual Diagram

TacComms, TacC2IS and ISR, collectively, make up the Land C4ISR technical model as shown in Figure 3. Figure 4 depicts Land C4ISR in the battle space.

Land C4ISR Technical Model

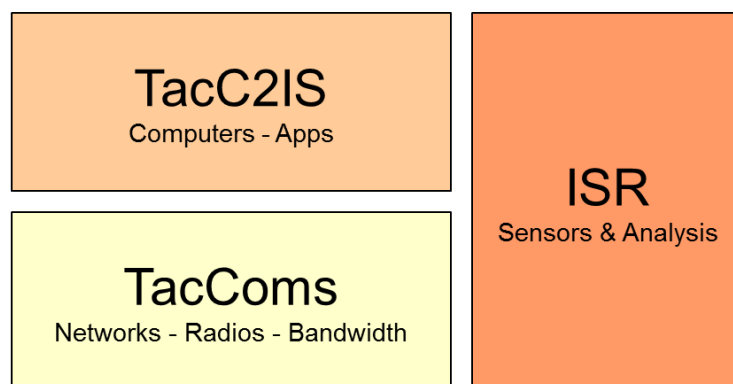


Figure 3 Land C4ISR Technical Model

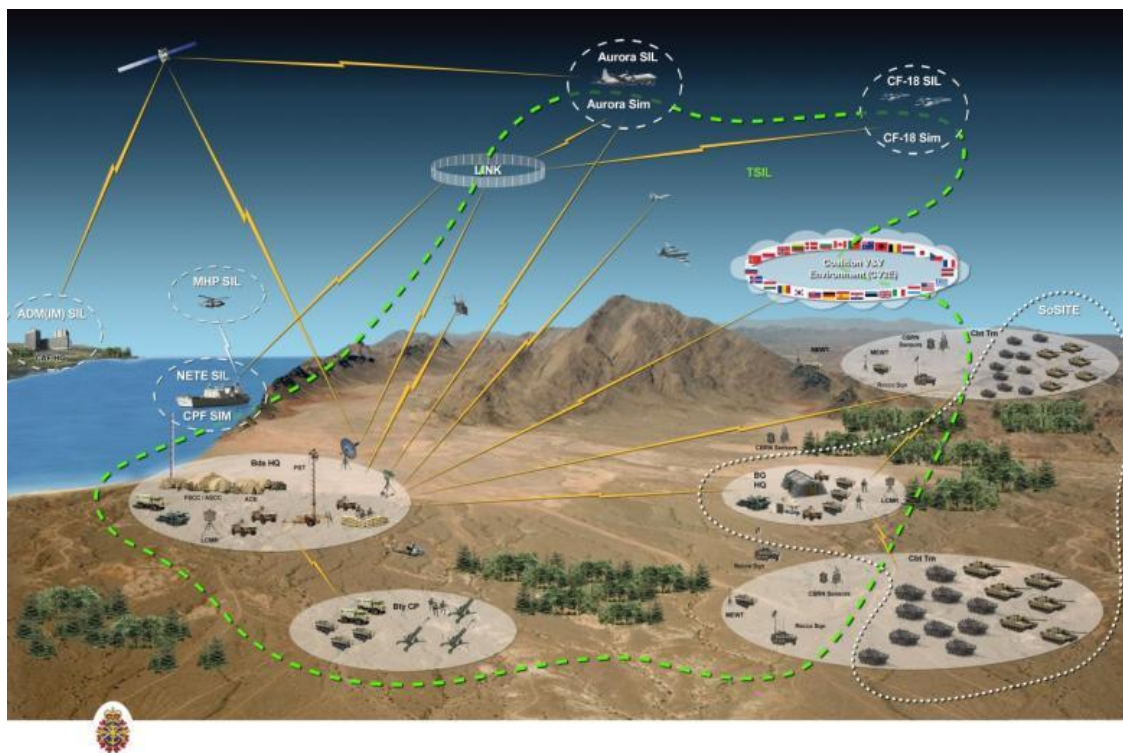


Figure 4 Land C4ISR in the Battle Space

For the purpose of this overview, the Land C4ISR System is considered to be the Army/Land Force operated CIS hardware and software that is used to provide commanders with the required C2 services. In the context of the Land C4ISR, however, the Army operates jointly and seamlessly with all other environments. In order to meet the CAF's operational requirements effectively and efficiently, DLSCPM jointly supports a number of applications, services and standards.

The proposed separation of System Integration and test responsibility at the IPT level and at the OEM level is depicted at Figure 5.

DLSCPM is providing the Land C4ISR system through its support contracts of two primary interconnected integration facilities; the Tactical System Integration Laboratory (TSIL) and System of System Integration and Test Environment (SoSITE). These facilities which are to be used at the appropriate level by all Land C4ISR System support contractors. These facilities are capable of enabling engineering, integration, installation and testing on actual Land C4ISR System elements, both in controlled lab environments and on various CAF vehicles and platforms. These facilities support multiple Land C4ISR System baselines including the fielded baseline, where it acts as the reference implementation, and supports other engineering baselines that are being integrated or tested. Participants, specifically engineers, are able to add, optimize and/or improve designs including equipment, applications, services and platforms.

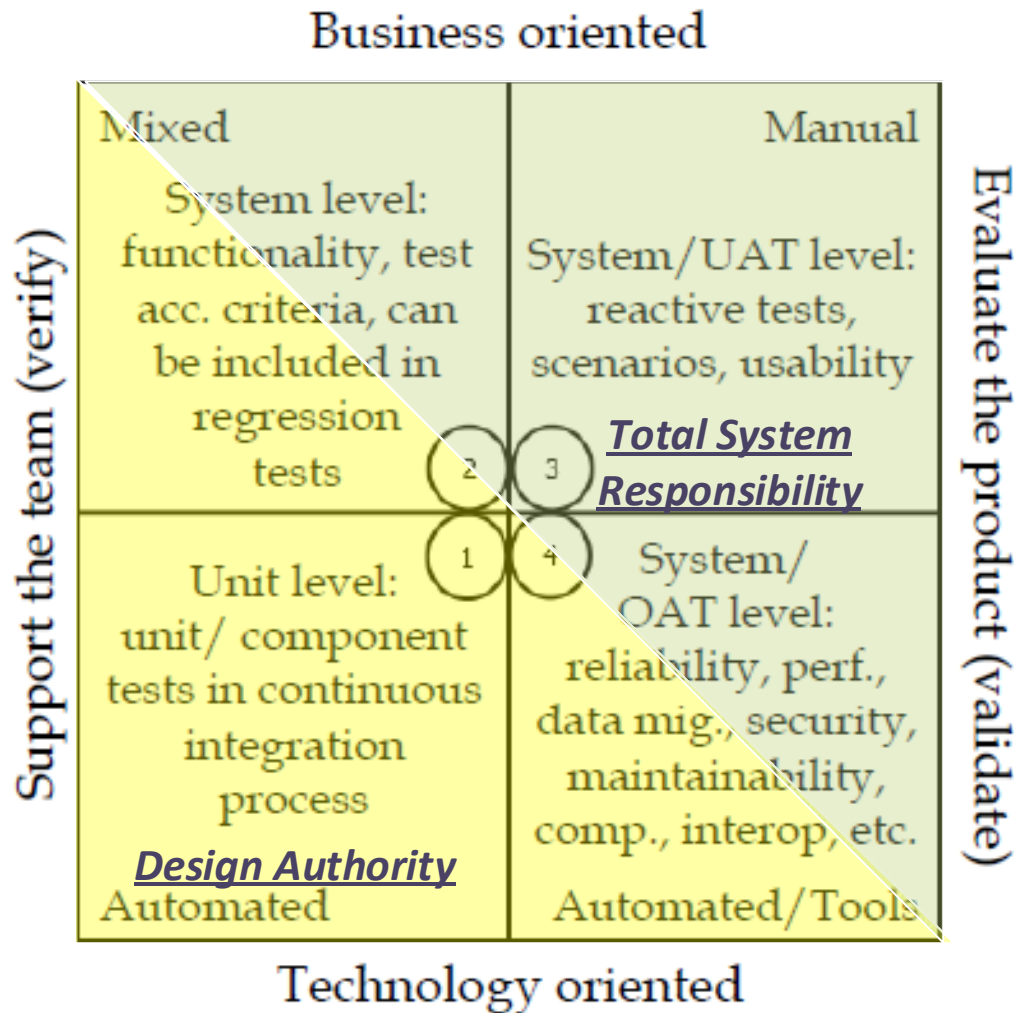


Figure 5 Land C4ISR System Engineering process

1.4 Electronic Document Format

All documents requested in electronic format, with the exception of Portable Document Format (PDF) files, must be delivered in a format that can be imported, read, edited, printed and saved. PDF files are only acceptable for those documents that the Technical Authority (TA) has no requirement to insert comments, to amend the text or data, to extract text or data, or to use the content of the document for other action.

