RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Bid Receiving - PWGSC / Réception des soumissions - TPSGC
11 Laurier St. / 11, rue Laurier
Place du Portage, Phase III
Core 0A1 / Noyau 0A1
Gatineau, Québec K1A 0S5
Bid Fax: (819) 997-9776

LETTER OF INTEREST
LETTRE D'INTÉRÊT

Title - Sujet
RFI - ROBOTICS DNA & RNA SEQUENCING

Solicitation No. - N° de l'invitation	Date
01E86-140157/A	2013-08-16
Client Reference No. - N° de référence du client	**GETS Ref. No. - N° de réf. de SEAG**
01E86-140157	PW-$$HN-366-63311
File No. - N° de dossier	**CCC No./N° CCC - FMS No./N° VME**
hn366.01E86-140157	

Solicitation Closes - L'invitation prend fin
at - à 02:00 PM
on - le 2013-09-26

Time Zone
Fuseau horaire
Eastern Daylight Saving Time EDT

F.O.B. - F.A.B.
Plant-Usine: ☐ **Destination:** ☑ **Other-Autre:** ☐

Address Enquiries to: - Adresser toutes questions à:	Buyer Id - Id de l'acheteur
Cooper, Michael	hn366
Telephone No. - N° de téléphone	**FAX No. - N° de FAX**
(819) 934-0232 ( )	( ) -

Destination - of Goods, Services, and Construction:
Destination - des biens, services et construction:

DEPARTMENT OF AGRICULTURE AND AGRI-FOOD
CEREALS&OILSEEDS RES. CTR.
NEATBY BLDG 4TH FL
ATTN: RAFIK ASSABGUI
OTTAWA
Ontario
K1A0C6
Canada

Comments - Commentaires

Instructions: See Herein

Instructions: Voir aux présentes

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

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
See Herein	

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**

Issuing Office - Bureau de distribution
Electrical & Electronics Products Division
11 Laurier St./11, rue Laurier
6B1, Place du Portage, Phase III
Gatineau, Québec K1A 0S5

Canada

Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM Destination	Plant/Usine	Delivery Req. Livraison Req.	Del. Offered Liv. offerte
1	Request for Information (RFI) To develop a Robotics for DNA & RNA Sequencing unit for AAFC	01E86	01E86	1	Each	$	XXXXXXXXXX	See Herein	

PART 1 - INTRODUCTION

A Letter of Interest (LOI) or Request for Information (RFI) is used when detailed information and feedback are required from suppliers. Such requests might outline a potential requirement and request suppliers to describe their ability to satisfy the requirement and to provide ideas and suggestions on how the eventual solicitation might be structured. Responses are used to assist the client department and PWGSC in finalizing their plans for the requirement and in developing achievable objectives and deliverables.

The main objectives of the LOI/RFI are to:

1. Allow suppliers to:

- assess and comment on the adequacy and clarity of the requirements as currently expressed;
- offer suggestions regarding potential alternative solutions that would meet requirements, such as a solution with a lower environmental impact.

2. Provide information to assist the client department to:

- determine whether to proceed with requirements/strategy as planned, and if so, further developing internal planning, approval and solicitation documents that may potentially lead to a solicitation;
- refine the procurement strategy, project structure, cost estimate, timelines, requirements definition, and other aspects of the requirement;
- become a more "informed buyer" with an enhanced understanding of industry goods and service offerings in the areas of interest; and
- assess potential alternative solution concepts that would meet its requirement, such as environmentally preferable solutions.

This is not a bid solicitation. A contract will not result from this activity.

This LOI will not necessarily result in any procurement action. This LOI is for informational purposes only and does not constitute a commitment by Canada. Responses to this LOI will not constitute a commitment from the industry provider. Canada will not reimburse any expenses incurred for the preparation of responses to this LOI.

PART 2 - SUPPLIER INSTRUCTIONS

1. Responses are to be submitted to the PWGSC Bid Receiving Unit:

LOI no. 01E86-140157/A
Bid Receiving - PWGSC
11 Laurier Street
Place du Portage, Phase III
Core 0A1
Gatineau, Québec K1A 0S5
Tel.: (819) 956-3366

2. Due to the nature of the LOI, it is requested that responses are not submitted by facsimile (fax) or electronic mail (email), but rather only in hardcopy format, submitted to the Bids Receiving Unit address above.

