

**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
Public Works and Government Services Canada  
Telus Plaza North/Plaza Telus Nord  
10025 Jasper Ave./10025 ave. Jaspe  
5th floor/5e étage  
Edmonton  
Alberta  
T5J 1S6  
Bid Fax: (780) 497-3510

**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**

<b>Title - Sujet</b> Perception & Navigation in UAVs	
<b>Solicitation No. - N° de l'invitation</b> W7702-115124/A	<b>Date</b> 2010-11-05
<b>Client Reference No. - N° de référence du client</b> W7702-11-5124	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$EDM-006-8632	
<b>File No. - N° de dossier</b> EDM-0-32512 (006)	<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 2010-11-30</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Mountain Standard Time MST
<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> Wittmeier, Alecia	<b>Buyer Id - Id de l'acheteur</b> edm006
<b>Telephone No. - N° de téléphone</b> (780) 497-3779 ( )	<b>FAX No. - N° de FAX</b> (780) 497-3510
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> DEPARTMENT OF NATIONAL DEFENCE DEFENCE R&D CANADA SUFFIELD BLDG 560 RECEIVING CFB SUFFIELD RALSTON Alberta T0J2N0 Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

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

**Issuing Office - Bureau de distribution**  
Public Works and Government Services Canada  
Telus Plaza North/Plaza Telus Nord  
10025 Jasper Ave./10025 ave Jasper  
5th floor/5e étage  
Edmonton  
Alberta  
T5J 1S6

<b>Delivery Required - Livraison exigée</b> See Herein	<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>

**TITLE: Perception and Navigation for UAVs in Support of Dismounts**

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## PART 1 - GENERAL INFORMATION

### 1. Introduction

The bid solicitation and resulting contract document is divided into seven (7) parts plus annexes 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 and states that the Bidder agrees to be bound by the clauses and conditions contained in all parts of 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, if applicable, and the basis of selection;

Part 5 Certifications: include the certifications to be provided;

Part 6 Controlled Goods Requirement;

Part 7 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract.

The Annexes include the Statement of Work, the Basis of Payment, the Disclosures Certification, and the Mandatory Criteria, Evaluation Criteria and Selection Method.

### 2. Summary

Defence Research and Development Canada (DRDC) - Suffield, Medicine Hat, Alberta, requires a contract to develop navigation and control algorithms enabling a small commercial off-the-shelf rotorcraft UAV (Draganfly X8) to execute simple autonomous behaviours thereby reducing the operator's control burden. To this end, an 'autonomy package' that will subsume and build upon the sensing and control functions provided by the UAV's existing autopilot will be developed. The integration of the autonomy package with the autopilot will enable the provision of additional capabilities required for autonomous operation.

The period of the contract is from Date of Award to March 31, 2013.

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

### 3. Communication Notification

As a courtesy, the Government of Canada requests that successful bidders notify the Contracting Authority in advance of their intention to make public an announcement related to the award of the contract.

#### **4. Debriefing**

After contract award, bidders may request a debriefing on the results of the bid solicitation. Bidders should make the request to the Contracting Authority within 15 working days of receipt of notification that their bid was unsuccessful. The debriefing may be provided in writing, by telephone or in person.

#### **5. Maximum Funding**

The maximum funding available for the Contract resulting from the bid solicitation is \$233,500.00 (Goods and Services Tax or Harmonized Sales Tax extra, as appropriate). Bids valued in excess of this amount will be considered non-responsive. This disclosure does not commit Canada to pay the maximum funding available.

### **PART 2 - BIDDER INSTRUCTIONS**

#### **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 issued by Public Works and Government Services Canada. The Manual is available on the PWGSC Website:  
<http://sacc.pwgsc.gc.ca/sacc/index-e.jsp>.

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 (2010/01/11) Standard Instructions - Goods or Services - Competitive, are incorporated by reference into and form part of the bid solicitation.

#### **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.

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

#### **3. Enquiries - Bid Solicitation**

All enquiries must be submitted in writing to the Contracting Authority no later than five (5) 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 questions or may request that the Bidder do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

#### **4. Applicable Laws**

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

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

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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.

## 5. Basis for Canada's Ownership of Intellectual Property

The Department of Defence Research and Development Canada has determined that any intellectual property rights arising from the performance of the Work under the resulting contract will belong to Canada, on the following grounds:

- 1) To avoid fragmented ownership and facilitate systems integration.

## PART 3 - BID PREPARATION INSTRUCTIONS

### 1. Bid Preparation Instructions

Section I: Technical Bid (3 hard copies)  
Section II: Management Bid (3 hard copies)  
Section III: Financial Bid (2 hard copies)  
Section IV: Certifications (1 copy)

Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.

Canada requests that bidders follow the format instructions described below in the preparation 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.

