

SOLICITATION, OFFER AND AWARD		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)		RATING DO-C9	PAGE OF 1 31 PAGES
2. CONTRACT NO.	3. SOLICITATION NO. N00173-00-R-RS02	4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)		5. DATE ISSUED 17 MAY 2000	6. REQUISITION/PURCHASE NO.
7. ISSUED BY Procuring Contracting Officer, Code 3235:RDS Naval Research Laboratory - SSC Department of the Navy Stennis Space Center, MS 39529-5004			8. ADDRESS OFFER TO (If other than Item 7) N00173		

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

SOLICITATION

9. Sealed offers in original and 5 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 Bldg. 1007, SSC, MS 39529-5004 until 3:30 local time 19 JUN 2000
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section I, 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:	A. NAME Richard D. Sewell	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) (228) 688-5784
---------------------------	-------------------------------------	--

11. TABLE OF CONTENTS

(✓) SEC.	DESCRIPTION	PAGE(S)	(✓) SEC.	DESCRIPTION	PAGE(S)	
PART I - THE SCHEDULE			PART II - CONTRACT CLAUSES			
<input checked="" type="checkbox"/>	A	SOLICITATION/CONTRACT FORM	1	<input checked="" type="checkbox"/> I	CONTRACT CLAUSES	15 - 19
<input checked="" type="checkbox"/>	B	SUPPLIES OR SERVICES AND PRICES/COSTS	2-3	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.		
<input checked="" type="checkbox"/>	C	DESCRIPTION/SPECS./WORK STATEMENT	4	<input checked="" type="checkbox"/> J	LIST OF ATTACHMENTS	20
<input checked="" type="checkbox"/>	D	PACKAGING AND MARKING	4	PART IV - REPRESENTATIONS AND INSTRUCTIONS		
<input checked="" type="checkbox"/>	E	INSPECTION AND ACCEPTANCE	5	<input checked="" type="checkbox"/> K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	21
<input checked="" type="checkbox"/>	F	DELIVERIES OR PERFORMANCE	6	<input checked="" type="checkbox"/> L	INSTRS., CONDS., AND NOTICES TO OFFERORS	22 - 29
<input checked="" type="checkbox"/>	G	CONTRACT ADMINISTRATION DATA	7 - 10	<input checked="" type="checkbox"/> M	EVALUATION FACTORS FOR AWARD	30 - 31
<input checked="" type="checkbox"/>	H	SPECIAL CONTRACT REQUIREMENTS	11 - 14			

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 (4 copies unless otherwise specified)	
24. ADMINISTERED BY (If other than Item 7)		25. PAYMENT WILL BE MADE BY	ITEM
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

ITEM NUMBER	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	ESTIMATED COST PLUS FIXED FEE
0001	The Contractor shall provide the necessary personnel, equipment and facilities to accomplish the work as described in Section C.	\$	\$	\$
0002	Reports, Data, Software and Documentation in accordance with Exhibit A (DD 1423) and Attachment (1)		* NSP	* NSP

OPTION ONE (YEAR 2)

0003	The Contractor shall provide the necessary personnel, equipment and facilities to accomplish the work as described in Section C.	\$	\$	\$
0004	Reports, Data, Software and Documentation in accordance with Exhibit A (DD 1423) and Attachment (1)		* NSP	* NSP

OPTION TWO (YEAR 3)

0005	The Contractor shall provide the necessary personnel, equipment and facilities to accomplish the work as described in Section C.	\$	\$	\$
------	--	----	----	----

0006	Reports, Data, Software and Documentation in accordance with Exhibit A (DD 1423) and Attachment (1)	* NSP	* NSP	* NSP
------	---	-------	-------	-------

OPTION THREE (YEAR 4)

0007	The Contractor shall provide the necessary personnel, equipment and facilities to accomplish the work as described in Section C.	\$	\$	\$
------	--	----	----	----

0008	Reports, Data, Software and Documentation in accordance with Exhibit A (DD 1423) and Attachment (1)	* NSP	* NSP	* NSP
------	---	-------	-------	-------

OPTION FOUR (YEAR 5)

0009	The Contractor shall provide the necessary personnel, equipment and facilities to accomplish the work as described in Section C.	\$	\$	\$
------	--	----	----	----

0010	Reports, Data, Software and Documentation in accordance with Exhibit A (DD 1423) and Attachment (1)	* NSP	* NSP	* NSP
------	---	-------	-------	-------

TOTAL ESTIMATED COST PLUS FIXED FEE: (If All Options are Exercised)	\$	\$	\$
---	----	----	----

*Not Separately Priced

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, Attachment (2), Workforce Qualifications and Experience, Exhibit A, Contract Data Requirements List, all other Attachments cited in Section J, which are incorporated by reference into Section C, and the Contractor's technical proposal which may be incorporated by reference in any resulting contract.

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 11 April 2000, which are hereby incorporated by reference. The full text is available at <http://heron.nrl.navy.mil/contracts/home.htm>.

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

52.246-8 - Inspection Of Research And Development - Cost Reimbursement (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 shall be for a period of twelve (12) months from the date of contract award. The period of performance for each subsequent option, if exercised, shall be for an additional twelve (12) month period.

(b) The principal place of performance of this contract shall be *
(* To be filled in at time of award)

(The Government anticipates that 100% of the required effort will be performed at the Contractor's site.)

**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.

Contract Matters- *

Security Matters- *

Safety Matters- *

Patent Matters- *

Release of Data- *

The ACO will forward invention disclosures and reports directly to the Associate Counsel for Patents, Code 1008.2, Naval Research Laboratory, Washington DC 20375-5320. The Associate Counsel for Patents will return the reports along with a recommendation to the Administrative Contracting Officer. The Associate Counsel for Patents will represent the Contracting Officer with regard to invention reporting matters arising under this contract.

(* To be filled in at time of award)

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 filled in 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 CONTRACTOR-ACQUIRED PROPERTY

- (a) The contractor is authorized to acquire the following items of facilities which are needed to accomplish this contract:

SEE ATTACHMENT 6

- (b) This authorization does not constitute any consent required pursuant to the contract clause entitled "Subcontracts" (FAR 52.244-2). Advance notification or requests for consent pursuant to that clause shall be directed to the administrative contracting officer (ACO).
- (c) Pursuant to the contract clause entitled "Government Property (Cost-Reimbursement, Time-and-Material, or Labor-Hour Contracts)" (FAR 52.245-5), title to the property shall vest in the Government.
- (d) Prior to acquisition of any item of Industrial Plant Equipment, the Contractor must comply with the requirements of Department of Defense Federal Acquisition Regulation Supplement (DFARS 245.302-1(b)(1)(A). (See DFARS 245.301 for definition of "Industrial Plant Equipment.")

G-5 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
-------------------------------	----------------

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

G-6 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 filled in 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-7 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-8 PAYMENT INSTRUCTIONS FOR MULTIPLE ACCOUNTING CLASSIFICATION CITATIONS (COST-REIMBURSEMENT)

The purpose of these instructions is to permit the paying office to charge the accounting classification citations in the contract in a manner that reflects the performance of the contract. These instructions do not create any obligation on the part of the Government or the contractor nor do they in any way alter any obligation created by any other provision of the contract. Invoices should be paid from available ACRNs in the following order:

(a) ACRNs cited on the contractor's invoice.

(b) On a proportional basis from any ACRNs assigned to funds which will cancel at the end of the current fiscal year.

(c) The ACRN assigned to the following line of accounting:

97X4930.NH4A 000 77777 0 000173 2F 000000 N00173Z45000.

(d) If funds appropriated in more than one fiscal year are allotted to the contract, the ACRN assigned to the oldest allotment of funds.

(e) On a proportional basis from all ACRNs assigned to allotments of funds appropriated in a single fiscal year.

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 fifteen (15) days in advance (thirty (30) 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)

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 65,700 total hours of direct labor for the base year and 65,700 total hours for each of the option years. The total shall include 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 of 5,475 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:

For Proposal and Informational Purposes Only: The Offeror may assume that the estimated maximum number of hours is equally distributed to each of the base and option years.

<u>Labor Category</u>	<u>Hours</u>
Program Director/Manager	1,800
Assistant Program Manager	2,700
Chief Engineer/Scientist	1,800
Senior Engineer – Communications	1,800
Senior Engineer – Digital	1,800
Senior Engineer – RF	1,800
Senior Engineer – Software	5,400
Senior Engineer – Industrial	1,800
Engineer – Digital	7,200
Engineer – Analog	3,600
Engineer – Software	10,800
Engineer – Manufacturing	1,800
Engineer – Testing	5,400
Senior Technician	3,600
Technician	7,200
Senior Computer Graphics Artist	1,800
Technical Writer/Editor	1,800
Admin/Clerical & Graphics	3,600

H-4 ONR 5252.235-9714 - REPORT PREPARATION (FEB 97)

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: ANSI Z39.18 may be obtained from NISO Press Fulfillment Center, P. O. Box 338, Oxon Hill, MD. 20750-0338. Telephone 1-800-282-6476]

H-5 OPTION TO EXTEND TERM

This contract shall be renewable at the unilateral option of the Government by the Contracting Officer's notice of renewal to the Contractor within the existing term of the contract.

H-6 GOVERNMENT-FURNISHED PROPERTY

The following Government property will be furnished to the contractor on a rent-free basis for use in performing the contract:

(To be filled in at time of award)

H-7 YEAR 2000 COMPLIANT INFORMATION TECHNOLOGY

This requirement applies to information technology (IT) that processes date-related information. All such IT delivered under this contract shall be Year 2000 compliant as defined at FAR 39.002.

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.

**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 (OCT 1995)
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	- Printing/Copying Double-Sided On Recycled Paper (JUN 1996)
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 (JUNE 1999)
52.215-8	- Order of Precedence - Uniform Contract Format (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) (<i>will be included if the successful offeror does not propose facilities capital cost of money</i>)
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 and Pricing Data or Information Other Than Cost or Pricing Data - Modifications (OCT 1997) - Alternate IV (OCT 1997)
52.216-7	- Allowable Cost And Payment (APR 1998)
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)
- 52.219-8 - Utilization Of Small Business Concerns (OCT 1999)
- 52.219-14 - Limitations on Subcontracting (DEC 1996)
- 52.222-1 - Notice To The Government Of Labor Disputes (FEB 1997)
- 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 (JUL 1995)
- 52.222-20 - Walsh-Healey Public Contracts Act (DEC 1996)
- 52.222-21 - Prohibition of Segregated Facilities (FEB 1999)
- 52.222-26 - Equal Opportunity (FEB 1999)
- 52.222-35 - Affirmative Action For Disabled Veterans And Veterans Of The Vietnam Era (APR 1998)
- 52.222-36 - Affirmative Action For Workers With Disabilities (JUN 1998)
- 52.222-37 - Employment Reports On Disabled Veterans And Veterans Of The Vietnam Era (APR 1998)
- 52.223-6 - Drug-Free Workplace (JAN 1997)
- 52.223-14 - Toxic Chemical Release Reporting (OCT 1996)
- 52.225-13 - Restrictions On Certain Foreign Purchases (FEB 2000)
- 52.226-1 - Utilization Of Indian Organizations And Indian-Owned Economic Enterprises (FEB 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)
- 52.227-11 - Patent Rights - Retention By The Contractor (Short Form) (JUN 1997)
(will be included if the successful offeror is a small business or a non-profit organization)
- 52.228-7 - Insurance - Liability To Third Persons (MAR 1996)
- 52.232-9 - Limitation On Withholding Of Payments (APR 1984)
- 52.232-17 - Interest (JUN 1996)
- 52.232-18 - Availability Of Funds (APR 1984)
- 52.232-20 - Limitation Of Cost (APR 1984) *(Applicable when the contract or task order is fully funded)*
- 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 (JUN 1997)
- 52.232-33 - Payment By Electronic Funds Transfer-Central Contractor Registration (MAY 1999)
- 52.233-1 - Disputes (DEC 1998) - Alternate I (DEC 1991)
- 52.233-3 - Protest After Award (AUG 1996) - Alternate I (JUN 1985)
- 52.237-2 - Protection Of Government Buildings, Equipment And Vegetation (APR 1984)
- 52.237-3 - Continuity Of Services (JAN 1991)
- 52.237-10 - Identification of Uncompensated Overtime (OCT 1997)

- 52.242-1 - Notice Of Intent To Disallow Costs (APR 1984)
- 52.242-3 - Penalties For Unallowable Costs (OCT 1995)
- 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 and Commercial Components (OCT 1998)
- 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)
- 52.251-1 - Government Supply Sources (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 (MAR 2000)
- 252.204-7005 - Oral Attestation of Security Responsibilities (AUG 1999)
- 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)
- 252.223-7004 - Drug-Free Work Force (SEP 1988)
- 252.225-7001 - Buy American Act And Balance Of Payments Program (MAR 1998)
- 252.225-7002 - Qualifying Country Sources As Subcontractors (DEC 1991)
- 252.225-7009 - Duty Free Entry- Qualifying Country Supplies (End Products and Components) (MAR 1998)

- 252.225-7010 - Duty Free Entry - Additional Provisions (MAR 1998)
- 252.225-7012 - Preference For Certain Domestic Commodities (MAY 1999)
- 252.225-7016 - Restriction On Acquisition Of Ball And Roller Bearings (AUG 1998)
- 252.225-7021 - Trade Agreements (APR 2000)
- 252.225-7025 - Restriction On Acquisition Of Forgings (JUN 1997)
- 252.225-7026 - Reporting Of Contract Performance Outside The United States (MAR 1998)
- 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)
- 252.227-7014 - Rights In Noncommercial Computer Software And Noncommercial Computer Software Documentation (JUN 1995)
- 252.227-7016 - Rights In Bids or Proposal Information (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)
- 252.227-7026 - Deferred Delivery Of Technical Data Or Computer Software (APR 1988)
- 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)
- 252.235-7010 - 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 (SEP 1996)
- 252.243-7002 - Requests for Equitable Adjustment (MAR 1998)
- 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 (MAR 2000)
- 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)

- 252.251-7000 - Ordering From Government Supply Sources (MAY 1995)

I-2 FAR 52.223-11 - OZONE-DEPLETING SUBSTANCES (JUN 1996)**(a) Definitions.**

"Ozone-depleting substance", as used in this clause, means any substance designated as Class I by the Environmental Protection Agency (EPA) (40 CFR Part 82), including but not limited to chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or any substance designated as Class II by EPA (40 CFR Part 82), 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:	Pages 33
J-2	Attachment (2) - Workforce Qualifications and Experience	Pages 8
J-3	Exhibit A - DD Form 1423, Contract Data Requirements:	Pages 5
J-4	Attachment 4 - Contract Security Classification Specification	Pages 2
J-5	Attachment 5 - Government Furnished Equipment	Pages 2
J-6	Attachment 6 – Contractor-Acquired Property	Pages 2
J-7	Attachment 7 – Accounting and Appropriation Data	Pages 1

**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/rep&certs.htm>

K-2 FILL IN FOR FAR 52.219-1 - SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 1999)

The fill in information is as follows:

The standard industrial classification (SIC) code for this acquisition is 8731.

The small business size standard is 500.

K-3 COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING

The Offeror's CAGE Code is {fill-in}_____.

See DFARS 252.204-7001 in Section L for procedures on requesting a CAGE Code.

**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)
52.214-34	-	Submission Of Offers In The English Language (APR 1991)
52.214-35	-	Submission Of Offers In U.S. Currency (APR 1991)
52.215-1	-	Instructions to Offerors- Competitive Acquisition (FEB 2000)
52.215-16	-	Facilities Capital Cost Of Money (OCT 1997)
52.222-24	-	Preaward On-Site Equal Opportunity Compliance Evaluation (FEB 1999)
52.252-5	-	Authorized Deviations in Provisions (APR 1984)
252.204-7001	-	Commercial and Government Entity (CAGE) Code Reporting (AUG 1999)

L-2 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-3 FAR 52.215-20 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA (OCT 1997)ALTERNATE IV (OCT 1997)

(a) Submission of cost or pricing data is not required.

