ACAN - SOLICITATION NUMBER: 16-22014

Requirement for a data acquisition system utilizing software written using LabVIEW Object-Oriented Programming architecture with duplexed-dynamic queued state processing to implement acoustic measurements

1. Advance Contract Award Notice (ACAN)

An ACAN is a public notice indicating to the supplier community that a department or agency intends to award a contract for goods, services or construction to a pre-identified supplier, thereby allowing other suppliers to signal their interest in bidding, by submitting a statement of capabilities. If no supplier submits a statement of capabilities that meets the requirements set out in the ACAN, on or before the closing date stated in the ACAN, the contracting officer may then proceed with the award to the pre-identified supplier.

2. Definition of the requirement

The National Research Council, Acoustics Group has a requirement for a data acquisition system utilizing software written using LabVIEW Object-Oriented Programming architecture with duplexed-dynamic queued state processing to implement acoustic measurements in the five building acoustic laboratories located at the NRC's Montreal Rd campus in Ottawa.

The software shall acquire data from microphones in the laboratories using National Instruments modules and post process the data. The software shall also monitor the environmental conditions in the laboratories and to control the robots which are used to move the microphones to designated positions within the laboratories. The development of the system also includes the implementation of a central Oracle database to store the measured data from all five laboratories. This database must be accessible from the software installed in the acoustic laboratories as well as the software installed in other computers at the NRC's Montreal Rd campus.

The software shall run on Windows 7 PCs. The software shall also be capable of running on Android tablets so that parts of the measurements can be controlled by the tablet using a WIFI network.

The project will include five phases which include both software and hardware components. The first phase is the development of the software component which must include communication and meetings with the Acoustics Group where the interface and software will be demonstrated in its current state. The specification of the required hardware is part of the first phase. The second phase will occur once the software is developed and will involve testing the software in one of the acoustics laboratories at the Montreal Rd campus using the existing hardware. The third phase will involve the removal of the existing hardware and the installation of the new hardware and software in one of the laboratories at the Montreal Rd campus. The fourth phase will involve the replacement of the existing software and hardware in all of the acoustic facilities. The fifth phase will involve ongoing support of the software.

The measurements the software will be used to perform will include:

- Transmission loss measurements according to ASTM E90-09
- Light impact measurements according to ASTM E492-09
- Heavy impact measurements according to ISO 10140-3
- Sound absorption measurements according to ASTM C423 - 09a
- Airborne sound attenuation between rooms sharing a common ceiling plenum measurements according to ASTM E1414 / E1414M - 11ae1
- Normalized flanking level difference measurements according to ISO 10848-3
- Normalized flanking impact sound pressure level measurements according to ISO 10848-3

To perform these measurements, the software must be capable of:

- Calculating the STC ratings according to ASTM E413 - 16

- Calculating the IIC ratings according to ASTM E989 - 06
- Calculating the classification for acoustic ceiling products according to ASTM E1264-14.
- Controlling the three axis robots in the measurement chambers to move microphones to different positions in the chambers. The software shall be capable of controlling robots in eight rooms simultaneously.
- Acquiring data from up to sixteen microphones simultaneously
- Monitoring environmental conditions in the laboratories
- Monitoring the status of the doors to the laboratories to ensure they are closed before the testing starts and to stop the measurements if a door is opened.
- Generating uncorrelated noise signals in four channels for the testing. The noise signals will include white noise, pink noise, pure tones and frequency sweeps.
- Communicating with the microphones to determine serial numbers
- Initiating the calibration of the measurement equipment
- Initiating loudspeaker tests to ensure the loudspeakers are functioning properly
- Sending the test results to an Oracle database (also to be developed as part of this program).
- Monitoring the loudspeakers to ensure that they are not being overdriven
- Monitoring the state of the microphones

As part of the project, the developer will be expected to specify new hardware components (if required) which will integrate with the software. These may include:

- Environmental monitoring equipment (temperature, atmospheric pressure, relative humidity)
- Door sensors to determine if doors are open
- Cables for the microphones, loudspeakers and monitoring equipment
- National Instruments data acquisition modules
- Computers
- Tablets

The software will require a user interface for the details of the test specimens to be entered. The details include a hierarchy of information about the material properties, the construction details and the assembly details. All of the details will be exported to the central database along with the test results. The database and material specification GUI must be designed in cooperation with the staff from the Acoustics Group. The vendor is expected to work closely with the group to develop and refine the GUI and to deliver to the Acoustics Group working demonstrations throughout the development process.

The software shall be developed with clear annotations about the functions within the code so that it can be easily modified by the NRC at a later date.

Since the software must be compatible with all of the hardware, the installation of the software and the corresponding hardware will be the responsibility of the vendor. The installation will include:

- Laying of cables between the computers and the equipment in the laboratories
- Design of a stand to support a microphone array in the laboratories. The stand will be suspended from the ceiling of the laboratory and must be capable of being raised and lowered for the calibration of the microphones.
- Implementation of the environmental measurement hardware
- Implementation of the sensors for the doors of the laboratories
- Purchase and implementation of the computers and National Instruments data acquisition modules.

