



## RETURN BIDS TO:

## RETOURNER LES SOUMISSIONS À:

Réception des soumissions - TPSGC / Bid Receiving  
- PWGSC

1550, Avenue d'Estimauville

1550, D'Estimauville Avenue

Québec

Québec

G1J 0C7

## REQUEST FOR PROPOSAL DEMANDE DE PROPOSITION

**Proposal To: Public Works and Government  
Services Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Proposition aux: Travaux Publics et Services  
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

**Comments - Commentaires**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du**

**fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**

TPSGC/PWGSC

601-1550, Avenue d'Estimauville

Québec

Québec

G1J 0C7

<b>Title - Sujet</b> Steering platform complete gimbal	
<b>Solicitation No. - N° de l'invitation</b> W7701-196989/A	<b>Date</b> 2019-10-11
<b>Client Reference No. - N° de référence du client</b> W7701-196989	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$QCL-052-17782	
<b>File No. - N° de dossier</b> QCL-8-41169 (052)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2019-11-21</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Heure Normale du l'Est HNE
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Proulx, Jean-R.	<b>Buyer Id - Id de l'acheteur</b> qcl052
<b>Telephone No. - N° de téléphone</b> (418) 649-2774 ( )	<b>FAX No. - N° de FAX</b> (418) 648-2209
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> RDDC-R et D Défense Canada Valcartier BATISSE 53 2459 ROUTE DE LA BRAVOURE QUEBEC Québec G3J1X5 Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b> Voir Doc.	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

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## **PART 1 - GENERAL INFORMATION**

### **1.1 Security Requirements**

No requirements related to security

### **1.2 Statement of Work**

The Work to be performed is detailed in Annex A

### **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 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 Trade Agreements**

The requirement is subject to the provisions of the North American Free Trade Agreement (NAFTA) and the Canadian Free Trade Agreement (CFTA).

### **1.5 ePost Connect service**

This bid solicitation allows bidders to use the epost Connect service provided by Canada Post Corporation to transmit their bid electronically. Bidders must refer to Part 2 entitled Bidder Instructions, and Part 3 entitled Bid Preparation Instructions, of the bid solicitation, for further information.

## 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-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) 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](#) (2019-03-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

### 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 in the bid solicitation.

#### 2.2.1 By using the [epost Connect service provided by Canada Post Corporation](https://www.canadapost.ca/web/en/products/details.page?article=epost_connect_send_a) ([https://www.canadapost.ca/web/en/products/details.page?article=epost\\_connect\\_send\\_a](https://www.canadapost.ca/web/en/products/details.page?article=epost_connect_send_a))

The email address of PWGSC Quebec region Bid Receiving Unit is:

[TPSGC.RQReceptionSoumissions-QRSupplyTendersReception.PWGSC@tpsgc-pwgsc.gc.ca](mailto:TPSGC.RQReceptionSoumissions-QRSupplyTendersReception.PWGSC@tpsgc-pwgsc.gc.ca)

Note: Bids will not be accepted if emailed directly to this email address. This email address is to be used to open an epost Connect conversation, as detailed in Standard Instructions [2003](#), or to send bids through an epost Connect message if the bidder is using its own licensing agreement for epost Connect.

#### 2.2.2 By mail or in person at: Public Works and Government Services Canada (PWGSC) 1550, Avenue of Estimaerville Quebec City, Quebec G1J 0C7

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

### 2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority at [Jean-Renaud.Proulx@tpsgc-pwgsc.gc.ca](mailto:Jean-Renaud.Proulx@tpsgc-pwgsc.gc.ca) no later than **seven (7) 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.

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## 2.4 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.

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## PART 3 - BID PREPARATION INSTRUCTIONS

### 3.1 Bid Preparation Instructions

- If the Bidder chooses to submit its bid electronically, Canada requests that the Bidder submits its bid in accordance with section 08 of the 2003 standard instructions. The epost Connect system has a limit of 1GB per single message posted and a limit of 20GB per conversation.

The bid must be gathered per section and separated as follows:

Section I: Technical Bid  
Section II: Financial Bid  
Section III: Certifications  
Section IV: Additional Information

- If the Bidder chooses to submit its bid in hard copies, Canada requests that the Bidder submits its bid in separately bound sections as follows:

Section I: Technical Bid (2 hard copies and 1 soft copy on USB key)

Section II: Financial Bid (2 hard copies and 1 soft copy on USB key)

Section III: Certifications (2 hard copies and 1 soft copy on USB key)

Section IV: Additional Information (2 hard copies and 1 soft copy on USB key)

- If there is a discrepancy between the wording of the soft copy on electronic media and the hard copy, the wording of the hard copy will have priority over the wording of the soft copy.
- If the Bidder is simultaneously providing copies of its bid using multiple acceptable delivery methods, and if there is a discrepancy between the wording of any of these copies and the electronic copy provided through epost Connect service, the wording of the electronic copy provided through epost Connect service will have priority over the wording of the other copies.
- Canada requests that bidders follow the format instructions described below in the preparation of hard copy of their bid:
  - (a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
  - (b) 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 (<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=32573>). 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 Bid**

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

## **Section II: Financial Bid**

Bidders must submit their financial bid in accordance with the Basis of Payment.