Documents submitted with security settings or document protection settings that prevent DND from printing and editing the document must be re-submitted in an appropriate format.

1.5 Applicable Documents

1.5.1 Applicability

The information provided in this section support this SOW and must be considered as supplemental information only.

1.5.2 Glossary and Definitions

The glossary and definitions that support this SOW are identified at Appendix 1.

1.5.3 Standards, Specifications and Publications

The standards, specifications and publications that support this SOW are identified at Appendix 2. The latest edition of the document is in effect unless specifically specified otherwise.

1.6 Statement of Work Structure and Content

This SOW is organised into the following sections:

Section 1: Introduction.

Section 2: General Requirements.

Section 3: Core Management Services.

Section 4: Core Engineering Support Services.

Section 5: Task-Based Services.

This SOW is supported by the following appendices:

Appendix 1, Glossary and Definitions.

Appendix 2, Standards and Reference Documents.

Appendix 3, System Description

Appendix 4, Logistic SOW.

Appendix 5, Contract Data Requirements List (CDRL) and Data Item Descriptions (DIDs).

Appendix 6, Labour Categories.

1.7 Authorities and Responsibilities

In addition to the Authorities defined in the terms and conditions of the contract, this SOW defines the following roles, authorities and responsibilities.

1.7.1 Technical Office of Primary Interest

The Technical Office of Primary Interest (Tech OPI) is a DND employee delegated by the TA to exercise certain authorities on his or her behalf in accordance with this SOW and any additional scope as may be provided for in any additional task-based SOWs that may be provided under this contract. Each task issued under this SOW will have a single Tech OPI.

1.7.2 Contractor's Lead Software System Architect

The Contractor must designate an individual as its Lead Software System Architect.

The Lead Software System Architect must have the requisite authority within the Contractor's organization for all matters related to the engineering work performed under this SOW. This individual is accountable to provide advice to the IPT on all matters related to technical standards and architecture of the Contractor's portion of the Land C4ISR system.

1.7.3 Integrated Product Team

Canada, which includes DND and other government departments, manages support of the Land C4ISR System within an integrated team environment. Therefore, Canada anticipates that Core Engineering Support Services will be conducted in an environment consisting of Canada, the Engineering & Integration (E&I) Contractor and other support contractors. Although the E&I contractor is providing the core of the IPT, the Contractor must contribute to the IPT, where the work will be performed in a collaborative and cooperative manner in order to achieve the agreed objectives. The roles and responsibilities of all parties will be discussed and formalized in the IPT Terms of Reference.

The Contractor must explain as part of their Program Management Plan (PMP) and System Engineering Management Plan (SEMP) how they will support the DND-led Integrated Project Team and manage its day-to-day activities with DND and other IPT members.

1.7.4 Design Authority

As described in Section 1.3, DLCSPM retains TSR for the Land C4ISR SoS. For task work the TA may delegate Design Authority to a Contractor for a portion of the design work being undertaken (see figure 6). Design Authority, for the purpose of this SOW, is the authority to make design decisions regarding a system element or elements under design or modification within the boundaries defined by stated requirements and constraints, including resource limitations, placed upon the person or organization exercising Design Authority. It includes the responsibility to produce a design responsive to the requirements for the system element under consideration, responsive to the need to be integrated into the higher level SoS, consistent to established interfaces, and to prove the sufficiency and completeness of the design produced against the requirements to the standards provided by the Canada through the IPT process.

Canada retains overall Design Authority over all work done under this SOW unless Design Authority is specifically assigned by Canada to a member of the IPT for a defined scope of task work being undertaken as follows (see figure 6).

For work tasked through a DND 626 Task Authorization (see section 2.2 and section 5), the Task SOW may define an explicit assignment of Design Authority to the Contractor for defined portions of the work. The portion of the work subject to the Contractor's Design Authority will be defined in a task. At a minimum, assignment may occur only at a defined point in the system design process that must be after the requirements for the system element for which Design Authority is being transferred are agreed to, and after the test plan and expected results to conduct design verification have been produced and agreed to. Tech OPI acceptance of successful completion of this system element testing constitutes the return of Design Authority to Canada.

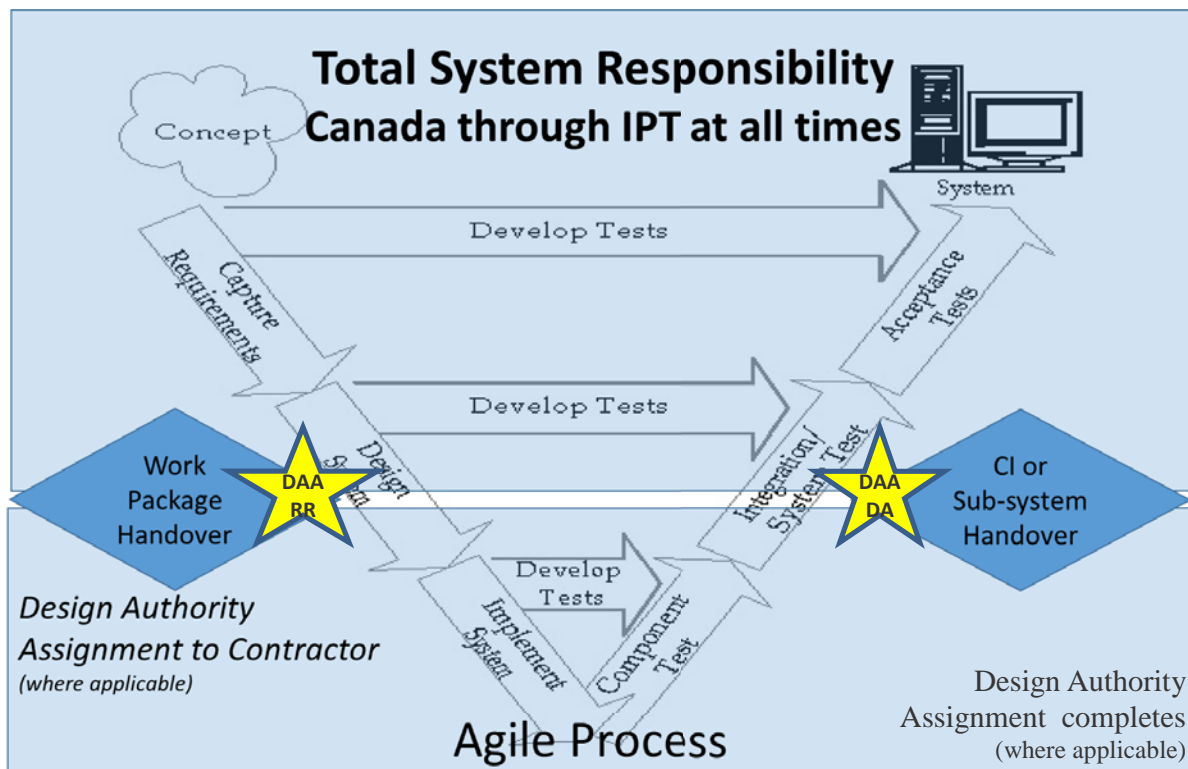


Figure 6: Land C4ISR Design Authority Transfer

In each case, a Design Authority Assignment Readiness Review gate will occur prior to transfer of Design Authority to the Contractor to ensure expectations are clear and the system element requirements, test requirements, schedule, costs and work requirements are well defined. This Review can, for tasks that include a handover point, be combined with the System Requirements Review meeting, or, for standalone tasks, with a task Kick-Off meeting. In all cases, the Design Authority Transfer Readiness Review meeting is to be used as a mechanism for DND to determine whether or not to move forward with work on the Task and will be at Canada's sole discretion.

Similarly, a Design Authority Assignment Deliverables Audit will occur prior to return of Design Authority to the Canada to ensure that the system element requirements have been met

and are tested and documented, where applicable any waivers or deviations that were acceptable to the TA are in place and all specified deliverable have been accepted by Canada. This review will be modeled on a Functional Configuration Audit with scope defined by the system element and work that was subject to the transfer of Design Authority.

Approval authority for the Design Authority Assignment Readiness Review and the Design Authority Transfer Deliverables Audit rests solely with Canada

2 GENERAL REQUIREMENTS

2.1 Core Work

Core Work comprises those elements of the Work that must be conducted by the Contractor within the firm fixed price element of the contract as established at contract award.

