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Solicitation No. - N° de l'invitation 9F052-150101/A	Date 2015-06-16
Client Reference No. - N° de référence du client 9F052-15-0101	
GETS Reference No. - N° de référence de SEAG PW-\$MTB-690-13302	
File No. - N° de dossier MTB-5-38031 (690)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-08-11	
Time Zone Fuseau horaire Heure Avancée de l'Est HAE	
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Address Enquiries to: - Adresser toutes questions à: Paquin, Esther	Buyer Id - Id de l'acheteur mtb690
Telephone No. - N° de téléphone (514) 496-3889 ()	FAX No. - N° de FAX (514) 496-3822
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: AGENCE SPATIALE CANADIENNE Exploration Spatiale/Space Explor. 6767 ROUTE DE L AEROPORT ST HUBERT Québec J3Y8Y9 Canada	

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1	LSRS - Bio Analysis	9F052	9F052	1	EA		\$	XXXXXXXXXXXX		

Solicitation No. - N° de l'invitation

9F052-150101/A

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

mtb690

Client Ref. No. - N° de réf. du client

9F052-15-0101

File No. - N° du dossier

MTB-5-38031

CCC No./N° CCC - FMS No/ N° VME

- Please refer to the REQUEST FOR PROPOSALS (RFP) hereto attached -

NOTE: Applicable documents in the Table 3-1 of the Annex A-Statement of Work included in the Request for Proposals are available at the following site:

<ftp://ftp.asc-csa.gc.ca/users/tpsgc/pub>



CSA-LSRS-SOW-0002

Canadian Space Agency Space Exploration Projects

**International Space Station
Life Science Research System (LSRS)**

Bio-analysis System

Statement Of Work (SOW)

Revision A

March 27, 2015

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**Canadian Space
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1 INTRODUCTION

1.1 SCOPE

The Life Science Research System (LSRS) consists of a research platform composed of health diagnostic technologies that will be deployed on the International Space Station to support the identification, characterization and mitigation of risks to humans in space. The LSRS supports Canada's continued commitment to the ISS and contributes to the enhancement of Canada's return on ISS investment.

This Statement of Work defines the work for Phases A, B, C and optional Phase D of the LSRS Bio-analysis System.

The scope of Phases A, B and C includes the design of the Bio-analysis System including the manufacturing, testing and delivery of an Engineering Qualification Model (hardware and software) and associated maintenance and ground support equipment.

The scope of the optional Phase D includes the manufacturing, testing, and delivery of two Flight Models (hardware and software) and associated commissioning and maintenance kits, ground commanding and telemetry stations and ground support equipment. The Phase D scope also includes on-orbit commissioning as well as support to launch and integration of one Flight Model into the ISS.

The launch of the Bio-analysis System to the ISS is excluded from the scope of work. The CSA is responsible for the launch and any associated coordination activities. The scope of work also excludes on-orbit operation as well as science utilization of the System after commissioning.

The Bio-analysis System must meet the requirements as defined in Section 3 (Applicable Documents). These include the specific Bio-analysis System functional and performance requirements as well as other applicable requirements such as ISS engineering, interface, quality, safety and operational requirements.

1.2 BACKGROUND

Although the ISS is well equipped for health and life sciences research, possessing ultrasound imaging systems, blood pressure monitoring capability, and many other research/medical tools, the equipment available for cellular and molecular biology are still limited compared to capabilities found in laboratories on Earth. To address this limitation, the CSA is looking for novel systems, instruments or technologies, designated as LSRS, to supplement Life Sciences research capabilities on ISS and to help CSA meet its mandate, which is to address the principal health risks of human spaceflight.

The Bio-analysis System performs on-orbit quantification of biological molecules from samples collected and prepared on board the ISS. The analysis is similar to the one performed using a flow cytometer in research laboratories. The basic principle of conventional flow cytometers is that a sample is passed through a fluidic pathway where it intersects the path of a light source. This light excites the fluorescent tags in the samples and the emitted fluorescence is correlated with the frequency of tagged cells or, for the micro-bead assay, soluble molecules.

This Bio-analysis System performs the detection and quantification of cell surface molecules on a per cell basis (in particular for blood cell counts) and the assessment of soluble molecule concentration in a

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liquid sample. In order to enable flow cytometry on board the ISS, biological samples are processed (see section 3.3) to tag biomarkers of interest before analysis by the flow cytometer. Therefore, the Bio-analysis System needs to perform two processes: sample processing and sample analysis. The sample processing enables fluorescent tagging of cells or molecules using fluorescent antibodies for analysis. It processes liquid samples to produce two end-products: either cell populations tagged by fluorescent-labelled antibodies, or soluble molecules tagged with micro-beads or similar technology.

1.3 MISSION CONCEPT

The System will act as the central piece of equipment that gathers scientific data in support of specific investigations initiated by a Canadian or international Principal Investigator (PI). In case of a Canadian PI, the investigation will usually be integrated into the ISS utilisation program by a CSA Mission Team. In all cases, only minimal ground support will be provided to the crewmember. It is therefore essential that the System operation be simplified as much as possible. Since crew time, stowage and cold stowage space, as well as launch mass allocations are very limited, it is critical that the System design optimizes resource allocation. Most investigations must be performed during very precise time windows with very limited sample size. System availability is therefore a critical element for the success of such experiments.

Figure 1-1 shows the mission elements and the associated sequence of events from development to full science operation. After successful commissioning, the System will be declared operational by CSA and ready to support scientific investigations.

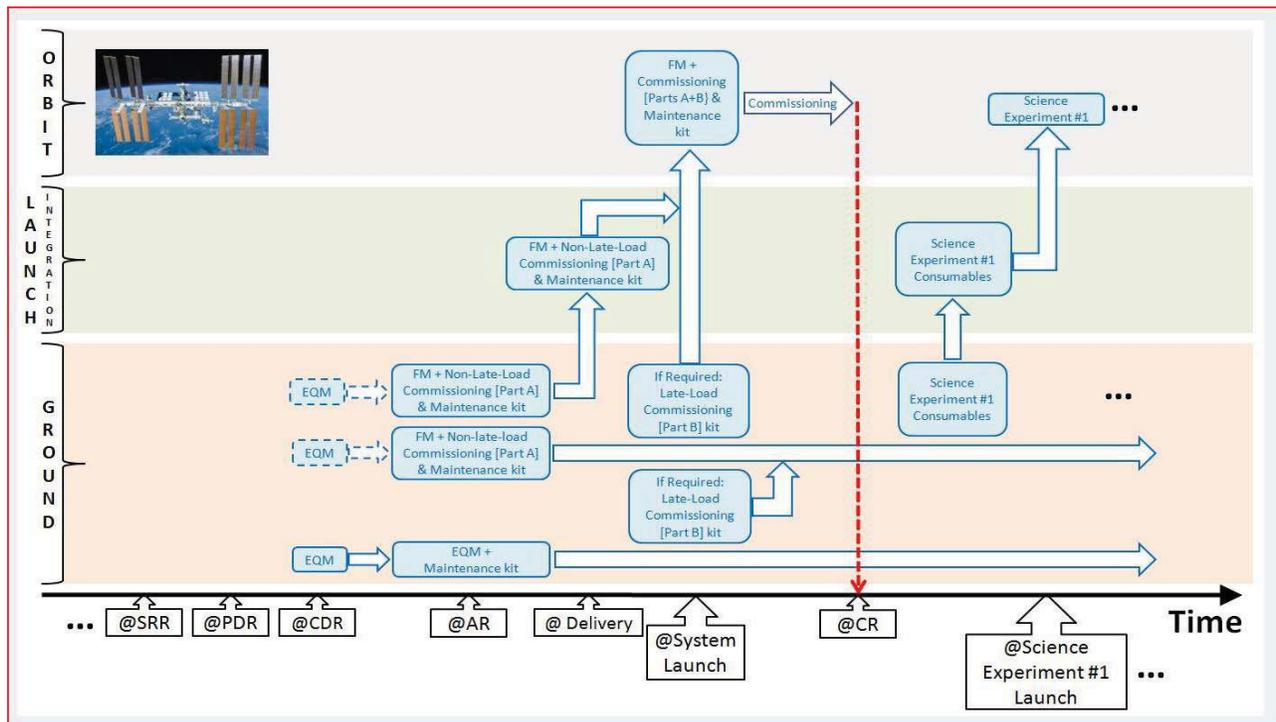


FIGURE 1-1 : MISSION CONCEPT AND TIMELINE

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Figure 1-2 shows the operation concept including the flight and ground-based mission elements.

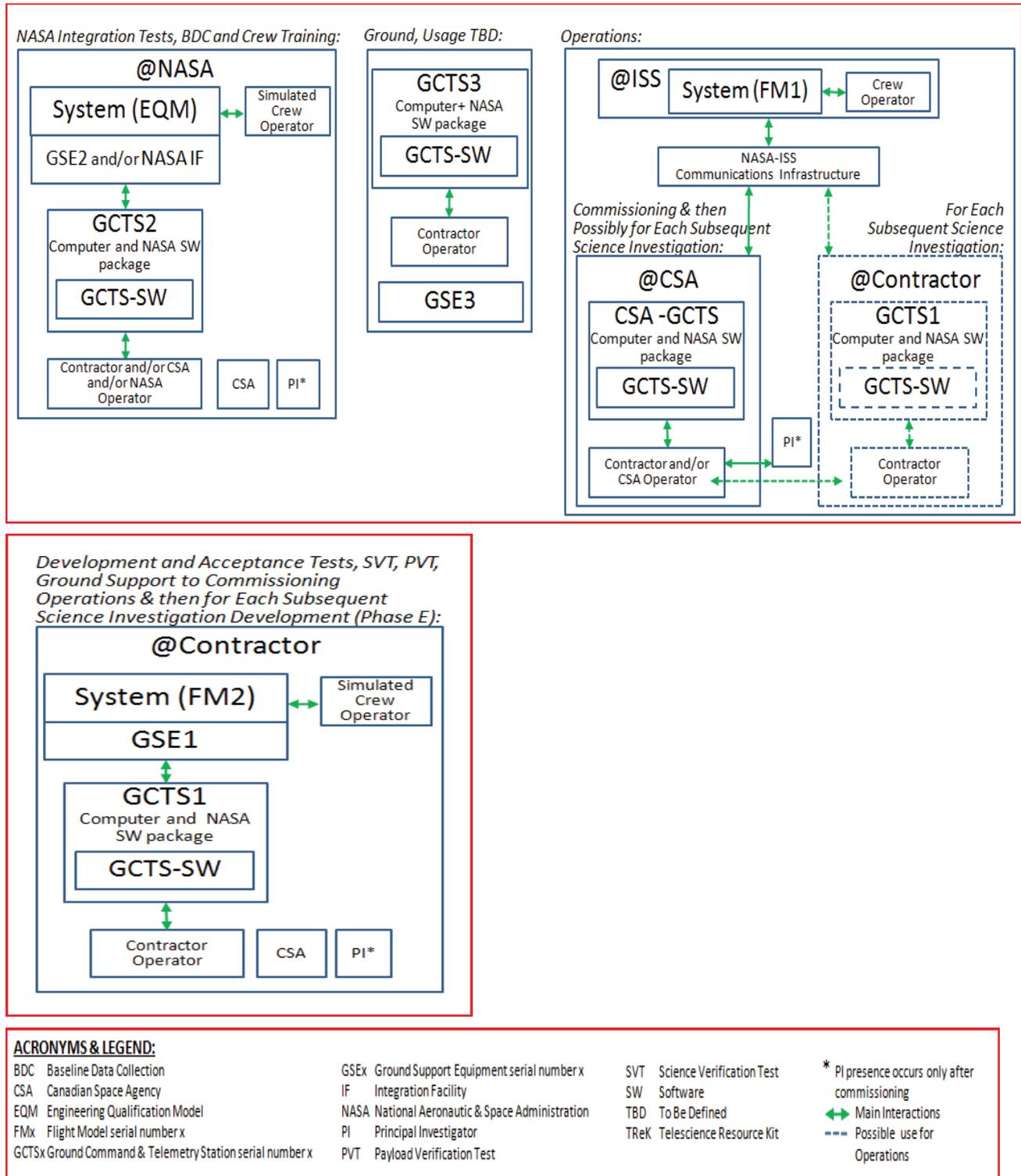


FIGURE 1-2 : OPERATION CONCEPT

2 ASSUMPTIONS

Below are the general assumptions that form the basis of this contract.

2.1 DEFINITIONS, LANGUAGE, AND DOCUMENT CONVENTION

2.1.1 Definitions

The following definitions are applicable to this document.

Contractor	Contractor refers to the Canadian prime Contractor responsible for delivering the work as per this Statement of Work.
Contract Authority	* The Public Works and Government Services Canada (PWGSC) representative that has the authority to sign Contracts and approve modifications and invoices for the Government of Canada.
Contract	* PWGSC-awarded contract responding to the requirements set out in the current SOW.
Flight Model (FM)	The FM is built to full flight standards in accordance with PA and CADM requirements. FMs are subjected to acceptance level environmental testing.
Engineering Qualification Model (EQM)	An EQM is fully representative of the FM and built to full flight standards (i.e., form, fit and function) in accordance with the PA and CADM requirements. EQMs are subjected to qualification level environmental testing.
Project	Defined here as the sum of activities specified and under authority of the PWGSC contract negotiated to carry out the Work.
System	Refers to the overall assembly made of the Contractor Flight Model (and its other models of) hardware, Flight Software and any ISS items that are required to perform the activities that meet the requirements of this SOW.
Work	* The work specifically described in this SOW or resulting from the requirements herein.
Technical Authority	* The CSA Scientific/Technical Authority (TA) for the project is the person responsible for the management of the Work on behalf of the CSA. He/she, or the delegate, will be the direct interface with the Contractor and will monitor progress on the contract, verify that the contract Work has been completed satisfactorily, and will indicate this by signing off on claims together with the Contract Authority, and participate in negotiating changes to the contract.

** These definitions are part of the General Conditions 2040 or identified in the contract document. They have been added here for sake of completeness and convenience in understanding this document. The definitions presented in 2040 or the contract document, take precedence in case of discrepancy.*

2.1.2 Language

As English is the standard oral and written language for design, development, operation and utilization on the International Space Station (ISS), the Contractor must use English for this Work, and for exchanges with CSA, along with System International (SI) units.

2.1.3 Document Convention

The following verbs, as used in this document, have the specific meaning as indicated below:

“must”	Indicates a mandatory requirement.
“should”	Indicates a preferred, but not mandatory alternative.
“may”	Indicates an option.
“will”	Indicates a statement of intention.

2.2 ROLES & RESPONSIBILITIES

Many partners share the responsibilities for the success of this effort. Here is a summary of their roles and responsibilities:

CSA:

- a) Contractual Technical Authority (TA).
- b) Main coordinator for the overall Work.
- c) Main interface and generates agreement with the ISS Program and the ISS International Partners.
- d) Manifests the System for launch to the ISS.
- e) Coordinates all in-flight activities.

NASA:

- a) Overall ISS integrator.
- b) Technical authority for all ISS processes and acceptability.
- c) Provides the Payload Integration Manager (PIM) that will facilitate the integration of the System into the ISS program.
- d) Coordinates launch with launch provider, based on the manifest request from CSA.
- e) Provides resources required to support the mission.

Contractor:

Designs, constructs, tests, qualifies, certifies, delivers and commissions the system.

Public Works and Government Services Canada (PWGSC):

- a) Contractual Authority.
- b) The only entity allowed to change the scope of Work.

3 DOCUMENTS

3.1 APPLICABLE DOCUMENTS

The following documents latest release versions are applicable and form an integral part of this document to the extent specified herein.

TABLE 3-1: APPLICABLE DOCUMENTS

AD No.	Document Number	Document Title
AD1	CSA-LSRS-RD-0003	Bio-analysis System Functional and Performance Requirements Document
AD2	CSA-SE-STD-0001	Systems Engineering Technical Reviews Standard.
AD3	CSA-ST-GDL-0001	Technology Readiness Levels and Assessment Guidelines.
AD4	ESTEC, TEC-SHS/5574/MG/ap	Technology Readiness Levels Handbook for Space Applications.
AD5	CSA-ST-FORM-0003	Critical Technologies Elements Identification Criteria Worksheet.
AD6	CSA-ST-FORM-0001	Technology Readiness and Risk Assessment Worksheet.
AD7	CSA-ST-RPT-0002	Technology Readiness and Risk Assessment Data Rollup Tool.
AD8	CSA-LSRS-RD-0002	LSRS Product Assurance Requirements Document for Bio-analysis

4 WORK REQUIREMENTS

This section describes the Work requirements that the Contractor must meet. Some requirements are driven by the National Aeronautics and Space Administration (NASA). As stated in Section 3, the latest released versions of the documents included in Table 3-1 are applicable. If requirements are conflicting between documents, the CSA must be consulted and the most stringent requirement must be used.

4.1 PROJECT MANAGEMENT

The Contractor must manage the Bio-analysis System project to achieve successful performance, scope, quality, and schedule requirements of this SOW.

The Contractor must provide the management, technical leadership, and support necessary to ensure effective and efficient performance of all project efforts and activities. The Contractor must dedicate experienced personnel to the project in all the disciplines required to carry out the work.

The Contractor personnel must establish and maintain a close management and technical interface with the CSA to assure a coordinated program effort to meet or exceed the project objectives.

The Contractor must include, within its program management structure, the necessary leadership to effectively manage the performance of subcontractors in keeping with the project objectives.

The Contractor must implement the Project Management Plan to be provided with the proposal as per CDRL 1.

4.1.1 Scope Planning (Work Breakdown Structure and Work Packages)

The project must be planned, controlled and directed according to the Work Breakdown Structure (WBS) and associated WBS Dictionary to be provided with the proposal as per CDRL 2.

The WBS, which describes all the project elements that organise and define the total work scope of the project, must be deliverable-oriented and must include, at the minimum, the major deliverables which represent the main functions of the System (i.e., Sample Preparation (cells), Sample Preparation (molecules) and Sample Analysis).

The WBS Dictionary defines the work to be done against each WBS element identified in the WBS, by means of a Work Package Description (WPD) for each such element.

4.1.2 Project Schedule

Table 4-2 shows the Project Milestones Schedule. The Contractor must maintain and deliver the Project Schedule each month as per CDRL 3. The schedule must also be provided with the proposal. The schedule must be based on the WBS.

4.1.3 Project Management Control

The Contractor must provide a management function for the monitoring, control, and reporting of the Work. The Contractor must demonstrate that it has an established project management control System and that it is used to provide timely visibility of the Work's status of costs, schedule, technical, performance and risk issues, in order to allow proactive problem solving in concert with the TA. The management control system must provide for cost effective and timely re-planning of activities to support workarounds. The management control system must track the total costs on a monthly basis. This is in addition to cost management required at the contract level. The contractor must maintain and provide CDRLs as per the due dates defined in Appendix B.