### **3.1.1 Electronic Payment of Invoices – Bid**

If you are willing to accept payment of invoices by Electronic Payment Instruments, complete Annex D Electronic Payment Instruments, to identify which ones are accepted.

If Annex D Electronic Payment Instruments is not completed, it will be considered as if Electronic Payment Instruments are not being accepted for payment of invoices.

Acceptance of Electronic Payment Instruments will not be considered as an evaluation criterion.

### **3.1.2 Exchange Rate Fluctuation**

C3011T (2013-11-06) Exchange Rate Fluctuation

### **3.1.3 SACC Manual Clauses**

## **Section III: Certifications**

Bidders must submit the certifications and additional information 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 financial evaluation criteria.

#### 4.1.1 Technical Evaluation

##### 4.1.1.1 Mandatory Technical Criteria

Although the bidders must propose products that meet all the specifications described in Annex A at the closure date, bids will be evaluated on the mandatory technical requirements listed at Annex C – Tables of Mandatory Technical Evaluation Criteria.

To demonstrate that their products meet all selected technical specifications mentioned above, Bidders must submit with their bid *proofs of compliance*. A proof of compliance is defined as a document, such as a brochure and/or technical literature and/or a third party test report provided by a nationally and/or internationally recognized testing facility and/or a report generated by a nationally and/or internationally recognized third party software. *The document must provide detailed information on each performance mandatory technical evaluation criteria.*

*The bidder must clearly demonstrate how the proposed equipment complies to each mandatory technical evaluation criteria listed at Annex C.* Simply stating that the criteria are met is not sufficient. Where it is necessary to refer to other documentation that is included in the proposal, bidders should include the precise location of the reference material including the title of the document, and the page and paragraph numbers. It is the bidder's responsibility to provide enough details to permit a complete evaluation.

Any proposal that does not clearly demonstrate compliance with each of the mandatory technical evaluation criteria listed Annex C will be considered non-responsive.

#### 4.1.2 Financial Evaluation

1. Bidders must submit firm prices, customs duties and excise taxes included, and Applicable Taxes excluded.
2. Unless the bid solicitation specifically requires bids to be submitted in Canadian currency, bids submitted in foreign currency will be converted to Canadian currency for evaluation purposes. The rate given by the Bank of Canada in effect on the bid solicitation closing date, or on another date specified in the bid solicitation, will be applied as a conversion factor to the bids submitted in foreign currency.
3. Bidders must provide prices Delivered Duty Paid (DDP) RDDC Valcartier Incoterms 2010 for shipments from a commercial contractor. Bids will be assessed on an DDP basis.

### 4.2 Basis of Selection

#### 4.2.1 Basis of Selection - Mandatory Technical Criteria

SACC Manual Clause [A0031T](#) (2010-08-16), Basis of Selection - Mandatory Technical Criteria

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## PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

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

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default 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 will render the bid non-responsive or constitute a default under the Contract.

### 5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

#### 5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

### 5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid, but may be submitted afterwards. If any of these required certifications or additional information 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 provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

#### 5.2.1 Integrity Provisions – Required Documentation

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real property agreement of the [Ineligibility and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

#### 5.2.2 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 available at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's](https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#) website (<https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#>).

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.

## PART 6 - RESULTING CONTRACT CLAUSES

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

### 6.1 Security Requirements

6.1.1 There is no security requirement applicable to the Contract.

### 6.2 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex A.

### 6.3 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-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

#### 6.3.1 General Conditions

[2030](#) (2018-06-21), General Conditions – Goods (Higher Complexity), apply to and form part of the Contract.

#### 6.3.2 Supplemental General Conditions

[4002](#) (2010-08-16) Software Development or Modification Services, apply to and form part of the Contract.

### 6.4 Term of Contract

#### 6.4.1 Period of the Contract

The period of the Contract is from date of Contract to 1 year after the warranty period inclusive.

#### 6.4.2 Delivery Date

All the deliverables must be received in accordance with the delivery calendar specified in Annex A of the Contract.

#### 6.4.3 Delivery Points

Delivery of the requirement will be made to delivery point(s) specified at Annex A of the Contract.

### 6.5 Authorities

#### 6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name : Jean-Renaud Proulx  
Title : Procurement Specialist  
Public Work and Government Services Canada

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Procurement Division  
Telephone : 418-649-2774  
Facsimile : 418-648-2209  
Email : Jean-Renaud.Proulx@tpsgc.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.

### **6.5.2 Project Authority**

The Project Authority for the Contract is:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_

Telephone: \_\_\_\_ \_\_\_\_ \_\_\_\_  
Facsimile: \_\_\_\_ \_\_\_\_ \_\_\_\_  
E-mail: \_\_\_\_\_

The Project 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 Project Authority; however, the Project 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.

