

IMPORTANT NOTICE

The U.S. Postal Service continues to irradiate letters, flats, Express and Priority Mail with stamps for postage and other packages with stamps for postage destined to government agencies in the ZIP Code ranges 202 through 205.

Mail that is irradiated may exhibit a discolored (tan-colored) quality, as well as be brittle, show spots on envelopes and make address labels unreadable. Irradiation may destroy electronic format materials provided on computer discs. Customers and businesses sending mail to ZIP Codes 202-205 can avoid the irradiation process by affixing postage meter strips or permit indicia instead of postage stamps to Express or Priority Mail. The use of corporate accounts for Express Mail or registered mail also is another way to avoid the irradiation process.

Due to potential delays in receiving mail and potential for receipt of damaged computer discs, offerors are encouraged to use alternatives to the mail when submitting proposals.

SOLICITATION, OFFER AND AWARD		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)		RATING DO-C9	PAGE OF PAGES 1 31
2. CONTRACT NUMBER	3. SOLICITATION NUMBER N00173-05-R-LS01	4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	5. DATE ISSUED 01/27/2005	6. REQUISITION/PURCHASE NUMBER	
7. ISSUED BY CONTRACTING OFFICER, ATTN: CODE 3230.LS NAVAL RESEARCH LABORATORY 4555 OVERLOOK AVE., SW WASHINGTON DC, 20375-5326		CODE N00173	8. ADDRESS OFFER TO (If other than Item 7) TO ALL OFFERORS		

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

SOLICITATION

9. Sealed offers in original and 3 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. 222, Rm. 115 until 4:00 pm local time 02/24/2005
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL:	A. NAME LISA A. FLEMING	B. TELEPHONE (NO COLLECT CALLS)		C. E-MAIL ADDRESS Lisa.Fleming@NRL.Navy.Mil
		AREA CODE 202	NUMBER 767-3739	EXT.

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OFFER (Must be fully completed by offeror)

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

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

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52.232-8)	10 CALENDAR DAYS (%)	20 CALENDAR DAYS (%)	30 CALENDAR DAYS (%)	CALENDAR DAYS (%)
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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)	
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15B. TELEPHONE NUMBER	15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE.	17. SIGNATURE	18. OFFER DATE
AREA CODE NUMBER EXT.			

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION
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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)	ITEM
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24. ADMINISTERED BY (If other than Item 7)	CODE	25. PAYMENT WILL BE MADE BY	CODE
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26. NAME OF CONTRACTING OFFICER (Type or print)	27. UNITED STATES OF AMERICA (Signature of Contracting Officer)	28. AWARD DATE
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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 Research, Development, Technical and Engineering Support in accordance with Section C.	\$	\$	\$
0002	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
TOTAL ESTIMATED COST PLUS FIXED FEE			\$	\$

* *Not Separately Priced*

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

**SECTION C
DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK**

C-1 STATEMENT OF WORK

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

C-2 REQUIREMENTS FOR ON-SITE CONTRACTORS

For those portions of the work under this contract performed at any NRL site, the contractor shall comply with the Requirements for On-Site Contractors dated 30 July 2004, which are hereby incorporated by reference. The full text is available at <http://heron.nrl.navy.mil/contracts/home.htm>.

C-3 SUBCONTRACTING PLAN

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

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

**SECTION D
PACKAGING AND MARKING**

D-1 PACKAGING AND MARKING

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

**SECTION E
INSPECTION AND ACCEPTANCE**

E-1 INSPECTION AND ACCEPTANCE CLAUSES INCORPORATED BY REFERENCE**FAR CLAUSE TITLE**

52.246-8 - Inspection Of Research And Development - Cost Reimbursement (MAY 2001)

DFARS CLAUSE TITLE

252.246-7000 - Material Inspection And Receiving Report (MAR 2003)

E-2 INSPECTION AND ACCEPTANCE

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

**SECTION F
DELIVERIES OR PERFORMANCE**

F-1 DELIVERIES OR PERFORMANCE CLAUSES INCORPORATED BY REFERENCE:**FAR CLAUSE TITLE**

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

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

F-2 PERIOD AND PLACE OF PERFORMANCE

- (a) The term of this contract is from date of award through twelve months thereafter, with four options each extending the period of performance by an additional twelve months, if exercised.
- (b) The principal place of performance of this contract shall be 86% on-site at the Naval Research Laboratory (NRL), Washington DC and 14% at the contractor's facilities.

