



**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
Public Works and Government Services / Travaux  
publics et services gouvernementaux  
Kingston Procurement  
Des Acquisitions Kingston  
86 Clarence Street, 2nd floor  
Kingston  
Ontario  
K7L 1X3  
Bid Fax: (613) 545-8067

**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> 5 Hole Pressure Probe	
<b>Solicitation No. - N° de l'invitation</b> W0114-175361/A	<b>Date</b> 2016-11-10
<b>Client Reference No. - N° de référence du client</b> W0114-17-5361	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$KIN-620-7050	
<b>File No. - N° de dossier</b> KIN-6-46123 (620)	<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 2016-12-29</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Eastern Daylight Saving Time EDT
<b>F.O.B. - F.A.B. Specified Herein - Précisé dans les présentes</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input checked="" type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Porter, Marta M.	<b>Buyer Id - Id de l'acheteur</b> kin620
<b>Telephone No. - N° de téléphone</b> (613) 483-6084 ( )	<b>FAX No. - N° de FAX</b> (613) 545-8067
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> DEPARTMENT OF NATIONAL DEFENCE CFB KINGSTON, LSS SUP, R&I 5 SOMME AVE, BLDG C-36 KINGSTON Ontario K7K7B4 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 / Travaux publics  
et services gouvernementaux  
Kingston Procurement  
Des Acquisitions Kingston  
86 Clarence Street, 2nd floor  
Kingston  
Ontario  
K7L 1X3

<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/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

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Buyer ID - Id de l'acheteur  
kin620  
CCC No./N° CCC - FMS No./N° VME

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## **PART 1 - GENERAL INFORMATION**

### **1.1 Requirement**

The Department of Mechanical and Aerospace Engineering at the Royal Military College of Canada (RMCC) has a requirement for one (1) fast response 5-hole (FRFH) pressure probe for its various transonic wind tunnel test-setups, and as per Annex B – Requirement.

### **1.2 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.

### **1.3 Trade Agreements**

The requirement is subject to the provisions of the North American Free Trade Agreement (NAFTA), and the Agreement on Internal Trade (AIT).

## **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>) 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 (2016-04-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

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

Delete: 60 days  
Insert: 90 days

### **2.2 Submission of Bids**

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

### **2.3 Enquiries - Bid Solicitation**

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

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

### **2.4 Applicable Laws**

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

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.

## **PART 3 - BID PREPARATION INSTRUCTIONS**

### **3.1 Bid Preparation Instructions**

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

Section I: Financial Bid (1 hard copy)

Section II: Certifications (1 hard 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.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, Bidders should:

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

#### **Section I: Financial Bid**

Bidders must submit their financial bid in accordance with the Basis of Payment. The total amount of Applicable Taxes must be shown separately.

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

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

If Annex "C" 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

#### **Section II: 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.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

#### **4.1.1 Financial Evaluation**

To be responsive the Bidder must:

- 1) Provide a Firm Unit price for **all** items listed in Annex A – Basis of Payment.
- 2) Not alter the format of the Basis of Payment in Annex A.

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

The Bidder's Firm Unit Price will be multiplied by the quantity to calculate the extended firm Unit Pricing.

### **4.2 Basis of Selection**

#### **4.2.1 Basis of Selection**

SACC Manual Clause (A0069T) 2007-05-25, Basis of Selection

## **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 *Ineligibility and Suspension Policy* (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide with its bid the required documentation, as applicable, 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 *Ineligibility and Suspension Policy* (<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](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969) website ([http://www.esdc.gc.ca/en/jobs/workplace/human\\_rights/employment\\_equity/federal\\_contractor\\_program.page?&\\_ga=1.229006812.1158694905.1413548969](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969)).

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 Requirement**

The Department of Mechanical and Aerospace Engineering at the Royal Military College of Canada (RMCC) has a requirement for one (1) fast response 5-hole (FRFH) pressure probe for its various transonic wind tunnel test-setups, and as per Annex B – Requirement.

### **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**

[2010A \(2016-04-04\)](#), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

#### **6.3.2 Supplemental General Conditions**

4003 (2010-08-16), Licensed Software, apply to and form part of the Contract

4004 (2013-04-25), Maintenance and Support Services for Licensed Software, apply to and form part of the Contract

### **6.4 Term of Contract**

#### **6.4.1 Delivery Date**

All the deliverables must be received on or before March 31, 2017.

#### **6.4.2 Shipping Instructions – FOB Destination and DDP**

Incoterms 2000 "DDP Delivered Duty Paid" CFB Kingston, Royal Military College, Kingston ON.

