

<b>AWARD/CONTRACT</b>		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)		RATING	PAGE OF PAGES 1   37		
2. CONTRACT (Proc. Inst. Ident.) NO. HR0011-13-C-0061		3. EFFECTIVE DATE 01 Mar 2013		4. REQUISITION/PURCHASE REQUEST/PROJECT NO. HR001132059			
5. ISSUED BY DARPA CMO ATTN: MICHAEL MUTTY 675 N. RANDOLPH STREET ARLINGTON VA 22203-2114		CODE HR0011	6. ADMINISTERED BY (If other than Item 5) DCMA SAN DIEGO 7675 DAGGET STREET SUITE 200 SAN DIEGO CA 92111-2241		CODE S0514A		
7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, state and zip code) QUASAR FEDERAL SYSTEMS, INC. 5754 PACIFIC CENTER BLVD STE 203 SAN DIEGO CA 92121-4206			8. DELIVERY <input type="checkbox"/> FOB ORIGIN <input checked="" type="checkbox"/> OTHER (See below)		9. DISCOUNT FOR PROMPT PAYMENT		
CODE 36WH2			FACILITY CODE		10. SUBMIT INVOICES 1 (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN:		
11. SHIP TO/MARK FOR U.S. ARMY RESEARCH LABORATORY DR. BRAD E. FORCH WEAPONS & MATERIALS RESEARCH DIRECTORATE RDRL - WM, BLDG 4600 ABERDEEN PROVING GROUND MD 21005-5066			CODE WB13LT	12. PAYMENT WILL BE MADE BY DFAS COLUMBUS CENTER WEST ENTITLEMENT OPERATIONS P.O. BOX 182381 COLUMBUS OH 43218-2381			
13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c)( ) <input type="checkbox"/> 41 U.S.C. 253(c)( )			14. ACCOUNTING AND APPROPRIATION DATA <b>See Schedule</b>				
15A. ITEM NO.	15B. SUPPLIES/ SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT		
<b>SEE SCHEDULE</b>							
15G. TOTAL AMOUNT OF CONTRACT					<b>\$1,177,425.00</b>		
16. TABLE OF CONTENTS							
(X) SEC.	DESCRIPTION	PAGE(S)	(X) SEC.	DESCRIPTION	PAGE(S)		
PART I - THE SCHEDULE			PART II - CONTRACT CLAUSES				
X	A	SOLICITATION/ CONTRACT FORM	1	X	I	CONTRACT CLAUSES	20 - 36
X	B	SUPPLIES OR SERVICES AND PRICES/ COSTS	2 - 3	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS			
X	C	DESCRIPTION/ SPECS/ WORK STATEMENT	4 - 7	X	J	LIST OF ATTACHMENTS	37
X	D	PACKAGING AND MARKING	8	PART IV - REPRESENTATIONS AND INSTRUCTIONS			
X	E	INSPECTION AND ACCEPTANCE	9	K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS		
X	F	DELIVERIES OR PERFORMANCE	10 - 11		L	INSTRS., CONDS., AND NOTICES TO OFFERORS	
X	G	CONTRACT ADMINISTRATION DATA	12 - 15	M	EVALUATION FACTORS FOR AWARD		
X	H	SPECIAL CONTRACT REQUIREMENTS	16 - 19				
CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE							
17. <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT Contractor is required to sign this document and return _____ copies to issuing office. Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)			18. <input type="checkbox"/> AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____				
19A. NAME AND TITLE OF SIGNER (b)(4),(b)(6)			20A. NAME OF CONTRACTING OFFICER MICHAEL S. MUTTY TEL: 571-218-4588 EMAIL: Michael.Mutty@darpa.mil				
19B. NAME OF CONTRACTING OFFICER (b)(4),(b)(6)			19C. DATE SIGNED 20 FEB 2013	20B. UNITED STATES OF AMERICA MUTTY.MICHAEL (b)(6) BY L.S.1228601728 (Signature of Contractor)	20C. DATE SIGNED 2/21/2013		

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X	C	DESCRIPTION/ SPECS./ WORK STATEMENT		4 - 7	X	J	LIST OF ATTACHMENTS	
X	D	PACKAGING AND MARKING		8	<b>PART IV - REPRESENTATIONS AND INSTRUCTIONS</b>			
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<b>CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE</b>								
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19A. NAME AND TITLE OF SIGNER (Type or print)				20A. NAME OF CONTRACTING OFFICER MICHAEL S. MUTTY TEL: 571-218-4588 EMAIL: Michael.Mutty@darpa.mil				
19B. NAME OF CONTRACTOR		19C. DATE SIGNED		20B. UNITED STATES OF AMERICA		20C. DATE SIGNED		
BY _____ (Signature of person authorized to sign)				BY _____ (Signature of Contracting Officer)				

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
0001	MEDS PROGRAM CPFF BASE PERIOD - The contractor shall conduct the research for the Methods for Explosive Detection at Standoff (MEDS) Program Tasks 1 through 8 in accordance with the Attachment Statement of Work, February 13, 2013, and with Section C herein. Data deliverables/reports shall be provided in accordance with Section C and F herein. FOB: Destination	(b)(4)		\$1,177,425.00 \$1,177,425.00

ITEM NO	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
000101	FUNDING FOR CLIN 0001 CPFF FOB: Destination PR No. HR001132059	\$0.00	\$0.00	\$0.00 \$0.00
	ACRN AA			\$1,177,425.00



ITEM NO	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
0002		(b)(4)		\$473,509.00
OPTION	MEDS PROGRAM CPFF OPTION 1 - The contractor shall conduct the research for the Methods for Explosive Detection at Standoff (MEDS) Program Tasks 9 through 12 in accordance with the Attachment Statement of Work, February 13, 2013, and with Section C herein. Data deliverables/reports shall be provided in accordance with Section C and F herein. FOB: Destination			\$473,509.00



## Section C - Descriptions and Specifications

## CLAUSES INCORPORATED BY FULL TEXT

## C-1 Scope of Work

(a) The Contractor shall furnish the necessary personnel, materials, facilities, and other services as may be required to perform Contract Line Items (CLIN) 0001, in accordance with the Statement of Work, Attachment 1 hereto.

(b) The Contractor shall furnish the necessary personnel, materials, facilities, and other services as may be required to perform Option 1, Contract Line Items (CLIN) 0002, if and to the extent exercised, in accordance with the Statement of Work, Attachment 1 hereto.

(c) In the event of an inconsistency between the provisions of this contract and the Contractor's proposal, the inconsistency shall be resolved by giving precedence in the following order: (1) the contract, (2) the attachments to the contract, and then (3) the Contractor's proposal.

## C-2 Reports and Other Deliverables

(a) The Contractor shall submit the following reports and other deliverables in accordance with the delivery schedule set forth in Section F. Reports and other deliverables shall include an acknowledgment of the Government's support and a disclaimer in accordance with DFARS 252.235-7010 and shall be submitted in writing, as defined in FAR 2.101, or as specified below:

## (1) R&amp;D STATUS REPORT

This brief narrative, not to exceed five pages in length, shall contain the following:

- (i) For first report only; the date work actually started.
- (ii) Description of progress during the reporting period, supported by reasons for any change in approach reported previously
- (iii) Planned activities and milestones for the next reporting period.
- (iv) Description of any major items of experimental or special equipment purchased or constructed during the reporting period.
- (v) Notification of any changes in key personnel associated with the contract during the reporting period.
- (vi) Summary of substantive information derived from noteworthy trips, meetings, and special conferences held in connection with the contract during the reporting period.
- (vii) Summary of all problems or areas of concern.
- (viii) Related accomplishments since last report.
- (ix) Fiscal status, to include reporting of summary level financial data in the following format:  
(next page)

**Note: In accordance with DFAR 252.227-7013(e) (iii) the Contractor (Prime and Subcontractor) shall notify the Government, via the Status Report, of any data deliverables which will be furnished to the Government with less than unlimited rights.**



## (2) FINAL REPORT

(a) This report shall document the results of the complete effort and should be delivered at the completion of the contract. If the Government chooses to exercise the options under this contract, the due date for the final report is extended accordingly. Title pages shall include a disclaimer worded substantially as follows:

“The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressly or implied, of the Defense Advanced Research Projects Agency or the U.S. Government.”

The Final Technical Report summary shall include:

Task Objectives  
 Technical Problems  
 General Methodology (i.e., literature review, laboratory experiments, surveys, etc.)  
 Technical Results  
 Important Findings and Conclusions  
 Significant Hardware Development  
 Special Comments  
 Implications for Further Research  
 Standard Form 298, August 1998

## (3) ALL REPORTS

(a) Reports delivered by the Contractor in the performance of the contract shall be considered “Technical Data” as defined in Section I contract clauses entitled “Rights in Technical Data – Noncommercial Items” and “Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation.”

(b) Bulky Reports shall be mailed by other than first-class mail unless the urgency of submission requires use of first-class mail. In this situation, one copy shall be mailed first-class and the remaining copies forwarded by less than first-class.

(c) All papers and articles published as a result of DARPA sponsored research shall include a statement reflecting the sponsorship. In addition, a bibliography of the titles and authors of all such papers are to be included in the Final Technical Report

(d) The cover or title page of each of the above reports or publications prepared will have the following citation:

(i) Sponsored by  
 Defense Advanced Research Projects Agency  
 Defense Sciences Office (DSO)  
 Program: Methods for Explosive Detection at Standoff (MEDS)  
 Purchase Request No. HR001132059, Program Code: DQ426  
 Issued by DARPA/CMO under Contract No. HR0011-13-C-0061

(ii) The title page shall include a disclaimer worded substantially as follows:

“The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressly or implied, of the Defense Advanced Research Projects Agency or the U.S. Government.”



(e) All technical reports must (i) be prepared in accordance with American National Standards Institute (ANSI) Standard Z39.18; (ii) include a Standard Form 298, August 1998; and (iii) be marked with an appropriate Distribution Statement.

