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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.

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Title - Sujet Medium Range Radar (MRR) LOI	
Solicitation No. - N° de l'invitation W8476-133817/B	**Amendment No. - N° modif.** 003
Client Reference No. - N° de référence du client W8476-133817	**Date** 2012-07-20
GETS Reference No. - N° de référence de SEAG PW-$$QD-014-22899	
File No. - N° de dossier 014qd.W8476-133817	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2012-07-31**	**Time Zone** **Fuseau horaire** Eastern Standard Time EST
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AMENDMENT 003

Amendment 003 is raised to address General Comments regarding the Medium Range Radar (MRR) Letter of Interest (LOI).

See Annex A to Amendment 003 for questions and answers asked during the MRR Industry Day and those received directly from interested parties.

General Comments

Note 1 - Qualification testing (Reference 5.17)

Live fire qualification testing data refers to data that has been obtained through testing conducted by the government of a state allied with Canada. This data needs to be independent of testing performed by the Respondent.

Note 2 - Classified Material Handling.
Any material submitted as part of the LOI response that is identified as Secret by the Respondent will be received by DND directly. Please forward classified material independent of the LOI response to Major Kevin Foss, Director Land Requirements 4-8. He can be reached at phone number 819-994-2765, and is located at 555 boulevard de la Carriere, Gatineau, Quebec, Canada. The material will be handled and stored in accordance with DND policies on Secret information.

Note 3 - Definition of Military Off the Shelf (MOTS) (Reference 1)

The term MOTS refers to the radar system itself. MOTS equipment is equipment that has been developed to military or commercial standards for use in a military application, is available from a commercial or government source, and has technology that is mature enough to be used immediately without significant change.

Note 4 - Identification Friend or Foe (IFF) (Reference 5.13)

Although it was not mentioned in the LOI, there will be a requirement for IFF in the actual Request for Proposal (RFP). Complete details for the IFF requirement will be provided in the RFP.

Note 5 - Trailer Mounted MRR System (Reference 5.11)

After further DND investigation of transportation options for the MRR System, it has been determined that only a trailer mounted solution will be accepted. All references to vehicle

mounting of the system in the LOI can be disregarded. All trailer-mounted requirements are still valid. Additional details will be provided in the RFP.

Note 6 - False Location Rate (Reference 5.3)

A false location rate refers to the rate at which the radar system reports false locations and is associated with the weapons locating requirements of the radar. The false location rate is not the same as a 'false alarm rate'. The latter refers to air surveillance applications.

Note 7 - Volley Fire (Reference 5.10)

The intent of the requirement for detection of volley fire is to accurately track multiple projectiles in the air at the same time and locate the point of origin of the artillery and mortar systems that are within close proximity of each other. The following wording should replace paragraph 5.10 in the LOI:

> The MRR system shall locate volley fire from mortars and guns within the mandatory CEP limits provided in paragraphs 5.4 and 5.7 from at least 5 or more different weapons, in a 360 degree sector in azimuth, at a maximum of 15 km from the MRR system. The desirable CEP limits for volley fire provided in paragraphs 6.1 are desirable for weapons originating from a predefined azimuth sector of 90 degrees or less. The weapons shall be arranged such that they are no further than 80m apart both laterally and in depth.

Note 8 - Simultaneous Hosting of Software and Simultaneous Operation of Software (Reference 5.14)

The mandatory requirement for simultaneous hosting will enable the system to switch between weapon locating and air surveillance modes without rebooting the system. Simultaneous operation of the MRR System in weapons locating mode and air surveillance mode is desirable but not mandatory.

Note 9 - Clutter Model (Reference 5.3)

See Annex A to Amendment 003 for the rain clutter model that will be used for the MRR System.

The following terrain clutter model will be used:

Land Terrain Clutter Characteristics
For the MRR, surface clutter is defined in the book Low-Angle Radar Land Clutter: Measurements and Empirical Models by J. Barrie Billingsley. See chapter 4 for the Clutter Model.

See Table 4.2 Multi-frequency Weibull Parameters of Land Clutter Amplitude Distributions page 295 of Low-Angle Radar Land Clutter: Measurements and Empirical Models by J. Barrie Billingsley. Table 4.2 gives the Weibull parameters of the land clutter that the MRR shall be able to operate in the present of.