### **6.5.3 Contractor's Representative**

Name: \_\_\_\_\_  
Telephone: \_\_\_\_ \_\_\_\_ \_\_\_\_  
Facsimile: \_\_\_\_ \_\_\_\_ \_\_\_\_  
E-mail: \_\_\_\_\_

## **6.6 Payment**

### **6.6.1 Limitation of Price**

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.

### **6.6.2 Multiple Payments**

Canada will pay the Contractor upon completion and delivery of deliverables in accordance with the payment provisions of the Contract if:

- a. an accurate and complete invoice and any other documents required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all such documents have been verified by Canada;

- 
- c. the Work delivered has been accepted by Canada.

### **6.6.3 Electronic Payment of Invoices – Contract (To be completed at contract award)**

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- a. Direct Deposit (Domestic and International);
- b. Electronic Data Interchange (EDI);

### **6.7 Invoicing Instructions**

The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

Invoices must be distributed as follows:

- a. The original and one (1) copy must be forwarded to the address shown on page 1 of the Contract for certification and payment.
- b. On request, one (1) copy must be forwarded to the Contracting Authority identified under the section entitled "Authorities" of the Contract.

### **6.8 Certifications and Additional Information**

#### **6.8.1 Compliance**

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

### **6.9 Applicable Laws**

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Quebec.

### **6.10 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 4002 (2010-08-16) Software Development or Modification Services
- (c) the general conditions 2030 (2018-06-21) General Conditions – Goods (Higher Complexity)
- (d) Annex A, Statement of Work;
- (e) Annex B, Basis of Payment;
- (f) Annex C, Mandatory evaluation criteria;
- (g) Annex D, Electronic Payment of Invoices
- (h) the Contractor's bid dated \_\_\_\_\_ **(to be completed at contract award)**

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## 6.11 **SACC Manual Clauses**

B1501C (2006-06-16), Electrical Equipment

## ANNEX A – STATEMENT OF WORK

### 1. TITLE

#### GIMBAL STEERING PLATFORM FOR EO SYSTEMS

### 2. BACKGROUND

Steering platforms are commonly used in the evaluation of the performances of Electro-Optic (EO) systems. They are used to point the Field Of View (FOV) of the evaluated systems toward a specific targeted area which could be a fixed position or a target in movement. The steering platform must have specific characteristics to provide an effective solution for these types of evaluations. The required characteristics depend on the application (static pointing or tracking) and the evaluated system characteristics. The application requirements usually include the dimensions, the weight, the pointing precision and maximum speed of the steering platform. The physical characteristics of the evaluated equipment must be taken into account to determine the real performance the steering platform. Some critical characteristics of the evaluated components are: their dimensions, their weight and their positions on the steering platform.

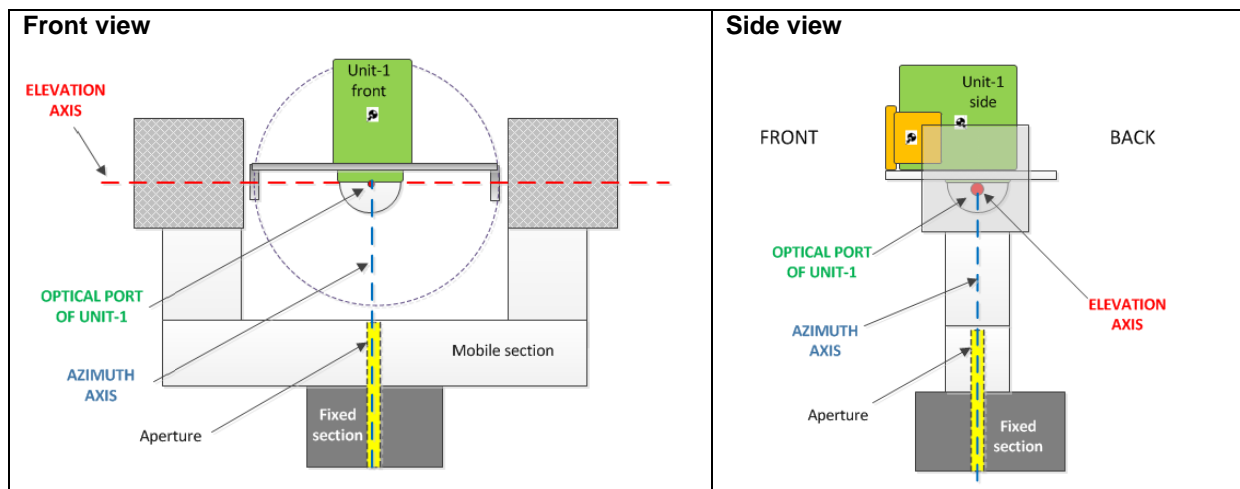


Figure A1- Typical components of a steering platform in gimbal configuration

Figure A1 illustrates the typical elements of a steering platform used for the evaluation of EO systems. The illustrations present two typical view representations: front and side. The presented steering platform is a typical configuration where the aiming point is controlled by 2 axes: the azimuth and the elevation one. They are represented by thick dashed lines: red for elevation and blue for azimuth axes.