The management control system must track, control and report project costs on a monthly basis through the Monthly Progress Report (CDRL 4).

4.1.4 Progress Reporting

The Contractor must provide Monthly Progress Reports (CDRL 4) to the CSA and to the Contracting Authority, no later than 7 working days after the end of the month covered by the report.

4.1.5 Risk Management

The Contractor must have a risk management process to control hardware, software, and documentation. The Contractor must continuously identify and monitor areas of cost, schedule, programmatic and technical risk and must identify and implement risk reduction/resolution/mitigation activities. The Contractor must assess and report the status of each risk element in the Monthly Progress Report (CDRL 4) and at all technical reviews.

4.1.6 Export Control

The Contractor must obtain and manage, as applicable, all the necessary Export Control permits and documentation as well as any Technical Assistance Agreements related to the International Traffic in Arms Regulations for hardware, software and documentation resulting from the Work.

4.1.7 Intellectual Property

The Contractor must explicitly define the Foreground Intellectual Property (FIP) generated during the execution of the contract and report this in the IP Disclosure Report (CDRL 14). This document must also identify the Background Intellectual Property (BIP) that is required to use the FIP. The BIP disclosure must also be provided with the proposal as per CDRL 14.

4.2 SCHEDULE CONSTRAINTS

The Contractor must deliver according to the Project Milestones schedule shown in Appendix A, or earlier. The Contractor is encouraged to find schedule efficiencies, and even to propose a more compressed schedule and/or combined phases to CSA. The only phase that cannot be combined is Phase D. The contractor is allowed to procure long lead items prior to Phase D.

4.3 REQUIREMENTS AND SYSTEM MODELS

The system must meet the requirements detailed in the System Functional and Performance Requirements Document (AD1) as well as all the NASA requirements required for flight qualification.

The System Models must be implemented and delivered as per Table 4-3.

All models (i.e., EQMs and FMs) must always be kept identical in form/fit/function/part type to all other models and must be interchangeable for all tasks, with the exception that only FMs are allowed for the acceptance tests and to be launched to space.

4.4 SPARING APPROACH

The Contractor must procure spares in sufficient quantities to ensure that all System models are maintained in fully operational condition to support a minimum of 5 years of ISS space operations (hereafter called the “operational period”). This period includes post-commissioning and must take into account the models remaining on the ground. The delivery schedule of all spares is the same as the FM that will fly to the ISS. Flight spares must be packaged in the launch configuration.

Bio-analysis System Statement Of Work (SOW)

Note: The models which will remain on ground (one EQM and one FM) will exceed the ISS FM usage. These are necessary for various activities such as assay development, protocols tests and validations, baseline data collection and training for ground personnel etc. Both units remaining on the ground shall meet the same availability requirement as the ISS FM, based on a usage five times higher than the ISS FM usage described in AD1.

4.5 COMMISSIONING APPROACH

The Contractor is responsible for commissioning the System as per the benchmark assay described in (AD1). The Contractor must procure commissioning items (non late-load and late-load if any) and their spares in sufficient quantities to ensure that the commissioning of the System on the ISS is completed, and equivalent ground commissioning on all System models is also completed. Items are considered late-load when they have a short life before being used, and cannot survive the time period between non late-load item delivery to NASA and the launch, which is several months. An example of a late-load item is a set of biological samples that must be kept colder than ambient temperature and have a life of only a few weeks. Late-load items must be delivered to NASA 48 hours before launch, are logistically much more demanding than the non late-load deliveries, require on-site launch support and therefore must be minimized by the Contractor. Late-load versus non late-load decisions are Contractor-recommended and must be approved by CSA. The commissioning activity is defined as a contractor-designed demonstration of all requirements that can be verified on the ISS, and their ground equivalents for the other models. Flight commissioning items must be packaged in the launch-ready configuration. The Contractor must support, in coordination with CSA, the NASA required documentation for manifesting the System. The Contractor must support live in-flight commissioning from the CSA, likely the PTOC. The Contractor must perform commissioning data analysis and debugging until successfully completed. All PTOC related activities will be led by CSA personnel. The Contractor will act as support position to CSA PTOC operators. The contractor must provide a Commissioning Plan (CDRL 38).

4.6 IN-FLIGHT CREW TRAINING AND PROCEDURE APPROACH

The Contractor must provide support to CSA to generate, update, submit and obtain approval for in-flight Crew training materials and procedures; supplying the text, figures, instructions, diagrams, photographs and video-clips (CDRL 27) as required.

4.7 PHASE E PLAN

The Contractor must produce a Phase E plan (CDRL 37) to support the planning and implementation of the post-commissioning activities.

4.8 MEETINGS AND REVIEWS

The Contractor must lead and/or support a series of meetings and reviews. The following table provides a summary:

TABLE 4-1 : MEETINGS AND REVIEWS

Meetings/Reviews	Lead	Date	Location	Participants
Kick-Off Meeting	CSA	Within 1 month of Contract Award	CSA	CSA, Contractor, Sub-contractors
System Requirements Review	Contractor	As per proposed schedule	Contractor	CSA, Contractor

Bio-analysis System Statement Of Work (SOW)

Meetings/Reviews	Lead	Date	Location	Participants
Preliminary Design Review	Contractor	As per proposed schedule	Contractor	CSA, Contractor
Critical Design Review	Contractor	As per proposed schedule	Contractor	CSA, Contractor
Phase 0/I/II Safety Reviews	NASA	As per proposed schedule and NASA process	NASA	CSA, NASA, Contractor
Test Readiness Reviews	Contractor	As per proposed schedule	Teleconference	CSA, Contractor
Phase III Safety Review	NASA	As per proposed schedule and NASA process	NASA	CSA, NASA, Contractor
Acceptance Review	Contractor	As per proposed schedule	Contractor	CSA, NASA, Contractor
Pre-Ship Review	Contractor	As per proposed schedule	Contractor	CSA, NASA, Contractor
Bench Review/ Handover to NASA	NASA	As per proposed schedule and NASA process	NASA	CSA, NASA, Contractor
Commissioning Review	Contractor	As per proposed schedule	Contractor	CSA, Contractor, Sub-contractors
Operational Assessment Review	NASA	As per proposed schedule and NASA process	NASA	CSA, NASA, Contractor
Human Factor Interface Team (HFIT)	NASA	As per proposed schedule and NASA process	NASA	CSA, NASA, Contractor
ISS Program Label Assessment Team (IPLAT)	NASA	As per proposed schedule and NASA process	NASA	CSA, NASA, Contractor
Operations Training Strategy Team	NASA	As per proposed schedule and NASA process	Teleconference	CSA, NASA, Contractor
Project Status Meetings	CSA	Weekly	Teleconference	CSA, Contractor
Technical interchange meetings with NASA (e.g. interfaces, safety, etc.)	Subject dependant	Ad-hoc	Teleconference	CSA, NASA, Contractor

For Contractor-led meetings and reviews the Contractor must provide Meeting Agendas (CDRL 6) and Meeting Minutes (CDRL 7). Minutes will primarily report decisions.

The Contractor must maintain a detailed Action Item Log (AIL, CDRL 9) throughout the Work to track actions and decisions resulting from meetings and reviews

For NASA-led meetings and reviews, the Contractor must provide the necessary contributions, which may include documentation, oral presentation, and supporting visual media. The contractor must assume that agendas, meeting minutes and action items will be provided by NASA.

If acceptable to CSA, the requirement for any of the above mentioned reviews/meetings could be waived when it coincides with other review meetings.

Additional teleconferences and face-to-face review meetings will be held if necessary when mutually agreed to by the Contractor and the CSA.

The contractor must produce and deliver to CSA the Meeting/Review Presentation (CDRL 10) before each meeting or review. The Review Data Package (CDRL 11) must be delivered to the CSA prior to each review.

For major reviews, the Contractor must provide written responses to Review Item Discrepancies (RIDs) within ten (10) working days of receipt or as agreed with CSA. The review is considered complete when RID dispositions are provided and agreed upon to the satisfaction of CSA.

4.8.1 Weekly Project Status Meetings

The Contractor must conduct weekly project status meetings with CSA to review the project status and to resolve unforeseen and urgent issues. The selection of participants will depend on the nature of the issue. These meetings must be held by teleconference.

4.8.2 Kick Off Meeting (KOM)

The contractor must support a KOM at the CSA in the first month after Contract award. The Work must start when the contract starts, not waiting for the KOM to occur. The purpose of the KOM is to introduce the Contractor and CSA teams, review the scope of work, the schedule, the basis of payment and discuss any other topics as required. All key participants under the contract, including representative from each major subcontractor, must attend.

4.8.3 System Requirement Review (SRR)

The contractor must prepare and conduct an SRR meeting. The purpose of the SRR is to demonstrate the validity of the system requirements and the project readiness to proceed with the preliminary design.

The SRR must meet the objectives, entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

The SRR Data Package (CDRL 11) must include as a minimum the CDRLs as per the due date and version in the CDRL (Table 4-5).

4.8.4 Preliminary Design Review (PDR)

The contractor must prepare and conduct a PDR meeting. The purpose of the PDR is to demonstrate that the preliminary design meets all the requirements and is feasible within the cost and schedule constraints, and that the project is ready to proceed with the detailed design.

The PDR must meet the objectives, entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

The PDR Data Package (CDRL 11) must include as a minimum the CDRLs as per the due date and version in the CDRL (Table 4-5).

4.8.5 Critical Design Review (CDR)

The contractor must prepare and conduct a CDR meeting. The purpose of the CDR is to demonstrate that the final detailed design will meet all requirements and is feasible within the cost and schedule constraints, and that the project is ready to proceed with the manufacturing, assembly, integration and test.

The CDR must meet the objectives, entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

The CDR Data Package (CDRL 11) must include as a minimum the CDRLs as per the due date and version in the CDRL (Table 4-5).

4.8.6 Phase 0/III Safety Reviews

The purpose of the Safety reviews is to demonstrate to NASA that the safety requirements are met, knowing that safety to the crew and vehicle are the highest-level requirement of the ISS. The Contractor must prepare a Flight Safety Data Package (FSDP, CDRL 12) and must deliver it to CSA and then to the Payload Safety Review Panel (PSRP), after which the Contractor must schedule, via the PIM, and present at the actual Flight Safety Review (FSR) meeting, which is usually held at JSC.

4.8.7 Test Readiness Review (TRR)

Before the start of acceptance test the Contractor must conduct a TRR to authorize the start of testing. The TRR must be held at the completion of assembly and integration and prior to the start of acceptance testing. The Contractor must notify the CSA of the TRR in advance and provide the TRR data package (CDRL 11) including checklist at the TRR.

The purpose of a TRR is to demonstrate that the test article hardware or software, test facility, ground support personnel, and test procedures are ready for testing, and for data acquisition, reduction, and control.

The TRR must meet the objectives; entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

4.8.8 Phase III Safety Review

After successful completion of all verification tests, the Contractor must schedule (via the PIM) and present the Phase III Safety Review with the goal of obtaining flight safety certification. The Contractor must prepare a FSDP (CDRL 12) according to the PSRP requirements. When the package is ready, it must be delivered to CSA and then to the PSRP, after which the Contractor must schedule, via the PIM, and present the actual FSR presentation at NASA.

4.8.9 Acceptance Review (AR)

For the EQM and the FMs, the contractor must hold an AR to demonstrate to CSA that the System has been finalized, can be accepted as built and tested..

The AR must meet the objectives, entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

The AR Data Package (CDRL 11) must include as a minimum the CDRLs as per the due date and version in the CDRL (Table 4-5).

4.8.10 Pre-Shipment Review (PSR)

The contractor must hold a PSR prior to shipment of the System to the NASA integration facility. The PSR could be combined with the AR.

The PSR must meet the objectives, entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

4.8.11 Delivery, Bench Review and Handover to NASA

The Contractor must provide resources, logistics and transport to deliver the System to NASA for bench review and/or final on-dock delivery of one FM. The Contractor must be responsible for obtaining access clearance to the necessary NASA facilities. The Contractor must advise and coordinate with CSA accordingly.

4.8.12 Commissioning Review (CR)

After the successful commissioning, the CR demonstrates that ground and flight hardware, ground and flight software, personnel, ground and flight procedures, ground and flight databases, ground and flight documentation are operationally ready. If this review is successful, CSA will declare the System operational.

The CR must meet the objectives, entry and exit criteria detailed in the Systems Engineering Technical Reviews Standard (AD2).

4.8.13 Other Reviews

Other reviews, of less importance from a resources point of view, but nevertheless part of the review cycle, must be supported at NASA. These typically include the Operational Assessment Review, Human Factor Interface Team (HFIT), ISS Program Label Assessment Team (IPLAT), and the Operations Training Strategy Team.

4.9 LIAISON AND COMMUNICATION REQUIREMENTS

The Contractor must establish channels of communication with the CSA for monitoring of the Work and performance and therefore must provide access to its facility and personnel, at mutually agreeable dates, by representatives of the CSA or other organizations nominated by the TA. The Contractor must provide access to their office facilities and equipment on a temporary basis for the use of the CSA representatives (and the nominated attendees) visiting the Contractor's premises for reviews, meetings, audits, liaison, etc. Office facilities include desk space, telephone access and Internet access. The Contractor must also undertake to arrange at the TA's request for such facilities to be available at the major subcontractors. All documentation and data generated by the Contractor and its major subcontractors for the Work must be accessible to the TA for review.

4.9.1 External Communications

The Contractor communications external to the project Team must be coordinated and approved by CSA. This includes with the public, other companies or government entities, and conferences.

4.10 PRODUCT ASSURANCE (PA)

The Contractor must implement the Product Assurance Implementation Plan (PAIP, CDRL 5) which must be compliant to the LSRS Product Assurance Requirements (AD8) to support all tasks under the Contract and subject to periodic review or audit by CSA or its designated representative(s). The approved PAIP must be used as the basis for determining compliance to PA requirements during any audits. In particular for such a System to the ISS, the Contractor must assure the overall System safety of the design that eliminates, reduces, or minimizes safety risk to an acceptable level. The Contractor must support all reviews of this safety documentation. The Contractor must meet as well the requirements for ground safety operations, as specified by the launch site or worksite used for hardware testing and/or processing. The Product Assurance Implementation Plan must be provided with the proposal as per CDRL 5.

4.10.1 Right of Access

A CSA PA representative must be provided the right of access, on a non-interference basis, to the Contractor and subcontractor facilities and information, documents and records related to deliverable items. The CSA representative must be provided reasonable facilities and equipment normally available to the Contractor's PA and engineering personnel and any other basic assistance so that CSA personnel can perform their duties with safety and convenience.

4.10.2 Audits

The CSA must have the right to perform audits of the Contractor and subcontractors to assess conformance to the expected PA for such Work. Data and documentation generated by the Contractor and subcontractor, including design and test data and PA program documentation, are subject to review, evaluation and inspection by the TA. The Contractor must notify the TA of any audits of subcontractors or suppliers. The CSA reserves the right to be represented at subcontractor and supplier audits performed by the Contractor.

4.10.3 Flight Safety Data Package (FSDP)

The contract must prepare the FSDP (CDRL 12) as stated in Sections 4.8.6 and 4.8.8.

4.10.4 Failure Modes Effect and Critical Assessment (FMECA)

The contractor must prepare the FMECA report (CDRL 29).

4.10.5 Material Identification and Usage List (MIUL)

The Contractor must generate the MIUL (CDRL 30) in NASA format.

4.10.6 Declared EEE Parts List

The Contractor must generate Declared EEE Parts List (CDRL 31). The intent can be met by providing a manufacturing parts list, e.g., electronics parts Bill of Material (BOM).

4.10.7 Declared Mechanical Parts List

The Contractor must generate a Declared Mechanical Parts List (CDRL 32). The intent can be met by providing a manufacturing parts list, e.g., mechanical parts Bill of Material (BOM).

4.10.8 Non-Conformance Review Board and Reporting

The Contractor must maintain non-conformance review board minutes and non-conformance reports in accordance with LSRS Product Assurance Requirements (AD8) and (CDRL 39).

4.10.9 Request for Deviation and Waiver

In the event that a requirement cannot be complied with, the Contractor must submit a Request for Deviation (RFD) or a Request for Waiver (RFW) (CDRL 40).

4.11 CONFIGURATION AND DATA MANAGEMENT (CADM)

4.11.1.1 Configuration and Data Management System

The Contractor must maintain a Configuration and Data Management process that:

- Identifies the functional and physical characteristics of the system;
- Controls changes to those characteristics; and
- Provides status on change activity.

The Contractor must document its CADM plan in the Product Assurance Implementation Plan.

4.11.1.2 Configuration Change Control

The Contractor must establish a Configuration Review Process for the purpose of comprehensively evaluating proposed or requested changes and variances and of assessing the total impact (technical, cost, schedule, risk, safety, etc.) of each change or variance. The Contractor must request approval before the implementation of any changes that affect requirements, safety, interface, form, fit or function.

4.12 ENGINEERING

4.12.1 Requirements, Design and Development

The contractor must develop the System Requirements Documents (CDRL 17), System Specification Documents (CDRL 19), architecture definition, Computer Aided Design (CAD) models and analyses (CDRL 28), design documents (CDRL 18), engineering budgets, layouts, drawings, technical notes as applicable, to support the design.

The contractor must produce the Interface Control Document (CDRL 34) for the hardware and software, including internal and external interfaces.

The contractor must develop the Software Development Plan (CDRL 35) and the Software Version Description (CDRL 36).

4.12.2 Technology Readiness and Risk Assessment

The Contractor must perform a Technology Readiness and Risk Assessment (TRRA) in accordance with the requirements of the CSA Technology Readiness and Risk Assessment Guidelines (AD3) and the Technology Readiness Levels Handbook for Space Application (AD4), to formally document the system technology status. The Contractor must produce CDRL 15 for the TRRA using the Critical Technologies Elements Identification Criteria Worksheet (AD5) as well as the Technology Readiness and Risks Assessment Worksheet (AD6) for each Critical Technology Element (CTE) and Rollup using (AD7).

4.12.3 Verification Plan (VP)

The Contractor must undertake a review of all the requirements and ensure that all have been captured in the VP (CDRL 20), which must be prepared and submitted to CSA for approval.

The Contractor must perform verification activities on the detailed design to demonstrate that it complies with the requirements. The VP must be developed for the purposes of assessment and ultimately the validation leading to the acceptance and flight qualification of the system. The plan must address test and evaluation activities on a fully integrated basis, employing an appropriate combination of simulation and other analytical tools, mock-ups, laboratory models, engineering models and/or Flight models. The plan must also address the testing of environment requirements.