#### Section 1: Technical Bid

In their technical 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 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 been addressed.

#### Controlled Goods Requirement

The technical bid should also address the subject of controlled goods. It is possible that some components may be of foreign origin and subject to foreign export controls. Although such components should be avoided where possible, controlled components may be unavoidable. Respondents should identify both the components and the impact on the project (cost and schedule) of their use.

#### Section II: Management Bid

In their management bid, bidders must describe their capability and experience, the project management team and provide client contact(s).

#### Section III: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment in Annex B. The total amount of Goods and Services Tax or Harmonized Sales Tax is to be shown separately, if applicable.

#### Section IV: Certifications

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Bidders must submit the certifications required under Part 5.

## **PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION**

### **1. Evaluation Procedures**

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical, management, and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

#### **1.1 Technical Evaluation**

Mandatory and point rated technical evaluation criteria are included in Annex D.

#### **1.2 Management Evaluation**

Management evaluation criteria are detailed under "B. Training & Experience" and "C. Project Organization" as included in Annex D.

#### **1.3 Financial Evaluation**

Financial evaluation will be based on the total limitation of expenditure proposed in Annex B. The costs for the items in Annex B will be added together to obtain the total limitation of expenditure.

### **2. Basis of Selection**

To be declared responsive, a bid must:

- (a) comply with all the requirements of the bid solicitation;
- (b) meet all mandatory technical evaluation criteria; and
- (c) obtain the required minimum points for the technical evaluation criteria which are subject to point rating.

2. Bids not meeting (a) or (b) or (c) will be declared non responsive. The responsive bid with the highest number of points will be recommended for award of a contract, provided that the total evaluated price does not exceed the budget available for this requirement.

## **PART 5 - CERTIFICATIONS**

Bidders must provide the required certifications to be awarded a contract. Canada will declare a bid non-responsive if the required certifications are not completed and submitted as requested.

Compliance with the certifications bidders provide to Canada is subject to verification by Canada during the bid evaluation period (before award of a contract) and after award of a contract. The Contracting Authority will have the right to ask for additional information to verify the bidders' compliance with the certifications before award of a contract. The bid will be declared non-responsive if any certification made by the Bidder is untrue, whether made knowingly or unknowingly. Failure to comply with the certifications or to comply with the request of the Contracting Authority for additional information will also render the bid non-responsive.

### **1. Certifications Precedent to Contract Award**

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

## 1.1 Federal Contractors Program - Certification

### Federal Contractors Program - \$200,000 or more

- 1.1.1. The Federal Contractors Program (FCP) requires that some suppliers, including a supplier who is a member of a joint venture, bidding for federal government contracts, valued at \$200,000 or more (including all applicable taxes), make a formal commitment to implement employment equity. This is a condition precedent to contract award. If the Bidder, or, if the Bidder is a joint venture and if any member of the joint venture, is subject to the FCP, evidence of its commitment must be provided before the award of the Contract.

Suppliers who have been declared ineligible contractors by Human Resources and Skills Development Canada (HRSDC) are no longer eligible to receive government contracts over the threshold for solicitation of bids as set out in the Government Contracts Regulations. Suppliers may be declared ineligible contractors either as a result of a finding of non-compliance by HRSDC, or following their voluntary withdrawal from the FCP for a reason other than the reduction of their workforce to less than 100 employees. Any bids from ineligible contractors, including a bid from a joint venture that has a member who is an ineligible contractor, will be declared non-responsive.

- 1.1.2. If the Bidder does not fall within the exceptions enumerated in 3.(a) or (b) below, or does not have a valid certificate number confirming its adherence to the FCP, the Bidder must fax (819-953-8768) a copy of the signed form LAB 1168, Certificate of Commitment to Implement Employment Equity, to the Labour Branch of HRSDC.

(  
<http://www.servicecanada.gc.ca/cgi-bin/search/eforms/index.cgi?app=profile&form=lab1168&dept=sc&lang=e>)

- 1.1.3. The Bidder, or, if the Bidder is a joint venture the member of the joint venture, certifies its status with the FCP, as follows:

The Bidder or the member of the joint venture

- (a)  is not subject to the FCP, having a workforce of less than 100 full-time or part-time permanent employees, or temporary employees having worked 12 weeks or more in Canada;
- (b)  is not subject to the FCP, being a regulated employer under the Employment Equity Act, S.C. 1995, c. 44;
- (c)  is subject to the requirements of the FCP, having a workforce of 100 or more full-time or part-time permanent employees, or temporary employees having worked 12 weeks or more in Canada, but has not previously obtained a certificate number from HRSDC (having not bid on requirements of \$200,000 or more), in which case a duly signed certificate of commitment is attached;
- (d)  is subject to the FCP, and has a valid certificate number as follows: \_\_\_\_\_ (e.g. has not been declared an ineligible contractor by HRSDC.)