Core Work comprises the activities described in Section 3 and Section 4 of this SOW that occur on a regular ongoing basis over the duration of the contract period, separate from but including support for task-based work. Core Work is not initiated through a Task Authorisation.

The Contractor must provide, as Core Work, the following work as described in this SOW:

- a. Core Management Work (Section 3); and
- b. Core Engineering Support Work (Section 4).

2.2 Task-Based Work

The Contractor may be tasked, as and when required, with the performance of specific work related to the Engineering, Integration and In-service Support of software system elements within the Land C4ISR System, including but not limited to the following:

- a. Engineering Support Services;
- b. Life Cycle Application Management (LCAM) Support Services;
- c. Integrated Logistic Support (ILS) Services;
- d. Field Support Services; and
- e. Support to IPT activities.

3 Core Management Services

3.1 General

The Contractor is responsible to preform Core Program Management Work at an incentivized fixed monthly fee.

This Core Management Work does not require a separate DND 626 Task Authorization.

3.2 Program Management Core Work

The Contractor must implement and maintain a Program Management Program in accordance with the approved Program Management Plan (PMP). The Program Management Program is considered core work under this contract, meaning that it will not be initiated through a Task.

The Contractor must plan, organize and control all work described in this SOW and their subsequent Tasks.

The Contractor must maintain scheduling and management control for all activities carried out under the Contract.

Program Management encompasses the management of all program activities to initiate, plan, execute, control, and closeout all the work defined by this SOW. The Contractor's overall Program Management activity must adhere to the provisions of the approved PMP. Project Management encompasses the same activities as Program Management and is normally applied to management of specific Tasks and groups of Tasks.

The Contractor must be ready, using their identified core management resources, to manage multiple concurrent Tasks. To meet the expected core task workload Canada estimates that approximately 4 to 5 FTE are required to perform the work identified below. It is the Contractor's responsibility to identify in the PMP how this work is distributed among the full time and part-time core resources being offered.

Program Management and Project Management activities include but are not limited to:

- a. Program Monitoring and Control;
- b. Task Estimation;
- c. Task and Budget Management;
- d. Progress Reporting and Billing;
- e. Performance Management and Continuous Improvement Process;
- f. Canada Owned Resource Management; and
- g. Risk Management.

3.3 Program Management Plan

The Contractor must prepare, deliver, update and maintain a PMP in accordance with DID 100.001.

3.4 Monitoring and Control

The Contractor must implement Program Monitoring and Control as described in the following sub-sections.

3.4.1 Monthly Progress Reports

The Contractor must prepare and submit Monthly Progress Reports in accordance with CDRL 100.002.

3.4.2 Progress Review Meetings

Progress Review Meetings (PRMs) must be conducted on a periodic basis, at least semi-annually, among the Contractor, the CA, the PA and the TA. These PRMs must encompass the total program status as of the review date, and must present, for resolution, all known problems as of that date.

3.4.3 Progress Review Agenda and Minutes

The Contractor must prepare, submit for approval and update the agenda for the PRM IAW CDRL 100.003.

The Contractor must prepare, submit for approval and update minutes of the PRM IAW CDRL 100.004

3.4.4 Other Meetings and Reviews

Working level meetings can be held to review work. No action affecting cost or schedule may be taken as a result of these meetings.

For all meetings (including reviews), the Contractor must prepare and submit an agenda for approval.

3.5 Task Management

The TA will establish the priority of Tasks. Should a change be made to the priority of an existing Task, the Contractor must inform the TA of the impact that this change will have on other current Tasks. Impacts may involve the adjustment of priority, cost, schedule and scope of current Tasks.

Irrespective of the nature of the work tasked or DND processes to approve a Task, the Contractor must manage Tasks in the manner described in the following sub-sections.

3.5.1 Task Initiation and Planning

The TA will manage Task requirements.

The TA will issue a request to the Contractor to provide a task proposal for all Tasks.

When the Contractor is requested to provide a proposal, such a request will typically include a SOW and any other requirements necessary to define the Task. The Contractor's proposal, unless otherwise specified in the request, must contain:

- a. An Implementation Plan;
- b. A Work Breakdown Structure (WBS), if not provided with the task definition;
- c. A schedule; and
- d. A price, including a breakdown of the required resources, IAW the agreed basis of payment for the task.

Quotations or Task definition assistance requested from the Contractor must not be construed as authority to proceed with any work.

Subject to internal approval of the proposal, Canada will issue an approved DND 626 Task Authorization.

3.5.2 Task Execution and Control

When a DND 626 Task Authorization is issued, the Contractor must:

- a. Assign a Task Lead responsible to oversee the Task and maintain its status;
- b. Assign resources in accordance with Task requirements and budgetary estimates;
- c. Implement any special reporting or metric requirements;
- d. Initiate risk management for any identified risk elements; and
- e. Commence work on the Task in accordance with the approved Implementation Plan, WBS and schedule.

The Contractor must demonstrate/manage all pertinent information related to the task, including the original DND 626 Task Authorization and subsequent revisions and any relevant data or documents.

On an ongoing basis during the execution of the Task, the Contractor must:

- a. Track and report Tasks based on the serial numbers on the DND 626 Task Authorizations;

- b. Monitor tasks to ensure that the financial expenditures are in line with approved tasks and report status to the CA, PA and TA on a regular basis;
- c. Maintain project time scheduling and tracking; and
- d. Implement a performance measurement and continuous improvement process.

3.5.3 Task Closure

When the work identified in the DND 626 Task Authorization and associated SOW is complete, the Contractor must:

- a. Prepare a final report in accordance with CDRL 100.006 as a deliverable for every Task, unless otherwise directed;
- b. Formally close out the Task to ensure that there are no further charges accumulated against the Task in accordance with the PMP; and
- c. Update final Task metrics and present them in the Monthly Progress Report.

3.6 Risk Management

The Contractor must, as part of Core Management Work, implement a Risk Management program for the performance of the work described by this SOW. Risk management must encompass the following:

- a. Risk identification, including risk quantification;
- b. Analysis;
- c. Planning; and
- d. Tracking and Control.

The Contractor must perform Risk Management in accordance with the approved PMP.

3.7 Canada Owned Resources Management

The Contractor must, as part of Core Management Services, implement a Canada Owned Resource Management program, including management of controlled goods.

Canada will make available to the Contractor Government Furnished Assets (GFA), including Government Furnished Equipment (GFE), Government Furnished Vehicles (GFV), Government Furnished Information (GFI) and Government Supplied Material (GSM), to be used to support the work.

The GFI will include Commercial Off-the-shelf (COTS) software, Military Off-the-shelf (MOTS) software, Government Off-the-shelf (GOTS) software licenses, media and associated documentation and other technical documentation.

The GFE will include MOTS and COTS hardware to enable the Contractor to engineer, integrate and test software systems. The Contractor must implement a Canada Owned Resource Management program in accordance with the process identified in Appendix 4 of this SOW - Logistic SOW.

3.7.1 Canada Owned Resource Management Report

The Contractor must prepare a Canada Owned Resource Management Report in accordance with CDRL 100.005.

3.8 Configuration and Data Management (CM-DM)

The Contractor must perform CM-DM of its own deliverables as a part of core management work.

The Contractor must perform the CM-DM work as follows:

- a. Configuration Management Planning and Management;
- b. Configuration Identification;
- c. Configuration Change Management;
- d. Configuration Status Accounting;
- e. Configuration Verification and Audit;
- f. Documentation Management; and
- g. Software Release Management and Delivery.

3.9 Security

The Contractor must establish and implement a Security Program to conduct the work, in accordance with contract Security Requirements Checklist (SRCL).

3.10 Travel

It is anticipated that Contractor personnel will be required to travel to TA specified locations in support of the work. The Contractor must manage travel for their personnel. The Contractor must obtain approval from DND for all travel, prior to incurring any expense.

4 Core Engineering Work

The Contractor must provide Core Engineering Work at an incentivized fixed monthly fee.

This Core Engineering Work does not require a separate DND 626 Task Authorization.

The Contractor must be ready, using their identified core engineering resources, to provide the Software Architecture, Engineering and Test Management support to the IPT, and provide for the day to day operation of the TACNET engineering capability at the TSIL. To meet the expected core task workload Canada estimates that approximately 19 to 20 FTEs are required to perform the work identified below. It is the Contractor's responsibility to identify in the System Engineering Management Plan (SEMP) how this work is distributed among the full time and part-time core resources being offered.

The Contractor must perform Core Engineering Work in order to provide:

- a. Engineering Management;
- b. Software Engineering;
- c. Software Integration and Test
- d. Configuration Management;
- e. Quality Assurance;
- f. Problem Resolution Support;
- g. Incident Management; and
- h. Obsolescence Management
- i. TacC2IS support to the IPT.