(b) Provide information described below : The Offeror shall provide information as required in Section L.11.C of this solicitation.

L-4 FAR 52.216-1 - TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Cost Plus Fixed Fee Research and Development Term-type Contract resulting from this solicitation.

L-5 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-6 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 or 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-7 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-8 GOVERNMENT-FURNISHED PROPERTY

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

L-9 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-10 INSTRUCTIONS FOR SUBMISSION AND INFORMATION REQUIRED TO EVALUATE PROPOSALS

- (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 Identification/Mailing - The proposal should be packaged for delivery so as to permit safe and timely arrival at destination. The proposal package should be sent to the address shown in Block 7 of the RFP face page and marked:

Solicitation No. N00173-00-R-RS02
Closing Date:
(As specified in Block 9, RFP face page)
Attn: Code 3235:RDS

- (3) Proposal Format and Length - No attempt is made to restrict the proposal format and style. However, 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.11.B VOLUME I - TECHNICAL/MANAGEMENT PROPOSAL

GENERAL PROPOSAL CONTENT:

Offerors are required to furnish an original and five copies of a detailed TECHNICAL PROPOSAL with sufficient detail to show compliance with the requirements stated in each subparagraph of Section C of this solicitation. Specific cost or pricing details shall be omitted from the Technical Proposal.

The technical proposal shall include any drawings, including schematic drawings, which will enable independent technical evaluation of the proposal.

The technical proposal shall clearly and concisely identify and discuss the Offeror's technical and managerial qualifications and approaches to accomplishing the requirements outlined in Section C.

The technical proposal shall be subdivided into a "Proposal Summary" section, a "Workforce Qualifications and Experience" section, a "Technical Approach" section, a "Corporate Resources and Organizational Capabilities" section, and a "Corporate Past Performance Information" section in that order.

The technical proposal shall also contain responses to each of the individual requirements listed in **Section C.3.1 – C.3.7** of Attachment 1, Attachment 2, and Attachment 3. Each response shall furnish the Government with sufficient detail to enable the technical evaluation panel to independently evaluate each response against the respective Government requirement as stated in Section C and Section M.

L.11.B.1 PROPOSAL SUMMARY

The proposal summary is an unevaluated requirement. The Offeror shall provide a concise summary, exclusive of cost information, of its proposal. This summary should be complete, stand on its own, and provide executive level reviewers with an understanding of the content of the proposal. The summary should summarize the highlights, plans and qualifications contained in the body of the technical proposal.

L.11.B.2 WORK FORCE QUALIFICATION AND EXPERIENCE

The Offeror shall document the experience, education, and other qualifications of all personnel proposed to accomplish the technical requirements stated in Section C of this solicitation. As a minimum, the Offeror shall provide the following information for each proposed individual: (a) name of proposed personnel; (b) proposed labor category, as designated in Attachment 2; (c) proposed Task areas of involvement, as identified in Attachment 1; (d) educational qualifications; (e) technical or managerial qualifications and experience as they relate to the Statement of Work and the requirements in Attachment 2; (f) length of experience; and (g) previous work history. Key Personnel shall be identified as such.

In addition to the requirements stated above, the Offeror shall (a) describe their plan to retain key personnel throughout the term of any resulting contract, (b) demonstrate their ability to attract additional trained personnel, and (c) describe their strategy for and ability to respond to surges in effort.

L.11.B.3 QUALITY OF TECHNICAL APPROACH

The Offeror shall discuss in detail its proposed technical approach for performance of the research, development, engineering and integration requirements associated with the digital data dissemination tools and spacecraft systems efforts, as required in Section C of this solicitation. This discussion

shall be in sufficient detail to (a) demonstrate the Offeror's compliance with the requirements specified in Section C of this solicitation; (b) demonstrate the Offeror's technical competence and understanding of the purpose, objectives and scope of the required work; (c) demonstrate the Offeror's understanding of the specific technical issues dealt with in the requirements; (d) present the Offeror's proposed procedures and solutions to address the requirements in Section C of this solicitation; and (e) discuss all other pertinent technical issues.

L.11.B.4 MANAGERIAL APPROACH

Pursuant to this requirement, the Offeror shall provide a managerial plan to demonstrate its capability to efficiently, effectively and economically plan, organize, manage, coordinate and control the work effort required under this solicitation. The Offeror's managerial plan shall address its approach for tracking milestones, costs, subcontractor efforts (if applicable) and deliverables. The Offeror's managerial plan shall also address its proposed internal procedures for assuring timely responses to the Government's research needs on any resulting contract.

L.11.B.5 CORPORATE RESOURCES AND ORGANIZATIONAL CAPABILITIES

The Offeror shall describe and document those resources which the firm will make available to this project, including, but not limited to, (a) financial resources, (b) research, development and production facilities and equipment, and (c) any other technical resources offered to meet the Government's requirements as stated in Section C of this solicitation.

The Offeror shall document the firm's experience on similar or related projects through narrative descriptions of these experiences. Prior and current program experience should be identified in these narratives by citing contract numbers, contracting agencies or firms, the COR's name and telephone number, the applicable period of performance, and a summary of the nature of the work. The narratives should show the clear relationship of previous work to the requirements of this project.

The Offeror shall demonstrate its capacity to routinely and rapidly respond to the requirements stated in Attachment 1 to this solicitation by providing specific examples drawn from the previous five years of operations.

L.11.B.6 CORPORATE PAST PERFORMANCE INFORMATION

(i) 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 contracts or subcontracts completed during the past three years for supplies or services similar in nature to this requirement. Include in the five any current contract or subcontracts for similar supplies/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

(ii) 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 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.

(iii) 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.11.C VOLUME II - BUSINESS PROPOSAL

REQUIRED COPIES: 1 ORIGINAL AND 4 COPIES

The Offeror shall submit a Cost/Pricing Proposal, which shall include such explanatory data as is necessary to establish that proposed costs are reasonable, allocable, appropriate and allowable pursuant to both Part 31 of the Federal Acquisition Regulation (FAR) and Part 231 of the Defense Federal Acquisition Regulation Supplement (DFARS). More specifically, the Cost/Pricing proposals shall provide the following information:

- (a) (i) Labor to include categories of labor, individuals proposed within each category; hours proposed for each individual, and hourly rate for each individual;
- (ii) Indirect or Overhead Rate(s);
- (iii) Any Direct Materials proposed;
- (iv) Any Other Direct Costs proposed;
- (v) General and Administrative Rate(s);
- (vi) Facilities Capital Cost of Money Rate(s);
- (vii) Any other applicable rates;
- (viii) Other supporting costs;
- (ix) Fee

(b) Any information reasonably required to explain the Offeror's estimating process, including mathematical algorithms and judgmental factors used in formulating the estimate; and any contingency assumptions employed in arriving at the proposed price

(c) Consultants/Subcontractors: Offerors shall describe subcontracting arrangements proposed for completing the work required herein. Sub-Contractors shall be identified as well as the portion of the work to be subcontracted. Documents establishing a subcontracting relationship shall be submitted with the cost proposal. Offerors may arrange for proposed subcontractors to submit supporting cost data directly to the Government. Any such submission shall not be deemed to establish privity of contract between the Government and the proposed sub-contractor. With respect to Independent Contractors or Consultants, the Offeror shall document direct labor rates proposed by providing the Government with copies of either letters of intent or Consultant or Independent Contractor Agreements executed between the Offeror and the Independent Contractor. Offerors who intend to include subcontracted effort as part of their proposal are responsible for ensuring that complete information as described above is provided from each subcontractor as part of their response to this solicitation.

(d) Material and Travel: FOR PROPOSAL PURPOSES ONLY, Offerors will use the following estimates (with applicable indirect costs added to the estimate) for required material and travel costs. If subcontractors propose material or travel costs, these must also be burdened and that burden added to the estimates.

(i) The "Material" estimate of \$940,000.00 for the base year and \$940,000.00 for each of the four option years includes those directly associated items which are expected to be incorporated into end products or expended during performance and minor direct equipment expense.

(ii) The "Travel" estimate of \$60,000.00 for the base year and \$60,000.00 for each of the four option years included in the period of performance includes travel and subsistence for work at alternative sites, and for allowable local travel per the Joint Travel Regulations.

L-12 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 responsible 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 cost, the closer the technical scores of the various proposals are to one another, the more important cost considerations become.

M-2 EVALUATION FACTORS FOR AWARD

Proposals received in response to this solicitation will be evaluated in accordance with the criteria stated in Sections L.11.B(2), L.11.B(3), L.11.B(4), L.11.B(5), and L.11.B(6), which together comprise the Technical Category; and Section L.11.(C), which comprises the Cost/Pricing category.

M-2-1 – TECHNICAL CATEGORY

The technical evaluation will consider the Offeror's overall approach to, understanding of, and capability to adequately perform and provide the requirements listed in the Statement of Work, as reflected in the Offeror's responses to the evaluation criteria listed in Sections L.11.B.2, L.11.B.3, L.11.B.4, L.11.B.5, and L.11.B.6. Technical scores will be based on evaluative determinations of whether the Offeror's proposal meets, does not meet, or, as proposed, is more advantageous than the Government's minimum requirements. Pursuant to FAR 15.306(c), proposals which are found to contain unrealistic technical or schedule terms, which fail to comply with the requirements stated in this RFP, or which are found to be unrealistically high or low in cost/price, may be significantly downgraded or removed from further consideration. Areas within the Offeror's technical proposal that are found to offer unique or innovative technical solutions or effort beyond the Government's anticipations as stated in Attachment 1 may receive maximum technical scores.

Evaluated Components within the Technical area include "Workforce Qualifications and Experience", "Quality of Technical Approach", "Managerial Approach", "Corporate Resources and Organizational Capabilities" and "Corporate Past Performance Information". Within the Technical category, the component "Workforce Qualifications and Experience" is weighted significantly higher than the component "Quality of Technical Approach", which is rated higher than "Managerial Approach", "Corporate Resources and Organizational Capabilities", and "Corporate Past Performance Information", all of which are weighted equally

Past Performance – Past performance will be evaluated on the basis of quality of work performed, timeliness of performance, cost control, and business relations. The evaluation will be based on the information provided pursuant to Contract Section L.11.B.(6) and other sources, if available. 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)(iii).

M-2-2 COST TO THE GOVERNMENT

Proposed estimated cost to the Government. The Government may adjust the proposed cost for purposes of evaluation based upon the findings of a cost realism analysis. Cost Realism means that the costs in an offeror's proposal represent the most-probable cost; are realistic for the work to be performed; reflect a clear understanding of the requirements; and are consistent with the various elements of the offeror's technical proposal. The cost realism evaluation includes (a) an analysis of the adequacy of the hours, labor mix, and other direct costs to perform the work as proposed in the technical proposal as well as the proposed labor and indirect rates; (b) an analysis of costs proposed for travel, materials, consultants and subcontractors, facility capital cost of money, and fee; and (c) an evaluation of the likelihood that the risks inherent in the offeror's technical approach will result in higher actual costs than anticipated.

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).

ATTACHMENT 1
SECTION C:
STATEMENT OF WORK:
DIGITAL DATA DISSEMINATION TOOLS
AND SPACECRAFT SYSTEMS

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
C.1.0	INTRODUCTION	3
C.1.1	Scope	4
C.1.2	Background	4
C.1.2.1	Engineering Tasks	5
C.1.2.2	Test Beds	5
C.1.3	Background (IOBP)	5
C.1.3.1	Engineering Tasks (IOBP)	5
C.2.0	APPLICABLE DOCUMENTS	5
C.2.1	Government Documents	5
C.2.1.1	Specifications	6
C.2.1.2	Standards	6
C.2.1.3	Other Publications	8
C.2.2	Non-Government Documents	9
C.3.0	ACRONYMS	10
C.4.0	REQUIREMENTS	15
C.4.1	Sustaining Engineering	15
C.4.1.1	Digital Data Dissemination	15
C.4.1.1.1	Hardware Design Facility	15
C.4.1.1.2	Software Maintenance Facility	15
C.4.1.1.3	Software Configuration Management	16
C.4.1.1.4	Application Specific Integrated Circuits (ASIC)	16
C.4.1.1.5	Hardware Upgrades	17
C.4.1.1.6	Software Version Upgrades	17
C.4.1.1.6.1	Variable Message Format	18
C.4.1.1.6.2	Marine Tactical System	18
C.4.1.1.6.3	Software Integration with Future Platforms	18
C.4.1.1.7	Documentation Update Efforts	18
C.4.1.1.8	Test and Evaluation	18
C.4.1.2	Test Bed	19
C.4.1.2.1	Test Development	19
C.4.1.2.2	Test Operation and Analysis	19
C.4.1.2.3	Required Test Equipment	19
C.4.1.2.4	Software Tools	20

C.4.1.2.5	Configuration Management	20
C.4.1.2.6	Deliverables	20
C.4.1.3	Ground Station	20
C.4.1.3.1	System Maintenance	21
C.4.1.3.2	System Upgrades	21
C.4.1.3.3	Configuration Management	21
C.4.14	Support Equipment	21
C.4.1.5	Logistics	21
C.4.1.5.1	Spare and Repair Parts	21
C.4.1.5.2	Depot Level Maintenance	22
C.4.1.5.3	Training	22
C.4.1.5.4	Technical Manuals	22
C.4.1.5.5	Platform Integrating Contractor Support	22
C.4.1.6	Software and System Verification Tests	23
C.4.1.6.1	MIL-STD-1553 Interface Test	23
C.4.1.6.2	CSCI Hotbench Test	23
C.4.1.6.3	On-Aircraft Verification Test (OVT)	24
C.4.1.7	Airborne Communication Interface Module	24
C.4.2	Design and Development	24
C.4.2.1	Radio Terminals	24
C.4.2.2	Real-Time Intelligence in the Cockpit (RTICS)	25
C.4.2.3	Close Air Support Ground Control Unit	25
C.4.2.4	Global Positioning Subsystem	25
C.4.2.5	Radio Gate Way System	26
C.4.2.6	Graphics Module	26
C.4.2.7	Image Compression Module	26
C.4.2.8	SCSI Graphics Module	27
C.4.2.9	Asynchronous Transfer Mode (ATF)	27
C.4.2.10	Performance Testing	27
C.4.2.10.1	Failure Reporting Analysis and Corrective Action System	28
C.4.2.10.2	Electromagnetic Compatibility Testing	28
C.4.2.10.3	Qualification Testing	28
C.4.2.10.4	Environmental Stress Screening	28
C.4.2.10.5	Reliability Development Growth Test (RGDT) Program	28
C.4.2.10.6	Reliability Qualification Test	28
C.4.2.10.7	Safety of Flight	28
C.4.2.10.8	Platform Integration Support	28
C.4.2.11	Fabrication Assembly and Test	29
C.4.2.12	Engineering Data	29
C.4.2.13	Advanced Technology Demonstrations	29
C.4.2.13.1	Digital Data Link ATD	30
C.4.2.13.2	Global Surveillance and Communications ATD	30
C.4.3	Advanced Systems	30

		<i>PAGE</i>	<i>3</i>
C.4.3.1	New Conceptual Studies and Designs	30	
C.4.3.2	Engineering Analysis	30	
C.4.4	Systems Management	31	
C.4.4.1	Systems Engineering	31	
C.4.4.2	System Analysis and Design	31	
C.4.4.3	Technical Reviews	31	
C.4.4.3.1	System Specification Review	31	
C.4.4.3.2	Preliminary and Critical Design Reviews	32	
C.4.4.3.3	Software Review	32	
C.4.4.3.4	Test Readiness Review	32	
C.4.4.4	System Safety	32	
C.4.5.5	Computer Resource Management	32	
C.4.4.5.1	Code Development	33	
C.4.4.5.2	Software Documentation Requirements	33	
C.4.4.5.3	Commercial Source Code	33	
C.4.4.5.4	Update Service	33	
C.4.4.5.5	Software Testing	33	
C.4.4.6	Deliverables	34	
C.4.4.7	Program Management	34	
C.4.4.8	Management Information System	34	
C.4.4.9	Programmatic and Technical Support	34	
C.4.4.10	Deliverables	35	
C.4.4.11	Security and Transportation	35	
C.4.4.12	Government Furnished Equipment	35	
C.4.4.13	Contract Transition	35	
C.5.0	Requirements (IOPB)	35	

STATEMENT OF WORK

DIGITAL TARGET DISSEMINATION (DTD) AND IMAGERY ONBOARD PROCESSOR (IOBP)

C.1. INTRODUCTION

The Naval Research Laboratory (NRL) is conducting engineering development, fabrication, and subsystem integration and testing activities for a variety of Digital Data Dissemination Tools, and spacecraft subsystems. The tools use advanced technologies developed on other NRL programs to disseminate targeting data to and from airborne and ground platforms. Requirements exist to demonstrate the capability to pass Command and Control (C2) and targeting data via digital links between and among tanks, ground vehicles, helicopters, airborne vehicles, and unmanned aerial vehicles. Emerging requirements, including demonstration of organic theater data and non-organic tactical data disseminated using the systems are planned. Product upgrades to the

systems and their modules, which include but may not be limited to, (a) miniaturization, (b) reliability enhancements, (c) software (including design, coding, testing and integration), (d) spread-spectrum radio, (e) INFOSEC, (f) situation awareness, and (g) the capability of operating in a packet-switched Synchronous Optical Network (SONET) Asynchronous Transfer Mode (ATM) environments, may be required.

