

SOLICITATION, OFFER AND AWARD		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)		RATING DO-C9	PAGE OF 1 51 PAGES
2. CONTRACT NO.	3. SOLICITATION NO. N00173-03-R-HA01	4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)		5. DATE ISSUED NOV 22, 2002	6. REQUISITION/PURCHASE NO.
7. ISSUED BY CONTRACTING OFFICER NAVAL RESEARCH LABORATORY 4555 OVERLOOK AVENUE SW WASHINGTON DC 20375-5326 ATTN: CODE 3220.HA		8. ADDRESS OFFER TO (If other than Item 7)			

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and _____ copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in See Section L-2 until 4:00P local time DEC 30, 2002
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-10. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL: <input type="checkbox"/>	A. NAME HILDA R. ABDON, CONTRACT SPECIALIST	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) 202-767-0682
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OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52-232-8)	10 CALENDAR DAYS	%	20 CALENDAR DAYS	%	30 CALENDAR DAYS	%	CALENDAR DAYS	%
14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated:	AMENDMENT NO.	DATE	AMENDMENT NO.	DATE				

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
15B. TELEPHONE NO. (Include area code)	15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE.		17. SIGNATURE
			18. OFFER DATE

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION	
22. 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) ()		23. SUBMIT INVOICES TO ADDRESS SHOWN IN <input type="checkbox"/> ITEM (4 copies unless otherwise specified)	
24. ADMINISTERED BY (If other than Item 7)	CODE	25. PAYMENT WILL BE MADE BY	CODE
26. NAME OF CONTRACTING OFFICER (Type or print)		27. UNITED STATES OF AMERICA (Signature of Contracting Officer)	28. AWARD DATE

IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

**PART I - THE SCHEDULE
SECTION B
SUPPLIES OR SERVICES AND PRICES/COSTS**

B-1 SUPPLIES/SERVICES AND COSTS**FIRST YEAR**

ITEM NUMBER	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	ESTIMATED COST PLUS FIXED FEE
TASK 1				
0001	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 1.	\$	\$	\$
0002	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$
Task 2				
0003	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 2.	\$	\$	\$
0004	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$
Task 3				
0005	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 3.	\$	\$	\$
0006	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 4

0007	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 4.	\$	\$	\$
0008	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 5

0009	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 5.	\$	\$	\$
00010	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 6

0011	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 6.	\$	\$	\$
0012	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 7

0013	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 7.	\$	\$	\$
0014	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 8

0015	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 8.	\$	\$	\$
0016	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 9

0017	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 9.	\$	\$	\$
0018	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

Task 10

0019	The Contractor shall conduct research in accordance with the Statement of Work (SOW), Attachment 1, Task 10.	\$	\$	\$
0020	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE:		\$	\$	\$

** Not Separately Priced*

NOTICE TO OFFERORS: In addition to inserting the estimated cost and fixed fee for the base year above, the estimated cost and fixed fee for each optional extension of the term of the contract are to be inserted in Section H.

SECTION C
DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

C-1 STATEMENT OF WORK

The work and services to be performed hereunder shall be subject to the requirements and standards contained in Attachment (1), Statement of Work, with Exhibit A, Contract Data Requirements List, and all other Attachments cited in Section J, which are incorporated by reference into Section C.

C-2 REQUIREMENTS FOR ON-SITE CONTRACTORS

For those portions of the work under this contract performed at any NRL site, the contractor shall comply with the Requirements for On-Site Contractors dated 08 October 2002 which are hereby incorporated by reference. The full text is available at <http://heron.nrl.navy.mil/contracts/home.htm>.

C-3 SUBCONTRACTING PLAN

Subcontracting Plan _____ dated _____ is hereby incorporated by reference and made a material part of this contract.

*(*this provision will be included and completed at time of award, if applicable)*

SECTION D
PACKAGING AND MARKING

D-1 PACKAGING AND MARKING

Preservation, packaging, packing and marking of all deliverable contract line items must conform to normal commercial packing standards to assure safe delivery at destination.

**SECTION E
INSPECTION AND ACCEPTANCE**

E-1 INSPECTION AND ACCEPTANCE CLAUSES INCORPORATED BY REFERENCE

FAR CLAUSE TITLE

52.246-9 - Inspection Of Research And Development (Short Form) (APR 1984)

DFARS CLAUSE TITLE

252.246-7000 - Material Inspection And Receiving Report (DEC 1991)

E-2 INSPECTION AND ACCEPTANCE

Inspection and acceptance of the final delivery will be accomplished by the Technical Manager (TM) or Contracting Officer Representative (COR) designated in Section G of this contract. Inspection and acceptance will be performed at the Naval Research Laboratory, Washington DC 20375-5320.

**SECTION F
DELIVERIES OR PERFORMANCE**

F-1 DELIVERIES OR PERFORMANCE CLAUSES INCORPORATED BY REFERENCE:

FAR CLAUSE TITLE

52.242-15 - Stop-Work Order (AUG 1989) - Alternate I (APR 1984)

52.247-34 - F.O.B. Destination (NOV 1991)

F-2 PERIOD AND PLACE OF PERFORMANCE

- (a) The term of this contract is from through date of award through twelve (12) months thereafter. In the event that the options are exercised, the contract term shall be extended by twelve (12) months for each option exercised.
- (b) The principal place of performance of this contract shall be performed at the Naval Research Laboratory (NRL), or at other Navy or DoD Facilities as specified by the Contracting Officer's Representative (COR).

(* To be filled in at time of award.)

SECTION G
CONTRACT ADMINISTRATION DATA

G-1 PROCURING OFFICE REPRESENTATIVE

In order to expedite administration of the contract, the Administrative Contracting Officer (ACO) will direct inquiries to the appropriate office listed below. Please do not direct routine inquiries to the person listed in Item 20A on Standard Form 26.

Security Matters- Contracting Officer for Security, Code 1221, (202) 767-2240, DSN 297-2240, email security-group@nrl.navy.mil

Safety Matters- Head Safety Branch, Code 3540, (202) 767-2232, DSN 297-2232, email safety@nrl.navy.mil

Patent Matters-Associate Counsel (Intellectual Property), Code 1008.2, (202) 404-1552, DSN 297-1552, email patents@nrl.navy.mil

Release of Data-Public Affairs Officer, Code 1030 (202) 767-2541, DSN 297-2541, email publicaffairs@nrl.navy.mil

G-2 CONTRACTING OFFICER'S REPRESENTATIVE (COR) - FUNCTIONS AND LIMITATIONS

* is hereby designated the cognizant COR who will represent the Contracting Officer in the administration of technical details within the scope of this contract and inspection and acceptance. 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 change the specifications in the contract. If, as a result of technical discussions, it is desirable to alter contract obligations or statements of work, a modification must be issued in writing and signed by the Contracting Officer. The COR is responsible for reviewing the bills and charges submitted by the Contractor and informing the ACO of areas where exceptions are to be taken.

(* To be completed at time of award)

G-3 TECHNICAL DIRECTION MEMORANDUM (TDM)

- (a) For the purposes of this clause, technical direction includes the following:
- (1) Direction to the Contractor which shifts work emphasis between work areas or tasks, requires pursuit of certain lines of inquiry, fills in details or otherwise describes work which will accomplish the objectives described in the statement of work;
 - (2) Guidelines to the Contractor, which assist in interpretation of drawings, specifications or technical portions of, work description.
- (b) Technical instructions must be within the scope of work stated in the contract. Technical instructions may not be used to:
- (1) Assign additional work under the contract;
 - (2) Direct a change as defined in the contract clause entitled "Changes";
 - (3) Increase or decrease the estimated contract cost, the fixed fee, or the time required for contract performance; or
 - (4) Change any of the terms, conditions or specifications of the contract
- (c) The TDM shall be written by the Contracting Officer's Representative (COR), with the original given to the Contractor and a copy retained in the CORs file. Technical direction may be issued orally only in emergency situations. If technical direction is issued orally, a TDM must follow within two (2) working days from the date of the oral direction. Amendments, corrections, or changes to TDMs shall also be in written format and shall include all the information set forth in paragraph (e) below.
- (d) A TDM shall be considered issued when the Government deposits it in the mail, or if transmitted by other means, when it is physically delivered to the contractor.
- (e) TDMs shall include, but not be limited to, the following information:
- (1) Date of TDM,
 - (2) Contract Number,
 - (3) Reference to the relevant portion or item in the Statement of Work,
 - (4) The specific technical direction or clarification, and
 - (5) The signature of the COR.
- (f) CORs shall retain all files containing TDMs for a period of two (2) years after the final contract completion date.
- (g) The only individual authorized in any way to amend or modify any of the terms of this contract shall be the Contracting Officer. When, in the opinion of the Contractor, any technical direction calls for effort outside the scope of the contract or inconsistent with this special provision, the Contractor shall notify the Contracting Officer in writing within ten (10) working days after its receipt.

G-4 SUBCONTRACTORS/CONSULTANTS

(a) Advance notification or requests for consent pursuant to the contract clause entitled "Subcontracts" (FAR 52.244-2) shall be directed to the cognizant administrative contracting officer (ACO).

(b) The following subcontractors/consultants have been identified in the Contractor's proposal as necessary for performance of this contract:

Subcontractor/Consultant Name	Estimated Cost
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(Paragraph (b) will be included and filled in at time of award if subcontractor/consultants are proposed by the successful offeror)

G-5 NAPS 5252.232-9001 - SUBMISSION OF INVOICES (COST-REIMBURSEMENT, TIME-AND-MATERIALS, LABOR-HOUR, OR FIXED PRICE INCENTIVE (JUL 1992)

(a) "Invoice" as used in this clause includes contractor requests for interim payments using public vouchers (SF 1034) but does not include contractor requests for progress payments under fixed price incentive contracts.

(b) The Contractor shall submit invoices and any necessary supporting documentation, in an original and 4 copies, to the contract auditor at the following address:

(To be completed at time of award)

unless delivery orders are applicable, in which case invoices will be segregated by individual order and submitted to the address specified in the order. In addition, an information copy shall be submitted to [See Section G for designated COR]. Following verification, the contract auditor will forward the invoice to the designated payment office for payment in the amount determined to be owing, in accordance with the applicable payment (and fee) clause(s) of this contract.

(c) Invoices requesting interim payments shall be submitted no more than once every two weeks, unless another time period is specified in the Payments clause of this contract. For indefinite delivery type contracts, interim payment invoices shall be submitted no more than once every two weeks for each delivery orders. There shall be a lapse of no more than 30 calendar days between performance and submission of an interim payment invoice.

(d) In addition to the information identified in the Prompt Payment clause herein, each invoice shall contain the following information, as applicable:

- (1) Contract line item number (CLIN)
- (2) Subline item number (SLIN)
- (3) Accounting Classification Reference Number (ACRN)
- (4) Payment terms
- (5) Procuring activity
- (6) Date supplies provided or services performed
- (7) Costs incurred and allowable under the contract
- (8) Vessel (e.g., ship, submarine or other craft) or system for which supply/service is provided

(e) A DD Form 250, "Material Inspection and Receiving Report",

is required with each invoice submittal.

- is required only with the final invoice.
 is not required.

(f) A Certificate of Performance

- shall be provided with each invoice submittal.
 is not required.

(g) The Contractor's final invoice shall be identified as such, and shall list all other invoices (if any) previously tendered under this contract.

(h) Cost of performance shall be segregated, accumulated and invoiced to the appropriate ACRN categories to the extent possible. When such segregation of costs by ACRN is not possible for invoices submitted with CLIN/SLINS with more than one ACRN, an allocation ratio shall be established in the same ratio as the obligations cited in the accounting data so that costs are allocated on a proportional basis.

G-6 INCREMENTAL FUNDING

Pursuant to the Limitation of Funds clause (FAR 52.232-22), the total amount allotted to this contract is \$* and it is estimated that this amount is sufficient for contract performance through * .

*(*this provision will be included and completed at time of award, if applicable)*

G-7 INFORMATIONAL SUBLINE ITEMS

It is anticipated that the research and development services performed under this contract will be paid for from multiple sources of funds. Informational subline items will be established as necessary to identify each accounting citation classification.

G-8 SPECIAL PAYMENT INSTRUCTIONS- MULTIPLE ACCOUNTING CLASSIFICATION CITATIONS (COST-REIMBURSEMENT)

Payments shall be made in accordance with the ACRN(s) cited on the contractor's invoice. The Contractor may contact the COR regarding which ACRN(s) to cite on an invoice.

**SECTION H
SPECIAL CONTRACT REQUIREMENTS**

H-1 TYPE OF CONTRACT

This is a *

*(*To be completed at time of award)*

H-2 ONR 5252.237-9705 - KEY PERSONNEL (DEC 88)

(a) The Contractor agrees to assign to the contract tasks those persons whose resumes were submitted with its proposal and who are necessary to fulfill the requirements of the contract as "key personnel". No substitutions may be made except in accordance with this clause.

(b) The Contractor understands that during the first ninety (90) days of the contract performance period, no personnel substitutions will be permitted unless these substitutions are unavoidable because of the incumbent's sudden illness, death or termination of employment. In any of these events, the Contractor shall promptly notify the Contracting Officer and provide the information described in paragraph (c) below. After the initial ninety (90) day period the Contractor must submit to the Contracting Officer all proposed substitutions, in writing, at least thirty (30) days in advance (sixty (60) days if security clearance must be obtained) of any proposed substitution and provide the information required by paragraph (c) below.

(c) Any request for substitution must include a detailed explanation of the circumstances necessitating the proposed substitution, a resume for the proposed substitute, and any other information requested by the Contracting Officer. Any proposed substitute must have qualifications equal to or superior to the qualifications of the incumbent. The Contracting Officer or his/her authorized representative will evaluate such requests and promptly notify the Contractor of his/her approval or disapproval thereof.

(d) In the event that any of the identified key personnel cease to perform under the contract and the substitute is disapproved, the contract may be immediately terminated in accordance with the Termination clause of the contract.

The following are identified as key personnel: *

*(*To be completed at time of award)*

Labor Category	First/M/Last Name

H-3 ONR 5252.216-9706 - LEVEL OF EFFORT (DEC 88)

- (a) The Contractor agrees to provide the total level of effort specified in the next sentence in performance of the work described in this contract. The total level of effort for performance of this contract shall be 65,690 hours for the Base Year, 65,690 hours each for Options 1 through 4, if exercised, or 328,450 total hours of direct labor, including subcontractor direct labor for those subcontractors specifically identified in the Contractor's proposal as having hours included in the proposed level of effort. A breakdown of labor categories and hours is set forth in paragraph (k) below.
- (b) The level of effort for this contract shall be expended at an average rate 5,474 hours per month. It is understood and agreed that the rate of hours per month may fluctuate in pursuit of the technical objective, provided such fluctuation does not result in the use of the total hours of effort prior to the expiration of the term of the contract.
- (c) The Contractor is required to notify the Contracting Officer when any of the following situations occur, or are anticipated to occur: If during any three consecutive months the monthly average is exceeded by 25% or, if at any time it is forecast that during the last three months of the contract less than 50% of the monthly average will be used during any given month; or, when 85% of the total level of effort has been expended.
- (d) If, during the term of the contract, the Contractor finds it necessary to accelerate the expenditure of direct labor to such an extent that the total hours of effort specified would be used prior to the expiration of the term, the Contractor shall notify the Contracting Officer in writing, setting forth the acceleration required, the probable benefits which would result, and an offer to undertake the acceleration at no increase in the estimated cost or fixed fee together with an offer setting forth a proposed level of effort, cost breakdown, and proposed fixed fee for continuation of the work until expiration of the term hereof. The offer shall provide that the work proposed will be subject to the terms and conditions of this contract and any additions or changes required by then current law, regulations, or directives, and that the offer, with a written notice of acceptance by the Contracting Officer, shall constitute a binding contract. The Contractor shall not accelerate any effort until receipt of such written approval by the Contracting Officer. Any agreement to accelerate will be formalized by contract modification.
- (e) The Contracting Officer may, by written order, direct the Contractor to accelerate the expenditure of direct labor such that the total hours of effort specified in paragraph (a) above would be used prior to the expiration of the term. This order shall specify the acceleration required and the resulting revised term. The Contractor shall acknowledge this order within five days of receipt.
- (f) If the total level of effort specified in paragraph (a) above is not provided by the Contractor during the term of this contract, the Contracting Officer shall either (i) reduce the fixed fee of this contract as follows:
- $$\text{Fee Reduction} = \text{Fixed Fee} \times \frac{(\text{Required LOE Hours} - \text{Expended LOE Hours})}{\text{Required LOE Hours}}$$
- or (ii) subject to the provisions of the clause of this contract entitled "Limitation of Cost," require the Contractor to continue to perform the work until the total number of hours of direct labor specified in paragraph (a) shall have been expended, at no increase in the fixed fee of this contract.
- (g) In the event the government fails to fully fund the contract in a timely manner, the term of the contract may be extended accordingly with no change to cost or fee. If the government fails to fully fund the contract, the fee will be adjusted in direct proportion to that effort which was performed.
- (h) Notwithstanding any of the provisions in the above paragraphs, the Contractor may furnish hours up to five percent in excess of the total hours specified in paragraph (a) above, provided that the additional effort is furnished within the term hereof, and provided further that no increase in the

estimated cost or fixed fee is required, and no adjustment in the fixed fee shall be made provided that the Contractor has delivered at least 95% of the level of effort required in paragraph (a) above.

(i) It is understood that the mix of labor categories provided by the Contractor under the contract, as well as the distribution of effort among those categories, may vary considerably from the initial mix and distribution of effort which was estimated by the government or proposed by the Contractor.

(j) Nothing herein shall be construed to alter or waive any of the rights or obligations of either party pursuant to the Clause entitled "Limitation of Costs" or "Limitation of Funds," either of which clauses as incorporated herein applies to this contract.

(k) The anticipated breakdown by labor category of the total level of effort is as follows:

<u>Labor Category</u>	<u>Hours</u>
Task 1	
Program Manager	750
Sr. Scientist/Engineer	10,400
Scientist/Engineer	20,800
Task 2	
Program Manager	1000
Sr. Scientist/Engineer	20,800
Scientist/Engineer	20,800
Task 3	
Program Manager	1500
Sr. Scientist/Engineer	10,400
Scientist/Engineer	52,000
Consultant	1,250
Task 4	
Program Manager	250
Field Technician	10,400
Task 5	
Program Manager	1,625
Sr. Scientist/Engineer	10,400
Scientist/Engineer	36,400
Technician	20,800
Task 6	
Program Manager	750
Sr. Scientist/Engineer	15,600
Scientist/Engineer	20,800
Task 7	
Program Manager	375
Scientist/Engineer	10,400
Consultant	5,200

Task 8	
Program Manager	250
Scientist/Engineer	10,400
Programmer	500
Consultant	400
Task 9	
Program Manager	500
Scientist/Engineer	20,800
Task 10	
Program Manager	500
Scientist/Engineer	10,400
Programmer	10,400

H-4 ONR 5252.235-9714 - REPORT PREPARATION (FEB 02)

Scientific or technical reports prepared by the Contractor and deliverable under the terms of this contract will be prepared in accordance with format requirements contained in ANSI/NISO Z39.18-1995, Scientific and Technical Reports: Elements, Organization, and Design.

