

<b>AWARD/CONTRACT</b>		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)	RATING	PAGE 1	S
2. CONTRACT (Proc Inst Ident) NO HSHQDC-09-C-00125		3. EFFECTIVE DATE See Block 20C		4. REQUISITION/PURCHASE REQUEST/PROJECT NO. RDTR-09-00264	
5. ISSUED BY	CODE	DHS/OPO/DNDO		6. ADMINISTERED BY (If other than Item 5)	CODE

U.S. Dept. of Homeland Security  
Office of Procurement Operations  
Domestic Nuclear Detect. Office  
Acquisition Division  
245 Murray Lane, SW, Bldg. 410  
Washington DC 20528

U.S. Dept. of Homeland Security  
Office of Procurement Operations  
Domestic Nuclear Detect. Office  
Acquisition Division  
245 Murray Lane, SW, Bldg. 410  
Washington DC 20528

7. ADDRESS OF CONTRACTOR (No., Street, City, Country, State and ZIP Code)

GENERAL ELECTRIC COMPANY  
1 RESEARCH CIR  
NISKAYUNA NY 123091027

8. DELIVERY

9. DISCOUNT FOR PROMPT PAYMENT

10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN

CODE 0861884010000 FACILITY CODE

11. SHIP TO/MARK FOR

Department of Homeland Security  
DNDO  
245 Murray Lane  
Washington DC 20528

12. PAYMENT WILL BE MADE BY

DNDO  
Coast Guard Finance Center  
DNDO Invoices  
PO Box 4141  
Chesapeake

14. ACCOUNTING AND APPROPRIATION DATA

See Schedule

15A. ITEM NO	15C. QUANTITY	15D. UNIT
Continued		

15G. TOTAL AMOUNT OF CONTRACT \$1,316,956.00

(X)	SEC	DESCRIPTION	PAGE(S)	(X)	SEC	DESCRIPTION	PAGE(S)
PART I - THE SCHEDULE				PART II - CONTRACT CLAUSES			
	A	SOLICITATION/CONTRACT FORM		X	I	CONTRACT CLAUSES	19-25
X	B	SUPPLIES OR SERVICES AND PRICES/COSTS	4	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH			
X	C	DESCRIPTION/SPECS./WORK STATEMENT	5	X	J	LIST OF ATTACHMENTS	26
X	D	PACKAGING AND MARKING	6	PART IV - REPRESENTATIONS AND INSTRUCTIONS			
X	E	INSPECTION AND ACCEPTANCE	7	X	K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	27
X	F	DELIVERIES OR PERFORMANCE	8-9	L INSTRS., CONDS., AND NOTICES TO OFFERORS			
X	G	CONTRACT ADMINISTRATION DATA	10-15	M EVALUATION FACTORS FOR AWARD			
X	H	SPECIAL CONTRACT REQUIREMENTS	16-17				

CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17.  CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return to issuing office.) Contractor agrees to

18.  AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number including the additions or changes made by you in full above.

representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)

19A. NAME AND TITLE OF SIGNER (Type or print)  
Patrick Morais, Contract Admin.

19B. NAME OF CONTRACTOR

19C. DATE SIGNED  
11 Sept 2009

20A. NAME OF CONTRACTING OFFICER  
Rhonda M. Trent

20B. UNITED STATES OF AMERICA

20C. DATE SIGNED  
11 Sept 09

**CONTINUATION SHEET**

REFERENCE NO. OF DOCUMENT BEING CONTINUED  
HSHQDC-09-C-00125

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NAME OF OFFEROR OR CONTRACTOR  
GENERAL ELECTRIC COMPANY

(A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT	UNIT PRICE (E)	AMOUNT (F)
	<p>DUNS Number: 086188401+0000 ALC: 70-23-0001 APP: 70-X-0860</p> <p>The contractor shall provide all necessary labor, materials and all other resources needed in support of the Department of Homeland Security, Domestic Nuclear Detection Office's Advanced Technology Demonstration for Intelligent Radiation Sensor Systems (IRSS) in accordance with the terms and conditions of this contract. Phase I is fully funded at the not-to-exceed ceiling price of \$1,316,956.00</p> <p>The period of performance for Phase I is for 6 months from September 11, 2009 through March 10, 2010. Phases II, Phase III and IV are options to be exercised at the Government's discretion in accordance with Section F.4.</p> <p>The total value of this contract including the base period and all options (if exercised) is in the not-to-exceed ceiling amount of</p> <p>FOB: Destination Period of Performance: 09/11/2009 to 03/10/2010</p>				
0001	<p>Phase I - Preliminary Design Review in accordance with the Statement of Work outlined in Section J.</p> <p>Estimated Cost: (b) (4) Fixed Fee: \$ (b) (4) Obligated Amount: \$1,316,956.00</p> <p>Accounting Info: 7-RD09XA000D-2009-RT0860-303200-ATDE-TR30-305000-3050000000000000-2550 Funded: \$1,316,956.00</p>				1,316,956.00
1001	<p>Option 1 - Phase II - Critical Design Review in accordance with the Statement of Work outlined in Section J.</p> <p>Estimated Cost: (b) (4) Fixed Fee: \$ (b) (4) Amount: (b) (4)</p> <p>Accounting Info: Continued ...</p>				

**CONTINUATION SHEET**

REFERENCE NO. OF DOCUMENT BEING CONTINUED  
 HSHQDC-09-C-00125

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NAME OF OFFEROR OR CONTRACTOR  
 GENERAL ELECTRIC COMPANY

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
2001	<p>NONE                      Funded:</p> <p>Option II - Phase III - Integration and Test in accordance with the Statement of Work outlined in Section J.</p> <p>Estimated Cost:                      Fixed Fee: \$                      Amount:</p> <p>Accounting Info:                      NONE                      Funded:</p>				
3001	<p>Option III - Phase IV - Characterization &amp; Evaluation in accordance with the Statement of Work outlined in Section J.</p> <p>Estimated Cost: \$                      Fixed Fee: \$                      Amount:</p> <p>Accounting Info:                      NOME                      Funded: (b) (6)</p> <p>Note 1: For the base period the Forward Pricing Rates (FPR) for Direct Labor for FY09 are under review by DCAA as stated in the contractor's transmittal letter dated 8 July 2009. Upon final approval of the FPR the contractor will provide a copy of the approved FPR for each year the contract is in effect to the Contract Specialist listed in Section G.1 to allow for adjustment of the approved Direct Labor Rates.</p> <p>The total amount of award: (b) (4) The obligation for this award is shown in box 15G.</p>				

Advanced Technology Demonstration (ATD)  
for  
Intelligent Radiation Sensor Systems (IRSS)

**SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS**

**B.1 Schedule**

The purpose of this contract is to develop a sensor network utilizing combined multi-capable detectors, distributed algorithms, and hierarchical system networking. The total estimated cost for the cost-plus-fixed fee contract is Phase I – Preliminary Design Review will be fully funded in the amount of \$1,316,956 as specified herein. The Contractor shall provide the necessary labor (requisite level of technical personnel, materials and all other resources) required to perform the services in accordance with the terms and conditions of this contract.