(f) Distribution Statement B applies.

"Distribution authorized to U.S. Government agencies only due to the inclusion of proprietary information and to prevent Premature Dissemination of potentially critical technological Information. Other requests for this document shall be referred to DARPA Public Release Center (PRC) at PRC@darpa.mil."

**Note to contractor: As dictated by DFARS Part 27, legends or notices on restricted technical or computer software need to be accurate, conspicuous, and legible. The legend must be placed on the transmittal document or storage container and on each page of the printed material. Additionally, the delivered restricted data must be highlighted, underscored, or identified with marks that separate them from the technical data or software that is being delivered to the Government without restrictive rights.**

Section D - Packaging and Marking

CLAUSES INCORPORATED BY FULL TEXT

D-1 Packaging and Marking

All items shall be preserved, packaged, packed and marked in accordance with best commercial practices to meet the packing requirements of the carrier, and to ensure safe delivery at destination.

Section E - Inspection and Acceptance

CLAUSES INCORPORATED BY REFERENCE

52.246-9	Inspection Of Research And Development (Short Form)	APR 1984
252.246-7000	Material Inspection And Receiving Report	MAR 2008

CLAUSES INCORPORATED BY FULL TEXT

E-1 Inspection and Acceptance at Destination

Supplies/services will be inspected/accepted at destination by the Contracting Officer's Representative identified in Section G herein.

Use of the DD 250 is required for submission of the Final Report Only.



Section F - Deliveries or Performance

CLAUSES INCORPORATED BY REFERENCE

52.242-15 Alt I	Stop-Work Order (Aug 1989) - Alternate I	APR 1984
52.247-34	F.O.B. Destination	NOV 1991

CLAUSES INCORPORATED BY FULL TEXT

F-1 Term of Contract

(a) The term of the contract commences on March 1, 2013 and continues through February 28, 2014.

(b) The period of performance for Option 1, as set forth in CLIN 0002, shall be from the effective date of the option exercise to and including six (6) months thereafter.

(c) The Recipient shall make all requests for no-cost period of performance extensions, in writing, to the Administrative Contracting Officer, no later than 30 days prior to the end of the current period of performance. The Administrative Contracting Officer is delegated authority to grant such request, via modification to the Contract, after receiving approval from the Contracting Officer's Representative.

F-2 Reports and Other Deliverables

(a) Delivery of all reports and other deliverables shall be made to the addressee specified in F-3 entitled "Report Distribution" in accordance with the following:

Item No.	Description	Due Date (on or before)
0001, 0002	Quarterly R&D Status Report	15 <sup>th</sup> day of the month, every 3 months from commencing date of contract
0001, 0002	Final Report	End of contract

F-3 Report Distribution

(a) DARPA/DSO  
 Attn: Dr. Judah Goldwasser  
 675 North Randolph Street  
 Arlington, VA 22203-2114  
 Email: Judah.Goldwasser@darpa.mil  
 (one copy each report)

(b) U.S. Army Research Laboratory  
 Dr. Brad E. Forch  
 RDRL-WM  
 Weapons & Materials Research Directorate  
 Aberdeen Proving Ground, MD 21005-5066  
 Email: brad.forch@us.army.mil  
 (one copy each report)

- (c) DARPA/DSO  
Attn: ADPM  
675 North Randolph Street  
Arlington, VA 22203-2114  
Email: [DSO\\_ADPM@darpa.mil](mailto:DSO_ADPM@darpa.mil)  
(one copy of FINAL REPORT)
  
- (d) DARPA/CMO  
Attn: Michael S. Mutty (Contracting Officer)  
675 North Randolph Street  
Arlington, VA 22203-2114  
Email: [ReportsDSO@darpa.mil](mailto:ReportsDSO@darpa.mil)  
(one copy each report)
  
- (e) DARPA/Research Services  
675 North Randolph Street  
Arlington, VA 22203-2114  
Email: [ResearchServices@darpa.mil](mailto:ResearchServices@darpa.mil)  
(one copy of the Final Technical Report)
  
- (f) Defense Technical Information Center
  - (1) Email: [TR@dtic.mil](mailto:TR@dtic.mil)  
(one electronic copy of the Final Technical Report, if unclassified)
  
  - OR
  
  - (2) Attn: DTIC-BCS  
8725 John J. Kingman Road, Suite 0944  
Fort Belvoir, VA 22060-0944  
(two hard copies of the Final Technical Report if unclassified)

F-4 Notice Regarding Late Delivery

In the event the Contractor anticipates difficulty in complying with the contract delivery schedule, the Contractor shall immediately notify the Contracting Officer in writing, giving pertinent details, including the date by which it expects to make delivery; PROVIDED, however, that this date shall be informational only in character and the receipt thereof shall not be construed as a waiver by the Government of any contract delivery schedule, or any rights or remedies provided by law or under this contract.

## Section G - Contract Administration Data

## ACCOUNTING AND APPROPRIATION DATA

AA: 012193-21-2093-000-N-20122014-D--DQ426.MIPR2L105J7589.-2012.MBT-02-NA.D

AMOUNT: \$1,177,425.00

CIN 00000000000000000000000000000000: \$1,177,425.00

## CLAUSES INCORPORATED BY FULL TEXT

## 252.232-7006 WIDE AREA WORKFLOW PAYMENT INSTRUCTIONS (JUN 2012)

(a) Definitions. As used in this clause--

Department of Defense Activity Address Code (DoDAAC) is a six position code that uniquely identifies a unit, activity, or organization.

Document type means the type of payment request or receiving report available for creation in Wide Area WorkFlow (WAWF).

Local processing office (LPO) is the office responsible for payment certification when payment certification is done external to the entitlement system.

(b) Electronic invoicing. The WAWF system is the method to electronically process vendor payment requests and receiving reports, as authorized by DFARS 252.232-7003, Electronic Submission of Payment Requests and Receiving Reports.

(c) WAWF access. To access WAWF, the Contractor shall--

(1) Have a designated electronic business point of contact in the Central Contractor Registration at <https://www.acquisition.gov>; and

(2) Be registered to use WAWF at <https://wawf.eb.mil/> following the step-by-step procedures for self-registration available at this Web site.

(d) WAWF training. The Contractor should follow the training instructions of the WAWF Web-Based Training Course and use the Practice Training Site before submitting payment requests through WAWF. Both can be accessed by selecting the "Web Based Training" link on the WAWF home page at <https://wawf.eb.mil/>.

(e) WAWF methods of document submission. Document submissions may be via Web entry, Electronic Data Interchange, or File Transfer Protocol.

(f) WAWF payment instructions. The Contractor must use the following information when submitting payment requests and receiving reports in WAWF for this contract/order:

(1) Document type. The Contractor shall use the following document type(s).

Cost Voucher



(2) Inspection/acceptance location. The Contractor shall select the following inspection/acceptance location(s) in WAWF, as specified by the contracting officer.

Not Applicable

(3) Document routing. The Contractor shall use the information in the Routing Data Table below only to fill in applicable fields in WAWF when creating payment requests and receiving reports in the system.

Routing Data Table\*

Field Name in WAWF	Data to be entered in WAWF
Pay Official DoDAAC	HQ0339
Issue By DoDAAC	HR0011
Admin DoDAAC	S0514A
Inspect By DoDAAC	Not Applicable
Ship To Code	Not Applicable
Ship From Code	Not Applicable
Mark For Code	Not Applicable
Service Approver (DoDAAC)	S0514A
Service Acceptor (DoDAAC)	Not Applicable
Accept at Other DoDAAC	Not Applicable
LPO DoDAAC	Not Applicable
DCAA Auditor DoDAAC	HAA05B
Other DoDAAC(s)	Not Applicable

(4) Payment request and supporting documentation. The Contractor shall ensure a payment request includes appropriate contract line item and subline item descriptions of the work performed or supplies delivered, unit price/cost per unit, fee (if applicable), and all relevant back-up documentation, as defined in DFARS Appendix F, (e.g. timesheets) in support of each payment request.

(5) WAWF email notifications. The Contractor shall enter the email address identified below in the “Send Additional Email Notifications” field of WAWF once a document is submitted in the system.

brad.forch@us.army.mil

(g) WAWF point of contact. (1) The Contractor may obtain clarification regarding invoicing in WAWF from the following contracting activity's WAWF point of contact.

Not Applicable

(2) For technical WAWF help, contact the WAWF helpdesk at 866-618-5988.

(End of clause)

G-1 Procuring Office Representative

The Procuring Office Representative is Michael S. Mutty, 675 North Randolph Street, Arlington, VA 22203-2114.

G-2 Delegation of Authority for Contract Administration

DCMA San Diego, is hereby designated as the Contracting Officer's authorized representative for administering this contract in accordance with current directives.

G-3 Contracting Officer's Representative (COR)

(a) Performance of work under this contract shall be subject to the technical direction of

Dr. Brad E. Forch  
RDRL-WM  
U.S. Army Research Laboratory  
Weapons & Materials Research Directorate  
Aberdeen Proving Ground, MD 21005-5066  
[brad.forch@us.army.mil](mailto:brad.forch@us.army.mil)  
410-306-0929

Such technical direction includes those instructions to the Contractor necessary to accomplish the Statement of Work. The COR is not otherwise authorized to make any representations or commitments of any kind on behalf of the Contracting Officer or the Government. The COR does not have the authority to alter the Contractor's obligations or to change the specifications of the contract.

(b) Technical direction shall not include any direction which:

- (1) Constitutes additional work outside the scope of work;
- (2) Constitutes a change as defined in Section I contract clause entitled "Changes";
- (3) In any manner causes an increase or decrease in the total estimated cost or the time required for contract performance; or
- (4) Changes any of the stated terms, conditions, or specifications of the contract.