[NOTE: All NISO American National Standards are available as free, downloadable pdf(s) at <http://www.niso.org/standards/index.html> . NISO standards can also be purchased in hardcopy form from NISO Press Fulfillment, P. O. Box 451, Annapolis Junction, MD 20701-0451 USA. Telephone U.S. and Canada: (877) 736-6476; Outside the U.S. and Canada: 301-362-6904 ax: 301-206-9789.]

H-5 ELECTRONIC AND INFORMATION TECHNOLOGY (EIT)

In accordance with Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d), all EIT supplies and services provided under this contract must comply with the applicable accessibility standards issued by the Architectural and Transportation Barriers Compliance Board at 36 CFR part 1194 (see FAR Subpart 39.2). Electronic and information technology (EIT) is defined at FAR 2.101.

H-6 OPTION TO EXTEND THE TERM OF THE CONTRACT

This contract shall be renewable at the unilateral option of the Government by the Contracting Officer giving written notice of renewal to the Contractor within the existing term of the contract. The Government may exercise its option to renew the contract a total of four (4) times and each such renewal shall extend the term of the contract by twelve (12) months. The Contractor agrees that performance under each such renewal shall be accomplished in accordance with all of the terms and conditions of this contract and at the estimated cost and fixed fee set forth below:

First Option – Year 2

	Estimated Cost	Fixed Fee	Est. CPFF
Task 1			
0001	\$	\$	\$
0002	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 2			
0003	\$	\$	\$
0004	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 3			
0005	\$	\$	\$
0006	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 4			
0007	\$	\$	\$
0008	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 5

0009	\$	\$	\$
0010	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 6

0011	\$	\$	\$
0012	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 7

0013	\$	\$	\$
0014	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 8

0015	\$	\$	\$
0016	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 9

0017	\$	\$	\$
0018	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 10

0019	\$	\$	\$
0020	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Second Option – Year 3

	Estimated Cost	Fixed Fee	Est. CPFF
Task 1			
0001	\$	\$	\$
0002	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 2			
0003	\$	\$	\$
0004	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 3			
0005	\$	\$	\$
0006	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 4			
0007	\$	\$	\$
0008	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 5			
0009	\$	\$	\$
0010	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 6

0011	\$	\$	\$
0012	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 7

0013	\$	\$	\$
0014	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 8

0015	\$	\$	\$
0016	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 9

0017	\$	\$	\$
0018	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 10

0019	\$	\$	\$
0020	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Third Option – Year 4

	Estimated Cost	Fixed Fee	Est. CPFF
Task 1			
0001	\$	\$	\$
0002	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 2			
0003	\$	\$	\$
0004	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 3			
0005	\$	\$	\$
0006	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 4			
0007	\$	\$	\$
0008	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 5			
0009	\$	\$	\$
0010	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 6

0011	\$	\$	\$
0012	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 7

0013	\$	\$	\$
0014	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 8

0015	\$	\$	\$
0016	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 9

0017	\$	\$	\$
0018	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 10

0019	\$	\$	\$
0020	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Fourth Option – Year 5

	Estimated Cost	Fixed Fee	Est. CPFF
Task 1			
0001	\$	\$	\$
0002	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 2			
0003	\$	\$	\$
0004	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 3			
0005	\$	\$	\$
0006	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 4			
0007	\$	\$	\$
0008	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$
Task 5			
0009	\$	\$	\$
0010	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 6

0011	\$	\$	\$
0012	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 7

0013	\$	\$	\$
0014	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 8

0015	\$	\$	\$
0016	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 9

0017	\$	\$	\$
0018	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

Task 10

0019	\$	\$	\$
0020	*NSP	*NSP	*NSP
Total CPFF:	\$	\$	\$

H-7 ON-SITE USE OF GOVERNMENT PROPERTY

It is anticipated that Government property will be used by the contractor's personnel in the performance of that portion of the contract performed on-site at the U.S. Naval Research Laboratory (NRL) including any of its field sites. Such use will be on a rent free basis and all such property shall be considered to remain in the possession and control of the NRL for property responsibility and accountability purposes.

H-8 REPRESENTATIONS AND CERTIFICATIONS

The Contractor's completed Representations, Certifications, and Other Statements of Offerors or Respondents is incorporated herein by reference in any resultant award.

H-9 SUBCONTRACTING PLAN

The contractor's Comprehensive Small Business Subcontracting Plan is incorporated into this contract in accordance with DFARS SUBPART 219.7 *Test Program for Negotiation of Comprehensive Small Business Subcontracting Plans*.

**PART II - CONTRACT CLAUSES
SECTION I
CONTRACT CLAUSES**

I-1 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://www.arnet.gov/far>

<http://heron.nrl.navy.mil/contracts/home.htm>

a. FEDERAL ACQUISITION REGULATION CLAUSES**FAR CLAUSE TITLE**

52.202-1	-	Definitions (DEC 2001)
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 (JUL 1995)
52.203-7	-	Anti-Kickback Procedures (JUL 1995)
52-203-8	-	Cancellation, Rescission, And Recovery Of Funds For Illegal Or Improper Activity (JAN 1997)
52.203-10	-	Price Or Fee Adjustment For Illegal Or Improper Activity (JAN 1997)
52.203-12	-	Limitation On Payments To Influence Certain Federal Transactions (JUN 1997)
52.204-2	-	Security Requirements (AUG 1996)
52.204-4	-	Printed Or Copied Double-Sided On Recycled Paper (AUG 2000)

- 52.209-6 - Protecting The Government's Interest When Subcontracting With Contractors Debarred, Suspended, Or Proposed For Debarment (JUL 1995)
- 52.211-15 - Defense Priority And Allocation Requirements (SEP 1990)
- 52.215-2 - Audit And Records-Negotiation (JUN 1999)
- 52.215-8 - Order Of Precedence - Uniform Contract Format (OCT 1997)
- 52.215-10 - Price Reduction For Defective Cost Or Pricing Data (OCT 1997)
- 52.215-11 - Price Reduction For Defective Cost Or Pricing Data - Modifications (OCT 1997)
- 52.215-12 - Subcontractor Cost Or Pricing Data (OCT 1997)
- 52.215-13 - Subcontractor Cost Or Pricing Data Modifications (OCT 1997)
- 52.215-14 - Integrity Of Unit Prices (OCT 1997)
- 52.215-15 - Pension Adjustments And Asset Reversions (DEC 1998)
- 52.215-17 - Waiver Of Facilities Capital Cost Of Money (OCT 1997)
(will be included if the successful offeror does not propose facilities capital cost of money)
- 52.215-18 - Reversion Or Adjustment Of Plans For Post-Retirement Benefits (PRB) Other Than Pensions (OCT 1997)
- 52.215-19 - Notification Of Ownership Changes (OCT 1997)
- 52.215-21 - Requirements For Cost Or Pricing Data Or Information Other Than Cost or Pricing Data -Modifications (OCT 1997)
- 52.216-7 - Allowable Cost And Payment (FEB 2002) *(If the contract is with an educational institution, modify the clause by deleting from paragraph (a) "Subpart 31.2" and substitute "Subpart 31.3". If the contract is with a state or local government, delete from paragraph (a) "Subpart 31.2" and substitute "Subpart 31.6". If the contract is with a nonprofit other than an educational institution, a state or local government, or a nonprofit organization exempted under OMB Circular A-122, modify the clause by deleting from paragraph (a) "Subpart 31.2" and substituting "Subpart 31.7".)*
- 52.216-8 - Fixed-Fee (MAR 1997)
- 52.219-4 - Notice Of Price Evaluation Preference For HUBZone Small Business Concerns (JAN 1999) Offeror elects to waive the evaluation preference.
- 52.219-6 - Notice Of Total Small-Business Set-Aside (JUL 1996) - Alternate I (OCT 1995)
- 52.219-8 - Utilization Of Small Business Concerns (OCT 2000)
- 52.219-25 - Small Disadvantaged Business Participation Program-Disadvantaged Status And Reporting (Oct 1999)
- 52.222-2 - Payment For Overtime Premiums (JUL 1990) -The Use Of Overtime Is Authorized Under This Contract If The Overtime Premium Does Not Exceed "0"
- 52.222-3 - Convict Labor (AUG 1996)
- 52.222-4 - Contract Work Hours And Safety Standards Act-Overtime Compensation (SEP 2000)
- 52.222-19 - Child Labor – Cooperation With Authorities And Remedies (SEP 2002)
- 52.222-21 - Prohibition Of Segregated Facilities (FEB 1999)
- 52.222-26 - Equal Opportunity (APR 2002)
- 52.222-29 - Notification Of Visa Denial (FEB 1999)
- 52.222-35 - Equal Opportunity For Special Disabled Veterans, Veterans Of The Vietnam Era, And Other Eligible Veterans (DEC 2001)
- 52.222-36 - Affirmative Action For Workers With Disabilities (JUN 1998)
- 52.222-37 - Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, And Other Eligible Veterans (DEC 2001)
- 52.223-3 - Hazardous Material Identification And Material Safety Data (JAN 1997)

- 52.223-5 - Pollution Prevention And Right-To-Know Information (APR 1998)
- 52.223-6 - Drug-Free Workplace (MAY 2001)
- 52.223-10 - Waste Reduction Program (AUG 2000)
- 52.223-14 - Toxic Chemical Release Reporting (OCT 2000)
- 52.225-13 - Restrictions On Certain Foreign Purchases (JUL 2000)
- 52.227-1 - Authorization And Consent (JUL 1995)- Alternate I (APR 1984)
- 52.227-2 - Notice And Assistance Regarding Patent And Copyright Infringement (AUG 1996)
- 52.227-10 - Filing Of Patent Application- Classified Subject Matter (APR 1984)
- 52.227-12 - Patent Rights - Retention By The Contractor (Long Form) (JAN 1997)
(will be included if the successful offeror is not a small business or a non-profit organization)
- 52.228-7 - Insurance - Liability To Third Persons (MAR 1996)
- 52.230-2 - Cost Accounting Standards (APR 1998)
- 52.230-3 - Disclosure And Consistency Of Cost Accounting Practices (APR 1998)
- 52.232-9 - Limitation On Withholding Of Payments (APR 1984)
- 52.232-17 - Interest (JUN 1996)
- 52.232-18 - Availability Of Funds (APR 1984)
- 52.232-22 - Limitation Of Funds (APR 1984) (Applicable when the contract or task order is not fully funded)
- 52.232-23 - Assignment Of Claims (JAN 1986) Alternate I (APR 1984)
- 52.232-25 - Prompt Payment (FEB 2002)
- 52.232-33 - Payment By Electronic Funds Transfer-Central Contractor Registration (MAY 1999)
- 52.233-1 - Disputes (JUL 2002)
- 52.233-3 - Protest After Award (AUG 1996) - Alternate I (JUN 1985)
- 52.237-2 - Protection Of Government Buildings, Equipment And Vegetation (APR 1984)
- 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 - Changes - Cost-Reimbursement (AUG 1987) - Alternate V (APR 1984)
- 52.243-6 - Change Order Accounting (APR 1984)
- 52.243-7 - Notification Of Changes (APR 1984)fill in 30
- 52.244-2 - Subcontracts (AUG 1998) - Alternate I (AUG 1998)
- 52.244-5 - Competition In Subcontracting (DEC 1996)
- 52.244-6 - Subcontracts For Commercial Items (MAY 2002)
- 52.245-5 - Government Property (Cost-Reimbursement, Time-And-Material, Or Labor-Hour Contracts) (JAN 1986) (DEVIATION)
- 52.245-18 - Special Test Equipment (FEB 1993)
- 52.245-19 - Government Property Furnished "As-Is" (APR 1984)
- 52.246-23 - Limitation Of Liability (FEB 1997)
- 52.246-25 - Limitation Of Liability - Services (FEB 1997)
- 52.247-1 - Commercial Bill Of Lading Notations (APR 1984)
- 52.247-63 - Preference For U. S. Flag Carriers (JAN 1997)
- 52.249-6 - Termination (Cost-Reimbursement) (SEP 1996)
- 52.249-14 - Excusable Delays (APR 1984)
- 52.252-6 - Authorized Deviations in Clauses (APR 1984)(fill in Defense Federal Acquisition Regulation Supplement (48 CFR Chapter 2))
- 52.253-1 - Computer Generated Forms (JAN 1991)

b. DEPARTMENT OF DEFENSE FEDERAL ACQUISITION REGULATION CLAUSES

DFARS CLAUSE TITLE

- 252.201-7000 - Contracting Officer's Representative (DEC 1991)
- 252.203-7001 - Prohibition On Persons Convicted Of Fraud Or Other Defense Contract Related Felonies (MAR 1999)
- 252.203-7002 - Display Of DoD Hotline Poster (DEC 1991)
- 252.204-7000 - Disclosure Of Information (DEC 1991)
- 252.204-7003 - Control Of Government Personnel Work Product (APR 1992)
- 252.204-7004 - Required Central Contractor Registration (NOV 2001)
- 252.204-7005 - Oral Attestation Of Security Responsibilities (NOV 2001)
- 252.205-7000 - Provision Of Information To Cooperative Agreement Holders (DEC 1991)
- 252.209-7000 - Acquisition From Subcontractors Subject To On-Site Inspection Under The Intermediate-Range Nuclear Forces (INF) Treaty (NOV 1995)
- 252.209-7004 - Subcontracting With Firms That Are Owned Or Controlled By The Government Of A Terrorist Country (MAR 1998)
- 252.215-7000 - Pricing Adjustments (DEC 1991)
- 252.215-7002 - Cost Estimating System Requirements (OCT 1998)
- 252.219-7004 - Small, Small Disadvantaged And Women-Owned Small Business Subcontracting Plan (Test Program) (JUN 1997)
- 252.223-7001 - Hazard Warning Labels (DEC 1991)
- 252.223-7004 - Drug-Free Work Force (SEP 1988)
- 252.223-7006 - Prohibition On Storage And Disposal Of Toxic And Hazardous Materials (APR 1993)
- 252.225-7001 - Buy American Act And Balance Of Payments Program (MAR 1998)
- 252.225-7002 - Qualifying Country Sources As Subcontractors (DEC 1991)
- 252.225-7007 - Buy American Act--Trade Agreements--Balance Of Payments Program (OCT 2002)
- 252.225-7012 - Preference For Certain Domestic Commodities (APR 2002)
- 252.225-7025 - Restriction On Acquisition Of Forgings (JUN 1997)
- 252.225-7026 - Reporting Of Contract Performance Outside The United States (JUN 2000)
- 252.225-7031 - Secondary Arab Boycott Of Israel (JUN 1992)
- 252.225-7043 - Antiterrorism/Force Protection Policy For Defense Contractors Outside The United States (JUN 1998) (fill in : Naval Criminal Investigative Service (NCIS), Code 24, telephone, DSN 228-9113 or commercial (202)433-9113)
- 252.227-7000 - Non Estoppel (OCT 1966)
- 252.227-7001 - Release Of Past Infringement (AUG 1984)
- 252.227-7013 - Rights In Technical Data -- Noncommercial Items (NOV 1995) - Alternate I (JUN 1995)
- 252.227-7014 - Rights In Noncommercial Computer Software And Noncommercial Computer Software Documentation (JUN 1995) - Alternate I (JUN 1995)
- 252.227-7016 - Rights In Bid Or Proposal Information (JUN 1995)
- 252.227-7018 - Rights In Noncommercial Technical Data And Computer Software--Small Business Innovative Research (SBIR) Program (JUN 1995) - Alternate I (JUN 1995)

- 252.227-7019 - Validation Of Asserted Restrictions--Computer Software (JUN 1995)
- 252.227-7025 - Limitations On The Use Or Disclosure Of Government-Furnished Information Marked With Restrictive Legends (JUN 1995)
- 252.227-7027 - Deferred Ordering Of Technical Data Or Computer Software (APR 1988)
- 252.227-7030 - Technical Data--Withholding Of Payment (MAR 2000)
- 252.227-7034 - Patents--Subcontracts (APR 1984)
- 252.227-7036 - Declaration Of Technical Data Conformity (JAN 1997)
- 252.227-7037 - Validation Of Restrictive Markings On Technical Data (SEP 1999)
- 252.227-7039 - Patents--Reporting Of Subject Inventions (APR 1990)
- 252.231-7000 - Supplemental Cost Principles (DEC 1991)
- 252.232-7009 - Mandatory Payment By Governmentwide Commercial Purchase Card (JUL 2000)
- 252.235-7010 - Acknowledgment Of Support And Disclaimer (MAY 1995)
- 252.235-7011 - Final Scientific Or Technical Report (SEP 1999)
- 252.242-7000 - Post Award Conference (DEC 1991)
- 252.242-7004 - Material Management And Accounting System (DEC 2000)
- 252.243-7002 - Requests For Equitable Adjustment (MAR 1998)
- 252.244-7000 - Subcontracts For Commercial Items And Commercial Components (DOD Contracts) (MAR 2000)
- 252.245-7001 - Reports Of Government Property (MAY 1994)
- 252.246-7001 - Warranty Of Data (DEC 1991)
- 252.247-7023 - Transportation Of Supplies By Sea (MAY 2002)
- 252.247-7024 - Notification Of Transportation Of Supplies By Sea (MAR 2000)
(will be included if the successful offeror made a negative response to the inquiry at DFARS 252.247-7022)

I-2 FAR 52.223-11 - OZONE-DEPLETING SUBSTANCES (MAY 2001)

- (a) *Definitions.* "Ozone-depleting substance", as used in this clause, means any substance the Environmental Protection Agency designates in 40 CFR Part 82 as –
- (1) Class I, including, but not limited to, chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or
 - (2) Class II, including, but not limited to, hydrochlorofluorocarbons.
- (b) The Contractor shall label products which contain or are manufactured with ozone-depleting substances in the manner and to the extent required by 42 U.S.C. 7671j (b), (c), and (d) and 40 CFR Part 82, Subpart E, as follows:

WARNING

Contains (or manufactured with, if applicable) * _____, a substance(s)
which harm(s) public health and environment by destroying ozone in the upper atmosphere.

*The Contractor shall insert the name of the substance(s).