Each contract line item number is outlined as follows:

CLIN	Phase/Description	POP	Est. Cost	Fixed Fee	Total
0001	Phase I	Base			\$1,316,956.00
1001	Phase II	Option 1			
2001	Phase III	Option 2			
3001	Phase IV	Option 3			
	<b>Total</b>				

Phases II, III, and IV are options to be exercised at the Government's discretion as outlined in Section F.4. Pricing for Phase I is based on the SOW in Section J. Pricing for SOWs for subsequent phases are estimates. SOWs in subsequent phases will be based on work completed in the prior phase, which may impact pricing in the subsequent phases.

**END OF SECTION B**

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**SECTION C - DESCRIPTION/SPECIFICATION/WORK STATEMENT**

The Statement of Work is listed as Attachment 1 under Section J of this document.

**END OF SECTION C**

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**SECTION D – PACKAGING AND MARKING**

This Section is intentionally left blank.

**END OF SECTION D**

## SECTION E – INSPECTION AND ACCEPTANCE

### E.1 CONTRACT CLAUSES INCORPORATED BY REFERENCE

The following contract clauses pertinent to this Section are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (Feb 1998) in Section I of this contract. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at:

<http://arnet.gov/far/>

<u>NUMBER</u>	<u>TITLE/DATE</u>
	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1)
52.246-9	Inspection of Research and Development (Short Form) (Apr 1984)

### E.2 Acceptance

The Contracting Officer's Technical Representative identified in Section G of this contract is responsible for the acceptance of all services and resultant deliverables/documents.

### E.3 Acceptance Criteria

Certification by the COTR of satisfactory services provided is contingent upon the contractor performing in accordance with the terms and conditions of the contract and all modifications.

**END OF SECTION E**

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**SECTION F – DELIVERIES OR PERFORMANCE**

**F.1 Period of Performance**

The period of performance for this contract is (6) six months from 11 September 2009 through 10 March 2010.

The period of the performance for the option periods if exercised are as follows:

Option Year 1/Phase II – 11 March 2010 – 10 December 2010

Option Year 2/Phase III - 11 December 2010 – 10 September 2011

Option Year 3/Phase IV – 11 September 2011 – 10 March 2012

**F.2 Place of Performance**

The services will be performed at the contractor's facility located at 1 Research Circle Niskayuna, NY 12309.

**F.3 Deliverables/Reporting Requirements**

The Contractor shall prepare and submit the deliverables as outlined in the below table.

#	Deliverable	Phase	Due	Format	Receipt
1	Monthly Technical and Financial Reports	All	Two weeks after the last day of each month	Government	COTR/PM, CO, CS
2	Quarterly Performance Review (QPR) Brief	All	One week before QPR	Vendor	COTR/PM, CO, CS
3	QPR Meeting Minutes	All	One week after QPR	Vendor	COTR/PM, CO, CS
4	End-of-Phase Performance Evaluation (EPE) Brief	All	One week before EPE	Vendor	COTR/PM, CO, CS
5	End of Phase Report (Draft)	All	One week before EPE	Vendor	COTR/PM, CO, CS
6	End of Phase Report (Final)	All	Two weeks after EPE	Vendor	COTR/PM, CO, CS

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7	EPE Meeting Minutes, Actions and Issues Report	All	Two weeks after EPE	Vendor	COTR/PM, CO, CS
8	Three IRSS Performance Test Units (PTU), including all supporting hardware/software	III	End of Phase III	N/A	To be determined in Phase III
9	End of Program Report (Draft)	IV	End of Phase IV	Vendor	COTR/PM, CO, CS
10	End of Program Report (Final)	IV	Three week after Phase IV	Vendor	COTR/PM, CO, CS
11	Technical Reports	I-IV	As needed	Vendor	COTR/PM, CO, CS

All deliverables shall be sent in accordance with the table to the individuals identified in Section G.2. All financial and management reports shall be sent electronically to the COTR, Contracting Officer (CO) and the Contract Specialist (CS) at the addresses listed in Section G.

**F.4 OPTION TO EXEND THE TERM OF CONTRACT 52-217-9 (MAR 2000)**

- (a) The Government may extend the term of this contract by written notice to the Contractor within 30 days; provided that the Government gives the Contractor a preliminary written notice of its intent to extend at least 30 days before the contract expires. The preliminary notice does not commit the Government to an extension.
- (b) If the Government exercises this option, the extended contract shall be considered to include this option clause.
- (c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed 30 months.

**END OF SECTION F**

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**SECTION G CONTRACT ADMINISTRATION DATA**

**G.1 CONTRACTING OFFICER (CO) AND CONTRACT SPECIALIST (CS)**

The Contracting Officer (CO) for this Contract is identified below:

Name:	Rhonda Trent
Title:	Contracting Officer
Agency:	Department of Homeland Security Office of Procurement Operations
Address:	245 Murray Lane, Bldg.410 Washington, DC 20528
Voice:	
Fax:	
Email:	

The Contract Specialist (CS) for this Contract is identified below:

Name:	
Title:	Contract Specialist
Agency:	Department of Homeland Security Office of Procurement Operations
Address:	(b) (6) 245 Murray Lane, Bldg.410 Washington, DC 20528
Voice:	
Fax:	(b) (6)
Email:	(b) (6)

**G.2 CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR)**

The COTR for this Contract is identified below:

Name:	
Title:	Contracting Officer's Technical Representative
Agency:	Department of Homeland Security Domestic Nuclear Detection Office
Address:	Bldg Washington,
Voice:	
Email:	

### **G.3 Contracting Officer's Authority**

The Contracting Officer (CO) assigned to this contract has responsibility for ensuring the performance of all necessary actions for effective contracting; ensuring compliance with the terms of the contract and safeguarding the interests of the United States in its contractual relationships. The CO is the only individual who has the authority to enter into, administer, or terminate this contract and is the only person authorized to approve changes to any of the requirements under this contract, and notwithstanding any provision contained elsewhere in this contract, this authority remains solely with the CO.