4.1 System Engineering Management

The Contractor must establish and manage the System Engineering Program

The Contractor must gather, and track, engineering performance measures on all engineering tasks. The Contractor must identify and implement continuous process improvements to the core and task based Engineering Program.

4.1.1 Systems Engineering Management Plan

The Contractor must prepare, submit and maintain the SEMP in accordance with CDRL 200.001.

The purpose of the SEMP is to describe the Engineering Program intended for use on performing the engineering work of this SOW.

4.1.2 Systems Engineering Schedule

The Contractor must prepare, submit and maintain the System Engineering Schedule in contractor format.

The purpose of the Engineering Schedule is to describe and synchronize the Engineering program of work.

4.1.3 Lead Software Architect

The LTSSC Contractor must designate an individual as its Lead Software Architect/Engineer to advise on LTSSC Architecture, Design and interfaces within the Engineering and Integration (E&I) activities and interact directly with the Design Authority to assist with system design decisions and recommendations.

The Lead System Software Architect must have the requisite authority within the Contractor's organization for all Engineering Program matters related to the engineering work of the SOW.

4.2 Software Engineering

The Contractor must, as part of Core Engineering Support Services, provide Software Engineering Services to assist in resolving software problems and to provide engineering analysis associated with future Land C4ISR System software releases.

Software Engineering is the application of systems engineering principles specifically to the development and support of large complex software systems in order to improve process and product management throughout the system life cycle.

In conjunction with the other IPT members, the Contractor must perform Core Software Engineering in the areas of:

- a. Software Systems Requirements and Architecture:
- b. Software Systems Integration and Verification; and
- c. Software Systems Baseline Management.

4.2.1 Software Systems Requirements and Architecture

The Contractor must provide, as part of the Core Engineering Support Services, ongoing support to the Software Systems requirements and architecture capability for the Land C4ISR System. This includes:

- a. Business or Mission Analysis;
- b. Stakeholder Needs & Requirements Definition;
- c. Software Systems Requirements; and

d. Software Systems Architecture.

The Contractor must implement and maintain Software Systems Requirements and Architecture services in accordance with the approved SEMP.

4.3 Software Systems Integration and Test

The Contractor must, as part of Core Engineering Support Services, provide ongoing support to the Software Systems Integration and Test capability for the Land C4ISR System.

4.4 Software Baseline Change Management

The Contractor must, as part of Core Engineering Support Services, implement and maintain change management for the Land C4ISR System software baseline.

4.5 Quality Assurance

The Contractor must establish and maintain a Quality Assurance (QA) Program in order to provide a sufficient level of confidence that quality requirements, including those derived from Stakeholder Needs and Requirements Definition, System Requirements Definition, Software System Requirements Definition and Software Requirements Definition, will be fulfilled. Proactive analysis of all engineering processes and outputs must be performed to assure that the products being produced will be of the desired quality and that all applicable policies and procedures are being followed.

The Contractor must prepare and submit a QA Plan (QAP) in accordance with CDRL 400.002.

The Contractor must perform QA in accordance with the approved QAP.

4.6 Problem Resolution Support

The Contractor must investigate all System Problem Reports (SPR), Unsatisfactory Condition Reports (UCR) and Technical Failure Reports (TFR) initiated by the TA or designated Tech OPI.

The Contractor must respond with a technical assessment to assigned SPRs, UCRs and TFRs in accordance with the priorities defined below in Table 4-1, Problem Report Priority.

Table 4-1 – Problem Report Priority

Priority	Definition	Contractor Service Level Agreement from Receipt of SPR, UCR, TFR
1	Any Problem that prevents the accomplishment of an operational or mission essential capability, jeopardize safety, security, or any other requirement designated critical. This can be further defined as any problem that causes or has the potential to cause a failure that results in a complete denial of a capability (robustness and reliability).	24 hours
2	Any problem that causes the loss of or denies the use of a particular function of a capability and there is, at the time, no reasonable work around.	5 working days
3	Any problem that causes the loss of or denies the use of a particular function of a capability and there is a reasonable work around.	10 working days
4	Any problem that results in user/operator inconvenience or annoyance but does not prevent the user/operator from performing any function.	20 working days
5	Any other problems/defects or documentation issue.	20 working days

The Contractor must investigate, perform impact analysis, and make recommendations as a result of SPRs, UCRs and TFRs within the timeline set in the Table 4-1. Once this analysis is complete, the decision to proceed with any remediation activities will be upon the purview of Canada.

4.7 Incident Management Support

The Contractor respond to detected incidents.

The Contractor must provide initial verification and disposition of incidents, as defined under Information Technology Infrastructure Library (ITIL) framework, in accordance with the level of impact defined below in Table 4-1, Incident Impact.

Table 4-2 – Incident Impact

Severity	Definition	Contractor Service Level Agreement from detection or reporting of incidents.
Critical	Any incident detected by the NOC or user that impact the Mission Assurance posture and therefore affects the accomplishment of a mission essential capability, jeopardize safety or operational security.	24 hours
High	Any incident reported by the NOC or users that cannot be mitigated using current capability but that requires resolution.	2 working days
Medium	Any incident reported by the NOC or users that can be mitigated using current capability but that requires resolution.	5 working days
Low	Any incident identified as a part of routine System Health Assessment of in service operational systems.	10 working days
Trivial	Incident with no operational, safety or security impact.	20 working days

The Contractor must verify and propose disposition based on the Service Level Agreement identified in the table 4-2 above.

4.8 Obsolescence Management

The Contractor must implement and maintain an Obsolescence Management Program as a part of Core Engineering Work. The intent is to assist the TA with resolving Land C4ISR System obsolescence issues in a proactive manner. Implementation of remedial action will be Task based work

The Contractor must prepare and submit to the TA or Tech OPI an Obsolescence Report in accordance with CDRL 200.002 in order to identify obsolescence-related issues for all applicable system elements. The Contractor must advise the TA or Tech OPI of potential or actual obsolescence issues with sufficient advance notice to allow DND to make informed decisions regarding their resolution.

4.9 Support TacC2IS support to the IPT

The Contractor must support the TacC2IS Engineering environment found in the Tactical System Integration Laboratory (TSIL) and provide the LTSSC contribution to the Integrated Product

Team (IPT) as a part of Core Engineering Work.

4.9.1 Tactical Systems Integration Laboratory (TSIL) Support Services

The Contractor will provide support services to the TSIL infrastructure to include deployment, monitoring, control, maintenance and repair services. At the core of this capability is the maintenance of the test environments.

4.9.2 TSIL Integrated Product Team (IPT) Support

The Contractor will contribute resources and skills to the TSIL IPT to enable the execution of IPT led integration and test events. The purpose of this capability is the ability to contribute to the planning, execution, analysis and reporting of engineering, integration and test activities tasked to the IPT.

4.9.3 Software Integration and Testing and SoS Testing Support

The Contractor will contribute resources and skills to the TSIL IPT to enable the execution TSIL hosted Software Baseline Integration and Testing as well as support to SoS test events.

5 Task Based Services

The Contractor may be tasked to provide Software Support services in the following areas on an as and when required basis:

- a. Software Engineering for specified software components;
- b. LCAM of specified software system elements;
- c. ILS, including training, related to specific software system elements;
- d. Technical investigations and engineering studies;
- e. Field Support to the software elements of the Land C4ISR System;
- f. Support to Software Baseline Integration and Testing and system-of-systems (SoS) integration and testing.

The process for initiating, authorising and managing the Task-Based Work is described in Section 3.3 of this SOW.

5.1 Software Engineering

The Contractor may be tasked to provide Software Engineering services for any part or parts of the Software Development Life Cycle in relation to specified software elements of the Land C4ISR System, including:

- a. Software Requirements Analysis;
- b. Software Architectural Design;
- c. Software Detailed Design;
- d. Software Construction;
- e. Software Integration;
- f. Software Qualification Testing;
- g. Support to System Integration;
- h. Support to System Qualification Testing;
- i. Software Installation;
- j. Software Acceptance Support; and
- k. Software Operation and Maintenance.

Task-Based Software Engineering work must be performed in accordance with the approved SEMP.

5.1.1 Task Documentation and Data

Each Task will identify the life cycle information items and data to be produced and delivered as a result of performing the tasked system engineering activities.

5.1.2 Technical Reviews and Audits

The Contractor must hold Technical Reviews and Audits to evaluate the outcomes of activities, and services performed of this SOW in accordance the Contractor's SEMP, which may include but is not limited to:

- a. System Requirements Review;
- b. Preliminary Design Review;
- c. Critical Design Review;
- d. Integration Readiness Review;
- e. Test Readiness Review;
- f. Functional Configuration Audit; and
- g. Physical Configuration Audit.