PART III - LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS
SECTION J
LIST OF ATTACHMENTS

- J-1** Attachment (1) - Statement Of Work - 24 Pages, With Exhibit A - DD Form 1423, Contract Data Requirements List, 2 Pages.
- J-2** Attachment (2) - DD Form 254, Contract Security Classification Specification, Ser 060-02 Dated 20021105 - 2 Pages.
- J-3** Attachment (3) – Personnel Qualifications, 4 Pages.
- J-4** Attachment (4) – Accounting and Appropriation Data- 1 page. *

(To be included at time of award)*

**PART IV - REPRESENTATIONS AND INSTRUCTIONS
SECTION - K
REPRESENTATIONS, CERTIFICATIONS
AND OTHER STATEMENTS OF OFFERORS OR RESPONDENTS**

K-1 Representations, Certifications, and Other Statements of Offerors or Respondents

Each Offeror must submit a completed Representations, Certifications, and Other Statements Of Offerors or Respondents with its proposal which is available electronically in full text at [HTTP://HERON.NRL.NAVY.MIL/CONTRACTS/REPS&CERTS.HTM](http://HERON.NRL.NAVY.MIL/CONTRACTS/REPS&CERTS.HTM)

Use Representations and Certifications: A

K-2 FILL IN FOR FAR 52.219-1 - SMALL BUSINESS PROGRAM REPRESENTATIONS (MAR 2001)

The fill in information is as follows:

The NAICS code for this acquisition is 541710

The small business size standard is. 500

**SECTION L
INSTRUCTIONS CONDITIONS AND NOTICES
TO OFFERORS OR RESPONDENTS**

L-1 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions 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. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

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

<http://heron.nrl.navy.mil/contracts/home.htm>

FAR CLAUSE TITLE

52.204-6	-	Data Universal Numbering System (DUNS) Number (JUNE 1999)
52.215-1	-	Instructions To Offerors- Competitive Acquisition (MAY 2001)
52.215-1	-	Instructions To Offerors- Competitive Acquisition (MAY 2001) Alternate I (OCT 1997)
52.215-1	-	Instructions To Offerors- Competitive Acquisition (MAY 2001) Alternate II (OCT 1997)

- 52.215-5 - Facsimile Proposals (OCT 1997)
Paragraph (c) is completed as follows: (202) 767-5896 (primary) or (202) 767-0494 (alternate). In addition proposals may be transmitted by e-mail to Abdon@contracts.nrl.navy.mil (primary) or Cosby@contracts.nrl.navy.mil (alternate) in either Microsoft Word (version 97 or earlier) or pdf format.
- 52.215-16 - Facilities Capital Cost Of Money (OCT 1997)
- 52.219-24 - Small Disadvantaged Business Participation Program - Targets (OCT 2000)
- 52.222-24 - Preaward On-Site Equal Opportunity Compliance Evaluation (FEB 1999)
- 52.237-10 - Identification Of Uncompensated Overtime (OCT 1997)

DFAR CLAUSE TITLE

252.209-7001- Disclosure Of Ownership Or Control By The Government Of A Terrorist Country (MAR 1998)

L-2 INSTRUCTIONS FOR SUBMISSION OF PROPOSALS/OFFERS

All proposals shall be submitted in accordance with FAR 52.215-1- *Instructions to Offerors- Competitive Acquisition*. Proposals/offers submitted in paper media through the United States Postal Service (USPS) or delivery services shall be addressed to:

Contracting Officer, ATTN: Code _3220.HA
Naval Research Laboratory(NRL)
4555 Overlook Avenue, S.W.
Washington, D.C. 20375

Solicitation/RFP No. – N00173-03-R-HA01

Closing Date: DEC 30, 2002_Time_4:00 P.M. E.S.T.

Proposals may be hand delivered to the Contracting Office, NRL, 4555 Overlook Avenue, S.W., Washington, D.C. 20375, Building 222, Room 115 between the hours of 8AM until 4PM, local time, excluding weekends and federal holidays. NRL is a controlled-access facility. Photo identification will be required. Report first to Building 72, Visitor Control for access to NRL. After receiving a Visitor Pass, proceed directly to Building 222, Room 115, Contracting Office Receptionist to deliver the proposal. All offerors shall allow sufficient time for delivery of their proposal to the Contracting Office prior to the closing date and time announced in the solicitation. Directions and additional information about NRL is available at <http://www.nrl.navy.mil/aboutdc.htm>

If facsimile proposals are authorized, contracting officers may request offeror(s) to provide the complete; original signed proposal at a later date.

L-3 FAR 52.211-14 - NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be a DX rated order; DO rated order certified for national use under the Defense Priorities and Allocations system (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.

L-4 FAR 52.215-20 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA (OCT 1997)

(a) *Exceptions from cost or pricing data.* (1) In lieu of submitting cost or pricing data, offerors may submit a written request for exception by submitting the information described in the following subparagraphs. The Contracting Officer may require additional supporting information, but only to the extent necessary to determine whether an exception should be granted, and whether the price is fair and reasonable.

(i) *Identification of the law or regulation establishing the price offered.* If the price is controlled under law by periodic rulings, reviews, or similar actions of a governmental body, attach a copy of the controlling document, unless it was previously submitted to the contracting office.

(ii) *Commercial item exception.* For a commercial item exception, the offeror shall submit, at a minimum, information on prices at which the same item or similar items have previously been sold in the commercial market that is adequate for evaluating the reasonableness of the price for this acquisition. Such information may include--

(A) For catalog items, a copy of or identification of the catalog and its date, or the appropriate pages for the offered items, or a statement that the catalog is on file in the buying office to which the proposal is being submitted. Provide a copy or describe current discount policies and price lists (published or unpublished), e.g., wholesale, original equipment manufacturer, or reseller. Also explain the basis of each offered price and its relationship to the established catalog price, including how the proposed price relates to the price of recent sales in quantities similar to the proposed quantities.

(B) For market priced items, the source and date or period of the market quotation or other basis for market price, the base amount, and applicable discounts. In addition, describe the nature of the market.

(C) For items included on an active Federal Supply Service Multiple Award Schedule contract, proof that an exception has been granted for the schedule item.

(2) The offeror grants the Contracting Officer or an authorized representative the right to examine, at any time before award, books, records, documents, or other directly pertinent records to verify any request for an exception under this provision, and the reasonableness of price. For items priced using catalog or market prices, or law or regulation, access does not extend to cost or profit information or other data relevant solely to the offeror's determination of the prices to be offered in the catalog or marketplace.

(b) *Requirements for cost or pricing data.* If the offeror is not granted an exception from the requirement to submit cost or pricing data, the following applies:

(1) The offeror shall prepare and submit cost or pricing data and supporting attachments in accordance with Table 15-2 of FAR 15.408.

(2) As soon as practicable after agreement on price, but before contract award (except for unpriced actions such as letter contracts), the offeror shall submit a Certificate of Current Cost or Pricing Data, as prescribed in FAR 15.406-2.

L-5 FAR 52.216-1 - TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Cost Plus Fixed Fee Term contract resulting from this solicitation.

L-6 FAR 52.233-2 - SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in Section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO) shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from the Control Desk, Code 3200, Bldg. 222, Rm. 115, Naval Research Laboratory, 4555 Overlook Ave., S.W., Washington DC 20375-5326.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

L-7 DFARS 252.227-7017 - IDENTIFICATION AND ASSERTION OF USE, RELEASE, OR DISCLOSURE RESTRICTIONS (JUN 1995)

(a) The terms used in this provision are defined in following clause or clauses contained in this solicitation—

(1) If a successful offeror will be required to deliver technical data, the Rights in Technical Data--Noncommercial Items clause, or, if this solicitation contemplates a contract under the Small Business Innovative Research Program, the Rights in Noncommercial Technical Data and Computer Software--Small Business Innovative Research (SBIR) Program clause.

(2) If a successful offeror will not be required to deliver technical data, the Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation clause, or, if this solicitation contemplates a contract under the Small Business Innovative Research Program, the Rights in Noncommercial Technical Data and Computer Software--Small Business Innovative Research (SBIR) Program clause.

(b) The identification and assertion requirements in this provision apply only to technical data, including computer software documents, or computer software to be delivered with other than unlimited rights. For contracts to be awarded under the Small Business Innovative Research Program, the notification requirements do not apply to technical data or computer software that will be generated under the resulting contract. Notification and identification is not required for restrictions based solely on copyright.

(c) Offers submitted in response to this solicitation shall identify, to the extent known at the time an offer is submitted to the Government, the technical data or computer software that the Offeror, its subcontractors or suppliers, or potential subcontractors or suppliers, assert should be furnished to the Government with restrictions on use, release, or disclosure.

(d) The Offeror's assertions, including the assertions of its subcontractors or suppliers or potential subcontractors or suppliers shall be submitted as an attachment to its offer in the following format, dated and signed by an official authorized to contractually obligate the Offeror:

Identification and Assertion of Restrictions on the Government's Use, Release, or Disclosure of Technical Data or Computer Software.

The Offeror asserts for itself, or the persons identified below, that the Government's rights to use, release, or disclose the following technical data or computer software should be restricted:

Technical Data Computer Software to be Furnished With Restrictions*	Basis for Assertion **	Asserted Rights Category ***	Name of Person Asserting Restrictions****
(List)*****	(List)	(List)	(List)

- * For technical data (other than computer software documentation) pertaining to items, components, or processes developed at private expense, identify both the deliverable technical data and each such items, component, or process. For computer software or computer software documentation identify the software or documentation.
- ** Generally, development at private expense, either exclusively or partially, is the only basis for asserting restrictions. For technical data, other than computer software documentation, development refers to development of the item, component, or process to which the data pertain. The Government's rights in computer software documentation generally may not be restricted. For computer software, development refers to the software. Indicate whether development was accomplished exclusively or partially at private expense. If development was not accomplished at private expense, or for computer software documentation, enter the specific basis for asserting restrictions.
- *** Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited, restricted, or government purpose rights under this or a prior contract, or specially negotiated licenses).
- **** Corporation, individual, or other person, as appropriate.
- ***** Enter "none" when all data or software will be submitted without restrictions.

Date _____
 Printed Name and Title _____

 Signature _____

(End of identification and assertion)

- (e) An offeror's failure to submit, complete, or sign the notification and identification required by paragraph (d) of this provision with its offer may render the offer ineligible for award.
- (f) If the Offeror is awarded a contract, the assertions identified in paragraph (d) of this provision shall be listed in an attachment to that contract. Upon request by the Contracting Officer, the Offeror shall provide sufficient information to enable the Contracting Officer to evaluate any listed assertion.

L-8 DFARS 252.227-7028 - TECHNICAL DATA OR COMPUTER SOFTWARE PREVIOUSLY DELIVERED TO THE GOVERNMENT (JUN 1995)

The Offeror shall attach to its offer an identification of all documents or other media incorporating technical data or computer software it intends to deliver under this contract with other than unlimited rights that are identical or substantially similar to documents or other media that the Offeror has produced for, delivered to, or is obligated to deliver to the Government under any contract or subcontract. The attachment shall identify - -

- (a) The contract number under which the data or software were produced;
- (b) The contract number under which, and the name and address of the organization to whom, the data or software were most recently delivered or will be delivered; and
- (c) Any limitations on the Government's rights to use or disclose the data or software, including, when applicable, identification of the earliest date the limitations expire.

L-9 GOVERNMENT-FURNISHED PROPERTY

No material, labor, or facilities will be furnished by the Government unless provided for in the solicitation.

L-10 INQUIRIES CONCERNING THE RFP

Any questions concerning the RFP must be submitted in writing to the Contracting Officer at the location noted in blocks 7 and 9 of the Standard Form 33, "Solicitation, Offer and Award," no less than fifteen (15) days before closing. The Government will not consider questions received after this date. Offerors are cautioned against directing any questions concerning this RFP to technical personnel at the Naval Research Laboratory.

L-11 PROPOSAL ORGANIZATION

(1) Information for the technical/management proposal shall be placed in Volume I and be completely separate from the business proposal (Volume II).

(2) Proposal Format and Length - The length of the Technical Proposal, exclusive of resumes and biographical information is limited to a total of no more than **60** sequentially numbered pages. Proposals not conforming to the length restriction may be excluded from consideration.

The proposal should be written and organized so as to be compatible with the RFP, the Statement of Work, company's organization and accounting structure, and proposed cost estimate. Offerors are encouraged to use recycled paper and maximize the use of double sided copying when preparing responses to solicitations.

L-12 VOLUME I - TECHNICAL/MANAGEMENT PROPOSAL

REQUIRED COPIES: 1 ORIGINAL AND 4 COPIES .

- (1) Include a matrix indicating proposed labor hours by skill category required to perform the statement of work. This matrix shall not contain labor rates or any other indication of price. The offeror shall propose direct labor hours in accordance with the level of effort breakdown as shown in Section L-15.
- (2) The following information is required for evaluation of your technical/management :
 - A. Qualifications:
 - (a) The proposal must demonstrate that the offeror's key personnel are technically competent to accomplish the Statement of Work. Resumes, including experience and publication records, must be provided for proposed personnel so as to establish that the individuals proposed meet the Personnel Qualifications, as stated in Attachment No. 3.
 - (b) The proposal must indicate whether the offeror's key personnel are individually available to support the effort on a full time basis.
 - (c) The proposal must indicate whether the offeror's technical team spans the total requirements of the Statement of Work.
 - (d) The proposal must indicate whether the designated Project Manager meets the Personnel Qualifications, as stated in Attachment No. 3, and is qualified to address the total scope of the Statement of Work.
 - B. Technical Approach:
 - (a) The proposal must indicate that the offeror's proposed technical approach is sound. The proposal must demonstrate that the offeror understands the requirements of the tasks.
 - (b) The proposal must demonstrate that the offeror and the proposed staff possess the experience required to successfully address the technical issues.
 - (c) The proposal must fully address a competent approach to each of the technical requirements of the Statement of Work. The proposal must not simply play back the words in the Statement of Work.
 - C. Management:
 - (a) The proposal must demonstrate that the offeror possesses a corporate technical base to support the proposed effort including potential expansion of the level of effort within the scope of work.
 - (b) The proposal must demonstrate that the offeror possess the experience and maturity necessary to successfully manage the proposed effort.
 - D. Facilities:
 - (a) The proposal must demonstrate that the offeror's facilities are adequate and appropriate to support the in-house component of the proposed effort.

E. Past Performance:

- (a) The offeror who have relevant history must submit this information showing the quality of the work performed, timeliness of performance, cost control, and business relations.
- (b) Offerors that have no relevant performance history, or for which past performance information is not available, will not be evaluated favorably or unfavorably for past performance.

PAST PERFORMANCE INFORMATION

(a) Offerors shall submit the following information as part of their proposal. (*Offerors are encouraged to submit the information prior to other parts of the proposal to assist the government in reducing the length of the evaluation period.*) List the last five to seven contracts or subcontracts completed by the offeror or predecessor companies during the past three years for services similar in nature to this requirement. Include in the last five to seven contracts any current contracts or subcontracts for similar services that were awarded at least one year prior to the date of this solicitation. Offerors that have no similar previous or current contracts should provide the requested information for proposed subcontractors that will perform major or critical aspects of the requirement or for the proposed project manager or key personnel responsible for major or critical aspects of the requirement.

1. Name of contracting organization.
2. Contract number
3. Contract type
4. Total contract value
5. Description of the contract work
6. Contracting officer and telephone number
7. Contracting officer's representative, program manager, or similar official and telephone number

(b) Offerors shall contact the contracting organizations identified pursuant to paragraph (a) as soon as possible and request them to send past performance information on the identified contracts to the address in Block 7 of the face page of this solicitation. The past performance report which is available electronically in full text at <http://heron.nrl.navy.mil/contracts/home.htm> is to be provided to the contracting organization for this purpose. If the contracting organization has already collected past performance information on the contract pursuant to FAR Subpart 42.15, the format used to collect the information may be used instead of the past performance report.

(c) Offerors may include in their proposals specific information relating to problems encountered in performing the identified contracts and any corrective actions by the offeror. Offerors should not provide general information on their performance on the identified contracts as this will be obtained from the contracting organizations.

L-13 VOLUME II - BUSINESS PROPOSAL

REQUIRED COPIES: 1 ORIGINAL AND 4 COPIES

(1) COST PROPOSAL

The offeror shall submit a business proposal that includes a cost proposal with supporting information for each cost element consistent with offeror's cost accounting system. The supporting breakdown should include such elements as materials, direct labor, indirect cost, and other costs such as travel. The offeror shall provide exhibits as necessary to substantiate each cost element. Should rates be used in the proposal that are not DCAA approved, the offeror shall provide complete documentation and the rationale for their use at time of proposal submission. However, offerors are advised to use actual labor rates of proposed personnel as the basis for estimating labor costs when practicable.

(2) SMALL BUSINESS PARTICIPATION

- (a) In addition to complying with the clause at FAR 52.219-9, Small Business Subcontracting Plan (JAN 2002) with its Alternate II (OCT 2000), proposals must include information to permit evaluation of the extent of participation of small businesses and historical black colleges or universities and minority institutions in performance of the contract. Participation to be identified may be in the form of a joint venture, teaming arrangement, or subcontract. Small business concerns that are not required by FAR 52.219-9 to submit a subcontracting plan must indicate the extent to which proposed joint ventures, teaming arrangements, or subcontracts are with historically black colleges or universities and minority institutions. Information provided should include the extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.
- (b) Proposals must also include information to permit evaluation of the extent of participation of small disadvantaged business concerns in performance of the contract. See the provision at FAR 52.219-24, Small Disadvantaged Business Participation Program--Targets (OCT 2000), and the clause at 52.219-25, Small Disadvantaged Business Participation Program--Disadvantaged Status and Reporting (OCT 1999). Any targets will be incorporated into and become part of any resulting contract. Information provided should include the extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

Task 9: Naval Engineering Systems and Applications

Labor Category	Year 1 Hours	Year 2 Hours	Year 3 Hours	Year 4 Hours	Year 5 Hours	Total Hours
Program Manager	100	100	100	100	100	500
Scientist/Engineer	4,160	4,160	4,160	4,160	4,160	20,800
TOTAL	4,260	4,260	4,260	4,260	4,260	21,300

Task 10: Computerized Calibration of Instruments

Labor Category	Year 1 Hours	Year 2 Hours	Year 3 Hours	Year 4 Hours	Year 5 Hours	Total Hours
Program Manager	100	100	100	100	100	500
Scientist/Engineer	2,080	2,080	2,080	2,080	2,080	10,400
Programmer	2,080	2,080	2,080	2,080	2,080	10,400
TOTAL	4,260	4,260	4,260	4,260	4,260	21,300

L-15 ANTICIPATED TRAVEL REQUIREMENTS

Contractor employees will be required to travel to complete the requirements of this contract. Travel may be for the purposes of 1) reviewing contract progress in meetings at NRL, 2) supporting NRL staff in reviewing program progress in sponsor program reviews and meetings, 3) attending national or international meetings to present scholarly papers documenting the R&D accomplishments under the contract, and 4) supporting (for extended periods and at various locations) field studies and/or demonstrations of the hardware and software developed under this contract. The location of these field operations is currently unspecified, but may be at remote locations in or outside the US. It is assumed that all travel originates at the Contractor's facility.