**SECTION G
CONTRACT ADMINISTRATION DATA****G-1 PROCURING OFFICE REPRESENTATIVE**

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

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

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

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

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

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

* is hereby designated the cognizant COR who will represent the Contracting Officer in the administration of technical details within the scope of this contract and inspection and acceptance. The COR is not otherwise authorized to make any representations or commitments of any kind on behalf of the Contracting Officer or the Government. The COR does not have the authority to alter the Contractor's obligations or change the specifications in the contract. If, as a result of technical discussions, it is desirable to alter contract obligations or statements of work, a modification must be issued in writing and signed by the Contracting Officer. The COR is responsible for reviewing the bills and charges submitted by the Contractor and informing the ACO of areas where exceptions are to be taken.

(* To be completed at time of award)

G-3 TECHNICAL DIRECTION MEMORANDUM (TDM)

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

G-4 CONTRACTOR-ACQUIRED PROPERTY

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

Items to be Acquired	Estimated Cost
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*

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

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

G-6 INCREMENTAL FUNDING

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

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

G-7 INFORMATIONAL SUBLINE ITEMS

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

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

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

G-9 PAYMENT AND INVOICE INSTRUCTIONS (COST REIMBURSEMENT)Submission of Invoices

The contractor shall submit invoices and any necessary supporting documentation to the contract auditor at the following address:

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

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) clauses(s) of this contract.

The contractor shall provide an information copy of each invoice submitted to the COR identified in Section G.

A DD Form 250 "Material Inspection and Receiving Report" is required.

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

Pursuant to DFARS 242.803(b)(i)(c), if the cognizant Government auditor has notified the contractor of its authorization to do so, the contractor may submit vouchers under this contract direct to the payment office shown in Block 12 of SF 26 instead of to the address shown above. Such authorization does not extend to the first and final vouchers. The contractor shall continue to submit first vouchers to the cognizant auditor shown above. The final voucher shall be submitted to the Administrative Contracting Officer (SF 26, Block 6) with a copy to the cognizant auditor.

**SECTION H
SPECIAL CONTRACT REQUIREMENTS**

H-1 TYPE OF CONTRACT

This is a *

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

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

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

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

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

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

The following are identified as key personnel: *

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

Labor Category	First/M/Last Name

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

- (a) The Contractor agrees to provide the total level of effort specified in the next sentence in performance of the work described in this contract. The total level of effort for performance of this contract shall be 43,340 total hours of direct labor for the base year and 43,340 for each of the optional years, if exercised. This number includes 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 3,611 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:

LABOR CATEGORY	<u>HOURS/YEAR</u>
Program Manager	20
Project Engineer *	440
Senior Staff Engineer *	480
Senior Structural Analysis Engineer	2800
Structural Analysis Engineer	5000
Junior Structural Analysis Engineer	600
Senior Stress Analysis Engineer	1400
Stress Analysis Engineer	3800
Junior Stress Analysis Engineer	560
Senior Attitude Control Engineer *	2200
Attitude Control Engineer	600
Astrodynamics Engineer	200
Senior Thermal Engineer *	3200
Thermal Engineer	2600
Junior Thermal Engineer	600
Senior Mechanical Engineer	1800
Mechanical Engineer	3600
Junior Mechanical Engineer	800
Senior Mechanical Designer	1600
Mechanical Designer	400
Senior Electro-Mech Systems Engineer	1440
Electro-Mech Systems Engineer	640
Junior Electro-Mech Systems Engineer	640
Senior Electro-Optical Engineer	640
Electro-Optical Engineer	640
Junior Electro-Optical Engineer	640
Software Development Engineer	2000
Mechanical Technician	1800
Technical Writer	600
Analytical Dynamics Engineer *	1600

* KEY PERSONNEL DENOTED WITH AN ASTERISK

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

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

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

H-5 ELECTRONIC AND INFORMATION TECHNOLOGY (EIT)

