

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

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
Public Works and Government Services Canada
Ontario Region
33 City Centre Drive
Suite 480
Mississauga
Ontario
L5B 2N5

Title - Sujet Weather Radar Network Modernization	
Solicitation No. - N° de l'invitation K3D33-141144/A	Amendment No. - N° modif. 006
Client Reference No. - N° de référence du client K3D33-141144	Date 2015-02-13
GETS Reference No. - N° de référence de SEAG PW-\$TOR-018-6639	
File No. - N° de dossier TOR-4-37044 (018)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-03-16	
Time Zone Fuseau horaire Eastern Standard Time EST	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Pan, Long	Buyer Id - Id de l'acheteur tor018
Telephone No. - N° de téléphone (905) 615-2076 ()	FAX No. - N° de FAX (905) 615-2023
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	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

Solicitation No. - N° de l'invitation

K3D33-141144/A

Client Ref. No. - N° de réf. du client

K3D33-141144

Amd. No. - N° de la modif.

006

File No. - N° du dossier

TOR-4-37044

Buyer ID - Id de l'acheteur

tor018

CCC No./N° CCC - FMS No/ N° VME

AMENDMENT NO. 06

Please see attached documents.

Amendment No.06 to Letter of Interest

Amendment No.06 is raised to include the following information:

1. Extension of the Letter of Interest to March 16, 2015;
 2. Revise the title of the process to “Letter of Interest”
 3. Estimated Procurement Schedule
 4. Standard Acquisition Clauses and Conditions (SACC)
 5. Annex F – Scope of Requirement and Technical Considerations;
 6. Annex G – Geotechnical and Climatology Examples; and
 7. Annex H – Evaluation Methodology and Basis of Selection
-

Extension of the Letter of Interest to March 16, 2015

The Letter of Interest is hereby extended to March 16, 2015.

Letter of Interest

The process title is hereby revised to Letter of Interest (LOI)

Estimated Procurement Schedule

Canada does not contemplate posting the Draft Request for Proposal (RFP) through the LOI process. More information will be provided through Letter of Interest (LOI) process. The potential solicitation posting period is intended to be 80 days.

Standard Acquisition Clauses and Conditions (SACC)

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

The requirement does not offer exchange rate fluctuation risk mitigation. Requests for exchange rate fluctuation risk mitigation will not be considered. All bids including such provision will render the bid non-responsive.

SACC 2003 Subsection 01 (2014-09-25) Integrity Provisions – Bid

1. Bidders must comply with the *Code of Conduct for Procurement*. In addition, bidders must respond to bid solicitations in an honest, fair and comprehensive manner, accurately reflect their capacity to satisfy the requirements stipulated in the bid solicitations and resulting contracts, and submit bids as well as enter into contracts only if they will fulfill all obligations of the Contract.
2. By submitting a bid, bidders confirm that they understand that, to ensure fairness openness and transparency in the procurement process, the commission of certain acts or offences will render them ineligible to be awarded a contract. Canada will declare non-responsive any bid in respect of which the information requested is missing or inaccurate, or in respect of which the information

contained in the certifications is found by Canada to be untrue in any respect, at the time of contract award. If it is determined, after contract award, that the Bidder made a false declaration, Canada will, following a notice period, have the right to terminate the Contract for default. The Bidder will be required to diligently maintain up-to-date the information requested. The Bidder and any of the Bidder's Affiliates will also be required to remain free and clear of any acts or convictions and any conditional or absolute discharges specified in these Integrity Provisions during the period of any contract resulting from this bid solicitation.

3. Affiliates

For the purpose of these Integrity Provisions, everyone, including but not limited to organizations, bodies corporate, societies, companies, firms, partnerships, associations of persons, parent companies, and subsidiaries, whether partly or wholly-owned, as well as individuals, and directors, are Bidder's Affiliates if:

- a. directly or indirectly either one controls or has the power to control the other, or
- b. a third party has the power to control both.

Indicia of control, include, but are not limited to, interlocking management or ownership, identity of interests among family members, shared facilities and equipment, common use of employees, or a business entity created following the acts or convictions and any conditional or absolute discharges specified in these Integrity Provisions which has the same or similar management, ownership, or principal employees, as the case may be.

4. Bidders who are incorporated, including those bidding as a joint venture, must provide a complete list of names of all individuals who are currently directors of the Bidder. Bidders bidding as sole proprietorship, including those bidding as a joint venture, must provide the name of the owner. Bidders bidding as societies, firms, or partnerships do not need to provide lists of names. If the required names have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to provide the names within the time frame specified will render the bid non-responsive. Providing the required names is a mandatory requirement for contract award.

Canada may, at any time, request that the Bidder provide properly completed and signed consent forms (Consent to a Criminal Record Verification form - PWGSC-TPSGC 229) for any or all individuals mentioned above within a specified time frame. Failure to provide such consent forms and associated information within the time frame provided, or failure to cooperate to the verification process, will result in the bid being declared non-responsive.

5. The Bidder must diligently inform Canada in writing of any changes affecting the list of names of directors during this procurement process as well as during the contract period. The Bidder must also, when requested, provide Canada with properly completed and signed consent forms.
6. By submitting a bid, the Bidder certifies that it is aware, and that its Affiliates are aware, that Canada may request additional information, certifications, consent forms and other evidentiary elements proving identity or eligibility. Canada may also verify the information provided by the Bidder, including the information relating to the acts or convictions and any conditional or

absolute discharges specified in these Integrity Provisions, through independent research, use of any government resources or by contacting third parties.