Anticipated Contractor Travel Requirements

Task	Year	No. Trips	No. People	No. Days	E-3 PROBABLE DESTINATION
1	1	1	1	5	San Antonio, Texas
1	2	1	2	5	Baltimore, MD
1	3	1	1	5	Long Beach, CA
1	4	1	1	5	Salt Lake City, UT
1	5	1	2	5	Baltimore, MD

Task	Year	No. Trips	No. People	No. Days	Probable Destination
2	1	1	2	5	Orlando, FL
2	2	1	2	5	Chicago, IL
2	3	1	2	5	New Orleans, LA
2	4	1	2	5	Orlando, FL
2	5	1	2	5	Chicago, IL

Task	Year	No. Trips	No. People	No. Days	E-4 PROBABLE DESTINATION
3	1	1	2	5	San Antonio, TX
3	1	1	2	5	Jacksonville, FL
3	1	1	2	5	Great Lakes, IL
3	1	1	2	5	San Diego, CA
3	2	1	2	5	Baltimore, MD
3	2	1	2	5	Jacksonville, FL
3	2	1	2	5	Great Lakes, IL
3	2	1	2	5	San Diego, CA
3	3	1	2	5	Long Beach, CA
3	3	1	2	5	Jacksonville, FL
3	3	1	2	5	Great Lakes, IL
3	3	1	2	5	San Diego, CA
3	4	1	2	5	Salt Lake City, UT
3	4	1	2	5	Jacksonville, FL
3	4	1	2	5	Great Lakes, IL
3	4	1	2	5	San Diego, CA
3	5	1	2	5	Baltimore, MD
3	5	1	2	5	Jacksonville, FL
3	5	1	2	5	Great Lakes, IL
3	5	1	2	5	San Diego, CA

Task	Year	No. Trips	No. People	No. Days	Probable Destination
4	1	1	1	5	Boston, MA
4	2	1	1	10	Albuquerque, NM
4	3	1	1	10	Rapid City, SD
4	4	1	1	10	Reno, NV
4	5	1	1	5	Los Angeles, CA

Task	Year	No. Trips	No. People	No. Days	Probable Destination
5	1	1	2	5	San Francisco, CA
5	2	1	2	5	Portland, OR
5	3	1	2	5	Montreal, Canada
5	4	1	2	5	Honolulu, HI
5	5	1	2	5	San Francisco, CA

Task	Year	No. Trips	No. People	No. Days	E-5 PROBABLE DESTINATION
6	1	1	2	5	Baltimore, MD
6	1	1	1	5	Norfolk, VA
6	2	1	2	5	Anaheim, CA
6	2	1	1	5	Tulsa, OK
6	3	1	2	5	Philadelphia, PA
6	3	1	1	5	Indianapolis, IN
6	4	1	2	5	San Francisco, CA
6	5	1	1	5	Cincinnati, OH
6	5	1	2	5	Seattle, WA
6	5	1	1	5	Norfolk, VA

Task	Year	No. Trips	No. People	No. Days	E-6 PROBABLE DESTINATION
7	1	1	1	5	Orlando, FL
7	2	1	1	5	San Antonio, TX
7	3	1	1	5	Quebec City, Canada
7	4	1	1	5	Los Angeles, CA
7	5	1	1	5	Denver, CO

Task	Year	No. Trips	No. People	No. Days	E-7 PROBABLE DESTINATION
8	1	2	1	5	San Diego, CA
8	1	1	1	5	Oak Ridge, TN
8	2	2	1	5	Nashua, NH
8	2	1	1	5	South Bend, IN
8	3	2	1	5	Sommerville, MA
8	3	1	1	5	Simi Valley, CA
8	4	2	1	5	San Diego, CA
8	5	2	1	5	Nashua, NH

Task	Year	No. Trips	No. People	No. Days	Probable Destination
9	1	2	2	5	Los Angeles, CA
9	2	2	2	5	Los Angeles, CA
9	3	2	2	5	Los Angeles, CA
9	4	2	2	5	Los Angeles, CA
9	5	2	2	5	Los Angeles, CA

Task	Year	No. Trips	No. People	No. Days	E-8 PROBABLE DESTINATION
10	1	2	1	5	Vail, CO
10	2	2	1	5	San Diego, CA
10	3	2	1	5	Boulder, CO
10	4	2	1	5	Tampa, FL
10	5	2	1	5	Los Angeles, CA

L-16 ESTIMATED OTHER DIRECT COST REQUIREMENTS.

For purposes of preparing their proposals, offerors shall use the following estimates for anticipated Other Direct Cost requirements. Specific requirements will vary depending upon the approaches the contractor proposes, the requirements of specific sponsor projects undertaken, and the nature of field operations and demonstrations required. Offerors should note that estimates are direct costs and that they should specify and add any applicable indirect costs.

TASK 1: ANALYSIS AND CONTROL OF AIRBORNE AND WATERBORNE CHEMICALS

Materials costs for Task 1 are expected to include items such as general laboratory materials such as petri dishes, pipettes, vials, other glass and plastic labware, etc, solid-phase extraction media, expendable chemicals and biochemicals, GC and LC columns, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 1: \$30,000

Task 2: Chemical Analysis and Chemical Sensor Development

Materials costs for Task 2 are expected to include items such as general laboratory materials such as pipettes, vials, other glass and plastic labware, etc, solid-phase extraction media, expendable chemicals and biochemicals, GC and LC columns, microfluidics components, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 2: \$30,000

Task 3: Biotechnology and Biosensor Development

Materials costs for Task 3 are expected to include items such as general laboratory materials such as petri dishes, pipettes, vials, other glass and plastic labware, etc, solid-phase extraction media, expendable chemicals and biochemicals including DNA probes and primers, GC and LC columns, microfluidics components, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items. The possibility exists that short term needs for consultants with expertise in biosensor manufacturing and development, materials compatibility, and electrochemistry may be required. In addition, it is anticipated that collaborations with academic and/or industrial institutions will be an integral part of this effort, specifically related to the manufacture and testing of sensor components. Accordingly, provisions for subcontract arrangements are incorporated as a contingency.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 3: \$80,000

Subcontract/Consultant Costs (per year) for Base Year & 4 (four) Option Years, Task 3:
\$1,060,000

Task 4: Environmental Remediation and Site Characterization for Unexploded Ordnance (UXO)

Materials costs for Task 4 are associated primarily with support of field operations and demonstrations. They include items such as field support instrumentation (radios, electronics, software, portable laptop computers, GPS equipment, electronics test equipment, tool kits, etc.) Machining of specialized test fixtures, equipment repair, etc. will be required. Personnel protective equipment and clothing may be required. The possibility exists that short term needs for consultants with expertise in electromagnetics, as well as environmental compliance and regulatory affairs may be required.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 4: \$20,000

Consultant Costs (per year) for Base Year and 4 (four) Option Years, Task 4: \$10,000

Task 5: Biodegradation of Organics in Aquatic, Marine and Terrestrial Ecosystems

Materials costs for Task 5 are expected to include items such as general laboratory materials such as petri dishes, pipettes, vials, other glass and plastic labware, etc, solid-phase extraction media, expendable chemicals and biochemicals, GC and LC columns, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items. The possibility exists for the need of consultants with expertise in environmental compliance, shipboard support, and analytical chemistry may be required.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 5: \$30,000

Consultant Costs (per year) for Base Year and 4 (four) Option Years, Task 5: \$1,110,000

Task 6: Synthesis, Modification and Characterization of Surfaces, Interfaces and Materials

Materials costs for Task 6 are expected to include items such as general laboratory materials such as glass and plastic labware, expendable solvents and chemicals, electronic materials and components, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items. The possibility exists that short term needs for consultants with expertise in electronics manufacturing and development, materials compatibility, and chemistry/plasma etching may be required. In addition, it is anticipated that collaborations with academic and/or industrial institutions will be an integral part of this effort, specifically related to the manufacture and testing of sensor components. Accordingly, provisions for subcontract arrangements are incorporated as a contingency.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 6: \$50,000

Consultant Costs (per year) for Base Year and 4 (four) Option Years, Task 6: \$20,000

Task 7: Synthesis and Characterization of Materials for Energy Storage, Conversion and Generation

Materials costs for Task 7 are expected to include items such as general laboratory materials such as glass and plastic labware, expendable solvents and chemicals, electronic materials and components, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items. The possibility exists that short term needs for consultants with expertise in battery and fuel cell manufacturing and development, materials compatibility, and electrochemistry may be required. In addition, it is anticipated that collaborations with academic and/or industrial institutions will be an integral part of this effort, specifically related to the manufacture and testing of sensor components. Accordingly, provisions for subcontract arrangements are incorporated as a contingency.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 7: \$30,000

Consultant Costs (per year) for Base Year and 4 (four) Option Years, Task 7: \$20,000

Task 8: X-Ray and Other High-Energy Radiation Applications

Materials costs for Task 8 are expected to include items such as general laboratory materials such as glass and plastic labware, expendable solvents and chemicals, electronic materials and components, machining, computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items. The possibility exists that short term needs for consultants with expertise in sensor manufacturing and development, materials compatibility, and communication systems may be required. In addition, it is anticipated that collaborations with academic and/or industrial institutions will be an integral part of this effort, specifically related to the manufacture and testing of sensor components. Accordingly, provisions for subcontract arrangements are incorporated as a contingency.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 8: \$30,000

Consultant Costs (per year) for Base Year and 4 (four) Option Years, Task 8: \$20,000

Task 9: Naval Engineering Systems and Applications

Materials costs for Task 9 are expected to include items such as computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 9: \$15,000

Task 10: Computerized Calibration of Instruments

Materials costs for Task 10 are expected to include items such as computer hardware, software, software licenses, printers, electronics and test equipment, office supplies and other miscellaneous items.

Materials Costs (per year) for Base Year and 4 (four) Option Years, Task 10: \$30,000

L-17 MULTIPLE AWARDS

The Contracting Officer may make multiple awards resulting from this solicitation.

**SECTION M
EVALUATION FACTORS FOR AWARD**

M-1 EVALUATION

Award will be made to that offeror whose proposal is determined to be the best value to the Government, proposed cost and other factors considered. The Government reserves the right to make award to other than the low offeror. Although technical considerations are more important than the cost factor, the closer the technical scores of the various proposals are to one another, the more important the business considerations become.

M-2 EVALUATION FACTORS FOR AWARD

Proposals will be evaluated in accordance with the following criteria. The technical factor is more important than the cost factor. Technical subfactors are listed in descending order of importance.

M-2-1. TECHNICAL/MANAGEMENT**(1) QUALIFICATIONS**

- (a) The proposal will be evaluated as to whether the offeror's key personnel are technically competent to accomplish the Statement of Work
- (b) The proposal will be evaluated as to whether the offeror's key personnel are individually available to support the effort on a full time basis.
- (c) The proposal will be evaluated as to whether the offeror's technical team spans the total requirements of the Statement of Work.
- (d) The proposal will be evaluated as to whether the designated project manager meets the Personnel Qualifications, as stated in Attachment No. 3, and is qualified to address the total scope of the Statement of Work.

(2) TECHNICAL APPROACH

- (a) The proposal will be evaluated on the extent to which the offeror's proposed technical approach is sound. The proposal will be evaluated on the extent on which the proposal demonstrates that the offeror understands the requirements of the tasks and the technical issues critical to success of the effort.
- (b) The proposal will be evaluated on the extent to which the proposal and the proposed staff possess the experience required to successfully address the technical issues.
- (c) The proposal will be evaluated on the extent to which the proposal fully addresses a competent approach to each of the technical requirements specified in the Statement of Work rather simply playing back the words.

(3) MANAGEMENT

- (a) The proposal will be evaluated on the extent that the offeror provides a corporate technical base to support the proposed effort including potential expansion of the level of effort within the scope of work.
- (b) The proposal will be evaluated on the extent that the offeror demonstrates the experience and maturity required to the Key Personnel to successfully manage the proposed effort.

(4) FACILITIES

- (a) The proposal must demonstrate that the offeror's facilities are adequate and appropriate to support the in-house component of the proposed effort.

(5) PAST PERFORMANCE

Past performance will be evaluated on the basis of the quality of the work performed, timeliness of performance, cost control, and business relations. The evaluation will be based on the information provided pursuant to Section L and other sources if available. The evaluation will take into account past performance information regarding predecessor companies, subcontractors that will perform major or critical aspects of the requirement, or the proposed project manager or key personnel responsible for major or critical aspects of the requirement. Offerors that have no relevant performance history or for which past performance information is not available will not be evaluated favorably or unfavorably on past performance. The government may begin proposal evaluation prior to receipt of past performance information. If, after completion of proposal evaluation except evaluation of past performance, the contracting officer determines that evaluation of past performance will not affect the outcome of competitive selection, the contracting officer may waive its evaluation in accordance with FAR 15.304(c)(3)(iv).

M-2-2 COST TO THE GOVERNMENT

1. Cost realism takes into account the adequacy of the hours proposed, the categories and mix of labor proposed, and the appropriate distribution of labor among the tasks. The appropriateness of the supporting costs (travel, equipment, materials) will also be considered. Indirect rates are also a component of the evaluation, which also includes an evaluation of the likelihood that the risks inherent in the offeror's technical approach will result in higher actual costs than anticipated.
2. The chairperson of the evaluation board will collect and summarize the input of the panel members in a narrative prepared for the Contracting Officer.

M-3 FAR 52.217-5 - EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

STATEMENT OF WORK

1.0 INTRODUCTION

The Naval Research Laboratory (NRL) is the Navy's corporate laboratory. NRL conducts a broadly based multidisciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, system, and ocean, atmospheric, and space sciences and related technologies. The NRL Chemistry Division conducts multidisciplinary research and development programs in biotechnology, chemical dynamics and diagnostics, materials chemistry, corrosion science and engineering, surface chemistry including nanometer-scale science and technology, and fire and combustion research.

Primary research areas of expertise in the Chemical Dynamics and Diagnostics Branch include molecular reaction dynamics, mass spectrometry and ion chemistry, chemical and biological sensor and instrumentation development, molecular biology, alternative geochemical energy source exploration, marine and estuarine environmental research, and surface reaction dynamics of energetic materials. A central focus of the Branch involves development of experimental chemical diagnostic and analytical capabilities with theoretical and modeling support for experimental studies; this work is applied to both short-range Navy problems, environmental issues of both DOD and National concern, and to the long-range development of scientific expertise and knowledge relevant to future Navy and DOD missions. The Branch is a center of expertise in chemical processes associated with propellant/explosives initiation and combustion, and ship/aircraft infrared antimissile defense. Analytical and diagnostic expertise is directly applicable to combustion diagnostics, infrared decoy performance, explosives detection, atmospheric life support systems, toxic chemical detection and a wide range of environmental issues. An ultra fast dynamics group uses laser probes to characterize chemical processes and reactions taking place on the femtosecond time scale. In addition, the Branch has very strong capabilities in analytical methods and techniques development. This analytical chemistry expertise, which is focused upon the detection, identification and quantification of hazardous/toxic materials, forms the basis for the Branch being recognized as a center of expertise for monitoring workplace gas phase hazards and as a National center of expertise for enclosed life support systems. In addition to gas phase programs, scientific expertise is also focused on trace metal specification in complex solutions including seawater. The use of novel trace metal sequestering agents and fiber optics allows for specificity and *in situ* sampling. The Branch also has a strong commitment to a wide range of molecular biological thrusts. They conduct basic and applied research in (1) the use of microbial processes, such as biodegradation, bioemulsification, mineral cycling, etc. to reduce contaminants in waste streams and environmental contamination of site materials; (2) the development and implementation of *in situ* remediation treatment strategies for contaminated soil, sediment, and groundwater using a combination of laboratory, mesocosm and field-scale studies; (3) the characterization and monitoring of ecologically based parameters involving nutrient cycling, food web dynamics, and ecosystem characterization. The Branch is a center of expertise for a number of national and international efforts including the development of biological-based sensors and components, strategies for long-term storage and stability of biologics and biomaterials, environmental and strategic security of hazardous materials and air and water compliance efforts within the DOD.

The Surface Chemistry Branch conducts experimental and theoretical S&T programs to study surfaces and solids including the properties of the gas-solid, liquid-solid, and solid-solid interface. These programs develop a fundamental understanding of the properties and behavior of surfaces and solids through composition, structure and dynamics measurements taken under a variety of conditions (temperature, environment, ionizing radiation, and electron/photon excitation). This knowledge is then used to develop new or improved surfaces, coatings and materials for Naval applications. Examples of the research programs include developing sensitive and quantitative techniques for surface and interface analysis, some with nanometer-scale spatial resolution; developing improved fluid and solid lubricants; modifying surfaces to reduce friction, wear, erosion, corrosion, and adhesion or to improve adhesion; developing new film deposition technologies to tailor surface properties using plasma, chemical vapor, electrochemical, Langmuir-Blodgett, and other deposition technologies; understanding the chemical reaction dynamics on surfaces as they pertain to film deposition, etching, corrosion and catalysis; using lasers to probe sub-nanosecond phenomena in solids as well as to produce electronic and structural excitations; developing microsensors for the rapid and sensitive detection of chemical, biological and radioactive species in air and fluids; developing sensitive radiation detectors and analysis techniques to determine the nature of specific radiation sources and applying these technique to survey contamination sites and assist with remediation efforts; employing unique x-ray facilities to study the effects of x-rays on solids and to calibrate x-ray optics, detectors and instruments; and improving electrochemical power sources such as fuel cells and batteries. The Branch also uses its expertise and analytical techniques to help the Navy solve interface- and coatings-related problems. Areas of expertise include solid and liquid lubrication, surface modification to reduce wear or corrosion, advanced coatings, fuel cells, batteries, thermoelectric and electronic materials, electro-catalytic surfaces for environment and contaminant control, nanofabrication, nanolithography, chemical sensors, biological sensors, radiation sensors, microfluidics, waste remediation, and pollution prevention. The personnel in the Surface Chemistry Branch have an understanding of Navy problems and a reputation for working with the SYSCOMS, Naval repair facilities and fleet with problems relating to interface phenomena. Branch personnel also work with industrial partners to transfer Navy technologies to commercial applications and new products.

2.0 SCOPE

This contract seeks the assistance of highly skilled and technically qualified contractor scientists and engineers to carry out the mission of the NRL Chemistry Division with particular focus of the activities within the Chemical Dynamics and Diagnostics Branch and Surface Chemistry Branch. The range of skills required include laser expertise; optical, surface and interface spectroscopies including near-field and scanned probe microscopies; mass spectrometry; reaction kinetics and mechanisms; solid-state mechanics and processes including friction and wear; coating and thin film technologies; electrochemistry including materials and processes for energy storage, conversion and generation; corrosion science and engineering applications; environmental science and engineering including remediation activities; modern instrumental analysis technique development and applications; biological and microbiological analysis capabilities including drug analysis; advanced chemical, biological and radiation sensor development; computer modeling and graphics; software development; sophisticated data reduction and analysis; generation of briefings and reports; and hardware design and system engineering experience.

The R&D requirements include tasks that vary considerably in their scope and in the complexity of the deliverable products. However, the tasks are interrelated in that they support the central mission of NRL and must be coordinated with each other.

Specific categories of personnel to perform work shall consist of those direct labor classifications proposed by the contractor that are included in the resultant contract. The required personnel qualifications and level of security clearances to perform individual tasks are defined with each task description.

3.0 TASK DESCRIPTIONS

The task areas associated with this procurement are described below. The technical requirements, the source of the materials and equipment required supporting the work, and the contract deliverables are described for each task.

3.1 TASK 1: ANALYSIS AND CONTROL OF AIRBORNE AND WATERBORNE CHEMICALS

3.1.1 Background

The analysis of airborne and waterborne chemicals is a subject of Navy R&D for several reasons. The measurement of toxic industrial chemicals and chemical agents in both air and water is an important component of force protection and homeland defense, both from the perspective of direct measurements and in support of sensor research. Measurement of airborne and waterborne compounds is also an important element of Navy environmental issues, particularly where related to remediation of shipboard waste streams. Direct measurement of environmental contaminants in waste streams or the field is critical for understanding remediation processes, either artificial or natural. Such measurements are also made in the laboratory in support of sensor development for feedback monitoring of waste streams.

The measurement of airborne chemicals is also an important element of life support and industrial hygiene in the enclosed environment of US Navy submarines or in the air supplied to Navy divers, firefighters or other workers. The submarine atmosphere represents a unique environment in which sailors live and work in the same place for extended periods of time. A significant amount of equipment (and therefore space and energy) is devoted to controlling this atmosphere. Proper regulation of the atmosphere is important to support life, to maintain the long-term health of the sailor, and to prevent the atmosphere from deleteriously affecting instrumentation and equipment aboard the submarine. For this reason, life gases are continuously monitored in real time aboard submarines using a mass spectrometer-based system. Other gases are occasionally monitored with detector tubes. However, most trace constituents in the submarine atmosphere are not monitored in real-time, nor have they been extensively characterized across the fleet and over time. In order to demonstrate that the atmosphere aboard the submarine is in fact a healthy environment for the submariner, there is an increasing need to measure and monitor the atmosphere in several places within the submarine over the course of patrols and deployments.