See Appendix 2.B.3, page 133 of Low-Angle Radar Land Clutter: Measurements and Empirical Models by J. Barrie Billingsley for the definition of the Weibull probability density function. As well, see Appendix 5.A.2, page 549 for further information on the Weibull probability distribution function. As well, see section 5.2 Derivation of Clutter Modeling Information, page 416.

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.

MEDIUM RANGE RADAR (MRR) LETTER OF INTEREST (LOI)

AMENDMENT 003
ANNEX A

Rain Clutter Characteristics

The radar system is required to operate in accordance with the specifications during rain fall at 4mm/ hr. The range extent for rain is 30 km cross range and 30 km down range with respect to the radar coverage and extends uniformly to a 4km height. Specified radar performance in 4mm/hr rain is required over the entire down range extent of the radar coverage. In addition, the rain clutter in the context of the Medium Range Radar has the characteristics as defined in the following paragraphs:

The velocity distribution due to wind is Gaussian and is defined as follows:
V_m (m/s)= (2.53h + 7.7)
where

h is the height in kilometres
V_m is the mean velocity in meters per second

In stagnant air, limits on the falling speed of rain droplets at a particular temperature and pressure is shown in Tables 1 and 2 of The Terminal Velocity of Fall for Water Droplets in Stagnant Air by Ross Gunn and Gilbert D. Kinzer.

The standard deviation of wind velocity distribution σ_r is given by:
$\sigma^2_r = \sigma^2_{turb} + \sigma^2_{shear}$
where

σ_{turb} = 1.0 m/s and $\sigma_{shear} = 0.42kR\theta_{el}$
where

k = shear constant with a value of 4.0 m/s/km
R = slant range to clutter in km
θ_{el} = two-way half-power antenna elevation beamwidth (radians)

The formula for wind velocity distribution of the wind shear can be found in Radar Design Principles: Processing and the Environment by Fred E. Nathanson, J. Patrick Reilly and Marvin N. Cohen, Chapter 6, pages 242, formula 6.12.

The wind shear was calculated as between 5 to 10 m/s/km in the Naval Research Laboratory report Rain Clutter Statistics by William B. Gordon and Jon D. Wilson, 30 Sept 1982, page 8-9.

Wind shear is further discussed in The Shape of Doppler Spectra from Precipitation by Louis H. Janssen and Gerard A. Van Der Spek, Physics and Electronics Laboratory TNO, The Netherlands, 7 Dec 1984, IEEE AES-21 No 2, March1985.

The book Radar Design Principles: Processing and the Environment by Fred E. Nathanson, J. Patrick Reilly and Marvin N. Cohen, Chapter 6, pages 231-236 contains a discussion on the calculation of backscatter coefficients. The following equation on reflectivity η (m^2/m^3) of rain is defined as follows:

$\eta = (5.7 \times 10^{-14}) r^{1.6} \lambda^{-4}$

where

r = rainfall rate in mm/hr

λ = wavelength in meters

Radar performance in the presence of clutter is also discussed in the Radar Handbook edited by Merrill I. Skolnik, Second Edition, pages 2.56-2.60 where the instantaneous illuminated volume or volumetric clutter cell V_c, is defined as follows:

$V_c = R^2 \theta_{az} \theta_{el} (c * \tau / 2)$

where

R = slant range to clutter cell in meters

θ_{az} = two-way half power antenna azimuth beamwidth

θ_{el} = two-way half power antenna elevation beamwidth

c = speed of light in m/s

τ = processed received pulse width

Clear Air Attenuation

Atmospheric attenuation strictly due to air is defined by:

Frequency	***Attenuation (dB/km two-way)***
L	0.012
S	0.015
X	0.024

Rain Attenuation

Rain attenuation does not include atmospheric attenuation and is defined as follows:

$\alpha = ar^b$ (dB/km)

where

α = rain attenuation in dB/km (one way)

r = rainfall in mm/hr

a and b are a function of frequency and polarization as listed in the table below.

Values of a and b for Rain Attenuation

Frequency (GHz)	**a*H***	**a*V***	**b*H***	**b*V***
1	0.0000387	0.000035	0.912	0.880
2	0.000154	0.000138	0.963	0.923
3	0.00065	0.00059	1.121	1.075
6	0.00175	0.00155	1.308	1.265
7	0.0030	0.00265	1.332	1.312
8	0.0045	0.00395	1.327	1.31
10	0.010	0.00887	1.276	1.264

Note that values for **a** and **b** at other frequencies can be derived by interpolation using a logarithmic scale for **a** and a linear scale for **b**.