The Contractor must also develop a Verification Compliance Matrix (VCM) (CDRL 21). It provides the detailed linkage of verification activities to the specific requirements they address. Additionally the VCM must be augmented with a compliance statement for each requirement, along with references to the applicable documentation, as well as the verification methods associated with the closure of each requirement. All applicable documentation must be provided to the CSA. The Contractor must provide the initial release of the VCM with the proposal as per CDRL 21. The initial release only includes the compliance statement for each requirement whereas updated versions to be provided at technical reviews must also include the verification activities.

4.12.4 NASA Payload Interface Control Document (ICD)

The Contractor must provide support to the NASA ICD engineer by supplying inputs (CDRL 16) such as payload description, diagrams, rationale for non-applicable requirements etc. as required for the development of the payload unique ICD. It defines the payload hardware and software interfaces with the ISS, including the interface verification requirements.

4.12.5 Operating Procedures and Users Guide

The Contractor must develop the User Guide (CDRL 26), and in collaboration with the CSA, the Operating Procedures.

4.13 MANUFACTURE, ASSEMBLY, INTEGRATION AND TEST

The Contractor must manufacture and assemble the System in accordance with the design presented at the CDR. CSA must have the right to witness any tests or inspection conducted on the System. Availability of invitees must not delay the execution of the tests per the contractor schedule. The CSA will not provide testing facilities or any Government Furnished Equipment/Services.

4.13.1 Verifications

The Contractor must perform all required verification activities specified in Verification Plan (CDRL 20). The Contractor must perform the Science Verification Test (SVT) and the Payload Verification Test (PVT), to ensure that the System can generate high quality science data with representative subjects.

4.13.2 EXPRESS Payload Hardware Integrated Tests

The contractor must support the EXpedite the PROcessing of Experiments to Space Station (EXPRESS) payload hardware integrated tests. The EXPRESS payload hardware will be integrated at NASA and tested to obtain acoustics and EMI/EMC, power, data, thermal, mechanical, and human factors interface verification data. The Space Station Integration Testing Facility (SSITF) contains a Flight Equivalent Unit (FEU) of the EXPRESS rack, interfacing through the Payload Operations Integration Center (POIC) ground data systems. A Telescience Resource Kit (TReK) workstation is used to issue commands and view payload telemetry. The opportunity exists to review ground commands and simple crew procedures while interacting with the payload at the SSITF.

4.13.3 Ground Commanding and Telemetry Station Integrated Tests

The Contractor must develop the Ground Commanding and Telemetry Software (GCTS-SWs) and deliver Ground Commanding and Telemetry Stations (GCTSs). CSA will support the Contractor to obtain from NASA, the necessary accounts/licenses and/or SW package for Trek and Ku-Forward.

4.13.4 Ground Commanding and Telemetry from CSA

The contractor must develop and deliver the GCTS-SW, which will be installed on a CSA provided GCTS for Commanding and Telemetry from CSA.

4.13.5 Qualification/Certification Tests

The Contractor must undertake all the necessary tests to obtain the required flight Qualifications and Certifications for the FM. Test reports must be issued following each test (CDRL 25).

4.13.6 Cold Stowage Fit Check

If the Contractor determines that some commissioning items require stowage at cold temperatures, then the cold-stowed hardware will need to be fit-checked at NASA, to verify its compatibility with NASA-provided cold stowage refrigeration and transportation equipment.

4.13.7 Ground Support for Tests and After Deliveries

The Contractor must provide ground support hardware and personnel support to perform all tests at the required location and ensure that this ground support extends to NASA tests.

4.13.8 Test Procedures and Test Reports

The Contractor must prepare the Test Procedures (CDRL 24).

The Contractor must prepare the Test Reports (CDRL 25).

4.14 DOCUMENT DELIVERABLES

The Contractor must prepare and deliver the documents as requested in the Appendix B, Table 4-5.

4.14.1 Document Deliverables, Format and Content

The Contractor must ensure that documents delivered comply with the general preparation instructions and applicable Data Item Description (DID) or Contractor format (Cont. Format) which meets or exceeds the intent of the applicable DID.

Documents must be delivered in the original software application format, plus in Portable Document Format (PDF). One electronic copy of each deliverable document must be transferred to the CSA at the address and in the format specified in DID-0000. No paper copy is to be delivered, except when requested by the TA.

4.14.1.1 Documents Approval

The TA will provide approval or disapproval within 15 working days of receiving the document. In the event that a document is disapproved, the TA will advise the Contractor in writing, as to the reasons for such disapproval. Such notification will include a full explanation of the reasons for the lack of approval and will direct the additions, deletions and/or corrections, which the TA deems are required.

APPENDICES

A PROJECT MILESTONES SCHEDULE

TABLE 4-2: KEY PROJECT MILESTONES SCHEDULE

Phases	Milestones	Due Date
Phases ABC	EQM Delivery including Maintenance Kit, Ground Support Equipment (GSE) and Ground Commanding and Telemetry Station (GCTS)	Contract Award + 15 months
Optional Phase D (D1&D2)*	FM Delivery including Commissioning and Maintenance Kits, Ground Support Equipment (GSE) and Ground Commanding and Telemetry Stations (GCTS)	Phase D option exercised + 6 months
	Launch	FM delivery + 4 months (indicative)
	Commissioning Review	Launch + 1 month (indicative)

*Phase D consists of two phases: D1 and D2. Phase D1 includes the manufacturing, testing, acceptance and delivery of the FM hardware and associated software to CSA or NASA as per Table 4-3 and Table 4.4. Phase D2 includes all the subsequent work including support to launch, support to FM installation in the ISS and commissioning. The Phase D2 schedule will be driven by the launch date.

B DELIVERABLES AND CONTRACT DATA REQUIREMENTS LIST (CDRL)

The section describes the hardware, software and the data deliverables.

B.1 HARDWARE DELIVERABLES

These deliverables must be delivered, on-dock at NASA unless otherwise noted, in their Contractor-provided shipping containers and in launch configurations as follows:

TABLE 4-3: HARDWARE DELIVERABLES

Deliverable	Due Date	Quantity	Delivery On-Dock Location	Notes
EQM + Maintenance Kit	Contract Award + 15 months	1	NASA**	The Contractor may decide to produce more than 1 EQM for qualification testing. EQM Maintenance Kit includes equipment such as tools, spares and consumables required to meet the EQM maintainability, serviceability and availability requirements.
FMs + Maintenance Kits	Phase D option exercised + 6 months	2	1 to NASA 1 to CSA*	The Contractor is allowed to refurbish EQMs into FMs. 1 FM for flight (FM1) 1 FM for ground activities (FM2) FM Maintenance Kits include equipment such as tools, spares and consumables required to meet the FM maintainability, serviceability and availability requirements.
Commissioning Kits (non late-load and late-load if any)	Same as FMs for non late-load items. 48 hours before launch for late-load items	2 non late-load items 2 late-load items	1 non late-load items and 1 late-load items to NASA 1 non late-load items and 1 late-load items to CSA*	The commissioning kits are all for the FMs and must be of FM quality. One FM is commissioned on the ISS (with its commissioning kit delivered to NASA) and one FM is commissioned on the ground (with its commissioning kit delivered to CSA*). The EQM does not require commissioning.
Ground Support Equipment (GSE)	Same as FMs and EQM	3	1 for EQM to NASA** 1 for FM to NASA** 1 to CSA*	A GSE must contain all equipment and interconnecting items to completely operate one System on the ground, like if it was connected and operated from an EXPRESS rack. A GSE must be delivered in its shipping container.
Ground Commanding and Telemetry Stations (GCTS)	Same as FMs and EQM	3	1 for EQM to NASA** 2 to CSA*	This support equipment is for command and telemetry monitoring, through the CSA infrastructure or the Contractor.

Legend:

* Hardware deliveries to CSA might be changed to the Contractor location, at CSA's discretion, if it is preferable that the hardware that isn't launched to the ISS be left at the Contractor premises.

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**These hardware deliveries to NASA might have to be reshipped back to CSA* after use at NASA.

B.2 SOFTWARE DELIVERABLES

The Contractor must package and deliver the software listed in Table 4-4 and the Software EIDP (CDRL 13).

TABLE 4-4: SOFTWARE DELIVERABLES

No.	Deliverable	Due Date	Quantity	Location
1	Systems software and firmware (GCTS-SW) installed on the delivered hardware (Refer to Table 4-3)	Same date as hardware deliverables in Table 4-3: hardware deliverables	Same quantity as hardware deliverables in Table 4-3	Same location as hardware deliverables in Table 4-3
2	Systems software and firmware (GCTS-SW) to be installed in a CSA supplied GCTS	Same date as hardware deliverables in Table 4-3: hardware deliverables	1	CSA
3	All software (source code, graphic models, CAD models, engineering drawings, system definition files, initialization files, scripts, libraries etc.) required for the delivery of the systems	AR (part of EIDP)	1 of each final version	CSA

All delivered non-Commercial-Off-The-Shelf (non-COTS) software must include executable code, the source listings and source files, compiled files, configuration and parameter files, reloadable Field Programmable Gate Array (FPGA) configuration files, test scripts, design documentation, users' manuals, test results and associated plans and procedures.

All third party software must be accompanied by a license that allows the software to be archived and copied as necessary for all future CSA operations.

All software (i.e., non-COTS and COTS) must be accompanied by a license that allows CSA to use the software for the operational period after completion of commissioning.

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B.3 DATA DELIVERABLES

These Data Deliverables must be delivered as per Table 4-5. CSA review of advanced draft encouraged, unless otherwise indicated, as follows:

TABLE 4-5: CONTRACT DATA REQUIREMENTS LIST (CDRL)

CDRL No.	Category	Deliverable	Due Date	Version	DID No. or Cont. Format ***
1	PM	Project Management Plan	Proposal	Final	0001 or Cont. format
2	PM	WBS and Work Package Description	Proposal	Final	0002 or Cont. format
3	PM	Project Schedule	Proposal Monthly	IR Update	0004 or Cont. format
4	PM	Monthly Progress Reports	Monthly	Final	0003 or Cont. format
5	PA	Product Assurance Implementation Plan (PAIP)	Proposal SRR	IR Final	000129 or Cont. format
6	PM	Meeting Agendas	Meeting – 5 working days	Final	0005 or Cont. format
7	PM	Meeting Minutes	Meeting + 5 working days	Final	0006 or Cont. format
8	PM	2-page executive summary with figures	SRR, PDR, CDR, AR	Update	Cont. Format
9	PM	Action Items Log (AIL)	Monthly	Final	0007 or Cont. format
10	PM	Meeting/Review Presentations	Meeting – 5 working days	Final	Cont. format
11	PM	Review Data Package	Review – 10 working days (SRR, PDR, CDR, AR, TRR, CR)	IR	0008
12	PM & PA	Flight Safety Data Package (FSDP) and presentation	As per NASA process	Final	As per NASA format

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CDRL No.	Category	Deliverable	Due Date	Version	DID No. or Cont. Format ***
13	PM & PA	End Item Data Package (hardware and software)	AR – 10 working days Update as required	IR Final	0010 and 0011 or Cont. Format
14	PM	BIP/FIP Disclosure Report	Proposal (BIP) End of Contract (BIP/FIP)	IR Final	0013
15	SE	Critical Technologies Elements Identification Criteria Worksheet, Technology Readiness and Risk Assessment Worksheets and Rollup	PDR– 10 working days CDR– 10 working days	IR Update	0014
16	SE	Inputs to the NASA Payload Interface Control Document (ICD)	As requested by NASA	Final	As per NASA format
17	SE	System Requirements Document (hardware and software)	SRR – 10 working days	Final	0017 or Cont. format
18	SE	Design Documents (hardware and software)	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	0018 or Cont. Format
19	SE	System Specification Document	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	Cont. Format
20	SE	Verification Plan	SRR– 10 working days PDR– 10 working days CDR– 10 working days	IR Update Final	0019 or Cont. format
21	SE	Verification Compliance Matrix	Proposal SRR– 10 working days PDR– 10 working days CDR– 10 working days AR – 10 working days End of Contract	IR Update Update Update Update Final	0020
22	SE	Design, Assembly and Interface Control Drawings (mechanical and electrical).	PDR– 10 working days CDR– 10 working days AR – 10 working days End of Contract	IR Update Update Final	Cont. Format
23	SE	Test Plan (hardware and Software)	SRR– 10 working days PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Update Final	0021 or Cont. Format

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CDRL No.	Category	Deliverable	Due Date	Version	DID No. or Cont. Format ***
24	SE	Test Procedure (hardware and software)	CDR – 10 working days TRR – 10 working days	IR Final	0022 or Cont. Format
25	SE	Test Reports (hardware and Software)	Test + 10 working days	Final	0023 or Cont. Format
26	PM & Ops	Operating Procedures and Users Guide	CDR– 10 working days AR – 10 working days CR – 10 working days	IR Update Final	0024 or Cont. Format
27	SE	Crew Training and Procedures, figures, instructions, diagram and video-clips	As required by CSA and NASA CR – 10 working days	Update Final	As per required format by CSA/ NASA
28	SE	CAD Models & Analyses	SRR– 10 working days PDR– 10 working days CDR– 10 working days AR– 10 working days	IR Update Update Final	0025 or Cont. Format
29	PA	Failure Modes, Effects and Criticality Assessment (FMECA)	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	Cont. Format
30	PA	Material Identification and Usage List (MIUL)	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	NASA format
31	PA	Declared EEE Parts List	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	Cont. Format (i.e. manufacturing parts list)
32	PA	Declared Mechanical Parts List	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	Cont. Format
33	SE	Product Tree	SRR– 10 working days PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Update Final	Cont. Format
34	SE	Interface Control Document (ICD) (Hardware and Software)	PDR– 10 working days CDR– 10 working days AR – 10 working days	IR Update Final	Cont. Format

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CDRL No.	Category	Deliverable	Due Date	Version	DID No. or Cont. Format ***
35	Software	Software Development Plan	SRR– 10 working days PDR– 10 working days CDR– 10 working days	IR Update Final	0026 or Cont. Format
36	Software	Software Version Description Document	AR – 10 working days End of Contract	IR Final	0027 or Cont. Format
37	SE	Phase E Plan	PDR– 10 working days CDR– 10 working days AR – 10 working days End of Contract	IR Update Update Final	0028 or Cont. Format
38	SE	Commissioning Plan	PDR– 10 working days CDR– 10 working days AR – 10 working days CR– 10 working days	IR Update Update Final	Cont. Format
39	PA	Non-Conformance Reports	Non-Conformance As required AR – 10 working days	IR Update Final	0030 or Cont. Format
40	PM &PA	Request for Deviation/Waiver	As required	Final	0031 or Cont. Format

*** Cont. format = format chosen by the Contractor which meets or exceeds the intent of the applicable DID if provided.

C DATA ITEM DESCRIPTIONS

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DID-0000 - General Preparation Instructions

PURPOSE:

This DID specifies

- a. format requirements for project documents and data delivered by the supplier in compliance with the Contract Data Requirements List (CDRL)
- b. document and data delivery methods and communication of submission and receipt

INSTRUCTIONS:

1. GENERAL REQUIREMENTS:

- 1.1. All documents and data must be written in the English language. The term "Documents" includes change requests, change notices and requests for deviations and waivers.
- 1.2. All documents must include the following notification at the bottom of the cover page:

© Contractor's name, 2014

RESTRICTION ON USE, PUBLICATION OR DISCLOSURE OF PROPRIETARY INFORMATION

This document is a deliverable under contract no. _____ This document contains information proprietary to the Name of the Contractor, or to a third party to which the Name of the Contractor may have legal obligation to protect such information from unauthorized disclosure, use or duplication. Any disclosure, use or duplication of this document or any of the information contained herein for other than the specific purpose for which it was disclosed is expressly prohibited except as the Crown may otherwise determine.

- 1.3. Documents and data must be released by the supplier and submitted in native electronic format (Microsoft Word, Excel, MS Project, etc.) and in PDF format. Schedules must be submitted in Microsoft Project format (or equivalent) and PDF format.

2. DELIVERY METHODS:

- 2.1. The method of document and data submission and receipt will be coordinated by CSA and the Contractor:
 - 2.1.1. Documents and data may be delivered via
 - a. e-mail attachments;
 - b. direct transfer (FTP);
 - c. retrieval from the contractor's repository, once CSA has received a notification of the document's release and its location in the repository; or
 - d. DVD or CD-ROM media.

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-
- 2.1.2. Electronic documents and data or notifications of their availability must be sent to the CSA CM Receipt Desk: CM_Receipt@asc-csa.gc.ca
- 2.1.3. If deliverables contain ITAR content, notifications of their availability on contractor repositories must be sent to: CSA-CM-ITAR@asc-csa.gc.ca
- 2.1.4. Emails are to contain:
- a. in the "Subject" line, the project/program acronym or equivalent identifier and the CDRL number.
 - b. in the email text:
 - 1) Document Number;
 - 2) Document Revision;
 - 3) CDRL Identifier;
 - 4) Security Designation of the contents. Indicate if contents are subject to ITAR, when applicable.
- 2.1.5. Media or hard copy deliverables are to be addressed to:
- CM Library, 6A-100
Attention: CSA <<Project Name>> Project
Canadian Space Agency
6767, Route de l'Aéroport
Saint-Hubert, QC, J3Y 8Y9
CANADA
- 2.1.6. The DVD/CD-ROM labels must include the following information:
- a. Contractor Name
 - b. Contractor CAGE Code
 - c. Document Title
 - d. Document Number
 - e. Document Revision
 - f. Document Release Date
 - g. Contract Number
 - h. CDRL Identifier
 - i. Security Designation of the contents. Indicate if contents are subject to ITAR, when applicable.
- 2.1.7. Media or hard copy deliverables containing classified information, protected information or ITAR information are to be in compliance with the Canadian Government Security Policy, Access to Information Act and the Privacy Act.

DID-0001 - Project Management Plan**PURPOSE:**

The Project Management Plan (PMP) is used to guide both project execution and project control.

The PMP is used by the Government to assess the adequacy of the Contractor's plan for management of the work and to provide a basis on which to monitor and assess the progress of the work.

PREPARATION INSTRUCTIONS:

The PMP is used to:

- Guide the project execution;
- Document project planning assumptions;
- Document project planning decisions regarding alternatives chosen;
- Facilitate communications amongst shareholders;
- Define key management reviews as to content, extent and timing; and
- Provide a baseline for progress measurement and project control.

When the Contract has specified delivery of another document that contains aspects of the required information, the PMP should summarize these aspects and refer to the other document.