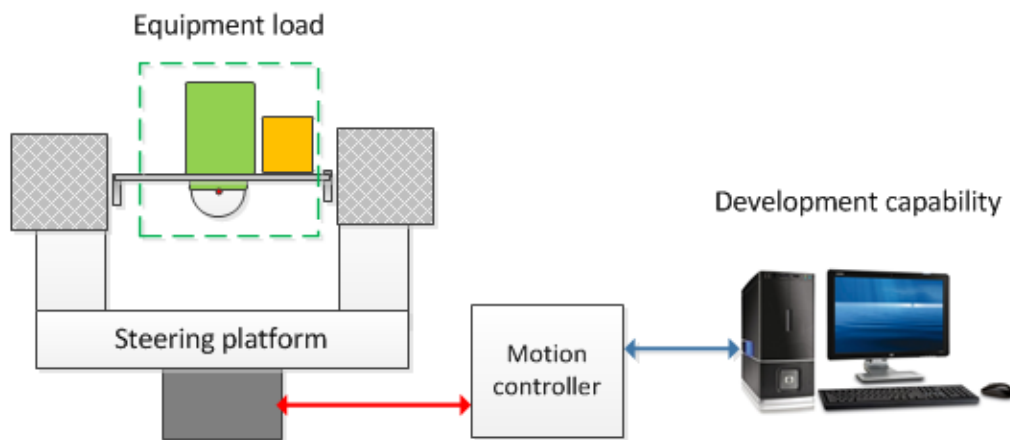
The steering platform is composed of two structures: one fixed and one mobile. Along the azimuth axis a cavity goes through the fixed section and the bottom of the mobile section. In Figure A1, it is designated as aperture and it is illustrated by the yellow section. It provides the capability to feed electrical cabling through the 2 structures without significant interference during the horizontal rotation of the platform.

The upper sections of the mobile structure (grey boxes) contain one or two motors controlling the orientation of the instrument platform around the vertical axis. The green box and the white dome represent an EO system where its optical port is precisely located at the intersection of the azimuth and elevation axes. This type of setup, called gimbal configuration, provides unique advantages for the EO system evaluations. The (azimuth or elevation) rotations of the steering platform do not generate parallax

effect on the sensor FOV. This characteristic is critical for evaluations completed at short ranges (e.g. in laboratory).

In spite of its advantages, the gimbal configuration generates challenges for the steering platform because the centers of mass of the tested systems are located away from the steering axis. This condition causes static torques and significantly increase the total rotational inertia of the equipment loaded on the platform. The selected steering platform must have the specific capabilities to efficiently work in gimbal configuration and rapidly adapt to the physical characteristic of the various equipment on the instrument platform.

The acquired steering platform is aimed at providing an effective solution in the evaluation of various EO systems for the short and mid-term projects. The short term requirements are precisely defined because tested systems and the evaluation objectives have been clearly identified and planned. The selected steering platform must have the suitable capabilities to carry out these initial evaluations. Some requirements have been extended to cope with different equipment loads in the future assessments.



*Figure A2- Components of the steering capability*

Figure A2 presents the various components required for the operation of a steering system. They include: the steering platform, the motion controller, the accessories, the equipment load and the development capability. The cabling (red and blue lines) is part of the accessories.

The development capability includes the environment for writing, debugging and uploading the motion control software into the motion controller. Additionally, the operator can remotely control the steering platform through the development station.

### 3. ACRONYMS

CW	Counter weight
DRDC	Defence Research and Development Canada
EO	Electro-Optic
FOV	Field Of View
SOR	Statement of Requirement
TA	Technical Authority
VAC	Voltage Alternative Current



#### 4. APPLICABLE DOCUMENTS & REFERENCES

None

#### 5. REQUIREMENTS

##### 5.1 Steering capability

##### 5.1.1 Steering platform

Figure A3 and Figure A4 present three views of the initial equipment loaded on the steering platform. They include the dimensions requirements for the steering platform. All dimensions are specified in centimeters. These figures only present a subset of the requirements and they are aimed at assisting the understanding of the physical requirements presented in Table A1.

