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**SOLICITATION AMENDMENT  
MODIFICATION DE L'INVITATION**

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

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

**Comments - Commentaires**

**Vendor/Firm Name and Address  
Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**  
TPSGC/PWGSC  
BFC Bagotville, CP 380  
CFB Bagotville, PO Box 380  
Bâtiment 62, local 112  
Building 62, Room 112  
Alouette  
Québec  
G0V1A0

<b>Title - Sujet</b> PIRATES Turret Update	
<b>Solicitation No. - N° de l'invitation</b> W7701-186676/A	<b>Amendment No. - N° modif.</b> 003
<b>Client Reference No. - N° de référence du client</b> W7701-186676	<b>Date</b> 2018-01-25
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$BAL-001-17299	
<b>File No. - N° de dossier</b> BAP-7-40215 (001)	<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 2018-02-06</b>	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Tremblay, Marial	<b>Buyer Id - Id de l'acheteur</b> ba1001
<b>Telephone No. - N° de téléphone</b> (418) 677-4000 (4159)	<b>FAX No. - N° de FAX</b> ( ) -
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>  Defence R & D Canada - Valcartier / R et D Défense Canada - Valcartier 2459 route de la Bravoure Québec (Québec) G3J 1X5	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<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/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

W7701-186676/A

003

bal001

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

File No. - N° du dossier

CCC No./N° CCC - FMS No./N° VME

W7701-186676

BAP-7-40215

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### Enquiries - Bid Solicitation - Clause # 2.3

To ensure consistency and quality of information provided to bidders, significant enquiries received and the replies to such enquiries will be provided simultaneously to bidders to which the bid solicitation has been sent, without revealing the sources of the enquiries.

Here are questions which we have received until now:

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Question 1: Ref: Annex A: Criterion # 3. (SSI encoders) of section A.5.2.1 and criterion # 4. (SSI protocol) of section A.5.2.2; and  
Annex D: Element # 3. (SSI encoders) of rated criterion # 1 and element # 4. (SSI protocol) of rated criterion # 2

SSI encoder protocol is listed as a requirement (A.5.2.1 and A.5.2.2). This is only one communication protocol for absolute encoders. However there are many other absolute encoder protocols which provide performance that is equivalent in performance to what the SSI protocol can provide. Other standard protocols such as EnDat or BiSS can provide the same or improved performance while allowing for greater flexibility in system configuration. The SSI protocol specification is overly narrow. We would suggest that the 16-bit minimum resolution absolute encoder requirement remain, while removing the specific SSI protocol requirement for both the encoders and the PCIA in sections A.5.2.1 and A.5.2.2. There should be a requirement that the encoders are compatible with the PCIA.

**Answer 1: The criteria and elements “SSI encoders” and “SSI protocol” indicated in Annexes A and D are replaced by the following:**

**The proposed encoders do not have to be limited to the SSI protocol but do need to have a 16-bit resolution at minimum and have to be compatible with the PCIA.**

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Question 2: Ref: Annex A, Section A.5.2.5

In the Video Camera requirement section (A.5.2.5), there is no requirement for environmental protection for the video camera. If the system is to be used outdoors, environmental protection is recommended. The camera systems should be enclosed in heated, weatherproof housings.

**Answer 2: The heated housing of the video camera is a nice-to-have option. A minimum protection against the rain is sufficient.**

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Question 3: Ref: Annex A, Section A.5.2.5

There are no alignment mounts specified for any cameras. Alignment mounts will be required to boresight the payload components. The cameras need to be bore sighted to the multispectral instrumentation to get best results. Therefore, we suggest adding a requirement for 2-axis alignment brackets on each camera assembly, adjustable within a range of  $\pm 2$  degrees, which are manufactured from rigid aluminum material and are lockable after adjustment.

**Answer 3: Criterion # 4 below is added in section A.5.2.5:**

- 4. Each camera must be mounted on 2-axis alignment lockable brackets to allow a rotating adjustment of  $\pm 2$  degrees. Note that the tracker is already equipped with three brackets Huber Mount 201 model D.**
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Question 4: Ref: Annex A, Section A.5.2.5

In addition to boresighting we have found that cameras and lenses need to be supported by camera and lens clamps, this is to minimize flex in the assembly to ensure that accuracies are maintained. Motion in the camera/lens assembly will result in less stable tracking.

