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**SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

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

Issuing Office - Bureau de distribution

Innovation Procurement Directorate
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Title-Sujet Area Detection and Identification System (ADIS)	
Solicitation No. - N° de l'invitation W8476-18ADIS/B	Amendment No. - N° modif. 019
Client Reference No. - N° de référence du client W8476-18ADIS/B	Date 28 May 2020
GETS Reference No. - N° de référence de SEAG	
File No. - N° de dossier 010sl.W8476-18ADIS/B	CCC No./N° CC - FMS NO. / N° VME
Solicitation Closes - L'invitation prend fin at - à 2:00 PM on - le 30 July 2020	Time Zone Fuseau horaire Eastern Standard Time EST
F.O.B. - F.A.B	
Plant-Usine : <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: April Campbell	Buyer Id - Id de l'acheteur 010SL
Telephone No. - N° de téléphone 613-858-9485	FAX No. - N° de FAX
Destination of Goods, Services and Construction: Destinations des biens, services et construction :	
Specified Herein Précisé dans les présentes	

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 telephone 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

THIS AMENDMENT IS RAISED TO RESPOND TO BIDDER QUESTIONS

Q128 In Volume 1: Bidder Instructions and Requirements, under 3.1.2.2 Identification Requirements – CWAs, it states “ADIS must detect and identify the mandatory CWAs listed in Table A of attachment AA3 to Appendix AA of Annex A. The Detection Criteria is defined as a probability of successful detection and identification of at least 80% (95% confidence level) under the following conditions:”

Can the PWGSC please clarify “80% (95% confidence level)”? For example, out of 100 trials, how many need to result in a positive detection and identification? Please provide an example or illustration that provides further clarification.

A128 The System must have a 80% probability of detection and identification (or better), verified to a 95% confidence level. While the probability of detection is a property of the System, the confidence level is a property of the statistical test used to demonstrate the probability of detection. The test is composed of a series of pass / fail trial events, in which a correct identification is a pass, and a fail otherwise. The output of the test will thus follow a binomial distribution (1) of mean $N \cdot P_d$, where N is the number of events and P_d is the probability of detection of the system.

Given a binomial distribution, we can estimate P_d by simply computing the ratio of successes. However, we require to be 95% certain of our estimate, and there is a greater than 5% probability that a system with $P_d < 0.8$ obtains 8/10 in a trials with 10 events. We must know how many trial events N to perform, and how many failures K to allow, to get a 95% confidence level.

In general, for a binomial distribution, the probability of a system failing exactly K events out of N is given by:

$$\Pr(p; N, K) = C(N, K) * p^K * (1-p)^{(N-K)}$$

where $p = 1 - P_d$ is the probability of failure and $C(N, K)$ is the binomial coefficient, i.e. the number of possible combinations for K failures out of N events.

The probability that a system would have at most K failures out of N events given $p = 1 - P_d$ is thus:

$$\sum_{k=0..K} \Pr(p; N, k)$$

We can use this formula to find N and K such that if achieved, there is only 5% chances that the system has P_d below 0.8. By setting $p = 0.2$ in the formula above and testing values of N and K , ensuring the result is below 0.05, we find:

for no failure ($K = 0$), N must be at least 14;
 for at most one failure ($K = 1$), N must be at least 22;
 for at most two failures ($K = 2$), N must be at least 30.

This may seem a rather strict interpretation of the confidence interval, but other interpretations are even more stringent. For example, using the Clopper-Pearson method to compute confidence intervals (2), we would need either 17/17, 25/26 or 32/34 to ensure a lower bound of 0.8 for Pd at a 95% confidence level (3). Under the Clopper-Pearson method, the required 14/14, 21/22 and 28/30 rather offers a 90% confidence level.

To specifically answer the bidder's question, over 100 trial events, we would require 91/100 under our method. The Clopper-Pearson method would become slightly less restrictive, allowing 89/100. Practical considerations and limits on the time required to perform these trials favor a lower number of trial events.