7. By submitting a bid, the Bidder certifies that neither the Bidder nor any of the Bidder's Affiliates have directly or indirectly, paid or agreed to pay, and will not, directly or indirectly, pay a contingency fee to any individual for the solicitation, negotiation or obtaining of the Contract if the payment of the fee would require the individual to file a return under section 5 of the *Lobbying Act*.
8. Time Period
The Time Period is 10 years and is measured from the date of the conviction or from the date of the conditional or absolute discharge.
In addition, for a conviction under paragraphs a. or b. of subsection 9, following the 10-year period, a pardon or a record suspension must have been obtained, or capacities must have been restored by the Governor in Council. The Bidder must therefore provide with its bid or promptly afterwards a copy of confirming documentation from an official source for its certification to be found true by Canada for the purpose of these Integrity Provisions. If the documentation has not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply within the time frame specified will render the bid non-responsive.
9. By submitting a bid, the Bidder certifies that neither the Bidder nor any of the Bidder's Affiliates have been convicted of an offence or received a conditional or an absolute discharge under any of the following provisions, unless the time period, as defined in the Time Period subsection, has elapsed:
 - a. paragraph 80(1)(d) (*False entry, certificate or return*), subsection 80(2) (*Fraud against Her Majesty*) or section 154.01 (*Fraud against Her Majesty*) of the *Financial Administration Act*, or
 - b. section 121 (*Frauds on the government and Contractor subscribing to election fund*), section 124 (*Selling or Purchasing Office*), section 380 (*Fraud*) for fraud committed against Her Majesty or section 418 (*Selling defective stores to Her Majesty*) of the *Criminal Code*, or
 - c. section 119 (*Bribery of judicial officers, etc*), section 120 (*Bribery of officers*), section 346 (*Extortion*), sections 366 to 368 (*Forgery and other offences resembling forgery*), section 382 (*Fraudulent manipulation of stock exchange transactions*), section 382.1 (*Prohibited insider trading*), section 397 (*Falsification of books and documents*), section 422 (*Criminal breach of contract*), section 426 (*Secret commissions*), section 462.31 (*Laundering proceeds of crime*) or sections 467.11 to 467.13 (*Participation in activities of criminal organization*) of the *Criminal Code*, or
 - d. section 45 (*Conspiracies, agreements or arrangements between competitors*), section 46 (*Foreign directives*), section 47 (*Bid rigging*), section 49 (*Agreements or arrangements of federal financial institutions*), section 52 (*False or misleading representation*), section 53 (*Deceptive notice of winning a prize*) of the *Competition Act*, or
 - e. section 239 (*False or deceptive statements*) of the *Income Tax Act*, or

- f. section 327 (*False or deceptive statements*) of the *Excise Tax Act*, or
- g. section 3 (*Bribing a foreign public official*), section 4 (*Accounting*), or section 5 (*Offence committed outside Canada*) of the *Corruption of Foreign Public Officials Act*, or
- h. section 5 (*Trafficking in substance*), section 6 (*Importing and exporting*), or section 7 (*Production of substance*) of the *Controlled Drugs and Substance Act*.

The Bidder also certifies that no one convicted under any of the provisions under a. or b. are to receive any benefit under a contract resulting from this bid solicitation, unless a pardon or a record suspension has been obtained or capacities restored by the Governor in Council, as defined in the Time Period subsection.

10. Foreign Offences

The Bidder also certifies that, within a period, as defined in the Time Period subsection, neither the Bidder nor any of the Bidder's Affiliates have been convicted of or have received a conditional or an absolute discharge, under any foreign offence that Canada deems to be of similar constitutive elements to the offences listed in these Integrity Provisions. Canada will also consider foreign measures declared by Canada to be similar in nature to the Canadian pardon, record suspension, or restoration of capacities by the Governor in Council.

11. Subcontractors

The Bidder must ensure that subcontracts include Integrity Provisions no less favourable to Canada than those imposed in the resulting contract.

12. Preventive Measures associated with the Time Period

In cases where the period (as defined in the Time Period subsection), for a conviction, or a conditional or an absolute discharge of the Bidder or any of the Bidder's Affiliates has elapsed, then the Bidder must also certify for itself and for its Affiliates that measures have been diligently put in place in order to avoid the reoccurrence of such convictions or reprehensible actions.

13. Public Interest Exception

Bidders understand that Canada may enter into contract with a bidder, where the Bidder or the Bidder's Affiliates have been convicted of or have received a conditional or an absolute discharge for an offence specified in these Integrity Provisions, when required to do so by law or legal proceedings, or when Canada in its sole discretion considers it necessary to the public interest for reasons which include, but are not limited to:

- o no one else is capable of performing the contract;
- o emergency;
- o national security;
- o health and safety;
- o economic harm;

If all bids are found non-responsive for reason of a listed relevant conviction or act, then Canada may invoke the public interest exception, as described in the paragraph above. In such cases, only bids containing a declaration concerning a relevant offence or act will be further considered. Canada may also elect to procure outside of the present process. In all cases, Canada reserves the right to impose additional conditions or measures to ensure the integrity of the procurement process.

14. Non-application

For governments, as well as entities controlled by a government, including Crown corporations, the present Integrity Provisions are reduced to complying with article 750 of the Criminal Code, the *Government Contracts Regulations* and the *Code of Conduct for Procurement*.

Annex G – Geotechnical and Climatology Examples

The Annex G is provided as examples only to guide costing for bid preparation and to allow fair bid evaluation. When costing site installation, assume a “Greenfield” site with standard power and telecommunications available at a demarcation point on site. The geotechnical survey provided here is an old one from one of our existing sites and the Engineering climatology data is for another of our sites (neither are in the 20 in the SOW). The engineering climatology data is for a 35 metre tower, which is taller than our average. The geotechnical data is likely on the easy side of average and the climatology is typical of Canada.

Annex F – Scope of Requirement and Technical Considerations

1.0 Questions for Suppliers

Suppliers are asked to review the information in the LOI and respond to the following questions:

1. Are the mandatory specifications for the Radar Systems described well enough?
2. Is the outline of the evaluation understandable? The details will follow in the RFP.
3. Are there any specifications that you think are not applicable, mis-leading or contradictory?
4. How do you think we should we specify the radar data packing, packaging and meta data. We are interested in developing data products to diagnose radar performance (see ERAD Romania work shop on this topic) and are therefore interested in meta data to do this. Should we specify this through an Annex or is this already done sufficiently so that it is not necessary?
5. Are there calibration techniques that should be included as either requested or allowed options? We have included the “bird bath” type calibration as a mandatory at this stage. (see Hubbet et al 2010).
6. Are the MTBCF figures reasonable? (Mean Time Between Critical failures)?
7. Pulse compression is acceptable, but not specified. How can we phrase technical performance standards to ensure pulse compression is not unintentionally excluded?