The PMP must contain the following information, as a minimum:

1) Introduction

- a) Project Objectives;
- b) Scope of the Plan; and
- c) Applicable and Reference Documents.

2) Project Integration Management

This section must describe the processes planned to be used to ensure that the various elements of the project are properly coordinated. It must describe:

- a) The overall project management strategy, including the subcontractor roles and responsibilities;
- b) How the plan will be executed; and
- c) Overall change control mechanisms.

3) Project Scope Management

This section must describe the processes planned to be used to ensure that the project includes all the work required, and only the work required, to complete the project successfully. It must address:

- a) Initiation;
- b) Scope Planning;
- c) Scope Definition;

- d) Scope Verification; and
- e) Scope Change Control.

4) Project Time Management

This section must describe the processes planned to be used to ensure timely completion of the project. It must address:

- a) Activity Definition;
- b) Activity Sequencing;
- c) Activity Duration Estimating
- d) Schedule Development; and
- e) Schedule Control.

This section must include the detailed project baseline schedule down to the activity level. The baseline schedule must include all elements of the WBS and must depict all linkages and dependencies.

5) Project Cost Management

This section must describe the processes planned to be used to ensure that the project is completed within the approved budget. It must address:

- a) Resource Planning;
- b) Cost Estimating;
- c) Cost Budgeting; and
- d) Cost Control.

6) Project Quality Management

This section must describe the processes planned to be used to ensure that the project will satisfy the needs for which it was undertaken. It must address:

- a) Quality Planning;
- b) Quality Assurance; and
- c) Quality Control.

7) Project Human Resources Management

This section must describe the processes planned to be used to make the most effective use of the people involved with the project. It must address:

- a) Organisational Planning;
- b) Staff Acquisition; and
- c) Team Development.

8) Project Communications Management

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This section must describe the processes planned to be used to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information. It must address:

- a) Communications Planning;
- b) Information Distribution;
- c) Performance Reporting; and
- d) Administrative Closure.

9) Project Risk Management

This section must describe the processes planned to be used to identify, analyze and respond to projects risks. It must address:

- a) Risk Identification;
- b) Risk Quantification;
- c) Risk Response Development; and
- d) Risk Response Control.

10) Project Procurement Management

This section must describe the processes planned to be used to acquire goods and services (“products”) from outside the Contractor’s organisation. It must address:

- a) Procurement Planning;
- b) Solicitation Planning;
- c) Solicitation;
- d) Source Selection;
- e) Contract Administration; and
- f) Contract Closeout.

DID-0002 – WBS and Work Package Descriptions**PURPOSE:**

The Work Breakdown Structure (WBS) is used during planning for estimating resources and scheduling the work. During the implementation phase, it is used for reporting and controlling costs and schedule.

PREPARATION INSTRUCTIONS:

The Contractor must provide an integrated Work Breakdown Structure (WBS) describing all the project elements that organise and define the total scope of the project including subcontracted work, and must be deliverable-oriented.

The Contractor must prepare and maintain a WBS Dictionary made up of Work Package Descriptions (WPDs) for every element to the lowest level of the WBS. Each WPD must include, as a minimum:

- a) A unique identifier traceable to the WBS;
- b) A title;
- c) The name of the individual responsible for completion of the work;
- d) The scope of the work package;
- e) The start date and duration;
- f) Required inputs and dependencies;
- g) A description of every activity covered by the WPD;
- h) Assumptions;
- i) Output and work package acceptance criteria;
- j) Issue date;
- k) Version number; and
- l) List of deliverable with delivery milestone.

DID-0003 – Progress Report

PURPOSE:

The Progress Report records the status of the work in progress during the previous calendar period. The Progress Report is used by the Government to assess the Contractor's progress in performance of the work.

PREPARATION INSTRUCTIONS:

The Progress Report must comprise, but not limited to, the following sections:

- 1) *Summary of progress this month*: must provide a summary of main activities accomplished during the month.
- 2) *Discussion of planned activities not accomplished*: must provide a summary of main activities not accomplished during the month, the reasons why and the potential impact on the project plan.
- 3) *Planned work next month*: must provide a summary of the planned important accomplishments for the following month, and must be limited to half a page.
- 4) *Technical/Design status*: must provide a summary of the status and description of the design, manufacturing, assembly, integration and testing activities accomplished during the month covering the following items:
 - a) *Key requirements*;
 - b) *Major trade off studies*;
 - c) *Design verification activities*;
 - d) *Interface definition and development*;
 - e) *Procurement status and issues*;
 - f) *Major internal technical issues*;
 - g) *Summary of waivers & Engineering Change Requests (ECRs)*;
 - h) *Problem/failure reports*;
- 5) *Long-lead items*: must describe the hardware and software long lead items (including need dates) that are required for the production of the models (EQM and FM);
- 6) *Brief discussion of problems/concerns*: must provide a summary of the current problems/concerns, their impact on the current plan, the plan to mitigate them and expected support from CSA to help resolve the situation.
- 7) *Schedule status*: must be in the form of a table showing, for each milestone, the baseline date, the planned completion date and the variance. A short narrative must provide a rationale for any variance.

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- 8) *Financial status*: must provide an updated milestone payment schedule.

- 9) Risk posture analysis: Risk status report including previous issues resolved, status on on-going risks (changes and impacts), and identification of new risks, their impact and proposed mitigation action.

Each progress presentation must answer the following three questions:

- 1) Is the project on schedule?
- 2) Is the project within budget?
- 3) Is the project free of any areas of concern in which the assistance or guidance of the CSA may be required?

Each negative response must be supported with an explanation.

DID-0004 – Project Schedule**PURPOSE:**

To provide a schedule planning and control system for the project and to provide visibility to the CSA into the program progress and status.

PREPARATION INSTRUCTIONS:

The project schedule must be based on the WBS, in the form of a Gantt chart. The project schedule must be detailed enough to show each WBS task to be performed, and must provide the following information:

- 1) dependencies,
- 2) the start and end date of each task (baseline and actual),
- 3) task duration,
- 4) completion status in percentage;
- 5) deadlines and milestones,
- 6) long lead items, and
- 7) critical path
- 8) margin.

The schedule must show dependencies between the Contractor and other organizations.

The tasks related to deliverables must be limited to three months in the project schedule. When applicable, the Contractor must divide longer tasks into smaller significant tasks.

Tasks that are not related to any specific deliverable, such as Project Management and Quality Assurance activities, must be grouped separately from the groups of deliverables, and must be shown at the top of the chart. The schedule must be provided in MS project format or equivalent.

DID-0005 – Meeting Agenda**PURPOSE:**

To clarify the purpose and content of a meeting.

PREPARATION INSTRUCTIONS:

The meeting agendas must contain the following information, as a minimum.

1) DOCUMENT HEADER:

- a) Title;
- b) Type of meeting;
- c) Project title, project number, and contract number;
- d) Date, time, and place;
- e) Chairperson;
- f) Mandatory and desirable attendance; and
- g) Expected duration.

2) DOCUMENT BODY:

- a) Introduction, purpose, objective;
- b) Opening Remarks: CSA;
- c) Opening Remarks: Contractor;
- d) Review of previous minutes and all open action items;
- e) Project technical issues;
- f) Project management issues;
- g) Other topics;
- h) Review of newly created/closed action items, decisions, agreements and minutes; and
- i) Set or confirm dates of future meetings.

DID-0006 – Minutes of Meetings

PURPOSE:

The minutes of reviews or meetings provide a record of decisions and agreements reached during reviews/meetings.

PREPARATION INSTRUCTIONS:

Minutes of meeting must be prepared for each formal review or meeting and must include the following information, as a minimum:

- 1) Title page containing the following:
 - a) Title, type of meeting, date, time and duration.
 - b) Project title, project number, and contract number,
 - c) Space for signatures of the designated representatives of the Contractor, the CSA and the Public Works and Government Services Canada (PWGSC), and
 - d) Name and address of the Contractor;
- 2) Purpose and objective of the meeting;
- 3) Location;
- 4) Agenda (DID-0005);
- 5) Summary of the discussions, decisions and agreements reached;
- 6) List of the attendees by name, position, phone numbers and e-mail addresses as appropriate;
- 7) Listing of open action items and responsibility for each action to be implemented as a result of the review;
- 8) Other data and information as mutually agreed; and
- 9) The minutes must include the following statement:

“All parties involved in contractual obligations concerning the project acknowledge that minutes of a review/meeting do not modify, subtract from, or add to the obligations of the parties, as defined in the contract.”

DID-0007 – Action Items Log**PURPOSE:**

The Action Item Log (AIL) lists, in chronological order, all items on which some action is required, allows tracking of the action, and in the end provides a permanent record of those Action Items (AI).

PREPARATION INSTRUCTIONS:

The Action Item Log (AIL) must be in a tabular form, with the following headings in this order:

- 1) Item Number;
- 2) Item Title;
- 3) Description of the action required;
- 4) Open Date;
- 5) Source of AI (e.g. PDR meeting, RID, etc.);
- 6) Originator;
- 7) Person responsible (for approving closure of the action);
- 8) Person responsible (for taking action);
- 9) Target/Actual Date of Resolution;
- 10) Progress update;
- 11) Rationale for closure;
- 12) Status (Open or Closed); and
- 13) Remarks.

The date in column 9) will be the target date as long as the item is open, and the actual date once the item is closed.

DID-0008 – Review Data Packages

PURPOSE:

The Review Data Package is a collection of all documents to be presented by the Contractor for all formal Technical Reviews:

PREPARATION INSTRUCTIONS:

Each Review Data Package must contain the documents identified in the CDRL (Table 4-5) as due for that review, plus the presentations made at the meeting, the agenda, the minutes, and the AI list.

DID-0010 – End Item Data Package (EIDP)

PURPOSE:

Data to document the design, fabrication, assembly, integration and testing of the deliverable hardware.

PREPARATION INSTRUCTIONS:

An EIDP must be prepared for each deliverable assembly. The EIDP must be delivered in electronic format with a search function or interface. Upgrade changes performed as a result of the first phase deployment must be clearly identified. The contents of the package must include, but not be limited to, the following information:

- 1) All hardware prototype and GSE including cables
- 2) As-Built data: "As-Built" hardware documentation is a compilation of items describing exactly the configuration of a fabricated serialized assembly including:
 - a) Part number and revision letter of each item
 - b) Part description (title) of each item
 - c) Electronic part reference designation
 - d) Manufacturer
 - e) Procurement specification or Source Control Drawing (SCD) number and SCD revision letter.
- 3) A complete list of the tests performed including a compilation of test data and test results for each test.
- 4) A list of open work/tests
- 5) Listing of the As-Designed drawings & parts list, with reconciliation of As-Designed vs. As-Built for any deltas between them, for each indentured line item of the end item deliverable.
- 6) A summary and copies of all deviations and waivers applicable to the deliverable items.
- 7) A one time delivery, with updates as required:
 - a) A complete and up-to-date top assembly drawing of each type of delivery.
 - b) Complete and up-to-date mechanical and electrical Interface Control Documents (ICDs) (interface drawings and specifications), for each delivery.
 - c) For electronic assemblies, a complete set of circuit schematics and circuit data sheets available for review at the Contractor's premises.

DID-0011 – Software End Item Data Package**PURPOSE:**

Data to document the design, development, integration and testing of the deliverable software.

PREPARATION INSTRUCTIONS:

An EIDP must be prepared for each deliverable software. The contents of the package must include, but not be limited to, the following information:

- 1) As-built product identification, including:
 - a) Identification of software release by program ID, phase, version, date, and build,
 - b) Operating system name and version,
 - c) Programming language name, compiler name, and version,
 - d) Supporting development environment name and version (if any);
- 2) Final VDD;
- 3) List all required software related documentation (under CM control), including the software design documentation, users' manuals, test procedures, scripts and test results;
- 4) All software source codes, executables, configuration and parameter files, reloadable FPGA configuration files;
- 5) All third party software; third party software must be accompanied by a license that allows the software to be archived and copied as necessary for all future CSA operations;
- 6) A list of all COTS software and computers purchased under this contract;
- 7) All COTS software purchased under this contract (original disk or file with license to CSA), GSE software etc.; and
- 8) A list of all open/closed anomalies or liens against this delivery. All flagged or major anomalies should be closed prior to the delivery.

All software must be delivered on media that is directly compatible with the delivered hardware. One set of software must be installed on the delivered hardware. A second set must be supplied on a CD-ROM or DVD disk.

DID-0013 – Background and Foreground Intellectual Property (BIP/FIP) Disclosure Report

PURPOSE:

The BIP/FIP Disclosure Report serves to identify FIP produced under the Contract with the CSA, as well as any BIP elements that were used to develop the FIP.

PREPARATION INSTRUCTIONS:

The Contractor must complete Table 1 for the report to be provided with the proposal (BIP). The report to be provided at the end of the contract must include Tables 1, 2 and 3 (BIP/FIP).

Background Intellectual Property (BIP)

Table 1 - Disclosure of Background Intellectual Property (BIP) brought to the project

BIP ID#	Project Element	Title of the BIP	Type of IP	Type of access to the BIP required to use/improve the FIP	Description of the BIP	Reference documentation	Origin of the BIP	Owner of the BIP
<i>Provide ID # specific to each BIP element brought to the project e.g. BIP-CON-99</i> <i>where CON is the contract acronym</i>	<i>Describe the system or sub system in which BIP is integrated (e.g. camera, control unit, etc)</i>	<i>Use a title that is descriptive of the BIP element integrated to the work</i>	<i>Is the BIP in the form of an invention, trade secret, copyright, design, patent?</i>	<i>Describe how the BIP will be available for Canada to use the FIP(e.g. BIP information will be incorporated in deliverable documents, software will be in object code, etc)</i>	<i>Describe briefly the nature of the BIP(e.g. mechanical design, algorithm, software, method, etc)</i>	<i>Provide the number and full title of the reference documents where the BIP is fully described. The reference document must be available to Canada. Provide patent# for Canada if BIP is patented.</i>	<i>Describe circumstances of the creation of the BIP Was it developed from internal research or through a contract with Canada? If so, provide contract number.</i>	<i>Name the organization that owns the BIP. Provide the name of the subcontractor if not owned by the prime contractor.</i>

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Foreground Intellectual Property (FIP)**Table 2 - Disclosure of the Foreground Intellectual Property (FIP) developed under the Contract**

FIP ID #	Project Element	Title of FIP	Type of FIP	Description of the FIP	Reference documentation	BIP used to generate the FIP	Owner of the FIP	Patentability
<i>Enter an ID # specific to each FIP element e.g.FIP-CON-99 where CON is the contract acronym</i>	<i>Describe the system or sub-system for which the FIP element was developed (e.g. a camera, ground control, etc)</i>	<i>Use a title that is descriptive of the FIP element.</i>	<i>Specify the form of the FIP e.g. invention, trade secret, copyright, industrial design, patent</i>	<i>Specify the nature of the FIP e.g. software, design, algorithm, etc?</i>	<i>Provide the full title and number of the reference document where the FIP is fully described. The reference document must be available to Canada</i>	<i>BIP referenced in table 1 e.g. BIP-CON-2, 15</i>	<i>Specify which organization owns the FIP e.g. Contractor, Canada* or Subcontractor. Provide the name of the subcontractor if not owned by the prime contractor. *If Canada is the owner of the FIP, complete Table 3 below Provide reference to contract clauses that support FIP ownership. Provide reference to WPDs under which the technical work has been performed.</i>	<i>In the case where the IP is owned by Canada, indicate with an "X", any IP elements described is patentable and complete Table 3 only for this IP.</i>

Table 3 - Canada's Owned FIP Additional Information

FIP ID #	Title of FIP	Aspects of FIP that are novel, useful and non obvious	Limitations or drawback of the FIP	References in literature or patents pertaining to the FIP	Has the FIP been prototyped, tested or demonstrated? (e.g. analytically, simulation, hardware)? Provide results	Inventor (s)	Was the FIP disclosed to other parties?
<i>ID# should be same as corresponding FIP element in Table2</i>	<i>Title of FIP should be same as corresponding FIP element in Table2</i>	<i>How is the FIP addressing a problem (useful) and what is thought to be novel in this solution (novel)?</i>	<i>Describe the limitations of present apparatus, or product or process</i>	<i>Provide references in published literature or patents relating to the problem or subject if any.</i>	<i>Describe briefly how the process, product or apparatus performed during testing or simulation. Provide reference document # where the performance is compiled if applicable.</i>	<i>Provide name and coordinates of the person(s) who created the FIP</i>	<i>Has any publication or disclosure of the FIP or any of its elements been made to third parties? If so, provide when, where and to whom.</i>

DID-0014 – Technology Readiness with TRRA Worksheets and Rollup**PURPOSE:**

Referring to AD7, the Technology Readiness and Risk Assessment (TRRA) describes in a systematic and objective fashion the technological readiness of a system for a particular spaceflight mission or environment, the criticality of the constituent technologies, and the expected degree of difficulty to achieve the remaining technology development steps.

The TRRA provides for all the Critical Technology Elements (CTE) of the proposed concept, as per the Product Breakdown Structure (PBS), a high-level summary of the maturity of the technologies and the technology development risks.

Agreement on the appropriate PBS level and identification of the CTE is required prior to the TRRA.

PREPARATION INSTRUCTIONS:

The Contractor must perform a Technology Readiness and Risk Assessment (TRRA) in accordance with the requirements of the CSA Technology Readiness and Risk Assessment Guidelines (AD3) and the Technology Readiness Levels Handbook for Space Application (AD4), to formally document the system technology status. The Contractor must produce CDRL 15 for the TRRA using the Critical Technologies Elements Identification Criteria Worksheet (AD5), Technology Readiness and Risks Assessment Worksheet (AD6) for each Critical Technology Element (CTE) and Rollup using (AD7).

DID-0017 – System Requirement Document

PURPOSE:

To define the functional, performance, environmental and other requirements for a given system, subsystem, unit, module or assembly.

PREPARATION INSTRUCTIONS:

The requirements documents must define the requirements on the subject item.

The Requirements Document must comprise a number of sections, each defining a specific set of requirements. The document must address all of the following requirement areas, as a minimum:

- 1) Functional Requirements;
- 2) Performance Requirements;
- 3) External Interface Requirements (unless done in a separate document);
- 4) Design Requirements;
- 5) Construction Requirements;
- 6) Qualification and/or Verification Requirements;
- 7) Packaging Requirements, if any;
- 8) External Stowage Requirements, if any;
- 9) Operational Requirements, if any;
- 10) Ground Support Equipment Requirements, if any (unless done in a separate document); and
- 11) Other applicable requirements types.