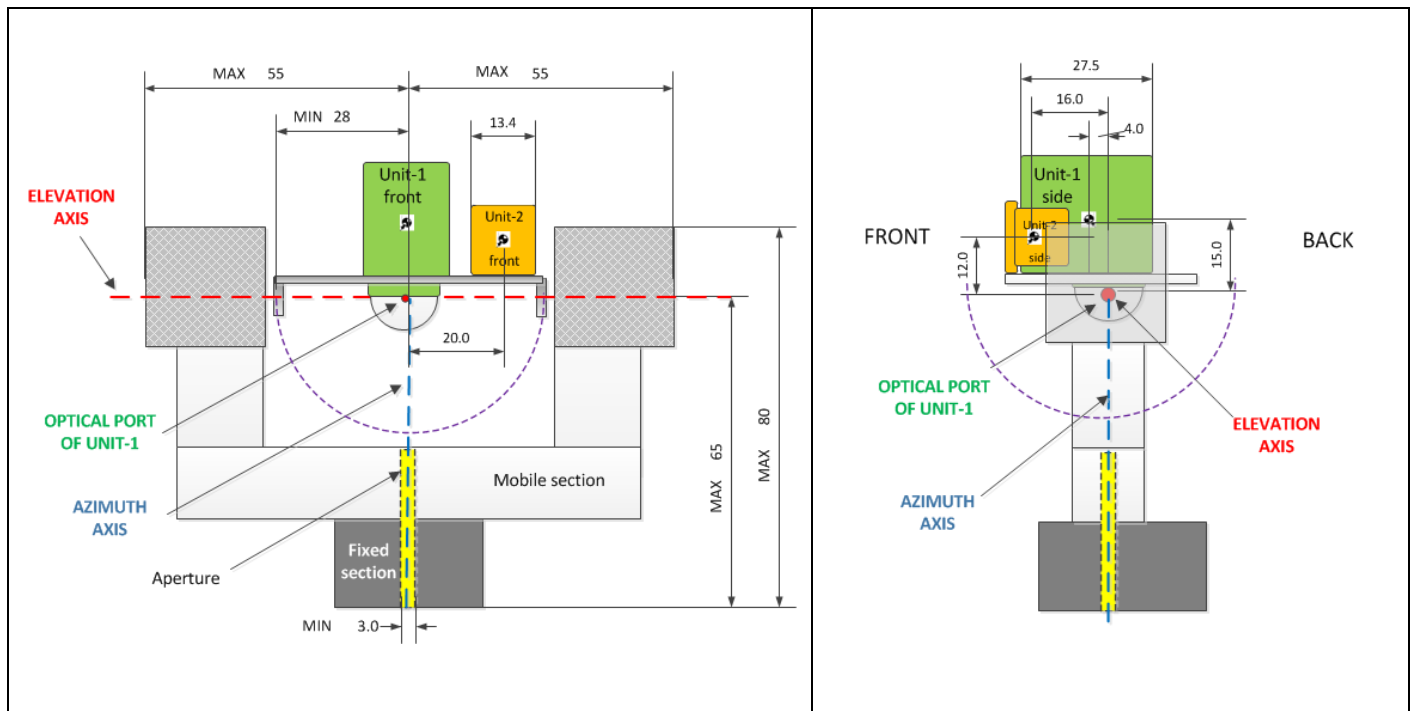


Figure A3- Dimension requirements of the steering platform (front and side view)

Figure A3 includes a half sphere centered on the intersection of the azimuth and elvation axes. This half sphere illustrates a volume below the elevation axis where the equipment load could be installed without any interference with steering platform structure. Above the elevation axis, no structure interference must exist within the stated window ( $\pm 28$  cm).

Figure A4 illustrates the requirement for the unobstructed field of view from the crossing point of the two rotation axes (azimuth and elevation). No part of the steering platform must block the field of view within the 135 degrees.

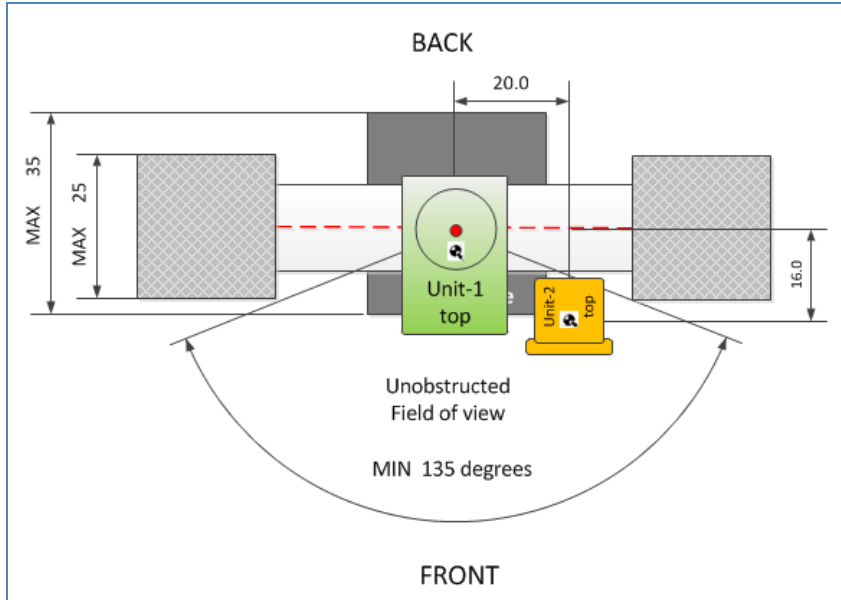


Figure A4 - Physical characteristics of the steering platform and its equipment loads (top view)

Table A1 presents the physical requirement for the steering platform. The requirements illustrated in previous figures (Figure A3 and Figure A4) have been identified by the “\*” symbol at the end of requirement name.