### **6.5 Authorities**

#### **6.5.1 Contracting Authority**

The Contracting Authority for the Contract is:

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File No. - N° du dossier  
KIN-6-46123

Buyer ID - Id de l'acheteur  
kin620  
CCC No./N° CCC - FMS No./N° VME

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Name: Marta Porter  
Title: Supply Specialist  
Public Works and Government Services Canada  
Acquisitions Branch  
Address: 86 Clarence Street, 2<sup>nd</sup> Floor  
Kingston ON., K7L 1X3

Telephone: 613-547-7587 Cell: 613-483-6084  
Facsimile: 613-545-8067  
E-mail address: [marta.porter@pwgsc.gc.ca](mailto:marta.porter@pwgsc.gc.ca)

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

### 6.5.2 Project Authority

The Project Authority for the Contract is:

Name: Dr. Billy Allan  
Organization: RMC Department of Mechanical and Aerospace Engineering  
Telephone: 613-541-6000 x 6120  
E-mail address: [billy.allan@rmc.ca](mailto:billy.allan@rmc.ca)

Name: Dr. Asad Asghar  
Organization: RMC Department of Mechanical and Aerospace Engineering  
Telephone: 613-541-6000 x 6354  
E-mail address: [asad.asghar@rmc.ca](mailto:asad.asghar@rmc.ca)

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 *(To be entered by the Bidder)*

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

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

## 6.6 Payment

### 6.6.1 Basis of Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm unit price, as specified in Annex "B", Basis of Payment for a cost of \$ \_\_\_\_\_ (*insert the amount at contract award*). Customs duties are included and Applicable Taxes are extra.

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 Limitation of Price**

SACC Manual clause [C6000C](#) (2011-05-16) Limitation of Price

### **6.6.3 Single Payment**

SACC Manual clause [H1000C](#) (2008-05-12) Single Payment

### **6.6.4 Electronic Payment of Invoices – Contract**

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

- a. Visa Acquisition Card;
- b. MasterCard Acquisition Card;
- c. Direct Deposit (Domestic and International);
- d. Electronic Data Interchange (EDI);
- e. Wire Transfer (International Only);
- f. Large Value Transfer System (LVTS) (Over \$25M)

### **6.7 Invoicing Instructions**

1. 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.
2. 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.

### **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 Ontario.

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## 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 4003 (2010-08-16), Licensed Software;
- (c) the supplemental general conditions 4004 (2013-04-25), Maintenance and Support Services for Licensed Software;
- (d) the general conditions 2010A (2016-04-04), General Conditions – Goods (Medium Complexity);
- (e) Annex A, Requirement;
- (f) Annex B, Basis of Payment;
- (g) the Contractor's bid dated \_\_\_\_\_

## **ANNEX "A"**

### **REQUIREMENT**

#### **1.0 INTRODUCTION AND BACKGROUND**

##### **1.1 Introduction**

The Department of Mechanical and Aerospace Engineering at the Royal Military College of Canada (RMCC) has a requirement for a fast response 5-hole (FRFH) pressure probe for its various transonic wind tunnel test-setups.

##### **1.2 Background**

The RMC transonic wind tunnel is an in-draft intermittent short-run (1-2 second) wind tunnel; therefore, a high frequency response 5-hole probe is required to obtain steady and unsteady flow velocity and angles at various Mach numbers during the short run of the wind tunnel. The atmospheric air enters the wind tunnel at 296 K temperature and 101.33 kPa. Many different types of test-sections and articles such as cascades, nozzles, wings, etc. can be installed in the wind tunnel. The procured FRFH pressure probe would be used in any or all of the existing or planned test-sections.

#### **2.0 REQUIREMENTS**

The Department of Mechanical and Aerospace Engineering requires a fast high frequency response 5-hole probe. The high-frequency response pressure transducers must be embedded in the probe body as close to the probe-tip as possible in order to obtain high overall frequency response. All the electronics for acquiring a signal from the sensors, signal conditioning, and power supply for each sensor must also be embedded within the body of the probe (preferred). If external signal conditioning is provided then single, shielded cable with single detachable connector from probe body to the electronic module must be provided. Only electrical connections must enter/exit in/from the probe body through a rugged bundled single cable

##### **2.1 Minimum Mandatory Technical Requirements**

###### **Equipment:**

1. Fast frequency response 5-hole pressure probe with embedded pressure transducers.
2. The required pressure sensor range is  $\pm 10$  psid.
3. Data acquisition module for acquiring sensor signal voltage, pressure-port information, and excitation voltage.
4. Cables for connecting probe, data acquisition module, and customer DAQ/Computer.
5. Software for converting raw voltage signal from 5 pressure port to total and static pressure, flow velocity and flow angles.
6. Capable of measurements in Mach 0.5 to 1.5 flow.