It is the Contractor's responsibility to contact the CO immediately if there is even the appearance of any technical direction that is or may be outside the scope of the contract. The Government will not reimburse the Contractor for any work not authorized by the CO, including work outside the scope of the contract.

### **G.4 Contracting Officer's Technical Representative (HSAR 3052.242-72)**

**(DEC 2003)**

(a) The Contracting Officer may designate Government personnel to act as the Contracting Officer's Technical Representative (COTR) to perform functions under the contract such as review or inspection and acceptance of supplies, services, including construction, and other functions of a technical nature. The Contracting Officer will provide a written notice of such designation to the Contractor within five working days after contract award or for construction, not less than five working days prior to giving the contractor the notice to proceed. The designation letter will set forth the authorities and limitations of the COTR under the contract.

(b) The Contracting Officer cannot authorize the COTR or any other representative to sign documents, such as contracts, contract modifications, etc., that require the signature of the Contracting Officer.

### **G.5 Technical Direction**

(a) Technical Direction is defined to include:

(1) Written directions to the Contractor which fill in details, suggest possible lines of inquiry, or otherwise facilitate completion of work within the existing scope of work as defined in the Statement of Work;

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- (2) Provision of written information to the Contractor which assists in the interpretation of drawings, specifications, or technical portions of the work statement;
- (3) Review and, where required, provide written approval of technical reports, drawings, specifications, or technical information to be delivered. Technical directions must be in writing, and must be within the scope of the work as detailed in Section C.

(b)The COTR is authorized by designation to take any or all action with respect to the following which could lawfully be taken by the Contracting Officer, except any action specifically prohibited by the terms of this Contract:

- (1) Assure that the Contractor performs the technical requirements of the contract in accordance with the contract terms, conditions, and specifications.
- (2) Perform or cause to be performed, inspections necessary in connection with (1) above and require the Contractor to correct all deficiencies; perform acceptance for the Government.
- (3) Maintain all liaison and direct communications with the Contractor. Written communications with the Contractor and documents shall be signed as "Contracting Officer's Technical Representative" with a copy furnished to the Contracting Officer.
- (4) Issue written interpretations of technical requirements of Government drawings, designs, and specifications.
- (5) Monitor the Contractor's production or performance progress and notify the Contractor in writing of deficiencies observed during surveillance, and direct appropriate action to effect correction. Record and report to the Contracting Officer incidents of faulty or nonconforming work, delays or problems.
- (6) Obtain necessary security clearance and appropriate identification if access to Government facilities is required. If to be provided, ensure that Government furnished property is available when required.

LIMITATIONS: The COTR is not empowered to award, agree to, or sign any contract (including delivery or purchase orders) or modifications thereto, or in any way to obligate the payment of money by the Government. The COTR may not take any action which may impact on the contract schedule, funds, scope or rate of utilization of

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LOE. All contractual agreements, commitments, or modifications which involve prices, quantities, quality, and schedules shall be made only by the Contracting Officer.

- (a) The COTR is required to meet annually with the Contractor and the Contracting Officer concerning performance of items delivered under this contract and any other administration or technical issues. Telephonic reports may be made if no problems are being experienced. Problem areas should be brought to the immediate attention of the Contracting Officer.
- (b) In the absence of the designated COTR, the COTR may designate someone to serve as COTR in their place. However, such action to direct an individual to act in the COTR's stead shall immediately be communicated to the Contractor and the Contracting Officer.
- (c) Contractual Problems - Contractual problems, of any nature, that may arise during the life of the contract must be handled in conformance with specific public laws and regulations (i.e. Federal Acquisition Regulation). The Contractor and the COTR shall bring all contracting problems to the immediate attention of the Contracting Officer. Only the Contracting Officer is authorized to formally resolve such problems. The Contracting Officer will be responsible for resolving legal issues, determining contract scope and interpreting contract terms and conditions. The Contracting Officer is the sole authority authorized to approve changes in any of the requirements under this contract. Notwithstanding any clause contained elsewhere in this contract, the said authority remains solely with the Contracting Officer. These changes include, but will not be limited to the following areas: scope of work, price, quantity, technical specifications, delivery schedules, and contract terms and conditions. In the event the Contractor effects any changes at the direction of any other person other than the Contracting Officer, the change will be considered to have been made without authority.
- (d) Failure by the Contractor to report to the Contracting Officer conduct that the Contractor considers to constitute a change to this contract, as provided by FAR 52.243-7 (Notification of Changes), waives the Contractor's right to any claims for equitable adjustments.

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**G.6 Interpretation or Modification**

No oral statement by any person, and no written statement by anyone other than the Contracting Officer (CO), or his/her authorized representative acting within the scope of his/her authority, shall be interpreted as modifying or otherwise affecting the terms of this contract. All requests for interpretation or modification shall be made in writing to the CO.

**G.7 Accounting and Appropriation Data**

The accounting and appropriation data corresponding to this contract is found in Section B, Pricing Schedule.

**G.8 Invoicing Instructions**

In order to initiate payment, the Contractor shall submit proper invoices for payment in the manner and format described herein:

- (a) The Contractor shall submit an original invoice or send via facsimile or email to the following address:

Invoicing PPB  
Coast Guard Finance Center  
DNDO Invoices  
P.O. Box 4141  
Chesapeake, VA 23327  
Email address: [FIN-SMB-DNDOInvoices@uscg.mil](mailto:FIN-SMB-DNDOInvoices@uscg.mil)

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(b) Each invoice shall include the following:

- Contract/Modification Number
- Contractor Name
- Date of Invoice
- Invoice/Voucher Number
- Contract Line Item Number (CLIN)
- Incurred Cost

The Contractor can obtain status of each invoice by calling or emailing to:  
USCG FINCEN Customer Service  
Call: 1-800-564-5507 or 757-523-6940  
Email: [http://www.fincen.uscg.mil/vendor info.htm](http://www.fincen.uscg.mil/vendor%20info.htm)