Environmental requirements should address the following, as appropriate:

- 1) Environmental test factors;
- 2) Environmental Design and Test Requirements:
 - a) Structural/Mechanical Design Requirements,
 - b) Electrostatic and EMC Design requirements,
 - c) Transport and Ground Environments;

Requirements must conform to the following standards for quality:

- a) They must be unambiguously clear to the intended readership;
- b) Each requirement must have a unique identifier (e.g. An id number or paragraph number);
- c) They must not define design solutions;
- d) They must be verifiable, preferably by tests or demonstrations;
- e) They must specify the conditions under which they apply; and
- f) Performance requirements must be quantified.

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Requirements documents must cite applicable standards and parent requirements, and must make clear the priority sequence of the applicable documents.

DID-0018 – Design Document**PURPOSE:**

To describe the features and capabilities of the item as designed. The item could be a system or subsystem.

PREPARATION INSTRUCTIONS:

The Design Document acts as an “answer” to the Requirements Document for the system or subsystem: the requirements state what is needed, and the Design Document describes what is provided to meet these needs. The Design Document serves as the main reference text for users after delivery of the item, describing the full range of performance and functional capabilities of the item, as verified during the test/verification program.¹

Each document must contain, as a minimum:

- 1) Scope
 - a) System Overview
 - b) Document Overview
- 2) System Design
 - a) Functional Block Diagram
 - b) External Interfaces
 - c) Subsystems descriptions
 - d) Internal Interfaces
 - e) Functional description
- 3) Mechanical description
- 4) Electrical description
- 5) Operating modes and states
- 6) Environmental considerations derived from the environment requirements as specified in this SOW.
- 7) Acronyms

¹ All 2-D drawings must be submitted in PDF format, with the capability to zoom

DID-0019 – Verification Plan

PURPOSE:

The verification process is defined by the Verification Plan. The plan also defines the planning policies, methods of controls, and organizational responsibilities. From the Verification Plan, the verification procedures are developed. The procedures provide the instruction, including configurations, constraints, and prerequisites, for obtaining data that show compliance with the requirements.

PREPARATION INSTRUCTIONS:

The Verification Plan must:

- 1) define the verification activities that will prove that the system and subsystems meet the all the imposed requirements including functional, performance, interface, environmental, etc.,
- 2) define all verification activities at each phase of the project, including test, analysis, and inspection,
- 3) describe the methods and techniques to be used to measure, evaluate, and verify the system. This is to include characterization of the system behaviour that is not controlled by requirements but is important for understanding of the system, and establishing the actual values of parameters that exceed requirements,
- 4) use an appropriate combination of simulation and analytical tools, mock-ups, laboratory models, engineering models and prototype models,
- 5) define the requirements for supporting facilities, analysis tools and test equipment, both existing and needing to be constructed, including:
 - a) the specific equipment and materials needed,
 - b) the configuration of the equipment to be used,
 - c) the location in which it is to be used,
- 6) define the schedule for verification activities.

For each defined test and analysis activity, the plan must contain:

- 1) a description of the activity,
- 2) the objective, including requirements to be verified,
- 3) supporting hardware and software,
- 4) assumptions and constraints that apply to the activity,
- 5) plans to install, setup, and maintain items in the test or analysis environment,
- 6) a description of the data recording, reduction, and analysis activities to be carried out during and after the activity.

VERIFICATION METHODS DEFINITIONS

The verification program must be accomplished by employing one or more of the methods described in the following sub-sections.

Test

Verification by test is the actual operation of the system, in clearly defined environmental conditions, to evaluate its performance.

Functional Tests

Functional testing is an individual test or series of electrical or mechanical performance test(s) conducted on the system's hardware and/or software at conditions equal to or less than design specifications. Its purpose is to establish that the system performs satisfactorily in accordance with design and performance specifications. Functional testing is generally performed at ambient conditions. Functional testing is performed before and after each environmental test or major move in order to verify system performance prior to the next test/operation.

Environmental Tests

Environmental testing is an individual or series of test(s) conducted on the system's hardware to ensure that the rover hardware must perform satisfactorily in an analog environment. Examples of environmental tests are vibration, acoustic, thermal, vacuum and EMC. Environmental testing may or may not be combined with functional testing depending on the objectives of the test.

Analysis

Verification by analysis is a process used in lieu of, or in addition to, testing to verify compliance to specification requirements. (e.g. stress, thermal, materials). The selected techniques may include systems engineering analysis (structural, environmental, electrical, etc.), statistics and qualitative analysis, computer and hardware simulations, and analog modelling.

Analysis may be used when it can be determined that:

- a) Rigorous and accurate analysis is possible;
- b) Test is not feasible or cost-effective;
- c) Similarity is not applicable; and
- d) Verification by inspection is not adequate.

Demonstration

Verification by demonstration is the use of actual demonstration techniques in conjunction with requirements such as serviceability, accessibility, transportability and human engineering features. In general, demonstration is specified as the method of verification for physical attributes which have no numerical requirements associated with them. This includes qualitative features such as comfort, accessibility, suitability and adequacy. Demonstration may also be specified for presence or compatibility of shipping containers, handling fixtures, etc.

Inspection

Verification by inspection is the physical evaluation of equipment and associated documentation to verify design features. Inspection is used to verify construction features, workmanship, dimensions and physical condition, such as cleanliness, surface finish and locking hardware. Often inspections are conducted in conjunction with a test or as part of assembly operations documented by manufacturing instructions (MIS).

Validation of Records

Validation of records is the process of using manufacturing records at end-item acceptance to verify construction features and processes for the system hardware. Verification of records is specified whenever it is necessary to compare two or more documents to each other in order to assess compliance with a requirement. Common examples of the way verification of records is used include:

- a) Examining drawings for features required by specifications;
- b) Examining parts lists for ESD sensitive components;
- c) Comparing two or more drawings to assess a mechanical interface;
- d) Checking personnel records for proper training;
- e) Checking facilities records for environmental exposure;
- f) Examining vendor data supplied with parts or materials; and
- g) Verification that analyses meet safety specifications.

Similarity

Verification by similarity is the process of assessing by review of prior test data or hardware configuration and applications that the article is similar or identical in design and manufacturing process to another article that has previously been qualified to equivalent or more stringent specifications.

Review of Design Documentation

Verification by review of design documentation is the process of reviewing the design against the requirements, which as stated may or may not contain specifics to be met by a test, analysis, etc. but must be present in the design. This method is used during the preliminary design and critical design reviews of the development phase.

DID-0020 – Verification and Compliance Matrices**PURPOSE:**

The Verification and Compliance Matrix shows the details of the compliance of the system and the verification thereof through the life of the project with respect to each system requirement. It is a living document that is updated at each review with new data. The matrix is tightly coupled with the Verification Plan because it provides the detailed linkage of verification activities to the specific requirements they address. However, it is a separate document from the Verification Plan.

PREPARATION INSTRUCTIONS:

The Requirements Verification and Compliance Matrices must contain, for each requirement:

- 1) The requirement document number and requirement identifier,
- 2) The requirement description,
- 3) Other relevant requirement references,
- 4) Verification method. For the verification methods definition refer to DID 0019.
- 5) Requirement compliance based on verification data presented at the current phase,
- 6) For quantitative requirements, the actual predicted or achieved performance and the margin over the requirement, including statistical analysis when applicable,
- 7) Link to the verification data that justifies the compliance and the quantitative value (document, page and paragraph),
- 8) Comments, for example on plans to rectify non-compliances.

DID-0021 – Test Plan

PURPOSE:

To describe the formal qualification end-to-end test plans for the system, to identify and describe the individual tests that must be performed during validation, and to identify the test resources required.

PREPARATION INSTRUCTIONS:

1 SCOPE

This DID establishes the content, format, and submittal requirements for all test activities. The Contractor must describe the nature and extent of the specific tests proposed for each unit, in accordance with SOW requirements, and as per the Verification Plan.

2 CONTENTS

The Test Plan (TP) may be prepared in the Contractor's format and must, contain the following information, as a minimum:

2.1 General

- 1) Identification number, title, and brief overview of the system to which the TP applies;
- 2) A description of the relationship of this plan to other project management plans;
- 3) Identification and description of general test requirements applicable to all system tests or group of system tests; and
- 4) A schedule of tests.

2.2 Test-specific

- 1) Description of each test to be conducted on the system including:
 - a) Test objective,
 - b) Qualification method as specified in the SRD or ICD or,
 - c) Reference to the corresponding SRD or ICD requirement,
 - d) Identification and type of data to be recorded, and
 - e) All assumptions and constraints associated with each test;
- 2) Identification and description of all hardware and software items required to perform validation testing, including identification of the proprietary nature and Government rights associated with each item;
- 3) A description of plans to install, setup, and maintain items in the system test environment; and
- 4) A description of the data recording, reduction, and analysis activities to be carried out during and after system tests.

DID-0022 – Test Procedure

PURPOSE:

To define the procedure to be followed for each test to be performed.

PREPARATION INSTRUCTIONS:

This DID is applicable to systems, hardware and software.

The test procedures must contain the following information, as a minimum:

1. SCOPE

This section must include a brief description of the test and the objectives of the test.

2. TEST REQUIREMENTS

This section must define the measurements and evaluations to be performed by the test.

3. TEST ARTICLE

This section must define in detail the test article configuration that is to be tested.

4. TEST FACILITIES

This section must identify the test facilities to be used, including their physical location, coordinates and contact points.

5. PARTICIPANTS REQUIRED

This section must provide a listing of the individuals (position titles, trade or profession) required to conduct or witness the test.

6. TEST SET-UP AND CONDITIONS

This section must include description/sketches of test articles in test configuration illustrating all interfacing test/support equipment. Instrumentation/functional logic must be shown where applicable. The section must include any environmental and cleanliness requirements.

7. INSTRUMENTATION, TEST EQUIPMENT AND TEST SOFTWARE

This section must provide a listing of the instrumentation, test equipment and software that is to be used during the test.

8. PROCEDURE

This section must define the step-by-step procedure to be followed, starting with the inspection of the test article, and describing the conduct of the test up to and including post-test inspection. Each test activity must be defined in sequence and task-by-task, including test levels to be used and measurements/recordings to be made. It must include any necessary malfunction and abort procedure.

9. DATA ANALYSIS

This section must define the methods to be used in the analysis of the results, along with the uncertainty range in the results. Data presentation format must be defined.

10. ACCEPTANCE/REJECTION CRITERIA TABLE

This section must provide data sheets needed during execution of the test specifying acceptance/rejection criteria, including identification of the associated requirements from the

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Requirements Documents or Specifications. These sheets will be in a tabular form allowing columns for measured values and deviations to be recorded. A computer printout generated by test software is acceptable provided it supplies the same information; however the test criteria must be stated in the Test Procedure.

DID-0023 – Test Report

PURPOSE:

To document the results of all tests done on a hardware unit or software CSCI.

PREPARATION INSTRUCTIONS:

This DID is applicable to systems, hardware and software.

The test report must document all tests performed to verify that the unit or software will meet the functional and operational requirements specified in the Requirements Documents or Specifications applicable to the unit.

The Test Report must contain, the following information, as a minimum:

1. APPLICABLE DOCUMENTS

This section must include test procedures and system requirements/specifications being tested.

2. TEST ARTICLE OR SYSTEM UNDER TEST:

This section must define in detail the test article configuration tested.

3. PURPOSE:

This section must describe the purpose of the test and the specific requirements/specifications that it is intended to verify.

4. SUMMARY OF TEST RESULTS

This section must present a summary of test results, including non-conformances, where applicable.

5. TEST FACILITIES

This section must identify the test facilities used, including their physical location, coordinates and contact points.

6. TEST SET-UP AND CONDITIONS:

This section must include descriptions/photos/sketches of test articles in test configuration illustrating all interfacing test/support equipment. Instrumentation/functional logic must be shown where applicable. The section must describe the environmental and cleanliness conditions present, as well as operating conditions (e.g. supply voltage).

7. INSTRUMENTATION, TEST EQUIPMENT AND TEST SOFTWARE:

This section must provide a listing of the instrumentation, test equipment and software used during the test.

8. DETAILED TEST RESULTS:

This section must record actual test data obtained on tabular sheets prepared in the Test Procedure (or software-generated) during the test performance, and deviations from the criteria.

9. TEST DATA ANALYSIS:

This section must document analyses required to relate the detailed results to the requirements to be verified.

10. NON-CONFORMANCES:

This section will provide all Non-Conformance Reports generated during the tests. The Non-Conformance Reports will be dated and stipulate the latest dispositions.

11. CONCLUSIONS AND RECOMMENDATIONS:

This section must identify deficiencies, limitations or constraints and propose alternative design solutions to be evaluated in order to resolve problems encountered in testing.

DID-0024 – Operating Procedures and Users Guide

PURPOSE:

To provide detailed step-by-step procedures and guidance for the operation of the system which is comprehensive and useful user manual, supporting the familiarization of Crew, PIs, and any other personnel involved with the regular in-flight use, maintenance, repair or disposal of the in-flight System.

PREPARATION INSTRUCTIONS:

General Requirements

The Operating Procedures and Users Guide must be provided in Microsoft Word. Drawings and pictures must be included in these Word documents, not in separate documents.

The Operating Procedures and Users Guide must contain an appendix that analyses End-to-End Operations Workflow, including the real-time operations as well as the offline pre-and post-missions analysis work and the operator training process, including training session preparation, execution and the use of tools to evaluate operator performance and achieve their certification.

The Users' Guide must contain the following information:

- 1) Introduction
- 2) Purpose and scope
- 3) Reference documentation
- 4) Overall System Description
- 5) Detailed System Description
- 6) Description and principles of operation, including configuration for:
 - a) Transportation
 - b) Deployments (if different)
- 7) Assembly procedure:
 - a) Mechanical Interfaces (including cooling/heating connections)
 - b) Electrical Interfaces
 - c) Command and Data Handling (C&DH) Interfaces
- 8) Disassembly procedure
- 9) Operational modes
- 10) Operational procedures (philosophy and detailed instructions):
 - a) Identification of all operations for which the system was designed
 - b) Specification of all constraints pertinent to each procedure, with references to technical documents for justification
 - c) Power On/Off and initiation of the software and termination of system operation
 - d) Calibration
 - e) Routine operating procedures
 - f) Monitoring of the operation of the system including: fault identification, evaluation, and conditions requiring computer shutdown
 - g) Detection, analysis and correction of anomalous behaviour
 - h) References to baseline configuration database for each parameter used in each procedure
 - i) Operating rules
- 11) C&DH Procedures

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- a) Methods of commanding the system and/or experiment (computer, manual, other)
 - b) Methods of collecting and disposing of H&S data
- 12) Software User Procedure (philosophy and detailed instructions):
- a) information and user instructions necessary for user interaction with the CSCI(s) including:
 - i) step-by-step operating procedures, including the use of all pre and post missions analyses tools, and operator training, evaluation and certification tools,
 - ii) identification of all options available to the user,
 - iii) initialization procedures,
 - iv) required user inputs and options,
 - v) identification and description of system inputs and effects on user interface,
 - vi) termination methods and indicators,
 - vii) restart procedures, and
 - viii) expected outputs.
 - b) a listing of all error messages including definition and action to be taken.
- 13) Maintenance Procedures and Troubleshooting (philosophy and detailed instructions):
- a) Recovery from faults or interrupts including restart and the collection of information concerning the fault
 - b) Description of diagnostic features available to the operator of the system including: available tools, and step-by-step diagnostic procedures
 - c) Trouble-shooting table
 - d) Periodic maintenance required, including tasks and frequencies
 - e) Test equipment and special tools required
- 14) Repair Procedures (philosophy and detailed instructions)
- 15) Disposal Procedures (philosophy and detailed instructions)
- 16) Detailed Mechanical Drawings.
- 17) Detailed Electrical Drawings.
- 18) Detailed Software Description.
- 19) Complete Drawing list.
- 20) Complete Parts List.

Operational Data Base

The Operational Data Base (ODB) must contain definitions for the following data:

- 1) Telemetry database format;
- 2) Telecommand database format;
- 3) System Baseline Configuration:
 - a) Definition of all parameters determining on-board database configuration at any time, including conversions and constraints, as installed in real-time, planning, and analysis platforms;
- 4) Remote Control Station (RCS) Baseline Configuration:
 - a) Definition of all parameters determining the RCS database configuration at any time, including conversions and constraints;
 - b) Values of all system related parameters in the ODB pertinent to procedure execution and on-board system maintenance;
 - c) Constraints on telemetry values for status and health verification; and
 - d) Software configuration status for the system and the RCS.

DID-0025 – CAD Models & Analyses

PURPOSE:

To support the design, establish feasibility of the design to meet the requirements in the design phases, and in some cases provide verification of compliance to requirements where this cannot be demonstrated directly by test or inspection.

PREPARATION INSTRUCTIONS:

All CAD models developed must be delivered:

- a) Mechanical design: e.g., STEP AP203 (.stp)
- b) Electrical design: e.g., .dsn, .sch, Pspice and Gerber formats
- c) Software design: e.g., UML 2.0 or XML (Extensible Markup Language), if applicable

In cases where a different tool is used from the one CSA uses, the model and outputs must be supplied in native format in addition to the required format. For generic modeling and analyses that don't use a specialty tool, CSA will accept Matlab, Excel and MathCad format data. Where a highly specialized tool is used, the delivery format must be negotiated with the TA. Translation from the Contractor's tool to the required format is only acceptable where the results can be repeated in CSA's tool. Translation that corrupts the model, loses data, or produces data that is interpreted differently, is not acceptable.

Analysis documents must contain all analysis work that is performed in support of the design. The analysis material must be sufficiently detailed so that, in combination with the delivered models, CSA or an external reviewer can reproduce the results. The analysis must establish feasibility and verification of the design to meet the requirements.

The data must include references to sources such as equations, material values, parameters and properties.

Each report must contain the following information, as a minimum:

- 1) Objectives of the analysis;
- 2) Reference to the relevant requirements;
- 3) Description of the analysis tools used;
- 4) Description of the model developed to aid the model user (if applicable);
- 5) Identification of the assumption(s) made;
- 6) Description of the main analysis steps and intermediate results;
- 7) Results of the analysis and compatibility with the requirements;
- 8) Identification of potential problem areas and presentation of alternative design solutions; and
- 9) Conclusion.

Delivered models must contain at least example outputs so that the user can check their function, and should contain the main outputs used in the analysis documents.

DID-0026 – Software Development Plan

PURPOSE:

To describe the management and technical approaches that govern the software development process. It describes what products and materials are received and delivered, how requirements are determined, and important aspects of the provider's relationship with the customer. It applies to whole system software or to the software used in any constituent subsystem.

Software includes all software and firmware (*software embedded in hardware*) to be developed, acquired, or incorporated into the system.