The formula for attenuation due to rain can be found in Radar Design Principles: Processing and the Environment by Fred E. Nathanson, J. Patrick Reilly and Marvin N. Cohen, Chapter 6, pages 226 – 228.

Industry Day Common Questions and Answers

Q1 Can DND elaborate on the open standard for interface?

A1 'Open Standard' refers to a non-proprietary standard for interface. Open Standard interface is a requirement. This will allow the MRR System to easily interface with other DND equipment and systems without using proprietary hardware and software.

Q2 Can DND define the word 'allied'?

A2 Paragraph 5.17 of the LOI refers to a state allied with Canada. This refers to nations with whom Canada has a formal defence relationship. This group includes all NATO nations, and several non-NATO nations where there are formal agreements for government to government information sharing.

Q3 Does DND require greater capability in a predefined sector mode for volley fire?

A3 Refer to Note 7. Yes, greater accuracy in the predefined sector mode will be desirable.

Q4 Is there emphasis on the Point of Impact (POI) as well as the Point of Origin (POO)?

A4 The high level mandatory requirements (HLMR) purposely emphasis the POO accuracy requirements for the MRR System. The RFP will specify POI accuracies for both friendly fire registration and hostile projectiles. The hostile POO will be of a higher priority than the POI.

Q5 Are there any specific requirements for the trailer?

A5 Refer to Note 5. The general mobility characteristics and requirements will be stated in the RFP.

Q6 How confident are we in the timeline for the RFP and how confident are we that the live fire will align with the bid evaluation process?

A6 The plan is to publish a draft RFP for comment this fall, likely in the October timeframe. As the steps in the process are sequential, the LOI responses are necessary to move forward. A live fire test will be conducted as part of the bid evaluation for those that meet all of the mandatory requirements in the bid review process. Sufficient notice will be provided to successful vendors in order to prepare for the live fire test.

Q7 Will there be a % mandatory for direct IRBs? For GVC? Or both?

A7 The Direct / GVC percentage determined for the MRR Project can be met through Direct transactions (work on the 8-10 MRR systems being purchased by Canada), GVC transactions (work on other similar platforms with equal or greater market potential), or a combination of both. The purpose of this being mentioned in the LOI is to solicit information regarding industry's ability to perform Direct / GVC IRB as part of the MRR project (on both the Acquisition and In Service Support) to aid Industry Canada in establishing a percentage fair to all bidders.

Methodology from the IRB Website: "A minimum level of Direct and Direct/GVC IRB requirement for a specific procurement will be established by Industry Canada through an approach that includes: undertaking internal government consultations; seeking input from industry through mechanisms such as a Letter of Interest, Statement of Interest and Qualification or Request for Information; and conducting a due diligence assessment to validate the industry feedback and ensure its accuracy.

Industry Canada will use the information collected through the above described approach and assess whether specifying a minimum Direct and Direct/GVC IRB requirement is appropriate and at what level. Our guiding principles will be that any minimum Direct and Direct/GVC IRB requirement must be fair to all bidders, achievable, and have a minimal impact on project costs and schedule."

For further information regarding the new approach to Global Value chains please see the IRB website: http://www.ic.gc.ca/irb. A direct link to the Policy Improvements is provided here: http://www.ic.gc.ca/eic/site/042.nsf/eng/h_00018.html

Q8 In the past, direct content in IRBs have been the deciding factor in competitions. Will there be some level of mandatory direct IRBs included in the RFP? How will GVC responses be measured / determined?

A8 As part of the RFP, the Bidder must commit to achieve the mandatory percentage, to be determined through the process described in the answer to Question 7, in Direct / eligible GVC transactions over the IRB Achievement Period.

For further information regarding the IRB section of the RFP as well as the IRB Model Contract please visit the IRB website. A direct link to the documents is provided here: http://www.ic.gc.ca/eic/site/042.nsf/eng/h_00047.html

For greater information on the IRB process please visit the website, or feel free to contact the IRB authority.

Christina Marcotte
IRB Manager
(613)957-2825

Christina.marcotte@ic.gc.ca

Eric McAskill
IRB Manager
(514)283-4336
Eric.mcaskill@ic.gc.ca

Website
www.ic.gc.ca/irb / www.ic.gc.ca/rir

Q9 Will there be two separate contracts with two separate IRB requirements?