G-4 252.204-0004 Line Item Specific: by Fiscal Year (SEP 2009)

The payment office will make payment using the oldest fiscal year appropriations first, exhausting all funds in the previous fiscal year before disbursing from the next fiscal year. In the event there is more than one ACRN associated with the same fiscal year, the payment amount shall be disbursed from each ACRN within a fiscal year in the same proportion as the amount of funding obligated for each ACRN within the fiscal year.

G-5 Incremental Funding

This Contract is fully funded and it is subject to FAR 52.232-20.

G-6 Payment of Cost and Fee

(a) As consideration for the proper performance of work required under this contract, the Contractor shall be paid as follows:

(1) Costs, as provided for under Section I contract clause titled "Allowable Cost and Payment" not to exceed the amount set forth as "Total Estimated Cost" in Section B, and subject further to those Section I clauses entitled "Limitation of Cost" or "Limitation of Funds".

(2) A fixed fee in the amount set forth as "Fixed Fee" in Section B, in accordance with the Section I contract clause entitled "Fixed Fee". The Contractor may bill on each invoice the amount of the fixed fee bearing the same percentage to the total fixed fee as the amount of cost billed bears to the total estimated cost.



## Section H - Special Contract Requirements

## CLAUSES INCORPORATED BY FULL TEXT

## H-1 Type of Contract

This is a Cost-Plus Fixed Fee contract.

## H-2 Contracting Officer

Notwithstanding any other provision of this contract, the Contracting Officer is the only individual authorized to redirect the effort or in any way amend or modify any of the terms of this contract. If, as a result of technical discussions, it is desirable to alter contract obligations or statement of work, a modification must be issued in writing and signed by the Contracting Officer.

## H-3 Public Release or Dissemination of Information

(1) At this time, DARPA expects the work performed under this contract to be fundamental research, and it is, therefore, not subject to publication restrictions. Papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and requirements, pursuant to DoD Instruction 5230.27 dated October 6, 1987.

(2) Should the character of the research change during contract performance so that the research is no longer considered fundamental, the contract will be modified to impose the restrictions on public release and dissemination of information that apply to those research efforts that are not considered fundamental research.

## H-4 Key Personnel

(a) The Contractor shall notify the Contracting Officer prior to making any change in key personnel. Key personnel are defined as follows:

- (1) Personnel identified in the proposal as key individuals to be assigned for participation in the performance of the contract; or
- (2) Personnel whose resumes were submitted with the proposal; or
- (3) Individuals who are designated as key personnel by agreement of the Government and the Contractor during negotiations.

(b) The Contractor must demonstrate that the qualifications of the prospective personnel are equal to or better than the qualifications of the personnel being replaced. Notwithstanding any of the foregoing provisions, key personnel shall be furnished unless the Contractor has demonstrated to the satisfaction of the COR that the qualifications of the proposed substitute personnel are equal to or better than the qualifications of the personnel being replaced.

#### H-5 Restrictions on Printing

Unless otherwise authorized in writing by the Contracting Officer, reports, data, or other written material produced using funds provided by this contract and submitted hereunder shall be reproduced only by duplicating processes and shall not exceed 5,000 single page reports or a total of 25,000 pages of a multiple-page report. These restrictions do not preclude the writing, editing, preparation of manuscript or reproducible copy of related illustrative materials if required as part of this contract, or incidental printing such as forms or materials necessary to be used by the Contractor to respond to the terms of the contract.

#### H-6 Invention Disclosure and Reports

All written communications required by this clause shall be submitted to the Administrative Contracting Officer (ACO). All required reporting (invention disclosures, patent disclosures, etc.) shall be accomplished using the i-Edison.gov reporting website (<https://s-edison.info.nih.gov/iEdison/>).

#### H-7 Insurance Schedule

The Contractor shall maintain the types of insurance listed in FAR 28.307-2 (a), (b) and (c), with the minimum amounts of liability indicated therein. The types of insurance coverage listed in paragraphs (d) and (e) shall also be maintained when applicable.

#### H-8 Travel

(a) University Performers: Reimbursement for travel-related expenses shall be as stipulated in OMB Circular A-21 (2 CFR 220) as prescribed by FAR Part 31.3.

(b) Non-Profit Performers: Reimbursement for travel-related expenses shall be as stipulated in OMB Circular A-122 (2 CFR 230) as prescribed by FAR Part 31.7

(c) Non-University/For-Profit Performers: Reimbursement for travel-related expenses shall be in accordance with the Contractor's approved travel policy. The Federal Travel Regulations, Joint Travel Regulations (JTR), and Standardized Regulations as stated in FAR 31.205-46 will be used as a guide in determining reasonableness of per diem costs. Costs for travel shall be allowable subject to the provisions of FAR 31.205-46.

(d) In connection with direct charge to the contract of travel-related expenses, the Contractor shall hold travel to the minimum required to meet the objectives of the contract, and substantial deviations from the amount of travel agreed to during contract negotiation shall not be made without the authorization of the Contracting Officer.

When applicable, the Contractor shall notify the COR of proposed travel of an employee beyond that agreed to during negotiations.

(e) Approval of the Contracting Officer shall be obtained in advance for attendance by personnel at training courses, seminars, and other meetings not directly related to contract performance if the costs for the courses, seminars, and other meetings are charged to the contract.

(f) All foreign travel shall be authorized and approved in advance, in writing, by the Contracting Officer. Request for such travel must be submitted to the Contracting Officer at least forty-five (45) days in advance of traveler's anticipated departure date, and shall include traveler's itinerary of United States Flag Air Carriers.

H-9 Metric System

(a) The Defense Advanced Research Projects Agency (DARPA) will consider the use of the metric system in all of its activities consistent with operational, economical, technical and safety requirements.

(b) The metric system will be considered for use in all new designs. When it is deemed not to be in the best interest of the DoD to provide metric design, justification shall be provided.

(c) Physical and operational interfaces between metric items and U.S. customary items will be designed to assure that interchangeability and interoperability will not be affected.

(d) Existing designs dimensioned in U.S. customary units will be converted to metric units only if determined to be necessary or advantageous. Unnecessary retrofit of existing systems with new metric components will be avoided where both the new metric and existing units are interchangeable and interoperable. Normally, the system of measurement in which an item is originally designed will be retained for the life of the item.

(e) During the metric transition phase hybrid metric and U.S. customary designs will be necessary and acceptable. Material components, parts, subassemblies, and semi-fabricated material, which are of adequate or when it is otherwise specifically determined to be in the best interest of the Department of Defense. Bulk materials will be specified and accepted in metric units when it is expedient or economical to do so.

(f) Technical reports, studies, and position papers, (except those pertaining to items dimensioned in U.S. customary units) will include metric units of measurement in addition to or in lieu of U.S. customary units. With respect to existing contracts, this requirement applies only if such documentation can be obtained without an increase in contract costs.

(g) Use of the dual dimensions (i.e., both metric and U.S. customary dimensions) on drawings will be avoided unless it is determined in specific instances that such usage will be beneficial. However, the use of tables on the document to translate dimensions from one system of measurement to the other is acceptable.

H-10 Proprietary Technical Data and Computer Software

Any deliverable technical data or computer software developed or generated at private expense and considered to be proprietary by the Contractor or subcontractors shall be delivered in accordance with DFARS 252.227-7013 and 252.227-7014.

H-11 Contractor Representations and Certifications

The Contractor's Representations and Certifications dated February 11, 2013 and the Contractor's On-Line Representations and Certifications (ORCA) are incorporated herein by reference.

H-12 Consultants

(a) The contractor is authorized to use the following consultants to the extent indicated:

CONSULTANT	# of HOURS	RATE / HR	COST
(b)(4),(b)(6)			

(b) Approval must be obtained from the Administrative Contracting Officer to increase the use of consultants from the level estimated in subparagraph (a).



## H-13 Export Control

(a) *Definition.* “Export-controlled items,” as used in this clause, means items subject to the Export Administration Regulations (EAR) (15 CFR Parts 730-774) or the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130). The term includes:

1) “Defense items,” defined in the Arms Export Control Act, 22 U.S.C. 2778(j)(4)(A), as defense articles, defense services, and related technical data, and further defined in the ITAR, 22 CFR Part 120.

2) “Items,” defined in the EAR as “commodities”, “software”, and “technology,” terms that are also defined in the EAR, 15 CFR 772.1.

(b) The Contractor shall comply with all applicable laws and regulations regarding export-controlled items, including, but not limited to, the requirement for contractors to register with the Department of State in accordance with the ITAR. The Contractor shall consult with the Department of State regarding any questions relating to compliance with the ITAR and shall consult with the Department of Commerce regarding any questions relating to compliance with the EAR.

(c) The Contractor's responsibility to comply with all applicable laws and regulations regarding export-controlled items exists independent of, and is not established or limited by, the information provided by this clause.

(d) Nothing in the terms of this contract adds, changes, supersedes, or waives any of the requirements of applicable Federal laws, Executive orders, and regulations,

including but not limited to—

(1) The Export Administration Act of 1979, as amended (50 U.S.C. App. 2401, *et seq.*);

(2) The Arms Export Control Act (22 U.S.C. 2751, *et seq.*);

(3) The International Emergency Economic Powers Act (50 U.S.C. 1701, *et seq.*);

(4) The Export Administration Regulations (15 CFR Parts 730-774);

(5) The International Traffic in Arms Regulations (22 CFR Parts 120-130);

and

(6) Executive Order 13222, as extended;

(e) The Contractor shall include the substance of this clause, including this paragraph (e), in all subcontracts.