2.0 Scope

Environment Canada is interested in replacing existing, obsolete operational weather surveillance radar systems with new Doppler dual-polarization weather radar systems. The data will be delivered to both regional and national forecast offices.

The current Doppler radar systems will be replaced by Doppler dual-polarization radar systems. The new equipment will be interfaced to the existing Environment Canada radar data processing and visualization systems and will be the responsibility of Environment Canada.

The mandate of the Project is to replace twenty (20) existing operational surveillance radar systems. An optional requirement for up to an additional thirteen (13) systems is included.

All radar systems including any options exercised must have passed acceptance by the Project Authority by March 31, 2023.

The Radar System is defined to include the transmitter, the receiver, the signal processor, the data processor, the radar control system, the monitoring system, the tower, the grounding systems, the antenna sub-system, the radome, the shelter(s) housing the equipment, the UPS and the APU.

The Contractor will install the radar systems and required infrastructure, including any footings or foundations required.

The Contract will provide initial technician training and the design of a course for future regenerative training. The Contract will also establish resources and processes for long term logistics support and life cycle management of the new radars.

The high level prioritized goals are to specify a radar system that will have:

1. Low life cycle management costs (reliable, robust, low maintenance, homogenized)
2. Overlapping Doppler coverage
3. High quality – low Doppler error rates, sensitive to detect low level snow

Canada is a vast country with substantial variation in weather and climate. Low level snow squalls are significant hazards in the winter in different parts of the country, hurricanes frequent the east coast, convective thunderstorms plague central Canada. No additional radar sites can be installed. Environment Canada has done an analysis and determined that a network of S Band radars with less than 1° beam width would meet their data requirements. However, Environment Canada is open to receiving alternative solutions in terms of radar frequency (S Band) if it can be demonstrated that it meets the Doppler coverage and data quality requirements.

2.1 System Overview

The new radar systems will replace existing radar systems at the same site (in almost all cases, treat as same site). The Contractor will be required to provide new equipment shelters, radomes and antenna supporting structures. The antenna supporting structures are referred to as “towers” in this TSOR. The implementation of the project is to be designed and scheduled to minimize downtime at any given site during the transition between the existing and replacement radar systems.

2.2 Intended Use

The System will be used to detect clear air and precipitation echoes for weather surveillance, data assimilation, weather warning (both summer and winter) and hydrological purposes. External users may use the data for other purposes (e.g. aviation, avian migration studies). The radar data will interface with existing Environment Canada processing and visualization systems (the Canadian Radar Decision Support (CARDS) system and NinJo) for the creation of advanced products and the provision of forecast services.

The System must provide overlapping Doppler and dual-polarization coverage using the existing sites with low extended¹ Nyquist velocity error rates, extensive low level coverage for clear air and low precipitation intensity echoes and high data quality. Augmentation of the network with additional operational sites (except for one specified in the SOW) is not contemplated.

¹ Extended Nyquist refers to maximum velocity after dual-PRF or staggered PRT technique for velocity extension.

3.0 Site Information

The following information is provided as examples only to guide costing for bid preparation and to allow for fair bid evaluation.

- Site Details (Table 1)
- Geotechnical Survey (Annex G to LOI)
- Engineering Climatology (Annex G to LOI)

When costing site installation, assume a “greenfield” site with standard power and telecommunications available at a demarcation point on site. The geotechnical survey provided here is an old one from one of our existing sites and the engineering climatology data is for another of our sites (neither are in the 20 in the SOW). The engineering climatology data is for a 35 metre tower, which is taller than our average. The geotechnical data is likely on the easy side of average and the climatology is typical of Canada.

Table - 1 Site Details

Radar Site	Call Sign	Province	Latitude North (degrees)	Longitude West (degrees)	Site Elevation Above Mean Sea Level (metres)	Antenna Feedhorn Height Above Ground Level (metres)
Aldergrove	WUJ	BC	49.017	122.487	93	20.4
Athabaska		AB	56.557	111.389	New site. Position approximate	
Carvel	WHK	AB	53.561	114.145	784	14.1
Chipman	XNC	NB	46.222	65.699	103	23.1
Dryden	XDR	ON	49.858	92.797	412	29
Foxwarren	XFW	MB	50.549	101.086	550	14.1
Holyrood	WTP	NF&L	47.326	53.126	300	13.9
Jimmy Lake	WHN	SK	54.913	109.960	637	17.1
Lac Castor	WMB	QC	48.575	70.667	801	20
Landrienne	XLA	QC	48.551	77.808	394	26.5
Lasseter Lake	XNI	ON	48.853	89.122	488	23.1
Montreal River Harbour	WGJ	ON	47.248	84.597	520	23.1
Marion Bridge	XMB	NS	45.950	60.205	104	20.4
Prince George	XPG	BC	53.615	122.955	1117	14.1
Radisson	XRA	SK	52.521	107.444	530	14.1
Schuler	XBU	AB	50.313	110.196	864	14
Silver Star Mountain	XSS	BC	50.369	119.064	1887	26.1
Spirit River	WWW	AB	55.695	119.231	1015	29
Timmins	XTI	ON	49.281	81.794	245	22.1
Villeroiy	WVY	QC	46.450	71.914	100	20.3