The Contractor must prepare and submit meeting agendas and minutes in accordance with CDRL/DID 100.003 and 100.004 respectively (see Appendix 5).

The Contractor must provide objective evidence, at all Reviews and Audits, that the activity activities under review:

- a. Are complete;
- b. Comply with standards and specifications;
- c. Are under change controls for any changes implemented;
- d. Adhere to the approved schedules and costs;
- e. Are ready for the next activity; and
- f. Are consistent with the requirements of this SOW.

5.2 Life-Cycle Application Management (LCAM) Support

The Contractor may be tasked to provide a variety of services to support LCAM function for specified software elements of the Land C4ISR System, including, but not limited to:

- a. Problem Resolution support;
- b. Incident and Event Resolution support; and
- c. Obsolescence Management support.

5.2.1 Problem Resolution Support

The Contractor may be tasked to perform corrective or adaptive maintenance for specified software system elements of the Land C4ISR System resulting from the analysis performed under Section 4.6, the Problem Resolution activity within the Core Engineering Support Services.

5.2.2 Incident and Event Resolution

The Contractor may be tasked to perform incident and event analysis in order to either resolve the issue or raise a Problem Report leading to problem Resolution in accordance with the standards set in Section 4.7, the Incident Resolution activity within the Core Engineering Support Services.

5.2.3 Obsolescence Management Support

As and when tasked, the Contractor must perform design, construction, test and integration activities for one or more specified software system elements of the Land C4ISR System resulting from the analysis performed under Section 4.8, the Obsolescence Management activity within the Core Engineering Support Services.

5.3 Integrated Logistics Support (ILS)

The Contractor may be tasked to provide support to DND in the provision of ILS, based upon the approved SEMP, for specified software elements of the Land C4ISR System, including, but not limited to:

- a. Training; and
- b. ILS Documentation.

5.3.1 Training

The Contractor may be tasked to provide training and training support services, including but not limited to:

- a. Conduct of training needs analyses;

- b. Preparation, submission and maintenance of training material; and
- c. Conduct of initial cadre training.

5.3.2 ILS Documentation

The Contractor may be tasked to provide ILS documentation services, which may include:

- a. Preparing and updating User Manuals; and
- b. Preparing and updating Technical Data Packages.

5.4 Technical Investigations and Engineering Studies

The Contractor may be tasked to provide technical investigations and engineering studies into any and all aspects of software support for the Land C4ISR System.

5.5 Field Support

5.5.1 General

The Contractor may be tasked to provide fully qualified personnel to travel to locations specified by DND to perform work described in the following sub-sections. Travel and accommodations are the responsibilities of the Contractor or as specified in the tasking. The Contractor shall ensure that the personnel have all they require to complete the assigned task.

5.5.2 Fielding Support

The Contractor may be tasked to provide support for the delivery of new software baselines or system elements, either as part of the larger fielding of a new System Release or as part of normal LCAM activities. Such support may include site acceptance testing, installation of production software at the delivery site(s), delivery of supporting documentation and the training of designated personnel at the delivery site(s).

5.5.3 Field Service Representatives (FSR) and Mentor for Exercises and Operations

Given the complex technological and functional nature of the Land C4ISR System, it is anticipated that FSR and Mentoring services will be required during specific periods in the life of the System. Accordingly, the Contractor may be tasked to provide expert technical assistance at specified locations for particular activities or events of known duration.

The Contractor may be tasked to provide FSR to provide on-site software support services, including but not limited to:

- a. Reporting, diagnosing and developing workarounds for problems with the software elements of the system, encompassing all aspects of the software's functionality, operating manuals, training and usage,

- b. Assisting with on-site configuration of the software;
- c. Assessing the usage of the software and recommending changes to training and standard operating procedures, as warranted;
- d. Assisting with field upgrades, installation, re-installation and modifications of the Software.

When notified of a requirement, the Contractor must dispatch a FSR or Mentor to locations in North America within seven (7) calendar days of receipt of notification and anywhere in the world within 14 calendar days of receipt of notification.

The Contractor must provide fully qualified FSR or Mentor personnel to travel to the location specified by DND in the tasking. Contractor personnel may be deployed into a combat zone. When this location is in an Operational Theatre, the tasking will identify the threat in sufficient detail to allow the Contractor to assess the risk and make the appropriate arrangements at the requisite cost.

Travel and accommodations are the responsibilities of the Contractor or as specified in the tasking. The Contractor shall ensure that the personnel have all the documentation and tools required to complete the assigned task.

5.5.4 Operational Test and Evaluation

The Contractor may be tasked to provide support for operational test and evaluation (OT&E) exercises, including but not limited to:

- a. Field engineering exercises; and
- b. Field validation exercises.

Support for OT&E exercises normally requires engineering and technical support above and beyond that provided by Field Service Representatives. Services may include support to:

- a. Planning, definition, scheduling and coordination of tests;
- b. Conduct and evaluation of tests;
- c. Analysis of test results; and
- d. Preparation of Test Reports.

5.5.5 ITSM-related Support to Episodic Mission Networks

The Contractor may be tasked to provide software systems technical expertise and support to all Information Technology Service Management (ITSM) life cycle activities, including Service Design, Service Transition and Service Operations and network close-out, for the episodic mission networks established for specific exercises or operations.

5.6 Software Integration and Testing and SoS Testing Support

The Contractor may be tasked to contribute specified resources and skills to the TSIL IPT to enable the execution TSIL hosted Software Baseline Integration and Testing as well as support to SoS a surge in test events. This requirement is over and above those performed by the Core Engineering Support Services.

**APPENDIX 6
TO ANNEX A**

**TO CONTRACT
W8486-184111**

**LAND C4ISR SYSTEM
TRANSITION SOFTWARE
SUPPORT CONTRACT
(LTSSC)**

LABOUR CATEGORIES

4 February 2018

1 Task Resource Category Requirements

1.1 General

1.1.1 Task Resource Requirement

The types of resources that may be required to complete tasks in the LTSSC SOW are identified in Table 1 below.

1.1.2 Experience

Unless explicitly stated, there are three possible levels of experience for each resource type:

- a. Junior resources (Level 1) have less than three (3) years of experience in the specified field;
- b. Intermediate resources (Level 2) must have a minimum of three (3) years of relevant experience in the specified field within the last six (6) years; and
- c. Senior Resources (Level 3) must have seven (7) years of relevant experience in the specified field within the last ten (10) years.

1.1.3 The Depth of Knowledge

In order to evaluate Level of a resource the Webb (1997) Degree of Knowledge (DoK) model is used as a basis for this contract. The DoK model is a process and criteria for systematically analyzing the alignment between standards and standardized assessments. The model assumes that work elements are categorized based upon the cognitive demands to produce the expected result. Each level reflects a different level of cognitive expectation, or depth of knowledge, required to complete the task. The term knowledge used here broadly encompass all forms of knowledge and experience.

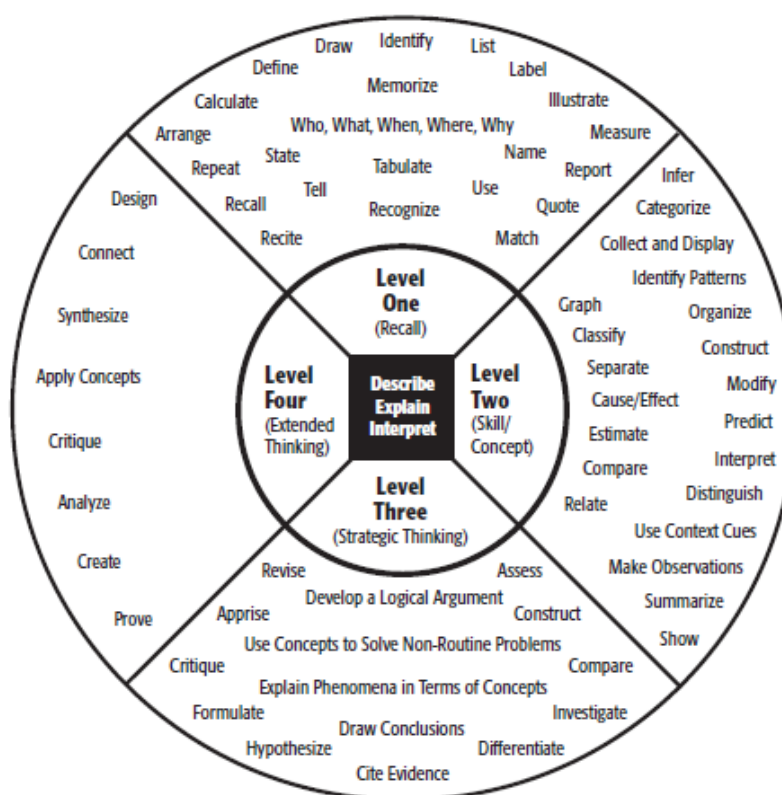


Figure A6-1 - Depth of Knowledge Skills

Depth of Knowledge			
Level 1	Level 2	Level 3	Level 4
Recall elements and details of assigned work.	Identify, plan and summarize work.	Support ideas with details and examples.	Conduct a project that requires specification, design, implementation and reporting results.
Conduct basic tasks.	Use context to explain an event/requirement.	Communicate with appropriate language to the purpose and audience.	Apply model to illustrate uses, problems or situations.
Represent in words or diagrams the behaviour or its relationship.	Solve routine problems.	Design investigations for a problem.	Analyze and synthesize information from multiple sources.
Perform routine procedures.	Describe cause/effect given data/conditions.	Develop a model for complex situation.	Design model to inform and solve uses, problems or situations.
Describe the behaviour or issue at hand.	Identify patterns in events or behavior.	Apply a concept in other contexts.	
	Organize, represent and interpret data.		