Table A1- Physical requirements of the steering platform

Category	Requirements	Value
<b>Configuration</b>	Steering platform type	Gimbal
	Drive type	Direct drive
<b>Physical</b>	Height*	80 cm maximum
	Width*	110 cm maximum
	Depth*	35 cm maximum
	Height of elevation axis*	65 cm maximum
	Base aperture*	3 cm minimum
	Weight	150 kg maximum
<b>Pointing capability</b>	Elevation steering range	Continuous
	Azimuth steering range	Continuous
<b>Load capability</b>	Load space (or larger) *	56 cm or larger
	Azimuth field of view (or wider)*	135 deg or wider
	Load weight (or higher)	0 - 50 kg (or more)
<b>Load protection</b>	Removable azimuth hard limits	± 90 deg.
	Removable elevation hard limit (upper)	+50 to 60 deg.
	Removable elevation hard limit (lower)	-25 deg.

---

### 5.1.2 Motion controller

The physical requirements related to the motion controller are:

- Maximum weight: 40 kg;
- Maximum volume: 0.04 cubic meter;
- Maximum depth: 50 cm;

The module power must allow its operation from voltage between 100 to 240 VAC and frequency between 50 and 60Hz.

The motion controller must have the following characteristics:

- Digital servo loop;
- Servo loop update rate ( > 1 kHz);
- Multi-axis (at least 2) coordinated motions;
- Dedicated inputs for monitoring the motion limits for at least 2 axes;
- Communication capabilities for Ethernet and USB links and
- Operation temperature range: 0 to + 40 C.

### 5.1.3 Accessories

The delivered system must include all connectors and cables (communication, control and power) to allow the proper operation of all subsystems. The cables between the steering platform and the motion controller (red line in Figure 2) must have a minimum length of 5 meters.

## 5.2 Initial load configuration

### 5.2.1 Load description

The steering system must be configured to allow the proper operation with the initial equipment loaded on the steering platform. Figure 5 presents a right side view of the initial configuration composed of two EO systems. The red dot identifies the elevation axis of the steering platform. Each module is presented in separate window to provide a clear access to their individual characteristics (dimensions and center of gravity).

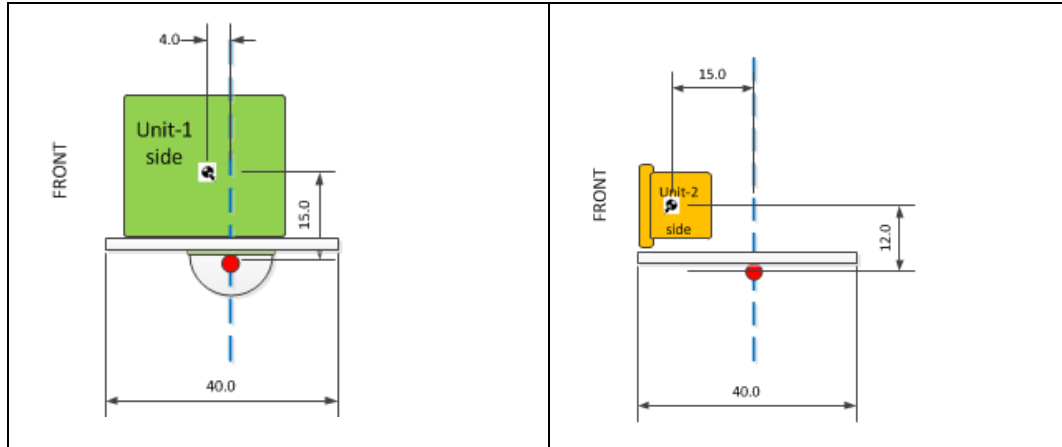


Figure A5- Positions of the center of mass for unit 1 and 2

The weight of the units 1 and 2 are respectively 16.0 kg and 1.9 kg.

### 5.2.2 Steering ranges

For this configuration, the steering range requirements are:

- Azimuth:  $\pm 60$  degrees;
- Elevation: -20 to +45 degrees

### 5.2.3 Performance requirements

Table A2 enumerates the performance requirements of the steering platform with the equipment load and the counter-weight module.

Table A2- Performance requirements of the steering platform

Axis	Requirements	Value
<b>Azimuth</b>	Speed	0 to 60 degrees/sec (or higher)
	Acceleration	0 to 90 degrees/sec <sup>2</sup> (or higher)
	Pointing accuracy	$\pm 10$ micro radians (or lower)
	Pointing repeatability	$\pm 5$ micro radians (or lower)
	Continuous torque	0 to 15 N*m (or higher)
<b>Elevation</b>	Speed	0 to 60 degrees/sec (or higher)
	Acceleration	0 to 90 degrees/sec <sup>2</sup> (or higher)
	Pointing accuracy	$\pm 10$ micro radians (or lower)
	Pointing repeatability	$\pm 5$ micro radian (or lower)
	Maximum continuous torque	0 to 10 N*m (or higher)

---

#### **5.2.4 Counter-weight module**

The steering system must include a counter-weight (CW) module to cancel the vertical torque generated by the loaded equipment (green and orange box in Figure 3, 4, 5). The Contractor must provide only one counter-weight module designed specifically for the load described in this section. However, the selected design of the counter-weight must be adaptable to balance different loads.