Further information on the FCP is available on the HRSDC Web site.  
( <http://www.hrsdc.gc.ca/eng/labour/equality/fcp/index.shtml> )

## 1.2 Former Public Servant Certification

Contracts with 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.

### 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, in the context of the fee abatement formula, 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

Is the Bidder a FPS in receipt of a pension as defined above? YES ( ) NO ( )

If so, the Bidder must provide the following information:

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

### Work Force Reduction Program

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of a work force reduction program? 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 reduction 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 the Goods and Services Tax or Harmonized Sales Tax.

#### Certification

By submitting a bid, the Bidder certifies that the information submitted by the Bidder in response to the above requirements is accurate and complete.

### **1.3 Canadian Content Certification**

**1.3.1** SACC Manual clause A3050T (2010/01/11), Canadian Content Definition

### **1.3.2 Canadian Content Certification - A3055T**

This procurement is limited to Canadian services.

The Bidder certifies that:

- ( ) the service offered is a Canadian service as defined in paragraph 2 of clause A3050T.

### **1.4 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.

### **1.5 Education and Experience**

**1.5.1** SACC Manual clause A3010T (2007-11-30), Education and Experience

## **PART 6 - CONTROLLED GOODS REQUIREMENT**

**1. Controlled Goods Program**

SACC Manual Clauses A9130T (2008-12-12), Controlled Goods Program

**PART 7 - RESULTING CONTRACT CLAUSES**

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

**1. Statement of Work**

The Contractor must perform the Work in accordance with the Statement of Work at Annex "A" and the Contractor's technical bid and management portion of the Contractor's bid entitled \_\_\_\_\_, dated \_\_\_\_\_.

**2. 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 issued by Public Works and Government Services Canada. The Manual is available on the PWGSC Website: <http://sacc.pwgsc.gc.ca/sacc/index-e.jsp>.

**2.1 General Conditions**

2040 (2010/01/11), General Conditions - Research & Development, apply to and form part of the Contract.

**2.2 Supplemental General Conditions**

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

**2.3 General Conditions - Modifications**

K3410C (2008/12/12), Canada to Own Intellectual Property Rights in Foreground Information apply to and form part of the Contract.

**3. Security Requirement**

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

**4. Period of Contract**

The period of the Contract is from date of award to March 31, 2013 inclusive.

**5. Authorities****5.1 Contracting Authority**

The Contracting Authority for the Contract is:

Alecia Wittmeier  
Supply Officer  
Acquisitions, Western Region  
Department of Public Works and Government Services  
Telus Plaza North,  
10025 Jasper Avenue, 5th Floor  
Edmonton, AB T5J 1S6

TELEPHONE NO.: (780) 497-3779

FACSIMILE NO.: (780) 497-3510

E-mail address: [alecia.wittmeier@pwgsc-tpsgc.gc.ca](mailto:alecia.wittmeier@pwgsc-tpsgc.gc.ca)

Solicitation No. - N° de l'invitation

W7702-115124/A

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

edm006

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

W7702-11-5124

File No. - N° du dossier

EDM-0-32512

CCC No./N° CCC - FMS No/ N° VME

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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.

## 5.2 Technical Authority

The Technical Authority for the Contract is:

*to be named upon contract award*

Department of National Defence  
Defence Research & Development Canada Suffield  
P.O. Box 4000  
Medicine Hat, AB T1A 8K6

TELEPHONE NO.: (403) 544-

FACSIMILE NO.: (403) 544-

E-MAIL: @drdc-rddc.gc.ca

The Technical Authority named above 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.

## 5.3 Administrative Authority

*to be named upon contract award*

Department of National Defence  
Defence Research & Development Canada Suffield  
P.O. Box 4000  
Medicine Hat, AB T1A 8K6

TELEPHONE NO.: (403) 544-

FACSIMILE NO.: (403) 544-

E-MAIL: @drdc-rddc.gc.ca

## 5.4 Contractor's Representative

Name: \_\_\_\_\_

Telephone No: \_\_\_\_\_

Facsimile No: \_\_\_\_\_

E-mail: \_\_\_\_\_

## 6. Payment

### 6.1 Basis of Payment - Ceiling Price

The Contractor will be reimbursed for the costs reasonably and properly incurred in the performance of the Work, plus a profit as determined in accordance with the Basis of Payment in Annex "B", to a ceiling price of \$233,500.00. Customs duties are included and Goods and Services Tax or Harmonized Sales Tax is extra, if applicable.

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The ceiling price is subject to downward adjustment so as not to exceed the actual costs reasonably incurred in the performance of the Work and computed in accordance with the Basis of Payment.