A9 There will be one IRB contract, although there may be different Direct / GVC IRB requirements for the Acquisition and the ISS portions of the contract. As part of this LOI, Industry Canada is soliciting information regarding industry's ability to perform Direct / GVC IRB as part of both the Acquisition and ISS portions of the contact.

LOI Questions and Answers

Reference: 5.13

Q1 The Crown has defined the requirement to **Detect and Track**, but there is no mention of **Identify and Classify**. We would like to know if these requirements are expected within the response:

- **Identify** – the ability to positively identify a target through the use of IFF Mode 4 and/or 5S; and
- **Classify** – the ability to classify an aerial system as Fixed Wing, Rotary Wing, RAM, UAV, Cruise Missile or Anti-radiation Missile based on detection specifications or performance characteristics.

A1 Refer to Note 4 on IFF. The extent of any requirements to classify targets has not yet been determined.

Q2 Is there any expectation for the MRR to effect independent **Control and Coordination** tasks/ such that would be found in a High Density Airspace Control Zone (HIDACZ), associated with precision fires entailing such systems as Multi-rocket Launch Systems (ie. Goal post) or 155mm Excalibur rounds?

A2 There is no requirement to effect independent control and coordination tasks. C2 is provided by LCSS.

Reference: 5.14

Q3 Is the requirement to "Simultaneously Host" **ONLY** or is the requirement to Simultaneously Host and **OPERATE** software for all operational modes, for both the weapons locating function and the air surveillance function.

Another way of defining the question - Is there any expectation for the MRR to effect missions in dynamic air space management, a situation in which the radar simultaneously does air surveillance and weapon locating?

A3 Refer to Note 8.

Reference: 5.15

The MRR system shall be integrated to the Land Command and Control System (LCSS) through an Ethernet interface using an Application Programming Interface.

Q4 Are there any expectations for the MRR to effect **autonomous Command, Control and Coordination** tasks/missions should access to the LCSS be denied? Are there expectations for operators in the cabin or remote control only?

A4 No. The LCSS is the communications, command and control system.

Q5 Are there any expectations for the MRR to effect **autonomous Command, Control and Coordination** tasks/missions should access to the Tactical Data Link be denied?

A5 No.

Q6 Is there an autonomous requirement for the MRR to **feed/receive directly into/from** the Tactical Data Link (TDL A, B, or J) network?

A6 No.

Reference: 5.16

Q7 ADSI is a gateway to receive data that has been fed into, and to upload data collected locally by sensors into the Tactical Data Link (A, B and J) network. Is there an autonomous requirement for the MRR to **feed/receive directly into/from** the Tactical Data Link (TDL A, B, or J) network should access be denied to the ADSI or LCSS?

A7 No.

Q8 Are there any considerations/limitations for personnel safety zones as they apply to operation near or within military encampments or urban areas?

A8 Yes. The reference document is *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz, Safety Code 6 (2009)*. The official reference will be provided with the RFP. It will be the Respondent's responsibility to state the safety exclusion zone as applicable to their radar as part of their proposal to the RFP. This safety exclusion zone shall comply with Safety Code 6.

Reference: 5.13

Q9 Due to the technological variability (update rates / antenna rotation rates) amongst the systems being evaluated, detections/minute would present an analysis method that would permit for a fair analysis of all contenders while providing for consideration of technological variations amongst systems. Can the Crown explain their choice for a percentage, versus detection/minute for detection probability so that we can respond in such a fashion that it meets the Crown's criteria?

A9 We have used 24 detections per target per minute as the minimum number of detections required without the probability of detection taken in to account. The 80% is the probability of detection in clear conditions which would result in 19.2 detections per target per minute. Similarly, the 50% probability of detection in rain results in 12 detections per target per minute.

Reference:

5.5.4 The gun (105mm) is firing a minimum of 1,100 mils elevation;

5.6.4 The rocket (107mm) is firing a minimum of 600 mils elevation

Q10 A 105 mm gun, gun firing a minimum of 1100 mils (61 deg) is viewed as an extremely high angle. High angles make it easier for the radars, due to larger cross sections, dwell time and greater predictability of trajectory. We would have expected a more challenging trajectory at lower angles which provide for smaller cross section and more challenging detectability parameters. Can the Crown explain their choice for this trajectory?

A10 The higher trajectory was chosen because it reduces the variable nature of the radar detection in clutter. This does not remove the requirement for the radar system to locate guns firing at lower trajectories.