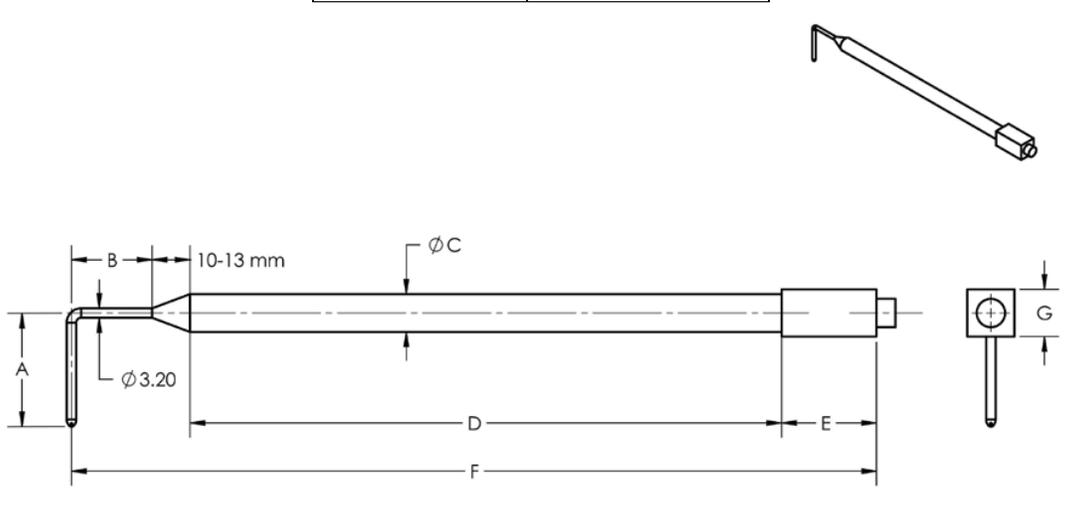
##### **2.2 Specification**

1. The general shape of the probe must be L-shaped with the probe-tip at the end of the short leg and fast response (high-frequency) transducers near the probe-tip. The electrical signal and power supply cable(s) and connector must be at the end of the long leg (called connector-end) of the L-shaped probe. Attached sketch must provide more information about the required general layout and the range of dimensions required. The range of dimensions is provided to

accommodate the constraints/requirements of good frequency response, low tip deflection, low probe-vibration, low flow blockage by probe, low upstream potential effect of probe stem, and possibility of sealing at insertion point.

2. Dimensions required:

Dimension	Range (mm)
A	38-45
B	27-35
C	10-13
D	180-210
E	25-40
F	242-298
G	16-20



- The short leg must have a diameter of 3.2 mm. The long leg can be 10 mm to 13 mm in diameter.
- The long leg must be structurally strong to provide an immersion length of 85-90 mm into the flow without compromising tip-deflection and vibration.
- The probe must have conical, hemispherical or tapered tip and 5-holes for pressure ports to measure components of total and static pressure for subsequent conversion to flow velocity and angles. The required flow angle capability is up to  $\pm 45^\circ$  or better.
- The FRFH-probe must have fast frequency response miniature pressure transducers in each of the above 5-hole pressure ports very close (within approximately 3 inches) to the probe tip. The diameter of the probe at the location of miniature transducers must be as small as possible but between 10-13 mm. The target overall frequency response of the probe is between 3.0 to 4 kHz.

7. The electronic circuit for the temperature measurement and compensation (if any), signal acquisition from pressure transducers, signal conditioning, and power-supply to transducers should also be inside the probe body but could be near the connector-end. If external signal conditioning is provided then single, shielded cable with single detachable connector from probe body to the electronic module must be provided.
8. The individual wiring connecting the transducers and all the electronics must exit the probe body from the connector-end through a rugged bundled single cable with one detachable connector.
9. The reference-pressure tube (stainless steel) and temperature cable (if used) must also be provided at the connector-end.
10. A reliable and rugged method of mounting the probe to the test-rig wall must be provided along with the well-marked indicator for aligning the probe to the wind tunnel flow direction.
11.
  - (a) Calibration of the 5-hole probe is required for flow angle and velocity coefficients in subsonic flow range from Mach 0.5 to 1.0 with increments of 0.1.
  - (b) Calibration of the 5-hole probe is required for flow angle and velocity coefficients in supersonic flow range from Mach 1.0 to 1.5 with sufficiently small increments to ensure the required accuracy as mentioned in Section 2.2-Part (5)
12. An external interface electronic module is required for acquiring data from the probe's embedded electronics and for transferring the data to a user supplied computer with a user-supplied DAQ system.
13. Cables of 3 m (approximate) length for connecting probe, data acquisition electronic module, and customer DAQ/Computer. A standard connector at the end of the cable for connection to the users DAQ system (TBD) must also be provided.
14. Necessary software(s) and drivers to acquire and convert 5-hole transducer voltage to static and total pressure, velocity and flow angle using sensor and probe calibration equations and coefficients and acoustic (or frequency response) calibration must be provided. Software must be able to integrate with *LabView* for fast data acquisition and real time display, and (2) with *Matlab* for fast and efficient post-processing and plotting of data.
15. The software must be compatible with Operating System: Microsoft Windows 8.1 and Windows 8 (Pro, Enterprise), Microsoft Windows 7 (Pro, Enterprise, Ultimate), Microsoft Windows Vista (Business, Enterprise, Ultimate), Microsoft Windows Server 2008, Microsoft Windows Server 2003.