## 6.2 Limitation of Price

SACC Manual clause C6000C (2007-05-25), Limitation of Price

## 6.3 Progress Payments

6.3.1. 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-WR01 (<http://www.pwgsc.gc.ca/acquisitions/text/forms/forms-e.html>) 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-WR01 have been signed by the respective authorized representatives.

6.3.2. 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.

6.3.3. 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.

## 6.4 Discretionary Audit

SACC Manual Clause C0705C (2010/01/11), Discretionary Audit

## 6.5 T1204 - Direct Request by Customer Department

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

## 7. Invoicing Instructions

### 7.1 Invoice Instructions - Progress Payments

7.1.1 The Contractor must submit a claim for progress payment using form PWGSC-WR01 to the Administrative Authority.

Each claim must show:

- (a) all information required on form PWGSC-WR01;
- (b) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
- (c) expenditures in accordance with the Basis of Payment for the Work performed during the period of the claim;

- (d) holdback of 10 percent;
- (e) total of all previous claims against the Contract and the extension of the totals to date;

Each claim must be supported by:

- (a) a copy of time sheets to support the time claimed;
- (b) two (2) sets of copies of the invoices, receipts, vouchers for all direct expenses, travel and living expenses;
- (c) a copy of the monthly progress report.

7.1.2 Goods and Services Tax (GST) or Harmonized Sales Tax (HST), as applicable, 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 GST/HST payable as it was claimed and payable under the previous claims for progress payments.

7.1.3 The Contractor must prepare and certify one original and two (2) copies of the claim on form PWGSC-WR01, and forward it to the Administrative Authority identified under the section entitled "Authorities" of the Contract for appropriate certification after inspection and acceptance of the Work takes place.

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

## 8. Certifications

8.1 Compliance with the certifications 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 or 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.

### 8.2 SACC Manual Clauses

A3060C (2008-05-12), Canadian Content Certification

### 8.3 Disclosures Certification

On completion of the Work, the Contractor must submit to the Technical Authority and to the Contracting Authority a copy of the Disclosure Certification attached as Annex "C" stating that all applicable disclosures were submitted or that there were no disclosures to submit under general conditions 2040.

## 9. Applicable Laws

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

## 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 2040 (2010/01/11), General Conditions - Research & Development;
- (d) Annex "A", Statement of Work;
- (e) Annex "B", Basis of Payment;
- (f) Annex "C", Disclosures Certification;

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(g) the Contractor's bid dated \_\_\_\_\_ (insert date of bid)

**11. Defence Contract**

SACC Manual Clause A9006C (2008/05/12), Defence Contract

**12. Foreign Nationals (Canadian Contractor)**

SACC Manual Clause A2000C (2006/06/16), Foreign Nationals (Canadian Contractor)

**13. Insurance**

SACC Manual Clause G1005C (2008/05/12), Insurance

**14. SACC Manual Clauses**

A9062C (2010/01/11), Canadian Forces Site Regulations

B6800C (2007/11/30), List of Non-consumable Equipment and Materials

A9131C (2008-12-12), Controlled Goods Program

B4060C (2008-05-12), Controlled Goods

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## ANNEX A - STATEMENT OF WORK

### 1. Title: Perception and Navigation for UAVs in Support of Dismounts

### 2. Background

The Autonomous Intelligent Systems Section (AISS) of Defence R&D Canada – Suffield is investigating the role that mini-unmanned air vehicles (mUAVs) could potentially play in support of dismounted ground troops. To be of use to a dismounted troop, a mUAV must not overly burden its operator so a candidate mUAV should be capable of some degree of autonomous operation. At the very least, a mUAV should be capable of waypoint following. Since the mUAV is likely to be flying at low altitude while moving between waypoints, it would be advantageous for a mUAV to be capable of sensing the environment, avoiding hazards, and constructing a map of its surroundings. Further, to enable fully autonomous behaviour, such as autonomous egress, a mUAV should be able to plan paths within the generated map.

For this investigation, AISS has chosen to employ a commercial off-the-shelf rotorcraft UAV, the Draganfly X8, in order to maintain compatibility with existing equipment. The provision of an Application Programming Interface (API) for the X8's autopilot is the subject of a separate sole source contract to Draganfly. This API will be made available to the successful bidder as Government Furnished Equipment.

### 3. Objective

The objective of this work is to develop navigation and control algorithms enabling a small commercial off-the-shelf rotorcraft UAV (Draganfly X8) to execute simple autonomous behaviours thereby reducing the operator's control burden. To this end, an 'autonomy package' that will subsume and build upon the sensing and control functions provided by the UAV's existing autopilot will be developed. The integration of the autonomy package with the autopilot will enable the provision of additional capabilities required for autonomous operation.