(1) See https://en.wikipedia.org/wiki/Binomial_distribution

(2)

See https://en.wikipedia.org/wiki/Binomial_proportion_confidence_interval#Clopper%E2%80%9393Pearson_interval

(3) See this handy calculator for the Clopper-Pearson confidence interval: <https://danielsoper.com/statcalc/calculator.aspx?id=85>

Q129 In Vol 1 Section 2 Verification Methodology for the Identification Requirements of Chemical Warfare Agents (CWAs), paragraph C, [Laboratory Test Point Rating System graphic](#). What is the definition of “Nominal signal level?” Please clarify.

A129 The nominal signal level is adjusted so that the peak absorption (or emission) provided by the target gas is the same as of GB at a column density of 135 mg/m² with a thermal contrast of 2K, observed at a 1 cm⁻¹ (1 wavenumber) resolution. We reserve the right to set the nominal signal level higher (equally for all participants) if unforeseen difficulties arise in the testing procedure requiring stronger signal for the targets to be detectable.

Q130 [In Appendix AA of Annex A of Volume 2 – System Requirements Specifications, ID 25 and 26 – What type of test report is required as evidence of the capability of the system to detect and identify the requested TICs?](#)

[Will the PWGSC consider changing the identification requirements of TICs to be the same as CWAs as described in Vol 1, Attachment 2B to Part 4, Point 2 \(report and analysis vs. a test report\)?](#)

A130 No. We consider the requirement (in Vol 1, Attachment 2B to Part 4, MR11) of 10 TICs tested out of 126 TICs (listed in Volume 2 Appendix AA2) a reasonable request. This will demonstrate the system's capabilities at least for the spectral range covered by these compounds. For the description of what constitutes a Test Report and other verification methods, please refer to Appendix AA to Annex A, Page 30, Section 4 - Verification.

Q131 [Table A in Appendix AA1 to Annex A: What are the required sensitivity levels for Cyanogen Chloride and Hydrogen Cyanide?](#)

A131 There is no required sensitivity level for cyanogen chloride and hydrogen cyanide. The bidder must demonstrate that these substances can be detected, and by analysis, establish under

which conditions this can be done (thermal contrast, concentration or column density, expected range, etc.).

Q132 Table A in Appendix AA1 to Annex A: Will the PWGSC consider changing the items Cyanogen Chloride and Hydrogen Cyanide from “Mandatory” to “Non-Mandatory?”

A132 Cyanogen chloride and hydrogen cyanide remain mandatory.

Q133 Volume 1: Bidder Instructions and Requirements, under 3.4.5.1 Data Logs for Audit, System ID 220, M128 references that the ADIS data logs must record “d. Event source (e.g. application name).” Can the PWGSC please clarify this requirement? What is expected exactly?

A133 This requirement refers to the source of the event described in 3.4.5.1 Data Logs for Audit, under System ID 211, requirements M117-M124. Since ADIS will in the future be part of a network of sensors connected via a Sensor Integration and Decision Support system, the data log must identify the application or system (i.e. ADIS operating system) that caused the event to distinguish it from other sensors (e.g. biological or radiation)

Q134 In several sections of the response, Mean Time Between Failure is listed as “at least 1,000 hours.” (Vol 1 Bidder Instructions and Requirements, 3.4.7.1, M137, Appendix AA of Annex A of Vol 2, 3.4.7.1, #238, and Appendix AC Data Item Descriptions, 10.2.1.) However, in Appendix AA of Annex A of Vol 2, System Requirements #239 it states “ADIS should have a MTBF of at least 2500 hrs.” Is the Mean Time Between Failure requirement 1,000 hours or 2,500 hours? Please clarify.

A134 The mandatory requirement is a MTBF of at least 1,000 hours (as described in , with a point rated MTBF of 2,500 hours or more.

Q135 The pricing section of the bid submission document is silent as to ongoing software license fees and support. Do we add a line item to the Basis of Payment Annex B or do we price it into the equipment and place the ongoing fee in the ISS contract as a line item? Please advise as to how you would like the cost presented.

A135 Canada will not be seeking an ongoing software license fee. Please refer to Volume 3, Annex A, Statement of Work, articles 4.3 and 4.4 for details on the anticipate support. The Financial Bid Presentation Sheet also includes a Helpdesk Category of Work. It is expected that support will be identified through a Task Authorization.