**Answer 4: Criterion # 5 below is added in section A.5.2.5:**

- 5. A solution for ensuring cameras and lenses stability must be proposed. The solution depends on the type of proposed camera and lens.**
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Question 5: Ref: Annex A, Section A.5.4

The signal interface to the tracking aid is unclear, and it is mentioned that this component is not working properly (A2). If this component is required to interface to the tracking system it will require update. We suggest that replacement of the tracking aid feedback sensors and interface be added to the solicitation.

- Modern 16-bit absolute encoders, matching those in the pan/tilt can be retrofit, should be added to the tracking aid
- The tracking aid should be fitted with a new 2-axis COTS motion controller matching the one in the pan tilt to read the encoders and relay position to the tracking computer.
- Absolute encoders are recommended so that the calibration is not lost when the system is powered off.

**Answer 5: (a) Modern 16-bit absolute encoders, matching those in the pan/tilt, must be added to the tracking aid.**

- (b) A motion controller (compatible with the one in the turret) must be added to the tracking aid for reading encoders and relay position to the tracking computer.**
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Question 6: Ref: Annex A, Section A.5.2.4

It's not clear what AC input power is available to the amplifiers. Please add the voltage and phase specifications to the amplifier requirements (A.5.2.4). For example, will they operate on single phase 230VAC or 3-phase 208VAC?

**Answer 6: The AC input power to the amplifiers is 3-phase 208VAC.**

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Question 7: Ref: Annex A: Criterion # 1. (16-bit resolution) of section A.5.2.4; and  
Annex D: Element # 1. (16-bit resolution) of rated criterion # 4

We recommend clarifying/rewording the "16-bit resolution" line in A.5.2.4 to "16-bit analog input resolution". As written it is not a clear requirement because it could be interpreted as a position resolution requirement which would not be logical considering the system architecture.

**Answer 7: The criteria and elements "16-bit resolution" indicated in Annexes A and D are replaced by the following: "16-bit analog input resolution".**

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Question 8: Ref: Annex A, Section A.5.3

The requirement should define the types of target that are being tracked, for each target type the following information would prove to be useful: a. Size; b. Speed; c. Range.

**Answer 8: For the video tracking, the type of targets is aircraft (helicopters, jet, transport) and flares. The speed goes from 50 knots to 480 knots at the extreme and the working range is usually between 1 and 3 km.**

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Question 9: Ref: Annex A, Section A.5.3

The video tracker should be defined specifically.

**Answer 9: Video tracking must integrate:**

- The ability to calibrate the camera and lenses for IFOV measurement.
  - Remote control of the infrared and visible cameras for adjusting integration time, gain and focus and aperture.
  - Several algorithms for target detection/tracking including manual designation with the mouse.
  - Several cue inputs such as tracking aid, joystick, radar.
  - Recording of time, tracking state, target range and target azimuth and elevation.
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Question 10: Ref: Annex A, Section A.5.3

Tracking Mount/Turret software controller integrated in video tracking software to allow the following functionality:

- Break-lock detection logic, which uses estimated and/or modelled trajectory, pattern matching, brightness and velocity to automatically reacquire.
- Manual mode where the operator can move it using the joystick.
- The ability to modify the slew rate, acceleration and deceleration rates, locking and braking, and other parameters for the pedestal and tracker.

**Answer 10: The proposed tracking controller must integrate the following functionalities:**

- automatic video tracking
- manual tracking using joystick or tracking-aid
- guidance with estimated/predicted trajectories
- possibility to modify parameters such as slew, acceleration and deceleration rates.

Question 11: Ref: Annex A, Section A.5.3

Survey Alignment Software integrated in video tracking software to allow the following functionality:

- To allow the tracking system to be aligned with an external frame of reference. This is critical for trajectory measurement or if an Input Cue is to be received from an external source.
- Right-handed Cartesian coordinate system. This approach will align the tracker with local frame of reference.
- Do you require WGS84 as an option?
- Calibration function for integration of an acquisition/tracking aid or instrumented binoculars.