## Section I - Contract Clauses

## CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JAN 2012
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	OCT 2010
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	OCT 2010
52.204-4	Printed or Copied Double-Sided on Postconsumer Fiber Content Paper	MAY 2011
52.204-10	Reporting Executive Compensation and First-Tier Subcontract Awards	AUG 2012
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	DEC 2010
52.209-9	Updates of Publicly Available Information Regarding Responsibility Matters	FEB 2012
52.215-8	Order of Precedence--Uniform Contract Format	OCT 1997
52.215-10	Price Reduction for Defective Certified Cost or Pricing Data	AUG 2011
52.215-12	Subcontractor Certified Cost or Pricing Data	OCT 2010
52.215-15	Pension Adjustments and Asset Reversions	OCT 2010
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other than Pensions	JUL 2005
52.216-8	Fixed Fee	JUN 2011
52.219-8	Utilization of Small Business Concerns	JAN 2011
52.219-9	Small Business Subcontracting Plan	JAN 2011
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.219-25	Small Disadvantaged Business Participation Program-- Disadvantaged Status and Reporting	DEC 2010
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 Veterans	SEP 2010
52.222-36	Affirmative Action For Workers With Disabilities	OCT 2010
52.222-37	Employment Reports on Veterans	SEP 2010
52.222-50	Combating Trafficking in Persons	FEB 2009
52.222-54	Employment Eligibility Verification	JUL 2012
52.223-16 Alt I	IEEE 1680 Standard for the Environmental Assessment of Personal Computer Products (Dec 2007) Alternate I	DEC 2007
52.223-18	Encouraging Contractor Policies To Ban Text Messaging While Driving	AUG 2011
52.225-13	Restrictions on Certain Foreign Purchases	JUN 2008
52.226-1	Utilization Of Indian Organizations And Indian-Owned Economic Enterprises	JUN 2000
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	DEC 2007

52.228-7	Insurance--Liability To Third Persons	MAR 1996
52.232-9	Limitation On Withholding Of Payments	APR 1984
52.232-20	Limitation Of Cost	APR 1984
52.232-23 Alt I	Assignment of Claims (Jan 1986) - Alternate I	APR 1984
52.232-25	Prompt Payment	OCT 2008
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration	OCT 2003
52.232-99 (Dev)	Providing Accelerated Payment to Small Business Subcontractors (Deviation)	AUG 2012
52.233-1	Disputes	JUL 2002
52.233-3 Alt I	Protest After Award (Aug 1996) - Alternate I	JUN 1985
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 Costs	JAN 1997
52.242-13	Bankruptcy	JUL 1995
52.243-2 Alt V	Changes--Cost-Reimbursement (Aug 1987) - Alternate V	APR 1984
52.244-6	Subcontracts for Commercial Items	DEC 2010
52.245-1	Government Property	APR 2012
52.245-9	Use And Charges	APR 2012
52.249-6	Termination (Cost Reimbursement)	MAY 2004
52.249-14	Excusable Delays	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7000	Requirements Relating to Compensation of Former DoD Officials	SEP 2011
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2008
252.203-7002	Requirement to Inform Employees of Whistleblower Rights	JAN 2009
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004 Alt A	Central Contractor Registration Alternate A	SEP 2007
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	DEC 2006
252.211-7007	Reporting of Government-Furnished Property	AUG 2012
252.215-7000	Pricing Adjustments	DEC 2012
252.215-7002	Cost Estimating System Requirements	DEC 2012
252.219-7003	Small Business Subcontracting Plan (DOD Contracts)	AUG 2012
252.219-7004	Small Business Subcontracting Plan (Test Program)	JAN 2011
252.222-7006	Restrictions on the Use of Mandatory Arbitration Agreements	DEC 2010
252.225-7002	Qualifying Country Sources As Subcontractors	DEC 2012
252.225-7006	Quarterly Reporting of Actual Contract Performance Outside the United States	OCT 2010
252.225-7012	Preference For Certain Domestic Commodities	DEC 2012
252.226-7001	Utilization of Indian Organizations and Indian-Owned Economic Enterprises, and Native Hawaiian Small Business Concerns	SEP 2004
252.227-7013	Rights in Technical Data--Noncommercial Items	FEB 2012
252.227-7014	Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation	FEB 2012
252.227-7015	Technical Data--Commercial Items	DEC 2011
252.227-7016	Rights in Bid or Proposal Information	JAN 2011
252.227-7019	Validation of Asserted Restrictions--Computer Software	SEP 2011
252.227-7027	Deferred Ordering Of Technical Data Or Computer Software	APR 1988
252.227-7037	Validation of Restrictive Markings on Technical Data	JUN 2012



252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	JUN 2012
252.232-7010	Levies on Contract Payments	DEC 2006
252.233-7001	Choice of Law (Overseas)	JUN 1997
252.235-7011	Final Scientific or Technical Report	NOV 2004
252.239-7001	Information Assurance Contractor Training and Certification	JAN 2008
252.242-7004	Material Management And Accounting System	MAY 2011
252.243-7002	Requests for Equitable Adjustment	DEC 2012
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts)	JUN 2012
252.247-7023	Transportation of Supplies by Sea	MAY 2002
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000

## CLAUSES INCORPORATED BY FULL TEXT

## 52.215-19 NOTIFICATION OF OWNERSHIP CHANGES (OCT 1997)

(a) The Contractor shall make the following notifications in writing:

(1) When the Contractor becomes aware that a change in its ownership has occurred, or is certain to occur, that could result in changes in the valuation of its capitalized assets in the accounting records, the Contractor shall notify the Administrative Contracting Officer (ACO) within 30 days.

(2) The Contractor shall also notify the ACO within 30 days whenever changes to asset valuations or any other cost changes have occurred or are certain to occur as a result of a change in ownership.

(b) The Contractor shall--

(1) Maintain current, accurate, and complete inventory records of assets and their costs;

(2) Provide the ACO or designated representative ready access to the records upon request;

(3) Ensure that all individual and grouped assets, their capitalized values, accumulated depreciation or amortization, and remaining useful lives are identified accurately before and after each of the Contractor's ownership changes; and

(4) Retain and continue to maintain depreciation and amortization schedules based on the asset records maintained before each Contractor ownership change.

The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirement of FAR 15.408(k).

(End of clause)

## 52.216-7 ALLOWABLE COST AND PAYMENT (JUN 2011)

(a) Invoicing.

(1) The Government will make payments to the Contractor when requested as work progresses, but (except for small business concerns) not more often than once every 2 weeks, in amounts determined to be allowable by the Contracting Officer in accordance with Federal Acquisition Regulation (FAR) subpart 31.2 in effect on the date of this contract and the terms of this contract. The Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as the representative may require, an invoice or voucher supported by a statement of the claimed allowable cost for performing this contract.

(2) Contract financing payments are not subject to the interest penalty provisions of the Prompt Payment Act. Interim payments made prior to the final payment under the contract are contract financing payments, except interim payments if this contract contains Alternate I to the clause at 52.232-25.

(3) The designated payment office will make interim payments for contract financing on the 30<sup>th</sup> day after the designated billing office receives a proper payment request.

In the event that the Government requires an audit or other review of a specific payment request to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the specified due date.

(b) Reimbursing costs. (1) For the purpose of reimbursing allowable costs (except as provided in subparagraph (b)(2) of the clause, with respect to pension, deferred profit sharing, and employee stock ownership plan contributions), the term "costs" includes only--

(i) Those recorded costs that, at the time of the request for reimbursement, the Contractor has paid by cash, check, or other form of actual payment for items or services purchased directly for the contract;

(ii) When the Contractor is not delinquent in paying costs of contract performance in the ordinary course of business, costs incurred, but not necessarily paid, for--

(A) Supplies and services purchased directly for the contract and associated financing payments to subcontractors, provided payments determined due will be made--

(1) In accordance with the terms and conditions of a subcontract or invoice; and

(2) Ordinarily within 30 days of the submission of the Contractor's payment request to the Government;

(B) Materials issued from the Contractor's inventory and placed in the production process for use on the contract;

(C) Direct labor;

(D) Direct travel;

(E) Other direct in-house costs; and

(F) Properly allocable and allowable indirect costs, as shown in the records maintained by the Contractor for purposes of obtaining reimbursement under Government contracts; and

(iii) The amount of financing payments that have been paid by cash, check, or other forms of payment to subcontractors.

(2) Accrued costs of Contractor contributions under employee pension plans shall be excluded until actually paid unless--

(i) The Contractor's practice is to make contributions to the retirement fund quarterly or more frequently; and

(ii) The contribution does not remain unpaid 30 days after the end of the applicable quarter or shorter payment period (any contribution remaining unpaid shall be excluded from the Contractor's indirect costs for payment purposes).

(3) Notwithstanding the audit and adjustment of invoices or vouchers under paragraph (g) of this clause, allowable indirect costs under this contract shall be obtained by applying indirect cost rates established in accordance with paragraph (d) of this clause.

(4) Any statements in specifications or other documents incorporated in this contract by reference designating performance of services or furnishing of materials at the Contractor's expense or at no cost to the Government shall be disregarded for purposes of cost-reimbursement under this clause.

(c) Small business concerns. A small business concern may receive more frequent payments than every 2 weeks.

(d) Final indirect cost rates. (1) Final annual indirect cost rates and the appropriate bases shall be established in accordance with Subpart 42.7 of the Federal Acquisition Regulation (FAR) in effect for the period covered by the indirect cost rate proposal.

(2)(i) The Contractor shall submit an adequate final indirect cost rate proposal to the Contracting Officer (or cognizant Federal agency official) and auditor within the 6-month period following the expiration of each of its fiscal years. Reasonable extensions, for exceptional circumstances only, may be requested in writing by the Contractor and granted in writing by the Contracting Officer. The Contractor shall support its proposal with adequate supporting data.

(ii) The proposed rates shall be based on the Contractor's actual cost experience for that period. The appropriate Government representative and the Contractor shall establish the final indirect cost rates as promptly as practical after receipt of the Contractor's proposal.

(iii) An adequate indirect cost rate proposal shall include the following data unless otherwise specified by the cognizant Federal agency official:

(A) Summary of all claimed indirect expense rates, including pool, base, and calculated indirect rate.

(B) General and Administrative expenses (final indirect cost pool). Schedule of claimed expenses by element of cost as identified in accounting records (Chart of Accounts).

(C) Overhead expenses (final indirect cost pool). Schedule of claimed expenses by element of cost as identified in accounting records (Chart of Accounts) for each final indirect cost pool.