PREPARATION INSTRUCTIONS:

The Software Development Plan must cover all deliverable software. The Software Development Plan must address the following:

- 1) Brief project overview
- 2) Brief functional characterization of the product and identification of project software life-cycle phases, milestones, and deliverables
- 3) A WBS for organizing and managing the development of software products consistent with the higher-level WBS
- 4) Organisational structure, boundaries and interfaces
- 5) Project staffing and assignment of roles and responsibilities
- 6) Technical approach to the following activities:
 - a) Articulation and elaboration of software requirements.
 - b) Design and implementation of the product (including the development environment, tools, methodology and standards)
 - c) Adaptation of inherited software, including the verification of functionality and the definition of necessary modifications
 - d) Identification of work products to be verified and verification methods to be used
 - e) Integration and test, including design, acquisition, and validation of test environment.
 - f) Review of the intermediate work products, including detailed technical review.
 - g) Delivery and operations support.
 - h) Configuration management of build process, code, documentation, and other work products.
- 7) Approach to managing the software development risk
- 8) An implementation schedule at a level of detail that facilitates tracking the progress
- 9) Approach to the development, review, approval, release, revision, and control of documentation
- 10) Identification of documents applicable to the software plan and their relationship (document tree)
- 11) Approach to monitoring development progress, utilizing product and process metrics.
- 12) Approach to identifying, managing and verifying safety critical software.

DID-0027 – Software Version Description Document (VDD)

PURPOSE:

To identify the contents of a software Configuration Software Configuration Item (CSCI) release and to record the details of all aspects of the system, support software and hardware required to regenerate this CSCI.

PREPARATION INSTRUCTIONS:

The VDD must contain the following information, as a minimum:

- 1) Version Description
 - a) Inventory
 - i) CSCI Source File Listing
 - ii) Documentation. This section must list all relevant documents revisions associated with this build version (requirements, ICDs,...)
 - b) Changes Incorporated. This section must list all new functionalities that were added, and/or all problems that were corrected in this version. A list of all modified and created files with the rationale must be included.
- 2) Version Description - Support Items
 - a) Hardware Tools
 - b) Development Platform Hardware Requirements
 - c) Software Tools
 - d) Build Procedures and Development Environment Setup Information. The procedure must provide step-by-step actions with screen shots whereas appropriate to document the complete build process.
 - e) Installation Procedures
 - f) Validation Test Scripts, Data and Results
- 3) Known Errors and Possible Problems
- 4) Notes

DID-0028 – Phase E Plan

PURPOSE:

To describe the approach, timing and detailed pricing for ground and in-flight operation, maintenance, repair and disposal, with the goal of providing planning information for the operations phase.

PREPARATION INSTRUCTIONS:

The plan must address the following:

A) For the ground and in-flight operations:

- a. This is for the regular CSA-led Canadian investigations (up to 2/year for 5 years), as well as for international partner's investigations (up to 2/year for 5 years).
- b. Contribution to NASA documentation required.
- c. Contractor provides training to the Crew so that they know how to operate the System on-orbit.
- d. Contractor provides all investigation ground and in-flight hardware/software and the personnel required to support these investigations. This includes hardware/software and personnel support to the EQM and the FM operations on the ground, as well as to develop protocols and ensure that Baseline Data Collection (BDC) is done on the Crew, if required, before and after their flight on the ISS.
- e. Each investigation hardware/software cost of the launch itself is provided by CSA.
- f. Each investigation procedure is a joint development by CSA, the investigation PI and the Contractor.
- g. In-flight operations preparations. Support to definition of number of operations and length of time for each.
- h. Live support of in-flight operations, on-console at CSA PTOC.
- i. Each investigation data analysis.
- j. Investigation debugging until completed.
- k. Separate estimates for training a third party in providing all the above support services.

B) For the ground and in-flight maintenance, repair and disposal:

- a. This is for the regular maintenance (as defined by the Contractor) and repairs (on an as-needed basis) for a minimum of 5 years of regular operations.
- b. Contribution to NASA documentation required.
- c. Contractor provides all maintenance/repair/disposal to hardware/software and the personnel required to support these activities. This includes hardware/software and personnel support to the EQM and the FM maintenance/repair/disposal on the ground.
- d. Each maintenance/repair hardware/software cost of the launch itself is provided by CSA.
- e. Each maintenance/repair procedure is a joint development by CSA and the Contractor.
- f. In-flight operations preparations. Support to definition of number of operations and length of time for each.
- g. Live support of in-flight maintenance, repair and disposal, on-console at CSA PTOC.
- h. Each maintenance/repair data analysis.

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- i. Maintenance/repair debugging until completed.
- j. Separate estimates for training a third party in providing all the above support services.

DID-0029 - Product Assurance Implementation Plan (PAIP)

PURPOSE

The Product Assurance Implementation Plan (PAIP) describes the Product Assurance organisation, objectives, and activities planned for the project. The PAIP provides the Government with insight into the Contractor's PA organisation, tasks, and activities and allows the Government to assess compliance with the governing PA requirements specified in CSA-LSRS-RD-0002, CSA Life Sciences Research System Product Assurance Requirements for Bio-analysis.

PREPARATION INSTRUCTIONS

General Requirements

The PAIP shall, as a minimum, provide the following information:

1. An overview of the objectives to be achieved by the plan;
2. Identification of the organisations in the company responsible for applying the provisions of the PAIP: organisational structure, relationships to other organisations within the project and company as with personnel identification and required skill levels;
3. PA plans for monitoring the different phases of the program development, for problem reporting and for ensuring corrective actions are taken;
4. Frequency, format, and content of reports submitted by PA to program management to report program progress as well as problems, risks, and proposed solutions;
5. A list of applicable general standards and practices which will be followed in the implementation of the plan;
6. A list of applicable in-house PA procedures, as well as PA procedures specific to the project and/or applicable to all project participants, with cross-reference to the compliance matrix below;
7. A compliance matrix testifying to the compliance with the requirements of CSA-LSRS-RD-0002 which clearly states for each requirement whether the contractor intends to comply with the requirement and rationale for partial or non-compliance.
8. A Parts, Materials and Processes Control Plan that describe the approach, methods, procedures and organisation that will be implemented to assure compliance to the parts/materials/processes program requirements of the CSA-LSRS-RD-0002.
9. Details on how government rights to access the premises and the program data will be implemented by the contractor;
10. Detail objectives and tasks to be performed to ensure reliability and availability requirements are adequately implemented.
11. Detail the plan and tasks to be performed to ensure that Configuration and Data Management (CADM) is carried out according to the CADM requirements in CSA-LSRS-RD-0002.
12. Detail plans for the implementation of the Safety Program and how the program will ensure compliance to the safety requirements of CSA-LSRS-RD-0002.

DID-0030 – Non-Conformance Reports**PURPOSE:**

This DID contains the content preparation instruction for Non-Conformance Reports (NCRs) generated under the work described in this SOW.

PREPARATION INSTRUCTIONS:

The NCRs shall contain the following information, as a minimum:

- 1) Originator;
- 2) Date;
- 3) Part Number of discrepant item;
- 4) Description;
- 5) Operation or test phase during which the discrepancy was observed;
- 6) Effectivity (SN or Lot number);
- 7) Description of Non-conformance;
- 8) Disposition;
- 9) NRC Board meeting minutes with attendees list;
- 10) Attachments required to support the disposition;
- 11) Root cause and corrective action;
- 12) Verification performed to closeout non-conformance;
- 13) Closeout summary report or statement;
- 14) NCR Board approval.

DID-0031 – Request for Deviation / Waiver

PURPOSE:

A Request for Deviation/Waiver shall be submitted for non-compliances to the program requirements and/or for equipment performance Class I non-compliances.

PREPARATION INSTRUCTIONS:

A Request for Deviation (RFD) or Request for Waiver (RFW) shall contain the following information, as a minimum:

ID	Data	Description	Deviation	Waiver
RFD/RFW Identification				
1.	Organization	Identification of the organization originating the RFD/RFW	X	X
2.	Number	Unique identification and register number	X	X
3.	Revision	Revision status of the RFD/RFW	X	X
4.	Date	Issue date of the RFD/RFW	X	X
5.	Classification	Classification (i.e. major or minor)	X	X
6.	Project	Project under which the nonconforming item is supplied	X	X
7.	Business agreement/ contract identifier	Business agreement / contract identification under which the nonconforming item is supplied (if applicable)	X	X
8.	Order	Order number under which the nonconforming item is supplied (if applicable)	X	X
9.	Originator site	Location of the request for deviation originator (if applicable)	X	X

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ID	Data	Description	Deviation	Waiver
Identification of Affected Item and Affected Documents				
10.	Item designation	Identification of the nonconforming item per name, manufacturer, part number and serial number (for a waiver), according to its configuration item data list	X	X
11.	Affected item(s)	Identification of the CI(s) (number and name) affected by the deviation of waiver	X	X
12.	Effectivity	Model or serial number (or batch / lot number) of the deviating or non-conforming item	X	X
13.	Affected document(s)	Identification of the document(s) (specification, design drawing, etc.) to which the item does not conform (document number and revision/issue, paragraph or requirement ID)	X	X
14.	Short description	Title or short description of the RFD/RFW (consistent with the title of the related non-conformance report)	X	X
15.	Detailed description	Description of the deviation from the relevant requirement or design feature. / Description of the non-conformity, supported by sketches and attachments as appropriate. Include information on the origin of the deviation/waiver (design difficulties, non-conformance observed, procurement difficulties, ambiguous specifications, schedule constraints, etc.)	X	X
16.	Non-conformance Report	Identification number of the Non-conformance Report related to the request for waiver		X
17.	NCRB	Identification of the minutes of meeting of the NCRB which decided to raise the RFW		X
Technical and Programmatic Impact Assessment and Decision				

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ID	Data	Description	Deviation	Waiver
18.	Impact Assessment	Impact on cost, schedule, functionality, performance, reliability and safety	X	X
19.	Consequences of non-approval	Project impact if the deviation/waiver is not approved (cost and schedule)	X	X
20.	Rationale for acceptance	Reason why the proposed deviation/non-conformity can be accepted (supporting analyses, drawings, etc.)	X	X
21.	Adverse effects	Item characteristics affected by the deviation or non-conformity	X	X
22.	Limitation of use	Regarding the intended use		X
23.	Approval	Decision (Approval or Disapproval), names, date and signatures of the relevant authorities (Project Manager, Systems Manager, S&MA Manager)	X	X

D ACRONYMS

AIL	Action Item Log
AR	Acceptance Review
BDC	Baseline Data Collection (BDC)
BIP	Background Intellectual Property
CAD	Computer Aided Design
CADM	Configuration and Data Management
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CoFR	Certificate of Flight Readiness
CR	Commissioning Review
CSA	Canadian Space Agency
CSCI	Computer Software Contractual Item
CSSP	Canadian Space Station Program
CTB	Cargo Transfer Bag
CTE	Critical Technology Element
DID	Data Item Description
EEE	Electrical Electromechanical Electronic
EoC	End of Contract
EMI/EMC	Electromagnetic Interference/Compatibility
EQM	Engineering and Qualification Model
EXPRESS	EXpedite the PRocessing of Experiments to Space Station
FEU	Flight Equivalent Unit
FIP	Foreground Intellectual Property
FM	Flight Model
FEMCA	Failure Modes Effect and Critical Assessment (FMECA)
FRR	Flight Readiness Review
FSDP	Flight Safety Data Package
FSR	Flight Safety Review
GCTS	Ground Commanding and Telemetry Station
GSE	Ground Support Equipment
HFIT	Human Factor Interface Team
ICD	Interface Control Document
IPLAT	ISS Program Label Assessment Team
ICD	Interface Control Drawing
ISS	International Space Station
JSC	Johnson Space Center

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KOM	Kick Off Meeting
KPP	Key Performance Parameters (KPPs)
LSRS	Life Science Research System
LSRS	Life Science Research System
NASA	National Aeronautics and Space Administration
MIUL	Material Identification Usage List
MfRR	Manufacturing Readiness Review (MfRR)
MSFC	Marshall Space Flight Center
OCR	Operations Change Request
PA	Product Assurance
PAIP	Product Assurance Implementation Plan
PD	Payload Developer
PDF	Portable Document Format
PDR	Preliminary Design Review
PEC	Performance Evaluation Criteria
PI	Principal Investigator
PIM	Payload Integration Manager
PM	Project Management
PMP	Project Management Plan
POIC	Payload Operations Integration Center
ProRR	Production readiness Review
PSR	Pre-Ship Review
PSRP	Payload Safety Review Panel
PTOC	Payload Telescience Operations Centre, at CSA
PVT	Payload Verification Test
PWGSC	Public Works and Government Services Canada
RID	Review Item Discrepancy
S&MA	Safety and Mission Assurance
SE	System Engineering
SOW	Statement Of Work
SPR	System Performance Report
SRD	System Requirements Document
SRR	System Requirement Review
SSITF	Space Station Integration Testing Facility
SVT	Science Verification Test
TA	Technical Authority
TPM	Technical Performance Measure
TRL	Technology Readiness Level
TRR	Test Readiness Review

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TRRA	Technology Readiness and Risk Assessment
TreK	Telescience Resource Kit
VCM	Verification Compliance Matrix
VDD	Verification Description Document
VP	Verification Plan
WBS	Work Breakdown Structure
WP	Work Package
WPD	Work Package Description

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PART 1 - GENERAL INFORMATION

1.1 Introduction

The bid solicitation is divided into seven parts plus annexes and attachments, as follows:

- Part 1 General Information: provides a general description of the requirement;
- Part 2 Bidder Instructions: provides the instructions, clauses and conditions applicable to the bid solicitation;
- Part 3 Bid Preparation Instructions: provides bidders with instructions on how to prepare their bid;
- Part 4 Evaluation Procedures and Basis of Selection: indicates how the evaluation will be conducted, the evaluation criteria that must be addressed in the bid, and the basis of selection;
- Part 5 Certifications: includes the certifications to be provided;
- Part 6 Financial and Other Requirements: includes specific requirements that must be addressed by bidders; and
- Part 7 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract

The following Annexes:

Annex A	Statement of Work
Annex B	Basis of Payment-Phase A, Phase B, Phase C
Annex B-1	Basis of Payment-Phase D-1
Annex B-2	Basis of Payment-Phase D-2
Annex C	Non-disclosure Agreement

The following Attachments:

Attachment 1 to Part 3 Technical and Managerial Bid Preparation Instructions
Attachment 1 to Part 4 Evaluation Criteria for the Technical and Managerial Bid

1.2 Summary

Project title

Bio-Analysis system for the International Space Station (ISS).

Description

Public Works and Government Services Canada (PWGSC) on behalf of Canadian Space Agency (CSA) located in St-Hubert, (Quebec), is seeking bids for the design of the Bio-Analysis System. The contract must be completed in four (4) phases: The scope of Phases A, B and C includes the design of the Bio-Analysis System including the manufacturing, testing and delivery of an Engineering Qualification Model (hardware and software) and associated maintenance kit and ground support equipment. The scope of the optional phase D includes the manufacturing, testing, and delivery of two (2) Flight Models (hardware and software) and associated commissioning and maintenance kits, ground commanding and telemetry stations and ground

support equipment. The Phase D scope also includes on-orbit commissioning as well as support to launch and integration of one (1) Flight Model into the ISS.

Period of Contract

The period of contract will be from the date of issue for a period of approximately twenty-six (26) months. Phase A, B and C (15 months) and phase D (11 months).

Intellectual Property

The Intellectual property will vest with the contractor.

Security Requirements

There are no security requirements associated with this requirement.

Integrity provisions for procurement

As per the Integrity Provisions under section 01 of *Standard Instructions 2003 and 2004*, bidders must provide a list of all owners and/or Directors and other associated information as required. Refer to section 4.21 of the *Supply Manual* for additional information on the Integrity Provisions.

Former Public Servant

For services requirements, Bidders must provide the required information as detailed in article 2.3 of Part 2 of *the bid solicitation*, in order to comply with Treasury Board policies and directives on contracts awarded to former public servants. Please also refer to Part 5 – Certifications.

Trade agreements

This requirement is not subject to the trade agreements.

Canadian Content

The requirement is limited to Canadian goods and/or services.

Controlled Goods Program

This procurement could be subject to the Controlled Goods Program. The *Defence production Act* defines Canadian Controlled Goods as certain goods listed in Canada's Export Control List, a regulation made pursuant to the Export and Import Permits Act (EIPA)."

Federal Contractors Program for Employment Equity

The Federal Contractors Program (FCP) for employment equity applies to this procurement; see Part 5 – Certifications and Part 7 - Resulting Contract Clauses.

1.3 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within fifteen (15) working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

1.4 Communications

As a courtesy and in order to coordinate any public announcements pertaining to any resulting Contract, the Government of Canada requests that successful Bidders notify the Contracting Authority, five (5) days in advance of their intention to make public an announcement related to the recommendation of a contract award, or any information related to the contract. The Government of Canada retains the right to make primary contract announcements.

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditionsmanual>) issued by Public Works and Government Services Canada. Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The 2003 (2014-09-25) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

Subsection 5.4 of 2003, Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: 60 days
Insert: 240 days

2.1.1 SACC Manual Clauses

A7035T (2007-05-25), List of Proposed Subcontractors

2.2 Submission of Bids

Bids must be submitted only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit by the date, time and place indicated on page 1 of the bid solicitation:

Public Works and Government Services Canada
Quebec Region
Place Bonaventure, South-East Portal
800 de La Gauchetière Street West
7th Floor, Suite 7300
Montreal, Quebec, Canada
H5A 1L6

Due to the nature of the bid solicitation, bids transmitted by facsimile or by electronic mail to PWGSC will not be accepted.

2.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts with FPS, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

For the purposes of this clause, **"former public servant"** is any former member of a department as defined in the Financial Administration Act, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- a. an individual;
- b. an individual who has incorporated;
- c. a partnership made of former public servants; or
- d. a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the Public Service Superannuation Act (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the Supplementary Retirement Benefits Act, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the Canadian Forces Superannuation Act, R.S., 1985, c.C-17, the Defence Services Pension Continuation Act, 1970, c.D-3, the Royal Canadian Mounted Police Pension Continuation Act, 1970, c.R-10, and the Royal Canadian Mounted Police Superannuation Act, R.S., 1985, c.R-11, the Members of Parliament Retiring Allowances Act, R.S., 1985, c.M-5, and that portion of pension payable to the Canada Pension Plan Act, R.S., 1985, c.C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes () No ()**

If so, the Bidder must provide the following information, for all FPS in receipt of a pension, as applicable:

- a. name of former public servant;
- b. date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes () No ()**

If so, the Bidder must provide the following information:

- a. name of former public servant;
- b. conditions of the lump sum payment incentive;
- c. date of termination of employment;
- d. amount of lump sum payment;
- e. rate of pay on which lump sum payment is based;
- f. period of lump sum payment including start date, end date and number of weeks;
- g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than ten (10) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated and the enquiry can be answered to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

2.5 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Quebec.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the bidders.