The subsystems required for spacecraft support provide payload data routing, formatting and compression. These systems shall be designed using hardware appropriate for the space environment in which that system will operate, and shall be environmentally tested prior to integration into the spacecraft to verify that they will meet the mission requirements while in that specific orbit. Software shall be written and integrated to support the needs of the hardware and the interfaces it has with the rest of the satellite system.

C.1.1 SCOPE

The SOW tasks defined herein include continuation of on-going developmental efforts, the conduct of tactical communications and targeting data dissemination systems Advanced Technology Demonstrations (ATD), and the development, fabrication and test of IOBP spaceflight hardware. In general, this SOW requires the Contractor to:

- a. provide engineering efforts necessary to maintain existing systems;
- b. provide engineering efforts necessary to design hardware capable of meeting specified requirements while surviving the space environment;
- c. develop hardware and software items, which shall include testing, prototyping, coding, integration, and documentation development efforts;
- d. conduct studies to determine the requirements of future tactical communications systems; and
- e. provide the engineering and management efforts necessary to assure effective integration and timely delivery of the technology or hardware end item.

C.1.2 BACKGROUND (DTD)

NRL's development approach is inextricably tied to affordability and performance. Economic considerations, coupled with shorter maturity cycles, are a requirement for this approach. NRL integrates emerging technologies with extensive involvement of the war fighters. This approach, when coupled with the emerging science and commercial technology base, focuses technology and provides demonstrations and insertions for war fighter simulations and exercises. The goal of NRL's effort is to quickly prove the technical feasibility, affordability, and operational concept to expedite the acquisition cycle.

C.1.2.1 Engineering Tasks (DTD)

These engineering tasks range from design maintenance to major upgrades or enhancements proposed by the end-user community. Some of the hardware and software products referenced herein have been in use in previous applications for several years, and are applied across a number of different applications within NRL's area of responsibility. Therefore, NRL provides pre-planned product improvements (P3I) keyed to foreseeable technologies and expected changes in the user's need. P3I is an orderly and systematic strategy to facilitate evolutionary, cost-effective upgrading and growth of a system's capabilities throughout the product life cycle.

C.1.2.2 Test Bed (DTD)

The Test Bed provides a real-time test and development environment with a high fidelity simulation of the platform configuration and its interfaces. The Test Bed system architecture and its functional allocations, have been defined by development and evolution. The system software segments are hosted in a common hardware segment based on prototype and ancillary common/peculiar support equipment (CSE/PSE). The DTB can be configured to provide realistic message traffic, and to determine responses to external commands and stimuli.

C.1.3 BACKGROUND (IOBP)

NRL, in support of the NEMO (Naval Earth Map Observer) program, has initiated the development of the IOBP to support operation of the NRL-patented ORASIS algorithm. This unit, by means of running ORASIS, will provide high image/payload data compression ratios so that larger than typical amounts of image data can be stored prior to downlink. This unit will (a) provide 2.5 Gflops of processing capability, (b) process the image data in real time, and (c) format the data for storage onto the Solid State Data Recorder (SSDR) until the spacecraft is over the ground site and can downlink.

C.1.3.1 Engineering Tasks (IOBP)

The tasks required in support of this development includes: (a) circuit design, (b) programmable gate array design, (c) software design, code and test, and (d) system integration and testing. Given that this unit will operate in the space environment, special care and considerations must be taken in the design phase to ensure survivability. The Contractor shall perform appropriate analysis and environmental testing to verify the operations of the unit over worst case conditions and in various failure modes.

C.2 APPLICABLE DOCUMENTS

C.2.1 GOVERNMENT DOCUMENTS

SSD-S-NE008 NEMO IOBP Critical Item Product Specification
The specifications and standards (MILSPECS and MILSTDS)
shall be used as necessary.

C.2.1.1 Specifications

MIL-STD 264 Electromagnetic Environmental, Effective Requirements for

SAE-AMS-
STD-2175 Casting, Classification and Inspection of

MIL-STD-7179 Finishes and Coatings, Protection of Aerospace Weapons Systems, Structures
and Parts, General Specification for.

MIL-RF-31032 Printed Wiring Boards, Rigid, General Specifications for

MIL-DTL-31000A Technical Data Package, General Specification for

MIL-W-22759 Wires, Electric, Flourpolymer-Insulated, Copper or Copper Alloy

MIL-P-55110 Printed Wiring Boards, General Specifications for

MIL-C-20674 Coating Electroless Nickel, Requirements for

MIL-A-83377 Adhesive Bonding (Structural) for Aerospace and Other Systems,
Requirements for

MIL-I-46058 Insulating Compound, Electrical (For Coating Printed Circuit Assy.)

MIL-I-43553 Ink, Marking, Epoxy Base

C.2.1.2 Standards

DoD-STD-100 Engineering Drawings

IEEE 12207.1-97 Software Life Cycle Processes-Life

IEEE 12207.2-97 Software Life Cycle Processes-Implementation Considerations

IEEE 12207.0-96 Software Life Cycle Processes

ASME-Y14.38 Abbreviations and Acronyms

MIL-STD-129N	Military Marking
MIL-STD-130J	Identification Marking of U.S. Military Property
MIL-HDBK-1379/1(1)	Guidance for Acquisition of Training Data Products and Services (Part 1 of 4)
MIL-HDBK-502	Acquisition Logistics
MIL-PRF-49506	Logistic Management Information
MIL-STD-1397C	Input/Output Interfaces, Standard Digital Data, Navy Systems
MIL-STD-1472F	Human Engineering
MIL-STD-1686C	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)
MIL-STD-171 E	Finishing of Metal and Wood Surfaces
MIL-STD-1840C	Automatic Interchange of Technical Information
MIL-STD-188-220A	Interoperability Standard for Digital Message Transfer Device Subsystems
IPC2221	Printed Board Design, Generic Standard for
IPC2223	Flexible Printed Boards, Sectional Design Standard for
IPC-D275	Design Standard for Rigid Printed Boards and Rigid Printed Board Assemblies
MIL-HDBK-454(1)	General Requirements for Electronic Equipment
MIL-HDBK-470	Designing and Developing Maintainable Products and Systems (Volume I and Volume II)
MIL-STD-961A	Defense Specifications
MIL-STD-2073/1D	DoD Standard Practice for Military Packaging
MIL-STD-810E(3)	Environmental Engineering Considerations and Laboratory Tests

MIL-HDBK-881	Work Breakdown Structures for Defense Material Items
MIL-STD-882C	System Safety Program Requirements
MIL-STD-889B	Dissimilar Metals
MIL-HDBK-965	Acquisition Practices for Parts Management
MIL-STD-973	Configuration Management
MIL-STD-275	Printed Wiring for Electronic Equipment
MIL-STD-461D	Requirements for the Control of Electromagnetic Interference Emissions and Susceptibility
MIL-STD-1246	Product Cleanliness Levels and Contamination Control Program
MIL-STD-1389	Design Requirements for Standard Electronic Modules
MIL-STD-2000	Standard Requirements for Soldered Electrical and Electronic Assemblies
MIL-STD-2036	Electronic Equipment Specifications, General Requirements for
MIL-STD-5400	Electronic Equipment, Airborne, General Standards for

C.2.1.3 Other Publications

All engineering drawings and lists (including software documentation) are subject to restrictions as a critical technology and subject to export control warnings.

DoD Directive 5000.1	Defense Acquisition Policies
MIL-HDBK-217F	Reliability Prediction of Electronic Equipment
MIL-HDBK-5H	Metallic Materials and Elements for Aerospace Vehicle Structures
MIL-DTL-24784A Sup 1	Manuals, Technical: General Acquisition and Development Requirements
MIL-DTD-24784/4A	Commercial Off-The Shelf (COTS) Equipment Manual Requirements
MIL-DTD-24784/12A	Hull, Mechanical and Electrical (HM&E) Equipment and Single Component Manual Requirements

MIL-DTD-24784/14A	Electronic, Experimental Electronic, Service Test Electronic, and Interior Communication (IC) Equipment Manual Requirements
MIL-DTD-24784/17A	Hull, Mechanical, and Electrical (HM&E) Systems and Electronic and Interior Communication (IC) Systems Manual Requirements
MIL-STD-38784	Manuals, Technical: General Style and Format Requirements
MIL-STD-961D(1)	Defense Specifications
NACSIM 5004	TEMPEST Countermeasures for Facilities Located Within the United States
NACSIM 5100A	Compromising Emanations Laboratory Test Requirements, Electromagnetic
SSD-D-059	Monthly Status Report Procedure
SSD-D-DM003	Program Configuration Management Plan

C.2.2 NON-GOVERNMENTAL DOCUMENTS

The following documents of the latest issue shall form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the specification shall take precedence.

ANSI TI.106	Digital Hierarchy Optical Interface Specification, Single Mode (SONET)
ANSI x3.131	Small Computer System Interface (SCSI)
ANSI Y32.16	Reference Designs for Electrical and Electronic Parts and Equipment's
ANSI Y32.2	Graphic Symbols for Electrical and Electronic Parts and Equipment's
ANSI Y14.5M	Dimensioning and Tolerancing
IEEE 803.2	Ethernet
IEEE 1101.4-1993	IEEE Standard for Military Module Format E Form Factor
IEEE 1394	High Performance Serial Bus
PCI, Revision 2.1	PCI Local Bus Standard, Revision 2.1

IEEE 1149.1-1990	IEEE Standard for Boundary Scan Testing
EIA-RS-232-C	Software Between Data Terminal Equipment and Data Communication Equipment Employing Serial Binary Data Interchange

Copies of military specifications, standards, drawings, and publications required by suppliers in connection with this SOW can be obtained from the Standardization Document Order Desk, 700 Robbins Avenue, Building #4, Section D, Philadelphia, PA 19111-5094.

Industry association specifications and standards are generally available for reference in libraries or from industry technical groups.

C.3 APPLICABLE ACRONYMS

AATP	After Authority to Proceed
ACIM	Advanced Communications Interface Module
ACNR	Avionics Combat Net Radio
AFAPD	Air Force Applications Program Development
ASCN	Advanced Specification Change Notice
ASIC	Application Specific Integrated Circuits
ASK	Amplitude Shift Keying
AT	Advanced Technology
ATD	Advanced Technology Demonstrations
ATHS	Automatic Target Hand-off System
ATM	Asynchronous Transfer Mode
BBS	Bulletin Board System
BERT	Bit Error Rate Tester
BIS	Battlefield Information System
BIT	Built-In Test
BPSK	Bi-phase Shift Keying
C2	Command and Control
C3	Command, Control and Communications
C3I2	Command, Control, Communications, Intelligence and Information
CAE	Computer Aided Engineering
CALS	Computer Aided Logistics System
CAS	Close Air Support
CCB	Configuration Control Board
CDMA	Code Division Multiple Access
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CFE	Contractor Furnished Equipment
CGCU	Close Air Support Ground

CHT	CSCI Hotbench Test
CI	Configuration Item
CM	Configuration Management
COMSEC	Communications Security
CONUS	Continental United States
CSAR	Configuration Status Accounting Report
CSCI	Computer Software Configuration Item
CSE	Common Support Equipment
CSUM	Computer Software User's Manual
CWBS	Contract Work Breakdown Structure
DAT	Digital Audio Tape
DEC	Digital Equipment Corporation
DMA	Direct Memory Access
DMD	Digital Message Device
DoD	Department of Defense
DSP	Digital Signal Processor
DT&E	Developmental Test and Evaluation
DTD	Digital Target Dissemination
DVT	Design Verification Testing
EEPROM	Electrically Erasable Prom
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EPS	Encapsulated Postscript
ESS	Environmental Stress Screening
FCR	Fire Control Radar
FLT	Flight
FPGA	Field Programmable Gate Array
FPT	Fine Pitch Technology
FRACAS	Failure Reporting, Analysis, and Corrective Action System
FRP	Full Rate Production
FSK	Frequency Shift Keying
FSM	Firmware Support Manual
FSU	First Service Unit
GFE	Government Furnished Equipment
GGN	Global Grind Network
GHz	Giga-Hertz
GIP	General Interface Processor
GPS	Global Positioning System
GSP	Graphics System Processor
GUI	Graphical User Interface
HDF	Hardware Design Facility
HDI	High Density Interconnect
HDLC	High-Level Data Link Controller

HMMM WV	High-Mobility, Multi-Mission, Wheeled Vehicle
HP	Hewlett-Packard
HSD	Horizontal Situational Display
I/O	Input/Output
IBM	International Business Machines, Inc.
ICI	Innovative Concepts, Inc.
ICM	Image Compression Module
ICWG	Interface Working Group Meetings
IDM	Improved Data Modem
ILS	Integrated Logistics Support
Inc.	Incorporated
INFOSEC	Information Security
IOBP	Imagery On Board Processor
IOT&E	Initial Operational Test and Evaluation
IP	Internet Protocol
IRD	Interface Requirements Specification
ISD	Instructional Systems Development
ITB	IDM Test Bed
IVIS	Inter-Vehicular Information System
JIAWG	Joint Interchange Avionics Working Group
JPEG	Joint Photographic Experts Group
JTIDS	Joint Tactical Information Distribution System
LAN	Local Area Network
LCC	Life Cycle Costs
LPI/AJ	Low Probability of Intercept/Anti-Jam
LRIP	Low Rate Initial Production
LRU	Line Replaceable Unit
LSAR	Logistics Support Analysis
MCM	Multi-Chip Module
MFDS	Multi-Functional Display Set
MIT	Mil-STD-1553 Interface Test
MLU	Mid-Life Update
MMC	Modular Mission Computer
MTS	Marine Tactical Systems
NCR	National Cash Register
NEMO	Naval Earth Map Observer
NRL	Naval Research Laboratory
OPEVAL	Operational Evaluation
OVT	On-Aircraft Verification Test
P3I	Pre-Planned Production Improvements
PC	Personal Computer
PDR	Preliminary Design Review
PIC	Platform Integration