4.0 Technical Deliverables (Mandatory)

4.1 System Operating Deliverables

1	The individual radar systems must be turnkey installations consisting of the specified equipment, installed and tested in accordance with the contract, and ready for operational use.
2	The radars must have reflectivity capability.
3	The radars must have Doppler capability.
4	The radars must have simultaneous transmit and receive dual-polarization capability.
5	Network Operating Configuration – All radars in the radar network must operate simultaneously, and weather information must be processed and transmitted for each radar. In the event of a single radar failure, the other radars in the network must continue to operate and transmit the data to EC data processing and visualization systems.
6	The sensitivity of the radar must have a minimum detectable signal of -8 dBZ at 50 km range (single shot, 125m range resolution, SNR of 0dB) and equivalent at all ranges.
7	The radar system must have an extended Nyquist range of 48 m/s (nominally using a dual-PRF technique) out to 256 km with dual-PRF error rate of less than 4.6% (see Joe et al, 1998 or Joe and May, 2004 for an explanation). This is nominally achieved using an S Band radar (~2.4GHz) and dual-PRF or staggered PRT techniques with 4:3 ratio.
8	The radar systems must have a phase noise level of less than 0.3° measured on an external target.
9	The radar system must have noise figure of less than 2.5 dB.
10	The radar system must have IF sampling of at least 16 bits.
11	The radar systems must have a co-polar correlation (ρ_{HV}) of at least 0.992.
12	The radar systems must be able to achieve an unbiased differential reflectivity (ZDR) of 0 dB with a precision of +/- 0.2 dB. This nominally sets the integrated beam matching and beam symmetry requirements as well as symmetry and performance for the dual channel paths.
13	The radar systems must be able to collect and report radar data from 0.125 km to 256 km at 125 m range resolution (at least 4096 bins) at 1° azimuthal resolution (with 1.0° and 0.5° dual-PRF data sampling or 1.0° staggered PRT sampling) up to 20 km altitude above horn height with 0.1° resolution in elevation scanning. Nominally this sets the PRF requirements to be between 250 and 1200 Hz.
14	The radar system must have a multi-trip suppression capability. This is nominally done through phase coding and removal of the second or greater trip echo from the first trip.
15	The system must be capable of clutter suppression of at least 50 dB. This nominally achieved with coherent transmitters and related to the phase noise performance.
16	The radar signal processor must produce user selectable ground clutter uncorrected data for the following parameters: Z, Vr, W, CSR, SNR, SQI, Kdp, ZDR, ρ_{HV} , Φ_{DP} .
17	The radar signal processor must produce user selectable ground clutter corrected data for the following parameters: Z, Vr, W, CSR, SNR, SQI, Kdp, ZDR, ρ_{HV} , Φ_{DP} .
18	The radar signal processor must produce and record time series data.
19	The signal processor must be real-time (keep up with data collection).
20	Ground clutter suppression must be done using spectral processing.
21	Moments must be estimated using time domain processing.
22	On-site data packaging must be less than 5 seconds after the end of data acquisition.

23	Common Time Reference – Coordinated Universal Time (UTC) must be used to time stamp radar data and the UTC source must operate to an accuracy and precision of 1 millisecond.
24	The power calibration among radars must have less than 2 dB bias and 1 dB variance.
25	The system must be designed to operate continuously, in an unmanned location.
26	The radar system must meet the following target accuracy requirements: <ul style="list-style-type: none"> a) Range bias of 0 m and less than 63 m standard deviation (σ) with quantization (precision) of 1 m b) Azimuthal and elevation angle bias of 0° and less than 0.1° standard deviation with quantization of 0.1° c) Reflectivity of 0 dB bias and less than 1 dB standard deviation at SNR > 10dB with quantization of 0.5 dB d) Radial Velocity of 0 m/s bias and less than 0.5 m/s standard deviation (σ) at SNR > 10dB with quantization of 0.5 m/s e) Zdr of 0 dB bias and 0.3 dB standard deviation with quantization of 0.01 dB f) ρ_{HV} precise to 0.001°, maximum > 0.992° g) Φ_{dp} and Kdp with 0° bias and with less than 2° standard deviation with quantization of 0.1°. h) Absolute time error < 100 ms. Time stamp error < 100 ms, where time stamp error is the time difference between reported time and actual time.
27	The radar receiver must have a dynamic range of > 100 dB.
28	The system must be capable of sun tracking in order to monitor and verify the antenna alignment and power calibration.
29	The transmitter must operate at 4 frequencies within the selected band for network operations and interference mitigation of adjacent radars.

4.2 System Monitor and Control Requirements

1	The Contractor must provide COTS computers and to control, configure, acquire data, produce real-time products and monitor the radar system.
2	Access to the local workstation from remote locations must be via Government of Canada network connection which is behind a firewall. Nominally, it is envisioned that this is via a virtual network connection acceptable to the Government of Canada.
3	Access to the workstation must be via password.
4	The radar monitor and control functionality must include mechanisms that enable assignment and restriction of control functions to different users.
5	The operating system for the workstations must be Linux.
6	The workstation display functionality must include but not limited to: <ul style="list-style-type: none"> a. time series b. ascope c. bscan d. PPI e. RHI f. Solar Calibration
7	The Maintenance and Control functions must include: <ul style="list-style-type: none"> a. stop/start the radar system b. enable selection and control of the system configuration and system parameters; c. provide system status and performance information; d. generate monitoring messages e. fault monitor capability and configuration

	<ul style="list-style-type: none"> f. display warnings and alerts; g. auto-shutdown capability in the event of exceeding fault thresholds h. automatic switch over to Auxiliary power in event of power (mains) failure i. graceful shutdown in event of Auxiliary power failure j. a minimum of one (1) year's history log of system fault reports and performance data, available for on-screen viewing and as printed reports
8	<p>The Test and Calibration Utilities must include:</p> <ul style="list-style-type: none"> a. auto-calibration function with built-in power meter b. sun tracking for elevation and azimuth calibration c. solar tracking and monitoring for power calibration d. automatic ZDR calibration (bird bath or other) e. automatic noise measurement
9	<p>The following radar sensor site status information (BITE information) and alarms, as a minimum, must be transmitted as messages with every radar scan cycle for monitoring purposes:</p> <ul style="list-style-type: none"> a. Antenna rotation – on or off. b. Transmitter radiation – on or off; c. System status – available or faulted; d. Major sub-system status – available or faulted; e. Radar equipment shelter fire status – fire or no fire; f. Radar equipment shelter security – alarm or no alarm; g. Radar equipment shelter temperature – alarm or no alarm; h. Auxiliary Power Unit – generator on, standby or faulted, if available from APU (see section T3.3 Interface Characteristics); i. UPS – on, standby or faulted <p>It will be the responsibility of Environment Canada to display this information.</p>