Q11 A 107 mm rocket, at a minimum of 600 mils (34 deg) is viewed as a high angle of trajectory based on operational experience from both the Iraq and Afghanistan theatres. Experience has demonstrated Quadrant Elevation (QE) for 107mm rockets is much lower, at 266-356mils (15-20 deg). Can the Crown explain their choice for this trajectory?

A11 The higher trajectory was chosen because it reduces the variable nature of the radar detection in clutter. This does not remove the requirement for the radar system to locate rockets firing at lower trajectories.

Reference: Paragraph 3

"Bidders will be required to provide in-service support consisting of fifteen years of contractor-level maintenance. "

Q12 Should bidders expect requirement to bid 15 years of In-service support in the upcoming RFP? If so will bidders be required to bid Time & Material (T&M) rates or Fixed Price based on a SOW?

A12 Currently, the government has not made a decision on the exact structure of the support contract. It is anticipated that the contract will consist of a firm period plus options for extension.

Reference: Paragraph 3

"Field Service Representative (FSR) support will be requested for the initial two year implementation period of the equipment."

Q13 Does this mean FSRs will not be required after the first two years?

A13 The expectation is that Canadian technicians would be fully trained and experienced on the equipment two years after Initial Operating Capability (IOC) is achieved. Currently, it is anticipated that a separately tasked option to retain FSR support would be in the support statement of work (SOW).

Reference: Paragraph 5.3

"The MRR system shall have a maximum False Location Rate (FLR) of one (1) per six (6) hours under nominal environmental conditions with terrain clutter and 4 mm/hour rainfall."

Q14 As the FLR requirement is in a combined terrain and rain clutter environment, will the same environment be equally applicable to the probability of location (PL), CEP50 and Air Surveillance probability of detection (PD) requirements?

A14 Yes.

Reference: Paragraphs 5.3 and 5.13

The clutter model stated in the LOI is very similar to the classical models found in radar textbooks. The MRR system shall have a minimum probability of detection of 50% per scan in rain fall of 4mm per hour.

Q15 Is the equation below the correct rain clutter reflectivity model to be used for the LOI response?

$\eta = (5.7x10\text{-}14)\ r1.6\lambda\text{-}4$
where:
r = rainfall rate in mm/hr
λ = wavelength in meters

A15 Refer to Note 9.

Reference: Paragraph 5.11

"The MRR System shall meet operational and reliability expectations whether mounted on in-service vehicles or on trailers."

Q16 When will "operational and reliability expectations" (i.e. requirements) be defined (MTTR, MTBF, etc.)?

A16 Operational availability will be defined in the design specifications as part of the RFP.

Reference: Paragraph 5.11

"If the MRR system is installed on vehicles, the vehicles will be supplied by Canada. The in-service 10-ton HLVW will be used."

Q17 When will information on the 10-ton HLVW vehicles be available, such as cargo bed details with overall dimensions and tie-down location for payload restraint evaluation? Please also provide the height of the cargo bed from the ground for evaluation of the GIC tunnel and CC-177 transport.

A17 Refer to Note 5.

Reference: Paragraph 5.13

"The MRR system shall perform airspace surveillance missions. The False Location Rate (FLR) specified in 5.3 is applicable to CTA missions, but not to airspace surveillance missions."

Q18 Is it correct to assume a 10^{-6} per cell probability of false alarm (pfa) for analysis purposes?

A18 Refer to Note 6. For analysis purposes, the maximum false alarm rate of 20 false alarms per hour can be used. Further details will be provided in the RFP.

Reference: Paragraph 5.13

"A one m^2 target consists of either fixed wing high speed aircraft or low speed rotary wing aircraft. Aircraft with $0.1m^2$ nominal RCS may consist of high speed cruise missiles and low speed UAVs in ground clutter."

Q19 With regards the range of target speeds for the Air Surveillance mode, is it correct to assume the speeds below for analysis purposes?

Low Speed (Rotary Wing and UAVs): 78 to 200 knots
High Speed (Aircraft and Cruise Missiles): 200 to 1166 knots

A19 The MRR shall detect UAV and rotary aircraft to a minimum velocity of 40 m/sec, and fixed wing high speed aircraft and cruise missiles to a maximum velocity of 600 m/sec.

Reference: Paragraph 5.13

"The MRR system shall have a minimum probability of detection of 50% per scan in rain fall of 4mm per hour."