**Answer 11: The video tracking tool must integrate a calibration function for the alignment of tracking aid or instrumented binoculars with the tracker. Also the integration of a rangefinder would be useful to evaluate the distance between the target and the turret.**

Question 12: Ref: Annex A, Section A.5.3

Does the system require IRIG and/or GPS Time Synchronization?

**Answer 12: The tracking system must integrate IRIG/GPS time synchronization with a precision of 100 µs (microseconds). DRDC Valcartier already owns one GPS time receiver. The information about the tracker position (azimuth, elevation) as a function of time must be recorded in a log file.**

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Question 13: Ref: Annex A, Section A.5.3

IR Camera Integration in video tracking software to allow the following functionality:

- Process and display the IR video, map dead pixels, deal and exclude the FLIR overlay from being identified as a target.
- Adjust image brightness and contrast settings.

**Answer 13: The video tracking tool must integrate the following IR processing capabilities:**

- Display the IR video and map dead pixels.
- Adjust image brightness and contrast settings.

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Question 14: Ref: Annex A, Section A.5.3

Ability to record, playback and post process the video and other tracking data, specifically.

**Answer 14: The video tracking tool does not have to record videos. The playback option is not requested.**

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Question 15: Ref: Annex A, Sections A.5.3 and A.5.4

The IR imager's minimum specifications should be listed, if the customer wants to track targets.

**Answer 15: The proposed video tracking solution must be able to integrate visible and infrared camera feeds. A new IR uncooled (micro-bolometer) camera can be proposed. DRDC Valcartier already owns a mid-wave FLIR SC6800 camera that could be used for IR tracking.**

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Solicitation No. - N° de l'invitation

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Buyer ID - Id de l'acheteur

W7701-186676/A

003

bal001

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CCC No./N° CCC - FMS No./N° VME

W7701-186676

BAP-7-40215

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Question 16: Ref: Annex A, Section A.5.2.5

We recommend that instead of using a zoom lens that customer purchase two daylight cameras, each with different focal lengths, this allows for instantaneous FOV lens, removes uncertainty in lens's focal centre as a result of zooming, will have minimal impact on cost.

**Answer 16: In criterion A.5.2.5 of the RFP, it is asked to replace the current video camera by a GigE camera. The actual camera must be replaced by two visible cameras to obtain a wide field-of-view (WFOV) and a narrow NFOV. Proposed cameras must fulfill these minimum requirements:**

- **GigE protocol**
  - **Resolution 1936 (H) x 1216 (V)**
  - **Frame rate: 60 fps at 640x480**
  - **Lens 70-200 mm for WFOV (with remote control for focus and aperture)**
  - **Lens 400 mm for NFOV (with remote control for focus and aperture).**
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Question 17: Ref: Part 5, Certification # 5.2.3 OEM Certification; and Annex F

There is an OEM hardware certificate required, these are onerous and may not be possible, is there a way of removing this requirement or at least limiting it to specific items that maybe if concern. We purchase most of our supplies from distributors and resellers and may not be able to obtain the OEM statements before submitting the bids. Could we provide a System Certificate: Single certificate from bidder stating that they are the OEM for design & installation & warrantee of PIRATES upgrade. This would include the sourcing of COTS components.

**Answer 17: A single System Certificate is sufficient.**

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W7701-186676/A

003

bal001

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W7701-186676

BAP-7-40215

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Question 18: Ref: Cables

- (a) How far is the pedestal and camera from the operator station?
- (b) What cable lengths are required?
- (c) Is a cable management system required?

**Answer 18:** (a) **The distance between the tracking-aid and the tracker is about 12 feet (4 m). The distance between the tracker and the truck (mobile lab) is about 25 feet (8m). The tracking-aid is connected to the control computer (located in the truck) which is connected to the tracker.**

(b) **The cable lengths required are 50' (15 m).**

(c) **There is no requirement for a cable management system.**

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All other terms and conditions of the solicitation remain the same.