**END OF SECTION G**

## SECTION H - SPECIAL CONTRACT REQUIREMENTS

### H.1 Confidentiality of Information

- (a) To the extent that the work under this contract requires that the Contractor be given access to or be furnished with confidential or proprietary business, technical, or financial information or data belonging to other entities which is clearly marked as confidential or proprietary, the Contractor shall, after receipt thereof, treat such information in confidence and agrees not to appropriate such information to its own use or to disclose such information to third parties unless specifically authorized in writing by the Contracting Officer. The foregoing obligations, however, shall not apply to and the Contractor shall have no obligation under this Agreement to hold information in confidence which, although identified and disclosed as stated herein, has been or is developed by the Contractor independently and without benefit of information disclosed hereunder; and:
- (1) Information or data which is in the public domain at the time of receipt by the Contractor;
  - (2) Information or data which is published or otherwise subsequently becomes part of the public domain through no fault of the Contractor;
  - (3) Information or data which the Contractor can demonstrate was already in its possession at the time of receipt thereof; or
  - (4) Information or data which the Contractor can demonstrate was received by it from a third party who did not require the Contractor to treat it in confidence.
- (b) The Contractor agrees (1) to enter into an agreement, identical in all material respects to the requirements of paragraph (a) above, with each entity requesting such agreement and that is supplying such confidential or proprietary information or data to the Contractor under this contract and (2) to supply a copy of such agreement to the Contracting Officer, upon written request.
- (c) This clause shall be included in any subcontract under which there is a requirement or there becomes a requirement that the subcontractor be given access to or be furnished with confidential or proprietary business, technical, or financial information or data.

## H.2 **Access Restriction/Information Handling**

The Contractor shall restrict access to those individuals with a valid need-to-know who are actually providing services under this contract. Further dissemination to other contractors, subcontractors, or other government agencies and private individuals or organizations is prohibited unless authorized in writing by the Contracting Officer's Technical Representative (COTR).

## H.3 **Advertisements, Publicizing Awards, and News Releases**

All press releases or announcements about agency programs, projects, and contract awards need to be cleared by the Program Office and the Contracting Officer. Under no circumstances shall the Contractor, or anyone acting on behalf of the Contractor, refer to the supplies, services, or equipment furnished pursuant to the provisions of this contract in any publicity news release or commercial advertising without first obtaining explicit written consent to do so from the Program Office and the Contracting Officer.

The Contractor agrees not to refer to awards in commercial advertising in such a manner as to state or imply that the product or service provided is endorsed or preferred by the Federal Government or is considered by the Government to be superior to other products or services.

## H.4 **Travel Costs**

(a) Except as otherwise provided herein, the Contractor shall be reimbursed for its reasonable actual travel costs in accordance with FAR clause 31.205-46.

(b) The Contractor is to use the current Federal Travel Regulations for all rates and definitions for travel, lodging and incidental expense and apply them consistently.

(c) Reimbursable travel costs are any costs associated with travel required to perform the contract, and approved by the Contracting Officer Technical Representative and/or the Contracting Officer.

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**H.5 Assertion of Data Rights**

The contract hereby incorporates by reference Section 10 – Assertion of Data Rights as described in the contractor’s Volume 1 - Technical Proposal dated 23 April 2009.

**END OF SECTION H**

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**PART II- CONTRACT CLAUSES**

**SECTION I CONTRACT CLAUSES**

**I.1 CONTRACT CLAUSES INCORPORATED BY REFERENCE**

The following contract clauses pertinent to this Section are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (Feb 1998) in Section I of this contract. This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at:

[www.acquisition.gov](http://www.acquisition.gov)

NUMBER	TITLE	DATE
	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1)	
52.202-1	Definitions	JUL 2004
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-6	Restrictions on Subcontractor Sales to the Government	SEP 2006
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price or Fee Adjustment for Illegal or Improper Activity	JAN 1997
52.203-12	Limitation on Payments to Influence Certain Federal Transactions	SEP 2007
52.204-7	Central Contractor Registration	APR 2008

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52.209-6	Protecting the Government's Interest When Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment	SEP 2006
52.215-2	Audit and Records – Negotiation	JUN 1999
52.215-8	Order of Precedence – Uniform Contract Format	OCT 1997
52.215-11	Price Reduction For Defective Cost or Pricing Data-Modifications	OCT 1997
52.215-13	Subcontractor Cost or Pricing Data -Modifications	OCT 1997
52.215-14	Integrity of Unit Price	OCT 1997
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-19	Notification of Ownership Changes	OCT 1997
52.215-21	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data –Modification Alternate IV (OCT 1995)	OCT 1997
52.216-7	Allowable Cost and Payment	DEC 2002
52.216-8	Fixed Fee	Mar 1997
52.217-8	Option To Extend Services	NOV 1999
52.219-8	Utilization of Small Business Concerns	MAY 2004
52.219-9	Small Business Subcontracting Plan	APR 2008
52.222-2	Payment for Overtime Premiums	JUL 1990
52.222-3	Convict Labor	JUN 2003
52.222-21	Prohibition of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	MAR 2007
52.222-35	Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-36	Affirmative Actions for Workers with Disabilities	JUN 1998
52.222-37	Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-38	Compliance With Veterans' Employment Reporting	DEC 2001

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Requirement

52.222-39	Notification of Employee Rights Concerning Payment of Union Dues or Fees	DEC 2004
52.222-50	Combating Trafficking In Persons	FEB 2009
52.223-6	Drug-Free Workplace	MAY 2001
52.223-14	Toxic Chemical Release Reporting	AUG 2003
52.225-13	Restrictions on Certain Foreign Purchases	JUN 2008
52.227-1	Authorization and Consent Alternate I (APR 1984)	DEC 2007
52.227-2	Notice and Assistance Regarding Patent and Copyright Infringement	DEC 2007
52.227-11	Patent Rights-Ownership by the Contractor (Short Form)	DEC 2007
52.227-14	Rights in Data-General	DEC 2007
52.228-7	Insurance-Liability To Third Persons	MAR 1996
52.232-17	Interest	OCT 2008
52.232-18	Availability of Funds	APR 1984
52.232-20	Limitation of Costs	APR 1984
52.232-22	Limitation of Funds	APR 1984
52.232-23	Assignment of Claims	JAN 1986
52.232-25	Prompt Payment	OCT 2008
52.232-33	Payment by Electronic Funds Transfer – Central Contractor Registration	OCT 2003
52.232-35	Designation of Office for Government Receipt of Electronic Funds Transfer Information	MAY 1999
52.233-1	Disputes	JUL 2002
52.233-2	Service of Protest	SEP 2006
52.233-3	Protest After Award (Alternate I) JUN 1985	AUG 1996
52.233-4	Applicable Law of Breach of Contract Claim	OCT 2004