Table A6-1 - Depth of Knowledge Summary

Serial	Short Title	Personnel Position Description
1	SwPM	Software Project Manager
2	SwSA	Software Systems Architect (Sr. and Int.)
3	SwSE	Software Systems Engineer
4	SwSS	Software Systems Specialist
5	SwSRA	Software Systems Requirements Analyst (Sr. and Int.)
6	SwT	Software Tester
7	SwD	Software Developer
8	NA	Network Administrator (Sr. and Jr.)
9	TW	Technical Writer (Sr. and Jr.)
10	TD	Training Developer (Sr. and Jr.)
11	FSR	Field Service Representative (Sr.)

Table A6-2: Resource Type

2 Resource Type Education, and Knowledge Requirements

2.1 General

Required education and knowledge is specified below for each resource type.

2.2 Software Project Manager

The SW Project Manager shall meet the following Webb Depth of Knowledge:

- a. Junior and Intermediate shall be at a minimum level 2; and
- b. Senior shall be at a minimum level 3.

Software Project Manager (SPM) must be capable of planning, directing, monitoring, assessing and controlling the project activities required to ensure that software support projects achieve their technical objectives according to higher level plans and schedules and within allocated budgets. A broad variety of knowledge is required about software development methods, project management techniques and the management of software engineering competencies and resources.

No.	Criteria
1.	<p><u>Education.</u></p> <p>The SwPM must have a university undergraduate degree in business, science, engineering or information systems.</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing software project management work, including experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Developing new information system application software; b. Maintaining in-service information system application software; or c. Maintaining complex database management system implementations. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ul style="list-style-type: none"> a. Management Information Systems (MIS) Development and Support; b. Business Application Development and Support; c. Real-Time Systems Development and Support; d. Database Management Systems (DBMS) Development and Support; e. Structured Message Formats; f. Enterprise Architecture; g. Rational Unified Process (RUP) for Software Development; h. Agile Methods for Software Development (in a deliberate and methodological approach, rather than ad-hoc); i. Software Systems Engineering V-Model; j. International Standards for Systems and Software Engineering, including but not limited to ISO/IEC 15288:2015 and ISO/IEC 12207:2008; k. Work Breakdown Structures; l. Scheduling and Schedule Management; m. Budgeting and Resource Management; n. Earned Value Management; o. Software Engineering Competencies Management, including managing software skills across numerous areas such as requirements, design, construction, testing, sustainment, quality, configuration management and human-computer interaction; p. Computer-Aided Software Engineering (CASE) and Integrated Development Environment (IDE) Technologies; q. Requirements Management Methods and Technologies;

	<ul style="list-style-type: none"> r. Test Management Methods and Technologies, including Automated Testing; s. Continuous Integration Methods and Technologies; t. Software Configuration Management; u. Software Quality; and v. Integrated Logistics Support (ILS).
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2.3 Software Systems Architect

There is no junior level in this labour category.

The SW System Architect shall meet the following Webb Depth of Knowledge:

- a. Intermediate shall be at a minimum level 3; and
- b. Senior shall be at level 4.

Software Systems Architect (SwSA) must be capable of producing and managing software architectural designs and guidance, with contributions from across software engineering and support disciplines, to achieve comprehensive software system implementation within the constraints of cost, schedule, and performance while maintaining an acceptable level of risk. The SSA is also expected to provide technical leadership and advice regarding the selection, use and, if required, creation or modification, of processes, procedures, methods and tools for the performance of software development and maintenance activities.

No.	Criteria
1.	<u>Education.</u> The SSA must have a university graduate degree in engineering or science.
2.	<u>Experience.</u> Mandatory. Must have experience doing software system architecture work, including experience in any of the following areas: <ul style="list-style-type: none"> a. Developing and maintaining an Information Systems Reference Architecture used for software systems development and support; b. Developing and maintaining Enterprise Architecture (EA) models and artefacts used for software systems development and support; or c. Creating and validating architectural representations of complex software-intensive systems used to predict and analyze performance, cost, schedule and risks, and to provide guidelines for system development, design, construction and management. Additional Assets. Requires a combination of education and experience in many

	<p>of the fields below:</p> <ul style="list-style-type: none"> a. Experience with Tactical Command and Control Information Systems (TacC2IS); b. Knowledge of Tactical Communications (TacComms); c. Knowledge of Intelligence, Surveillance and Reconnaissance (ISR); d. Management Information Systems (MIS) Development and Support; e. Business Application Development and Support; f. Database Management Systems (DBMS) Development and Support; g. Real-Time Systems Development and Support; h. Structured Message Formats; i. Enterprise Architecture; j. Business Analysis and Business Process Modeling; k. Unified Modeling Language (UML); l. Rational Unified Process (RUP) for Software Development; m. Agile Methods for Software Development (in a deliberate and methodological approach, rather than ad-hoc); n. Software Systems Engineering V-Model; o. International and Industry Standards for Systems and Software Engineering, such as ISO/IEC 15288:2015, ISO/IEC 12207:2008 and Capability Maturity Model Integration (CMMI); p. Software Engineering Competencies Management, including managing software skills across numerous areas such as requirements, design, construction, testing, sustainment, quality, configuration management and human-computer interaction; q. Computer-Aided Software Engineering (CASE) and Integrated Development Environment (IDE) Technologies; r. Requirements Management Standards, Methods and Technologies; s. Test Management Standards, Methods and Technologies, including Automated Testing; t. Continuous Integration Methods and Technologies; u. Software Configuration Management; and v. Software Quality Concepts, Standards and Methods.
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2.4 Software Systems Engineer

The SW System Engineer shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 2;

- b. Intermediate shall be at a minimum level 3; and
- c. Senior shall be at level 4.

Software Systems Engineer (SwSE) must be capable of leading, directing and coordinating the design, specification, integration and verification of the software system solution in accordance with the proposed architecture. Must be able to collaborate with the Software Systems Architect on any software systems requirements or architecture adjustments and work with the other software support disciplines to integrate their work products into the overall software systems engineering process.

No.	Criteria
1.	<p><u>Education.</u></p> <p>The SwSE must have a university undergraduate degree in software engineering, systems engineering, electrical engineering, computer engineering, information systems or computer science.</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing software systems engineering work, including experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Analyzing, designing, prototyping, implementing and testing management information systems (MIS); b. Analyzing, designing, prototyping, implementing and testing computer-based simulation systems; or c. Engineering software for real-time systems. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ul style="list-style-type: none"> a. Experience with Tactical Command and Control Information Systems (TacC2IS); b. Knowledge of Tactical Communications (TacComms); c. Knowledge of Intelligence, Surveillance and Reconnaissance (ISR); d. Rational Unified Process (RUP) for Software Development; e. Agile Methods for Software Development (in a deliberate and methodological approach, rather than ad-hoc); f. Software Systems Engineering V-Model; g. International and Industry Standards for Systems and Software Engineering, such as ISO/IEC 15288:2015, ISO/IEC 12207:2008 and Capability Maturity Model Integration (CMMI); h. Software Requirements Engineering, including requirements solicitation/development, requirements traceability and change management;

	<ul style="list-style-type: none"> i. Software Integration, including assembly of implemented system elements and preparation for verification of interfaces, functions and quality characteristics; j. Software Verification and Validation (V&V), including as appropriate: inspection, analysis, fitness for purpose and user acceptance testing of software system elements; k. Software Quality Assurance; l. Technical Reviews and Audits; m. Software Engineering Competencies Management, including managing software skills across numerous areas such as requirements, design, construction, testing, sustainment, quality, configuration management and human-computer interaction; n. Computer-Aided Software Engineering (CASE) and Integrated Development Environment (IDE) Technologies; o. Requirements Management Methods and Technologies; p. Test Management Methods and Technologies, including Automated Testing; q. Continuous Integration Methods and Technologies; r. Software Configuration Management; and s. Software Quality Concepts, Standards and Methods.
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2.5 Software Systems Specialist

The SW System Specialist shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 2;
- b. Intermediate shall be at a minimum level 3; and
- c. Senior shall be at a minimum level 3.