### 4. Scope of Work

The work is comprised of three tasks: the development of a vehicle dynamics simulator, the development of the autonomy package to interface with the rotorcraft's autopilot, and the investigation of autonomous behaviours.

Task 1: Development of a rotorcraft vehicle dynamics simulator

Task 1.1: Design Specification

The rotorcraft simulator will employ federated simulation consisting of the rotorcraft dynamics simulator, a Gazebo world, and a control station component providing control inputs to the rotorcraft simulator. The rotorcraft dynamics simulator will model the dynamics of the Draganfly X8 rotorcraft. The UAV's sensors, both exteroceptive and proprioceptive, will be implemented as Gazebo entities, only the UAV's state vector will be provided by the rotorcraft dynamics simulation. Control inputs to the rotorcraft dynamics simulation will be provided by a control station component (path planner, trajectory generator, trajectory tracker). A simulator system design document will detail the content and communication between the simulator's components.

Task 1.2: Implementation

To ensure compatibility with existing equipment and systems used by AISS, the simulator will employ the Gazebo open source robotics simulation package and use the Middleware for Robotics (MIRO) framework for communication between the simulator's components. The software will be written in C++, built using the Gnu tools for an Intel Linux target (Ubuntu 10.04 x86-64).

Task 1.3 Voxel World Model

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As a concrete demonstration, the federated simulation will be used to generate a voxel model of the environment 'discovered' by the vehicle as it moves between a series of waypoints in a previously unexplored Gazebo world.

#### Task 2: Integration of the Autonomy Package

In this task, two Draganfly X8 rotorcrafts will be acquired by the Contractor; a recent quotation from Draganfly is provided in Appendix B. Each of the two Draganfly X8 rotorcraft will then be fitted with an 'autonomy package', the purpose of which is to enable the X8 to sense its environment, to interface with the X8's autopilot, and to communicate with a ground control station. The hardware component of the autonomy package, consisting of an Ascending Technologies Atom processor board and 2 Hokuyo UTM-30LX scanning laser rangefinders, as detailed in Appendix A, will be provided as Government Furnished Equipment on loan for the duration of the contract. The incorporation of any additional hardware, for instance, attitude sensors, stereo cameras, etc., onto the X8 platform will be subject to approval by the Technical Authority (TA). The Contractor will furnish the control station, an Intel x86-64 PC running Ubuntu 10.04, and the software components of the autonomy package and control station. The control station computer, in addition to hosting the simulator developed in Task 2 and the navigation and control components to be developed in Task 3, will also provide a means to capture raw sensor data and diagnostic information from the modules encapsulating the various autonomous behaviours. Where appropriate any software components, whether resident on the control station or the autonomy package, should use the MIRO framework for communication, be written in C++ and be built using the Gnu tools. This is envisioned to be a low level of effort requiring plug and play skills from experienced users, requiring 3 man days of effort.

#### Task 3: Investigation of navigation and control strategies for manoeuvring through and mapping of complex urban environments

In this task, the simulator developed in Task 1 will be used to develop navigation and control strategies for the X8 that enable autonomous operation. It is anticipated that this task will constitute the bulk of the work in the contract. In particular, the following capabilities will be investigated:

- waypoint navigation,
- obstacle avoidance while navigating between waypoints,
- map building, while avoiding obstacles and moving between waypoints,
- autonomous behaviours such as, 'follow me', 'return to me', and 'wall following', entailing some level of path planning, and 'go home', involving planning within the generated world model and rapid egress,
- exploration of unknown space, and
- operator intervention.

The approaches developed to implement these behaviours should be robust in the event of loss of GPS. The use of autonomous operation will not preclude the recovery of manual control at any time.

#### Task 3.1: Demonstration in simulation

In this task, the various autonomous behaviours identified in Task 2 will be developed, implemented, and exercised in simulation.

#### Task 3.2: Implementation

In this task, the autonomous behaviours, demonstrated in simulation in Task 3.1, will be integrated into the autonomy package and control station.

#### Task 3.2: Flight Test Demonstration

The flight test demonstration will take place at DRDC Suffield under the supervision of the TA. An incremental approach to the flight test will be adopted. Communication between the control station and the X8 will be verified, first statically and then with the X8 flown under manual control using Draganfly's controller. Subsequent flight tests will involve demonstration of the autonomous behaviours investigated

in Task 3.1. During each of these tests, recovery of manual control via operator intervention will be verified.