3. Please submit two (2) identical copies of the response
1 copy will be given to Agriculture and Agri-Food Canada (AAFC), the Eastern Cereal and Oilseed Research Center (ECORC) and 1 copy will remain with the Contracing Authority (PWGSC).

Any response submitted will become the sole property of Canada and will not be returned to the supplier. The response will be used to assist Canada in further analysing the presented requirement and, as such, may be used in the development of a future solicitation process to be posted on Merx.

4. Response required by:

2:00 PM on September 26, 2013

5. Inquiries

Please address all inquiries about this LOI to the Contracting Authority:

Michael Cooper
Public Works and Government Services Canada
Place du Portage, Phase III
11 Laurier Street, Gatineau, Quebec Canada K1A 0S5
Telephone: (819) 956-3487
Email: michael.cooper@tpsgc-pwgsc.gc.ca

PART 3 - REQUEST FOR INFORMATION (RFI)

Robotics for DNA & RNA sequencing for Agriculture and Agri-Food Canada (AAFC), the Eastern Cereal and Oilseed Research Center (ECORC)

1. PROJECT CONTEXT

1.1 The Eastern Cereal and Oilseed Research Centre (ECORC) in Ottawa (CANADA) maintains a national mandate for assessing and utilizing biodiversity and environmental resources for Canadian agriculture. ECORC currently houses four biological collections of national importance: the Vascular Plant Collection, the National Mycology Herbarium, the Canadian National Collection of Insects, Arachnids and Nematodes, and the Canadian Collection of Fungal Cultures.

1.2 Working in collaboration with national and international, public and private sector organizations, part of the Centre's research activities are focused on innovation and advancing knowledge. The Biodiversity and Genomics group is partially responsible for identifying and characterizing Canada's flora and fauna to define economically important fungi, insects, crops and weeds, and to develop systems such as molecular diagnostics to positively identify economically important pests.

1.3 This project shall address the long-term goal of digitizing and unlocking the information available within the Agriculture and Agri-Food Canada collections. This requires the establishment of automated processes to minimize hands-on effort by technical staff, while ensuring full capture of provenance information related to sample handling and processing in support of regulatory activities.

2. OBJECTIVES OF THIS REQUEST FOR INFORMATION (RFI)

2.1 Pending the results of this RFI process, and incorporating any lessons learned, the scope and range of robotics for DNA sequencing sought by AAFC (ECORC) may be altered to better reflect what is currently available within the current marketplace.

2.2 AAFC (ECORC) is issuing this RFI as a means of gathering information to assist in accomplishing the following specific purposes:

1. To develop a full solution robotics package, capable of supporting PCR, qPCR and sequencing (Sanger- and Next Generation Sequencing (NGS)) workflows. The system must come complete with protocols that can eventually be ISO certified, if required, and provide input and output mechanism for integration with a Laboratory Information Management System (LIMS), and automated workflows;

2. To determine the cost effectiveness associated with individually selected, innovative new generation technologies that can accelerate results, improve data accuracy and reproducibility;

3. To develop a cost/benefit analysis associated with the lease or purchase of a LIMS system, including the costs associated with professional services to integrate with the existing equipment and develop custom workflows within the software;

4. To obtain information and recommendations directly from industry that may be used by ECORC in planning for the acquisition of robotics as part of a new and integrated DNA sequencing workflow, complete with the use of LIMS and related support.

3. RESPONDANT TEMPLATE

3.1 In order to gain the greatest value from responses to this RFI, and to facilitate a consistent and structured assessment of the information provided to PWGSC/ECORC within their responses, respondents are asked to structure their responses to match the order in which the questions are asked in Part 4 - Response Template, of this RFI package.