Software Systems Specialist (SwSS) must be capable of defining and implementing software systems requirements and processes within a specialized area of software systems development and maintenance not adequately covered by any other task resource category. Must work closely with the Software Systems Engineer and other software support disciplines to ensure that specialized concerns are identified, analyzed and addressed within the context of the overall software systems engineering effort.

No.	Criteria
1.	<p><u>Education.</u></p> <p>The SwSS must have:</p> <p>University undergraduate degree with sufficient content clearly related to the design, operation or sustainment of software-intensive systems;</p> <p>College diploma in an information technology (IT) related program; or</p> <p>On-job training (OJT) through work experience in the development and maintenance of software systems and hold a recognized professional or college certification in the relevant specialization.</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing specialized aspects of software systems engineering work, including relevant experience in any of the following areas:</p> <ol style="list-style-type: none"> Analyzing, designing, prototyping, implementing and testing management information systems (MIS); Analyzing, designing, prototyping, implementing and testing computer-based simulation systems; or Providing specialized input to the development and maintenance of other types of software systems. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ol style="list-style-type: none"> Rational Unified Process (RUP) for Software Development; Agile Methods for Software Development (in a deliberate and methodological approach, rather than ad-hoc); Software Systems Engineering V-Model; International and Industry Standards for Systems and Software Engineering, such as ISO/IEC 15288:2015, ISO/IEC 12207:2008 and Capability Maturity Model Integration (CMMI); Software Quality Assurance; Technical Reviews and Audits; Enterprise Architecture; Data Modeling and Database Design; Structured Message Formats; Geospatial Information Systems (GIS); Human-Computer Interaction (HCI) and User Experience (UX); Software Systems Sustainment;

	<ul style="list-style-type: none"> m. Software Configuration Management; n. Software Quality Concepts, Standards and Methods; and o. Computer-Aided Software Engineering (CASE) and Integrated Development Environment (IDE) Technologies.
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2.6 Software Systems Requirements Analyst

There is no junior level in this labour category.

The SW System Requirements Analyst shall meet the following Webb Depth of Knowledge:

- a. Intermediate shall be at a minimum level 2; and
- b. Senior shall be at a minimum level 3.

Software System Requirements Analyst (SwSRA) must be capable of performing stakeholder needs and expectations elicitation activities, analyzing the collected data to develop properly specified stakeholder requirements and, subsequently, working with other software support disciplines to develop all necessary levels of well-documented, fully traceable, configuration-managed software requirements in accordance with the established methods and procedures.

No.	Criteria
1.	<p><u>Education.</u></p> <p>The SwSRA must have:</p> <p>University undergraduate degree in engineering or applied science;</p> <p>College diploma in an information technology (IT) related program; or</p> <p>On-job training (OJT) through work experience in the development and management of software systems requirements and hold a recognized professional or college certification in requirements engineering or business analysis.</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing software requirements work, including experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Planning and conducting business analysis for the development and maintenance of management information systems (MIS), business applications or database management systems; b. Planning and conducting requirements development for computer-based simulation systems or other complex software systems; c. Developing and managing software requirements for real-time systems. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p>

	<ul style="list-style-type: none"> a. Rational Unified Process (RUP) for Software Development; b. Agile Methods for Software Development (in a deliberate and methodological approach, rather than ad-hoc); c. Software Systems Engineering V-Model; d. Business or Mission Analysis (often part of a project's Business Case Analysis) for Software Systems or System Elements; e. Requirements Development (i.e., Elicitation, Analysis, Specification and Validation) for Software Systems or System Elements; f. Requirements Management (i.e., Traceability, Prioritization, Agreement and Change Management) for Software Systems or System Elements; g. Software Verification and Validation (V&V); h. Software Quality Assurance; i. Computer-Aided Software Engineering (CASE) and Integrated Development Environment (IDE) Technologies; j. Business or Mission Analysis Standards, Methods and Technologies; k. Software Requirements Development Standards, Methods and Technologies; l. Software Requirements Management Standards, Methods and Technologies; and m. Software Quality Standards, Methods and Technologies.
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2.7 Software Tester

The SW Tester shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 1;
- b. Intermediate shall be at a minimum level 2; and
- c. Senior shall be at a minimum level 3.

Software Tester (SwT) must be capable of planning, conducting and documenting software testing activities at various levels of system element complexity in accordance with the established methods and procedures. Will also be expected to provide input into various requirements engineering activities regarding the testability of proposed requirements.

No.	Criteria
1.	<u>Education.</u> The SwT must have: University undergraduate degree in software engineering, systems engineering, electrical engineering, computer engineering, information systems or computer

	<p>science;</p> <p>College diploma in an information technology (IT) related program; or</p> <p>On-job training (OJT) through work experience in the planning and conduct of software systems testing and hold a recognized professional or college certification in software testing or software verification and validation (V&V).</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing software testing work, including experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Verifying and validating management information systems (MIS); b. Performing software testing for computer-based simulation systems or other complex software systems; or c. Planning and conducting software testing for real-time systems <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ul style="list-style-type: none"> a. Rational Unified Process (RUP) for Software Development; b. Agile Methods for Software Development; c. Software Systems Engineering V-Model (in a deliberate and methodological approach, rather than ad-hoc); d. Software Verification, including, as appropriate, inspection, analysis, demonstration and testing of software system elements; e. Software Validation, including fitness for purpose and user acceptance testing; f. Software Quality Assurance; g. Software Inspection and Analysis Standards, Methods and Technologies, including both manual techniques and the use of automated code analyzers; h. Software Testing Standards, Methods and Technologies, including those applicable to various types and aspects of black-box testing, white-box testing and automated testing; and i. Software Quality Standards, Methods and Technologies.

2.8 Software Developer

The SW Developer shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 1;
- b. Intermediate shall be at a minimum level 2; and

- c. Senior shall be at a minimum level 3.

Software Developer (SwD) must be capable of designing and coding software system elements for operation on a wide range of computing platforms using a variety of programming languages, software development methods and tools.

No.	Criteria
1.	<p><u>Education.</u></p> <p>The SwD must have:</p> <p>University undergraduate degree in software engineering, systems engineering, electrical engineering, computer engineering, information systems or computer science;</p> <p>College diploma in an information technology (IT) related program; or</p> <p>On-job training (OJT) through work experience in software programming and hold a recognized professional or college certification in software development or computer programming.</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing software development work, including experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Designing, coding and testing software system elements within an iterative and incremental software engineering process; b. Implementing application software through an Agile Method; or c. Implementing software as part of the development of real-time systems. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ul style="list-style-type: none"> a. Management Information Systems (MIS) Development and Support; b. Business Application Development and Support; c. Real-Time Systems Development and Support; d. Database Management Systems (DBMS) Development and Support; e. Structured Message Formats; f. Rational Unified Process (RUP) for Software Development; g. Agile Methods for Software Development (in a deliberate and methodological approach, rather than ad-hoc); h. Computer Programming (i.e., Design, Coding and Unit Testing) Standards, Methods and Technologies, including experience with a variety of programming languages; i. Computer-Aided Software Engineering (CASE) and Integrated

	Development Environment (IDE) Technologies; j. Test Management Methods and Technologies, including Automated Testing; k. Continuous Integration Methods and Technologies; l. Software Configuration Management; and m. Software Quality.
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2.9 Network Administrator

There is no intermediate level in this labour category.

The Network Administrator shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 1; and
- b. Senior shall be at a minimum level 2.

Network Administrator (NA) must be capable of administering one or more computer networks that employ a broad variety of hardware, software, applications, operating systems and environments. This includes managing the configuration of the network(s), monitoring and managing network performance and availability, maintaining network hygiene and monitoring and managing network security.

No.	Criteria
1.	<u>Education.</u> The NA must have: University undergraduate degree in software engineering, systems engineering, electrical engineering, computer engineering, information systems or computer science; College diploma in an information technology (IT) related program; or On-job training (OJT) through work experience in network administration and hold a recognized professional or college certification in network administration.