Q20 With regards the rain clutter's spectral characteristics, is it correct to use the industry accepted rain clutter model for analysis purposes, as cited below in *Radar Design Principles: Processing and the Environment*, by Fred E. Nathanson, J. Patrick Reilly and Marvin N. Cohen?

Gaussian distributed with standard deviation given by
$\sigma 2$
$r = \sigma 2$
$turb + \sigma 2$
shear
where
$\sigma turb$ = 1.0 m/s and $\sigma shear = 0.42kR\theta$el
where
k = shear constant with a value of 4.0 m/s/km
R = slant range to clutter in km
θel = two-way half-power antenna elevation beamwidth (radians)
and mean velocity (in m/s) given by
Vm (m/s)= (2.53h + 7.7)
where h = height in kilometers.
Maximum 4km height extend.

A20 Refer to Note 9.

Reference: Paragraph 5.13

"The MRR system shall have a minimum probability of detection of 80% per scan at the maximum range of 75 km with a minimum of 24 detections per target per minute in clear weather and with ground clutter."

Q21 With regards to ground clutter, is it correct to use the industry accepted terrain clutter model for analysis purposes, such as that cited below in *Low-Angle Radar*

Land Clutter, Measurements and Empirical Models, by J. B. Billingsley?

Naturally occurring terrain clutter radar cross section per unit area (or sigma zero) that is Weibull distributed with:
Mean sigma zero value = -25dBm2/m2
Median sigma zero value = -40.5dBm2/m2
Shape parameter = 3.4
Gaussian shaped power spectrum with zero mean and 0.3m/s standard deviation.

A21 Refer to Note 9.

Reference: Paragraph 5.13

"The MRR system shall have a minimum probability of detection of 50% per scan in rain fall of 4mm per hour."

Q22 Is the clutter environment for the 50% probability of detection requirement intended to represent "real world" clutter (i.e. combined ground and rain clutter)?

A22 Yes.

Reference: Paragraphs 5.15 and 5.16

"The MRR system shall be integrated to the Land Command and Control System (LCSS) through an Ethernet interface using an Application Programming Interface. The MRR system shall be integrated to the off the shelf Air Defense System Integrator (ADSI) version 14 (Service Pack 1, 2 and 3) through the Advanced Fusion and Tracking System version 2.0.11 with the Internet Protocol (IP) based ASTERIX interface protocol."

Q23 When will additional information regarding message content, formats, protocols, etc. associated with the LCSS and ADSI interfaces be defined?

A23 Additional information will be provided with the RFP. ASTERIX is a publicly available international standard. The interface with the LCSS will be by XML based files over IP.

Reference: Paragraph 3

Q24 Specifies that a live fire test will be conducted during the bid evaluation period. Can Canada provide more details at this stage about the location of the tests, the duration, the timeframe and the type of tests that are planned to be performed? Also, is this

exercise intended to be funded by Canada or considered part of the Contractor's investment?

A24 The live fire test is still in the planning phase. At this point, it is likely that the test will last approximately one week for each bidder, and the tests will consist of a series of shots deemed to be representative of the requirements. The location is to be determined. It is anticipated that the contractor would be responsible for transportation and radar system operator costs, and DND would be responsible for ammunition and range costs.

Reference: Paragraph 9

Q25 Will a draft RFP be provided prior to the final RFP?

A25 Yes, the intent is to provide a draft RFP.

Reference: Paragraph 5.9

Q26 Specifies that the MRR system shall perform friendly fire registration missions with a CEP (50%) of better than 50 meters. Usually, the accuracy requirements are in terms of "X" meters or "Y" %. In this case, the "Y" % of range is not mentioned. Is it correct to assume 0.5% in this case or should we consider another value?

A26 The required accuracy is for friendly fire registration is a Circular Error Probable of 50% (CEP(50%)) of 50 meters or 0.5% of range.

Reference: Paragraphs 6.1 (CEP)

Q27 In this case, 0.3% of range is expected and it is correct not to mention if the maximum range is 15 km (0.3% of 15 km is only 45m). However, as it is possible to propose longer ranges, the percentage of range is significant and for that reason, we would like to know the value if known.

A27 The desired accuracy for location of mortars and artillery in a predefined azimuth sector is a CEP(50%) of 50 meters or 0.3% of range for applicable ranges beyond 15km.

Q28 For paragraph 6.2, same question as for paragraph 6.1.

A28 The desired accuracy for location of rockets in a predefined azimuth sector is a CEP(50%) of 60 meters or 0.3% of range for applicable ranges beyond 15km.