3. Criteria for assessment of the Statement of Capabilities (Minimum Essential Requirements)

Any interested supplier must demonstrate by way of a statement of capabilities that it meets the following requirements:

- Experience: A minimum of 10 years of experience with robotics / motor control / motion control, a minimum of 10 years of experience with LABVIEW and a minimum of 10 years of experience with database design.

- Experience with RF, analog & digital hardware design.
- Experience with acoustic measurements
- Experience with audio amplifiers and loudspeakers
- The proposal must include a description of the Company's previous experience with acoustic measurements and analysis of the acoustic measurement data according to the relevant standards: ASTM E90-09, ASTM E492-09, ASTM C423 - 09a, ASTM E1414 / E1414M - 11ae1, ASTM E413 - 16, ASTM E989 - 06, ISO 10140-3 and ISO 10848-3.
- The proposal must include a description of the Company's previous experience with audio equipment including microphones and amplifiers.
- It is expected that the Company will be able to meet with the staff of the Acoustics Group frequently during the development process as well as during the implementation phase of the project. The proposal must include a description of the Company's plan for communicating and meeting with the staff of the Acoustics Group as well as anticipated travel plans during the implementation phase.
- The qualification and experience of the proposed personnel must be described in the proposal. The experience and expertise of the proposed personnel must be appropriate to the nature of the work in a laboratory setting. The proposed personnel must have a good knowledge of and experience in LabVIEW, the interfacing of LABVIEW to smart tablets, FlexShell framework for the architecture of the API and GUI, Oracle databases, data acquisition systems, robotics and motor control. Detailed resumes of proposed personnel must be included.
- The professional certification of the proposed personnel must include Certified LabVIEW Developer (CLD).
- The proposal should demonstrate a clear understanding of the work and the problems that might be encountered. This demonstrated understanding of the work should include an overview of the issues involved, possible limitations and difficulties associated with the assignment and possible solutions to address these difficulties.

4. Applicability of the trade agreement(s) to the procurement

This procurement is subject to the following trade agreement(s):

- Agreement on Internal Trade (AIT)
- World Trade Organization - Agreement on Government Procurement (WTO-AGP)
- North American Free Trade Agreement (NAFTA)

5. Justification for the Pre-Identified Supplier

The proposed supplier has the required knowledge for each of the steps for the implementation of the data acquisition system including LabVIEW, FlexShell framework for the architecture of the API and GUI and the specific building acoustic measurements conducted at the NRC. The proposed supplier aided in the development of a system for detailing the properties of specimens and assemblies for the acoustic testing as well as a GUI for inputting the details.

The proposed supplier has 23 years of LabVIEW experience, 13 years of experience with robotics and motion control and 15 years of experience with database design. The proposed supplier also has microphone and amplifier design experience as well as experience with the applicable standards.

In addition to being certified as a LabVIEW certified developer, the supplier is also listed as a LabVIEW champion which means that the vendor is recognized by National Instruments for their exceptional application development, technical depth and breadth, and leadership and contributions to the LabVIEW community.

The proposed supplier is located in the Ottawa area which allows for face to face meetings during the phases of the project including the support phase.

6. Government Contracts Regulations Exception(s)

The following exception to the Government Contracts Regulations is invoked for this procurement under subsection 6 (d) – Only person is capable of performing the work.

7. Ownership of Intellectual Property

Canada intends to retain ownership of any Foreground Intellectual Property arising out of the proposed contract on the basis that the main purpose of the contract is to generate knowledge and information for public dissemination.

8. Period of the proposed contract or delivery date

The data acquisition system must be completed and installed in its final form by 1 February, 2017.

9. Cost estimate of the proposed contract

Contract value is an estimated $248,000.00 CAD (HST included); however final cost is subject to negotiation.

10. Name and address of the pre-identified supplier

DRAWBRIDGE Technologies, Inc.
1546 Maley Lane
Kanata, ON K2W 1C5

11. Suppliers' right to submit a statement of capabilities

Suppliers who consider themselves fully qualified and available to provide the services described in the ACAN may submit a statement of capabilities in writing to the contact person identified in this notice on or before the closing date of this notice. The statement of capabilities must clearly demonstrate how the supplier meets the advertised requirements.

12. Closing date for a submission of a statement of capabilities

The closing date and time for accepting statements of capabilities is May 25, 2016 at 14:00 hrs. EDT.

13. Inquiries and submission of statements of capabilities

Inquiries and statements of capabilities are to be directed to:

NRC Contracting Officer: Melody Ellis
National Research Council
Bldg. M-22, 1200 Montreal Rd, Ottawa, ON
Telephone: 613-993-4461