(D) Occupancy expenses (intermediate indirect cost pool). Schedule of claimed expenses by element of cost as identified in accounting records (Chart of Accounts) and expense reallocation to final indirect cost pools.

(E) Claimed allocation bases, by element of cost, used to distribute indirect costs.

(F) Facilities capital cost of money factors computation.

(G) Reconciliation of books of account (i.e., General Ledger) and claimed direct costs by major cost element.

(H) Schedule of direct costs by contract and subcontract and indirect expense applied at claimed rates, as well as a subsidiary schedule of Government participation percentages in each of the allocation base amounts.

(I) Schedule of cumulative direct and indirect costs claimed and billed by contract and subcontract.

(J) Subcontract information. Listing of subcontracts awarded to companies for which the contractor is the prime or upper-tier contractor (include prime and subcontract numbers; subcontract value and award type; amount claimed during the fiscal year; and the subcontractor name, address, and point of contact information).

(K) Summary of each time-and-materials and labor-hour contract information, including labor categories, labor rates, hours, and amounts; direct materials; other direct costs; and, indirect expense applied at claimed rates.

(L) Reconciliation of total payroll per IRS form 941 to total labor costs distribution.

(M) Listing of decisions/agreements/approvals and description of accounting/organizational changes.

(N) Certificate of final indirect costs (see 52.242-4, Certification of Final Indirect Costs).

(O) Contract closing information for contracts physically completed in this fiscal year (include contract number, period of performance, contract ceiling amounts, contract fee computations, level of effort, and indicate if the contract is ready to close).

(iv) The following supplemental information is not required to determine if a proposal is adequate, but may be required during the audit process:

(A) Comparative analysis of indirect expense pools detailed by account to prior fiscal year and budgetary data.

(B) General Organizational information and Executive compensation for the five most highly compensated executives. See 31.205-6(p). Additional salary reference information is available at [http://www.whitehouse.gov/omb/procurement\\_index\\_exec\\_comp/](http://www.whitehouse.gov/omb/procurement_index_exec_comp/).

(C) Identification of prime contracts under which the contractor performs as a subcontractor.

(D) Description of accounting system (excludes contractors required to submit a CAS Disclosure Statement or contractors where the description of the accounting system has not changed from the previous year's submission).

(E) Procedures for identifying and excluding unallowable costs from the costs claimed and billed (excludes contractors where the procedures have not changed from the previous year's submission).

(F) Certified financial statements and other financial data (e.g., trial balance, compilation, review, etc.).

(G) Management letter from outside CPAs concerning any internal control weaknesses.

(H) Actions that have been and/or will be implemented to correct the weaknesses described in the management letter from subparagraph G) of this section.

(I) List of all internal audit reports issued since the last disclosure of internal audit reports to the Government.

(J) Annual internal audit plan of scheduled audits to be performed in the fiscal year when the final indirect cost rate submission is made.

(K) Federal and State income tax returns.

(L) Securities and Exchange Commission 10-K annual report.

(M) Minutes from board of directors meetings.

(N) Listing of delay claims and termination claims submitted which contain costs relating to the subject fiscal year.

(O) Contract briefings, which generally include a synopsis of all pertinent contract provisions, such as: Contract type, contract amount, product or service(s) to be provided, contract performance period, rate ceilings, advance approval requirements, pre-contract cost allowability limitations, and billing limitations.

(v) The Contractor shall update the billings on all contracts to reflect the final settled rates and update the schedule of cumulative direct and indirect costs claimed and billed, as required in paragraph (d)(2)(iii)(I) of this section, within 60 days after settlement of final indirect cost rates.

(3) The Contractor and the appropriate Government representative shall execute a written understanding setting forth the final indirect cost rates. The understanding shall specify (i) the agreed-upon final annual indirect cost rates, (ii) the bases to which the rates apply, (iii) the periods for which the rates apply, (iv) any specific indirect cost items treated as direct costs in the settlement, and (v) the affected contract and/or subcontract, identifying any with advance agreements or special terms and the applicable rates. The understanding shall not change any monetary ceiling, contract obligation, or specific cost allowance or disallowance provided for in this contract. The understanding is incorporated into this contract upon execution.

(4) Failure by the parties to agree on a final annual indirect cost rate shall be a dispute within the meaning of the Disputes clause.

(5) Within 120 days (or longer period if approved in writing by the Contracting Officer) after settlement of the final annual indirect cost rates for all years of a physically complete contract, the Contractor shall submit a completion invoice or voucher to reflect the settled amounts and rates. The completion invoice or voucher shall include settled subcontract amounts and rates. The prime contractor is responsible for settling subcontractor amounts and rates included in the completion invoice or voucher and providing status of subcontractor audits to the contracting officer upon request.

(6)(i) If the Contractor fails to submit a completion invoice or voucher within the time specified in paragraph (d)(5) of this clause, the Contracting Officer may--

(A) Determine the amounts due to the Contractor under the contract; and

(B) Record this determination in a unilateral modification to the contract.

(ii) This determination constitutes the final decision of the Contracting Officer in accordance with the Disputes clause.

(e) Billing rates. Until final annual indirect cost rates are established for any period, the Government shall reimburse the Contractor at billing rates established by the Contracting Officer or by an authorized representative (the cognizant auditor), subject to adjustment when the final rates are established. These billing rates--

(1) Shall be the anticipated final rates; and

(2) May be prospectively or retroactively revised by mutual agreement, at either party's request, to prevent substantial overpayment or underpayment.

(f) Quick-closeout procedures. Quick-closeout procedures are applicable when the conditions in FAR 42.708(a) are satisfied.

(g) Audit. At any time or times before final payment, the Contracting Officer may have the Contractor's invoices or vouchers and statements of cost audited. Any payment may be (1) Reduced by amounts found by the Contracting Officer not to constitute allowable costs or (2) Adjusted for prior overpayments or underpayments.

(h) Final payment. (1) Upon approval of a completion invoice or voucher submitted by the Contractor in accordance with paragraph (d)(4) of this clause, and upon the Contractor's compliance with all terms of this contract, the Government shall promptly pay any balance of allowable costs and that part of the fee (if any) not previously paid.

(2) The Contractor shall pay to the Government any refunds, rebates, credits, or other amounts (including interest, if any) accruing to or received by the Contractor or any assignee under this contract, to the extent that those amounts are properly allocable to costs for which the Contractor has been reimbursed by the Government. Reasonable expenses incurred by the Contractor for securing refunds, rebates, credits, or other amounts shall be allowable costs if approved by the Contracting Officer. Before final payment under this contract, the Contractor and each assignee whose assignment is in effect at the time of final payment shall execute and deliver--

(i) An assignment to the Government, in form and substance satisfactory to the Contracting Officer, of refunds, rebates, credits, or other amounts (including interest, if any) properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract; and

(ii) A release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract, except--



- (A) Specified claims stated in exact amounts, or in estimated amounts when the exact amounts are not known;
- (B) Claims (including reasonable incidental expenses) based upon liabilities of the Contractor to third parties arising out of the performance of this contract; provided, that the claims are not known to the Contractor on the date of the execution of the release, and that the Contractor gives notice of the claims in writing to the Contracting Officer within 6 years following the release date or notice of final payment date, whichever is earlier; and
- (C) Claims for reimbursement of costs, including reasonable incidental expenses, incurred by the Contractor under the patent clauses of this contract, excluding, however, any expenses arising from the Contractor's indemnification of the Government against patent liability.

(End of clause)

#### 52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 2000)

- (a) The Government may extend the term of this contract by written notice to the Contractor:

CLIN 0002 within twelve (12) months from the effective date of CLIN 0001;

provided that the Government gives the Contractor a preliminary written notice of its intent to extend at least sixty (60) 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 eighteen (18) months.

(End of clause)

#### 52.222-2 PAYMENT FOR OVERTIME PREMIUMS (JUL 1990)

- (a) The use of overtime is authorized under this contract if the overtime premium cost does not exceed \$0.00 or the overtime premium is paid for work --

(1) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;

(2) By indirect-labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;

(3) To perform tests, industrial processes, laboratory procedures, loading or unloading of transportation conveyances, and operations in flight or afloat that are continuous in nature and cannot reasonably be interrupted or completed otherwise; or

(4) That will result in lower overall costs to the Government.

- (b) Any request for estimated overtime premiums that exceeds the amount specified above shall include all estimated overtime for contract completion and shall--

(1) Identify the work unit; e.g., department or section in which the requested overtime will be used, together with



present workload, staffing, and other data of the affected unit sufficient to permit the Contracting Officer to evaluate the necessity for the overtime;

(2) Demonstrate the effect that denial of the request will have on the contract delivery or performance schedule;

(3) Identify the extent to which approval of overtime would affect the performance or payments in connection with other Government contracts, together with identification of each affected contract; and

(4) Provide reasons why the required work cannot be performed by using multishift operations or by employing additional personnel.

\* Insert either "zero" or the dollar amount agreed to during negotiations. The inserted figure does not apply to the exceptions in paragraph (a)(1) through (a)(4) of the clause.

(End of clause)

#### 52.227-11 PATENT RIGHTS--OWNERSHIP BY THE CONTRACTOR (DEC 2007)

(a) As used in this clause--

Invention means any invention or discovery that is or may be patentable or otherwise protectable under title 35 of the U.S. Code, or any variety of plant that is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321, et seq.)

Made means--

(1) When used in relation to any invention other than a plant variety, the conception or first actual reduction to practice of the invention; or

(2) When used in relation to a plant variety, that the Contractor has at least tentatively determined that the variety has been reproduced with recognized characteristics.

Nonprofit organization means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a)), or any nonprofit scientific or educational organization qualified under a State nonprofit organization statute.

Practical application means to manufacture, in the case of a composition of product; to practice, in the case of a process or method; or to operate, in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.