## 5. Meetings

Kickoff, monthly, and milestone meetings will ensure that both the TA and the Contractor have a clear understanding of the progress of the project. A kickoff meeting will be held at DRDC Suffield or via teleconference. Monthly update meetings, to be conducted via teleconference, will be preceded by a short email indicating the progress made by the Contractor over the course of the month. An assessment of the overall progress, risks, and schedule should be included. Meetings triggered by the completion of required milestones will be conducted via teleconference unless they involve field trials or otherwise agreed upon by the TA and the Contractor. Field trials will normally be conducted at DRDC Suffield at a time mutually agreed upon by the TA and the Contractor. *Bidders must budget for travel to DRDC Suffield for meetings and trials within the stated project budget.*

## 6. Reports and Deliverables

1. Simulator system design document detailing the proposed content of, and communication between, the components.
2. The full source code, build instructions, and user documentation for the simulator.
3. Interim Contractor's report detailing the hardware design and software components of the integrated Draganfly system, including operating instructions.
4. Two Draganfly X8 (Emergency Services Configuration; provided by the Contractor) each equipped with an Autonomy Package (provided as GFE), 2 Hokuyo UTM-30LX scanning range finders (provided as GFE), and any additional hardware, fabricated or purchased under the contract, that is required for demonstration and test.
5. One ground station fully implemented on a Linux-based computer (Ubuntu 10.04 x86-64). This same computer will also be host for the simulator. The Contractor will ensure that the computer has appropriate resources to run the simulator and control station software.
6. The source code and any third party libraries required to build the modules comprising the autonomous behaviours.
7. Final Contractor's report.

All reports or papers, co-authored with DRDC scientists must be approved by DRDC's Document Review Panel, while other reporting is to be approved by the Technical Authority.

## 7. Government Furnished Support / Equipment / Information

The autonomy package, as described in Appendix A will be furnished. The Draganfly API to enable the Contractor to interface with the autopilot or control the hardware directly will also be supplied. Lastly, 2 Hokuyo UTM-30LX scanning range finders will also be furnished. Unclassified background information available to DRDC Suffield as appropriate for completing the work of the contract.

## 8. Acceptance Criteria

The work plan will be finalized at the kickoff meeting and the work monitored regularly for adherence to the work plan thereafter. Any deviations from the work plan will be approved by the TA in advance. The TA will determine acceptance of the work based on the successful demonstration of the hardware / software and receipt of the deliverables, including satisfactory completion and acceptance of the final report.

## 9. DRDC-Suffield General Contract Safety & Security Requirements

### (1) GENERAL EXPERIMENTAL PROVING GROUNDS (EPG) SAFETY AND ACCESS INFORMATION

In accordance with DRDC Suffield regulations, all contractor personnel/visitors and subcontractors participating in Experimental Proving Ground (EPG) activities that are not escorted by DRDC Suffield personnel or the DRDC-authorized contract principal shall attend a general EPG safety briefing lasting

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approximately one (1) hour at the Field Operations Section (FOS). This briefing will take place annually for long standing contracts and new/additional personnel will be required to take the briefing before beginning work.

An access permit is required for non-DND vehicles traveling on the EPG. In addition, a two-way radio, compatible with the DRDC Suffield communication system, will be supplied for safety reasons. Other forms/briefings related to safety and security may be required.

## (2) WORK-SPECIFIC SAFETY BRIEFING

Contractors/visitors/subcontractors working with/supporting DRDC Suffield personnel on specific Field Trial Plans (FTP's), Standing Operating Procedures (SOP's), Study Approval Form (SAF), or other procedure shall attend work-specific briefings by the DRDC Technical Authority (TA) lasting approximately one (1) hour relating to health, safety, environmental and emergency response procedures.

Documentation including FTP's, SOP's, SAF or other procedures, safety standards and EPG regulations will be cited or made available to contract/visitor principals on a loan basis for reference, as applicable.

## (3) OBSERVANCE OF ON-SITE SAFETY, HEALTH AND ENVIRONMENTAL STANDARDS ON PROTECTION OF PROPERTY

The contractor, his employees and/or subcontractors, undertakes and agrees to comply with all DND/DRDC Suffield regulations in force at the worksite, including the observance of all safety, health and environmental standards and those in place to preserve and protect DND property from loss or damage from all causes including fire.

## (4) COMPLIANCE

The contractor is responsible to ensure that all employees and subcontractors that will be working on the site are fully briefed and have completed and signed the Safety Checklist **prior to the start** of any portion of the on site work. A copy of the signed checklist is to be provided to the DRDC Suffield General Safety Officer who will ensure that the original copy of the document is provided to the appropriate contract manager for the contract file. No payments will be issued until all documentation is in place.

### Appendix 1 to Annex A: Autonomy Package and Scanning Laser Description

Regarding information on the Atom Processor Board see <http://www.asctec.de/atom-processor-board-2/>

Contact information:

Ascending Technologies GmbH  
Konrad-Zuse-Bogen 4  
82152 Krailling  
Germany

Phone: +49-(0)89-89 55 60 79 0

Fax: +49-(0)89-89 55 60 79 19

mail: [team@asctec.de](mailto:team@asctec.de)

Support: [support@asctec.de](mailto:support@asctec.de)

Regarding information on the Hokuyo UTM-30LX scanning range finders see

[http://www.hokuyo-aut.jp/02sensor/07scanner/utm\\_30lx.html](http://www.hokuyo-aut.jp/02sensor/07scanner/utm_30lx.html)

Contact information:

HOKUYO AUTOMATIC CO., LTD.