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52.242-1	Notice of Intent to Disallow Costs	APR 1984
52.242-3	Penalties for Unallowable Costs	MAY 2001
52.242-4	Certification of Final Indirect Cost	JAN 1997
52.242-13	Bankruptcy	JUL 1995
52.243-2	Changes – Cost Reimbursement Alternate V (APR 1984)	AUG 1987
52.243-7	Notification of Changes	APR 1984
52.244-2	Subcontracts	JUN 2007
52.244-5	Competition in Subcontracting	DEC 1996
52.244-6	Subcontracts for Commercial Items	MAR 2009
52.245-1	Government Property Alternate II (JUN 2007)	JUN 2007
52.245-9	Use and Charges	JUN 2007
52.246-25	Limitation of Liability-Services	FEB 1997
52.247-34	F.O.B. Destination	NOV 1991
52.247-67	Submission of Transportation Documents For Audit	FEB 2006
52.249-6	Termination for Convenience of the Government  (Cost Reimbursement)	MAY 2004
52.249-14	Excusable Delays	APR 1984
52.251-1	Government Supply Sources	APR 1984
52.253-1	Computer Generated Forms	JAN 1991

**I.2 Prohibitions on Contracts with Corporate Expatriates (HSAR 3052.209-70)(Jun 2006)**

Prohibitions.

Section 835 of Public Law 107-296, prohibits the Department of Homeland Security from entering into any contract with a foreign incorporated entity after November 25, 2002, which is treated as an inverted domestic corporation as defined in this clause. The Secretary shall waive the prohibition with respect to any specific contract if the Secretary determines that the waiver is required in the interest of homeland security, or to prevent the loss of any jobs in the United States or prevent the Government from incurring any additional costs that otherwise would not occur.

Definitions. As used in this clause:

“Expanded Affiliated Group” means an affiliated group as defined in section 1504(a) of the Internal Revenue Code of 1986 (without regard to section 1504(b) of such Code), except that section 1504 of such Code shall be applied by substituting ‘more than 50 percent’ for ‘at least 80 percent’ each place it appears. “Foreign Incorporated Entity” means any entity which is, or but for subsection (b) of Section 835 of the Homeland Security Act, Public Law 107-296, would be, treated as a foreign corporation for purposes of the Internal Revenue Code of 1986.

“Inverted Domestic Corporation.” A foreign incorporated entity shall be treated as an inverted domestic corporation if, pursuant to a plan (or a series of related transactions)---The entity completes after November 25, 2002, the direct or indirect acquisition of substantially all of the properties held directly or indirectly by a domestic corporation or substantially all of the properties constituting a trade or business of a domestic partnership; After the acquisition at least 80 percent of the stock (by vote or value) of the entity is held—In the case of an acquisition with respect to a domestic corporation, by former shareholders of the domestic corporation by reason of holding stock in the domestic corporation; or In the case of an acquisition with respect to a domestic partnership, by former partners of the domestic partnership by reason of holding a capital or profits interest in the domestic partnership; and The expanded affiliated group which after the acquisition includes the entity does not have substantial business activities in the foreign country in which or under the law of which the entity is created or organized when compared to the total business activities of such expanded affiliated group. “Person”, “domestic”, and “foreign” have the meanings given such terms by paragraphs (1), (4), and (5) of section 7701(a) of the Internal Revenue Code of 1986, respectively.

Special rules.

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The following definitions and special rules shall apply when determining whether a foreign incorporated entity should be treated as an inverted domestic corporation.

**Certain Stock Disregarded.** For the purpose of treating a foreign incorporated entity as an inverted domestic corporation these shall not be taken into account in determining ownership: stock held by members of the expanded affiliated group which includes the foreign incorporated entity; or stock of such entity which is sold in a public offering related to the acquisition described in subsection (b)(1) of Section 835 of the Homeland Security Act, Public Law 107-296.

**Plan Deemed In Certain Cases.** If a foreign incorporated entity acquires directly or indirectly substantially all of the properties of a domestic corporation or partnership during the 4-year period beginning on the date which is after the date of enactment of this Act and which is 2 years before the ownership requirements of subsection (b)(2) are met, such actions shall be treated as pursuant to a plan.

**Certain Transfers Disregarded.** The transfer of properties or liabilities (including by contribution or distribution) shall be disregarded if such transfers are part of a plan a principal purpose of which is to avoid the purposes of this section.

*Special Rule for Related Partnerships.*

For purposes of applying Section 835(b) of Public Law 107-296 to the acquisition of a domestic partnership, except as provided in regulations, all domestic partnerships which are under common control (within the meaning of section 482 of the Internal Revenue Code of 1986) shall be treated as a partnership.

*Treatment of Certain Rights.*

Certain rights shall be treated as stocks to the extent necessary to reflect the present value of all equitable interests incident to the transaction, as follows: warrants; options; contracts to acquire stock; convertible debt instruments; and others similar interests.

Rights labeled as stocks shall not be treated as stocks whenever it is deemed appropriate to do so to reflect the present value of the transaction or to disregard transactions whose recognition would defeat the purpose of Section 835.

*Disclosure.*

By signing and submitting its offer, an Offeror under this solicitation represents that it not a foreign incorporated entity that should be treated as an inverted domestic corporation pursuant to the criteria of Section 835 of the Homeland Security Act, Public Law 107-296 of November 25, 2002. If a waiver has been granted, a copy of the approved waiver shall be attached to the bid or proposal.

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**I.3 DISSEMINATION OF CONTRACT INFORMATION (HSAR  
3052.242-71) (DEC 2003)**

The Contractor shall not publish, permit to be published, or distribute for public consumption, any information, oral or written, concerning the results or conclusions made pursuant to the performance of this contract, without the prior written consent of the Contracting Officer. An electronic or printed copy of any material proposed to be published or distributed shall be submitted to the Contracting Officer.

**I.4 F.O.B DESTINATION ONLY (HSAR 3052.242-72) (DEC 2003)**

Offers are invited on the basis of f.o.b. destination only. Offers submitted on any other basis will be rejected as nonresponsive.

**END OF SECTION I**

## **SECTION J – LIST OF ATTACHMENTS**

### **J.1 - Statement of Work**

Statements of Work for succeeding phases are subject to change based on work in prior phase.