NRL is involved in efforts to use available and new techniques to characterize chemical components in water and air. These measurements are used to obtain information directly about the sample, air or water, and to provide baseline information about the environment or process

of concern. In some cases, well-verified standard methods are used, with standard quality control procedures, so that the recorded data are thoroughly validated. In other cases, particularly in support of sensor development, new methods may be developed and employed to assist in the research process. In the case of submarine atmosphere analysis, new methods for measurement of both life gases and trace constituents are being developed. There is significant continuing effort to develop new real-time atmosphere analyzers, to characterize more thoroughly the submarine atmosphere, and to assist the Navy medical and industrial hygiene community in developing methods for long-term, fleet wide monitoring of atmospheric constituents aboard submarines. These efforts will provide important baseline information that will be used to characterize the performance of atmosphere control equipment, as well as serve as the beginning of a Navy database for submarine atmosphere compositions and the associated medical and health issues related to the crew. Techniques and capabilities developed specifically for water and atmospheric analysis in the fleet will have widespread applications ashore and in the civilian community.

3.1.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.1.3 Technical Requirements

- 1) The contractor, using standard analytical methods and techniques, shall characterize permanent gases, inorganic compounds and trace organic components from water and air samples. These samples may be taken from the environment, shipboard waste streams or may be samples taken from special environments such as the submarine atmosphere. Typical water analysis studies involve collection of samples from the environment or a shipboard process using the appropriate sampling method, including solid phase microanalysis (SPME) and grab samples. Samples may be cleaned up and concentrated over appropriate solid-phase extraction media or treated by solvent extraction/concentration. Samples are analyzed by a variety of methods including gas chromatography (GC) with flame ionization (FID), electron capture (ECD) or thermal conductivity detection (TCD) or gas chromatography/mass spectrometry (GC/MS). For aqueous samples, membrane introduction or purge and trap interfaces are combined with GC/MS. For air samples, canister sampling is used to collect whole air samples, or samples are acquired by passing air over adsorbent materials such as Tenax and Carbotrap. Sampling media employing reactive substrates shall also be used in the characterization of compounds such as aldehydes and ketones. In some cases, diffusive sampling media may be employed. Standard methods for analysis of these samples include thermal desorption/cryogenic trapping combined with gas chromatography and various hybrid mass spectrometry techniques. Other analytical approaches that will be employed include extraction, followed by liquid chromatography analysis with UV detection, and gas chromatography with flame ionization detection. The contractor shall make modifications to these techniques and shall develop new techniques where necessary. Commercial instrumentation will be provided by the Government or acquired by the contractor for the government as directed by the COR. The contractor shall evaluate analytical protocols and techniques for accuracy, precision, applicability and performance over time. Air sampling techniques will be used to characterize submarine air samples and will also be employed in the characterization of other materials and processes related to submarine atmosphere control, as necessary.

- 2) The contractor shall investigate and develop new technologies that will be used in obtaining information about the concentrations of permanent gases, refrigerants and trace organic compounds aboard submarines. These technologies will require remote auto-sampling devices for collecting air samples using adsorbent materials, passive sampling devices such as diffusive sampling badges, solid-phase extraction materials, and portable or hand-held gas sensors/instruments based on infra-red or electrochemical detection. In particular, laboratory validation of passive monitors will be performed. This will involve setting up exposure chambers that will generate atmospheric constituents at known generation rates (using permeation tubes and other appropriate technology), as validated by active sampling methods. These chambers will be used to validate passive monitors prepared in-house or acquired from vendors. Validation of such sampling technologies will involve analyses using GC, GC/MS or liquid chromatography. Additional sensors based on spectroscopic and electrochemical techniques shall be developed, including the investigation of miniaturized mass spectrometers for real-time atmosphere analysis.
- 3) The contractor shall obtain results from samples acquired from a variety of sources including those from shipboard processes and atmospheres. Specifically, the contractor will analyze samples taken from operational submarines. This information shall be used to create a database of background submarine atmospheric chemical components. This information can be used for evaluation of atmospheres following accidents and unexpected events on board. Additionally, this information will be used, in conjunction with Naval medical programs, to evaluate health effects. The contractor shall compile and analyze data, prepare reports and briefings on results, as required. As directed by the COR, the contractor shall organize and support meetings, workshops and conferences to disseminate this information. Government personnel shall conduct these meetings.
- 4) The contractor shall perform studies in which the solution and gas phase products from Navy shipboard waste remediation processes are analyzed in order to better understand, monitor and control these processes. These will include characterization of volatile and non-volatile components of products from bioreactors and plasma reactors being developed for waste stream treatment aboard Navy ships. The results of these studies will be used to understand and control the process, and will be used to inform selection of sensors that can provide real-time information about the process. As sensors are selected, standard sampling and analysis methods will be used to verify the output of sensors.
- 5) Techniques developed in this effort will be tested at field sites including aboard ships and submarines, as specified by the COR, to evaluate their performance. The contractor shall design test protocols, support field studies, evaluate results and draft reports describing performance.

3.1.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. It may be necessary to conduct studies onboard underway submarines.

3.1.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as

described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.1.6 Security Requirements

As this effort may require contractor personnel to have access to shipboard environments, as well as classified information pertaining to shipboard systems and engineering, the security classification for this task shall be at the SECRET level.

3.2 TASK 2: CHEMICAL ANALYSIS AND CHEMICAL SENSOR DEVELOPMENT

3.2.1 Background

Naval vessels are facing ever-increasing restrictions to operations at sea, in shallow water environments, and even at dock. Control of both solid and liquid wastes is subject to a myriad of complex, and often conflicting, requirements. The holding capacity of tanks for both gray and black water wastes is inadequate for legal operation in many scenarios and technologies are not available for timely volume reduction of these wastes. New techniques are required for treating both solid and liquid wastes onboard the surface fleet to allow unrestricted operation and access to all friendly ports. An ability to analyze in the field the contents of the liquid waste streams (gray water, black water and bilge water) is an immediate requirement. NRL is involved in efforts to develop new sensors and portable instrumentation that will be useful in the analysis of wastewater streams from Navy ships. This involves monitors based on conventional instrumentation such as mass spectrometers, as well as emerging techniques such as sensor array or lab-on-a-chip technologies based on surface acoustic wave and other chemical sensor devices. Conventional analytical techniques are also used to characterize these waste streams so that new sensor systems can be compared with approved protocols.

In fact, the principle function of the Chemical Sensing and Chemometrics Section of the Chemical Dynamics and Diagnostics Branch is to conduct research that will lead to new and basic understanding of chemical reactions as applied to chemical sensing and detection. Projects include the study of trace metal speciation, luminescence, chemical & biological detection, Lab-on-a-chip, hazardous chemical detection, chemometrics applied to sensor systems and analytical methods. This program consists of research projects involving novel state-of-the-art methods for hazardous chemical and fire detection. These R&D projects require expertise in basic chemical analysis, instrument design, method development, computational modeling, and system verification. The research areas address environmental and workplace chemical detection needs using chemical sensors, personal dosimeters, and area monitoring. Design and development of individual sensors and sensor arrays is the emphasis of the research. One of the major areas of research is the application of artificial intelligence techniques to data interpretation problems associated with hazardous material detection. A key focus of this research is the analysis of sensor array data using statistical multivariate methods such as pattern recognition methods and neural networks. A significant function of the section is in the development of novel spectrometric methods and analytical methodologies, and in the synthesis of new materials that can ultimately be used in sensor system(s). The use of

sophisticated state-of-the-art instrumentation such as "laboratory-on-a-chip", micro-capillary electrophoresis, computer controlled miniaturized flow systems are a major emphasis.

NRL is also involved in efforts directed toward the characterization of effluents from new solid waste disposal technologies. For example, the disposal of waste using plasma arc thermal destruction techniques is an emerging technology of interest to the Navy. An understanding of the trace organic compounds and particulate matter present in the effluent stream of such a reactor is critical to the eventual application of such technologies. Standard air sampling and analysis techniques, sensors and instrument-based monitors all can play a role in the characterization of such effluent streams. Such techniques can also be useful to characterize effluents from a variety of processes including pollution and atmosphere control equipment.

NRL, in collaboration with the Process Sensing Group of the Chemical Sciences and Technology Laboratory of the National Institute of Standards and Technology (NIST), conducts projects to develop, validate, and apply state-of-the-art measurement techniques, sensors, and mathematical models required for analysis, control and optimization of industrial processes. The Group's research seeks to develop a fundamental understanding of, and generate critical data pertinent to plasma processing used in semiconductor manufacturing and other industries, and chemical sensor technology for chemical process, environmental, and health care applications.

3.2.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.2.3 Technical Requirements

- 1) The contractor shall employ standard techniques and modifications of standard techniques to characterize water from shipboard waste streams. These techniques include purge and trap/gas chromatography analysis. Other methods including solid-phase extraction and solid-phase microextraction will be investigated. The precision, accuracy and long-term reliability of these techniques must be considered. After suitable development and evaluation, these techniques will be employed in the characterization of unknown samples. These data will be used for comparison with data obtained from other types of sensors.
- 2) The contractor shall explore and develop new technologies to characterize water from shipboard waste streams. These techniques will ultimately form the basis of potential shipboard monitors for wastewater streams and will include membrane introduction mass spectrometry, sensor arrays based on surface acoustic wave devices or electrochemical cells, and immunoassay techniques. Investigations of the precision, accuracy and long-term reliability will be used to compare these portable sensors to the results from more conventional techniques.
- 3) The contractor shall evaluate available technologies and develop new sensors and monitoring capabilities suitable for monitoring effluents from shipboard solid waste treatment facilities. Techniques currently under development include bioreactors, supercritical reactors, and arc and plasma assisted solid waste combustors. These treatment processes produce a range of liquid, solid and gas phase waste effluents. Process control monitors and effluent and stack monitors are required for solid waste reactor systems. The contractor shall use standard air sampling and analysis methodology to characterize trace atmospheric constituents in the effluents of these reactors. Sampling and analysis methodologies include

the collection of whole air and adsorbent tube samples followed by thermal desorption/gas chromatography/mass spectrometry for the characterization of trace atmospheric constituents. Methods will also be employed for the characterization of semi-volatile components such as polycyclic aromatic hydrocarbons (PAHs). These methods include the collection of large volume samples over filter and collection media, followed by extraction and analysis by gas chromatography, liquid chromatography and gas chromatography/mass spectrometry.

- 4) Techniques developed in this effort will be tested at field sites including aboard ships and submarines, as specified by the Government, to evaluate their performance. The contractor shall design and support field test protocols. The contractor shall compile and analyze data, prepare reports and briefings on results, as directed. As required, the contractor shall organize and provide support for meetings, workshops and conferences to disseminate this information. Government personnel shall conduct these meetings.
- 5) The contractor shall evaluate and use available sampling and analysis capabilities to characterize solid, liquid and gas samples from sites of Navy environmental interest. These analyses will include methods based on standard EPA protocols for the analysis of water, solid waste and air. The methods used will principally employ gas chromatography with flame ionization and electron capture detection, gas chromatography/mass spectrometry and liquid chromatography. Samples may include soil, sediment and water samples from environmental sites of interest. Principal targets of analysis include volatile and semi-volatile organic compounds including benzene, toluene, ethyl benzene and xylene (BTEX) and PAHs.
- 6) The contractor shall develop trace analytical and other chemical analysis methods to meet specific Navy needs. Several examples include, but are not limited to: 1) The use of atomic emission, electroanalytical, fluorescence, ion and liquid chromatography and other methods to detect trace metal specification and chlorinated hydrocarbons in the ocean environment. These efforts include development of highly selective chelating resins. 2) The development of a new class of radionuclide and heavy metal complexation agents that are tagged with near-infrared dyes and therefore can be extended to the implementation of a compact and portable "laboratory-on-a-chip" operable in the stringent field requirements of DOE site characterization and remediation. 3) The development of a capillary electrophoresis (CE) microchip sensor for the real-time, sensitive and selective detection of energetic explosives in seawater that capitalizes on the miniaturization, high speed, inherent selectivity, high sensitivity, versatility, and negligible reagent features of the "laboratory-on-a-chip" technology. 4) The development of a spectrophotometric field test to determine if a jet fuel contains a sufficient amount of copper to adversely affect thermal stability.
- 7) The contractor shall assist NRL to create, evaluate, and deploy a highly integrated, self-contained, portable/field-deployable, multi-channel microanalyzer, based on advanced 'Lab-on-a-Chip' technology and novel detection chemistries/biochemistries. The Microanalyzer will provide early/rapid/timely, reliable and simultaneous identification and quantification of nitroaromatic and ionic explosives and organophosphate nerve agents.
- 8) The contractor shall provide technical support in the evaluation of sensor and defense science technology. In the wake of recent terrorist attacks on the United States and with the continuing threat of such attacks of a chemical and biologic (such as toxins) nature, the evaluation of sensor technologies in the current development pipeline is required. Testing and evaluation of detection technologies to determining air and water quality conditions in

confined and non-confined areas for chemical and biologics are likely to be similar based on the current known "state-of-technology." Evaluation will be limited to some laboratory testing and comparison of emerging technologies with existing technologies and military requirements.

- 9) The contractor shall provide technical support in the evaluation of new detection methods for sensors and monitors of effluent streams, including, but not be limited to: ship waste, manufacturing or plant production waste, and air emission as related to potential terrorist attacks and scale-up or co-location of materials for chemical, biological or nuclear threats. Evaluation is limited to some laboratory testing and comparison of emerging technologies with existing technologies and military requirements.
- 10) The contractor shall investigate methods for the detection of surfactants, and surface-active water-soluble polymers and biopolymers in solutions based on thin film and MEMS device technologies. Fast transient heating phenomena will be the focus of this work to characterize hydrophobic and hydrophilic self-assembled monolayer surfaces and to develop new approaches to liquid phase sensing in microfluidic systems. Vapor-Liquid phenomena, particularly heterogeneous nucleation at smooth surfaces will be investigated for dependencies associated with liquid phase materials and upon rationally prepared surfaces. The contractor will prepare, or contribute to the preparation of, manuscripts and presentations describing the results of these experimental investigations.
- 11) The contractor shall investigate development of microsensor platforms for detection of extraterrestrial gaseous analytes and monitoring of spacecraft cabin environments. A major task of this study is the development micro-hotplate arrays for pre-concentration and subsequent detection of analytes of interest. Critical to this task is the development and application of chemically sensitive polymer thin films that will be married to microsensor platforms. Expertise with conducting polymer films having controlled functionalization and the electrochemical methods necessary for their use is required. Additionally, integration of polymer sensing films with metal oxide sensing films in array formats is necessary to develop prototype chemical sensing arrays with multi-analyte detection capabilities. The contractor will prepare, or contribute to the preparation of, manuscripts and presentations describing the results of these experimental investigations.

3.2.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. It may be necessary to conduct studies onboard Navy ships that are underway.

3.2.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.2.6 Security Requirements

As this effort may require contractor personnel to have access to shipboard environments, as well as classified information pertaining to shipboard systems and engineering, the security classification for this task shall be at the SECRET level.

3.3 TASK 3: BIOTECHNOLOGY AND BIOSENSOR DEVELOPMENT

3.3.1 Background

The NRL has an established history of collaborative research and development efforts within the Navy, the DOD and other Government agencies. The results of these efforts have effectively established the mechanisms to evaluate emerging technologies and to rapidly initiate research and development efforts that allow the Government to assess their potential for DOD and dual-use applications. Several projects have moved through advanced development into production applications for the fleet. These emerging technology investigations encompass a diverse technical spectrum within the physical, chemical, biological, and environmental arenas. Examples of biotechnologies include but are not limited to biological sensors, genetic engineering of biomaterials, cell biology, molecular recognition and identification, self-assembled films and patterning on such films, novel devices and microelectrodes, blood surrogates, liquid crystal technologies, and biomedical applications utilizing encapsulated therapeutic compounds. The object of the sensor studies is primarily the detection, identification, and quantification of trace chemical and biological species. These species may be trace-level single-component items of concern, or may be incorporated in complex mixtures of gases, liquids or solids such as, but not limited to, biological fluids, food, bilge/ocean/potable water, and soil/sediment samples. This task addresses emerging technologies specifically relating to biological sensor technologies.

Drug abuse is one example of a serious problem for our society. The Navy has an extensive program to combat the problem including analysis of various body fluids for evidence of drug use. The demands on analytical chemistry placed by many drugs of abuse are very severe. New techniques are needed to improve selectivity and sensitivity. NRL is developing procedures for the detection of various biomolecules in a variety of matrices, with emphasis on the detection of drugs of abuse in human urine, saliva, sweat, breath, and hair. The mechanisms of binding of drugs to hair and skin and the potential for passive incorporation of drugs to hair and skin from the external environment are being investigated with emphasis on differences between cultural groups. These matrices are also being compared in military and drug addict populations to ascertain which methods are the most effective in detecting drug use. Furthermore, hair has the potential for providing some drug use history that will allow a more informed decision on inducting an individual into the service. Likewise, saliva, sweat and breath are being explored as adjuncts to urine testing for drug screening/detection under certain field scenarios.

Wearable sensors and sensors packages are also being developed for the continuous, non-invasive, remote monitoring of the drug use status of an individual. This technology has applications mainly in the criminal justice environment. However, similar technology could be employed for fitness of duty monitoring and stress monitoring of individuals in the field and in combat operations. In addition, this technology will provide much more information on the health status of an individual than the current occasional testing. Recently, NRL has applied its biosensor technology to remotely monitor environmental aqueous media.

NRL, in collaboration with the Biotechnology Division of the Chemical Sciences and Technology Laboratory of the National Institute of Standards and Technology (NIST), is involved in the development of specific measurements and standards associated with the use of biotechnology on various commercial processes. Two of these areas include the development of biocatalysts and the use of DNA-based identification procedures. Biocatalysts may be genetically engineered organisms or enzymes that facilitate the synthesis or breakdown of chemicals, and that therefore be useful in a variety of industrial situations. The structure and activity of such materials are studied in order to understand their mechanisms of action, and thus provide a basis for modifying the enzymes to improve their activity or extend their application. For example, the chorismate (shikimate) biosynthetic pathway is the route by which microorganisms and plants produce aromatic amino acids. This pathway has value as a target for developing herbicide resistance in plants, and as an environmentally friendly, biocatalytic route for making novel industrial chemicals. Several key enzymes surrounding the central metabolite, chorismate, are under study. The enzymes are modeled and analyzed by molecular dynamics and computer simulation while expression, isolation and enzymological analysis provide the groundwork for structural and functional investigations. DNA-based identification procedures are widely used by both the medical and forensic communities. Methods and standards are being developed to accurately characterize DNA profiles for forensic and other uses. For these communities, the cloning, sequencing and preparation of standard reference DNA material are studied. This work involves critical fine-tuning of molecular biology techniques in order to consistently produce high quality reference material. Research has led to the next generation of DNA profiling standard based on polymerase chain reaction (PCR) technology. New methods are being developed for rapid DNA extraction, amplification, separation, and computer imaging. Work is progressing towards a mitochondrial DNA standard. In other work, the NIST/NCI Biomarkers Validation Laboratory (NIST-BVL) serves the National Cancer Institute's Early Detection Research Network (EDRN) to validate Network supported biomarkers of early cancer detection and cancer risk. The NIST-BVL supports development and implementation of high throughput biomarker. NIST/NRL is also involved in a biotech grain testing activity where there is a critical need for DNA- and protein-based reference materials for validation of protocols and testing materials. NIST is developing methodology and reference materials to quantify the amount of genetically modified material in a sample of corn, cotton, wheat and soybeans.