PMR	Program Management Review
PR	Problem Report
PROC	Processor
PROM	Programmable Read Only Memory
PSE	Peculiar Support Equipment
QPSK	Quadra-Phase Shift Keying
QRC	Quick Reaction Capability
QRD	Quick Reaction Demonstration
R-DEMO	Reliability Demonstration
RAM	Read Address Memory
RDGT	Reliability Development Growth Test
RDL	Required Documents List
RF	Radio Frequency
RGB	Red, Green, and Blue
RGS	Radio Gateway System
RISC	Reduced Instruction Set Computer
ROM	Read Only Memory
RQT	Reliability Qualification Test
RTICS	Real-Time Intelligence in the Cockpit
SCM	Software Configuration Management
SCP	Software Change Packages
SCSI	Small Computer Standard Interface
SDD	Software Design Document
SDP	Software Development Plan
SDR	System Design Review
SEAD	Suppression of Enemy Air Defense
SEI	Support Equipment Illustration
SEM-E	Standard Electronic Module, Type "E"
SEMP	Systems Engineering Management Plan
SEWG	Systems Engineering Working Groups
SIL	System Integration Laboratories

SINCGARS	Single Channel Ground and Airborne Radio System
SMF	Software Maintenance Facility
SMT	Surface Mounted Technology
SONET	Synchronous Optical Network
SOW	Statement of Work
SPS	Software Product Specification
SRAM	Static Read Only Memory
SRS	Software Requirements Specification
SRU	Sub-Assembly Repair Units
SSDR	Solid State Data Recorder
SSR	Software Specification Review
STD	Software Test Description
STK	Software Tool Kit
STP	Software Test Plan
T&E	Test & Evaluation
TACS	Tactical Air Control System
TADIL	Tactical Data Information Links
TAF	Tactical Air Forces
TBD	To Be Determined
TCIC	Tactical Communications Information Center
TCP	Transmission Control Protocol
TDP	Technical Data Package
TECHEVAL	Technical Evaluation
TIBS	Tactical Information Broadcast System
TIFF	Tagged Image Format File
TIM	Technical Interchange Meeting
TPS	Test Programmable Sets
TRANSEC	Transmission Security
TRAP	TRE and Related Program
TRD	Test Requirements Document
TTL	Transistor – Transistor Logic
UAV	Unmanned Aerial Vehicle
UFC	Up Front Control
UHF	Ultra High Frequency
USMC	U.S. Marine Corps
VDD	Version Description Document
VHDL	VHSIC Hardware Description Language
VHF	Very High Frequency
VHSIC	Very High Speed Integrated Circuit
VMF	Variable Message Format
WAN	Wide Area Network

C.4 REQUIREMENTS (DTD)

The DTD SOW requirements are described in this section. Unless otherwise specified, the Contractor shall perform the requirements, render the efforts, provide the facilities, and deliver complete to specification, all supplies, equipment, items, and services set forth herein. The Contractor shall accomplish these requirements using the guidelines and direction established by the references listed in Section C.2 of this work statement.

C.4.1 SUSTAINED ENGINEERING

The Contractor shall perform technical and engineering efforts for Ground-Station hardware, software, test equipment, and documentation projects currently in-progress at NRL.

C.4.1.1 Data Dissemination

The Contractor shall assure the capability of hardware and software to meet the requirements specified in the Prime Item Development Specifications (PIDS) and the Software Requirements Specifications (SRS). Tasks under this requirements shall include, but may not be limited conducting/providing: (a) requirements analysis, (b) trade studies, (c) functional definition, (d) software requirements definition, (e) high-level and detailed hardware and software design, and (f) implementation, integration, and testing for applications, protocols, and interface processing.

C.4.1.1.1 Hardware Design Facility

The Contractor shall maintain a Hardware Design Facility (HDF) to resolve design anomalies discovered during LRIP, Initial Operational Test and Evaluation (IOT&E), FRP, and other test demonstrations. The Contractor shall perform System and Hardware Engineering efforts to resolve issues and correct problems arising from design anomalies discovered during field use. The Contractor shall evaluate ECP from FRP contractors for design correctness and technical feasibility, testability, producibility and supportability. The Contractor shall (a) identify, examine, investigate, and report on design anomalies; (b) suggest appropriate fixes, refinements, or redesigns to correct the anomalies; and (c) provide the end user(s) with documented hardware modifications pertaining to their applications. The Contractor shall provide technical reports as required or necessary. The Contractor shall accomplish approved HMF updates and hardware changes as required or necessary.

C.4.1.1.2 Software Maintenance Facility

The Contractor shall implement and maintain a Software Maintenance Facility (SMF) to maintain the Computer Software Configuration Items (CSCI), which comprise the baseline system. The Contractor shall provide System and Software Engineering efforts to resolve issues and problems arising from software errors discovered during field use. The SMF shall correct software errors discovered during field-testing and incorporate performance or operating enhancements. The Contractor shall use the requirements stated in SSD-D-DM003 in producing approved SMF updates and software changes. The SMF shall be responsible to: (a) receive, log and

generate Software Change Requests/PRs; (b) investigate and evaluate PRs; (c) submit Software Change Requests (SCR) and evaluations for concurrence in classification and priority; (d) maintain Configuration Status Accounting Reports (CSAR); (e) implement and test approved CSCI modifications; (f) modify and update Software Program Documentation; and (g) produce and deliver Software Change Packages (SCP) or version releases to the end user. The Contractor shall present recommendations on the priority and implementation of SCRs to the COR for approval. The Contractor shall assign a priority and schedule for implementation to the approved SCP in accordance with SSD-D-DM003. The Contractor shall also, as a minimum, provide the following:

- (a) Telephonic or computer bulletin board system (BBS) for end users reporting software problem deficiencies;
- (b) Software maintenance and on-site troubleshooting to identify and correct software problems that cannot be isolated by the user and which are of sufficient importance to warrant direct Contractor interaction.
- (c) Collection, evaluation and documentation of SCRs.
- (d) Updates needed to accommodate changes in run-time code.
- (e) Software testing to verify correctness of changes and validate possible regressive effects.
- (f) Configuration management and control of changes.
- (g) Distribution of changes via SCPs or version releases.

The Contractor shall provide programmatic and technical reports on SMF situation status.

C.4.1.1.3 Software Configuration Management

The Contractor shall provide Software Configuration Management (SCM) and control for the SCIS. The Contractor shall maintain proper software configuration accounting using a mix of the automated and manual tools used at multiple DoD sites on many different platforms. The Contractor shall manage (a) the IDS's software development tools, (b) maintenance of the software library, and (c) an automated database that can provide requirements traceability from the baseline CSCI requirements specifications through the description document and software test reports.

C.4.1.1.4 Application Specific Integrated Circuits

The Contractor shall document, generate, enhance, and maintain behavioral and structural Very High Speed Integrated Circuits (VHSIC) Hardware Description Language (VHDL) to the ASIC design and documentation simulating and testing the ASICs. If the COR requires a design change in an ASIC for which a VHDL module is documented, the Contractor shall update and simulate the VHDL module, dependent VHDL modules, and associated test bench.

All test cases used by the Contractor to perform simulation of ASICs using behavioral modules shall demonstrate functionality and performance of every requirement in the ASICs development specifications and documentation. Test cases used by the Contractor to perform simulation of ASICs using structural modules

shall demonstrate functionality and performance of every requirement in that item's specifications. The Contractor shall annotate test cases to indicate the functions and timing verified by the test.

The Contractor shall generate a VHDL test bench and other data required to demonstrate the performance of that module for each new or revised VHDL module prepared under this SOW. When two modules are generated to model the same device, one with a behavioral body and the other with a structural body, the Contractor shall use the same test bench simulate each of them. The top-level VHDL test bench used by the Contractor to verify the design and documentation of an ASIC shall faithfully reproduce the system environment in which the ASIC is intended for use, including behavioral VHDL modules of all components that interface to the ASIC. The Contractor shall use the same test case and test bench each time a simulation is performed using a module of that item for each ASIC. If a test case is modified, the Contractor shall repeat all previous simulations that used the test case.

The Contractor shall simulate structural modules developed for ASICs using the test benches and other data developed under this SOW. The Contractor shall use each of the ASICs lower level structural components in performing these simulations. The Contractor may satisfy his requirement by using all lower level structural components at the same time or by piece-wise substitution of structural modules for behavioral modules. The Contractor shall validate that the results of these simulations confirm that each module meets the requirements identified in its corresponding product specification. When a non-VHDL structural module (i.e., net list or schematic) is used as a basis for design and fabrication of a custom or semi-custom integrated circuit, The Contractor shall validate that the behavioral and structural VHDL module conforms in function and performance with the structural module used for case and nominal conditions. The Contractor shall perform logic fault analysis and generate, update and maintain test vectors for each ASIC that demonstrates the fault analysis coverage required.

C.4.1.1.5 Hardware Upgrades

The Contractor shall perform the definition, design, documentation, fabrication, prototyping, and First Service Unit (FSU) manufacturing efforts required to develop an enhanced DSP module that provides four channels on one DSP module. The enhanced module shall incorporate the hardware functions required to meet the appropriate MIL-STD. The Contractor shall update the design and documentation of the backplane. The Contractor shall update the Modem SCSI and its documentation to provide the functionality required on the enhanced DSP module. The Contractor shall perform the incremental design verification testing (DVT) required to re-qualify the enhanced DSP module and backplane for flight. The Contractor shall deliver a TDP, compliant to the guidelines of the appropriate MIL-STD.

C.4.1.1.6 Software Version Upgrades

As a part of battlefield digitization and as a P3I, NRL anticipates a number of enhancements to the software to meet evolving requirements. The Contractor shall, as required, provide continued enhancement and upgrade of the CSCIs to meet these requirements. The Contractor shall enhance the existing CSCIs and their documentation to include new link protocols, waveforms, and user interfaces.

C.4.1.1.6.1 Variable Message Format

The Contractor shall incorporate Variable Message Format (VMF) into any developed system. The VMF link protocol shall comply with the appropriate MIL-STD. The Contractor shall implement new protocols in such a manner that they will not affect the existing protocols. By adding new protocols, the Contractor shall maintain the capability to translate messages from one protocol to the other. The Contractor shall participate in and support the appropriate MIL-STD.

C.4.1.1.6.2 Marine Tactical System

The Contractor shall modify the Air Force User CSCI to accept updated message formats and convert that message to the equivalent AFAPD and TACFIRE messages. The Contractor shall re-qualify the Link Protocol CSCI and the Air Force User Interface CSCI. This task shall include updating the qualification test plan, related testing procedures, and conducting the tests, which shall include regression tests.

C.4.1.1.6.3 Software Integration with Future Platforms

The Contractor shall update the user interfaces to operate with selected future platforms. The Contractor shall provide transition plans for implementing updated software capabilities into the field via specific ongoing program efforts (e.g., Mid Life Update (MLU), IVIS, Battlefield Digitization, Unmanned Aerial Vehicles (UAV), micro-sensors) to provide new C3 capabilities to personnel in the field. The Contractor shall provide programmatic and technical documentation, including installation plans and schedules.

C.4.1.1.7 Documentation Update Efforts

The Contractor shall provide update efforts for all hardware and software documentation, engineering drawings, and associated lists. The prototype, First Service Unit (FSU), and the Retrofitted FSUs' documentation shall reflect each original equipment manufacturer's current revision level. Change pages for the specifications and manuals shall be processed according to configuration management provisions and guidelines. All engineering drawings and lists (including software documentation) are subject to restrictions as a critical technology (in accordance with the appropriate MIL-STD) and shall be marked with the following export control warning:

“WARNING – This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C. SEC 2751, et sea.) or the Export Administration Act of 1979, as amended, (Title 50 U.S.C., App 2401 et seq.). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25.”

C.4.1.1.8 Test and Evaluation

The Contractor shall plan, manage, conduct and report on its Test and Evaluation (T&E) program. The T&E program shall include formal acceptance testing of each HWCI and CSCI, as well as meeting the IOT&E or operational evaluation (OPEVAL) requirements of the T&E program. The T&E program shall be conducted by the Contractor both at facilities provided by NRL and at PIC field sites. The Contractor shall provide a test

facility located at NRL that shall be capable of simulating the operational platform configuration so that the individual interfaces can be verified independently. NRL will use this facility to verify that the system requirements have been met, and to determine coordinated hardware and software operation.

C.4.1.2 Test Bed (TB)

The Contractor shall maintain and upgrade the Test Bed. Tasks associated with this requirements shall include, but may not be limited to, implementation of (a) new algorithms and protocols, (b) hardware upgrades, and (c) new operator interface functionality. The Contractor shall conduct performance and operational tests and simulations using the Test Bed and, based on the results of these tests and simulations, recommend design enhancement and upgrades. The Contractor shall examine potential upgrades of the Test Bed to provide a universal suite of test equipment emulating multiple waveforms, protocols, modulation and demodulation methods, cryptographic interfaces, and RF interfaces. The Contractor shall present the results of these examinations for approval. The Contractor shall maintain or upgrade the Test Bed for tactical communications simulations, including the implementation of new algorithms, protocols, hardware, platforms and their data interfaces, and new operator interfaces. All simulation and emulation software shall be written in 'assembly,' 'C,' 'C++,' ADA or a similar program. The Contractor shall recommend upgrades to the protocols and algorithms in the form of draft Software Requirements Specifications (SRS), so that NRL may determine the ultimate composition of the requirements. The Contractor shall define and upgrade the operator interface to the Test Bed, providing improved graphics, input file generation and report generation capabilities.

C.4.1.2.1 Test Development

The Contractor shall conduct developmental test and evaluation (DT&E) for modified or new software using the ITB throughout the developmental process. The DT&E shall be planned, conducted, and monitored by the Contractor. The DT&E shall, as a minimum, (a) validate the engineering design and developmental process, (b) verify that performance objectives and specifications are met, (c) demonstrate that design risks are minimized, (d) evaluate the compatibility and interoperability of the modified or new software with existing or planned systems, and (e) provide an assurance that the software is ready for testing or release in the operational environment.

C.4.1.2.2 Test Operation and Analysis

The Contractor shall conduct a test operation and analysis using the Test Bed. The test objectives shall be (a) to estimate the operational effectiveness of modified or new software, (b) to identify needed modifications and improvements, and (c) to provide the technical data required to update or verify the adequacy of user manuals, handbooks, supporting documents, and technical documentation.

C.4.1.2.3 Required Test Equipment

The Test Bed is comprised of a mix of program support equipment (PSE) and common support equipment (CSE). NRL will supply the P5E-IRS Government Furnished Equipment (GFE), as noted in Appendix A to this SOW. The Contractor shall provide the CSE (e.g., oscilloscopes, logic analyzers, digital voltmeters, PROM

Programmers, power supplies, personal computers, etc.) required for the ITB. Appendix B to this SOW provides a list of the CSEI that shall be provided by the Contractor for the ITB.

C.4.1.2.4 Software Tools

The Contractor shall develop and manage a software tool kit (STK) that allows users to operate the system using a Graphical User Interface (GUI). The tool kit may be written in the Microsoft Windows, Borland TurboVision-, or Smalltalks application. These software tools will be used by PIC to (a) verify system configuration, and (b) load new application code. The Contractor shall identify engineering tools that should be developed or collected into the common STK. The Contractor shall provide the requirements for additional tools and shall design and develop a software shell for operating the programs under a common user interface. The STK shall, as a minimum, provide the following:

A consistent set of menus for configuring and testing or troubleshooting;

A user-friendly program to load and verify application code;

A user-friendly program to transmit and receive messages; and

A consistent error handling mechanism to assure that invalid user inputs or unexpected responses are isolated. The effect of error on the system shall be minimized.

C.4.1.2.5 Configuration Management (CM):

The Contractor shall maintain the CM for the STK according to the requirements of the Program Configuration Management Plan. Tasks associated with this requirements shall include, but may not be limited to: (a) identification of the configurable items, (b) capture and retention of configurable items in a planned manner that allows an upgrade without regressive effects; (c) quality assurance and validation of items put into the configuration managed system, including regression testing; and (d) distribution of new STK versions to the users.