**END OF SECTION J**

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**SECTION K – REPRESENTATION AND CERTIFICATIONS**

The contractor's annual representation and certifications electronically filed at [www.orca.bpn.gov](http://www.orca.bpn.gov) are incorporated herein by reference and made a part of this contract.

**END OF SECTION K**

# Statement of Work

## I. SCOPE

The DNDO has previously funded development of portable radiation detection devices including GE-IPRL and the HPRDS. This program will focus on the development of software and networks that take advantage of stand-alone, small form factor, and very capable detectors. The networked system will be designed for applications that can benefit from such a sensor system, in particular locations where it is not possible to route traffic through a single point of entry. Examples of possible users include maritime boarding parties, personnel at general aviation facilities, security details at high profile events, and personnel monitoring non-entry border locations. In each of these cases, multiple personnel could wear detection units as part of performing other duties or for rad/nuc searches.

Existing radiation detectors will be integrated with communication and networking technology to produce a functionally enhanced system of devices. Algorithms will be distributed throughout the network that will yield increased performance and situational awareness. Commercially available technology will be utilized to the maximum extent as components in these detection devices

## II. OBJECTIVES

GE's Intelligent Radiation Sensor System (GE-IRSS) will demonstrate the ability of a system of detectors to improve the detection, localization, and identification of radiological threats including special nuclear materials and certain medical and industrial isotopes as compared to the individual detectors in the system. Areas of improvement include the discrimination of threat sources from non-threat sources, such as NORM and medical isotopes. It is also expected that the system will pin point the location of a radiological threat more rapidly than any single detector in the system. Spectroscopic and localization/directionality capabilities, in combination with discrimination algorithms, will significantly reduce the false alarm rate.

## III. TECHNICAL APPROACH

The GE-IRSS system will serve as an integration platform for a wide array of portable and handheld radiation detector technologies and brands. The system will enable self-configuration and connection to simplify system management and implementation. The integrated system will yield enhanced performance with respect to coverage, detection time, localization, and source identification. The means to these results is through intelligent sharing and processing of distributed sensor data. Robust communications, networking, positioning, and resource management are the enablers.

## IV. PERFORMANCE GOALS

The performance goals for this program are delineated in Table 1. Performance requirements.

Table 1. Performance requirements.

Parameter	Requirements	Goals	GE-IRSS	Notes
Coverage area	100 m x 100 m	1km x 1km		

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Operational Environment	Open field and urban setting	Inside buildings and urban setting
Detection time	<3 seconds <5 seconds	< 1 seconds < 2 seconds
Identification time	<10 seconds <20 seconds	< 2 seconds < 4 seconds
Localization	<5 seconds <10 seconds	< 2 seconds < 4 seconds
Reach back	>2 km	> 10km
Uptime	98%	99%
False alarms*	<1/day	< 1/week
Environmental conditions	-20°C to 50°C, 0-95% RH non-condensing	
Cost**	<\$90,000/system	
Neutron detection		
Neutron gamma rejection	>100 seconds	>200sec

\* False alarm rate includes alarms due to background fluctuations, as well as innocent alarms due to NORM and medical/industrial isotopes.

\*\* The cost is the projected based upon volumes of 10,000 detectors using the assumptions of Table 1 in BAA09-102 published by DNDO.

\*\*\* Assumes detector motion to source location

The columns labeled "Requirements" and "Goals" lists DNDO minimum acceptable performance requirements and long-term performance goals, respectively. The column labeled "GE-IRSS Capability" lists the performance goals for the contractor's specific implementation of that concept that will be demonstrated under this program. The capability to incorporate future technology to achieve the any unmet DNDO goals shall be a design consideration throughout the program.

**IV.a. Important Functional Features**

- Take advantage of stand-alone, small form factor, and very capable detectors

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- It is important that the detector devices be small and lightweight
- Data sharing structure should comply with DHS standard NIEM and CBP/DNDO N.25
- A graphic user interface at the local and/or the central unit should be provided
- The system is to be designed to be portable and re-deployable
- May consider how the communications system could be extended to include other detector

**V. WORK BREAKDOWN STRUCTURE (WBS) AND TASKS**

**1.0 Phase 1**

Phase 1 shall consist of research, development, experiments, modeling, analysis, trade studies, and/or design to quantify system design options. The period of performance will be six months.

**1.1 Identify System Detector Configuration.**

Work in this task will focus on the proper selection and configuration of the radiation detection devices to be used in subsequent phases.

**1.1.1 Design, Modeling, Analysis and Trades**

.Develop system models based upon component performance characteristics, network data sharing, and algorithm performance capabilities.

**1.1.2 Detectors.**

Identify candidate portable detection devices. Establish each device's standalone capabilities and the potential capabilities in a networked system. (b) (4)

(b) (4)

**1.1.3 Wireless and Communication Controller.**

Identify candidate technologies and devices that satisfy the communication requirements. The devices are to be characterized for capabilities assuming standard protocol solutions for a networked system. Physical interface requirements and options will be identified. Develop performance models for integration into systems simulations. Validate performance by experimentation, collect and analyze data. Results will be used to support trade studies.

**1.1.4 Locationing and Orientation.**

Identify devices for position and orientation determination.

(b) (4)

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## 1.2 Initial Algorithm and Protocol Development

To achieve the program goals, an initial set of algorithms will be developed to provide the detection, localization and identification capabilities. As part of this development, the network architecture will be defined.

### 1.2.1 Algorithms and Algorithm Processor

.Develop algorithms and software that enhance the performance

### 1.2.2 Networking and Data Structure

Identify potential networking protocols, routing, topologies, and data structures. Each candidate is to be characterized and performance requirements quantified including Quality of Service and power management. Models are to be developed and simulations conducted.

## 1.3 System Design.

The system performance and functionality will be optimized as an integrated set of components that leverage shared functionality and strengths.

### 1.3.1 HMI Graphics and User Operation and Maintenance

Identify operational scenarios based upon DNDO provided con ops.

(b) (4)

### 1.3.2 Base Station Design

(b) (4)

### 1.3.3 System Integration and Power Management.

Sub-system performance budgets will be established and assigned to the responsible sub system owners. System design options will be identified and incorporated into models for simulation. Sensitivity analysis will identify critical performance parameters and contributors.

(b) (4)

## 1.4 Program Management.

All documentation, including monthly reports, Kick-off meeting, quarterly reviews and a Preliminary Design Review (PDR), which will also serve as the final phase review, will be conducted.