3.3.2 Scope

The contractor shall conduct a laboratory research and development program to provide specified biochemical, engineering and computational expertise including but not limited to those described below. The contractor shall carry out laboratory research and development studies of emerging biochemical, medical, environmental technologies, and in conjunction with Government scientists as directed by the COR, transition these R&D efforts into breadboard demonstrations, and as indicated, into prototype devices. Others devices and applications may be proposed by the contractor or identified by the COR.

3.3.3 Technical Requirements

- 1) The contractor shall conduct a laboratory research and development program primarily on-site at NRL and other Government facilities to provide high level R&D support in the development of biologically based sensors for detection, identification and quantification of single-component and or mixtures of analytes in gas, liquid or solid forms. Biologically-based sensors and assays will include but not be limited to technologies based on biomolecular recognition, e.g., antibodies, DNA and PNA probes, enzymes, aptamers, cells, and other

biomolecules, that can be incorporated into biosensors as the recognition element. These sensors shall be used for the detection of drugs of abuse, explosives, pollutants and other environmental contaminants, pathogenic organisms, chemical/biological warfare agents, and other analytes.

- 2) In conjunction with 1) above, the contractor shall conduct collaborative studies with other NRL components for the purpose of developing new chemical and biological sensing concepts and devices as required. The contractor shall support NRL in the development of reagentless detection systems and label-free high-density sensors that do not rely on the addition of reagent or labels to the analyte solution to indicate when the desired interaction has occurred.
- 3) In conjunction with 1) above, the contractor shall support NRL to develop novel Micro Electrical-Mechanical Systems (MEMS) and Nano Electrical-Mechanical Systems (NEMS) devices that incorporate physical, chemical and/or biological sensing elements. The contractor shall also support NRL initiatives in the development of nano-technologies (such as carbon nano-tubes) that may be incorporated into sensing elements for Naval applications. As directed by the COR, the contractor shall provide engineering support in microfluidics and electronics for breadboard and prototype development. The fluidic systems may involve innovative engineering and lithography methods to develop micropumps, valves, and mixers, along with the means to actuate these devices.
- 4) The contractor shall support NRL to develop new techniques for the analysis of drugs and/or drug metabolites in urine, hair, sweat, saliva, and other matrices. The contractor shall also help to develop new techniques from screening and confirmation of drugs and/or drug metabolites in body fluids. The contractor shall help to develop methods for the remote, real-time monitoring of drug use status of an individual at his/her location.
- 5) The contractor shall support NRL and the Navy Drug Screening Laboratories by providing consultation and reviewing laboratory procedures and protocols.
- 6) The contractor shall conduct research at NIST to produce new methods for rapid DNA extraction, amplification, separation, and computer imaging. Work will progress to validate network-supported biomarkers of early cancer detection and cancer risk.
- 7) The contractor shall conduct research at NIST to produce, purify and characterize various enzymes and other proteins of interests, as well as specific mutant proteins for studies on their mechanism of action and effectiveness as biocatalysts. The contractor shall conduct research to purify, quantify and characterize genomic and plasmid DNA, and to develop and improve DNA amplification protocols, specifically quantitative real-time PCR. The work will help to identify biocatalytic routes for making novel industrial chemicals and support the biotech grain testing activity at NIST.
- 8) The contractor shall help to develop a program at NIST pertinent to the detection of and defense against microbial pathogens. This program will involve a well-conceived research agenda including pertinent biological standards. The use and development of technology platforms to measure whole organisms, nucleic acids, and proteins is encouraged. The work will involve coordinating the research activities of other staff as well as dealing with potential sponsors. The contractor shall also conduct original research at NIST in the area of microbiology and/or molecular biology pertinent to the program mentioned above.

3.3.4 Work Site

Major portions of this task will be performed on-site at NRL or other Government laboratories using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract.

3.3.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.3.6 Security Requirements:

For subtasks associated with the detection and identification of chemical and biological warfare agents, contractor personnel may be required to have access to military installations and specifically to classified ranges and operations as well as classified information pertaining to performance of DOD systems. Hence, the security classification for these specific subtasks shall be at the SECRET level. For those subtasks associated with Navy drug analysis or NIST biotechnology activities, no classified areas or access to classified information is anticipated. Therefore, the security classification for these subtasks shall be at the UNCLASSIFIED level.

3.4 TASK 4: ENVIRONMENTAL REMEDIATION AND SITE CHARACTERIZATION FOR UNEXPLODED ORDNANCE (UXO)

3.4.1 Background

Hundreds of thousands of acres of Department of Defense (DOD) property are returned to civilian use each year. Portions of DOD bombing and target ranges periodically must be rendered safe for further DOD operations. Additionally, toxic and hazardous burial sites must be evaluated to determine required remediation efforts. For many years, NRL has been developing automated technologies for detection of buried materials and non-intrusive characterization of explosive ordnance disposal (EOD) sites and toxic/hazardous waste burial sites. NRL has developed a state-of-the-art capability, the Multi-sensor Towed Array Detection System, MTADS, a fully field-worthy prototype system. It is currently being demonstrated at various field sites selected by the Office of the Assistant Secretary of Defense for Environmental Security and other DOD agencies. New sensors, data analysis schemes and remediation scenarios are being developed for future demonstrations. Depot maintenance of the MTADS equipment is required. Installation of hardware upgrades and their integration with existing system components is required. Additionally, support of field operations demonstrations is required as new tasks are undertaken.

3.4.2 Scope

The contractor shall provide specified R&D support including but not limited to the areas associated with this task as enumerated below. The majority of the effort will be accomplished at NRL and other Navy facilities. Demonstrations and surveys will be conducted at DOD, government and non-government sites as directed by the COR. These sites may be seriously contaminated with explosive and/or chemical ordnance or by the presence of toxic/hazardous chemicals. Access to these sites will require appropriate training, use of personal protective gear and OSHA and Hazardous Waste Operations (HAZWOPR) certification. This certification is a 40-hour course certified by the Environmental Protection Agency (EPA).

3.4.3 Technical Requirements

- 1) The contractor shall provide specified R&D support to evaluate the performance of commercially available geophysical survey and spatial location systems. These investigations will be directed at the evaluation of sensor performance, GIS integration and evaluation, as well as interoperability issues between vehicular, man-portable, airborne, and marine platform adjuncts using GPS, acoustic, or other navigation and location information.
- 2) The contractor shall support laboratory and field operations associated with the evaluation and/or in-house development of novel sensor systems as required. Specifically, the contractor shall address all logistical needs that will facilitate accurate and efficient data acquisition, preprocessing and target analysis using prototype systems. The contractor shall provide for support functions such as additional UXO/HAZWOPR field personnel as required, as well as providing for UXO remediation support to validate system performance. Additionally, the contractor, as required, shall contribute to the extensive reporting requirements associated with ESTCP and SERDP projects and field demonstration activities.

3.4.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. Tests, demonstrations and surveys, as directed by the COR, will be carried out at government sites, ranges and facilities. Special requirements may apply, as described above.

3.4.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.4.6 Security Requirements

As this effort may require contractor personnel to have access to military installations and specifically to classified ranges and operations, as well as classified information pertaining to specific ordnance, the security classification for this task shall be at the SECRET level.

3.5 TASK 5: BIODEGRADATION OF ORGANICS IN AQUATIC, MARINE AND TERRESTRIAL ECOSYSTEMS

3.5.1 Background

In coastal watersheds, the activities of naturally occurring bacteria and higher organisms result in the metabolism and cycling of organic matter. Inputs of organic matter to the watershed can be natural terrestrial (allocthonous), anthropogenic (contaminants), or produced in the water column or sediments (autocthonous). Proving the existence of these processes in a given site and determining the rate of which these processes occur is exceedingly difficult given the current state of analytical methodologies and the dynamic nature of many ecosystems. For instance, the ambient level of anthropogenic organics (i.e. petroleum hydrocarbons) in natural samples is the result of fluxes into the site, historical inputs, and degradation (biological, as well as chemical). In the natural environment, these processes are subject to changing environmental controls (seasonal, tidal, episodic meteorological events) that complicates the extrapolation of measured processes. Despite these difficulties, the need to understand contaminant and ecosystem dynamics is critical to reducing the health risk to military and civilian personnel; to the adequate protection of the environment; and to the efficient and effective operation of the Navy within their battlespace environments.

The Naval Research Laboratory is involved in field efforts to determine point and non-point sources of organic matter, measure the impact of organics to aquatic, marine and terrestrial ecosystems, develop strategies to manage watershed restoration, and predictive models for changes in organic matter character and quality. Understanding the environmental control and regulation of the biological and chemical processes that impact the cycling of organic matter in nature will lead to: the ecologically appropriate use or non-use of engineering solutions to ameliorate environmental impact; the development of improved technologies for Naval operations in aquatic and marine battlespace environments; and, the modeling of anthropogenic impacts to coastal watersheds.

3.5.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below. The majority of the effort will be accomplished in the field sites and at NRL facilities, as directed by the COR. Access to field sites may require appropriate training, personal protective gear, and HAZWOPR certification.

3.5.3 Technical Requirements

- 1) The contractor, at the direction of the COR, shall develop protocols for sampling and characterization of organic and inorganic matter (including contaminants) in marine and aquatic sediment and water samples from a variety of field sites using standard methods and techniques. The field sites include coastal estuaries, rivers, tributaries and creeks and

the terrestrial and groundwater media that provide the source organic material for these environments. Organic matter includes compounds and classes of materials that impact the water quality and character of coastal ecosystems such as terrestrially derived organics (i.e. lignin, humics, polysaccharides), anthropogenic organics (i.e. hydrocarbons, PAHS, PCBs) and co-contaminants (i.e. pesticides, heavy metals) and autochthonous material (i.e. phytoplankton derived).

- 2) The contractor shall conduct groundwater assessments in organic impacted watersheds, including measurements of ground water flow, contaminant movement and contaminant degradation, and tidal intrusion from adjacent waterways. Groundwater conductivity measurements shall be carried out using standard geoprobe techniques.
- 3) The contractor shall assist in river studies that characterize sedimentation rates contaminant transport, and chemical risk assessment.
- 4) The contractor shall conduct measurements to identify and quantify natural bacterial assemblages (i.e. Fluorescent In Situ Hybridization) and infaunal macrobiota in coastal sediments.
- 5) The contractor shall develop and conduct measurements to characterize biological and photochemical changes in organic matter suspended in coastal waters and colored dissolved organic matter (CDOM).
- 6) The contractor shall investigate and develop new techniques for assessing intrinsic bioremediation and engineering-enhanced bioremediation in terrestrial and aquatic waters and sediments. The contractor shall implement these techniques in field studies, as directed by the COR. The data generated in field studies by the contractor shall be shared with and integrated into a coordinated research effort between NRL employees, academia and other contractors. Proprietary techniques developed in the task are protected as set forth in other clauses in the contract.
- 7) The contractor shall assist in the collection and analysis of methane hydrate samples from marine sediment interface and/or which are embedded in cores, which are collected from marine cruises and other field trips. The analyses will consist of standard gas chromatography, gas chromatography/mass spectrometry, ion chromatography and other analytical chemistry procedures deemed necessary by the COR. Data reduction and analysis/interpretation shall be accomplished using standard data analysis programs or other novel data reduction techniques as determined by the COR.
- 8) The contractor shall organize and participate in shipboard field investigations of coastal ecosystems. This includes support for logistics, sample processing and shipment, data processing and interpretation, and presentation of results at scientific and regulatory meetings.
- 9) The contractor shall organize meetings, workshops and conferences to relate field data and findings to Remedial Program Managers, stakeholders and regulators and in support of Navy environmental programs and other related projects at the NRL, as directed by the COR. Government personnel will conduct these meetings.

3.5.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. Tests, demonstrations and surveys, as directed by the COR, will be carried out at government sites, federal and industrial facilities.

3.5.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.5.6 Security Requirements

No classified areas or access to classified information is anticipated for this task. The security classification for this task shall be at the UNCLASSIFIED level.

3.6 TASK 6: SYNTHESIS, MODIFICATION AND CHARACTERIZATION OF SURFACES, INTERFACES AND MATERIALS

3.6.1 Background

NRL is responsible for conducting both basic and applied research focusing on the development and application of new materials and devices for DOD applications. Fundamental research includes studies of ion-solid, laser-solid, and plasma-solid interactions; ion-, laser-, and flame-assisted thin film growth; defects in films and materials; and structure/film property relationships. Analysis of surfaces by ion, electron and photon beams is used extensively in materials research to characterize the surfaces/interfaces of solids and thin films with respect to their geometric structure and electronic, magnetic, optical and mechanical properties. NRL conducts research that addresses fundamentally new approaches to surface/interface analysis and materials characterization. The NRL Chemistry Division and Surface Chemistry Branch maintain state-of-the-art experimental and computational facilities including four beam lines at the National Synchrotron Light Source at Brookhaven National Laboratory. Examples of the surface and materials analysis techniques found in the Branch include scanning tunneling microscopy, atomic force microscopy, lateral force microscopy, scanning Auger microprobe, high resolution electron energy loss spectroscopy, low energy electron diffraction, X-ray photoelectron spectroscopy, Fourier transform infrared spectroscopy, micro-Raman spectroscopy, ellipsometry, electroanalytical techniques, impedance spectroscopy, scanning electron microscopy, surface area and porosimetry, X-ray absorption spectroscopy, X-ray fluorescence spectroscopy, X-ray diffractometry, micro- and nano-indentation instrumentation, hardness tester, adhesion and scratch testers, lubrication and wear testers, atomic absorption spectroscopy, and mass spectrometry.

These new surface analysis and materials characterization techniques are applied to DOD problems in surface modification to reduce wear or corrosion, advanced coatings, fuel cells, batteries, thermoelectric and electronic materials, electro-catalytic surfaces for environment and contaminant control, nanofabrication, nanolithography, and other areas. The Navy currently spends billions of dollars maintaining and replacing critical Naval components subject to wear and corrosion. These components and platforms are expected to see increasingly adverse conditions as the performance requirements for systems are extended. Research is needed to develop new, high-performance materials and/or coating technologies that protect or extend the life of existing materials. Besides characterizing surface/interface phenomena, considerable attention is paid to modifying surfaces to achieve desired physical/chemical/electrical properties. To this end, techniques involving Chemical Vapor Deposition (CVD), high temperature environments, photon-assisted processes, and plasma processing and plasma deposition/etching are applied. These modified surfaces/interfaces impact a broad array of DOD-related problems/applications including plasma modification, processing electronic devices, protective coatings, corrosion, and synthetic metastable materials. Thin film or coating deposition technologies include (but are not limited to) ion implantation, ion beam enhanced deposition, laser melting, physical and chemical vapor deposition, thermal and plasma spray techniques, self-assembly films, etc. New solid-state materials such as diamond-like carbon films are used to increase load carrying capacity, lower friction, reduce wear, and improve the surface mechanical properties of surfaces and interfaces. Metal, ceramics and polymeric surfaces will be subjected to novel treatments. High temperature tribomaterials will be an important part of this work.

Specifically, the Gas/Surface Dynamics Section conducts fundamental and applied research directed toward the growth and surface chemistry of advanced materials such as diamond, cubic boron nitride, aluminum nitride, gallium nitride, silicon carbide, and III-V materials. The Tribology and Coatings Section addresses a range of fundamental and applied problems in the highly interdisciplinary field of tribology and coatings including (1) reduction of friction and wear by coatings and surface modification of metals, ceramics and polymers; (2) relationship between tribological behavior, surface mechanical properties and surface composition and structure; (3) nanomechanics and nanotribology studies of surfaces and interfaces; (4) durability and adhesion of easy-release elastomeric coatings; (5) bearing/lubricant/additive interactions and their effects on lubrication; (6) development of lubricating oils and greases for especially demanding applications, and (7) replacement of hard chrome plate with alternative materials. The Surface Nanoscience and Sensor Technology Section studies the atomic-scale structure and chemistry of single crystal silicon, germanium, and III-V compound semiconductor surfaces, interfaces, and devices in UHV using STM and other surface analytical techniques. Because of the rapidly shrinking size of electronic devices, these studies are vital to the development of future Navy electronics. The Section also uses a host of chemical synthesis and characterization methods to fabricate and study a variety of nanostructures. Current work includes the development of AFM-based "dip-pen nanolithography" for creating nanoscale organic nanostructures on surfaces, the synthesis and self-assembly of nanowires and nanotubes, and bio-inspired self-assembly of nanoscale components such as submicron mercury or gallium droplets. They are also attempting to combine UHV-based atomic-scale control over surface structure with wet chemical processing to create hybrid organic-semiconductor nanostructures.

Generally, the Navy is working to improve the performance service life, affordability, maintainability, and safety while reducing life-cycle costs and manning requirements. NRL is significantly involved in assisting the Navy in its endeavors in supporting research, development and engineering efforts for improving these areas. Accordingly, NRL requires highly specialized

technical and engineering support that is capable of supporting the diverse and interdisciplinary research topics described above.

3.6.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.6.3 Technical Requirements

- 1) The contractor shall prepare samples for friction and wear studies using polishing techniques to yield geometry and finish suitable for subsequent analysis by modern, sophisticated surface analysis techniques. The surface modification will be done at an NRL facility or elsewhere as is cost effective. The friction, wear and load carrying characteristics of the modified and control samples shall be determined by appropriate techniques. Using the sample specified above, chemical and microstructural information must be determined on wear surfaces. The data obtained from these tests shall be correlated with tribological performance of the modified surfaces.
- 2) The contractor shall conduct surface engineering studies where surfaces are modified by film deposition (or ion implantation) to explore the effects of novel structures and alloy compositions on friction and wear behavior. For example, using a triple ion gun IBA system, the contractor shall make compositionally graded films of virtually any alloy. Surface analytical techniques are combined with micro-mechanical testing to establish structure-property relationships of tailored surfaces. Example of recent studies involve both metal and ceramic substrates, and coating materials such as solid lubricating films, hard-coatings (DLC, metal/metal-ceramic multilayers) and elastomer-based, foulant-release coatings.
- 3) The contractor shall prepare new metastable materials such as diamond, c-BN, silicon carbide, gallium nitride, and/or III-V materials via chemical vapor deposition or other deposition methods. Deposition conditions, surface reactivity, precursor decomposition mechanism, precursor adsorption/desorption, and nature of different ligands are some of the factors studied for their influence on the aforementioned thin film properties.
- 4) The contractor shall assist NRL in managing several major DOD and SERDP/ESTCP programs involving developing/depositing alternative hard coatings that replace chrome on a variety of components such as landing gear, helicopter rotor hubs, gas turbine engine components, and other components on military aircraft and other platforms. The contractor and their subcontractors shall also assist in the testing and evaluation of these components. Subcontractors shall include the following companies: Battelle Memorial Institute, Bell Helicopter, Boeing, GE Aircraft Engines, National Research Council Canada, Pratt & Whitney, Praxair Surface Technologies, Rowan Technology Group, Sauer Engineering, Sikorsky Aircraft, and Sulzer Metco.

3.6.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. Special requirements may apply, as described above.

3.6.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.6.6 Security Requirements

As this effort may require contractor personnel to have access to military installations and specifically to classified ranges and operations, as well as classified information pertaining to performance of DOD systems, the security classification for this task shall be at the SECRET level.