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

H-6 OPTION TO EXTEND THE TERM OF THE CONTRACT

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

First Option

Estimated Cost:	\$
Fixed Fee:	\$
Estimated Cost Plus Fixed Fee:	\$

Second Option

Estimated Cost:	\$
Fixed Fee:	\$
Estimated Cost Plus Fixed Fee:	\$

Third Option

Estimated Cost:	\$
Fixed Fee:	\$
Estimated Cost Plus Fixed Fee:	\$

Fourth Option

Estimated Cost:	\$
Fixed Fee:	\$
Estimated Cost Plus Fixed Fee:	\$

H-7 ON-SITE USE OF GOVERNMENT PROPERTY

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

H-8 REPRESENTATIONS AND CERTIFICATIONS

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

H-9 SUBCONTRACTING PLAN

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

PART II - CONTRACT CLAUSES
SECTION I
CONTRACT CLAUSES

I-1 FAR 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 (JUL 2004) |
| 52.203-3 | - | Gratuities (APR 1984) |
| 52.203-5 | - | Covenant Against Contingent Fees (APR 1984) |
| 52.203-6 | - | Restrictions On Subcontractor Sales To The Government (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 2003) |
| 52.204-2 | - | Security Requirements (AUG 1996) |
| 52.204-4 | - | Printed Or Copied Double-Sided On Recycled Paper (AUG 2000) |
| 52.209-6 | - | Protecting The Government's Interest When Subcontracting With Contractors Debarred, Suspended, Or Proposed For Debarment (JAN 2005) |
| 52.204-8 | - | Annual Representations and Certifications (JAN 2005) |
| 52.211-15 | - | Defense Priority And Allocation Requirements (SEP 1990) |
| 52.215-2 | - | Audit And Records-Negotiation (JUN 1999) |
| 52.215-8 | - | Order Of Precedence - Uniform Contract Format (OCT 1997) |
| 52.215-10 | - | Price Reduction For Defective Cost Or Pricing Data (OCT 1997) |
| 52.215-11 | - | Price Reduction For Defective Cost Or Pricing Data - Modifications (OCT 1997) |
| 52.215-12 | - | Subcontractor Cost Or Pricing Data (OCT 1997) |
| 52.215-13 | - | Subcontractor Cost Or Pricing Data Modifications (OCT 1997) |
| 52.215-14 | - | Integrity Of Unit Prices (OCT 1997) |
| 52.215-15 | - | Pension Adjustments And Asset Reversions (OCT 2004) |
| 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 Or Pricing Data Or Information Other Than Cost or Pricing Data -Modifications (OCT 1997) |

- 52.215-21 - Requirements For Cost Or Pricing Data Or Information Other Than Cost Or Pricing Data-Modifications (OCT 1997) - Alternate II (OCT 1997)
- 52.215-21 - Requirements For Cost Or Pricing Data Or Information Other Than Cost Or Pricing Data -Modifications (OCT 1997) - Alternate III (OCT 1997)
- 52.216-7 - Allowable Cost And Payment (DEC 2002) (fill in 30th)
- 52.216-8 - Fixed-Fee (MAR 1997)
- 52.219-4 - Notice Of Price Evaluation Preference For HUBZone Small Business Concerns (OCT 2004) Offeror elects to waive the evaluation preference.
- 52.219-8 - Utilization Of Small Business Concerns (MAY 2004)
- 52.219-9 - Small Business Subcontracting Plan (JAN 2002) - Alternate II (OCT 2001)
- 52.219-16 - Liquidated Damages-Subcontracting Plan (JAN 1999)
- 52.222-2 - Payment For Overtime Premiums (JUL 1990) -The Use Of Overtime Is Authorized Under This Contract If The Overtime Premium Does Not Exceed "0"
- 52.222-3 - Convict Labor (JUN 2003)
- 52.222-21 - Prohibition Of Segregated Facilities (FEB 1999)
- 52.222-26 - Equal Opportunity (APR 2002)
- 52.222-35 - Equal Opportunity For Special Disabled Veterans, Veterans Of The Vietnam Era, And Other Eligible Veterans (DEC 2001)
- 52.222-36 - Affirmative Action For Workers With Disabilities (JUN 1998)
- 52.222-37 - Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, And Other Eligible Veterans (DEC 2001)
- 52.222-39 - Notification Of Employee Rights Concerning Payment Of Union Dues Or Fees (DEC 2004)
- 52.223-3 - Hazardous Material Identification And Material Safety Data (JAN 1997)
- 52.223-5 - Pollution Prevention And Right-To-Know Information (AUG 2003)
- 52.223-6 - Drug-Free Workplace (MAY 2001)
- 52.223-10 - Waste Reduction Program (AUG 2000)
- 52.223-14 - Toxic Chemical Release Reporting (AUG 2003)
- 52.225-13 - Restrictions On Certain Foreign Purchases (JAN 2004)
- 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)
- 52.227-12 - Patent Rights - Retention By The Contractor (Long Form) (JAN 1997)
(will be included if the successful offeror is not a small business or a non-profit organization)
- 52.228-7 - Insurance - Liability To Third Persons (MAR 1996)
- 52.230-2 - Cost Accounting Standards (APR 1998)
- 52.230-3 - Disclosure And Consistency Of Cost Accounting Practices (APR 1998)
- 52.230-6 - Administration Of Cost Accounting Standards (NOV 1999)
- 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 (OCT 2003)
- 52.232-33 - Payment By Electronic Funds Transfer-Central Contractor Registration (OCT 2003)
- 52.233-1 - Disputes (JUL 2002) - Alternate I (DEC 1991)
- 52.233-3 - Protest After Award (AUG 1996) - Alternate I (JUN 1985)
- 52.233-4 - Applicable Law For Breach Of Contract Claim (OCT 2004)
- 52.237-2 - Protection Of Government Buildings, Equipment And Vegetation (APR 1984)
- 52.242-1 - Notice Of Intent To Disallow Costs (APR 1984)
- 52.242-3 - Penalties For Unallowable Costs (MAY 2001)
- 52.242-4 - Certification of Final Indirect Costs (JAN 1997)
- 52.242-13 - Bankruptcy (JUL 1995)
- 52.243-2 - Changes - Cost-Reimbursement (AUG 1987) - Alternate V (APR 1984)
- 52.244-2 - Subcontracts (AUG 1998) - Alternate I (AUG 1998)
- 52.244-5 - Competition In Subcontracting (DEC 1996)
- 52.244-6 - Subcontracts For Commercial Items (DEC 2004)
- 52.245-5 - Government Property (Cost-Reimbursement, Time-And-Material, Or Labor-Hour Contracts) (JUN 2003) (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)
- 52.246-24 - Limitation Of Liability - High-Value Items (FEB 1997)
- 52.246-24 - Limitation Of Liability - High-Value Items (FEB 1997) - Alternate I (APR 1984)
- 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 (JUN 2003)
- 52.249-6 - Termination (Cost-Reimbursement) (MAY 2004)
- 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 (DEC 2004)
- 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 - Alternate A (NOV 2003)
- 252.204-7005 - Oral Attestation Of Security Responsibilities (NOV 2001)
- 252.205-7000 - Provision Of Information To Cooperative Agreement Holders (DEC 1991)
- 252.209-7000 - Acquisition From Subcontractors Subject To On-Site Inspection Under The