## 2.3 Additional Requirements

### (1) Material of Construction

- Material of construction of probe body must be compatible with moist air.

### (2) Sensor Calibration

- NIST-traceable sensor calibration to be included with the probe for converting raw voltage into pressure.

### (3) Acoustic Calibration of Probe

- Acoustic (or frequency response) calibration across usable bandwidth is required for correction to measured pressure to account for attenuation due to pneumatic tube volume.

**(4) Temperature Consideration**

- The probe must be able to operate in temperatures that are reached during the Mach 1.5 flow (approximately  $-20^{\circ}\text{C}$ ) and up to  $+80^{\circ}\text{C}$

**(5) Measurement Accuracy**

- The following measurement accuracy is required:

Accuracy	Value
Sensor	$\pm 0.4\%$ FSO or better (with NIST calibration)
Pressure	$\pm 1\%$ at full scale pressure
Flow angle error	$\pm 1^{\circ}$ at full scale pressure
Flow velocity error	$\pm 1\%$ at full scale pressure
Tip deflection	$\pm 1^{\circ}$

**(6) Electrical Connection Range**

- The following electrical voltage range is acceptable for transducer/associated electronics' input and output:

Item	Range
Full-scale output	$\pm 4.5$ to $\pm 10$ VDC
Supply Voltage	10V nominal, 24Vmax

- All the electronic hardware must be able to connect to 110-120 voltage, 60 Hz electrical supply

**(7) Documentations**

- The FRFH probe supplier must also provide all the necessary documentations to install, operate, and troubleshoot the probe and associated electronic hardware.

**(8) Technical Support**

- Technical support through e-mail or phone call for installation, commissioning, and operational troubleshooting is required for both hardware and software for at least one year.

**2.3 Miscellaneous Requirements**

**Service Support**

- Initial service centre call-back of 8 hrs and service response time of 24 hrs maximum.

**Probe and Electronic Hardware Maintenance and Calibration**

- Provision for future replacement and repair of embedded transducers and electronic hardware must exist and be outlined in documentation.
- Provision for future calibration or re-calibration must exist and be outlined in documentation.

**Other**

- Supplier is authorized to offer academic packages and pricing.

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W0114-17-5361

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File No. - N° du dossier  
KIN-6-46123

Buyer ID - Id de l'acheteur  
kin620  
CCC No./N° CCC - FMS No./N° VME

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### **3.0 Delivery and Install Address**

RMCC, CFB Kingston  
Department of Mechanical and Aerospace Engineering  
19 General Crerar Cres, Sawyer Building  
Kingston, ON, K7K 7B4

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## ANNEX "B"

### BASIS OF PAYMENT

#### **Pricing Instructions:**

Bidders will provide a firm, all-inclusive unit price in Canadian dollars (exclusive of HST). H.S.T., if applicable, is extra to the price herein and shall be shown on any invoice as a separate item. Customs duties are included.

**Incoterms 2000 "DDP Delivered Duty Paid" CFB Kingston, Royal Military College, Kingston Ontario.**

<b><u>Item</u></b>	<b><u>Quantity</u></b>	<b><u>Firm Unit Price</u></b>	<b><u>Extended Unit Price</u></b>
<b>Fast Response 5-Hole Pressure Probe</b>	1	\$ _____	\$ _____

*(As per the Minimum Mandatory  
Technical Specifications in  
Annex A - Requirement)*

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## **ANNEX "C" to PART 3 OF THE BID SOLICITATION**

### **ELECTRONIC PAYMENT INSTRUMENTS**

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

- VISA Acquisition Card;
- MasterCard Acquisition Card;
- Direct Deposit (Domestic and International);
- Electronic Data Interchange (EDI);
- Wire Transfer (International Only);
- Large Value Transfer System (LVTS) (Over \$25M)