Osaka HU Building, 2-2-5 Tokiwamachi, Chuo-Ku, Osaka, 540-0028 Japan

<http://www.hokuyo-aut.jp/>

#### Draganfly X8 Quotation

The Emergency Services / Military Configuration Includes:

- \* One Draganflyer X8 Helicopter
  - \* One Handheld Controller, with video receiver
  - \* On-board stabilization software
  - \* Charging system with dual chargers, cables & case
  - \* Two helicopter batteries
  - \* Tool Case with helicopter maintenance tools
  - \* Transport Case
  - \* Log Book
  - \* User's Manual
  - \* 1 Day of Training at Draganfly Innovations for up to 2 people (limitations & conditions apply)
- See Terms & Conditions of Sale
- \* Plus: GPS Position Hold
  - \* Base Station complete with Radio & PC software, 2.4 Ghz Digital Control & Communications Link, Embedded DraganEye™ Pro 5.8GHz Quad Diversity Wireless Video Receiver, Video Glasses.
  - \* Low Light Video Camera including anti-vibration mount with tilt control and 5.8Ghz video transmitter and onboard digital video recorder. Features monochrome video with 0.0001 Lux sensitivity. Video is transmitted wirelessly for real time viewing.
  - \* Digital Still Camera including Anti-vibration mount and 5.8Ghz Video Transmitter. Features 10.1 Mega Pixel Resolution & 720p motion video, records to SDHC memory card. View finder video is transmitted wirelessly for real-time viewing.
  - \* Extra pair of Video Glasses
  - \* Extra Handheld Controller with wireless video receiver (allows for easier training and separate photo/video control).
- DF-X8-EMERG-PK DF X8 Emergency Services Configuration with camera system as listed:

Approximate price is \$35,000.00 USD

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Please contact Draganfly Innovations Inc.

Contact Information:

Draganfly Innovations Inc.

<http://www.draganfly.com/contact/>

World Wide Sales Inquiries:

Call: 1-800-979-9794 or

Int: 1-306-955-9907

Email: [sales@draganfly.com](mailto:sales@draganfly.com)

Draganfly Innovations Inc.

Mailing Address:

Draganfly Innovations Inc.

2108 St. George Avenue

Saskatoon, SK S7M0K7

Canada

Phone & Fax:

Toll Free: 1-800-979-9794

Int: 1-306-955-9907

Fax: 1-306-955-9906

## ANNEX B - BASIS OF PAYMENT

Payment will be made for time expended and other costs reasonably and properly incurred from the date of contract to contract completion in accordance with the following:

1. Labour at firm (daily/hourly) rates. One day consists of 7.5 hours. The rates will be prorated for any period of more or less than one day.
  - a) Title, name  
(est) \_\_\_\_ days @ \$---./day (est.) \$000,000.00
  - b) title, name  
(est) ---- days @ \$---./day (est.) \$000,000.00

Total Estimated Labour: \$000,000.00
2. Material and supplies at actual cost without mark-up, including (list items). (est.) \$000,000.00
3. Purchased equipment at laid down cost without mark-up, including (list items). (est.) \$000,000.00
4. Subcontracting at actual cost incurred without mark-up, (subcontractor name) (est.) \$000,000.00
5. Authorized travel and living expenses at actual cost incurred, except for meals and private vehicle mileage, which are not to exceed the rates given in the Treasury Board Travel and Living Guidelines in effect at the time of travel. A copy of the current Travel Directive Policy is available at: [http://www.tbs-sct.gc.ca/pubs\\_pol/hrpubs/TBM\\_113/td-dv\\_e.asp](http://www.tbs-sct.gc.ca/pubs_pol/hrpubs/TBM_113/td-dv_e.asp)  
Travel costs are not to include a mark-up. (est.) \$000,000.00
6. Other direct charges at actual cost incurred without mark-up, including (list items). (est.) \$000,000.00
7. Profit at a firm --% of items -, -, above (\$----.), not to exceed (max.) \$000,000.00

**TOTAL LIMITATION OF EXPENDITURE: \$000,000.00**

With the exception of the firm elements above, the amounts shown in the respective categories of the above Basis of Payment are estimates and it is the intention that changes from item to item will be accepted for billing purposes as the work proceeds, provided that the total cost of the Contract does not exceed \$000,000.00.