2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing network administration work, including experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Installation, configuration and maintenance of a business- or mission-critical computer network; b. Monitoring and management of the operations of a business- or mission-critical computer network; or c. Monitoring and management of the security and defence of a business- or mission-critical computer network. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ul style="list-style-type: none"> a. Cisco Certified Network Associate within the Routing and Switching field or Security field, or equivalent historical certifications (with justification); b. Microsoft Certified Solutions Associate, Microsoft Technology Associate, or equivalent historical certifications from Microsoft (with justification); c. Configuration and Maintenance of Computer Networks; d. Deployment, Configuration, Patching and Upgrade of switching and routing technologies. e. Management of Network Security Tools, including Firewalls, Access Control Lists, Anti-Virus Tools and Intrusion Detection Systems; f. Troubleshooting and Resolution of Network Connectivity and Performance Issues; g. Monitoring and Optimization of Network Speed and Availability; h. Installation, Configuration and Maintenance of Processing, Storage, Networking, End User and Peripheral Equipment, including Virtualization Technologies; i. Deployment, Configuration, Patching and Upgrade of Network Software, such as Enterprise Anti-Virus or Diagnostic Programs; j. Deployment, Configuration, Patching and Upgrade of Server-side Core Software, including but not limited to Windows Server, SQL Server, Microsoft Active Directory, Microsoft Exchange and Microsoft SharePoint; k. Implementation and Maintenance of Backup and Restoration Systems for Mission-Critical Network Servers;
A6-15/20 4 February 2018	<ul style="list-style-type: none"> l. Regulation of User Access to Devices, Services and Files; and m. Provision of End-User Desktop Support.

2.10 Technical Writer

There is no intermediate level in this labour category.

The Technical Writer shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 1; and
- b. Senior shall be at a minimum level 2.

Technical Writer (TW) must be capable of producing high quality technical documentation in a variety of formats and tools. Will be expected to provide advice on the appropriateness, applicability and effectiveness of specific technical documents, formats, notations and technologies.

No.	Criteria
1.	<u>Education.</u> The TW must have: University undergraduate degree; College diploma in a related program; or On-job training (OJT) through work experience in technical writing and hold a recognized professional or college certification in technical writing.
2.	<u>Experience.</u> Mandatory. Must have experience doing technical writing work, including experience in any of the following areas: <ol style="list-style-type: none">a. Authoring or editing user documentation or technical data packages (TDP) for business- or mission-critical software;b. Authoring or editing design and test documentation for business- or mission-critical software; orc. Authoring or editing software-related textbooks and student manuals. Additional Assets. Requires a combination of education and experience in many of the fields below: <ol style="list-style-type: none">a. User Guides;b. Online Help;c. Web-Based Documentation;d. Operator Manuals and Installation Guides;

	<ul style="list-style-type: none"> e. Programmer and Administrator Guides; f. Process Documentation, Operating Procedures and Work Flows; g. System Design Documents and Assembly Manuals; h. System Verification and Validation Documentation, including Test Plans, Trial Directives and Evaluation Instructions; and i. Authoring, Publishing and Content Management Standards, Methods and Technologies.
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2.11 Training Developer

There is no intermediate level in this labour category.

The Training Developer shall meet the following Webb Depth of Knowledge:

- a. Junior shall be at a minimum level 1; and
- b. Senior shall be at a minimum level 2.

Training Developer (TD) must be capable of planning, designing and developing professional quality, engaging and effective training materials, courseware and instructional/reference material for instructor-led classroom training, self-paced electronic learning (e-learning), virtual classroom training and webinar-based training, as well as embedded software training modules, tutorials and job aids. May be called upon to teach periodically, but the TD is focused primarily on developing training and reference materials for delivery by others, including self-paced student learning via learning management system or embedded training modules. Will be expected to provide advice on the appropriateness, applicability and effectiveness of specific methods, environments, tools and technologies for training development and delivery as they relate to particular products and training audiences.

No.	Criteria
1.	<u>Education.</u> The TD must have: University undergraduate degree; College diploma in a related program; or On-job training (OJT) through work experience in training development and hold a recognized professional or college certification in education technologies or instructional design.
2.	<u>Experience.</u> Mandatory. Must have experience doing training development work, including

	<p>experience in any of the following areas:</p> <ul style="list-style-type: none"> a. Designing and developing interactive web-based multimedia training modules to support self-paced e-learning; b. Planning, designing and developing training curricula and courseware for classroom-based instructor-led training on information technology; or c. Designing and developing job aids, help files, tutorials and embedded training modules for business- or mission-critical software systems. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ul style="list-style-type: none"> a. Adult Learning Theory, Concepts and Methods; b. Instructional Design Standards, Methods and Tools; c. Training Needs Assessment and Analysis; d. Process and Workflow Modelling Standards, Methods and Technologies; e. Learning Management System (LMS) Standards, Methods and Technologies including Sharable Content Object Reference Model (SCORM) conformant courseware modules; f. Multimedia E-learning and Computer-Based Training Standards, Methods and Technologies; g. Web-Authoring and Desktop Publishing Standards, Methods and Technologies; h. Advanced Use of Office Automation Technologies for Training Content Development and Maintenance; and i. Process Simulation Standards, Methods and Technologies.
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2.12 Field Service Representative

There is no junior or intermediate level in this labour category.

The Field Service Representative shall be at a minimum Webb Depth of Knowledge level 3.

Field Service Representative (FSR) must be capable of providing comprehensive technical support to end users regarding the installation, configuration, management, operation and use of supported software system elements. Must work closely with end users in various locations around the world and other members of the Land C4ISR Systems Integrated Product Team (IPT) to identify and resolve technical problems and usage issues on-site, to develop effective workarounds for problems and issues that cannot be readily resolved with local resources, and to educate end users on changes to system elements in terms of their impact on installation, configuration, management, operation and use of the software. Will be expected to provide technical reports and detailed recommendations to the IPT on problems and issues encountered

as well as end user needs and expectations for supported software system elements.

No.	Criteria
1.	<p><u>Education.</u></p> <p>The FSR must have:</p> <p>University undergraduate degree in software engineering, systems engineering, electrical engineering, computer engineering, information systems, computer science or information management;</p> <p>College diploma in a field related to information technology (IT) or information management (IM); or</p> <p>On-job training (OJT) through work experience in the provision of on-site technical support to end users of management information systems (MIS) or command and control information systems (C2IS).</p>
2.	<p><u>Experience.</u></p> <p>Mandatory. Must have experience doing end-user support work for information systems, including experience in any of the following areas:</p> <ol style="list-style-type: none"> Developing and delivering formal instruction to end users on the management, operation or use of MIS or C2IS as part of an approved training curriculum in government, industry or academia; Providing “front-line” user support, including technical support, information management, workflow enhancement and/or user training, for MIS or C2IS software in government or industry; or Acting as a an end user representative to provide user input and feedback to MIS or C2IS software development, to design and conduct user acceptance testing for MIS or C2IS software, and/or to develop end user procedures for the management, operation and use of MIS or C2IS software. <p>Additional Assets. Requires a combination of education and experience in many of the fields below:</p> <ol style="list-style-type: none"> Canadian Armed Forces (CAF) Land Operations Doctrine, Command and Control (C2) Processes, and Command and Staff Procedures; CAF Land C4ISR Systems Technologies; CAF Signal Doctrine, including Signal Structures and the System Management Procedures for Land C4ISR Systems Technologies

	<ul style="list-style-type: none">d. Information Management (IM) Standards, Methods and Tools;e. Process and Workflow Modelling Standards, Methods and Technologies;f. Process Documentation, Operating Procedures and Work Flows;g. Advanced Use of Office Automation Technologies for Training Content Development and Maintenance;h. Configuration and Maintenance of Computer Networks;i. Management of Network Security Tools, including Firewalls, Access Control Lists, Anti-Virus Tools and Intrusion Detection Systems;j. Troubleshooting and Resolution of Network Connectivity and Performance Issues;k. Monitoring and Optimization of Network Speed and Availability;l. Installation, Configuration and Maintenance of Processing, Storage, Networking, End User and Peripheral Equipment, including Virtualization Technologies;m. Deployment, Configuration, Patching and Upgrade of Network Software, such as Enterprise Anti-Virus or Diagnostic Programs;n. Deployment, Configuration, Patching and Upgrade of Server-side Core Software, including but not limited to Windows Server, SQL Server, Microsoft Active Directory, Microsoft Exchange and Microsoft SharePoint;o. Implementation and Maintenance of Backup and Restoration Systems for Mission-Critical Network Servers;p. Regulation of User Access to Devices, Services and Files; andq. Provision of End-User Desktop Support.
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