4.3 Shelter Requirements

1	The electronic equipment must be installed within a secure, weather-sealed, temperature-controlled environment at each site. The electronics equipment must be installed in Contractor-provided shelters.
2	The HVAC system must be capable of maintaining the shelter interior temperature within the range 15 to 30 degrees Celsius with external temperatures over the range -40 degrees Celsius to +40 degrees Celsius.
3	The shelter must provide air conditioner redundancy, or a ventilation system that activates in the event of an air conditioner failure and associated heat rise.
4	The shelter electrical system must provide all electrical branch circuits energized from a master power distribution panel mounted on the inside entry wall of the shelter.
5	The shelter internal electrical system must provide a minimum of six (6) non-switched 3-wire 120 volts AC duplex convenience outlets, each outlet fused separately at 15 amperes, which are located near the equipment cabinets.
6	The shelter electrical system must provide a single common grounding system, grounding all metallic parts of the electrical system ground to the exterior grounding terminal.
7	The shelter electrical system must provide an external Ground Fault Circuit Interrupter (GFCI) protected convenience duplex circuit near the shelter entrance.
8	The shelter must be equipped with internal lighting that provides adequate illumination for the performance of maintenance activities.
9	The shelter must be equipped with a locally audible fire/smoke detector that is monitored, with alarm signals

	sent to Remote Monitoring for display and alarm to the operator.
10	The shelter access must be lockable with a weather-protected lock, and the entrance area must be provided with exterior lighting that is automatically turned off during daylight. The shelter door must be equipped with a panic bar to allow for quick egress in an emergency.
11	The shelter must be equipped with an intrusion alarm that is monitored, with alarm signals sent to Remote Monitoring for display and alarm to the operator.
12	The shelter must be protected from damage from ice falling from the tower, if the shelter location is exposed to such a hazard.
13	The shelter must have a minimum useful life of 20 years.

4.4 Tower Requirements

1	The antenna assembly at each site must be mounted on a tower.
2	The tower must meet the operational requirements described in the solicitation and must be designed to be safe from structural failure during the useful life of the structure while bearing the static and dynamic loads imposed by the radar system and environmental conditions.
3	The elevation of the radar antenna assembly must be such that the performance requirements of the system as described in the solicitation are met that takes into account local terrain, and man-made obstructions at each site. The Contractor must not change the heights of the feed horns without prior approval from the Crown.
4	The tower must provide access above and below the platform to enable maintenance of the antenna and turning mechanism. The access hatch to the platform level must be large enough to permit personnel access for the maintenance of the radar and passage of replacement parts.
5	The tower must include an enclosure, with motion-activated internal lighting, below the antenna platform to provide protection for maintenance personnel. The enclosure must also be equipped with a duplex electrical outlet on a separate circuit breaker.
6	The tower must be equipped with steel stairs from ground level to the maintenance enclosure level, and with steel stairs or ladders for entry to the platform level or other areas requiring access for radar system maintenance.
7	Exterior stairs, walkways and platforms must be of open grate design and have non-slippery surfaces.
8	The tower must be equipped with safety railings at all accessible areas above ground level.
9	The base of the tower must be equipped with an anti-climb system with lockable access gate and lighting that is automatically turned off during daylight. A power switch located at the base of the tower, inside the access gate, must control lights that illuminate the tower stairways and platform area level.
10	The tower-antenna assembly must be equipped with a safety interlock system to prevent antenna rotation and power transmission while maintenance and inspection activities are taking place on the antenna platform.
11	The tower must be equipped with dual steady burning red obstruction lighting. The tower must provide a method to access the obstruction lighting for maintenance purposes. It must not be located at the top of the radome to avoid obstructing vertical pointing for dual-polarization calibration.
12	Environment Canada will provide an automatic weather station reporting temperature, humidity, pressure, wind speed, wind direction, precipitation occurrence and precipitation type. The compact weather station will be configurable to report at the scan time of the radar (once per scan cycle). The data must be recorded and transmitted from the radar site. Nominally, it must be transmitted as part of the radar data.
13	The tower must be equipped with a mechanical means for raising and lowering of replacement components, materials and tools to both the maintenance enclosure level and the platform level. The lifting mechanism must be rated for raising/lowering a static load that is twice the weight of the heaviest replaceable item on the

	tower (excluding antenna sail). The lifting mechanism must accommodate for the raising and lowering of the largest replaceable item.
14	The tower must be equipped with lightning protection and grounding.
15	The tower must be equipped with voice communications (intercom or telephone) from the platform level to the equipment shelter.
16	The tower must be designed and constructed such that preventive maintenance, including re-painting or refinishing of externally exposed surfaces, is not required more frequently than every 10 years.
17	The tower must have a minimum useful life of 20 years.

4.5 Radome Deliverables

1	The radar antenna assembly must be enclosed in a Contractor-provided radome.
2	The radome must be of rigid type construction and must provide a minimum clearance of one meter to the inside surface of the radome for all maintenance activities.
3	The radome must have a pseudo random panel design to minimize the impact on dual-polarization parameters.
4	The radome must be equipped with four 120 volt duplex receptacles for general purpose use, as a minimum.
5	The radome must be constructed of a hydrophobic material, or must have an applied hydrophobic coating which has a minimum service life of 10 years.
6	The radome physical and electromagnetic performance characteristics must be such that the performance requirements are met over the range of required environmental conditions.
7	The radome must have a minimum useful life of 20 years.

4.6 Antenna Deliverables

1	The antenna must be of a parabolic type.
2	The radar antenna assembly must produce a beam width of 1° or less.
3	The radar system must operate in Simultaneous Transmission and Receive (H+V).
4	The antenna must produce matched beams in the horizontal and vertical
5	The antenna and the radar system must be able to rotate from 0.1 rpm to a maximum of 6 rpm.
6	The antenna must have a pointing accuracy of 0.1°.
7	The antenna must be able to continuously scan between -2° to 60° elevation angles and be positioned to 90° for calibration purposes. The antenna must be able to scan 0° to 360° in azimuth.
8	The antenna side lobes must be less than -27 dB.
9	The radar system must have an integrated cross-polar isolation of greater than 32 dB.
10	The antenna must be able to scan in the following modes: <ul style="list-style-type: none"> a. Stare (fixed azimuth and elevation) b. Sweep (constant elevation angle, varying azimuth) c. Solar Search (map the sun over several tens of minutes)
11	The antenna must have a minimum useful life of 20 years.