C.4.1.2.6 Deliverables

The Contractor shall provide STK software requirements specifications, STK source listings, and software distribution reports.

C.4.1.3 Ground Station

The Contractor shall provide requirements analysis, trade studies, functional definition, requirements definition, high-level and detailed hardware and software design and implementation, integration and testing to assure the ground station's capability for modified and enhanced applications, protocols and interface processing.

C.4.1.3.1 System Maintenance

The Contractor shall provide ongoing maintenance and upgrade efforts for the NRL ground station and all previous fielded units. Maintenance shall include, but may not be limited to, mechanical and electrical design, along with its software. The Contractor shall maintain and upgrade the software. The Contractor shall repair all hardware subsystems except for the GFE radios and GFE cryptographic unit, as required. If the radios or cryptographic unit fails, the Contractor shall coordinate with the appropriate Government depot to retrieve and repair the equipment.

C.4.1.3.2 System Upgrades

The Contractor shall incorporate enhanced system hardware, software, RF equipment, and modulation/demodulation upgrades into the ground stations. The changes shall be accomplished in the priority assigned by the CCB. Change requests are normally initiated by the ground station users and will be presented to the CCB by the Contractor. The CCB will determine whether the changes are justified, and the priority for implementation. Documentation of the ground station shall consist primarily of engineering notes and drawings of an informal nature.

C.4.1.3.3 Configuration Management (CM):

The Contractor shall maintain the CM for the ground station according to the requirements of SSD-D-DM003. Tasks associated with this requirements shall include, but may not be limited to: (a) identification of configurable items; (b) capture and retention of configurable items in a planned manner that allows for upgrades without regressive effects; (c) quality assurance and validation of items incorporated into the configuration managed system, including regression testing; and (d) distribution of new versions of ground station software.

C.4.1.4 Support Equipment:

The Contractor shall develop and maintain equipment required for integration and testing. The equipment shall, as a minimum, include interface boxes (a) for interconnections between other communication equipment; and (b) which allow connection of the system to specialized test equipment to verify operation during platform integration. Documentation of the equipment shall be as specified in the appropriate MIL-STD.

C.4.1.5 Logistics:

The Contractor shall provide information and reports on design changes and enhancements that may impact the Integrated Logistics Support (ILS) program.

C.4.1.5.1 Spare and Repair Parts:

The Contractor shall provide spare and repair parts for the Prototype, FSU and LRIP, and FRP phase deliverables. NRL may furnish the parts as GFE, or may direct the Contractor to procure the parts. The Contractor shall provide the facilities and personnel necessary to store and inventory spare and repair parts. The

Contractor shall use the Logistics Support Analysis Record (LSAR) database, as updated during the LRIP/FRP, as a source of data for spare and repair parts.

C.4.1.5.2 Depot Level Maintenance

The Contractor shall provide depot level maintenance for the Prototype, FSU, LRIP, and FRP phase deliverables. Depot level maintenance efforts may require development of PSE, particularly Test Program Sets (TPS). The Contractor shall minimize development of new PSE for the system. The Contractor shall prepare and submit Support Equipment Illustrations (SEIs) for all recommended PSE. The Contractor shall request any such PSE through the normal SERD process. The Contractor shall prepare Test Requirement Documents (TRD) for all LRU and SRU modules coded as repairable. The Contractor shall prepare all TRDs in accordance with the appropriate MIL STD. The Contractor shall implement a data collection, analysis, and corrective action system for the tools and related tactical communications products returned from the field. The collected data shall provide the inputs for organizational and depot level maintenance. The Contractor shall submit Data collection, analysis, and corrective action system reports to the COR for approval in accordance with the appropriate CDRL.

C.4.1.5.3 Training

The Contractor shall provide the technical personnel, data, materials, facilities and equipment to prepare and present, as a minimum, the courses shown in **TABLE 4-1** and related tactical communications systems. The Contractor shall follow the Instructional Systems Development (ISD) principles identified in the appropriate MIL-STD to design and develop the required training course(s) and data, as identified above. Adjustments to course commencement data, schedules, and training conference requirements, will be specified by the COR as required.

TABLE 4-1: TRAINING COURSES

HARDWARE MAINTENANCE
SOFTWARE MAINTENANCE
OPERATOR AND USER TRAINING

C.4.1.5.4 Technical Manuals

The Contractor shall develop, verify, and validate technical manuals according to the requirements of the appropriate MIL-STD.

C.4.1.5.5 Platform Integration Efforts

The Contractor shall provide system engineering efforts for the Government's DT&T/IOT&E or TECHEVAL/OPEVAL. Task to be performed under this requirements shall include, but may not be limited to: (a) Development of test plans and procedures; (b) Installation of units, equipment and spares; (c) maintenance and resolution of unit deficiencies during field testing; (d) collection and correlation of field reliability data during the field test period; (e) Performance of system engineering and technical analysis efforts at the Platform

Integrating Contractor's (PIC) facility curing field testing; (f) Provision of instrumentation and data processing, collection, reduction and analysis; (g) Investigation, resolution and correction of operational discrepancies which become apparent during the field test program; (h) Analysis and recording of failure causes for all units returned to the test site and provision of required corrective action; (i) Provision of results of test analysis for the investigation of deficiencies revealed during the test program.

C.4.1.6 Software and System Verification Tests

The Contractor shall conduct acceptance tests of updated and newly-developed CSCIs for implementation into developed LRIP/FSU in three types of tests: (a) Software Interface Tests; (b) CSCI Hotbench Tests; and (c) On Aircraft Verification Tests. The Contractor shall complete and document all tests and submit to test results to the COR for approval and acceptance of the CSCI.

C.4.1.6.1 MIL-STD-1553 Interface Test

The Contractor shall provide systems engineering efforts during the test. The test will be conducted by NRL or the designated PIC at an appropriate site. The systems engineering efforts necessary under this requirements shall include, but may not be limited to, (a) test procedure reviews, (b) test observations, (c) problem evaluation, and (d) provision of technical expertise during the test period. NRL's test objective will include testing the unit for completeness, validity, and conformance to the MIT ICD, and to the requirements set forth herein. All non-conforming conditions shall be corrected by the Contractor. The Contractor shall correct and retest all software deficiencies prior to the SCSI Hotbench Test.

C.4.1.6.2 CSCI Hotbench Test

The Contractor shall conduct the CSCI Hotbench Test (CHT) at the Contractor's facility in accordance with the appropriate DoD Standard, the STP, and the STD. The Contractor's test objectives shall ensure that all requirements set forth in the SRS are satisfied. The Contractor shall perform the CHT using the CSCI versions approved for testing. The Contractor may conduct informal CHT on preliminary CSCI versions with prior approval. The Contractor shall set up a CHT environment to demonstrate all CSCI requirements. The Contractor shall conduct communications tests over the air using GFE radios. The Contractor shall not commence the CHT until the Test Readiness Review (TRR) is conducted and the STD is approved. The Contractor shall correct software deficiencies discovered during the test. The Contractor shall conduct regression testing if a possibility exists that the software fixes may have affected previously-verified software. The Contractor shall, as a minimum, conduct the following CHT operations for the MLU: (a) Bi-directional communications between the tools or system and an AHS (CP-1516A/ASQ); (b) Dual CDU operation; (c) Bi-directional communications between an AHS (CP-1516A/ASQ) with CMS-90 displays; (d) Bi-directional communications between an AHS (CP-1516A/ASQ) with AAH displays; (e) Bi-directional communication between a tool (as system) and a Digital Message Device (DMD), AN/PSG-2A; and (f) Operation of the push-to-talk key and radio transmitter key.

C.4.1.6.3 On-Aircraft Verification Test (OVT)

The Contractor shall provide systems engineering and technical analysis efforts during the OVT. The test will be conducted by NRL's PIC at a CONUS facility. The Contractor shall perform systems engineering efforts to provide test procedure reviews, test observations, and problem evaluations. The Contractor's test objectives shall be tailored to assure that the system has been fully tested during operations on an airborne platform for conformance to design specifications. Given that the OVT is a part of the software acceptance tests, the Contractor shall correct Software deficiencies found during the test. The Contractor shall conduct regression testing if there is a possibility that the software fixes may have affected previously-verified software.

C.4.1.7 Airborne Communication Interface Module

The Contractor shall complete development of the Advanced Communications Interface Module (ACIM) to meet evolutionary requirements. The Contractor shall complete the hardware and software development, and shall perform system integration and testing.

C.4.2 DESIGN AND DEVELOPMENT

The Contractor shall design, develop, fabricate, integrate and test the hardware and software described in the following subsections for use on evolving and new NRL programs and initiatives. While these efforts may involve new work, the Contractor shall take advantage of existing NRL facilities, inventory, hardware and software designs, and related test capabilities. It is anticipated that all new work shall be accomplished through extension or modification of current systems, and that the developed hardware and software shall be appropriate for use in later development projects. The Contractor shall provide the following deliverables:

- (a) The Contractor shall provide a breadboard and brassboard system detailed design document on the breadboard and brassboard implementation. The document shall include schematics, parts lists, mechanical and electrical assembly drawings, software source code and listings, and a detailed description of the theory of operation.
- (b) The Contractor shall provide an integration and test plan addressing design verification testing (DVT).
- (c) The Contractor shall provide a final test report, which summarizes the system DVT results.
- (d) The Contractor shall provide a prototype system and its technical documentation package.

C.4.2.1 Radio Terminals

The Contractor shall provide (a) the requirements analysis, (b) the functional definition, (c) the requirements definition, (d) the high level and detailed design, and (e) the implementation, integration and testing necessary for development of breadboard and brassboard radio terminal modules. The Contractor shall review the reuse potential of existing tools and ACIM hardware and software prior to selection of the final processor

implementation. The radio receiver, demodulator, and decoder shall be housed with a single SEM-E module that is functionally and operationally compatible with the system. The demodulator shall be programmable for multiple modulation techniques (e.g., BPSK, QPSK, SQPSK, FSK, CPFSK, and ASK). The decoder shall provide error correcting codes (e.g., convolution, Reed-Solomon, BCH and Golay).

C.4.2.2 Real-Time Intelligence in the Cockpit (RTICS)

The Contractor shall define, design, develop, test and demonstrate breadboard, brassboard, and prototype digital data, imagery, and information dissemination systems. The Contractor shall ensure the definition, design, and testing process reflects the requirements for maintenance of existing technology, hardware and software products while allowing new technology, components, and subsystems to be easily integrated into the existing structure in a manner transparent to the user. All software developed by the Contractor to meet these requirements shall be modular, reusable, and capable of being easily updated.

C.4.2.3 Close Air Support Ground Control Unit

The Contractor shall design, develop, test and demonstrate a Close Air Support (CAS) ground control unit (CGCU). The CGCU shall be used to transmit CAS, Suppression of Enemy Air Defense (SEAD), or other targeting messages from the ground to airborne/ground platforms. The CGCU shall, as a minimum, include a GFE radio, a personal computer, and a cryptographic unit. The Contractor's CGCU shall provide for future upgrades and interfaces to other software displaying organic and non-organic sensor data with an ultimate objective of near real-time target designation and digital data dissemination. The Contractor shall develop software to provide the following functions:

- * The user shall be able to configure the tool using a GUI.
- * The user shall be able to present several configurations and rapidly switch among them.
- * The CGCU shall provide up to four channels of communication simultaneously.
- * The CGCU shall provide AFAPD, TACFIRE and MTS simultaneously.
- * The user shall substitute network addresses with symbolic names
- * The users shall be able to handle many missions and many aircraft at the same time, including tracking and mission progress.
- * The users shall allow message editing and storage in files, and the CGCU shall log, transmit and receive messages.
- * The CGCU shall save received messages in a file and allow the transfer of these messages to the transmit file for transmission.
- * The CGCU shall attach data and time to the messages, and the CGCU shall sort messages by date and time, type, and source.

C.4.2.4 Global Positioning Subsystem

The Contractor shall, if tasked via a TDM, develop a multi-function Global Positioning Subsystem (GPS) SEM-E received module to be housed inside the system. The GPS module shall be capable of tracking a minimum of

six (6) GPS satellites with L1-Coarse Acquisition (C/A) and Xpw Signals. The GPS receiver shall have the capability to operate in a differential GPS mode. The GPS module shall provide position, velocity, and time information through a high-level data link controller (HDLC) interface. The GPS module shall be configurable through a functionally and operationally compatible serial port. The GPS module shall be re-configurable to receive tactical downlink broadcasts. The GPS module shall meet the following specifications:

- * Single position accuracy of 25 meters
- * Differential position accuracy of three meters
- * Single and differential velocity accuracy of one meter per second
- * Single and differential time accuracy of 100 nanoseconds

C.4.2.5 Radio Gate Wave System

The Contractor shall develop a Radio Gateway System (RGS). The RGS shall be a gateway between a number of low power communication systems and an ATM network. The RGS shall use direct spread spectrum, and code division multiple access waveforms. The RGS shall be capable of receiving data from up to 16 transmitters simultaneously and multiplex the data into ATM cells. Data received over the ATM network shall be transmitted to the appropriate remote receivers. For the code division multiple access (CDMA) waveform, the RGS shall control the output power of each of the remote transmitters. The RGS shall be able to operate in either a stand-alone mode or as part of the ATM network, at the Government's discretion. The RGS shall include a message processor and a graphic processor that will allow processing and display of information from the mobile transceivers. The RGS shall be developed using SEM-E packaging and modules. The RGS ATM interface shall handle an OC-3 data rate or alternate data rates at the Government's discretion. The RGS ATM interface shall operate with ATM cells or ATM cells embedded into Sonet frames.

C.4.2.6 Graphics Modules

The Contractor shall develop a graphics SEM-E module graphics module. The graphics module shall have an RS-170A interface to allow interface to a video camera or video cassette recorder. The graphics card shall capture image frames, compress them frames using an industry and NITF 2.0 compression standard, and transfer the images to be transmitted over the air. The graphics module shall be able to decompress images and display them on an RGB monitor. The graphics module shall include two layers of text overlay, and two layers of cursor overlay. The module shall be capable of receiving and displaying on an RGB monitor video with a frame rate of up to 30 frames per second.

C.4.2.7 Image Compression Module (ICM)

The Contractor shall develop an ICM in a SEM-E module that accepts data from both a camera and a LAN, and outputs the processed image data to the LAN. Partitioning shall be divided into the image compression, LAN interface, and host processor functions. Image compression and decompression shall be based on a standard compression algorithm. The module shall have four quantization tables and four entropy-encoding tables. The

tables shall be software selectable. The ICM shall have a RS-170A serial interface, and a parallel interface (8/12/24 bit pixel, pixel clock, horizontal and vertical synchronization).

C.4.2.8 SCSI Graphics Module

The Contractor shall develop a SCSI Graphics Module that provides a link between the LAN (IEEE 802.3), the SCSI bus, and the graphics processor. The module shall also provide graphics processing and display capabilities. The module is functionally divided into a graphics processor, LAN interface, SCSI interface, and the host processor functions. The graphics processor may be used for a software implementation of the standard data compression algorithm. The data compression algorithms will be specified by the COR in a TDM.

C.4.2.9 Asynchronous Transfer Mode (ATM)

The Contractor shall develop an ATM adapter to be housed in a SEM-E module. The ATM adapter shall interface between an optical interface using ATM cells and electrical interface. The adapter optical interface shall use a TAXI physical interface using a 900 nm fiber optics link. The adapter shall operate an OC-3 data rate and shall contain sufficient buffering rate to adapt between an OC-3 link and an i80960MC processor read/write bus. The adapter shall be functionally and operationally compatible with the FORE system switch and other switches currently available on the market. The adapter shall be upgradeable for functional and operational compatibility with SONET interfaces. The ATM adapter shall, with only minor modifications, interface (a) to a computer workstation; (b) to a VME bus interface; or (c) to a stand-alone system requiring Ethernet, serial, parallel, or similar complexity bus interfaces.