The CW module must not negatively affect:

- The steering ranges defined in 5.2.2;
- The azimuth field of view (FOV) defined in Table 1.

#### **5.3 Design validations**

Two specific design validations are mandatory to insure the protection of the equipment load: the limit protections and the counter-weight module. The Contractor must provide documentation for both implementations to allow validation by the technical authority.

##### **5.3.1 Pointing range limits**

The Contractor must provide a robust solution to limit the platform movement inside the specified range for both axes (ref. Table 1). In addition to the software limits, the protection must include removable hard limits. The capacity to remove the hard limit is necessary for future applications.

##### **5.3.2 Counter-weight module**

The documentation on the counter-weight design must be presented to the technical authority to validate its safe integration in the laboratory environment.

#### **5.4 Development support**

The development and control computer is not included in the procurement request but the delivered system must include the following software development capabilities:

- Environment to develop, execute and debug motion control programs in an high language such as C or C++;
- Driver libraries (Labview, C, and .NET) compatible with the motion controller;
- Real-time acquisition of position, status and fault information;
- Compatible with Windows 7.0 or newer.

The development tools must include a capability to automatic adjust the motion parameters for the efficient operation of different equipment loads (different position, inertia, etc.). The optimisation software must automatically determine the optimum parameters based on its measurements with the actual equipment loaded on the steering platform. The optimization operation must not require any specialized personnel.

### **6. DELIVERABLES**

#### **6.1 Deliverables for requirement 5.3.1 – Validation of the hard limit design.**

Documentation supplied in MS Word format includes:

- the description of the software protection and

- the physical information about the hard limits (dimensions, positions and material).

## 6.2 Deliverables for requirement 5.3.2 – Validation of the Counter-weight module

Documentation supplied in MS Word format includes:

1. the description of the mechanical characteristics (dimensions and the positions) and
2. the suggested approaches for its adaption for other load configurations.

## 6.3 Deliverables for requirement 5.4– Preliminary development capability

A tool suite allowing the development of the control application before steering platform delivery. These deliverables includes:

1. The software development environment (requirement 5.3) and
2. Hardware components for simulating the platform operation.

The Contractor must provide the hardware components at no cost up to the final platform delivery (6.4).

## 6.4 Deliverables for requirement 5.1 and 5.2: - Operational steering platform ready for initial load.

All hardware and software components required for the effective operation of the steering platform and the initial load. (quantity = 1).

The delivery does not include the installation and the initial start-up of the equipment. However, they must be achievable by the technical team of the establishment (DRDC Valcartier). The support of the Contractor must include the necessary documentation and the remote assistance (ex. phone, e-mail) of technical staff to allow the successful completion of the initial start-up by the local teams within 2 weeks.

The support of the local teams for the initial start-up do not limit the Contrator's responsibility to repair or to replace any defective component during the warranty period.

## 7. DATE OF DELIVERY

Deliverable	Delivery date
6.1	Within 10 weeks after contract award
6.2	Within 10 weeks after contract award
6.3	Within 4 weeks after contract award
6.4	Within 20 weeks after contract award

## 8. LANGUAGE OF WORK

English or French.

## 9. DELIVERY LOCATION

Deliverables 6.1 to 6.2 must be transmitted by any agreed communication channel.

Deliverables 6.3 to 6.4 must be delivered at:

Defence Research and Development Canada – Valcartier Research Centre  
Building 53

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W7701-196989

Amd. No. - N° de la modif.  
File No. - N° du dossier  
QCL-8-41169

Buyer ID - Id de l'acheteur  
QCL052  
CCC No./N° CCC - FMS No./N° VME

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2459, de la Bravoure road  
Quebec, QC  
G3J 1X5  
Canada

## **10. TRAVEL**

The Contractor is required to travel at DRDC Valcartier for the mandatory and agreed meetings.

## **11. MEETINGS**

Additional meeting can be agreed between the Contractor representative and the technical authority but one meetings must be mandatory:

- One start-up meeting to validate the most critical requirements such as: the 2 design validations, development environment and detailed information on the equipment integration on the steering platform.

## **12. GOVERNMENT SUPPLIED MATERIAL (GSM)**

None

## **13. GOVERNMENT FURNISHED EQUIPMENT (GFE)**

None

## **14. SPECIAL CONSIDERATIONS**

None

## **15. SECURITY**

All work is unclassified and the Contractor will not have access to any classified information. When on site, the Contractor will be escorted at all times.