4. RESERVED RIGHTS

In addition to any other expressed or implied rights, PWGSC/ECORC reserves the right to:

4.1 Cancel this RFI process at any time;

4.2 Re-issue this RFI for the same or similar information;

4.3 Change the structure and timing of the RFI process;

4.4 Vary or extend the date or time in this RFI at any time, and for such period as ECORC in its absolute discretion considers appropriate;

4.5 Request written clarification from any and all Respondents, and/or provide additional information or clarification; and,

4.6 Contact any customer or reference provided with a Respondent's submission, as part of its assessment process.

PART 4 - RESPONSE TEMPLATE
Solicitation No. 01E86-140157/A
Robotics for DNA & RNA sequencing for Agriculture and Agri-Food Canada (AAFC), the Eastern Cereal and Oilseed Research Center (ECORC)

In order to gain the greatest value from responses to this RFI, and to facilitate a consistent and structured assessment of the information provided to PWGSC/ECORC, Respondents are asked to structure their responses in accordance with the following Response Template:

1. VENDOR PROFILE

1.1 Describe your organizations previous and current experience as a provider of genetic analysis products for molecular research and molecular diagnostics, both for Sanger sequencing and Next Generation sequencing. Experience related with industry and the Federal Government should be noted separately, as applicable.

1.2 Indicate if the robotics and other automated solutions are developed by your organization, or whether you are a third-party reseller of another vendor's robotics systems.

1.3 Indicate your organizations previous and current experience as a provider of Laboratory Information Management System (LIMS).

1.4 If applicable, indicate if the LIMS is developed and maintained by your organization, or by a third party.

1.5 Indicate office location(s) in Canada, and worldwide.

1.6 Indicate the number of years your organization has been in the business of supplying automated solutions and/or LIMS systems and related support.

1.7 Indicate the number of years your organization has been in business in Canada supplying automated solutions and/or LIMS systems and related support.

2. LABORATORY INFORMATION MANAGEMENT SYSTEM

2.1 Assuming that you can provide a LIMS, describe the possible options and pricing difference.

i. Clearly indicate both upfront (i.e. purchase & installation) and recurring (e.g. maintenance) costs.

ii. Clearly describe all per user, host, instrument and other factors that influence pricing.

iii. Describe the process and cost associated with custom LIMS feature development.

2.2 Indicate if the client interface is web or desktop based.

2.3 Describe the available options for hosting the LIMS service (e.g. local server & storage vs. "cloud"), storing the data, and associated costs.

i. Where the LIMS is offered as a cloud-based service, include documents and diagrams describing technical (e.g. bandwidth) and security policy requirements (e.g. availability of ports) to permit an assessment by IT security, and a description of data security standards.

ii. Where the LIMS system is locally hosted, describe the IT requirements and whether required equipment is to be provided by the vendor or the client.

iii. Where the LIMS is locally hosted, describe the OS and client/server configuration.

iv. Where the LIMS is locally hosted and running Windows, indicate the version of windows and comment on best practices with respect to enterprise integration including use of anti-virus.

2.4 To what extent is your LIMS "enterprise" ready, e.g. use of central user management & authentication?

2.5 To what extent does the LIMS differentiate between different types of users (e.g. roles) and what types of roles are available within the LIMS?

2.6 Is the source code for your LIMS available for review and in-house modification?

2.7 Does your LIMS provide an Application Programming Interface (API) to facilitate integration with other systems? If so, include API documentation with RFI.

2.8 Does your LIMS system provide a plugin architecture permitting execution of client-developed functionality? If so, include plugin architecture documentation with RFI.

2.9 Describe the experience you have with existing open-source LIMS systems.

3. MOLECULAR BIOLOGY APPLICATIONS ROBOTICS

3.1 Through a detailed summary of the main technical features of the instruments, provide for a response considering a full solution robotics package, capable of supporting PCR, qPCR and sequencing (Sanger and NGS) workflows. The system must include protocols that can eventually be ISO certified, if required, and provide input and output mechanism for integration with a LIMS and automated workflows. Ensure that the following points are considered:

i. The system must be compatible with the following equipment, already in place:

a) Thermo Scientific King Fisher mL DNA extractor (Nucleic acid purification system);

b) Thermo Scientific King Fisher Flex DNA extractor (Nucleic acid purification system);

c) Applied Biosystems 3130xl Genetic Analyzer, (Sequencing and Fragment chemistries);

d) Illumina MiSeq (Next-Generation sequencing analysis);
e) Roche LightCycler 480 Real-Time PCR system;

f) Agilent 2100 Bioanalyzer;

g) Digital PCR System (Model not known yet);