- 252.209-7004 - Intermediate-Range Nuclear Forces (INF) Treaty (NOV 1995)
Subcontracting With Firms That Are Owned Or Controlled By The Government Of A Terrorist Country (MAR 1998)
- 252.211-7003 - Item Identification And Valuation (JAN 2004)
- 252.215-7000 - Pricing Adjustments (DEC 1991)
- 252.215-7002 - Cost Estimating System Requirements (OCT 1998)
- 252.219-7003 - Small Business And Small Disadvantaged Business Subcontracting Plan (DoD Contracts) (APR 1996)
- 252.219-7004 - Small, Small Disadvantaged And Women-Owned Small Business Subcontracting Plan (Test Program) (JUN 1997)
- 252.223-7001 - Hazard Warning Labels (DEC 1991)
- 252.223-7004 - Drug-Free Work Force (SEP 1988)
- 252.223-7006 - Prohibition On Storage And Disposal Of Toxic And Hazardous Materials (APR 1993)
- 252.225-7001 - Buy American Act And Balance Of Payments Program (APR 2003)
- 252.225-7002 - Qualifying Country Sources As Subcontractors (APR 2003)
- 252.225-7012 - Preference For Certain Domestic Commodities (JUN 2004)
- 252.225-7013 - Duty Free Entry (JAN 2004)
- 252.225-7031 - Secondary Arab Boycott Of Israel (APR 2003)
- 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)
- 252.226-7001 - Utilization of Indian Organizations, Indian-Owned Economic Enterprises, And Native Hawaiian Small Business Concerns (OCT 2003)
- 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 Bid 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)
- 252.227-7030 - Technical Data--Withholding Of Payment (MAR 2000)
- 252.227-7034 - Patents--Subcontracts (APR 1984)
- 252.227-7037 - Validation Of Restrictive Markings On Technical Data (SEP 1999)
- 252.227-7039 - Patents--Reporting Of Subject Inventions (APR 1990)
- 252.231-7000 - Supplemental Cost Principles (DEC 1991)
- 252.232-7003 - Electronic Submission Of Payment Requests (JAN 2004)
- 252.235-7010 - Acknowledgment Of Support And Disclaimer (MAY 1995)
- 252.235-7011 - Final Scientific Or Technical Report (NOV 2004)
- 252.242-7000 - Post Award Conference (DEC 1991)
- 252.242-7004 - Material Management And Accounting System (DEC 2000)
- 252.243-7002 - Requests For Equitable Adjustment (MAR 1998)
- 252.244-7000 - Subcontracts For Commercial Items And Commercial Components (DOD Contracts) (MAR 2000)
- 252.245-7001 - Reports Of Government Property (MAY 1994)
- 252.246-7001 - Warranty Of Data (DEC 1991)
- 252.247-7023 - Transportation Of Supplies By Sea (MAY 2002)