3.7 **TASK 7: SYNTHESIS AND CHARACTERIZATION OF MATERIALS FOR ENERGY STORAGE, CONVERSION AND GENERATION**

3.7.1 Background

Disordered and amorphous materials are critical components in numerous technologies of societal and military importance. Examples of such materials, in which charge transport is required for the technological end use include amorphous semiconductors for photovoltaics or electrophotographic imaging, superconducting cuprates and magnetoresistive manganese manganates whose properties derive from localized defects for motors and ferroelectrics, respectively, and insertion solids such as carbon and metal oxides or hydrides for electrochemical power storage. In particular, it has recently been recognized that nanoscale, poorly crystalline, charge-insertion solids function as high-performance materials in power source such as lithium-ion batteries, direct methanol fuel cells, and reformate-fed fuel cells. The difficulty of analytical and physiochemical characterization of disordered-to-amorphous materials is further compounded when the materials and phases are nanoscopic. Hence, conventional X-ray diffraction and other traditional techniques used to determine the structure of materials may be the place to start when characterizing any new material, but isn't the place to finish when working with charge-insertion nanomaterials of interest in batteries, supercapacitors, ultracapacitors, photovoltaics, fuel cells, and electrocatalysts.

3.7.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.7.3 Technical Requirements

- 1) The contractor shall prepare and characterize new advanced electrochemical materials such as ambigel/xerogel/aerogel monoliths and powders and/or colloidal gold and platinum aerogels and composite aerogels for catalysis, sensors, and electrochemical devices

including batteries and fuel cells. The contractor shall also assist in the preparation and characterization of 3-D nanoarchitectures as integrated, tricontinuous nanobatteries including fabrication of ultrathin, pinhole-free electropolymerized polymeric separators.

- 2) The contractor shall also conduct applied research on new oxide-based catalysts for oxygen-reduction at polymer fuel cell catalysts. This work shall include the synthesis of novel materials plus their physical and electrochemical characterization. The contractor shall also assemble and test the catalysts in fuel cells.
- 3) The contractor shall help to develop mesoscale electrochemical and solar energy harvesting devices. Materials will be characterized and tested for their performance and energy efficiency.

3.7.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. Special requirements may apply, as described above.

3.7.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.7.6 Security Requirements

No classified areas or access to classified information is anticipated for this task. The security classification for this task shall be at the UNCLASSIFIED level.

3.8 TASK 8: X-RAY AND OTHER HIGH-ENERGY RADIATION APPLICATIONS

3.8.1 Background

Applications of X-rays to chemical and structural analysis have been a focus of research activities in the Surface Chemistry Branch and specifically in the Energetic Interactions Section. Efforts in environmental and machinery condition monitoring using X-rays have led to advances in miniaturized remotely operable monitoring systems and concepts. Structural dynamics are monitored by diffraction carried out at the National Synchrotron Light Source or at major laser plasma X-ray sources, over time scales from picoseconds to hours. The Section also has a collaborative thrust in the fielding of distributed autonomous sensor systems by unmanned vehicles.

The Section also has broad interests in the development of advanced radiation detection devices and systems and the application of these to the characterization of environmental radiation, nuclear wastes, treaty verification and non-proliferation issues, nuclear radiation monitoring and other problems in radiation detection. The Section has extensive field experience in conducting both on-site measurements and in environmental sampling for later laboratory analysis.

The Section has developed a transportable gamma-ray analysis facility and a mobile chemical laboratory that are being used on-site for an environmental assessment and characterization of hazardous waste sites at Kirtland AFB, New Mexico. The transportable gamma-ray analysis facility was used previously for on-site analysis of radionuclide contamination from nuclear weapons production facilities in Siberia as part of the ONR ANWAP program for investigating Soviet nuclear waste releases into the Arctic environment. An underwater gamma-ray monitor was developed as part of this program for monitoring environmental releases in the Arctic seas. Additionally, the Section has the capability for acquiring environmental samples and performing low-level gamma-ray analysis at NRL.

3.8.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.8.3 Technical Requirements

- 1) The contractor shall assist with the absolute spectral measurement and calibration of X-ray tubes and other X-ray sources used for X-ray fluorescence, x-ray lithography and other applications. The contractor will develop X-ray and computational methods to analyze chemical compositions using only fundamental parameters, such as absorption, fluorescence yield, incident spectrum, etc. This work served as the basis of most X-ray fluorescence analysis codes available today. These codes are currently being updated to include more recently measured data over a wider spectral range. In addition, experimentally verified theoretical models of tube spectral output were developed that permit analysis and prediction for many X-ray source geometries. Commercial X-ray films and detectors will also be calibrated to provide absolute measurement capabilities for use with continuous and pulsed X-ray sources. For example, methods for plastically and elastically curving X-ray diffracting crystals and multi-layered structures will be explored and developed. Such diffracting elements disperse incident rays so that the complete spectral distribution can be measured simultaneously, a necessity for measuring single, high intensity X-ray pulses. Curved diffractor spectrographs are now routinely used to measure plasmas emissions from pulsed-lasers, dense-plasma-focus, and other short duration pulsed sources.
- 2) The contractor shall assist NRL to characterize large Cd(Zn)Te (CZT) crystals being developed at Yinneltech, South Bend, IN and Fermionics, Simi Valley, CA for room temperature semiconductor gamma-ray detectors. Once the detectors are built, the contractor shall also help to characterize the detectors. In addition to characterizing the detectors and materials from these companies, the contractor may also be required to visit the companies in order to view their facilities and processing.

3.8.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. Special requirements may apply, as described above.

3.8.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.8.6 Security Requirements

As this effort may require contractor personnel to have access to military installations and specifically to classified ranges and operations, as well as classified information pertaining to performance of DOD systems, the security classification for this task shall be at the SECRET level.

3.9 TASK 9: NAVAL ENGINEERING SYSTEMS AND APPLICATIONS

3.9.1 Background

The Navy is continually developing and improving hull, mechanical and electrical (HM&E) systems and components for all current and future Navy ships. The program includes auxiliary machinery, hull and deck machinery, fiber optic systems, shipboard corrosion control, HM&E materials, underway replenishment, shipboard waste treatment, and ship salvage systems. The objectives are to improve performance, service life, affordability, reliability, maintainability, and safety; reduce life-cycle costs, manning requirements, and "signatures"; and comply with environment regulations. This task is directed toward studies of advanced technologies, materials and devices to improve HM&E systems.

3.9.2 Scope

The contractor shall conduct an on-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.9.3 Technical Requirements

- 1) The contract shall support NRL and NAVSEA R&D programs related to environmentally sound ships of the 21st century specifically in the areas of environmental issues and shipboard waste management, hazardous materials afloat, oil-spill response and contingency planning, fleet environmental information management systems support, uniform National discharge standards. The contractor shall compile and analyze data, prepare reports and briefings on results, as required. As directed by the COR, the contractor

shall organize and support meetings, workshops and conferences to disseminate this information. Government personnel shall conduct these meetings.

- 2) The contractor shall support Navy programs to investigate shipboard waste disposal and remediation technology for the destruction of solid waste onboard Navy ships.

3.9.4 Work Site

Major portions of this task will be performed on-site at NRL using GFE and facilities on a non-interfering basis. Additional facilities needed to support the effort will be provided either by the contractor or the government at the discretion of the COR, subject to the conditions and scope of the contract. Special requirements may apply, as described above.

3.9.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.9.6 Security Requirements

As this effort may require contractor personnel to have access to shipboard environments, as well as classified information pertaining to shipboard systems and engineering, the security classification for this task shall be at the SECRET level.

3.10 TASK 10: COMPUTERIZED CALIBRATION OF INSTRUMENTS

3.10.1 Background

NRL, in collaboration with the Process Measurement Division of NIST, is involved in providing measurement calibration services and information to various interested parties. A specific goal in this effort is to establish automated measurement devices and procedures and make data analysis available on an around-the-clock basis. A critical step in meeting this goal is the development of new hardware and software for various computer systems for conducting the specialized data analysis requirement.

3.10.2 Scope

The contractor shall conduct an off-site research program for NRL according, but not limited, to the technical requirements set forth below.

3.10.3 Technical Requirements

The contractor shall develop new software for various computer systems involved in conducting the specialized data storage and analysis required for the automation of systems involved in the

calibration of measuring instruments. In addition, the contractor shall design and adapt various hardware systems associated with various measurement standards and instrumentation systems that function as transfer standards that are used for comparison of calibration capabilities of various laboratories in both the private and governmental sectors. Examples of instruments that required computerized calibration include spinning rotor vacuum gauge, pressure sensors, sensors for density/specific gravity/concentration measurements, gas manifold valving, robotic systems, mass spectrometers, and ring-down time measurement systems.

3.10.4 Work Site

A major portion of this task will be performed at NRL, or at other Navy, DOD or Government facilities as specified by the COR. Some parts of the task may be performed at the contractor's facilities. Certain equipment, materials, and components will be supplied as GFE. Special requirements may apply, as described above.

3.10.5 Deliverables

The contractor shall provide a monthly status of funds report, periodic progress reports (monthly, or as required by the COR) and a final report upon completion of this task as described in DD Form 1423. Prototype equipment, if developed as part of this task, will be a deliverable. Any developed prototype equipment will be provided with full documentation including manuals, drawings, schematics and documented software. (The level of drawings, schematics, etc. will be specified by the COR on a case-by-case basis.) Detailed test procedures associated with analytical tests, documented analytical protocols, and test procedures, as specified by the COR, are deliverables.

3.10.6 Security Requirements

No classified areas or access to classified information is anticipated for this task. The security classification for this task shall be at the UNCLASSIFIED level.

CONTRACT DATA REQUIREMENTS LIST
(2 Data Items)

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OMB No. 0704-0188

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A. CONTRACT LINE ITEM NO. 0002	B. EXHIBIT "A"	C. CATEGORY: TDP _____ TM _____ OTHER _____
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D. SYSTEM/ITEM	E. CONTRACT/PR NO. N00173-03-R-HA01	F. CONTRACTOR TO BE DETERMINED
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1. DATA ITEM NO. A0003	2. TITLE OF DATA ITEM Annual Technical Report	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE Naval Research Laboratory
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY Annually	12. DATE OF FIRST SUBMISSION End of CY	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION End next CY			
					Draft	Final
					Reg	Repro

16. REMARKS The contractor shall provide an annual technical report by 15 January of each calendar year (CY). Annual reports will document technical accomplishments associated with each task/subtask, cite all documents/publications delivered during the CY, and enumerate all deliverables produced. Any special conditions, observations or problems requiring deviation from the planned or approved activities will be described and explained. Documentation of all purchases and procurement will be presented by task/subtask and a list of government-owned materials, equipment and supplies in contractor inventory will be presented. Additional annual reports of a specialized nature (in response to specific requirements associated with a particular study, analysis, meeting, task, subtask, or field activity) may be required and may have different reporting dates or requirements.	15. TOTAL →	
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1. DATA ITEM NO. A0004	2. TITLE OF DATA ITEM Final Technical Report	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE Naval Research Laboratory
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY Once	12. DATE OF FIRST SUBMISSION EndContract	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION			
					Draft	Final
					Reg	Repro

16. REMARKS The contractor shall provide a final technical report within 30 days following the end of the contract. Final reports will document technical accomplishments associated with each task/subtask, cite all documents/publications delivered during the contract, and enumerate all deliverables produced. Any special conditions, observations or problems requiring deviation from the planned or approved activities will be described and explained. Documentation of all purchases and procurement will be presented by task/subtask and a list of government-owned materials, equipment and supplies in contractor inventory will be presented. Other final reports of a specialized nature (in response to specific requirements associated with a particular study, analysis, meeting, task, subtask, or field activity) may be required and may have different reporting dates or requirements.	15. TOTAL →	
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G. PREPARED BY	H. DATE	I. APPROVED BY <i>Shirley P. Adams</i>	J. DATE 10/31/02
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17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

CONTRACT DATA REQUIREMENTS LIST
(2 Data Items)

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A. CONTRACT LINE ITEM NO. 0002	B. EXHIBIT "A"	C. CATEGORY: TDP _____ TM _____ OTHER _____
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D. SYSTEM/ITEM	E. CONTRACT/PR NO. TO BE DETERMINED	F. CONTRACTOR TO BE DETERMINED
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1. DATA ITEM NO. A0001	2. TITLE OF DATA ITEM Monthly Progress Reports	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE Naval Research Laboratory
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY Monthly	12. DATE OF FIRST SUBMISSION 30 DAC	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE 30th / 31st	13. DATE OF SUBSEQUENT SUBMISSION 5th workday	a. ADDRESSEE	b. COPIES	
					Draft	Final

16. REMARKS The contractor shall provide a monthly progress report by the 5th workday of each month for the preceding month. The report must include, but is not limited to, the following: (a) Description of progress on individual tasks/subtasks during the reporting period, accompanied by description of any changes in approach, requirements, and schedule; (b) Summary of problems or areas of concern for which Government assistance or guidance is appropriate; (c) Description of existing or anticipated deviation from the approved program plan or required change in program objectives; and (d) Formal or informal oral briefings describing progress on individual tasks or subtasks, as required by the COR.	15. TOTAL →			
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17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A0002	2. TITLE OF DATA ITEM Monthly Fiscal Status Report	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE Naval Research Laboratory
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY Monthly	12. DATE OF FIRST SUBMISSION 30 DAC	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE 30th / 31st	13. DATE OF SUBSEQUENT SUBMISSION 5th workday	a. ADDRESSEE	b. COPIES	
					Draft	Final

16. REMARKS The contractor shall provide a monthly fiscal status report by the 5th workday of each month for the preceding month. The report must include, but is not limited to, the following: (a) Current cumulative support provided for the contract and enumeration of all prior increments applied to the contract associated with individual tasks/subtasks; (b) Monthly and cumulative (contract to date and fiscal year to date) labor hours and costs (including total expended and current funding obligated) associated with each task/subtask including program management, individual labor hours (show employee name, number of hours, and total amount billed for employee), materials, travel, publications, consultants, subcontracts, and other costs. If the contractor employees worked on multiple tasks/subtasks (as defined by the COR), the number of hours worked on each task/subtask must be shown separately; (c) Funds remaining to support each task/subtask	15. TOTAL →			
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17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY <i>Nilda R. Abdon</i>	J. DATE 10/31/02
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DEPARTMENT OF DEFENSE CONTRACT SECURITY CLASSIFICATION SPECIFICATION <i>(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)</i>				1. CLEARANCE AND SAFEGUARDING a. FACILITY CLEARANCE REQUIRED <p style="text-align: center;">SECRET</p> b. LEVEL OF SAFEGUARDING REQUIRED <p style="text-align: center;">SECRET</p>	
2. THIS SPECIFICATION IS FOR: <i>(X and complete as applicable)</i>			3. THIS SPECIFICATION IS: <i>(X and complete as applicable)</i>		
<input checked="" type="checkbox"/>	a. PRIME CONTRACT NUMBER <p style="text-align: center;">TO BE DETERMINED</p>			a. ORIGINAL <i>(Complete date in all cases)</i> DATE (YYYYMMDD)	
	b. SUBCONTRACT NUMBER			b. REVISED <i>(Supersedes all previous specs)</i> REVISION NO.	DATE (YYYYMMDD)
<input checked="" type="checkbox"/>	c. SOLICITATION OR OTHER NUMBER <p style="text-align: center;">61-XXXX-03</p>	DUE DATE (YYYYMMDD)		c. FINAL <i>(Complete Item 5 in all cases)</i> DATE (YYYYMMDD)	
4. IS THIS A FOLLOW-ON CONTRACT? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO. If Yes, complete the following: Classified material received or generated under _____ <i>(Preceding Contract Number)</i> is transferred to this follow-on contract.					
5. IS THIS A FINAL DD FORM 254? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO. If Yes, complete the following: In response to the contractor's request dated _____, retention of the classified material is authorized for the period of _____.					
6. CONTRACTOR <i>(Include Commercial and Government Entity (CAGE) Code)</i>					
a. NAME, ADDRESS, AND ZIP CODE (TO BE DETERMINED)		b. CAGE CODE	c. COGNIZANT SECURITY OFFICE <i>(Name, Address, and Zip Code)</i>		
7. SUBCONTRACTOR					
a. NAME, ADDRESS, AND ZIP CODE		b. CAGE CODE	c. COGNIZANT SECURITY OFFICE <i>(Name, Address, and Zip Code)</i>		
8. ACTUAL PERFORMANCE					
a. LOCATION		b. CAGE CODE	c. COGNIZANT SECURITY OFFICE <i>(Name, Address, and Zip Code)</i>		
9. GENERAL IDENTIFICATION OF THIS PROCUREMENT Competitive, level of effort contract for Research and Development in Engineering and the Physical and Life Sciences.					
10. CONTRACTOR WILL REQUIRE ACCESS TO:			11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:		
	YES	NO		YES	NO
a. COMMUNICATIONS SECURITY (COMSEC) INFORMATION		<input checked="" type="checkbox"/>	a. HAVE ACCESS TO CLASSIFIED INFORMATION ONLY AT ANOTHER CONTRACTOR'S FACILITY OR A GOVERNMENT ACTIVITY		<input checked="" type="checkbox"/>
b. RESTRICTED DATA	<input checked="" type="checkbox"/>		b. RECEIVE CLASSIFIED DOCUMENTS ONLY	<input checked="" type="checkbox"/>	
c. CRITICAL NUCLEAR WEAPON DESIGN INFORMATION		<input checked="" type="checkbox"/>	c. RECEIVE AND GENERATE CLASSIFIED MATERIAL	<input checked="" type="checkbox"/>	
d. FORMERLY RESTRICTED DATA	<input checked="" type="checkbox"/>		d. FABRICATE, MODIFY, OR STORE CLASSIFIED HARDWARE		<input checked="" type="checkbox"/>
e. INTELLIGENCE INFORMATION			e. PERFORM SERVICES ONLY		<input checked="" type="checkbox"/>
(1) Sensitive Compartmented Information (SCI)		<input checked="" type="checkbox"/>	f. HAVE ACCESS TO U.S. CLASSIFIED INFORMATION OUTSIDE THE U.S., PUERTO RICO, U.S. POSSESSIONS AND TRUST TERRITORIES		<input checked="" type="checkbox"/>
(2) Non-SCI		<input checked="" type="checkbox"/>	g. BE AUTHORIZED TO USE THE SERVICES OF DEFENSE TECHNICAL INFORMATION CENTER (DTIC) OR OTHER SECONDARY DISTRIBUTION CENTER	<input checked="" type="checkbox"/>	
f. SPECIAL ACCESS INFORMATION		<input checked="" type="checkbox"/>	h. REQUIRE A COMSEC ACCOUNT		<input checked="" type="checkbox"/>
g. NATO INFORMATION		<input checked="" type="checkbox"/>	i. HAVE TEMPEST REQUIREMENTS		<input checked="" type="checkbox"/>
h. FOREIGN GOVERNMENT INFORMATION		<input checked="" type="checkbox"/>	j. HAVE OPERATIONS SECURITY (OPSEC) REQUIREMENTS		<input checked="" type="checkbox"/>
i. LIMITED DISSEMINATION INFORMATION		<input checked="" type="checkbox"/>	k. BE AUTHORIZED TO USE THE DEFENSE COURIER SERVICE		<input checked="" type="checkbox"/>
j. FOR OFFICIAL USE ONLY INFORMATION	<input checked="" type="checkbox"/>		l. OTHER <i>(Specify)</i>		
k. OTHER <i>(Specify)</i>					

12. PUBLIC RELEASE. Any information (*classified or unclassified*) pertaining to this contract shall not be released for public dissemination except as provided by the Industrial Security Manual or unless it has been approved for public release by appropriate U.S. Government authority. Proposed public releases shall be submitted for approval prior to release Direct Through (*Specify*)

COMMANDING OFFICER, NAVAL RESEARCH LABORATORY, WAHSINGTON, DC 20375-5320, CODE 6170

to the Directorate for Freedom of Information and Security Review, Office of the Assistant Secretary of Defense (Public Affairs)* for review.
*In the case of non-DoD User Agencies, requests for disclosure shall be submitted to that agency.