h) Invitrogen E-Gel 96 Electrophoresis system; and

i) DNA quantification systems, including:
1. Invitrogen Qubit Fluorometer
2. NanoDrop Spectrophotometer
3. Tecan Infinite Multiplate Reader

ii. The integrated robotics platform should consist of the following pieces of equipment, including liquid handling robot(s). Ensure that for each piece of equipment listed, the approximate price, electrical and space requirements, the delivery time, as well as any other special requirements necessary for the proper installation and operation are included:

a) DNA shearer capable of fragmenting DNA for genomic library construction;

b) Automated nucleic acid size fractionation system;

c) All equipment required to automate all the applications listed below, with minimal human intervention. The integrated solution may consist of multi-purpose robots, or a variety of instruments for the different applications, to avoid a bottleneck. Be aware that pre-and post-PCR activities are to be kept physically separated from each other.

d) The robotics solution should also have a component dedicated to microfluidics, in order to facilitate amplicon metagenomic analyses of environmental samples, Taqman assays, Digital PCR and very small samples volumes associated with certain obligate pathogens-, and precious type specimens.

iii. The applications expected to be performed on the system include:

a) PCR Mastermix Preparation;

b) PCR Reaction set up;

c) PCR Clean Up;

d) qPCR Sample Preparation;

e) Sanger sequencing Reaction Set-Up;

f) Sanger sequencing Reaction Clean Up (ethanol/ salt precipitation or commercially available kits);

g) Cloning of PCR products;

h) Routine Sample Preparation and Dilutions;

i) Digital PCR;

j) Amplicon based library preparation for Next Generation sequencing;

k) DNA/RNA sequencing, using Illumina TruSeq Sample Preparation;

l) All Nextera Sample Preparation and enrichment kits for DNA and RNA, used in Ilumina applications.

iv. The main objective of this project is to be able to automate our routine molecular biology workflows, which will facilitate the capture of the molecular information from our collections. Responses should emphasize how this can be best achieved using validated protocols, databases that are or have the potential to be ISO certified. Example workflows should be directed against the applications stated above. Example workflows follow, but Respondents are encouraged to state which robot(s) and validated protocols they would suggest, as applicable:

a) DNA through PCR to Sanger sequencing workflow will encompass extraction of DNA using the Kingfisher, automated PCR set-up, E-gel electrophoresis, automated sequencing reaction set-up, automated sequencing reaction clean-up (plate set up and transfer, adding salts and ethanol), Sanger sequencing on ABI Genetic Analyzer.

b) DNA to MiSeq genome sequencing workflow will encompass extraction of DNA using the Kingfisher, automated DNA shearing on the DNA shearer, size fractionation on nucleic acid size fractionation system, quality control verification using the bioanalyzer, end repair and polyA tailing set-up, PCR amplification, library QC using Bioanalyzer, automated sequencing set-up on MiSeq.

c) RNA to MiSeq transcriptome sequencing workflow will encompass extraction of RNA using the Kingfisher, followed by quantification on the Bioanalyzer using RNA chips, and elimination of ribosomal RNA from total RNA samples, followed by first and second strand cDNA synthesis, adenylation of 3'-ends, ligation of adapters using the Illumina TruSeq Stranded Total RNA Ribo-Zero kit, and enrichment of cDNA using PCR amplification. Quantification of the resulting libraries will be performed using qPCR according to the Sequencing Library qPCR Quantification Guide and qualification of the library will be assessed on the Bioanayzer, using a DNA specific chip.

d) Microfluidics PCR workflow will encompass micromanipulator assisted manual collection of single cells, specific target amplification using target primer and protocol E, followed by qPCR on a dynamic array (performed on microfluidics instrument D) to make amplicons, PCR as per usual, next generation sequencing on Illumina.

e) DNA to MiSeq or HiSeq GBS workflow will encompass extraction of DNA using the Kingfisher, normalization of DNA samples and dilution of aliquots to standardized volumes of 50 ng/ul in 96 or 384 samples, addition of double restriction enzyme mastermix, followed by incubation, followed by addition of 2 ligation mixes: 1) a single master mix matching

one restriction site, and 96 (or 384) unique mastermixes matching the second site. Following the ligation incubation step, 96 (or 384) samples are pooled (multiplexed) into a single well and held for completion of PCR and sequencing preparation. The sequencing preparation will be multiplexed into 12 or 24 reactions and sequencing using MiSeq.