4.7 System Robustness

1	Reliability: The Radar System must have a Mean Time Between Critical Failure (MTBCF) of greater than 15,000 hours with appropriate preventative maintenance. Critical failure is defined as a failure resulting in data loss for 48 hours.
2	Availability: The equipment Achieved Availability (Aa) must each be greater than 97%. Aa is a measure of availability under ideal conditions. Aa assumes that an end item is unavailable only when corrective and preventive maintenance are being performed. Ideal conditions exist when the stipulated tools, parts, skilled manpower, manuals, support equipment and other required support items are available. Aa excludes delays such as ready time, supply downtime, administrative downtime, etc. Aa may be expressed as a percentage by the following formula: $Aa = (1 - (CM + PM) / Ts) \times 100$, where Ts = specified operating time (8760 hours annually) CM = Corrective Maintenance (annual hours) PM = Preventive Maintenance (annual hours)
3	Maintainability: The Built-In-Test Equipment (BITE) of the Radar System must be capable of isolating at least 75% of faults to one Line Replaceable Unit (LRU), and isolating at least 90% of faults to two LRUs.
4	The scheduled preventative maintenance required for the Radar System must not exceed more than 2 visits per year and a total of 24 hours downtime per trip.
5	The Mean Time to Repair (MTTR) for the Radar System must be no greater than 8 hours from arrival at site with equipment.

4.8 Safety Human Factors

1	Spacing around the perimeter of equipment racks must include a minimum clearance of one meter to ensure that there is adequate space for personnel and their equipment so they can safely complete operational and maintenance activities such as removal of equipment from sliders, access to rear cabinets, alignments, etc.
2	The design of the equipment and structures must provide safe and adequate passageways, hatches, ladders, stairways, platforms, inclines and other provisions of ingress, egress and passage under normal, adverse and emergency conditions.
3	System design must provide an efficient layout of operation and maintenance workplaces, equipment, controls and displays.

4.9 Environmental Conditions

1	The Radar Site/System must be capable of being operated at an altitude from mean sea level (MSL) to 2500 meters above MSL without degradation of service or performance.
---	--

4.10 Environment Canada Monitoring, Data Processing and Visualization Systems

1	EC will continue to use existing forecaster and monitoring displays. The radar data must interface with EC systems.
2	The Radar System must transmit the data on a sweep by sweep basis or volume basis depending on user

	configuration. The data must be fully documented – metadata and data. The data must be 8 and 16 bit. The data must consist of radar moments and radar status messages.
3	Radar status information must be included in the Radar Data or as a separate message.
4	The data from the compact weather station must be included in the Radar Data or as a separate message.

5.0 Applicable Documents

The following documents form part of this requirement. Unless otherwise specified, the applicable version is the issue available upon issuance of the Request for Proposal.

Table - 2 Applicable Documents

Publisher	Name
Industry Canada	RSS-102, Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
Health Canada	Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 KHz to 300 GHz – Safety Code 6
Treasury Board of Canada	Canada Labour Code Part II Canada Occupational Health and Safety Regulations
Transport Canada, Civil Aviation Rules	Standard 621.19: Standard Obstruction Markings
Canada	Hazardous Product Act of Canada http://laws-lois.justice.gc.ca/eng/acts/H-3/
Canadian Standards Association	<ul style="list-style-type: none"> • Standard CAN/CSA T529-95: "Telecommunications Cabling Systems in Commercial Buildings"; • Standard CAN/CSA-T528-93: "Design Guidelines for Administration of Telecommunications Infrastructure in Commercial Buildings"; • Standard CAN/CSA-T530-99: "Building Facilities, Design Guidelines for Telecommunications"; • Standard CAN/CSA-T527: "Grounding and Bonding for Telecommunications in Commercial Buildings"; • Standard CAN/CSA S37-13: "Antennas, towers, and antenna-supporting structures" • Standard CAN/CSA 221-15 "Canadian Electrical Code"
International Standards Organisation	ISO 3864-2 Graphical Symbols – Safety Colors and Safety Signs – Part 2: Design Principals for Product Safety Labels
National Research Council of Canada	National Building Code http://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2010_national_building_code.html
Canadian Commission on Building and Fire Codes	National Fire Code (NFC) of Canada
Industry Canada	National Spectrum Policy and Standards (www.strategis.ic.gc.ca)

6.0 Supplier Experience

The experience requirement for this contract is to ensure that the successful bidder has demonstrated the capacity and capabilities necessary to handle a project of this size and complexity; thereby, minimizing the risks associated with replacing a radar network that has been identified as a Government-Wide Mission Critical system that operates 24 hours/365 days. EC has a sparse radar network (limited overlap between radars) that provides important data to forecasters and users throughout the year, in all four seasons. This project will require an experienced and responsive contractor who is flexible and able to minimize radar outages at sites transitioning from the old radars to the new. Also, the pace of radar replacement (contract to run from award to March 31, 2023) will require working in non-ideal weather conditions and having mature contingency plans in place.