### GOODS AND SERVICES TAX:

The Total Estimated Goods and Services Tax (GST), \$\_\_\_\_\_, is not included in the amounts above. The GST is to be shown as a completely separate item on each invoice.

F.O.B. Point: Defence Research and Development Canada - Suffield

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**ANNEX C - DISCLOSURES CERTIFICATION**

This document is to be completed and signed by the Contractor at the completion of the subject contract and submitted to the Contracting Officer and the Technical Authority designated below:

Contracting Authority

Alecia Wittmeier  
Supply Officer  
Acquisitions, Western Region  
Public Works & Government Services Canada  
Telus Plaza North, 5th Floor  
10025 Jasper Avenue  
Edmonton, AB T5J 1S6

Technical Authority

Defence Research & Development Canada Suffield  
Department of National Defence  
P.O. Box 4000 Main  
Medicine Hat, AB T1A 8K6

**CONTRACT TITLE: Perception and Navigation for UAVs in Support of Dismounts**

Please tick appropriate box:

We hereby certify that all applicable disclosures were submitted in compliance with General Conditions 2040 - Research and Development.

**YOUR ATTENTION IS DRAWN TO THE TERMS AND CONDITIONS, REGARDING IMPLICATIONS ON NON-DISCLOSURE OF** any Technical Documentation, Prototypes, Inventions and Technical Information arising during the performance of work pursuant to the above identified contract,

OR

We hereby certify that there are no disclosures to submit under the above-referenced Contract, referred to in General Conditions 2040 - Research and Development.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Contractor Name

\_\_\_\_\_  
Date

## ANNEX D- MANDATORY CRITERIA, EVALUATION CRITERIA AND SELECTION METHOD

### MANDATORY CRITERIA

#### **Mandatory Criteria at Solicitation Closing**

Failure to meet any of the following mandatory requirements at solicitation closing will render your submission non-compliant and given no further consideration.

1. Education: At least one member of the project team must possess a Ph.D. in a robotics-related discipline
2. Experience: Minimum 5 years of relevant experience in robotics

### EVALUATION CRITERIA

#### **Point Rated Criteria**

Each Technical Bid which meets all the Mandatory Criteria specified above, will be evaluated and scored in accordance with the following evaluation criteria:

<b>III. POINT RATED REQUIREMENTS: Rating: 4=excellent, 3=good, 2=average, 1=poor, 0=nothing</b>			
<b>A. STUDY STRATEGY</b>	<b>WEIGHT</b>	<b>RATING</b>	<b>SCORE</b>
1. Demonstrated understanding of the Statement of Work as set out in RFP, and the scope and importance of study.	5		
2. Breakdown of project into logical tasks; planning and detail of tasks; detailed schedule and timetable; realistic estimation of the time required to complete the work.	10		
3. Methods of handling potential problems during the project.	5		
4. Demonstrated original and innovative ideas.	10		
Maximum points available			120
Minimum points acceptable			84
Points awarded			
<b>B. TRAINING &amp; EXPERIENCE</b>	<b>WEIGHT</b>	<b>RATING</b>	<b>SCORE</b>
1. Demonstrated corporate experience in projects of this nature.	5		
2. Suitability of academic backgrounds of personnel assigned.	10		
3. Relevant experience of personnel assigned to the project	5		
4. Adequacy and availability of personnel to carry out the project.	10		
Maximum points available			120
Minimum points acceptable			84
Points awarded			

<b>C. PROJECT ORGANIZATION</b>	<b>WEIGHT</b>	<b>RATING</b>	<b>SCORE</b>
1. Study team organization for external and internal control.	5		
2. Allocation of manpower for efficient use of personnel.	5		
3. Assurance of liaison with the Scientific Authority.	10		
4. Overall organization of the project.	10		
Maximum points available			120
Minimum points acceptable			84
Points awarded			
<b>Max Total Points Available</b>			<b>360</b>
<b>Minimum Total Points Acceptable</b>			<b>252</b>
<b>Total points Awarded</b>			

**EVALUATION:**

Each evaluation criterion has a number allotment ("weight") that reflects its importance in bid submissions. The degree to that the bid satisfies the requirement of each criterion will be assessed and a "rating" will be assigned ranging from 0 to 4, with 0 meaning the bid completely fails to satisfy the requirement, and the total allotment meaning the bid fully meets the outlined criterion. A score will be assessed by multiplying the weight by the rating.

Each proposal must meet all of the mandatory requirements set out in the evaluation criteria. Bids that fail to meet these requirements will be discarded without further consideration.

Each proposal must achieve a minimum score of 70% of the maximum points available in EACH category subject to point rating. Bids that fail to achieve this score will be considered technically unacceptable and will be given no further consideration.

**SELECTION METHOD:**

Contractor selection will be based on the bidder that submits the highest technically acceptable bid provided that the estimated total price does not exceed the established budget.