C.4.2.10 Performance Testing

The Contractor shall make all effort to assure that the hardware and items developed under this Statement of Work perform the intended functions without degradation in the operational environment. The Contractor shall plan, manage, conduct and report on a Test and Evaluation (T&E) program (excluding the OT&E portion) that verifies that all the requirements of the System, Segment, or Development Specification have been met. The T&E program shall include formal acceptance testing of each CI as well as system-like acceptance testing. The Contractor shall provide engineering efforts for the OT&E portion of the T&E program. The T&E program shall be conducted at facilities provided by either the Contractor, NRL, or the Platform Integrating Contractor (PIC) field sites. The Contractor shall provide a portable test facility capable of simulating operational configuration in such a manner that the individual interfaces can be verified independently. The Contractor and NRL shall use this facility to verify that system requirements have been met, and to demonstrate coordinated hardware and software operation.

C.4.2.10.1 Failure Reporting, Analysis, and Corrective Action System (FRACAS)

The Contractor shall implement a FRACAS according to the guidelines of the appropriate MIL STD for all LRIP and Flight Units. The level of assembly required for reporting shall include all levels required to allow traceability from the piece part or component level to the circuit card or replaceable module level. FRACAS reports shall be submitted to the COR for review and approval, as required.

C.4.2.10.2 Electromagnetic Compatibility Testing

The Contractor shall make all efforts to assure that the design is sufficient for compatible operation in the anticipated electromagnetic environments. The Contractor shall verify that the developed hardware is designed to meet necessary requirements. The Contractor shall document all tests performed. The Contractor shall provide engineering expertise for system level EMI/EMC problems encountered through test or demonstration.

C.4.2.10.3 Qualification Testing

The Contractor shall specify, develop, and implement qualification procedures and tests for newly-developed or modified modules or chassis. The Contractor shall provide documentation, hardware and engineering efforts throughout the qualification process. If a module or chassis is rejected from qualification, the Contractor shall correct the deficiencies identified as the cause of rejection.

C.4.2.10.4 Environmental Stress Screening (ESS)

The Contractor shall specify, develop, and perform ESS for all LRIP and Flight Units.

C.4.2.10.5 Reliability Development Growth Test (RDGT) Program

The Contractor shall specify, develop and implement an RDGT program in accordance with the guidelines of the applicable MIL-STD for all LRIP and Flight Units.

C.4.2.10.6 Reliability Qualification Test (RQT)

The Contractor shall specify, develop and implement a reliability qualification test in accordance with the guidelines of the applicable MIL-STD for all LRIP and Flight Units.

C.4.2.10.7 Safety of Flight

The Contractor shall specify, develop and conduct safety of flight tests.

C.4.2.10.8 Platform Integration Efforts

The Contractor shall provide technical efforts directed toward allowing the PIC to specify, test, integrate, and conduct platform integration tests and demonstrations.

C.4.2.11 Fabrication, Assembly, and Test

The Contractor shall fabricate, assemble, and test avionics components and subsystems which shall include, but may not be limited to, SEM-E modules, avionics chassis, mounting trays, cables and displays. The Contractor shall provide the hardware fabrication facilities and efforts required for special interfaces, processors, connecting cables, and test fixtures. The Contractor shall integrate the tactical communications hardware and software, shall develop subsystem and system testing requirements and specifications, and shall perform the tests and document the test results. The following table (Table 4-2) provides the Workmanship and Quality requirements for the end item hardware deliverables.

TABLE 4-2: WORKMANSHIP AND QUALITY PROVISIONS

<u>END ITEM DELIVERABLE</u>	<u>WORKMANSHIP</u>	<u>QUALITY REQUIREMENT</u>
Breadboard	Best Engineering Practice	Best Engineering Practice
Prototypes	Best Engineering Practice	Best Engineering Practice
First Service Units	MIL-STD-2000	MIL-I-4520A
Flight Models	MIL-STD-2000	MIL-Q-9858A
LRIP	MIL-STD-2000	MIL-Q-9858A

C.4.2.12 Engineering Data

The Contractor shall document the hardware design and manufacturing process for the hardware with TDPs developed according to the appropriate guidelines. The Contractor shall develop and document a Required Document List (RDL) for the efforts defined within this SOW. The Contractor shall deliver a TDP for the LRIP efforts conducted under this SOW.

C.4.2.13 Advanced Technology Demonstration

The Contractor shall design, develop, fabricate, test, and demonstrate advanced technology models that pass digital data to and from airborne, ground, and personnel in a tactical communications environment. Specific areas of interest under this subtask shall include, but may not be limited to: (a) improving team coordination, (b) instantaneous location information for first aid or rescue, (c) improved understanding of troop and mission status (e.g., health, environmental, geographical, situational), (d) soldier-to-soldier communication, and (e) instantaneous transmission of orders. The Contractor shall establish and maintain functional and operational compatibility with existing radio and COMSEC systems, along with the flexibility to accommodate evolving requirements, as a part of the ATD. The Contractor shall demonstrate the technical feasibility of a given design, determine its ability to meet existing performance requirements, secure ability to meet existing performance requirements, and secure engineering data for use in further development activities.

C.4.2.13.1 Digital Data Link ATD

The Contractor shall integrate existing, upgraded, and new hardware and software CSCIs with other data links to provide an ATD of a digital data link (video, imagery, data and voice) between ground forces, vehicles, and airborne platforms. The ATD will use derivative technologies for concept verification, prototype development, and for a proof-of-concept next generation communications terminal.

C.4.2.13.2 Global Surveillance and Communications ATD

The Contractor shall develop and integrate existing and upgraded hardware, along with its CSCIs, with GGN.

C.4.3 ADVANCED SYSTEMS

As required, the Contractor shall perform technology studies supporting development, evaluation, design, implementation, and insertion of advanced tactical communications technologies. Technology areas of interest under this task shall include, but may not be limited to: (a) field communications networks, (b) physiologic sensor suites, (c) INFOSEC, micro-RF assemblies, (d) packaging and fabrications techniques for MCM and High-Density Interconnect (HDI), (e) micro-sensors, (f) energy storage technologies, (g) processor technologies, (h) distributed and network operating systems, (i) Local/Wide Area Network (LAN/WAN) protocols and related routing techniques, (j) wide area addressing, (k) operating systems, and (l) display techniques. The contractor shall plan, demonstrate, and insert ATDs for tactical communication network hardware and software. The Contractor shall provide the following deliverables for Advanced Systems:

Engineering Analyses and Reports
Technical Reports, White Papers, and Special Studies
Breadboard, Proof-of-Concept, and Prototype Models

C.4.3.1 New Conceptual Studies and Designs

The Contractor shall provide concept definition studies to formulate specifications for tactical communications systems, and to identify required trades in terms of hardware and software. The Contractor shall perform prototyping and breadboarding to validate the studies and trades.

C.4.3.2 Engineering Analysis

The Contractor shall determine and document the application of new tactical communications technology to NRL programs. Specifically, the Contractor shall provide the engineering and technical analysis efforts necessary to perform the following activities:

Identify and assess new technologies and their applicability to NRL problems;
Define, analyze, and develop requirements for new systems;
Develop algorithms or improve algorithms for tactical communications systems;
Develop and use simulation tools to model communications links and communications networks;

Review requirements and design documentation for tactical communications systems in the LRIP and FRP Phases.

C.4.4 SYSTEMS MANAGEMENT

The Contractor shall ensure the system definition, design, testing, and implementation process reflects the requirements for all system elements, including but not limited to design, hardware, software, equipment, personnel, facilities, and data. The Contractor shall ensure that integrated technical efforts of the design team specialists produce a balanced design that is compatible with fielded hardware and software systems.

C.4.4.1 Systems Engineering

The Contractor shall plan, coordinate, implement, and integrate the technical program tasks and requirements contained within this document. The Contractor shall establish and provide effective control over the system engineering process, including subcontracted items and services, to ensure performance and schedule requirements are met. The Contractor shall monitor the efforts required under this document to (a) provide early indication of problems, (b) to resolve problems, and (c) to reduce risk.

C.4.4.2 System Analysis and Design

The Contractor shall perform system engineering efforts pursuant to definition, allocation, and integration of those hardware and software performance requirements and characteristics, which can be demonstrated to meet the requirements of each functional area identified in the System Specifications. System engineering efforts shall include trade-off analyses, which consider all aspects of performance, quality, life cycle cost, program schedule, data processing reserves, and growth. The Contractor shall use this data to refine the system design and identify the hardware and software required to fabricate the system. The Contractor shall (a) submit periodic technical reports which address its system-engineering efforts, and (b) submit to scheduled technical reviews.

C.4.4.3 Technical Reviews

The Contractor shall conduct periodic technical reviews to provide details to the Program Sponsor, the Platform Integrating Contractor, and other external agencies, concerning system design implementation, hardware modification status, interface implementation, and integration of the developed hardware and software. The Contractor shall prepare agendas and minutes of these reviews which shall be provided to the COR.

C.4.4.3.1 System Specification Review

The Contractor shall conduct System Design Reviews (SDR) and Technical Interchange Meetings (TIM) to present the System, Segment, and PIDS to the Program Sponsor and other external agencies.

C.4.4.3.2 Preliminary and Critical Design Review (PDR/CDR)

The Contractor shall conduct a PDR in accordance with the applicable MIL STD guidelines within two months of the System Specification Review. The Contractor shall conduct a CDR in accordance with the applicable MIL STD guidelines prior to the initiation of hardware fabrication. The reviews shall be conducted with two major objectives: (1) to provide the Program Sponsor and other external agencies with evidence that the detailed design of the hardware and software functions satisfies the overall requirements of the System/Segment Specification and the Software Requirements Specification; and (2) to establish the exact interface relationships between the functions comprising the system. The Contractor shall provide updated system engineering data, specifications, drawings, manuals, schedules, and the results of studies and analyses at the PDR/CDR.

C.4.4.3.3 Software Review

As an adjunct to the PDR, the Contractor shall conduct a Software Specification Review (SSR) in accordance with the guidelines of the applicable MIL STD and the DOD.

C.4.4.3.4 Test Readiness Review

The Contractor shall conduct a TRR prior to the CSCI testing for all software versions in accordance with the guidelines of the applicable MIL STD and DOD standards.

C.4.4.4 System Safety

The implementation of avionics hardware mandates a systems approach to meeting flight certification requirements. The Contractor shall apply safety engineering and safety management principles, criteria, and techniques as a formal system safety program to optimize safety and enhance mission effectiveness, time and cost. System safety activities shall stress early hazard identification, evaluation, and elimination or reduction of residual risk to preclude both system damage or destruction and injury to personnel. The Contractor shall conduct its system safety program in accordance with guidelines determined appropriate by the COR.

C.4.4.5 Computer Resource Management

The Contractor shall (a) manage software (whether designated as software or firmware) development to satisfy the design and performance requirements defined in the System, Segment and PIDS; and (b) prepare a software development plan (SDP). The Contractor shall manage developed software for the system as deliverable software to be developed and designated as a CSCI in accordance with the applicable guidelines. The Contractor shall provide software quality assurance efforts, which shall include maintenance diagnostics, for all developed and acquired software. Software and maintenance diagnostics not provided as unmodified commercially-available and reusable software that is used in a deliverable CSCI shall be provided as deliverable software to be developed and designated as a CSCI. The software, which shall, as a minimum, consist of development tools and test routines, shall be tested during developmental testing. Design, development, documentation, and testing requirements for firmware shall be the same as for software. Firmware shall be handled as deliverable software to be developed, and designated as a CSCI.

C.4.4.5.1 Code Development

The Contractor shall code software according to the guidelines of the system segment specification and the SDP. The Contractor shall use ADA and an NRL-approved Assembler language. Use of any language other than that specified above shall require written approval from the COR on a case-by-case basis prior to the inclusion of such software. The Contractor shall identify all software languages to be used for system development at the SDR, and shall provide written justification for the use of a non-approved language, if contemplated. The Contractor shall assure that all code is portable to serve cross-platform requirements.

C.4.4.5.2 Software Documentation Requirements

The Contractor shall prepare Advanced Specification Change Notices (ASCN) for all new software developments and software modifications. The Contractor shall document all software requirements. The following software documentation shall be provided, unless otherwise directed in a TDM: (a) Software Development Plan (SDP); (b) Software Requirements Specification (SRS); (c) Interface Requirements Specification (IRS); (d) Software Design Document (SDD); (e) Firmware Support Manual (FSM); (f) Software Test Description (STD); (g) Software Test Plan (STP); (h) Software Product Specification (SPS); (i) Computer Software User's Manual (CSUM); and (j) Version Description Document (VDD).

C.4.4.5.3 Commercial Source Code

The Contractor shall acquire software source code when commercially available for sale from the vendor. All software source code and licenses acquired by the Contractor shall be delivered to NRL as source code, executable, and transfer of licenses.

C.4.4.5.4 Update Service

The Contractor shall acquire or provide an update service for all hardware and software documentation developed under this SOW. The hardware and software-related documentation shall reflect each original equipment manufacturer's current revision level. Change pages for the specifications and manuals shall be processed according to the CM provisions of this SOW.

C.4.4.5.5 Software Testing

The Contractor shall conduct Informal and formal Configuration Item (CI) level testing. The Contractor shall prepare and maintain informal test procedures and reports to document the conduct of unit level testing. The Contractor shall guarantee that these test procedures and reports are filed in the appropriate software development files according to the guidelines.

C.4.4.6 Deliverables

The Contractor shall provide the following deliverables for the software development activities performed under this SOW: (a) Technical Reports, Plans, and Specifications; (b) Software Documentation to DoD-STD-2167A; (c) Design Reviews and Related Minutes; and (d) Technical Presentation Materials.

C.4.4.7 Program Management

The Contractor shall provide the program management, control and reporting functions necessary to manage and direct the accomplishment of the efforts required under this SOW. The Contractor shall designate a program manager who shall have overall responsibility for the program, and who shall act as the single point of contact for all matters pertaining to this SOW. The program manager shall provide the COR with information on overall contract progress and the progress of various tasks via monthly reports and personal interaction, as necessary.

C.4.4.8 Management Information System

The Contractor shall develop and provide a management information system to be used in controlling and reporting program and contract efforts. Factors to be included in this MIS shall include, but may not be limited to: cost information, schedule information, and technical performance information over the life of the Contract. The management system shall be based on the use of a Contract Work Breakdown Structure (CWBS) for the work to be performed under this SOW. The CWBS shall be designed to assess technical achievement, to measure progress and to accurately determine and accrue costs for each task described in this SOW.

The MIS shall, as a minimum, (a) compare actual achievement to planned achievement; (b) compare accrued costs to planned and budgeted costs; and (c) determine program/contract status for program control, progress reporting, and status review. The Contractor shall prepare and submit program status reports on a monthly basis in accordance with the appropriate CDRL.

C.4.4.9 Programmatic and Technical Efforts

The Contractor shall provide analysis, reports, evaluations, briefings, and studies depicting tactical communications. The Contractor shall coordinate plans and presentations with the COR, and shall respond to the issues raised in the coordination process. The Contractor shall develop and prepare reports in the form of 35mm slides, overhead transparencies, computer media, video, and action papers on both a routine and expedited basis, in black-and-white, color, and multi-media formats, as required by the COR. All data, reports, processes, and models developed under this task shall become the property of NRL. The Contractor shall provide a final report summarizing all developmental activities conducted under this SOW with recommendations for future areas of study.

The Contractor shall develop, implement, and maintain a Tactical Communications Information Center (TCIC), which shall consist of the materials and information developed during the engineering process. The Contractor shall collect, organize, maintain, and distribute reports, presentations, and analyses related to the Tactical

Communications library and database. The Contractor may, at the Government's discretion, be required to enter into non-disclosure agreements with other industrial firms to enable the access to, and retention of some data. The database may be physically maintained at the Contractor's site, provided that all contents and items thereof are indexed and available at no more than one hour's notice. Any items requiring special proprietary agreements for access will be so indicated in the database.

