Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Bid Receiving
PWGSC
33 City Centre Drive
Suite 480C
Mississauga
Ontario
L5B 2N5
Bid Fax: (905) 615-2095

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

Address inquiries to the Contracting Authority at Hussain.Noor@pwgsc-tpsgc.gc.ca

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
Ontario Region
33 City Centre Drive
Suite 480
Mississauga
Ontario
L5B 2N5

Title - Sujet 5 Hole Pressure Probe	
Solicitation No. - N° de l'invitation W0114-185510/B	**Date** 2017-12-04
Client Reference No. - N° de référence du client W0114-185510	
GETS Reference No. - N° de référence de SEAG PW-$TOR-007-7427	
File No. - N° de dossier TOR-7-40028 (007)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2018-01-15**	**Time Zone** **Fuseau horaire** Eastern Standard Time EST
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Noor, Hussain	**Buyer Id - Id de l'acheteur** tor007
Telephone No. - N° de téléphone (905) 615-2077 ( )	**FAX No. - N° de FAX** ( ) -
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:** DEPARTMENT OF NATIONAL DEFENCE ILS RCVG 5 Somme Avenue, Bldg. C36 Kingston Ontario K7K7B4 Canada	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée See Herein	**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**	

Canada

This cancels and supersedes previous bid solicitation no. W0114-185510/A, dated 08 August 2017 with a closing date of 04 October 2017 at 2:00 PM EDT.

TABLE OF CONTENTS

PART 1 - GENERAL INFORMATION

1.1 Requirement

The requirement is detailed under Article 6.2 of the resulting contract clauses.

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 Canadian Free Trade Agreement (CFTA).

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 (2017-04-27) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

2.2 Submission of Bids

Bids must be submitted only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit by the date, time and place indicated 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: Technical Bid (2 hard copies)

Section II: Financial Bid (1 hard copy)

Section III: 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). To assist Canada in reaching its objectives, Bidders should:

1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and

2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

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

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

3.1.1 Exchange Rate Fluctuation

C3011T (2013-11-06), Exchange Rate Fluctuation

Section III: Certifications
Bidders must submit the certifications and additional information required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

(a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.

(b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Technical Criteria

Bidders must provide documentation demonstrating that their proposed product meets all the technical specifications detailed below. When published documentation does not demonstrate compliance, a written narrative demonstrating compliance will be accepted.

ITEM #	Mandatory Requirement	Page # (Identify page number in your proposal where the information can be found)
M1	**Equipment:** 1. Fast frequency response 5-hole pressure probe with embedded pressure transducers. 2. The required pressure sensor range is ± 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.	
M2	**Specifications:** 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 (see Annex A) 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

3. The short leg must have a diameter of 3.2 mm. The long leg can be 10 mm to 13 mm in diameter.

4. 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.

5. 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 ± 40 degree and ± 20 degree or better for subsonic flow and supersonic flow, respectively.

6. 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 Annex A- Article (A3).	
	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) muat 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.	

4.1.2 Financial Evaluation

1. Bidders must submit pricing in accordance with Annex B, Basis of Payment, in Canadian Funds;
2. The price used in the evaluation will be the Firm Unit Price at Annex B, Basis of Payment;
3. The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

4.2 Basis of Selection

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract.

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 website (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 Contractor must provide the items detailed under the "Requirement" at Annex "A".

6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) 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 Period of the Contract

The period of the Contract is from date of Contract to 30 April 2018 inclusive.

6.4.2 Delivery Date

All the deliverables must be received on or before 31 March 2018.

6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Husssain Noor
Supply Officer
Public Works and Government Services Canada
33 City Centre Dr., Suite 480C
Mississauga, ON
L5N 2N5

Telephone: 905-615-2080
Facsimile: 905-615-2060
E-mail address: Hussain.Noor@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 *(to be inserted at contract award)*

The Project Authority for the Contract is:

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone : ___ ___ _____
Facsimile: ___ ___ _____
E-mail address: _____

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 completed by 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 price as specified in Annex B, Basis of Payment, for a cost of $_____. 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 SACC Manual Clauses

H1000C Single Payment (2008-05-12)

6.6.3 Electronic Payment of Invoices – Contract

If applicable, where payment of invoices will be made using electronic payment instruments, Refer to Annex "C" Electronic Payment Instruments, where the Bidder indicated which electronic payment instruments are accepted and change the text below accordingly.

Delete 6.6.3 if bidder does not accept electronic payment

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.
    b. One (1) copy must be forwarded to the Contracting Authority identified under the section entitled authorities of the Contract.