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## 2.0 Phase 2

Phase 2 will complete the detailed design by conducting the necessary development, engineering, modeling, analysis, simulations, experiments, trade studies which will optimize and quantify the system design. This phase will conclude with a Critical Design Review (CDR). The period of performance is nine months commencing immediately after Phase 1.

### 2.1 System Detection Design and Prototyping.

The result of this effort shall be a final system design that yields optimum performance as compared to the requirements in Section V.

#### 2.1.1 Design, Modeling, Analysis and Trades.

Revise and update system models based upon component performance characteristics, network data sharing, and algorithm performance capabilities.

#### 2.1.2 Detectors.

Down select detection devices based upon the trade study results. Performance models for the selected devices will be refined for system simulations.

#### 2.1.3 Wireless and Communication Controller

Down select wireless devices and protocols for peer to peer, to base station, and to back haul requirements. Address gaps and risks to budgeted communication requirements. Design, prototype and test physical interface boards and circuits. Refine performance models for integration into systems simulations. Develop prototypes with detectors and validate performance by experimentation under simulated operational conditions.

#### 2.1.4 Locationing and Orientation

Down select devices for position and orientation determination based upon simulation and test results. Design, prototype and test physical interface boards and circuits. Develop prototypes integrated with sensor devices and test in a simulated operational environment.

(b) (4)

### 2.2 Algorithm and Protocol Development.

To achieve the program goals, the initial set of algorithms will be refined based upon system simulation results to provide the detection, localization, and identification capabilities.

#### 2.2.1 Algorithms and Algorithm Processor

Refine algorithms and software based upon system simulations and detector characterization results. Characterize each chosen algorithm for projected capability, parametric inputs, processing requirements, latency, and resulting outputs.

(b) (4)

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2.2.2 Networking and Data Structure

.Select networking protocols, routing, topologies, and data structures based upon trade studies, system requirements and simulation results. Refine characterization parameters and performance capabilities for network modeling and simulations. Develop application specific protocols for optimum and unique system requirements. Incorporate protocols into prototype sensor networks and validate performance results. Develop mitigations for any remaining risks and a plan for implementation.

2.3 System Design

The system performance and functionality will be demonstrated as an integrated set of prototyped components that leverage shared functionality and strengths.

2.3.1 HMI Graphics and User Operation and Maintenance

Refine the operational scenarios based upon DNDO provided con ops.

2.3.2

(b) (4)

2.3.3 System Integration and Power Management

Revise sub-system performance budgets as an outcome of phase I results and allocate to the responsible sub system owners. As prototype results are developed, incorporate into systems models for simulation. (b) (4)

(b) (4)

2.4 Program Management.

All documentation, including monthly reports, quarterly reviews and a CDR, which will also serve as the final phase review, will be conducted. The contractor will develop test and evaluation protocols for Phase IV in coordination with DNDO.

3.0 Phase 3

Phase 3 will concentrate on the manufacture, construction, and factory test of the ATD PTU system. The phase will conclude with a Characterization Readiness Review (CRR). The period of performance is 9 months commencing immediately after Phase 2.

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### 3.1 Final System Development.

Complete the sub system and system design and development, and finalize the manufacturing and test requirements. Address all remaining open risk mitigation actions. Test software algorithms in system configurations on prototype hardware to validate performance and reliability in preparation for the PTU units.

### 3.2 Manufacture and Test PTU Systems.

Three (3) PTU systems for delivery shall be manufactured and tested. A PTU system is the entire detection system inclusive of all detection devices, communications hardware, control hardware, software and algorithms required to meet the functional requirements.

#### 3.2.1 Order Materials, Fabrication and Assembly.

Identify and order all material required to manufacture the PTUs. Identify any long lead material and release orders in sufficient time to satisfy schedule requirements.

#### 3.2.2 Unit Test.

Unit testing will be conducted to demonstrate performance to the allocated sub system performance budgets. Deviations will be analyzed in the system model to determine impact and required actions.

#### 3.2.3 System Testing.

System testing will be conducted to baseline operational performance scenarios.

**(b) (4)**

### 3.3 Program Management.

All documentation, including monthly reports, quarterly reviews and a CRR, which will also serve as the final phase review, will be conducted. The test and evaluation protocols for Phase IV will be revised in coordination with DNDO.

### 4.0 Phase 4

Phase 4 shall support Characterization and Evaluation (C&E) of the ATD PTU system by DNDO. The period of performance is 6 months commencing immediately after Phase 3. The effort in this phase will be provided by GE Global Research.

#### 4.1 30 Day Characterization and Evaluation Test Support.

The goal of these activities will be to fully characterize the PTU system against the requirements specified in Section IV, understand success of technology implementation as a function of component, formulate recommendations on technology maturity as well as generate scalable performance data for a cost-benefit analysis to transition to commercial system development and acquisition. For planning purposes, the C&E phase shall consist of thirty days of activity at a to be determined DNDO Characterization Facility. The C&E effort will be led by the PI and supported by the core team.

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**4.1.1 Test Preparation.**

Prepare PTUs for testing, including operating instructions, transportation cases, needed support equipment, and problem action process.

**4.1.2 On-Site Test Support.**

The necessary resources will be present during the testing to provide support and real time feedback on performance results, answer questions, and correct problems.

**4.1.3 PTU Support and Updates.**

During the testing updates and support will be provided.

**4.2 Program Management.**

All documentation, including monthly reports, quarterly reviews and a CRR, which will also serve as the final phase review, will be conducted. The test and evaluation protocols for Phase IV will be revised in coordination with DNDO.

**VI. PROGRAM MANAGEMENT**

The Contractor shall maintain and implement a Management Program, which clearly defines how the program effort will be managed and controlled. The Contractor shall organize, coordinate, and control all internal project activities to ensure the correct and timely delivery of all supplies and services specified in the contract. The Contractor shall report progress at program reviews and as specified below.

**VI.1 Kick off Meeting**

A kickoff meeting shall be held within the first three (3) weeks after the program start. The meeting shall review all contractual material, including SOW, specifications, deliverables, resources, costs, and schedule.

**VI.2 Monthly Technical and Financial Reports**

Brief narrative reports shall be submitted electronically within two weeks after the last day of each month. These reports will include:

- The previous month's activity
- Progress achieved against planned goals and milestones
- Difficulties encountered and recovery plans (if needed)
- Explicit plans for the next month,
- An account of all funds expended by task to date
- Projected expenditures for the coming calendar month

**VI.3 Quarterly Performance Reviews (QPR)**

QPRs will be conducted via teleconference or at the GE Global Research facility. This review will be led by the PI and supported by the core team. The QPR Meeting date is to be coordinated with the DNDO Program manager but is planned to be held approximately every three months with the exception of when it coincides with a PDR, CDR, or CRR review. The QPR Briefing shall be supplied 1 week prior to the QPR.