Subject invention means any invention of the Contractor made in the performance of work under this contract.

(b) Contractor's rights. (1) Ownership. The Contractor may retain ownership of each subject invention throughout the world in accordance with the provisions of this clause.

(2) License. (i) The Contractor shall retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, unless the Contractor fails to disclose the invention within the times specified in paragraph (c) of this clause. The Contractor's license extends to any domestic subsidiaries and affiliates within the corporate structure of which the Contractor is a part, and includes the right to grant sublicenses to the extent the Contractor was legally obligated to do so at contract award. The license is transferable only with the

written approval of the agency, except when transferred to the successor of that part of the Contractor's business to which the invention pertains.

(ii) The Contractor's license may be revoked or modified by the agency to the extent necessary to achieve expeditious practical application of the subject invention in a particular country in accordance with the procedures in FAR 27.302(i)(2) and 27.304-1(f).

(c) Contractor's obligations. (1) The Contractor shall disclose in writing each subject invention to the Contracting Officer within 2 months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. The disclosure shall identify the inventor(s) and this contract under which the subject invention was made. It shall be sufficiently complete in technical detail to convey a clear understanding of the subject invention. The disclosure shall also identify any publication, on sale (i.e., sale or offer for sale), or public use of the subject invention, or whether a manuscript describing the subject invention has been submitted for publication and, if so, whether it has been accepted for publication. In addition, after disclosure to the agency, the Contractor shall promptly notify the Contracting Officer of the acceptance of any manuscript describing the subject invention for publication and any on sale or public use.

(2) The Contractor shall elect in writing whether or not to retain ownership of any subject invention by notifying the Contracting Officer within 2 years of disclosure to the agency. However, in any case where publication, on sale, or public use has initiated the 1-year statutory period during which valid patent protection can be obtained in the United States, the period for election of title may be shortened by the agency to a date that is no more than 60 days prior to the end of the statutory period.

(3) The Contractor shall file either a provisional or a nonprovisional patent application or a Plant Variety Protection Application on an elected subject invention within 1 year after election. However, in any case where a publication, on sale, or public use has initiated the 1-year statutory period during which valid patent protection can be obtained in the United States, the Contractor shall file the application prior to the end of that statutory period. If the Contractor files a provisional application, it shall file a nonprovisional application within 10 months of the filing of the provisional application. The Contractor shall file patent applications in additional countries or international patent offices within either 10 months of the first filed patent application (whether provisional or nonprovisional) or 6 months from the date permission is granted by the Commissioner of Patents to file foreign patent applications where such filing has been prohibited by a Secrecy Order.

(4) The Contractor may request extensions of time for disclosure, election, or filing under paragraphs (c)(1), (c)(2), and (c)(3) of this clause.

(d) Government's rights--(1) Ownership. The Contractor shall assign to the agency, on written request, title to any subject invention--

(i) If the Contractor fails to disclose or elect ownership to the subject invention within the times specified in paragraph (c) of this clause, or elects not to retain ownership; provided, that the agency may request title only within 60 days after learning of the Contractor's failure to disclose or elect within the specified times.

(ii) In those countries in which the Contractor fails to file patent applications within the times specified in paragraph (c) of this clause; provided, however, that if the Contractor has filed a patent application in a country after the times specified in paragraph (c) of this clause, but prior to its receipt of the written request of the agency, the Contractor shall continue to retain ownership in that country.

(iii) In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

(2) License. If the Contractor retains ownership of any subject invention, the Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice, or have practiced for or on its behalf, the subject invention throughout the world.

(e) Contractor action to protect the Government's interest. (1) The Contractor shall execute or have executed and promptly deliver to the agency all instruments necessary to--

(i) Establish or confirm the rights the Government has throughout the world in those subject inventions in which the Contractor elects to retain ownership; and

(ii) Assign title to the agency when requested under paragraph (d) of this clause and to enable the Government to obtain patent protection and plant variety protection for that subject invention in any country.

(2) The Contractor shall require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in the Contractor's format, each subject invention in order that the Contractor can comply with the disclosure provisions of paragraph (c) of this clause, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. The disclosure format should require, as a minimum, the information required by paragraph (c)(1) of this clause. The Contractor shall instruct such employees, through employee agreements or other suitable educational programs, as to the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

(3) The Contractor shall notify the Contracting Officer of any decisions not to file a nonprovisional patent application, continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response or filing period required by the relevant patent office.

(4) The Contractor shall include, within the specification of any United States nonprovisional patent or plant variety protection application and any patent or plant variety protection certificate issuing thereon covering a subject invention, the following statement, "This invention was made with Government support under (identify the contract) awarded by (identify the agency). The Government has certain rights in the invention."

(f) Reporting on utilization of subject inventions. The Contractor shall submit, on request, periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining utilization of the subject invention that are being made by the Contractor or its licensees or assignees. The reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and other data and information as the agency may reasonably specify. The Contractor also shall provide additional reports as may be requested by the agency in connection with any march-in proceeding undertaken by the agency in accordance with paragraph (h) of this clause. The Contractor also shall mark any utilization report as confidential/proprietary to help prevent inadvertent release outside the Government. As required by 35 U.S.C. 202(c)(5), the agency will not disclose that information to persons outside the Government without the Contractor's permission.

(g) Preference for United States industry. Notwithstanding any other provision of this clause, neither the Contractor nor any assignee shall grant to any person the exclusive right to use or sell any subject invention in the United States unless the person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for an agreement may be waived by the agency upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States, or that under the circumstances domestic manufacture is not commercially feasible.

(h) March-in rights. The Contractor acknowledges that, with respect to any subject invention in which it has retained ownership, the agency has the right to require licensing pursuant to 35 U.S.C. 203 and 210(c), and in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the agency in effect on the date of contract award.



(i) Special provisions for contracts with nonprofit organizations. If the Contractor is a nonprofit organization, it shall--

(1) Not assign rights to a subject invention in the United States without the written approval of the agency, except where an assignment is made to an organization that has as one of its primary functions the management of inventions, provided, that the assignee shall be subject to the same provisions as the Contractor;

(2) Share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (but through their agency if the agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202(e) and 37 CFR 401.10;

(3) Use the balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions for the support of scientific research or education; and

(4) Make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business concerns, and give a preference to a small business concern when licensing a subject invention if the Contractor determines that the small business concern has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business concerns; provided, that the Contractor is also satisfied that the small business concern has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the Contractor.

(5) Allow the Secretary of Commerce to review the Contractor's licensing program and decisions regarding small business applicants, and negotiate changes to its licensing policies, procedures, or practices with the Secretary of Commerce when the Secretary's review discloses that the Contractor could take reasonable steps to more effectively implement the requirements of paragraph (i)(4) of this clause.

(j) Communications. All written communications required by this clause shall be submitted to the Administrative Contracting Officer (ACO). All required reporting (invention disclosures, patent disclosures, etc.) shall be accomplished using the i-Edison.gov reporting website (<https://s-edison.info.nih.gov/iEdison/>).

(k) Subcontracts. (1) The Contractor shall include the substance of this clause, including this paragraph (k), in all subcontracts for experimental, developmental, or research work to be performed by a small business concern or nonprofit organization.

(2) The Contractor shall include in all other subcontracts for experimental, developmental, or research work the substance of the patent rights clause required by FAR Subpart 27.3.

(3) At all tiers, the patent rights clause must be modified to identify the parties as follows: references to the Government are not changed, and the subcontractor has all rights and obligations of the Contractor in the clause. The Contractor shall not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(4) In subcontracts, at any tier, the agency, the subcontractor, and the Contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and the agency with respect to the matters covered by the clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contract Disputes Act in connection with proceedings under paragraph (h) of this clause.

(End of clause)

## 52.233-4 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (OCT 2004)

United States law will apply to resolve any claim of breach of this contract.

(End of clause)

## 52.244-2 SUBCONTRACTS (OCT 2010)

(a) Definitions. As used in this clause--

Approved purchasing system means a Contractor's purchasing system that has been reviewed and approved in accordance with Part 44 of the Federal Acquisition Regulation (FAR).

Consent to subcontract means the Contracting Officer's written consent for the Contractor to enter into a particular subcontract.

Subcontract means any contract, as defined in FAR Subpart 2.1, entered into by a subcontractor to furnish supplies or services for performance of the prime contract or a subcontract. It includes, but is not limited to, purchase orders, and changes and modifications to purchase orders.

(b) When this clause is included in a fixed-price type contract, consent to subcontract is required only on unpriced contract actions (including unpriced modifications or unpriced delivery orders), and only if required in accordance with paragraph (c) or (d) of this clause.

(c) If the Contractor does not have an approved purchasing system, consent to subcontract is required for any subcontract that—

(1) Is of the cost-reimbursement, time-and-materials, or labor-hour type; or

(2) Is fixed-price and exceeds—

(i) For a contract awarded by the Department of Defense, the Coast Guard, or the National Aeronautics and Space Administration, the greater of the simplified acquisition threshold or 5 percent of the total estimated cost of the contract; or

(ii) For a contract awarded by a civilian agency other than the Coast Guard and the National Aeronautics and Space Administration, either the simplified acquisition threshold or 5 percent of the total estimated cost of the contract.

(d) If the Contractor has an approved purchasing system, the Contractor nevertheless shall obtain the Contracting Officer's written consent before placing the following subcontracts:

(e)(1) The Contractor shall notify the Contracting Officer reasonably in advance of placing any subcontract or modification thereof for which consent is required under paragraph (b), (c), or (d) of this clause, including the following information:

(i) A description of the supplies or services to be subcontracted.

(ii) Identification of the type of subcontract to be used.

(iii) Identification of the proposed subcontractor.