C.4.4.10 Deliverables

The Contractor shall provide the following deliverables: (a) Technical Status Reports, (b) Financial Status Reports, (c) Meeting Minutes, (d) Presentation Materials, and (e) Contract Final Report.

C.4.4.11 Security and Transportation

The Contractor shall perform according to the DoD industrial security manual (DoD 5220-22-M) and ensure that classified material is handled in accordance with the latest security classification specifications. The Contractor shall provide and implement a security plan to protect classified and sensitive materials associated with the SOW tasks. The Contractor shall be responsible for all transportation arrangements for Contractor personnel working at NRL, platform integration, or other test efforts at any designated location.

C.4.4.12 Government Furnished Equipment

The Contractor shall maintain an accurate inventory of all Government Furnished Equipment in its possession. The Contractor shall provide a complete listing describing all GFE and its location to the COR on a quarterly basis. A list of GFE associated with this solicitation may be found at Attachment 5 to this solicitation.

C.4.4.13 Contract Transition

The Contractor shall phase-in its organization into the ongoing system development efforts performed by the incumbent Contractor within 45 days of Contract award. During this period, the Contractor shall establish a trained and experienced work force, acquire adequate facilities and equipment, develop adequate procedures, and establish the program management controls and procedures required to accomplish the tasks defined herein. The Contractor shall also transition the ongoing hardware and software design enhancement and modifications ITB maintenance and development, and software maintenance activities that are being performed by the incumbent Contractor within 45 days of Contract award.

C.5.0 REQUIREMENTS (IOBP)

The IOBP SOW requirements are described in this section. Unless otherwise specified, the Contractor shall perform the requirements, render the services, provide the facilities, and deliver all supplies, equipment, items, and services as set forth herein complete to specifications.

The Contractor shall design, code, test and integrate IOBP flight software to satisfy the requirements stated in the IOBP specification. A Software Requirements Specification and a Software Development Plan shall be generated and delivered with the Brassboard unit.

The Contractor shall assist NRL/ORASIS engineers in the resolution of any hardware or software issues which arise with the IOBP Breadboard System, as previously assembled by the Contractor. The Contractor shall also assist in porting the ORASIS software into this hardware, as required by the COR.

ATTACHMENT 2:
WORKFORCE REQUIREMENTS

Minimum Qualifications:

This section contains the minimum personnel qualifications for the efforts performed under this SOW. Professional personnel used in the performance of tasks under this solicitation shall, as a minimum and unless otherwise specified, possess a bachelor's degree from an accredited college or university. The degree must be directly related to, or provide a clear foundation for, the category of work for which the individual is assigned responsibility. Additionally, the individuals must possess a minimum of three years of progressive work experience in the category of work to which assigned. Proven experience and effective performance may be substituted for education based on three years of relevant experience for one year of education. Full time graduate education may be substituted for experience year for year, provided it is directly related to the classification of labor proposed and that it is obtained from an accredited college or university. Experience must also be progressive in the classification of labor proposed. Consultants or subcontractors who are proposed shall also meet the requirements of the work to which assigned. The NRL reserves the right to approve or disapprove resumes submitted.

Key Personnel:

The mandatory personnel labor categories for the developmental efforts defined within this solicitation are designated below: (Key personnel are designated via (*))

Program Manager (*)
Assistant Program Manager (*)
Chief Engineer/Scientist (*)
Sr. Engineer, Communications (*)
Sr. Engineer, Digital (*)
Sr. Engineer, RF(*)
Sr. Engineer, Software (*)
Sr. Engineer, Industrial (*)
Engineer, Digital (*)
Engineer, Analog (*)
Engineer, Software (*)
Engineer, Manufacturing (*)
Engineer, Test (*)
Sr. Technician
Technician
Sr. Computer Graphics Artist (*)
Technical Writer/Editor (*)
Administrative, Clerical, and Graphics

Specific Personnel Qualifications:

A description of each labor category and the minimum qualification for that category is contained in the following paragraphs.

1. Program Director/Manager:

The proposed Program Director/Manager shall, as a minimum, have at least 10 years of demonstrable experience directly applicable to the complex work required under this solicitation. Specifically, the proposed Program Director/Manager shall possess (a) as a minimum, a Bachelor's degree with ten years experience in the management of aerospace and tactical communication systems; (b) demonstrable experience, knowledge, and familiarity with the planning and execution of hardware and software development programs for satellite, aircraft, and UAV platforms, particularly as these programs pertain to command, control, and communications activities, particularly as it relates to data dissemination units; (c) extensive demonstrable experience in program and contract management and documented ability to provide solutions to a wide range of project-related technical and management problems; (d) demonstrable management experience in the definition and design of avionics development programs; (e) a demonstrable and thorough understanding of DoD platform integration and test process, which shall as a minimum include the development of plans for the technical program planning efforts required to develop the system engineering management plan (SEMP); and (f) demonstrable experience in risk analysis; engineering program integration; program reviews; technical performance measurement; interface control; documentation control; and planning for technical and program management tasks.

2. Assistant Program Manager:

The proposed Assistant Program Manager shall, as a minimum, possess at least five years of demonstrable experience directly applicable planning, directing, and controlling the complex work required under this solicitation. Specifically, the proposed Assistant Program Manager shall possess (a) as a minimum, a bachelor's degree in engineering, business administration, or business management from an accredited college or university; (b) a demonstrable, thorough understanding of development process, particularly as it relates to data dissemination manufacturing, platform integration and integrated logistics; (c) demonstrable experience in the preparation and coordination of formal presentations, schedules, vu-graphs, and data reviews; and (d) a demonstrable, thorough understanding of the pertinent issues associated with configuration and quality management, logistics, and with identifying and applying design to cost and life cycle cost analysis principles to the development process.

3. Chief Engineer/Scientist:

The proposed Chief Engineer/Scientist shall, as a minimum, possess at least ten years of demonstrable experience directly applicable to conceptualizing, analyzing, solving and accomplishing the complex work required under this solicitation. Specifically, the proposed Chief Engineer/Scientist shall possess (a) as a

minimum, a Ph.D. in the area of engineering, physical sciences, or mathematics; (b) demonstrable experience in the application of principles, theories, and concepts associated with the work required under this solicitation, particularly as it relates to data dissemination units; (c) demonstrable experience, knowledge and familiarity with the planning and execution of hardware and software development programs for tactical communications using the i80960 and/or Pentium processor(s) and the Ada software language; (d) demonstrable experience, knowledge and familiarity with the digital dissemination of targeting data via the device(s); (e) demonstrable experience, knowledge and familiarity with the concepts, protocols, and implementation of a multi-tear system providing intelligence, surveillance, Command, Control, Communications, and Computer Intelligence (C4I) over multi-gigabit data links; and (f) demonstrable knowledge of ATM with the expertise and capability to specify and develop ATM protocols for use in tactical communication systems.

4. Sr. Engineer, Communications:

The proposed Senior Engineer, Communications shall, as a minimum, possess at least ten years of demonstrable experience directly applicable to analyzing, solving and accomplishing the complex work required under this solicitation, particularly as it relates to data dissemination units. Specifically, the proposed Senior Engineer, Communications shall possess (a) as a minimum, an advanced degree in the technical area of engineering, physical sciences, or mathematics; (b) demonstrable experience in application of the standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) demonstrable experience, knowledge and familiarity with planning and executing hardware and software development programs for tactical communications; (d) demonstrable experience, knowledge and familiarity with specific digital target dissemination programs developed by the NRL; (e) demonstrable experience with the i80960 and/or Pentium processor(s), ADA software language, and the TMS330C30 and/or TMS320C30 DSP; and (f) demonstrable experience with design and application of the statistical correlation concepts, data protocols, formats, and codes typically used with digital target dissemination programs.

5. Sr. Engineer, Digital:

The proposed Senior Engineer, Digital shall, as a minimum, possess at least ten years of demonstrable experience directly applicable to analyzing, solving, and accomplishing the complex work required under this solicitation. Specifically, the proposed Sr. Engineer, Digital shall possess (a) as a minimum, an advanced degree in the technical area of engineering, physical sciences, or mathematics; (b) demonstrable experience in the application of standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) demonstrable experience, knowledge, and familiarity with analysis, research, design, development, testing, and evaluation of complex digital hardware and software development programs; (d) demonstrable engineering experience related to electrical analysis, design, integration, and testing of JIAWG-approved processors, DSP, ASIC, MIL-STD-1553B, and their related development systems; (e) demonstrable experience with the i80960 and/or Pentium processor and the TMS320C30 and/or TMS330C30 DSP; (f) demonstrable experience with the electrical analysis and design of discrete ASIC and field programmable gate arrays (FPGA); and (g) demonstrable experience with the integration and testing of avionics modules that are similar or equal to those used in digital target dissemination programs.

6. Sr. Engineer, RF:

The proposed Senior Engineer, RF shall, as a minimum, possess at least 10 years of demonstrable experience directly applicable to analyzing, solving, and accomplishing the work required under this solicitation. Specifically, the Senior Engineer, RF shall possess (a) as a minimum, an advanced degree in the technical area of engineering, physical sciences, or mathematics; (b) demonstrable experience in the application of standard principles, theories, concepts and techniques in the work areas required under this solicitation; (c) demonstrable experience, knowledge, and familiarity with: the planning and execution of RF development programs for tactical communications; (d) demonstrable experience, knowledge, and familiarity with specific digital target dissemination programs; and (e) demonstrable experience with design and application of the specification and design of analog ASIC, spread spectrum technologies, UHF/VHF transmitters and receivers, militarized tactical communications modules, and wireless personal data communications systems.

7. Sr. Engineer, Software:

The proposed Senior Engineer, Software shall, as a minimum, possess at least 10 years of experience directly applicable to analyzing, solving, and accomplishing the complex work required under this solicitation, particularly as it relates to the IDM. Specifically, the proposed Senior Engineer, Software shall possess (a) as a minimum, an advanced degree in the technical area of Engineering, Physical Sciences, or Mathematics; (b) demonstrable experience in the application of standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) demonstrable experience, knowledge, and familiarity with the planning, execution, and documentation of real-time software development programs according the requirements of DoD-STD-2167A and MIL-STD-1815; (d) demonstrable experience in perform the systems analysis, simulation, algorithm design, and system evaluation efforts required to design and implement complex software systems using assembly, "C", "ADA", "C++", Python, and Java programming languages on a JIAWG-approved reduced instruction set computer (RISC) processor; (e) demonstrable working experience with digital hardware and software test beds that are typical of digital target dissemination equipment and which have the capability to evaluate and resolved hardware/software compatibility problems occurring during the developmental process; (f) demonstrable experience with the I80960 or Pentium processor, the ADA software language, and the TMS330C30 or TMS320C30 DSP; (g) demonstrable experience with both the IRVINE and TARTON ADA and GNAT software compilers; and (h) demonstrable experience using computer aided engineering (CAE) tools, i.e., Software through Pictures™.

8. Sr. Engineer, Industrial:

The proposed Senior Engineer, Industrial, shall, as a minimum, possess at least ten years of experience directly applicable to analyzing, solving and accomplishing the work required under this solicitation, particularly as it relates to data dissemination devices. Specifically, the proposed Senior Engineer, Industrial, shall possess (a) as a minimum, a bachelor's degree in the technical area of Engineering, Physical Sciences or Mathematics; (b) demonstrable experience in application of the standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) demonstrable experience in the reasoning and rationale behind

selection and implementation of fine-pitch technology (FPT) surface mounted technology (SMT) components onto constrained core (SME-E) modules; (d) demonstrable experience in the issues and ramifications of multi-chip module (MCM) and high density interconnect (HDI) packaging; (e) demonstrable experience in the specification, design, and development of the processes and controls required to assure high reliability interconnections in the military avionics environment; and (f) demonstrable experience in developing approved processes that comply with DoD requirements for elimination of ozone depleting chemicals (ODC) in the production process while meeting strict equipment reliability objectives.

9. Engineer, Digital:

The proposed Digital Engineer shall, as a minimum, possess at least five years of experience directly applicable to analyzing, solving and accomplishing the work required under this solicitation, particularly as it relates to data dissemination devices. Specifically, the proposed Digital Engineer shall possess (a) as a minimum, a bachelor's degree (advance degree desirable) in the area of Engineering, Physical Sciences, or Mathematics; (b) demonstrable experience in application of the standard principles, theories, concepts, and techniques in the work areas under this solicitation; (c) demonstrable experience with the electrical analysis and design of discrete ASIC and FPGA; (d) demonstrable experience with the integration and testing of avionics modules that are typical of those used in digital target dissemination programs; and (e) demonstrable experience with the Pentium or i80960 processor, the ADA software language, and the TMS330C30 or TMS320C30 DSP.

10. Engineer, Analog:

The proposed Analog Engineer shall, as a minimum, possess at least five years of experience directly applicable to analyzing, solving and accomplishing the work required under this solicitation, particularly as it relates to data dissemination devices. Specifically, the proposed Analog Engineer shall possess (a) as a minimum, a bachelor's degree (advanced degree desirable) in the area of Engineering, Physical Sciences, or Mathematics; (b) demonstrable experience in application of the standard principles, theories, concepts, and techniques in the work areas under this solicitation; (c) demonstrable engineering experience in electrical analysis, circuit design, mixed ASIC design, integration, and testing of RF and analog circuitry for avionics equipment, particularly as it relates to MIL-STD 1553, MIL-STD-188 and radio systems; and (d) demonstrable experience in conducting engineering test programs typical of those used for digital target dissemination.

11. Engineer, Software:

The proposed Software Engineer shall, as a minimum, possess at least five years of experience directly applicable to analyzing, solving and accomplishing the work required under this solicitation, particularly as it relates to the data dissemination devices. Specifically, the proposed Software Engineer shall possess (a) as a minimum, a bachelor's degree (advanced degree desirable) in the area of Engineering, Physical Sciences, or Mathematics; (b) demonstrable experience in the application of the standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) demonstrable experience, knowledge, and familiarity with the specification, analysis, simulation, coding, integration, testing, evaluation, and documentation of real-time software development programs according to the requirements of DoD-STD-2167A and MIL-STD-1815; (d) demonstrable experience in designing and implementing complex software systems

using Assembly, "C", "ADA", "C++", Python, Java programming languages on a JIAWG-approved RISC processor; (e) demonstrable experience with the Pentium or i80960 processor, the ADA software language, and the TMS320C30 or TMS330C30 DSP; (f) demonstrable experience with the IRVINE, TARTON ADA and GNAT software compilers; (g) demonstrable working experience with the device(s) digital hardware and software testbeds that are typical of digital target dissemination equipment and which have the capability to evaluate and resolve hardware/software compatibility problems occurring during the development process; and (h) demonstrable experience in the use of CAD tools, i.e., Software through Pictures™.

12. Engineer, Manufacturing:

The proposed Manufacturing Engineer shall, as a minimum, possess at least five years of experience directly applicable to analyzing, solving and accomplishing the complex work required under this solicitation, particularly as it relates to data dissemination devices. Specifically, the proposed Manufacturing Engineer shall possess (a) as a minimum, a bachelor's degree (advanced degree desirable) in the area of Engineering, Physical Sciences, or Mathematics; (b) demonstrable experience in the application of the standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) demonstrable experience in specifying, developing and documenting developmental test programs; (d) demonstrable experience in conducting systems level environmental and reliability tests; (e) demonstrable experience in documenting acceptance tests in formal plans and procedures; (f) demonstrable experience in planning and conducting tests and demonstrations in conjunction with the integrating contractor; and (g) demonstrable experience with Pentium or i80960 processors, the ADA software language, and the TMS330C30 or TMS320C30 DSP.