The QPR briefing must include, where appropriate:

- Review of the prior quarter's activity,
- Review of the overall technical progress,
- Difficulties encountered and recovery plans,
- A comprehensive account of all funds expended by task to date,
- Explicit plans for the next quarter including an updated Gantt chart for the current phase.

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The QPR does not replace the monthly progress report, unless agreed upon with the DNDO Program Manager. QPR Minutes are to be supplied within one week of the QPR.

**VI.4 PDR and End of Phase Performance Evaluation and Report**

A PDR shall be held (unless otherwise directed) at the end of Phase I at DNDO headquarters in Washington, DC. The PDR will satisfy an end of phase performance evaluation and report and does not replace the monthly technical report. The PDR will be led by the PI and supported by the core team. The meeting date will be coordinated with the DNDO Program manager but is expected to be held in the last month of Phase 1. PDR Presentation Material will be delivered 1 week prior to the PDR

The material must include, where appropriate:

- Technical progress achieved against goals
- Difficulties encountered and recovery actions
- Lessons learned and their impact on future R&D
- Overall management including a comprehensive account of all funds expended by program, project, and tasks during the phase along with a comparison of these figures with projections from the start of the contract
- If required an updated Gantt chart, Statement of Work and cost breakdown for the next phases of the project

PDR Report is to include Minutes, Actions, and issues are to be delivered due two weeks after the PDR.

**VI.5 CDR and End of Phase Performance Evaluation and Report**

A CDR shall be held (unless otherwise directed) at DNDO headquarters in Washington, DC at the end of Phase II. The CDR will satisfy an end of phase performance evaluation and report and will not replace the monthly technical report. The CDR will be led by the PI and supported by the core team. The meeting date will be coordinated with the DNDO Program manager but is planned to be held in the last month of Phase 2. CDR Presentation Material will be delivered one week prior to the CDR.

The material must include, where appropriate:

- Technical progress achieved against goals
- Difficulties encountered and recovery actions
- Lessons learned and their impact on future R&D
- Overall management including a comprehensive account of all funds expended by program, project, and tasks during the phase along with a comparison of these figures with projections from the start of the contract

If required an updated Gantt chart, Statement of Work and cost breakdown for the next phases of the project. The CDR Report will include Minutes, Actions, and issues to be delivered two weeks after the CDR.

**VI.6 Characterization Readiness Review (CRR) and End of Phase Performance Evaluation and Report**

A CRR shall be held (unless otherwise directed) at DNDO headquarters in Washington, DC. The CRR will satisfy an end of phase performance evaluation and report and does not replace the monthly technical report. The CRR will be led by the PI and supported by the core team.

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The meeting date will be coordinated with the DNDO Program manager but is planned to be held in the last month of Phase 3. The CRR Presentation Material is to be delivered one week prior to CCR.

The CRR material must include, where appropriate:

- Technical progress achieved against goals
- Performance of tested PTUs
- Difficulties encountered and recovery actions
- Lessons learned and their impact on future R&D
- Overall management including a comprehensive account of all funds expended by program, project, and tasks during the phase along with a comparison of these figures with projections from the start of the contract
- If required an updated Gantt chart, Statement of Work and cost breakdown for the next phases of the project
- Final test and evaluation plan

The CRR Report including the Minutes, Actions, and issues will be delivered two weeks after the CCR.

#### VI.7 Final Phase Performance Evaluation and Report

A Final Phase Report shall be delivered by the end of the Phase 4. The final report will be a cumulative, stand-alone document that describes the work of the entire program. The final report shall also include “lessons learned” from the effort, recommendations for future research in this area, and a comprehensive account of all funds expended. The final report shall be submitted to the DNDO Program Manager. This effort will be lead by the PI with support from the core team and the program manager.

#### APPENDIX - SOW DEFINITIONS

**Detector:** The detector is defined as the specific element of the detection device responsible for the transduction of the radiation into an electronic signal.

**Detection Device:** The detection device is defined as the unit that encompasses the detector as well as display, power supply, and other technologies that allow the unit to operate individually or in a network of detection devices.

**PTU System:** The PTU system is the entire detection system inclusive of all detection devices, communications hardware, control hardware, software and algorithms required to meet the requirements and goals as specified.

**Normal Background Radiation:** Naturally Occurring Radioactive Material (NORM) is radioactive materials that are found in nature. NORM may be part of a commercial product (e.g. granite, kitty litter, concrete). Typical NORM is represented by radionuclides include 40K (potassium), 232Th (thorium) and thorium decay chain daughters, 226Ra (radium), and uranium decay chain daughters.

**Radioactive Threats:** Radioactive threats include those used for medical and industrial purposes as well as special nuclear material. Threats of interest span the energy range from 60keV-2.6MeV. These threats may be unshielded or shielded. These threats will be used to compare the performance of proposed detection systems. A range of threat masses, activities, geometric configurations, and binary mixtures will be tested as part of this program to characterize overall system performance.

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**Positive Detection Rate:** Detection results will be characterized as true positive, TP, false negative, FN, true negative, TN, and false positive, FP. The positive detection rate is defined as the sum of true positives and true negatives divided by the sum of true positives, false positive,

$$\frac{TP+TN}{TP+FP+TN+FN}$$

true negatives, and false negatives:

**Positive Localization:** Positive localization is defined as determining the position of a source to within 0.2 steradians. The positive localization rate is defined as the sum of positive localizations divided by the sum of positive localizations and incorrect localizations.

**Positive Identification:** Positive identification is the ability to correctly identify the type or types of radioisotopes that are responsible for a positive detection. The positive identification rate is defined as the sum of positive identifications divided by the sum of positive identifications and incorrect identifications.

**Up Time:** Up time is the percentage of time that the PTU system is fully operational divided by the total time that the system was intended to monitor. Issues that can negatively impact up time are individual detector failures, communications failures, and system failures.

**Data Structure:** Data structure is the format that data will be transmitted, collated, and passed on to other users. To assure interoperability with other users, the data structure should comply with the DHS standard for data exchange, NIEM (National Information Exchange Model), and the Customs and Border Patrol (CBP)/DNDO N.25 message protocol where applicable.