6.8 Certifications and Additional Information

6.8.1 Compliance

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

6.9 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in _____ (*Insert the name of the province or territory as specified by the Bidder in its bid, if applicable*).

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 _____. *(to be inserted at contract award)*

6.11 Insurance

The Contractor is responsible for deciding if insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any insurance acquired or maintained by the Contractor is at its own expense and for its own benefit and protection. It does not release the Contractor from or reduce its liability under the Contract.

ANNEX "A"

REQUIREMENT

A1. 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.

A2. 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.

A3. Firm Requirement

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

Equipment:

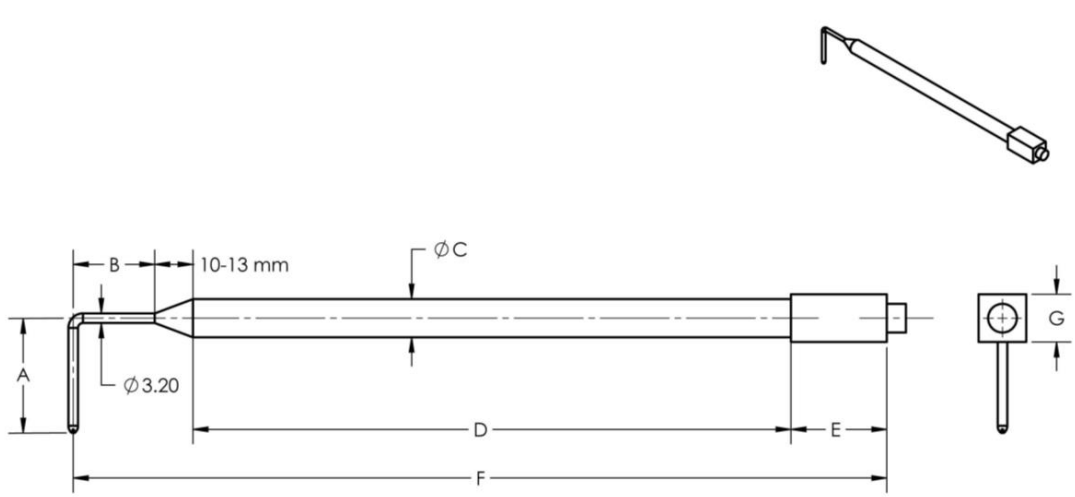
1. Fast frequency response 5-hole pressure probe with embedded pressure transducers.
2. The required pressure sensor range is ± 10 psid.
3. Data acquisition module for acquiring sensor signal voltage, pressure-port information, and excitation voltage.
4. Cables for connecting probe, data acquisition 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.

Specifications:

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



3. The short leg must have a diameter of 3.2 mm. The long leg can be 10 mm to 13 mm in diameter.

4. 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.

5. 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 ± 40 degree and ± 20 degree or better for subsonic flow and supersonic flow, respectively.

6. 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 ±45º or better.

7. 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.

8. 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.

9. 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.

10. The reference-pressure tube (stainless steel) and temperature cable (if used) must also be provided at the connector-end.

11. 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.

12. (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 Measurement Accuracy of Annex A.

13. 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.

14. 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) muat also be provided.

15. 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.

16. 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.

Material of Construction:

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

Sensor Calibration:

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

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.

Temperature Consideration:

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

Measurement Accuracy:

- The following measurement accuracy is required:

Accuracy	Value
Sensor	±0.4 % FSO or better (with NIST calibration)
Pressure	±1% at full scale pressure
Flow angle error	±1° at full scale pressure
Flow velocity error	±1% at full scale pressure
Tip deflection	±1°

Electrical Connection Range:

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

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

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

Documentations:

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

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.

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.

A4. Delivery and Installation Address

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

ANNEX "B"

BASIS OF PAYMENT

Firm, all inclusive price in Canadian Funds. F.O.B destination including all delivery charges, Canadian Customs Duties and excise taxes included as applicable. The total amount of Goods and Services Tax (GST) or Harmonized Sales Tax (HST) is to be shown separately, if applicable.

Firm Prices

Item #	Description	Quantity	Firm Unit Price	Extended Price
1	Supply, delivery and assembly of Fast Response 5-Hole Pressure Probe, in accordance with Annex A.	1	$_____	$_____
			Total Cost	$_____

ANNEX "C" to PART 6 OF THE BID SOLICITATION

ELECTRONIC PAYMENT INSTRUMENTS

As indicated in Part 6, clause 6.6.3, the Bidder must identify which electronic payment instruments they are willing to accept for payment of invoices.

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)