f) Amplicon-based metagenomics workflow will encompass quantification of environmental DNA, followed by a PCR, using fusion primers. After visualization on E-gel electrophoresis, samples will be cleaned using magnetic bead purification (SPRI or AMPure). PCR replicates will be quantified and diluted in order to serve as template for the second round PCR, which will incorporate appropriate dual-indexes. Following another magnetic bead clean-up, the replicate PCR products will be pooled, quantified and normalized to the desired concentration. At least 48 amplicon libraries will be pooled together before sequencing on the MiSeq.

v. Samples are likely to be stored in a variety of states and / or environments (ex. air- or freeze- dried, -20oC, -80oC, etc.) The ability to store and retrieve specimen DNA rapidly is imperative;

vi. Due to the wide range of organisms, coupled with the fact that protocols are continually being developed and modified to fulfill the ongoing requirements associated with DNA barcoding, genotyping and genome sequencing, the system must be flexible. Flexibility is also required in the type of workflow that is being used; the ability to seamlessly work between various workflows is imperative. If instruments can be preloaded with commercially available protocols, as described herein, it should be duly noted within the specifications;

vii. For Sanger sequencing, the expected annual throughput will be between 40,000 and 60,000 samples (low-/mid-throughput). The proposal must include instruments capable of cherry-picking samples, and making both PCR- and Sequencing- master mixes. Clean-up of sequencing products, using ABI Big Dye chemistries, should also be discussed as part of the solution;

viii. For NGS, the expected annual throughput is to be between 500 and 2,000 samples (low-throughput). The NGS will consist of small genomes, RNA and amplicon analysis. The proposal must include instruments capable of cherry-picking samples, and using a variety of kits available through Illumina, including, but not limited to, Genomic DNA sample Prep, Mate Pair Library Prep., Truseq RNA and Nextera XT DNA sample prep. The

robotics platform must also be capable of performing RNA sequencing as well as amplicon based library preparation, for the NGS;

ix. The robotics solution must be capable of working between a variety of container types, including but not limited to 96-and 384-well plates, strip tubes, and 0.5mL and 1.5 mL tubes;

x. Response time versus Repair time;

xi. The robotics could be self-contained in order to prevent cross contamination;

xii. The minimum volume to be aspirated must be 1µl, less is better. State the CV value, and provide supporting data, if applicable.

3.2 For each instrument provided as part of the solution, include the following information:

i. The warranty that comes with the instrument (length of warranty and what is covered);

ii. Cost for an annual maintenance agreement, or applicable service fees in the absence of a maintenance agreement;

iii. Availability of adequate long-term (minimum 5 years) service for such instrumentation by personnel approved by the instrument manufacturer;

iv. Type of tips used by instrument(s) (e.g. universal or instrument specific) and the associated costs

v. List of any lab supplied consumables associated with the instrument(s) and the approximate cost of all consumables;

vi. The validated protocols which could be used on the platforms quoted. Should a protocol still be in the validation process, indicate the expected validation date;

vii. Any other information that is deemed pertinent to the stated instrumentation.

3.3 Describe your organization's pervious and current experience in successfully providing custom molecular biology robotics solutions. For each submitted solution provide:

i. details of the time and location of the customized solution(s);

ii. the name of the Client organization for whom this was accomplished;

iii. A description of the similarities or differences between the solution(s) provided to these clients and requirement described herein;

iv. The name, position, and current contact information (phone, fax and/or email address) of a contact within the Client organization for whom this was accomplished who would be knowledgeable of the experience with your company and your solution(s).

3.4 Interested suppliers are requested to indicate an estimate on the minimum amount of time that would be required to complete a formal Request for Proposal (RFP). Note that a potential supplier's requested time to prepare a proposal may not necessarily be the amount of time that will be allocated in the RFP.

4. RECOMMENDATIONS

4.1 Provide AAFC with any specific recommendations or advice which is relevant, to better enable ECORC to derive as much benefit as possible from this RFI process (e.g. Further procurement) and to enhance its understanding of the marketplace and the capabilities for an automated robotics solution to aid in molecular biology and sequencing.