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## ANNEX B – BASIS OF PAYEMENT

#	Description*	Firm Price
A	<b>Deliverable for requirement 5.3.1</b> <b>Validation of the hard limit design</b>	_____ \$
B	<b>Deliverable for requirement 5.3.2</b> <b>Validation of the counter-weight module</b>	_____ \$
C	<b>Deliverable for requirement 5.4</b> <b>Preliminary development capability</b>	_____ \$
D	<b>Deliverable for requirement 5.1 et 5.2</b> <b>Operational steering platform ready for initial load</b>	_____ \$
<b>PRICE OF BID* (A+B+C+D)</b>		_____ \$

*\*In accordance with the characteristics and conditions listed in Annex A "Statement of Work"*

*\*Firm prices, all inclusive, DDP destination. Prices include Canadian customs duties and Applicable Taxes extra.*



## ANNEXE C – MANDATORY EVALUATION CRITERIA

These criteria are deemed mandatory by DRDC 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.

### 1. BIDDER EXPERIENCE

The Bidder must demonstrate his experience and expertise as instructed in criteria 1.1 and 1.2 below.

All experience described in the bid must be the experience of one or more of the following:

- a) The Bidder itself (which includes the experience of any companies that formed the Bidder by way of a merger but does not include any experience acquired through a purchase of assets or an assignment of contract); or
- b) The Bidder's affiliates (i.e. parent, subsidiary or sister corporations), provided the Bidder identifies and demonstrates the transfer of know-how, the use of toolsets and the use of key personnel from the affiliate for the applicable criterion; or
- c) The Bidder's subcontractors provided the Bidder includes a copy of the teaming agreements and identifies the roles and responsibilities of all parties under the agreement and how their work will be integrated.

The experience of the Bidder's suppliers will not be considered.

#### 1.1 Operational history

Bidders should include the precise location of the reference material including the title of the document, and the page and paragraph numbers.

TABLE C1 – Operational History			
Mandatory requirement	Met	Not met	If met, identify the reference in the bidder's proposal
The bidder must demonstrate to have been in the business of supplying, configuring and maintaining pan & tilt systems and/or motion controllers for at least five (5) years.			
The bidder must demonstrate a minimum of three (3) years of experience in supplying, configuring and maintaining direct drive gimbal mount systems.			

#### 1.2 Similar project experiences

The Bidder must provide a minimum of two (2) current or previous projects where the Bidder has provided a similar or related system along with the client's name and a short description that demonstrates that the project is similar or related to the Work described in the SOW.

The referenced projects have to be advanced enough to demonstrate that the design, manufacturing and testing phases are completed.

The Bidder may provide additional projects at his discretion but only needs two (2) demonstrated similar projects to meet criteria 1.2.

Each referenced projects must include two (2) of the followings characteristics:

- High precision pointing capability (25 micro radians or better);
- Heavy load ( 30 kg capacity or better);
- High speed ( 40 degrees/second or better ) and high acceleration ( 50 degrees/second<sup>2</sup> or better)

Project #1 (mandatory):
Client name:
Description of the project and relations to the present Work:
Characteristics of the product:
<input type="checkbox"/> High precision capability <input type="checkbox"/> Heavy load
<input type="checkbox"/> High speed and High acceleration
Date of installation :

Project #2 (mandatory):
Client name:
Description of the project and relations to the present Work:

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QCL052  
CCC No./N° CCC - FMS No./N° VME

Characteristics of the product:
<input type="checkbox"/> High precision capability <input type="checkbox"/> Heavy load
<input type="checkbox"/> High speed and High acceleration
Date of installation :

Project #3 (optional):
Client name:
Description of the project and relations to the present Work:
Characteristics of the product:
<input type="checkbox"/> High precision capability <input type="checkbox"/> Heavy load
<input type="checkbox"/> High speed and High acceleration
Date of installation :

## 2. SYSTEM REQUIREMENTS

Bidders should include the precise location of the reference material including the title of the document, and the page and paragraph numbers.

TABLE C2 – FMS SYSTEM REQUIREMENTS FOR EVALUATION				
References to Annex A-Statement of Work	Mandatory requirement	Met	Not met	If met, identify the reference in the bidder's proposal
Section 2.0 Page 2 of 9	As illustrated in Figure A2 (of Annex A), the steering platform system must a completely operational system (turn-			

	key) which includes: a pan & tilt mount, the motion controller, the development suite, the necessary interconnect cables and power supplies			
Section 5.1.1 Page 4 of 9	The steering platform must meet the physical requirements enumerated in Table A1 (of Annex A).			
Section 5.1.2 Page 5 of 9	The motion controller must be able to adapt to the command rate of the host simulation computer up to 200 Hz.			
Section 5.2.3 Page 6 of 9	The steering system must provide the performance requirements defined in Table A2 (of Annex A) for the initial load configuration. The details (mass and location) of this equipment load are provided in section 5.2.1 (of Annex A).			
Section 5.3 Page 7 of 9	The development tools must include a capability to optimise the motion parameters to allow the efficient operation with different equipment configurations (different position, inertia). The optimisation software must automatically determine the optimum parameters based on its measurements with the actual equipment loaded on the steering platform.			
<b>Refer to Annex A for the full text of technical requirements</b>				

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## **ANNEX D - ELECTRONIC PAYMENT INSTRUMENTS**

The Bidder accepts any of the following Electronic Payment Instrument(s):

- ( ) Direct Deposit (Domestic and International);
- ( ) Electronic Data Interchange (EDI);