- (iv) The proposed subcontract price.
- (v) The subcontractor's current, complete, and accurate certified cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions.
- (vi) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract.
- (vii) A negotiation memorandum reflecting—
  - (A) The principal elements of the subcontract price negotiations;
  - (B) The most significant considerations controlling establishment of initial or revised prices;
  - (C) The reason certified cost or pricing data were or were not required;
  - (D) The extent, if any, to which the Contractor did not rely on the subcontractor's certified cost or pricing data in determining the price objective and in negotiating the final price;
  - (E) The extent to which it was recognized in the negotiation that the subcontractor's certified cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and the subcontractor; and the effect of any such defective data on the total price negotiated;
  - (F) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and
  - (G) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.
- (2) The Contractor is not required to notify the Contracting Officer in advance of entering into any subcontract for which consent is not required under paragraph (c), (d), or (e) of this clause.
  - (f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination—
    - (1) Of the acceptability of any subcontract terms or conditions;
    - (2) Of the allowability of any cost under this contract; or
    - (3) To relieve the Contractor of any responsibility for performing this contract.
  - (g) No subcontract or modification thereof placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement type subcontracts shall not exceed the fee limitations in FAR 15.404-4(c)(4)(i).
  - (h) The Contractor shall give the Contracting Officer immediate written notice of any action or suit filed and prompt notice of any claim made against the Contractor by any subcontractor or vendor that, in the opinion of the Contractor, may result in litigation related in any way to this contract, with respect to which the Contractor may be entitled to reimbursement from the Government.
  - (i) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.

(j) Paragraphs (c) and (e) of this clause do not apply to the following subcontracts, which were evaluated during negotiations:

Scientific Solutions

(End of clause)

#### 52.247-1 COMMERCIAL BILL OF LADING NOTATIONS (FEB 2006)

When the Contracting Officer authorizes supplies to be shipped on a commercial bill of lading and the Contractor will be reimbursed these transportation costs as direct allowable costs, the Contractor shall ensure before shipment is made that the commercial shipping documents are annotated with either of the following notations, as appropriate:

(a) If the Government is shown as the consignor or the consignee, the annotation shall be:

"Transportation is for supplies under Contract HR0011-13-C-0061 and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the Government."

(b) If the Government is not shown as the consignor or the consignee, the annotation shall be:

"Transportation is for supplies under Contract HR0011-13-C-0061 and the actual total transportation charges paid to the carrier(s) by the consignor or consignee shall be reimbursed by the Government, pursuant to cost-reimbursement Contract No. HR0011-13-C-0061. This may be confirmed by contacting Mr. Michael S. Mutty, Contracting Officer at (571) 218-4588 or Michael.Mutty@darpa.mil."

(End of clause)

#### 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

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 this/these address(es):

<http://farsite.hill.af.mil>

(End of clause)



## 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any Defense Federal Acquisition regulation (48 CFR Chapter 2) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of clause)

## 252.204-7006 BILLING INSTRUCTIONS (OCT 2005)

When submitting a request for payment, the Contractor shall--

(a) Identify the contract line item(s) on the payment request that reasonably reflect contract work performance; and

(b) Separately identify a payment amount for each contract line item included in the payment request.

(End of clause)

## 252.235-7010 Acknowledgment of Support and Disclaimer. (MAY 1995)

(a) The Contractor shall include an acknowledgment of the Government's support in the publication of any material based on or developed under this contract, stated in the following terms: This material is based upon work supported by the Defense Advanced Research Projects Agency under Contract No. HR0011-13-C-0061.

(b) All material, except scientific articles or papers published in scientific journals, must, in addition to any notices or disclaimers by the Contractor, also contain the following disclaimer: Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Defense Advanced Research Projects Agency.

Section J - List of Documents, Exhibits and Other Attachments

Attachment 1                      Statement of Work – February 13, 2013

**STATEMENT OF WORK**  
**February 13, 2013**

**BASE PROGRAM TASKS**

**Task 1 MRI Signal Model and Field Optimization**

1.1. Estimate Relaxation Times

*Description:* In order to predict expected signal levels, we will require estimates for the expected longitudinal and transverse relaxation time of the high water content media. This task will primarily consist of a literature search to determine reasonable ranges for these parameters.

*Output:* Expected longitudinal and transverse relaxation times (b)(4)

1.2 Research Fast Imaging Pulse Sequences

*Description:* There are a wide variety of fast imaging methods including echo planar, fast gradient echo, steady state free precession, and free induction decay. In this task we will research available methods and consider the relative tradeoffs in terms of performance and hardware requirements.

*Output:* Identification of a preferred imaging strategy.

1.3 Signal Modeling and Field Optimization

*Description:* For a selected imaging strategy, we will generate performance projections as a function of field strength. This will require a tentative field homogeneity spec (Task 2.1). The optimization will allow choice of the best field strength and appropriate pulse sequence parameters.

*Output:* For selected imaging strategy (or strategies) a target field strength, pulse parameters, and performance projections.

**Task 2 MRI Magnet and Gradient Coil Design and Fabrication**

2.1 Magnet Simulation

*Description:* The objective of this task will be to generate a realistic magnet model and anticipated field map over the desired field of view (FOV). The map will include the effect of an underlying steel floor intended to shield permeable materials in the floor (e.g., rebar) from the magnetic field.

*Output:* Magnet model and field map (b)(4)

## 2.2 Detailed Magnet Design

*Description:* The signal model will be used to choose the optimal field strength. With this design goal the magnet model will be refined to generate number of turns, wire gauge, inductance, resistance, and current.

*Output:* Detailed magnet design including turns, wire gauge, inductance, resistance, and current.

## 2.3 Gradient Coil Design

*Description:* The anticipated field strength and field distortions will determine the gradient strength required (b)(4). The object of this task is to design coils which generate all three axes of gradient fields with required strength and linearity.

*Output:* Gradient coil design including current and inductance.

## 2.4 Magnet Supply and Gradient Amplifier Procurement

*Description:* The magnet power supply and gradient amplifiers will be COTS units. Under this task QFS will use the requirements generated in Task 1 and Task 2 to specify and procure appropriate units.

*Output:* Gradient amplifiers that meet requirements projected from Task 1 and Task 2.

## 2.5 Magnet and Gradient Coil Fabrication

*Description:* The objective of this task is to fabricate the magnet and gradient coils. This will include both electrical and mechanical aspects.

*Output:* Fabricated magnet and gradient coils

## 2.6 Field Mapping

*Description:* The main field and gradient fields will be mapped to determine uniformity/linearity. This will require construction of a shim jig for use with a high accuracy DC field probe.

*Output:* Main field uniformity and gradient linearity measurements

## 2.7 Shimming

*Description:* If the main field is not within design spec it will be shimmed to bring it back within specification. This may be performed either with small amounts of permeable material or with separate shim coils

*Output:* Main field uniformity within specification.

### **Task 3 MRI RF Coil Design and Fabrication**

*Description:* The MRI coil will be designed by QFS, and based on a resonant design at the proton Larmor frequency in the DC field. The pulse sequence parameters determined in Task 1.3 will determine other parameters such as the required RF field, and hence transmit voltage

*Output:* Completed MRI coil.

### **Task 4 MRI Tuning and Software**

#### 4.1 Gradient Tuning

*Description:* The gradient waveforms will require tuning to achieve fast (b)(4) rise times with square edges. Typically some level of pre-emphasis is required to counter eddy currents in coupled conductive structures.

*Output:* Calibrated gradients with fast rise times and square edges.

#### 4.2 MRI Pulse Sequence Programming and Tuning

*Description:* The pulse sequence appropriate for the chosen imaging method must be programmed into the spectrometer. The gradient and RF pulses must be tuned to achieve desired excitation bandwidths and refocusing intervals.

*Output:* Tuned imaging pulse sequence

#### 4.3 Image Reconstruction

*Description:* The raw k-space data must be transformed into an image by the reconstruction software. In the case of a standard rectilinear grid of k-space points this may involve conjugation, filtering, Fourier transform and windowing of the resulting image.

*Output:* Image of the high water content medium.

### **Task 5 QR Hardware Design and Fabrication**

#### 5.1 QR RF Coil Design and Fabrication

*Description:* The QR coils will be resonant designs at the frequencies of interest for the target materials (AN, TNT, PETN, RDX, Tetryl). The coils will function for both transmit and receive. They will also incorporate Q-damping circuits for fast recovery.

*Output:* Completed QR coils



## 5.2 Preamp Development

*Description:* A preamplifier will be designed to amplify the coil signal prior to reception by the spectrometer. The preamp will incorporate a mechanism to protect it from the high voltage transmit pulses. A single basic design will cover the entire frequency range of both MRI and QR coils.

*Output:* Preamplifiers for MRI and QR RF coils

## 5.3 Power Amplifier Blanking Circuit

*Description:* Depending on the transmit amplifier design, a blanking circuit may be required to isolate the RF coils from the transmit amplifier during receive mode. If so, an appropriate circuit will be designed and built.

*Output:* RF blanking module attached to amplifier output.

## **Task 6 QR Hardware Procurement**

### 6.1 Spectrometer

*Description:* A commercial spectrometer will be purchased for implementation of the QR pulse sequences. The unit will be chosen so that it will also be compatible with the requirements of the MRI pulse sequences.

*Output:* Spectrometer for QR and MRI pulse sequences.

### 6.2 Power Amplifier

*Description:* A power amplifier will be required to provide the RF excitation fields. This will be a pulsed amplifier with relatively low duty cycle. We will specify and procure an appropriate unit from a commercial vendor.

*Output:* RF power amplifier.

### 6.3 Explosive Simulant

*Description:* With the exception of AN, the explosive compounds we will test require special facilities. To enable testing at our facility we will acquire appropriate commercial simulants. These are commercially available for TNT, PETN, and RDX. We will work with a simulant vendor to see whether a Tetryl simulant can be developed.

*Output:* Explosive simulants for testing purposes.

#### 6.4 Shielded Enclosure

*Description:* At this stage we will perform the QR experiments in a shielded enclosure. We will either qualify our current shielded room or purchase a small shielded enclosure.

*Output:* Small RF shielded enclosure adequate to contain QR coil and sample.