Mandatory	
1	<p><u>Corporate Experience</u></p> <p>The primary bidder must meet the following corporate experience.</p> <ul style="list-style-type: none"> a) Minimum of 15 years in weather radar or similar industrial radar systems (e.g., large scanning surveillance radars such as ATC or military/defense). b) Minimum of 10 years in the field of large scanning weather radar. <p>This is to confirm that the bidder has a proven track record in this work.</p>
2	<p><u>Experience – Radar systems</u></p> <p>The primary bidder must provide two (2) projects, within the last ten (10) years, which collectively demonstrates experience substantively similar to this contract:</p> <ul style="list-style-type: none"> a) A project requiring significant infrastructure goods and services (over \$10M) at a minimum of three (3) related sites, including the construction/ installation of the goods; b) A project requiring configuration management/control of a system in order for it to effectively perform and be supported as a “network” and that spanned at least three (3) years in duration. <p>The following information must be included (maximum 10 pages per project using the content of the list below as headings.):</p> <ul style="list-style-type: none"> i. A clear indication of how the project is comparable/relevant to this project; ii. A brief description of the project's intent, objectives, scope, schedule, budget and cost or time overruns, and explanation of variances; iii. A brief description of design and construction approaches (including site services) used to meet project objectives, scope, budget and schedule requirements; iv. An explanation of any changes in the project scope (engineering and construction , and site services) during the project implementation; v. A brief description of challenges/problems that were encountered during the project and how they were resolved; vi. An identification of key disciplines involved in the project, the names of the firms (e.g., Prime Consultant or Sub-consultant) who provided the expertise and the names of key personnel who provided the services; vii. Client References including: name, address, phone, fax and e-mail address of client contact at working level. References must be current and complete. Canada reserves the right to contact the reference to verify the information provided.
3	<p><u>Experience – Project management</u></p> <p>The bidder must provide a minimum of two (2) projects, within the last ten (10) years, which collectively demonstrates experience substantively similar to this contract:</p>

Mandatory	
	<p>a. A project over \$20M and a duration of at least three (3) years that involved both goods and services and resulted in the client obtaining an operational system.</p> <p>b. A project over \$10M with complex and challenging timelines and constraints. The project required mature project management skills (<i>e.g.</i>, risk and contingency management, critical path tracking, issue identification and resolution, communication management).</p> <p>The following information must be included (maximum 10 pages per project using the content of the list below as headings.):</p> <ul style="list-style-type: none"> i. A clear indication of how the project is comparable/relevant to this project; ii. A brief description of the project's intent, objectives, scope, approach, schedule, budget and cost and time overruns, and explanation of variances; iii. Where services were provided on multi-disciplinary projects, indicate the portion of the project scope, budget and schedule that was under the responsibility of the Sub-consultant; iv. An explanation of any changes in the project scope during the project implementation; v. A brief description of challenges/problems that were encountered during the project and how they were resolved using risk and contingency management, critical path tracking, issue identification and resolution, and communication management; vi. An identification of key personnel who provided the project management expertise; vii. Client References including: name, address, phone, fax and e-mail address of client contact at working level. References must be current and complete. Canada reserves the right to contact the reference to verify the information provided.

Point Rated	
Project Management	
1	<p>The bidder must provide information on project management team expertise and years of experience (breadth of experience and years of experience)</p> <p>The following information must be included:</p> <ul style="list-style-type: none"> i. detailed profiles of key project management positions; ii. names, titles, years of pertinent experience and company (i.e. Prime Contractor, Sub-Contractors, other Specialists) of all team members, as well as a summary of what their roles and responsibilities will be on the project;
2	<p>The bidder must provide information on the project management approach and describe the internal processes and methodologies that will be in place to ensure that all project goods services are delivered on time, on budget, on scope and at the highest level of quality. Control methodologies are in place and meet recognized project management standards (<i>e.g.</i>, PMBOK, ISO 21500:2012).</p> <p>The following information must be included:</p> <ul style="list-style-type: none"> i. Project governance ii. Time Planning, Scheduling and Control; iii. Cost Planning, Estimating and Control; iv. Quality Assurance and Control; v. Scope of Work Control; vi. Communication and Reporting vii. Risk/Issue management viii. Change management

Point Rated	
Training	
3	Describe the Training Management Plan which includes: <ul style="list-style-type: none"> a. Training plan, training budget and schedule <ul style="list-style-type: none"> i. Training methodology (<i>e.g.</i>, how training requirements, training approaches and training delivery will be determined).
<i>Expertise and Experience of Key Personnel</i>	
4	Describe the expertise and experience of key personnel to be assigned to this project. This is the opportunity to emphasize the strengths of the individuals on the team, to recognize their past responsibilities, commitments and achievements. For each key personnel: <ul style="list-style-type: none"> a. Individual's name, title and brief description of current functions; and name of firm; b. A description of expertise and experience (with number of years) and demonstration of how they are relevant to the specific needs of this RFP; c. A demonstration of roles, responsibilities and degree of involvement on past projects that will corroborate the person's expertise and experience; d. Details regarding relevant education and professional accreditation (designation body, year, status, etc.) e. Involvement in any technical committees and associations; f. Special accomplishments / achievements / awards.

**Similar – is defined as being comparable in scope, size, duration, and cost of the work described in this solicitation. Types of similar project activities include, but are not limited to:*

- *Design, construction, installation and maintenance of radars, preferably weather radars;*
- *Large scale projects with government;*
- *Project management, and frequent reporting on project requirements;*
- *Development and delivery of training.*

Annex G – Geotechnical and Climatology Example

Annex H – Evaluation Methodology and Basis of Selection

Note: This Annex is for information and comment purpose only, Canada reserve the right to revise the terms and conditions herein in any potential solicitation process.

1.0 Evaluation Methodology

The bidder who passes the documentation evaluation process and verification process will be recommended for award of a Contract.

2.0 Evaluation Process

Canada is conducting a two-step bid evaluation process for this requirement.

- Step 1: Documentation Evaluation Process.
 - a) Technical Evaluation: Mandatory Technical Criteria and Point-Rated Technical Criteria
 - b) Financial Evaluation: Mandatory Financial Criteria
- Step 2: Verification Process.
 - a) Demonstration, Site Visit, Reference Check or Onsite Test to verify the proof of compliance regarding bidder's proposal.
 - b) Only the first ranked bidder whose bid met all technical and financial criteria resulted from Step 1: Documentation Evaluation Process will be invited to participate in Step 2.

3.0 Step 1: Documentation Evaluation Process

Canada will conduct a documentation evaluation of each Section as described below.