13. SECURITY GUIDANCE. The security classification guidance needed for this classified effort is identified below. If any difficulty is encountered in applying this guidance or if any other contributing factor indicates a need for changes in this guidance, the contractor is authorized and encouraged to provide recommended changes; to challenge the guidance or the classification assigned to any information or material furnished or generated under this contract; and to submit any questions for interpretation of this guidance to the official identified below. Pending final decision, the information involved shall be handled and protected at the highest level of classification assigned or recommended. (*Fill in as appropriate for the classified effort. Attach, or forward under separate correspondence, any documents/guides/extracts referenced herein. Add additional pages as needed to provide complete guidance.*)

Access to classified information is not required for the purpose of submitting a bid/proposal for this statement of work. However, prior to award of contract, the successful contractor will be required to have a SECRET facility clearance, SECRET storage capabilities, and personnel available with DoD granted personnel security clearances commensurate with level of access required for performance of contract.

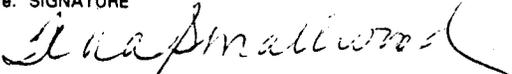
14. ADDITIONAL SECURITY REQUIREMENTS. Requirements, in addition to ISM requirements, are established for this contract. Yes No
(*If Yes, identify the pertinent contractual clauses in the contract document itself, or provide an appropriate statement which identifies the additional requirements. Provide a copy of the requirements to the cognizant security office. Use Item 13 if additional space is needed.*)

15. INSPECTIONS. Elements of this contract are outside the inspection responsibility of the cognizant security office. Yes No
(*If Yes, explain and identify specific areas or elements carved out and the activity responsible for inspections. Use Item 13 if additional space is needed.*)

16. CERTIFICATION AND SIGNATURE. Security requirements stated herein are complete and adequate for safeguarding the classified information to be released or generated under this classified effort. All questions shall be referred to the official named below.

a. TYPED NAME OF CERTIFYING OFFICIAL TINA SMALLWOOD	b. TITLE CONTRACTING OFFICER, SECURITY	c. TELEPHONE (<i>Include Area Code</i>) (202) 767-2240 2391
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d. ADDRESS (*Include Zip Code*)
NAVAL RESEARCH LABORATORY
4555 OVERLOOK AVE., SW
WASHINGTON, DC 20375-5320

e. SIGNATURE


17. REQUIRED DISTRIBUTION

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. CONTRACTOR |
| <input type="checkbox"/> | b. SUBCONTRACTOR |
| <input checked="" type="checkbox"/> | c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR |
| <input type="checkbox"/> | d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION |
| <input type="checkbox"/> | e. ADMINISTRATIVE CONTRACTING OFFICER |
| <input checked="" type="checkbox"/> | f. OTHERS AS NECESSARY 1221.1, 6170 |

DEPARTMENT OF DEFENSE CONTRACT SECURITY CLASSIFICATION SPECIFICATION <i>(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)</i>				1. CLEARANCE AND SAFEGUARDING SER: 060-02 a. FACILITY CLEARANCE REQUIRED <p style="text-align: center;">SECRET</p> b. LEVEL OF SAFEGUARDING REQUIRED <p style="text-align: center;">SECRET</p>			
2. THIS SPECIFICATION IS FOR: (X and complete as applicable)				3. THIS SPECIFICATION IS: (X and complete as applicable)			
a. PRIME CONTRACT NUMBER		X		a. ORIGINAL (Complete date in all cases)		DATE (YYYYMMDD) 20021105	
b. SUBCONTRACT NUMBER				b. REVISED (Supersedes all previous specs)		REVISION NO. DATE (YYYYMMDD)	
X c. SOLICITATION OR OTHER NUMBER 61-0141-03		DUE DATE (YYYYMMDD)		c. FINAL (Complete Item 5 in all cases)		DATE (YYYYMMDD)	
4. IS THIS A FOLLOW-ON CONTRACT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO. If Yes, complete the following: Classified material received or generated under _____ (Preceding Contract Number) is transferred to this follow-on contract.							
5. IS THIS A FINAL DD FORM 254? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO. If Yes, complete the following: In response to the contractor's request dated _____, retention of the classified material is authorized for the period of _____.							
6. CONTRACTOR (Include Commercial and Government Entity (CAGE) Code)							
a. NAME, ADDRESS, AND ZIP CODE				b. CAGE CODE		c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)	
FOR RFP PURPOSES ONLY, NOT VALID FOR ACTUAL CONTRACT.						N/A	
7. SUBCONTRACTOR							
a. NAME, ADDRESS, AND ZIP CODE				b. CAGE CODE		c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)	
N/A						N/A	
8. ACTUAL PERFORMANCE							
a. LOCATION				b. CAGE CODE		c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)	
N/A						N/A	
9. GENERAL IDENTIFICATION OF THIS PROCUREMENT COMPETITIVE, LEVEL OF EFFORT CONTRACT FOR RESEARCH AND DEVELOPMENT IN ENGINEERING AND THE PHYSICAL AND LIFE SCIENCES.							
10. CONTRACTOR WILL REQUIRE ACCESS TO:				11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:			
		YES	NO			YES	NO
a. COMMUNICATIONS SECURITY (COMSEC) INFORMATION			X	a. HAVE ACCESS TO CLASSIFIED INFORMATION ONLY AT ANOTHER CONTRACTOR'S FACILITY OR A GOVERNMENT ACTIVITY			X
b. RESTRICTED DATA		X		b. RECEIVE CLASSIFIED DOCUMENTS ONLY			X
c. CRITICAL NUCLEAR WEAPON DESIGN INFORMATION			X	c. RECEIVE AND GENERATE CLASSIFIED MATERIAL		X	
d. FORMERLY RESTRICTED DATA		X		d. FABRICATE, MODIFY, OR STORE CLASSIFIED HARDWARE			X
e. INTELLIGENCE INFORMATION				e. PERFORM SERVICES ONLY			X
(1) Sensitive Compartmented Information (SCI)			X	f. HAVE ACCESS TO U.S. CLASSIFIED INFORMATION OUTSIDE THE U.S., PUERTO RICO, U.S. POSSESSIONS AND TRUST TERRITORIES			X
(2) Non-SCI			X	g. BE AUTHORIZED TO USE THE SERVICES OF DEFENSE TECHNICAL INFORMATION CENTER (DTIC) OR OTHER SECONDARY DISTRIBUTION CENTER		X	
f. SPECIAL ACCESS INFORMATION			X	h. REQUIRE A COMSEC ACCOUNT			X
g. NATO INFORMATION			X	i. HAVE TEMPEST REQUIREMENTS			X
h. FOREIGN GOVERNMENT INFORMATION			X	j. HAVE OPERATIONS SECURITY (OPSEC) REQUIREMENTS			X
i. LIMITED DISSEMINATION INFORMATION			X	k. BE AUTHORIZED TO USE THE DEFENSE COURIER SERVICE			X
j. FOR OFFICIAL USE ONLY INFORMATION		X		l. OTHER (Specify)			
k. OTHER (Specify)							

12. PUBLIC RELEASE. Any information (*classified or unclassified*) pertaining to this contract shall not be released for public dissemination except as provided by the Industrial Security Manual or unless it has been approved for public release by appropriate U.S. Government authority. Proposed public releases shall be submitted for approval prior to release Direct Through (*Specify*)

COMMANDING OFFICER, NAVAL RESEARCH LABORATORY, WAHSINGTON, DC 20375-5320, CODE 6170

to the Directorate for Freedom of Information and Security Review, Office of the Assistant Secretary of Defense (Public Affairs)* for review.
 *In the case of non-DoD User Agencies, requests for disclosure shall be submitted to that agency.

13. SECURITY GUIDANCE. The security classification guidance needed for this classified effort is identified below. If any difficulty is encountered in applying this guidance or if any other contributing factor indicates a need for changes in this guidance, the contractor is authorized and encouraged to provide recommended changes; to challenge the guidance or the classification assigned to any information or material furnished or generated under this contract; and to submit any questions for interpretation of this guidance to the official identified below. Pending final decision, the information involved shall be handled and protected at the highest level of classification assigned or recommended. (*Fill in as appropriate for the classified effort. Attach, or forward under separate correspondence, any documents/guides/extracts referenced herein. Add additional pages as needed to provide complete guidance.*)

Access to classified information is not required for the purpose of submitting a bid/proposal for this statement of work. However, prior to award of contract, the successful contractor will be required to have a SECRET facility clearance, SECRET storage capabilities, and personnel available with DoD granted personnel security clearances commensurate with level of access required for performance of contract.

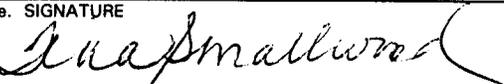
14. ADDITIONAL SECURITY REQUIREMENTS. Requirements, in addition to ISM requirements, are established for this contract. Yes No
 (*If Yes, identify the pertinent contractual clauses in the contract document itself, or provide an appropriate statement which identifies the additional requirements. Provide a copy of the requirements to the cognizant security office. Use Item 13 if additional space is needed.*)

15. INSPECTIONS. Elements of this contract are outside the inspection responsibility of the cognizant security office. Yes No
 (*If Yes, explain and identify specific areas or elements carved out and the activity responsible for inspections. Use Item 13 if additional space is needed.*)

16. CERTIFICATION AND SIGNATURE. Security requirements stated herein are complete and adequate for safeguarding the classified information to be released or generated under this classified effort. All questions shall be referred to the official named below.

a. TYPED NAME OF CERTIFYING OFFICIAL TINA SMALLWOOD	b. TITLE CONTRACTING OFFICER, SECURITY	c. TELEPHONE (<i>Include Area Code</i>) (202) 767-2240/2391
--	---	--

d. ADDRESS (*Include Zip Code*)
 NAVAL RESEARCH LABORATORY
 4555 OVERLOOK AVE., SW
 WASHINGTON, DC 20375-5320

e. SIGNATURE


17. REQUIRED DISTRIBUTION

- a. CONTRACTOR
- b. SUBCONTRACTOR
- c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR
- d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION
- e. ADMINISTRATIVE CONTRACTING OFFICER
- f. OTHERS AS NECESSARY 1221.1, 6170

PERSONNEL QUALIFICATIONS

Program Manager

The Program Manager (PM) for this contract must be a senior R&D manager with a minimum of 10 years experience in an applied R&D environment administering DOD-sponsored programs. Because of the highly technical and specific nature of the work the PM should possess a technical degree in the chemical, physical or engineering sciences, and shall have a demonstrated record of recent technical publications relevant to the scope of this effort. Specifically, the Program Manager must possess documented first-hand R&D expertise in (1) the development of chemical and biological sensors for the detection, analysis and control of airborne and waterborne species, (2) the handling of environmental problems associated with site characterization and remediation of environmental contaminants in soils, groundwater and sediments including UXO on military ranges, (3) the development, characterization and evaluation of materials and instrumentation for Naval and other DOD/Government applications; and (4) the design and operation of Naval engineering systems and their applications. As manager of a group of highly-trained specialists, with diverse talents working on programs with both strong laboratory R&D and field operational components, the PM should have documented strengths in coordinating complex programs and managing/supervising a staff composed of physical, material, chemical and biological scientists, engineers, as well as ancillary technical and administrative support personnel.

Task 1: Analysis and Control of Airborne and Waterborne Chemicals

The Senior Scientist/Engineer must have a Ph.D. degree in Chemistry, Microbiology, Marine Engineering or a related field, with a minimum of 5 years of experience in chemical/biochemical analysis. The person is expected to be a recognized expert and an active researcher in his/her field, as documented by his/her stature in professional societies and/or regular publications/presentations in professional society meetings. He/she may be required to coordinate the activities of junior staff; hence, demonstrated supervisory experience is considered a strength. The junior staff should possess BS degrees in chemistry, biology, environmental science/engineering or related disciplines and have hands on experience using standard analytical methods such as gas and liquid chromatography, electrochemical methods, mass spectrometry and optical spectroscopy and techniques such as solid-phase extraction and other sampling methods for characterizing gases, inorganic compounds and trace organic and biological components in water and air samples.

Task 2: Chemical Analysis and Chemical Sensor Development

The senior scientists/engineers must have Ph.D. degrees in Chemistry or a related field, with a minimum of 5 years of experience in chemical synthesis and analysis. Each person is expected to be a recognized expert and an active researcher in his/her field, as documented by his/her stature in professional societies and/or regular publications/presentations in professional society meetings. Specific expertise using methods such as gas, ion and liquid chromatography, GC/MS and other mass spectrometry including time-of-flight, atomic emission, electrochemical and electroanalytical methods, fluorescence, spectrophotometry, bench top and microchip capillary electrophoresis, chip-based sensors such as micro-hotplate arrays and microChemFETs, NMR, UV-VIS spectroscopy, and FTIR spectroscopy are required. Other

desired skills include a familiarity with the design of instrumentation such as microfluidics, ion sources and high and ultra-high vacuum systems.

Task 3: Biotechnology and Biosensor Development

The Senior Scientist/Engineer staff must possess Ph.D. degrees in Chemistry, Biology/Microbiology, Biochemistry, Biomedical/Electrical/Mechanical Engineering, or equivalent, with a minimum of 5 years of experience. Each person is expected to be a recognized expert and an active researcher in his/her field, as documented by his/her stature in professional societies and/or regular publications/presentations in professional society meetings. He/she may be required to coordinate the activities of junior staff; hence, demonstrated supervisory experience is considered a strength. The Senior Scientist/Engineer(s) should possess collectively demonstrated experience in the following areas: the design and construction of scientific instrumentation including the development of biosensors and microfluidics systems, and expertise in microbial physiology, ecology, genomics, and molecular biology as applied to the detection and defense against microbial pathogens.

Other Senior Scientists are needed as consultants to review drug analysis procedures and the operation of drug screening laboratories. These consultants must possess Ph.D. degrees in Chemistry, Biology/Microbiology, Biochemistry, or equivalent, with a minimum of 10 years of experience. Each consultant is expected to be a recognized expert and an active researcher in his/her field, as documented by his/her stature in professional societies and/or regular publications/presentations in professional society meetings.

Additional staff will be expected to possess BS degrees in chemistry, biochemistry and/or biology related fields. In addition, background and practical experience in molecular biology (including the cloning and sequencing of genes, enzyme assays, the production and characterization of protein), drug analysis, and miscellaneous laboratory procedures such as spectrophotometry (UV, visible, and fluorescence), centrifugation, and cleaning and sterilization is required. Other hands-on experience using standard analytical methods such as gas and liquid chromatography, electrochemical methods, mass spectrometry, NMR and optical spectroscopy and techniques such as solid-phase extraction and other sampling methods are also needed.

Task 4: Environmental Remediation and Site Characterization for Unexploded Ordnance (UXO)

The scientific and engineering support staff for this task must have at least 3 years of direct experience in the development and demonstration of instrumentation used for magnetic and electromagnetic geophysical surveys and in the remediation of UXO on military ranges.

Task 5: Biodegradation of Organics in Aquatic, Marine and Terrestrial Ecosystems

The scientific and engineering support staff for this task should possess BS or equivalent degrees in chemistry, biology, environmental or marine science/engineering or related disciplines and have hands on experience in operating and maintaining standard analytical methods such as gas and liquid chromatography, total organic carbon analyzer, coulometer, fluorometer, nutrient analyzer, mass spectrometry and optical spectroscopy and techniques

such as solid-phase extraction and other sampling methods for characterizing gases, inorganic compounds and trace organic and biological components in water and air samples. The support staff will also be directly involved with the collection of samples at remote field sites and subsequent remediation of these sites. Hence, significant field experience is considered a strength.

Task 6: Synthesis, Modification and Characterization of Surfaces, Interfaces and Materials

The Senior Scientist/Engineer staff must possess a Ph.D. in Chemistry or Physics, Materials Science or Engineering, Mechanical Engineering, or equivalent, with a minimum of 5 years of experience in materials characterization. Each person is expected to be a recognized expert and an active researcher in his/her field, as documented by his/her stature in professional societies and/or regular publications/presentations in professional society meetings. Senior Scientist/Engineer(s) should possess demonstrated experience the field of surface chemistry, corrosion inhibition, and tribology including the synthesis of lubricants for Naval applications. Additional Senior staff will be expected to possess advanced degrees, with experience in materials engineering as it pertains to failure analysis, coating systems, and specifically in materials and coatings to address service conditions and corrosion prevention. Knowledge of corrosion, weathering, and physical test methods in accordance with various standards organizations is critical. Prior practical experience in life cycle cost analysis is a requirement. Another required expertise of Senior staff includes the synthesis of semiconductor crystals and other electronic materials including the study of their defect structures for the applications in semiconductor engineering. Additional staff will be expected to possess BS or other technical degrees in chemistry, materials science, or other related fields. In addition, background and practical experience in the synthesis of materials via chemical vapor and other deposition methods is required. The staff should as possess knowledge and skills in areas of metallographic polishing and chemical etching. Data base management skills are also needed.

Task 7: Synthesis and Characterization of Materials for Energy Storage, Conversion and Generation

The scientific and engineering support staff for this task should possess advanced degrees (or their equivalent) in chemistry, physics, materials science or related disciplines and have hands on experience in electrochemistry and electrochemical systems including battery, fuel cell, and other power generating/storage technologies. Other hands-on experience using various surface and materials characterization tools such as electrochemical methods (such as potentiometry, impedance spectroscopy, and cyclic voltammetry), scanning and transmission electron microscopy, X-ray diffraction, and X-ray photoelectron spectroscopy is also needed.

Task 8: X-Ray and Other High-Energy Radiation Applications

Scientists are needed to consult on matters related X-ray and other high-energy radiation applications including (but not limited to) X-ray sources, optics and diffraction, X-ray lithography, nuclear spectroscopy, and radiation detection and analysis. These consultants must possess advanced degrees in Physics or related disciplines, with a minimum of 10 years of experience. Each consultant is expected to be a recognized expert in his/her field, as documented by his/her publication record.

Support staff for this task should possess technical skills in electronics and computer science including experience with multiple platforms such as Unix and NT, and various programming languages including C/C++ and FORTRAN.

Task 9: Naval Engineering Systems and Applications

The scientific and engineering staff for this task should possess advanced degrees (or their equivalent) in science, engineering or related disciplines and have hands on experience in the design and operation of Naval engineering systems and their applications.

Task 10: Computerized Calibration of Instruments

Support staff for this task should possess technical skills in electronics including a familiarity with the function of standard instrumentation interfaces and protocols such as IEEE-488, RS-232, parallel communication port. Computer science and programming skills are also required including experience with multiple platforms such as Unix and NT, and various programming languages including Lab View, Test Point, C++, Pascal, and Visual Basic.