13. Engineer, Test:

The proposed Test Engineer shall, as a minimum, possess at least four years of experience directly applicable to analyzing, solving and accomplishing the complex work required under this solicitation, particularly as it relates to the IDM. Specifically, the proposed Test Engineer shall possess (a) as a minimum, a Bachelor's degree in engineering, physical science, or mathematics; (b) demonstrable experience in the application of the standard principles, theories, concepts, and techniques in the work areas required under this solicitation; (c) a demonstrable understanding of the process and procedures required to: (i) specify, develop and document a developmental test program, (ii) conduct systems level environmental and reliability tests, (iii) document acceptance tests in formal plans and procedures, and (iv) plan and conduct tests and demonstrations in conjunction with the integrating contractor; and (d) demonstrable experience with Pentium or i80960 processors, the ADA software language, and the TMS330C30 or TMS320C30 DSP.

14. Sr. Technician:

The proposed Senior Technician shall, as a minimum, be a technical specialist skilled and experienced in the performance of technical duties requiring some creativity and judgment while operating within the framework of the engineering and technical staff. Senior Technicians required for this labor category may include digital, analog and test electronic technicians, mechanical/electrical designers, and software programmers.

15. Technician:

The proposed Technicians shall, as a minimum, be technical specialist skilled and experienced in performing standard duties requiring some new techniques or procedures. Technicians required for this labor category may include Electro-mechanical specialists such as assembly technicians, test technicians, drafters, and quality assurance technicians.

16. Sr. Computer Graphics Artists:

The proposed Senior Computer Graphics Artist shall, as a minimum, possess at least five years of experience directly applicable to the creation of original artwork for technical, scientific, and presentation purposes. Specifically, the proposed Senior Computer Graphics Artists shall possess (a) demonstrable experience in the rendering of complex aerospace artwork that incorporates PC and Macintosh™ applications programs which are available for technical drawing, drafting, rendering, and shading, (e.g. ADOBE ILLUSTRATOR™, and PhotoShop™, AutoCAD, VIS10, PowerPoint™, MacDraw PRO™, ALDUS FREEHAND™, MINI-CAD™, FETCH™, FASTRACK™, AND Pixar's Renderman™); (b) demonstrable experience, knowledge, and familiarity with the various computer file formats used to store and translate computer text and graphics files, including TIFF, EPS, and PICT, JPG, CGM; (c) demonstrable experience in setting up large graphics, clip art, and presentation server files, and in maintaining those files for read access by multiple graphics personnel; and (d) demonstrable experience with the setup and operation of IBM PC Computers, Macintosh Computer systems, Microsoft Windows, LINUS, SOLARIS, LYNXOS related products, including scanners, SCSI drives, Local Area Networks (LANs) and other peripheral devices.

17. Technical Writer/Editor:

The proposed Technical Writer/Editor shall, as a minimum, possess at least four years of experience directly applicable to analyzing, solving, and accomplishing the work required under this solicitation, particularly as it relates to data dissemination devices. Specifically, the proposed Technical Writer/Editor shall possess (a) a bachelor's degree in engineering, business administration, or English from an accredited college or university; (b) demonstrable proficiency with PC and Macintosh Cross-platform word processing, spreadsheet, and database programs (e.g. Framemaker™, Word™, Excel™, Filemaker Pro™, and Mini-SQL); (c) demonstrable experience in coordinating, preparing, editing and proofing technical specifications, plans, procedures, and documents related to tactical communications program; (d) demonstrable working knowledge of the requirements for military technical manuals in a computer aided logistics systems (CALS) environment; and (e) demonstrable experience in collecting, compiling, and tracking technical data and comments thereto, including the documentation and tracking of CDRLs.

18. Administrative, Clerical, and Graphics:

The proposed Clerical and Graphical Administrative position shall, as a minimum, possess at least four years of experience directly applicable to the work required under this solicitation. Specifically, the proposed Clerical and Graphical Administrative position shall possess (a) demonstrable experience in rendering complex aerospace artwork that incorporates MacIntosh/PC applications programs for technical drawing, drafting and

shading; and (b) demonstrable proficiency with PC and MacIntosh cross-platform word processing, spreadsheet, and database programs.

Resume Requirements/Format:

Each period of work experience should be listed in the format shown below:

Dates of Employment:

Average number of hours per week:

Title of Position:

Employer and Place of Employment:

Name of Supervisor and his/her Phone Number:

Annual Salary (NOT HOURLY RATE)

Kind of Business or Organization:

Security Clearance (type and date):

Reason for Leaving the Position:

Description of Duties, Responsibilities and Accomplishments:

Awards (Monetary or other types) (include reason for and title of award, date presented by and nature of award

Publications, patents, consultation services, etc: If the individual for whom the resume is being submitted has had articles published, indicate the title of the article, where it was published and in what year. Describe any patents the individual has obtained (include the year the patent was awarded) describe the individual's experience in serving as a consultant to private industry and the government. Indicate the type of consultant services the individual provided and the fee that was received. How frequently did the individual provide the consulting services?

Managerial/Leadership: Describe the supervisory responsibilities. Include (1) the number and kinds of workers directed/supervised, (2) the complexity of the work directed, i.e. was it a small unit performing one basic function or a large organization composed of a diversity of functional and product areas, (3) the number of years of supervisory experience, (4) Individual experience as it relates to estimating material, manpower, and equipment needs, scheduling work flow and work assignments, (5) financial management responsibilities (including size of annual budget), (6) special awards or accomplishments received as a supervisor, and (7) other information relative to skills as a manager/supervisor.

CONTRACT DATA REQUIREMENTS LIST

(2 Data Items)

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 220 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. 0002,0004,0006,0008,0010		B. EXHIBIT A		C. CATEGORY: TDP _____ TM _____ OTHER _____		
D. SYSTEM / ITEM			E. CONTRACT / PR NO. N00173-00-R-RS02		F. CONTRACTOR To Be Determined at Time of Award	
1. DATA ITEM NO. A006	2. TITLE OF DATA ITEM Technical and Program Progress Reports			3. SUBTITLE		
4. AUTHORITY (Data Acquisition Document No.)			5. CONTRACT REFERENCE Section C - Attachment 1		6. REQUIRING OFFICE NRL Code: ****	
7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY See Blk. 16	12. DATE OF FIRST SUBMISSION See Blk. 16	14. DISTRIBUTION		
8. APP CODE AN	11. AS OF DATE See Blk. 16	13. DATE OF SUBSEQUENT SUBMISSION See Blk. 16	a. ADDRESSEE			b. COPIES
				Draft	Final	
					Reg	Repro
16. REMARKS The Contractor shall provide Program Progress Reports and Technical Progress Reports which shall include, but may not be limited to: Monthly Status Reports, Milestone Charts, and Government-Furnished Equipment Reports. Unless specifically stated in the Statement of Work, the format for all deliverables under this CDRL shall be the Contractor's format as reviewed and approved by the C.O.R. Monthly Status Reports: Shall be provided on a monthly basis beginning 30 DAC and by the 20th day of each month thereafter Milestone Charts shall be provided on a monthly basis beginning 30 DAC and by the 20th day of each month thereafter. GFE Status Reports shall be provided on a monthly basis beginning 30 DAC and by the 20th day of each month thereafter.				NRL Code ****	1	1
				ACO (trx. ltr. only)		
				15. TOTAL →	1	1
1. DATA ITEM NO. A007	2. TITLE OF DATA ITEM Other Deliverables			3. SUBTITLE		
4. AUTHORITY (Data Acquisition Document No.)			5. CONTRACT REFERENCE Section C - Attachment 1		6. REQUIRING OFFICE NRL Code: ***	
7. DD 250 REQ DD	9. DIST STATEMENT REQUIRED	10. FREQUENCY ASREQ	12. DATE OF FIRST SUBMISSION ASREQ	14. DISTRIBUTION		
8. APP CODE AN	11. AS OF DATE ASREQ	13. DATE OF SUBSEQUENT SUBMISSION ASREQ	a. ADDRESSEE			b. COPIES
				Draft	Final	
					Reg	Repro
16. REMARKS The Contractor shall provide any other deliverables that may be required under the Statement of Work, as applicable. If not specifically stated in the Statement of Work, the format for all deliverables required under this CDRL shall be the Contractor's format as reviewed and approved by the C.O.R. Deliverables under this data requirement shall be delivered to the C.O.R. at the address provided in Contract Section F.2, unless otherwise directed.				NRL Code ****	1	1
				ACO (trx. ltr. only)		
				15. TOTAL →	1	1
G. PREPARED BY Richard D. Sewell			H. DATE 21 APR 2000	I. APPROVED BY		J. DATE

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

DEPARTMENT OF DEFENSE
CONTRACT SECURITY CLASSIFICATION SPECIFICATION
(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)

1. CLEARANCE AND SAFEGUARDING
 a. FACILITY CLEARANCE REQUIRED
 SECRET
 b. LEVEL OF SAFEGUARDING REQUIRED
 SECRET

2. THIS SPECIFICATION IS FOR: (X and complete as applicable)

a. PRIME CONTRACT NUMBER		X	a. ORIGINAL (Complete date in all cases)	Date (YYMMDD) 000211
b. SUBCONTRACT NUMBER			b. REVISED (Supersedes all previous specs)	Revision No. Date (YYMMDD)
c. SOLICITATION OR OTHER NUMBER 81-0174-00	Due Date (YYMMDD)		c. FINAL (Complete Item 5 in all cases)	Date (YYMMDD)

4. IS THIS A FOLLOW-ON CONTRACT? YES NO. If Yes, complete the following:
 Classified material received or generated under N00014-96-C-2060 (Preceding Contract Number) is transferred to this follow-on contract.

5. IS THIS A FINAL DD FORM 254? YES NO. If Yes, complete the following:
 In response to the contractor's request dated _____, retention of the identified classified material is authorized for the period of _____

6. CONTRACTOR (Include Commercial and Government Entity (CAGE) Code)

a. NAME, ADDRESS, AND ZIP CODE FOR RFP PURPOSES ONLY	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)
---	--------------	--

7. SUBCONTRACTOR

a. NAME, ADDRESS, AND ZIP CODE N/A	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code) N/A
---	--------------	---

8. ACTUAL PERFORMANCE

a. LOCATION N/A	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code) N/A
------------------------	--------------	---

9. GENERAL IDENTIFICATION OF THIS PROCUREMENT
 Engineering Development Efforts for IDM, Conduction of Tactical Communications Targeting Data Dissemination Systems ATDs and IOBP Testbed development

10. THIS CONTRACT WILL REQUIRE ACCESS TO:		YES	NO	11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:		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) <u>Secure Voice Required.</u>			
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):

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.)

14. ADDITIONAL SECURITY REQUIREMENTS. Requirements, in addition to ISM requirements, are established for this contract. (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.)

Yes No

15. INSPECTIONS. Elements of this contract are outside the inspection responsibility of the cognizant security office. (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.)

Yes No

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	b. TITLE	c. TELEPHONE (Include Area Code)
d. ADDRESS (Include Zip Code)	17. REQUIRED DISTRIBUTION	
e. SIGNATURE	<input type="checkbox"/> a. CONTRACTOR	
	<input type="checkbox"/> b. SUBCONTRACTOR	
	<input 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 type="checkbox"/> f. OTHERS AS NECESSARY	

Attachment 5:
Government Furnished Equipment

<u>Manufacturer</u>	<u>Serial</u>	<u>Model</u>	<u>Description</u>
COLLINS	0613	RT1506/ARC A640	RADIO
COLLINS	0614	RT1506/ARC A640	RADIO
COLLINS	3764	RT1299-ARC	RADIO
COLLINS	3772	RT1299-ARC	RADIO
COLLINS	4127	RT1299-ARC	RADIO
COLLINS	4250	RT1506/ARC A637	RADIO
COLLINS	4259	RT1506/ARC A638	RADIO
COLLINS	37695	RT1506/ARC A639	RADIO
COLLINS	80686	RT1506/ARC A640	RADIO
HP		6002	DC POWER SUPPLY
HP	6D1020	6433B	POWER SUPPLY DC-24-40 VOLT
HP	1901U00934	3780A	PATTERN GENERATOR
HP	2204A-07090	6002a	DC POWER SUPPLY
HP	2333A-08471	6267B	DC POWER SUPPLY
HP	2730A101	6002A	DC POWER SUPPLY
HP	3001A14482	3577A	NETWORK ANALYZER
HP	2948A02897	54111D	OSCILLOSCOPE
ICI	001	GS16518	CORRELATOR
ICI	001	GSXXXX	DSP TESTER
ICI	001	GSXXXX	GIP TESTER
ICI	001	GSXXXX	IDM TESTBOX
ICI	002	GS16518	CORRELATOR
ICI	002	GSXXXX	DSP TESTER
ICI	002	GSXXXX	IDM TESTBOX
ICI	003	GS16518	CORRELATOR
ICI	003	GSXXXX	DSP TESTER
ICI	003	GSXXXX	GIP TESTER
ICI	003	GSXXXX	IDM TESTBOX
ICI	004	GS16518	CORRELATOR
INTEL	2518	108399-002	VOLTAGE SELECT
INTEL	3559	108399-002	ICE P/S
INTEL	4079	108399-002	ICE P/S
INTEL	455293-002		ICE SAST
INTEL	455293-004		ICE SAST
INTEL	N0026301B		ICE SAST
INTEL	N50011306		ICE CONTROL UNIT

<u>Manufacturer</u>	<u>Serial</u>	<u>Model</u>	<u>Description</u>
INTEL	N50011312		ICE MODULE
INTEL	N50022039		GPIB
SPERRY FLT SYS			CMS-80 DISPLAY
SPERRY FLT SYS			DIGITAL MESSAGE DEVICE
SPERRY FLT SYS			FLT. CONTROL COMPUTER
SPERRY FLT SYS	B603C150		MASTER CONTROL
TAU-TRON	8701173	50666	BERT TESTER
TAU-TRON	8701183	MB302	BERT RECEIVER
TAU-TRON	H9910111289	5100	FREQ. SYNTH.

Attachment 6:
Contractor Acquired Property

Pursuant to Solicitation Section G.4, the successful Offeror on any resulting contract will be authorized to acquire the following facilities, which are needed to accomplish the IDM Test Bed, the Software Development Library, and other related efforts required under Section C of this document.

QTY	DESCRIPTION	MODEL
A/R	File Server, Functional and Operationally Compatible with TCP/IP, LAT & IPX Protocols. Minimum of 6 GB of data storage are required.	Novell or Equivalent
A/R	Workstations, IBM compatible, 486 Personal Computers with ISA Bus	ASTRIX486 or Equivalent
A/R	Workstations, MacIntosh Operating Systems	MacIntosh IICI or Equivalent
A/R	Network, Ethernet supporting up to (TBD) users with thin, thick, and 10BASET interfaces.	IEEE802.6 Network with interconnect between 10BASE5, 10BASE2, and 10BASET.
1	Programmable Read Only Memory (PROM) Programmer	ALLPRO or Equivalent
1	Development System	Altera or Equivalent
1	Logic Analyzer	HP1631A or Equivalent
A/R	Laboratory Power Supplies	HPE36110A or Equivalent
A/R	General Purpose Software	WINDOWS for DOS 3.1, EXCEL, WORD, FRAMEMAKER, POWERPOINT 3.0, FILEMAKER PRO, McDRAW, ILLUSTRATOR, FREEHAND, MacIntosh/PC Compatible

QTY	DESCRIPTION	MODEL
A/R	C++ Development Software	Turbo C++ or Equivalent
A/R	Software Development Library Configuration Management Software	TLIB or Equivalent
A/R	Automated Network Backup System, to include DAT Tape Backup Media, DAT hardware, and software.	The Network Archivist™ or Equivalent

Attachment 7:
Accounting and Appropriation Data

(Accounting and Appropriation Data will be Provided at the Time of Award)