(i) Section I: Technical Bids

Bidder's responses to the following solicitation requirement documents will be reviewed:

Annex 1 - Statement of Work

Attachment X (*to be determined*) – Mandatory Requirements

Attachment X (*to be determined*) – Point-Rated Requirements

ii) Section II: Financial Bid

Bidder responses to the following solicitation requirement documents will be reviewed:

Attachment XXX – Financial Evaluation Table

iii) Section III: Certifications (*to be determined*)

Canada will review the above-noted documents to:

- a) Determine if a Bidder's submission in respect of mandatory technical requirements having a pass/fail is considered by Canada to be responsive. A bid will be considered by Canada to be non-responsive if the bid fails to achieve a "pass" rating on any mandatory pass/fail requirement.

- b) Determine if a Bidder’s submission in respect of point-rated technical requirements meet the minimum pass standard for each requirement. A bid will be considered by Canada to be non-responsive if the bid fails to achieve the minimum pass standard for the Point-Rated requirements.
- c) For the Technical bid - the minimum pass standard is *(to be determined)* points.
- d) Identify any instances where a Bidder has failed to submit a required certification or proof of compliance or where a submitted document lacks the requisite signature(s) only for the certifications required to be submitted with the bid.
- e) Determine if a Bidder’s submission in respect of Financial Evaluation meet the required standard. A bid will be considered by Canada to be non-responsive if the bid fails to meet the guidance and standard described in the solicitation.

3.1 Technical Evaluation

The Technical Evaluation includes the Mandatory Requirements and Point-Rated Requirements.

3.1.1 Mandatory Requirements

Bidders must meet all of the mandatory requirements described in *(to be determined)*.

NOTE: Failure to meet any mandatory requirement will result in the proposal being deemed non-compliant and it will be excluded from further consideration.

3.1.2 Point-Rated Requirements

Each bid will be point-rated by assigning a score to each point-rated. The degree of importance of each point-rated Requirement is determined by the points allocated to each requirement.

Only bids that meet the Minimum Overall Pass Score XX/XX *(to be determined)* identified in “Attachment *(to be determined)* – Point-Rated Requirements” will be considered responsive.

NOTE: The point-rated requirements will not be assessed if the bid fails to meet any mandatory requirement.

3.1.3 Total Technical Score

The total technical score is worth 70 points.

NOTE: *The weighted points will be rounded to two (2) decimal places.*

Bidder	Rated Requirements Score	Total Technical Score
Bidder 1	$(87.5/100)*70 = 61.25$	61.25
Bidder 2	$(80/100)*70 = 56$	56
Bidder 3	$(70/100)*70 = 49$	49

3.2 Financial Evaluation

The Financial Evaluation is worth 30 points. The 30 points will be allocated as follows:

The proposal with the lowest Evaluated Bid Price from Attachment X (*to be determined*) – Financial Evaluation Table will be awarded 30 points. The remaining proposals will have their Evaluated Bid Prices prorated against the lowest Evaluated Bid Price. The following formula will be applied:

$$\text{Financial Score} = (\text{Lowest Evaluated Bid Price} / \text{Bidders Evaluated Bid Price}) * 30$$

Bidder	Evaluated Bid Price	Financial Score
Bidder 1	80	$(60/80)*30 = 22.5$
Bidder 2	70	$(60/70)*30 = 25.71$
Bidder 3	60	$(60/60)*30 = 30.00$

4.0 Step 2: Verification Process

Step 2 consists of the Validation of a Bidder’s proposed technical bid. Canada will conduct verification process in accordance with the bidder’s technical bid in response to the Mandatory criteria described in the solicitation.

The Bidder that has been deemed responsive and ranked first in Step 1 will be notified of exact times and dates for the verification process. Canada will provide the Bidder at least 2 weeks’ notice before the date of this process.

5.0 Evaluation Weighting

Evaluation Element	Bid Element	Percentage/Weight
Technical Score	Technical Proposal - Rated Requirements	70%
Financial Score	Financial Proposal	30%
TOTAL		100%

6.0 Basis of Selection

To be declared responsive:

- (a) a bid must:
 - (i) comply with all the requirements of the bid solicitation; and
 - (ii) meet all mandatory requirements including Technical, Financial and Certification requirements and the minimum pass mark of point-rated technical requirements identified in Attachment X (*to be determined*)
- (b) the Bidder's proposed solution must pass the Verification Process

Bids not meeting (a) (i) and (ii) during Step 1 will be declared non-responsive, and receive no further consideration.

Bids not meeting the requirements during Step 2 will be declared non-responsive, and receive no further consideration.

6.1 Top-Ranked Bidder Selection from Step 1 – Documentation Evaluation Process

The proposal with the highest total score, calculated by adding the Total Technical Score to the Financial Score, will be considered as the proposal representing the best value to the Government of Canada and would be invited to participate in Step 2 – Verification Process.

If more than one Bidder is tied for the highest “Total Score”, the responsive bid with the highest Total Technical Score will be invited to Step 2 – Verification Process, subject to the provisions of this bid solicitation.

If more than one bidder is tied for the highest Total Score with identical Total Technical Scores and Evaluated Bid Prices, these bidders will be notified in writing by the Contracting Authority and advised that the Total Score, Total Technical Score and Evaluated Bid Price of their bid is identical to that of another Bidder. The tied Bidders will have 7 days following receipt of the notification to submit a revised financial bid to the Contracting Authority. The revised financial bid will be evaluated according to the financial evaluation methodology and procedures as described in this solicitation and a winning bid will then be determined.

6.2 Verification Process

Only the first ranked bidder whose bid met all technical and financial criteria resulted from Step 1: Documentation Evaluation Process will be invited to participate in Step 2.

The first ranked bidder will be deemed non-responsive if they do not pass the criteria described in the Annex X (*to be determined*) - Verification Process and the second ranked bidder will then be invited to participate in Step 2. The same methodology applies to the following ranked bidders who met all the Technical and Financial evaluation criteria, i.e. the third ranked bidder will be invited to Step 2 if the second ranked bidder does not pass the Verification Process.

6.3 Winning Bid Selection

The bidder who passes the documentation evaluation process and is identified as the first ranked bidder and also pass the verification process will be recommended for award of a Contract.