2.6 Improvement of Requirement During Solicitation Period

Should bidders consider that the specifications or Statement of Work contained in the bid solicitation could be improved technically or technologically, bidders are invited to make suggestions, in writing, to the Contracting Authority named in the bid solicitation. Bidders must clearly outline the suggested improvement as well as the reason for the suggestion. Suggestions that do not restrict the level of competition nor favour a particular bidder will be given consideration provided they are submitted to the Contracting Authority at least ten (10) days before the bid closing date. Canada will have the right to accept or reject any or all suggestions.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

Canada requests that bidders provide their bid in separately bound sections as follows:

- Section I: Technical and Managerial Bid (1 hard copy and two (2) soft copies on CD/DVD)
Section II: Financial Bid (1 hard copy and 1 soft copy on CD/DVD)
Section III: Certifications (1 hard copy)

If there is a discrepancy between the wording of the soft copy and the hard copy, the wording of the hard copy will have priority over the wording of the soft copy;

For the soft copies of Section I (Technical and Managerial Bid as well as the Executive Summary), all of the information must be contained in one file. The only acceptable formats are: MS Word, PDF and HTML;

For the soft copy of Section II (Financial Bid), all of the information must be contained in one file. The only acceptable formats are: MS Word, PDF and HTML;

The soft copy of Section II must be submitted on a separate CD than the soft copy submitted for Section I;

Prices must appear in Section II (Financial Bid) only. No prices must be indicated in any other section of the bid;

The total number of pages for Section I should not exceed 75 pages (8.5 X 11 inches) 216 mm X 279 mm) paper excluding bid appendices;

The bid should use a numbering system that corresponds to the bid solicitation; In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process **Policy on Green Procurement** (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achatsprocurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, bidders should:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and
- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

Section I: Technical and Managerial Bid

In their technical and managerial bid, bidders should demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will meet these requirements. Bidders should demonstrate their capability and describe their approach in a thorough, concise and clear manner for carrying out the work.

The technical and managerial bid should address clearly and in sufficient depth the points that are subject to the evaluation criteria against which the bid will be evaluated. Simply repeating the statement contained in the bid solicitation is not sufficient. In order to facilitate the evaluation of the bid, Canada requests that bidders address and present topics in the order of the evaluation criteria under the same headings. To avoid duplication, bidders may refer to different sections of their bids by identifying the specific paragraph and page number where the subject topic has already been addressed.

Part 4: *Evaluation Procedures and Basis of Selection* contains additional instructions that bidders should consider when preparing their technical and managerial bid.

The structure and content requested for the Technical and Managerial Bid (Section I) are detailed in Attachment 1 to Part 3: *Technical and Managerial Bid Preparation Instructions*.

Section II: Financial Bid

3.1.1 Bidders must submit their financial bid in accordance with the basis of payment Annex B, B-1 and B-2 included in the Request for Proposal. The total amount of Applicable Taxes must be shown separately.

Prices must be in Canadian funds, Applicable Taxes excluded and Canadian customs duties and excise taxes included.

3.1.2 Price Breakdown

Bidders are requested to detail the following elements for the performance of each task, milestone or phase of the Work, as applicable:

(a) Labour: For each individual and (or) labour category to be assigned to the Work, indicate: i) the hourly rate, inclusive of overhead and profit; and ii) the estimated number of hours.

(b) Equipment: Specify each item required to complete the Work and provide the pricing basis of each one, Canadian customs duty and excise taxes included, as applicable.

(c) Materials and Supplies: Identify each category of materials and supplies required to complete the Work and provide the pricing basis.

(d) Travel and Living Expenses: Indicate the number of trips and the number of days for each trip, the cost, destination and purpose of each journey, together with the basis of these costs which must not exceed the limits of the Treasury Board (TB) Travel Directive. With respect to the TB Directive, only the meal, private vehicle and incidental allowances specified in Appendices B, C and D of the Directive <http://www.njcSolicitation.cnm.gc.ca/directive/travel-voyage/index-eng.php>, and the other provisions of the Directive referring to "travellers", rather than those referring to "employees", are applicable. The Treasury Board Secretariat's Special Travel Authorities, http://www.tbsct.gc.ca/pubs_pol/hrpubs/tbm_113/statb-eng.asp, also apply.

(e) Subcontracts: Identify any proposed subcontractor and provide for each one the same price breakdown information as contained in this article.

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- (f) Other Direct Charges: Identify any other direct charges anticipated, such as long distance communications and rentals, and provide the pricing basis.
(g) Applicable Taxes: Identify any Applicable Taxes separately.

Section III: Certifications

Bidders must submit the certifications required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

(a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and managerial evaluation criteria;

(b) An evaluation team composed of representatives of Canada will evaluate the bids;

4.1.1 Technical and Management Evaluation

4.1.1.1 Mandatory Technical Criteria

The mandatory technical criteria are described at Attachment 1 to Part 4: Evaluation Criteria for the technical and managerial bid.

4.1.1.2 Point Rated Technical and Management Criteria

The Point Rated Technical and Management Criteria are described at Attachment 1 to Part 4: *Evaluation Criteria for the technical and managerial bid*.

4.1.2 Financial Evaluation

4.1.2.1 Evaluation of Price

The price of the bid will be evaluated in Canadian dollars, the Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

4.2 Basis of Selection – Highest Combined Rating of Technical Merit and Price

- 1) To be declared responsive, each bid must:
 - (a) meet all mandatory evaluation criteria;
 - (b) comply with all the requirements of the bid solicitation; and
 - (c) obtain the required minimum of points for the Evaluation Criterion #3 Technical Risks indicated in Table 1: *Evaluation Criteria for the Technical and Managerial Bid*, of Attachment 1 to Part 4.
2. Bids not meeting (a) or (b) or (c) will be declared non-responsive;
3. The selection will be based on the highest responsive combined rating of technical merit and price. The ratio will be 70 % for the technical merit and 30% for the price.
4. To establish the pricing score, each responsive bid will be prorated against the lowest evaluated price and the ratio of 30 %.
5. For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.
6. Neither the responsive bid obtaining the highest technical score nor the one with the lowest evaluated price will necessarily be accepted. The responsive bid with the highest combined rating of technical merit and price will be recommended for award of a contract.

In the event that more than one responsive bid has the same combined score for the technical merit and the price, the bid which obtained the highest overall technical score will be recommended for award of a contract.

PART 5 - CERTIFICATIONS

Bidders must provide the required certifications and associated information to be awarded a contract.

The certifications provided by bidders to Canada are subject to verification by Canada at all times. Canada will declare a bid non-responsive, or will declare a contractor in default in carrying out any of its obligations under the Contract, if any certification made by the Bidder is found to be untrue, whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority may render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Precedent to Contract Award

The certifications listed below should be completed and submitted with the bid but may be submitted afterwards. If any of these required certifications is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to comply with the request of the Contracting Authority and to provide the certifications within the time frame specified will render the bid non-responsive.

5.1.1 Integrity Provisions - Associated Information

By submitting a bid, the Bidder certifies that the Bidder and its Affiliates are in compliance with the provisions as stated in Section 01 Integrity Provisions - Bid of Standard Instructions 2003. The associated information required within the Integrity Provisions will assist Canada in confirming that the certifications are true.

5.1.2 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list (http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml) available from Employment and Social Development Canada (ESDC) - Labour's website. Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

5.1.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts with FPS, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

For the purposes of this clause, "**former public servant**" is any former member of a department as defined in the Financial Administration Act, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

-
- a. an individual;
 - b. an individual who has incorporated;
 - c. a partnership made of former public servants; or
 - d. a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the Public Service Superannuation Act (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the Supplementary Retirement Benefits Act, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the Canadian Forces Superannuation Act, R.S., 1985, c.C-17, the Defence Services Pension Continuation Act, 1970, c.D-3, the Royal Canadian Mounted Police Pension Continuation Act, 1970, c.R-10, and the Royal Canadian Mounted Police Superannuation Act, R.S., 1985, c.R-11, the Members of Parliament Retiring Allowances Act, R.S., 1985, c.M-5, and that portion of pension payable to the Canada Pension Plan Act, R.S., 1985, c.C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes () No ()**
If so, the Bidder must provide the following information, for all FPS in receipt of a pension, as applicable:

- a. name of former public servant;
- b. date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes () No ()**

If so, the Bidder must provide the following information:

- a. name of former public servant;
- b. conditions of the lump sum payment incentive;
- c. date of termination of employment;
- d. amount of lump sum payment;
- e. rate of pay on which lump sum payment is based;
- f. period of lump sum payment including start date, end date and number of weeks;
- g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

5.2 Additional Certifications Precedent to Contract Award

5.2.1 Canadian Content Certification

This procurement is limited to Canadian goods and Canadian services.

The Bidder certifies that:

() a minimum of 80 percent of the total bid price consist of Canadian goods and Canadian services as defined in paragraph 5 of clause A3050T.

For more information on how to determine the Canadian content for a mix of goods, a mix of services or a mix of goods and services, consult Annex 3.6.(9), Example 2, of the Supply Manual

5.2.1.1 *SACC Manual* clause A3050T (2014-11-27) Canadian Content Definition.

5.2.2 Status and Availability of Resources

The Bidder certifies that, should it be awarded a contract as a result of the bid solicitation, every individual proposed in its bid will be available to perform the Work as required by Canada's representatives and at the time specified in the bid solicitation or agreed to with Canada's representatives. If for reasons beyond its control, the Bidder is unable to provide the services of an individual named in its bid, the Bidder may propose a substitute with similar qualifications and experience. The Bidder must advise the Contracting Authority of the reason for the substitution and provide the name, qualifications and experience of the proposed replacement. For the purposes of this clause, only the following reasons will be considered as beyond the control of the Bidder: death, sickness, maternity and parental leave, retirement, resignation, dismissal for cause or termination of an agreement for default.

If the Bidder has proposed any individual who is not an employee of the Bidder, the Bidder certifies that it has the permission from that individual to propose his/her services in relation to the Work to be performed and to submit his/her résumé to Canada. The Bidder must, upon request from the Contracting Authority, provide a written confirmation, signed by the individual, of the permission given to the Bidder and of his/her availability. Failure to comply with the request may result in the bid being declared non-responsive.

5.2.3 Education and Experience

The Bidder certifies that all the information provided in the résumés and supporting material submitted with its bid, particularly the information pertaining to education, achievements, experience and work history, has been verified by the Bidder to be true and accurate. Furthermore, the Bidder warrants that every individual proposed by the Bidder for the requirement is capable of performing the Work described in the resulting contract.

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PART 6 - FINANCIAL AND OTHER REQUIREMENTS

6.1 Financial Capability

SACC Manual clause A9033T (2012-07-16), Financial Capability

6.2 Controlled Goods Requirement (if applicable)

SACC Manual clause A9130T (2014-11-27), Controlled Goods Program – Bid

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PART 7 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

7.1 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work in Annex A and the Contractor's technical and Managerial Bid entitled _____, dated _____ (*will be inserted at contract award*).

7.2 Optional Goods and/or Services

The Contractor grants to Canada the irrevocable option to acquire optional Phase D goods and services defined in the Statement of Work, in Annex A of the contract under the same conditions and at the prices and/or rates stated in the Contract. The option may only be exercised by the contracting Authority and will be evidenced, for administrative purposes only, through a contract amendment. The Contracting Authority may exercise the option within a period between contract award and eight (8) months following the CDR (Critical Design Review) approval by sending a written notice to the Contractor.

7.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the Standard Acquisition Clauses and Conditions Manual (<https://buyandsell.gc.ca/policy-andguidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

7.3.1 General Conditions

2040 (2014-09-25), General Conditions - Research & Development, apply to and form part of the Contract

7.3.2 Supplemental General Conditions

The following supplemental general conditions apply to and form part of the Contract:

- 4001 (2015-04-01), Hardware, Purchase, Lease and Maintenance
- 4002 (2010-08-16), Software Development or Modification Services
- 4003 (2010-08-16), Licensed Software
- 4004 (2013-04-25), Maintenance and Support Services for Licensed Software

7.3.3 Non-disclosure Agreement

The Contractor must obtain from its employee(s) or subcontractor(s) the completed and signed non-disclosure agreement, attached at Annex C, and provide it to the Contracting Authority before they are given access to information by or on behalf of Canada in connection with the Work.

7.4 Period of the Contract (*will be inserted at contract award*)

7.5 Authorities

7.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Esther Paquin
Contract Specialist
Public Works and Government Services Canada
Quebec Region

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CCC No./N° CCC - FMS No./N° VME

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Suite 7300
Montreal, Quebec, H5A 1L6
Telephone: 514-496-3889
Facsimile: 514-496-3822
E-mail address: esther.paquin@tpsgc-pwgsc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

7.5.2 Technical Authority *(will be inserted at contract award)*

The Technical Authority for the Contract is:

Name : _____
Title : _____
Organization : _____
Address : _____
Telephone: _____
Facsimile: _____
E-mail address: _____

The Technical Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Technical Authority; however, the Technical Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

7.5.3 Contractor's Representative *(will be inserted at contract award)*

The Contractor's Representative for the Contract is:

Name: _____
Title: _____
Organization: _____
Address: _____
Telephone: _____ - _____ - _____
Facsimile: _____ - _____ - _____
E-mail: _____

7.6 Proactive Disclosure of Contracts with Former Public Servants

SACC Manual Clause A3025C (2013-03-21)

7.7 Payment

7.7.1 Basis of Payment (Milestone Payment)(Phase A, B, C and D-1)

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price, as specified in the Contract for a cost of \$ _____ (*the amount will be inserted at contract award*). Customs duties are included and Applicable taxes are extra, if applicable.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

7.7.2 Basis of Payment (Limitation of expenditures)(Phase D-2)

Canada's total liability to the Contractor under the Contract must not exceed \$ _____. Customs duties are _____ (*insert "included", "excluded" or "subject to exemption"*) and Applicable Taxes are extra.

No increase in the total liability of Canada or in the price of the Work resulting from any design changes, modifications or interpretations of the Work, will be authorized or paid to the Contractor unless these design changes, modifications or interpretations have been approved, in writing, by the Contracting Authority before their incorporation into the Work. The Contractor must not perform any work or provide any service that would result in Canada's total liability being exceeded before obtaining the written approval of the Contracting Authority. The Contractor must notify the Contracting Authority in writing as to the adequacy of this sum:

when it is 75 percent committed, or four (4) months before the contract expiry date, or

as soon as the Contractor considers that the contract funds provided are inadequate for the completion of the Work,
whichever comes first.

If the notification is for inadequate contract funds, the Contractor must provide to the Contracting Authority a written estimate for the additional funds required. Provision of such information by the Contractor does not increase Canada's liability.

7.7.2 Method of Payment

7.7.2.1 Milestone Payments (Annex B, B-1)

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in Annex B, Annexe B-1, - Basis of Payment and the payment provisions of the Contract if:

- (a) an accurate and complete claim for payment using form PWGSC-TPSGC 1111 (<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/1111.pdf>) and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- (b) all the certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives;
- (c) all work associated with the milestone and as applicable any deliverable

required has been completed and accepted by Canada.

7.7.2.2 Limitation of expenditures (Annex B-2)

1. Canada will make progress payments in accordance with the payment provisions of the Contract, no more than once a month, for cost incurred in the performance of the Work, up to 90 percent of the amount claimed and approved by Canada if:
 - a. an accurate and complete claim for payment using form [PWGSC-TPSGC 1111](#), Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
 - b. the amount claimed is in accordance with the basis of payment;
 - c. the total amount for all progress payments paid by Canada does not exceed 90 percent of the total amount to be paid under the Contract;
 - d. all certificates appearing on form [PWGSC-TPSGC 1111](#) have been signed by the respective authorized representatives.
2. The balance of the amount payable will be paid in accordance with the payment provisions of the Contract upon completion and delivery of all work required under the Contract if the Work has been accepted by Canada and a final claim for the payment is submitted_____ (insert one of the options provided under the Remarks section above.)
3. Progress payments are interim payments only. Canada may conduct a government audit and interim time and cost verifications and reserves the rights to make adjustments to the Contract from time to time during the performance of the Work. Any overpayment resulting from progress payments or otherwise must be refunded promptly to Canada

7.7.2.3 Schedule of Milestones

The schedule of milestones for which payments will be made in accordance with the Contract is detailed in Annex B, Annex B-1.

7.8 SACC Manual Clauses

SACC Manual Clause A9117C (2007-11-30), T1204 - Direct Request by Customer Department

7.9 Invoicing Instructions - Progress Claim - Firm Price

7.9.1 Progress Claim - Firm Price

1. The Contractor must submit a claim for progress payment using form PWGSC-TPSGC 1111 Claim for Progress Payment (<http://www.tpsgc-pwgsc.gc.ca/appacq/forms/documents/1111.pdf>).

Each claim must show:

-
- (a) all information required on form PWGSC-TPSGC 1111;
- (b) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
- (c) the description and value of the milestone claimed as detailed in the Contract.

2. Applicable Taxes must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.

3. The Contractor must prepare and certify **one (1) original and two (2) copies** of the claim on form PWGSC-TPSGC 1111, forward:

a) the **original and one (1) copy** to the Canadian Space Agency at the address shown on page 1 of the Contract under "Invoices" (Financial Services Section) for appropriate certification by the Project Authority identified herein after inspection and acceptance of the Work takes place;

and,

b) **one (1) copy of the original** progress claim to the Contracting Authority identified under the section entitled "Authorities" of the Contract.

4. The CSA's Financial Services Section will then forward the original and one (1) copy of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.

5. The Contractor must not submit claims until all work identified in the claim is completed.

7.9.2 Progress Claim-Limitation of expenditures

The Contractor must submit a claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment (<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/1111.pdf>.)

1. Each claim must show:
 - (a) all information required on form PWGSC-TPSGC 1111;
 - (b) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions.
2. Applicable Taxes must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.
3. The Contractor must prepare and certify **one original and two (2) copies** of the claim on form PWGSC-TPSGC 1111, and forward:
 - a) **the original and one (1) copy** to the Canadian Space Agency (CSA) at the address shown on page 1 of the Contract under "**Invoices**" (Financial Services Section) for appropriate certification by the Technical Authority identified herein after inspection and acceptance of the Work takes place;
and,
 - b) **one (1) copy of the original progress claim** (including all back-up documentation) to the Contracting Authority specified herein.
4. The CSA's Financial Services Section will then forward the original and one (1) copy of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.
5. The Contractor must not submit claims until all work identified in the claim is completed.