### **Task 7 QR Tuning and Software**

#### 7.1 QR Pulse Sequence Programming and Tuning

*Description:* The pulse sequence appropriate for detection of RDX (b)(4) will be programmed into the spectrometer. The sequence will be tuned to provide the highest SNR for RDX at the target depth.

*Output:* Optimized RDX pulse sequences.

#### 7.2 QR Data Processing

*Description:* The raw QR data must be appropriately phase cycled, windowed, apodized, and averaged before Fourier transformation. Then the appropriate phase correction and thresholding must be applied to generate a detection criterion.

*Output:* A yes/no indicator of explosive presence.

#### 7.3 Additional Compounds

*Description:* We will repeat the pulse programming, tuning and data processing steps using sequences appropriate for other compounds, including AN, TNT, and PETN. Tetryl will be included pending the availability of simulant.

*Output:* Optimized pulse sequences and data processing

### **Task 8 Program Management and Review**

*Description:* QFS will lead the development of MRI and NQR, and coordinate the support efforts by subcontractor and consultant. QFS will also be responsible for communicating with the DARPA project manager, and prepare all required reports and presentations.

*Output:* Contractually required reports, and meeting presentations. Attend required quarterly review meetings and a final review.



## **OPTION PHASE TASKS**

### **Task 9 Study Effects of Static Magnetic Field on QR**

*Description:* For an integrated system, it will be desirable to perform the QR detection inside the magnet. However, application of a static field during the measurement of the NQR signal will tend to broaden the measured resonance; we expect this effect to be less than a few kHz. In this task, we will first undertake a theoretical study to precisely calculate the expected line shapes for the compounds of interest, followed by experimental verification of these calculations for at least 1 compound. This will allow us to determine whether the SNR penalties are within tolerable limits. If the level of broadening is unacceptable, we may have to turn the magnet off. This would be less than optimal, but with a resistive, low energy magnet should not be too onerous.

*Output:* Decision as to whether QR is to be performed in the static magnetic field.

### **Task 10 Integrate and Optimize MRI and QR Sensors**

#### **10.1 Build or Procure RF Shield Room**

*Description:* Implementation of the hardware and software required for unshielded QR operation is beyond the scope of this program. Therefore we intend to site the integrated MRI/QR system inside a RF shielded room. We have a shielded room which, with some modification, might be suitable for this purpose. Otherwise, we will procure an appropriate enclosure. This will require filter panels for gradients and magnet.

*Output:* RF shield enclosure.

#### **10.2 Integrate MRI and QR Hardware**

*Description:* Under this task we will install the magnet in a shielded room. Much of the MRI and QR hardware will be of similar design. However, there may be integration issues that need to be addressed, such as interactions between the QR coil(s) and magnet or gradient coils.

*Output:* Integrated MRI and QR hardware

### **Task 11 Government Demonstration**

*Description:* We will conduct a demonstration of standoff explosives detection for DARPA and invited guests at our facility. We will demonstrate detection of AN, TNT, PETN and RDX at a minimum, in appropriate high water content media.

*Output:* Demonstration for DARPA and invited guests.

**Task 12      Program Management and Reporting**

*Description:* In addition to progress reports and anticipated reviews, we will prepare a comprehensive system design documentation package that will enable reproduction of the system at another facility.

*Output:* Program management and system documentation



DEFENSE ADVANCED RESEARCH PROJECTS AGENCY  
675 NORTH RANDOLPH STREET  
ARLINGTON, VA 22203-2114

(b)(6)

JAN 3 2013

QUASAR Federal Systems  
5754 Pacific Center Blvd.  
Suite 203  
San Diego, CA 92121-4206

Ref. #: DARPA-13-01-MEDS-FP-004, Explosives Detection at Standoff

Dear (b)(6)

This letter is in response to the proposal referenced above, submitted in response to the Defense Advanced Research Projects Agency (DARPA) Broad Agency Announcement (BAA) 13-01, Methods for Explosive Detection at Standoff. Your submission has been reviewed by a panel of Government experts against the criteria published in the BAA. Based on that review, your proposal was found to be selectable for funding. Please be advised that this letter is not a guarantee of funding, but rather an intent to negotiate the funding of all tasks with a program value not to exceed \$1,182,876.16 for the 12-month base period (FY 12); and all tasks with a program value not to exceed \$475,338.95 for the 6-month option period. You should be contacted shortly by a contracting officer to begin the negotiation process.

Thank you for your interest in working with DARPA/DSO. We look forward to an exciting partnership.

Sincerely,

Judah Goldwasser, Ph.D.  
Program Manager  
Defense Sciences Office

# Explosives Detection at Standoff

**Sponsored by:**

Defense Advanced Research Projects Agency  
Defense Science Offices (DSO)

**Program:** Methods for Explosive Detection at Standoff (MEDS)

**Purchase Request No.** HR001132059, **Program Code:** DQ426

**Issued by:** DARPA/CMO under Contract No. HR011-13-C-0061



5754 Pacific Center Blvd, Suite 203  
San Diego, California 92121  
tel. (858) 228-3206  
fax (858) 228-1002

June 15, 2013

(b)(4),(b)(6)

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# Program Quarterly Status Report

## Explosives Detection at Standoff

Principal Investigator: Dr. Lowell Burnett  
 Contract Number: HR0011-13-C-0061

1<sup>st</sup> Quarterly Report  
 Date: June 15, 2013

### 1 Executive Summary

The goal of this project is to develop and validate MRI and NQR subsystems for imaging and detection of explosives in liquid media. There is a 12-month base period, followed by a 6-month option. In the main project period, QUASAR Federal Systems (QFS) will build a prototype and validate its functionality, while in the option phase, subsystems will be integrated and performance demonstrated. A block diagram of the proposed system is shown in Figure 1.

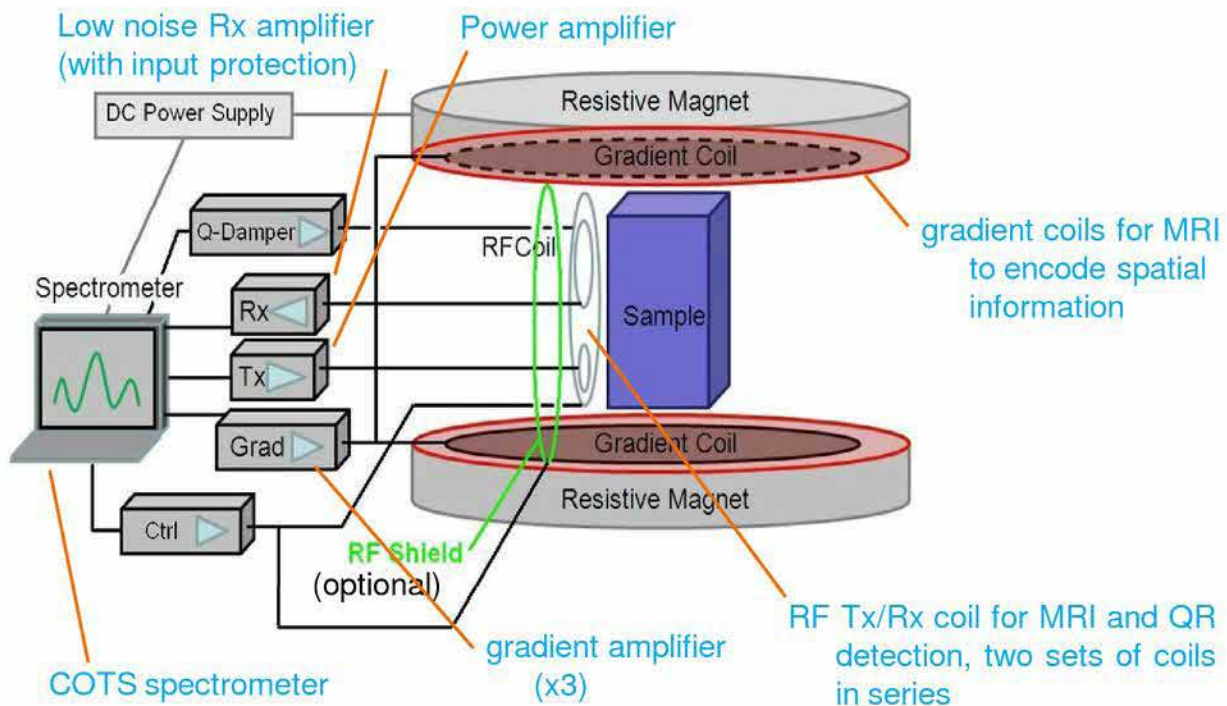


Figure 1. MRI/NQR system block diagram

Work began on this contract on March 1, 2013, the first day of the contract's Period of Performance. QFS arranged a kickoff meeting with (b)(4) which was held on March 4, 2013. In addition, we met with (b)(4) to initiate his work, set weekly internal meetings, and we have ordered long lead time items necessary for



project execution. We also had a kick-off and review meeting with the DARPA program manager on May 06, 2013.

The project is currently on schedule and on budget. We have planned resource usage, acquired needed resources, purchased a spectrometer, power amplifier and explosive simulant, simulated the system signal-to-noise ratio (SNR) for MRI and QR, finalized requirements for the magnets and gradient coil, and designed and prototyped the RF hardware for MRI and NQR.

**Task Progress is as follows:**

Task 1: MRI Signal Model and Field Optimization – the task is complete

Task 2: MRI Magnet and Gradient Coil Design and Fabrication – the task is approximately 30% complete

Task 3: MRI RF Coil Design and Fabrication – the task is 90% complete

Task 4: MRI Tuning and Software – the task has not yet begun

Task 5: QR Hardware Design and Fabrication – the task is approximately 75% complete

Task 6: QR Hardware Procurement - the task is complete

Task 7: QR Tuning and Software – the task has not yet begun

Task 8: Program Management -is ongoing

(b)(3) 22 USC § 2778(e) Sec 38(e),(b)(4)























