

RETURN BIDS TO:

RETOURNER LES SOUMISSIONS À:

**Bid Receiving - PWGSC / Réception des soumissions
- TPSGC**

1550 D'Estimauville Avenue

1550, Avenue d'Estimauville

Québec

Québec

G1J 0C7

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

Title - Sujet High-Speed Camera	
Solicitation No. - N° de l'invitation 31206-141813/A	Amendment No. - N° modif. 002
Client Reference No. - N° de référence du client 31206-141813	Date 2014-12-29
GETS Reference No. - N° de référence de SEAG PW-\$BAL-001-16234	
File No. - N° de dossier BAP-4-37274 (001)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-01-14	Time Zone Fuseau horaire Heure Normale du l'Est HNE
F.O.B. - F.A.B.	
Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Tremblay, Marial	Buyer Id - Id de l'acheteur bal001
Telephone No. - N° de téléphone (418) 677-4000 (4159)	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	
Conseil national de recherches Canada (CNRC) National Research Council Canada (NRC) Site Saguenay 501, boulevard de l'Université est Saguenay (Québec) G7H 8C3	

Instructions: See Herein

Instructions: Voir aux présentes

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

1) **Addition of the following mandatory technical criterion in article 4.1.1.1 Mandatory Technical Criteria (on page 9 of the Request for Proposal)**

The high speed camera proposed must have been delivered after January 1st 2012 in at least two (2) organizations / businesses / laboratories in the World. No prototype equipment will be accepted.

NRC could decide contacting users of these cameras to check if the proposed camera is exactly the same as the one they received after 2012 January 1st. It is not required that the bidders have been the supplier of cameras sold in previous projects (see below projects 1 and 2), but it is required that the proposed camera is exactly the same as those sold in projects 1 and 2 (same brand name, same model, same options if any)

Bidders have to answer to the five (5) following points for each of two previous projects for which a camera has been delivered since 2012 January 1st :

➔ Project 1

Model and options (if any):

- Brand Name: _____
- Model: _____
- Options: _____

Date of delivery: _____

Organization name to which the camera was sold: _____

Contact person of the organization: _____

Phone or email of the contact: _____

➔ Project 2

Model and options (if any):

- Brand Name: _____
- Model: _____
- Options: _____

Date of delivery: _____

Organization name to which the camera was sold: _____

Contact person of the organization: _____

Phone or email of the contact: _____

2) 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 the questions which we have received until now:

Question 1: Ref.: Annex A, section A.4, specification # 1.4: Be a CMOS sensor whose smallest side dimension is a minimum of 15 mm and the longest is a maximum of 28 mm.

Please change the minimum dimension of pixels to 10 micrometers. One of our cameras has 10 micrometer pixels for a CMOS sensor with micro lenses and yet offers the same sensitivity as the larger pixels @ 10,000 asa?

Answer 1: This point is answered in question # 3 hereinafter. Specification # 1.4 does not concern pixel size.

Question 2: Ref.: Annex A, section A.4, specification # 1.5.2: has a minimum quantum efficiency (QE) of 20%.

Please change the minimum quantum efficiency (20%) to 12% as the one of our cameras offers 12% with 10,000 asa?

Answer 2: No. Camera sensor has to meet one of the two following criteria (or both of them although meeting both criteria is not necessary):

1.5.1 : Relative spectral sensitivity at 808 nm = 70% spectral sensitivity at maximum (usually around 700 nm)

1.5.2 : minimum quantum efficiency (QE) = 20% at 808 nm

We don't think these criteria are restrictive as almost all (if not all) monochrome CMOS cameras fulfill these criteria.

Question 3: Ref.: Annex A, section A.4, specification # 1.6: Have a pixel size between 18 and 25 µm.

Please change the minimum dimension of pixels to 10 micrometers. One of our cameras has 10 micrometer pixels for a CMOS sensor with micro lenses and yet offers the same sensitivity as the larger pixels @ 10,000 asa?

Answer 3: No. NRC needs a camera whose pixel size is between 18 and 25 micrometers as described in 1.6 (Mandatory Specifications and Components). This size of pixel is the best compromise corresponding to our needs in terms of pixel performance and resolution. With larger pixel size, sensors have fewer pixels per unit length of sensor, so a lower resolution. With 10 micrometer pixel size the performance (not only sensitivity) is lower than with pixels around 20 micrometers (criterion says between 18 and 25 micrometers in order to avoid being too specific). It is clearly established that pixel performance decreases when pixel size decreases (see for instance among other papers: 'Resolution and light sensitivity tradeoff with pixel size', Joyce Farrell et al., 2006, attached file).

We understand that some CMOS cameras with 10 micrometer pixels use micro-lenses in front of each 10-micrometer pixel to compensate some of the disadvantages of the small pixel size (10 micrometers) instead of larger (about 20 micrometers). However, at our knowledge there is no micro-lens system which can fully compensate for the smaller size of pixels compared to CMOS sensors of the same technology with double size pixels and same total sensor size. If this was true high speed CMOS camera suppliers would not sell anymore high speed cameras with 20 micrometer size pixels as cameras with 10 micrometer pixels are less expensive. This price difference refers to comparison to products from well-established suppliers. Another element which proves that micro-lens is not the best way to go for best performances is written on camera data sheets, for instance we can find "Fill factor = 60%, no micro-lens" for sensor with 20 micrometer size. If micro-lens was a good way for improved performances, data sheets of higher price cameras with 20 micrometer pixels would not indicate they don't use micro-lens. Avoiding micro-lens seems to be good in terms of marketing these cameras with 20 micrometer pixels.

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