7.10 Certifications

7.10.1 Compliance

Compliance with the certifications and related documentation provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the entire contract period. If the Contractor does not comply with any certification, provide the related documentation or if it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

7.11 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in _____ (*to be inserted at contract award*).

7.12 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the supplemental general conditions 4001 (2015-04-01), Hardware, Purchase, Lease and Maintenance, 4002 (2010-08-16), Software Development or Modification Services and 4003 (2010-08-16), Licensed Software, 4004 (2013-04-25) Maintenance and Support Services for Licensed Software;
- (c) the general conditions 2040 (2014-09-25) General Conditions - Research & Development;
- (d) Annex A, Statement of Work;
- (e) Annex B, B-1, B-2 Basis of Payment
- (f) Annex C, Non-disclosure Agreement;
- (g) the Contractor's bid dated _____ (insert date of bid) (If the bid was clarified or amended, insert at the time of contract award: "as clarified on _____" **or** ", as amended on _____" and insert date(s) of clarification(s) or amendment(s))

7.13 Foreign Nationals (Canadian Contractor)

SACC Manual clause A2000C (2006-06-16), Foreign Nationals (Canadian Contractor)

7.14 Insurance

SACC Manual clause G1005C (2008-05-12), Insurance

7.15 Controlled Goods Program (if applicable)

SACC Manual clause A9131C (2014-11-27), Controlled Goods Program

7.16 Directive on Communications with the Media

1. Definitions

"Communication Activity(ies)" includes: public information and recognition, the planning, development, production and delivery or publication, and any other type or form of dissemination of marketing, promotional or information activities, initiatives, reports, summaries or other products or materials, whether in print or electronic format that pertain to the present agreement, all communications, public relations events, press releases, social media releases, or any other communication directed to the general public in whatever form or media it may be in, including but without limiting the generality of the preceding done through any company web site.

2. Communication Activities Format

The Contractor must coordinate with the Canadian Space Agency (CSA) all Communication Activities that pertain to the present contract.

Subject to review and approval by the CSA, the Contractor may mention and/or indicate visually, without any additional costs to the CSA, the CSA's participation in the contract through one or both of the following methods at the complete discretion of the CSA:

- a. By clearly and prominently labelling publications, advertising and promotional products and any form of material and products sponsored or funded by the CSA, as follows, in the appropriate official language:

"This program/project/activity is undertaken with the financial support of the Canadian Space Agency."

“Ce programme/projet/activité est réalisé(e) avec l'appui financier de l'Agence spatiale canadienne.”

b. By affixing CSA's corporate logo on print or electronic publications, advertising and promotional products and on any other form of material, products or displays sponsored or funded by the Canadian Space Agency.

The Contractor must obtain and use a high resolution printed or electronic copy of the CSA's corporate identity logo and seek advice on its application, by contacting the Technical Authority, as mentioned in section 7.5.2 of this contract.

3. Communication Activity Coordination Process

The contractor must coordinate with the CSA's Directorate of Communications and Public Affairs all Communication Activities pertaining to the present contract. To this end, the contractor must:

a. As soon as the Contractor intends to perform a Communication Activity, send a Notice to the CSA's Directorate of Communications and Public Affairs. The Communications Notice must include a complete description of the proposed Communication Activity. The Notice must be in writing in accordance with Article 44 of the General Conditions 2040 contract titled Notice. The Communications Notice must include a copy or example of the proposed Communication Activity.

b. The contractor must provide to the CSA any and all additional document in any appropriate format, example or information that the CSA deems necessary, at its entire discretion to correctly and efficiently coordinate the proposed Communication Activity. The Contractor agrees to only proceed with the proposed Communication Activity after receiving a written confirmation of coordination of the Communication Activity from the CSA's Directorate of Communications and Public Affairs.

c. Should the Contractor proceed with the Communication Activity without having previously received the written confirmation of coordination from the CSA's Directorate of Communications and Public Affairs, subject to giving Notice to the Contractor, Canada is entitled to exercise its right under section 155 of the *Financial Administration Act* and retain from payment to the Contractor or recover from the Contractor the amount of damages that may be due to Canada as a result of the release of information by the Contractor.

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9F052-150101/A
Client Ref. No. - N° de réf. du client
9F052-15-0101

Amd. No. - N° de la modif.
File No. - N° du dossier
MTB-5-38031

Buyer ID - Id de l'acheteur
mtb690
CCC No./N° CCC - FMS No./N° VME

ANNEX "A"

STATEMENT OF WORK

The Statement of Work, appended to the bid solicitation package, is to be inserted at this point and forms part of this document.

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ANNEX B (Phase A)

BASIS OF PAYMENT

SCHEDULE OF MILESTONES

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Milestone No.	Description of Deliverable	Firm Amount	Delivery Date
1	Specify		
2	Specify		
3	Specify		
Etc			

Phase A Total Firm Price \$ _____ (All taxes applicable Extra)

ANNEX B (Phase B)

BASIS OF PAYMENT

SCHEDULE OF MILESTONES

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Milestone No.	Description of Deliverable	Firm Amount	Delivery Date
1	Specify		
2	Specify		
3	Specify		
Etc			

Phase B Total Firm Price \$ _____ (All taxes applicable Extra)

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9F052-15-0101

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File No. - N° du dossier
MTB-5-38031

Buyer ID - Id de l'acheteur
mtb690
CCC No./N° CCC - FMS No./N° VME

ANNEX B (Phase C)

BASIS OF PAYMENT

SCHEDULE OF MILESTONES

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Milestone No.	Description of Deliverable	Firm Amount	Delivery Date
1	Specify		
2	Specify		
3	Specify		
Etc			

Phase C Total Firm Price \$ _____ (All taxes applicable Extra)

Solicitation No. - N° de l'invitation
9F052-150101/A
Client Ref. No. - N° de réf. du client
9F052-15-0101

Amd. No. - N° de la modif.
File No. - N° du dossier
MTB-5-38031

Buyer ID - Id de l'acheteur
mtb690
CCC No./N° CCC - FMS No./N° VME

**ANNEX B-1 (Phase D-1)
OPTIONAL SERVICES**

BASIS OF PAYMENT

SCHEDULE OF MILESTONES

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Milestone No.	Description of Deliverable	Firm Amount	Delivery Date
1	Specify		
2	Specify		
3	Specify		
Etc			

Total Firm Price \$ _____ (All taxes applicable Extra)

ANNEX B-2 (Phase D-2)
OPTIONAL SERVICES

BASIS OF PAYMENT

For the work described in Annex «A», the Contractor will be paid as follows:

1. **LABOUR:** at actual hourly firm rate inclusive of overhead and profit: **Est.: \$**

2. **EQUIPMENT:** at laid down cost without markup **Est.: \$**

3. **MATERIALS AND SUPPLIES:** at laid down cost without markup **Est.: \$**

4. **TRAVEL AND LIVING EXPENSES:** **Est.: \$**

The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the National Joint Council (NJC) Travel Directive (<http://www.njc-cnm.gc.ca/directive/travel-voyage/index-eng.php>), and with the other provisions of the directive referring to "travellers", rather than those referring to "employees" are applicable. All travel must have prior authorization of the Project Authority. All payments are subject to government audit.

5. **DIRECT CHARGES SUBCONTRACTS:** at actual cost without markup **Est.: \$**

6. **SUBCONTRACTS:** at actual cost without markup **Est.: \$**

Estimated Cost to a Limitation of Expenditure: \$
(All taxes applicable extra)

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9F052-15-0101

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File No. - N° du dossier
MTB-5-38031

Buyer ID - Id de l'acheteur
mtb690
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ANNEX "C"

NON-DISCLOSURE AGREEMENT

I, _____, recognize that in the course of my work as an employee or subcontractor of _____, I may be given access to information by or on behalf of Canada in connection with the Work, pursuant to Contract Serial No _____ between Her Majesty the Queen in right of Canada, represented by the Minister of Public Works and Government Services and _____, including any information that is confidential or proprietary to third parties, and information conceived, developed or produced by the Contractor as part of the Work. For the purposes of this agreement, information includes but not limited to: any documents, instructions, guidelines, data, material, advice or any other information whether received orally, in printed form, recorded electronically, or otherwise and whether or not labeled as proprietary or sensitive, that is disclosed to a person or that a person becomes aware of during the performance of the Contract. I agree that I will not reproduce copy, use, divulge, release or disclose, in whole or in part, in whatever way or form any information described above to any person other than a person employed by Canada on a need to know basis. I undertake to safeguard the same and take all necessary and appropriate measures, including those set out in any written or oral instructions issued by Canada, to prevent the disclosure of or access to such information in contravention of this agreement.

I also acknowledge that any information provided to the Contractor by or on behalf of Canada must be used solely for the purpose of the Contract and must remain the property of Canada or a third party, as the case may be.

I agree that the obligation of this agreement will survive the completion of the Contract Serial No: _____

Signature

Date

ATTACHMENT 1 TO PART 3

TECHNICAL AND MANAGERIAL BID PREPARATION INSTRUCTIONS

TECHNICAL AND MANAGERIAL BID

The Bidder should present the information about the Technical and Managerial Bid in the following order:

1. Title / Project Identification Page
2. Executive Summary
3. Table of Contents
4. Technical and Managerial Section
5. Bid Appendices

The structure of the Technical and Managerial Bid and its subsections are described below.

1. Title/Project Identification Page

The first page of the bid submitted should state the following information:

- a) The Request for Proposal file number;
- b) The company's name and address;
- c) The title of the proposed Work (the use of acronyms in the title is discouraged, unless they are described).

Bidders who bid as a joint venture must indicate clearly that it is a joint venture and provide the following information:

- the name of each member of the joint venture;
- the Procurement Business Number of each member of the joint venture;
- the name of the representative of the joint venture, i.e. the member chosen by the other members to act on their behalf, if applicable;
- the name of the joint venture, if applicable.

A joint venture is an association of two or more parties who combine their money, property, knowledge, expertise or other resources in a single joint business enterprise, sometimes referred as a consortium, to bid together on a requirement.

2. Executive Summary

The Bidder must provide an Executive Summary. The Executive Summary is a stand-alone document suitable for public dissemination, for example, through the CSA web site. The Executive Summary should not exceed two pages in length (8.5" x 11") and should highlight the following elements:

- a) Work objectives
- b) Technical and programmatic risks
- c) Major milestones and deliverables

3. Table of Contents

The table of contents should be formatted such that its headings are linked to their respective location in the bid for ease of reference when using the bid's Soft copy version.

4. Technical and Managerial Section

The Technical and Managerial Section should describe the technical and Managerial aspects of the project and should be presented in a format that closely follows the one from the evaluation criteria, as follows:

a) Mandatory Evaluation Criteria

The Bidder must have a subsection in its bid for each mandatory evaluation criterion by focusing on providing details pertaining to the information contained in the description of each evaluation criterion.

b) Point-Rated Evaluation Criteria

The Bidder must have a subsection in its bid for each rated evaluation criterion by focusing on providing details pertaining to the information contained in the description of each point-rated evaluation criterion.

5. Bid Appendices

The following items should be addressed in individual appendices as part of the bid (refer to Statement of Work for more information about the following specific documents):

- Project Management Plan
- WBS and Work Package Description
- Schedule
- Product Assurance Implementation Plan
- BIP/FIP Disclosure Report
- Verification Compliance Matrix

ATTACHMENT 1 TO PART 4

EVALUATION CRITERIA FOR THE TECHNICAL AND MANAGERIAL BID

1. Technical/Management

Mandatory criteria

These criteria are deemed mandatory by CSA as the minimum necessary competence and capability for undertaking the work. Mandatory requirements are evaluated on a pass or fail basis and they will be evaluated very strictly as to compliancy. Therefore, no rating is associated with them. Proposals not meeting all mandatory criteria will be deemed non-responsive.

M1: The Bidder must have demonstrated experience in design, manufacture, test and successful operation of a minimum of one (1) system of similar or greater complexity over the last ten (10) years. This system must be rated for operations in a human space flight program (examples include Space shuttle, International Space Station programs). This criterion assesses the Bidder's experience and expertise in a similar system and how the Bidder has been active in the business related to the proposed technology. The Bidder must provide a description of a previous, or current, similar or related system along with references to demonstrate that the system is similar or related to the Work.

M2: The Bidder must be certified ISO 9002 or have, as a minimum, a quality system in place equivalent to ISO 9001 (equivalence to ISO 9001 must be clearly substantiated).

Point-rated Criteria

The proposal will be evaluated according to the point-rated criteria as specified in Table 1.

Proposals must achieve the stated minimum points required for each rated criterion to be assessed as responsive under the point rated technical criteria section; proposals not meeting the minimum required points will be deemed non-responsive. Only those proposals which are responsive (compliant) with all of the mandatory criteria and then achieve (or exceed) the stated minimum points required for each point rated criterion will be further considered for award of a contract.

Point-Rated Evaluation Criteria	Ratings
R1. Understanding the Functional and Performance Requirements Minimum Score	25 N/A
R2. Understanding the Product Assurance Requirements Minimum Score	15 N/A
R3. Technical Risks Minimum Score	30 5
Maximum Score	70

Table 1: Point-Rated Evaluation Criteria and Associated Ratings

R1: Understanding of the Functional and Performance Requirements

The Bidder must demonstrate that the requirements are understood and that the proposed solution will meet the Bio-analysis Functional and Performance Requirements as defined in the applicable CSA document: CSA-LSRS-RD-0003.

The Bidder must provide a requirement compliance substantiation for each group of requirements as listed in Table 2. Each group of requirements correspond to specific sections of the Functional and Performance Requirements Document (FPRD). Although some groups include multiple “shall”, the Bidder is not requested to address each “shall”. The Bidder must rather address each group as a whole. Table 2 must be used as a template.

Bio-analysis Functional and Performance Requirements (CSA-LSRS-RD-0003)			
Group	Document section	Requirements	Compliance Substantiation
1	3.2	General	
2	3.3.1	System Performance – General Sample Preparation Requirements	
3	3.3.2	System Performance – Antibody-labelling of cells	
4	3.3.3	System Performance – Labelling of soluble molecules	
5	3.3.4	System Performance – Sample analysis requirements	
6	3.3.5	System Performance – Benchmark Assay	
7	3.4; 3.5; 3.6; 3.7; 3.8	Location and Operation, Volume, Mass, Launch Environment, Software Integration	

8	3.9	ISS and Launch Interfaces	
9	3.10	Operations	
10	3.11; 3.12	Conditioned Stowage, Fluid Containment	
11	3.13; 3.14; 3.15; 3.16	Modularity, Upgrades and Expansion, Maintainability, Serviceability, Availability	
12	3.17; 3.18; 3.19	Software Maintenance, Uplink and Downlink, Software Integration, Hard Drives	
13	3.20; 3.21; 3.22	Disposal, Packaging, Identification	

Table 2: Functional and Performance Requirements Compliance Substantiation

Score Benchmark Statements

25 points: An understanding of all 13 groups of requirements is demonstrated and a credible substantiation and technical solution to meet those requirements is provided.

20 points: An understanding of at least 10 groups of requirements is demonstrated, including Group 8 (ISS and Launch Interfaces), and a credible substantiation and technical solution to meet those requirements is provided.

15 points: An understanding of at least 8 groups of requirements is demonstrated, including Group 8 (ISS and Launch Interfaces), and a credible substantiation and technical solution to meet those requirements is provided.

10 points: An understanding of at least 6 groups of requirements is demonstrated, including Group 8 (ISS and Launch Interfaces), and a credible substantiation and technical solution to meet those requirements is provided.

5 points: An understanding of at least 4 groups of requirements is demonstrated, including Group 8 (ISS and Launch Interfaces), and a credible substantiation and technical solution to meet those requirements is provided.

0 point: An understanding of less than 4 groups of requirements is demonstrated.

R2: Understanding of the Product Assurance Requirements

The Bidder must demonstrate that the requirements are understood and that the proposed solution will meet the Product Assurance Requirements as defined in the applicable CSA document: CSA-LSRS-RD-0002.

The Bidder must provide a requirement compliance substantiation for each group of requirements as listed in Table 3. Each group of requirements correspond to specific sections of the Product Assurance Requirements Document. Although some groups include multiple “shall”, the Bidder is not requested to address each “shall”. The Bidder must rather address each group as a whole. Table 3 must be used as a template.

PRODUCT ASSURANCE REQUIREMENTS FOR BIO-ANALYSIS (CSA-LSRS-RD-0002)			
Group	Document section	Requirements	Compliance Substantiation
1	3	Product assurance Program	
2	4	Qualification Program	
3	5	EEE Parts Program	
4	6	Reliability	
5	7	Mechanical Parts, Materials and Processes Program	
6	8	Quality Assurance Program	
7	9	Software Product Assurance Program	
8	10	FPGA Development	
9	11	Safety Program	

Table 3: Product Assurance Requirements Compliance Substantiation

Score Benchmark Statements

15 points: An understanding of all 9 groups of requirements is demonstrated and a credible substantiation to meet those requirements is provided.

12 points: An understanding of at least 7 groups of requirements is demonstrated, including Group 9 (Safety Program), and a credible substantiation to meet those requirements is provided.

8 points: An understanding of at least 5 groups of requirements is demonstrated, including Group 9 (Safety Program), and a credible substantiation to meet those requirements is provided.

5 points: An understanding of at least 3 groups of requirements is demonstrated, including Group 9 (Safety Program), and a credible substantiation to meet those requirements is provided.

0 point: An understanding of less than 3 groups of requirements is demonstrated.

R3: TECHNICAL RISKS

The Bidder must demonstrate that the technical risks are well understood, that the Technological Readiness Level (TRL) is adequate and that there is a credible plan for delivering the technology within the allocated schedule. The Technology Readiness Level must be determined according to the guidelines defined in the Technology Readiness Levels and Assessment Guidelines document (CSA-ST-GDL-0001). The technical risk assessment must identify the risks, their likelihood and consequence as well as the associated mitigation method.

Score Benchmark Statements

30 points: A credible rationale for why the proposed system has a TRL of at least 4. This rationale is further supported by third party evidence such as journal publication of test results. The proposal also includes a detailed technical risk assessment.

20 points: A credible rationale for why the proposed system has a TRL of at least 4. The proposal also includes a detailed technical risk assessment.

10 points: The TRL is less than 4 but a credible plan for delivering the technology within the allotted schedule is provided and substantiated. The proposal also includes a detailed technical risk assessment.

5 points: The TRL is less than 4 but a credible plan for delivering the technology within the allotted schedule is provided.

0 point: No credible rationale or substantiated path to technology maturity within the allocated schedule is provided.