- 252.247-7024 - Notification Of Transportation Of Supplies By Sea (MAR 2000)
(will be included if the successful offeror made a negative response to the inquiry at DFARS 252.247-7022)
- 252.251-7000 - Ordering From Government Supply Sources (OCT 2002)

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

(a) *Definitions.* "Ozone-depleting substance", as used in this clause, means any substance the Environmental Protection Agency designates in 40 CFR Part 82 as –

- (1) Class I, including, but not limited to, chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or
- (2) Class II, including, but not limited to, hydrochlorofluorocarbons.

(b) The Contractor shall label products which contain or are manufactured with ozone-depleting substances in the manner and to the extent required by 42 U.S.C. 7671j (b), (c), and (d) and 40 CFR Part 82, Subpart E, as follows:

WARNING

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

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

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

SECTION J

LIST OF ATTACHMENTS

- J-1** Attachment (1) - Statement Of Work - Pages, With Exhibit A - DD Form 1423, Contract Data Requirements List, Pages.
- J-2** Attachment (2) - DD Form 254, Contract Security Classification Specification, Ser 060-04 Dated 20040916 w/Attachments 2 Pages.
- J-3** Attachment (3) – Personnel Qualifications, 9 Pages.
- J-4** Attachment (4) – Accounting and Appropriation Data- 1 page. *
(To be included at time of award)*

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

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

Each Offeror must submit a completed Representations, Certifications, and Other Statements Of Offerors or Respondents with its proposal which is available electronically in full text at <http://heron.nrl.navy.mil/contracts/repsandcerts.htm>

Use Representations and Certifications: A

K-2 FILL IN FOR FAR 52.219-1 - SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002)

The fill in information is as follows:

The NAICS code for this acquisition is 541710.

The small business size standard is 500.

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

L-1 FAR 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 (OCT 2003)
52.204-7	-	Central Contractor Registration (OCT 2003)
52.211-2	-	Availability Of Specifications Listed In The DOD Index Of Specifications And Standards (DoDISS) And Descriptions Listed In The Acquisition Management Systems And Data Requirements Control List, DoD 5010.12-L (DEC 2003)
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 (JAN 2004)
- 52.215-16 - Facilities Capital Cost Of Money (JUN 2003)
- 52.222-24 - Preaward On-Site Equal Opportunity Compliance Evaluation (FEB 1999)
- 52.237-1 - Site Visit (APR 1984)
- 52.237-10 - Identification Of Uncompensated Overtime (OCT 1997)

DFAR CLAUSE TITLE

- 252.209-7001- Disclosure Of Ownership Or Control By The Government Of A Terrorist Country (SEP 2004)
- 252.211-7005 - Substitutions For Military Or Federal Specifications And Standards (FEB 2003)

L-2 INSTRUCTIONS FOR SUBMISSION OF PROPOSALS/OFFERS

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

Contracting Officer, ATTN: Code 3230.LS
Naval Research Laboratory (NRL)
4555 Overlook Avenue, S.W.
Washington, D.C. 20375
Solicitation/RFP No. – N00173-05-R-LS01
Closing Date: 24 February 2005; Time: 4:00PM

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

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

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

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

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

(a) *Exceptions from cost or pricing data.* (1) In lieu of submitting cost or pricing data, offerors may submit a written request for exception by submitting the information described in the following

subparagraphs. The Contracting Officer may require additional supporting information, but only to the extent necessary to determine whether an exception should be granted, and whether the price is fair and reasonable.

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

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

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

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

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

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

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

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

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

(c) When the proposal is submitted, also submit one copy each to: (1) the Administrative Contracting Officer, and (2) the Contract Auditor.

(d) Submit the cost portion of the proposal via the following electronic media: *CD Rom containing an Excel version of the cost proposal compatible with Microsoft Excel 2000.*

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

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

L-6 FAR 52.222-18 – CERTIFICATION REGARDING KNOWLEDGE OF CHILD LABOR FOR LISTED END PRODUCTS (FEB 2001)

The fill-in information is as follows:

Listed End Product	Listed Countries of Origin

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-8 DFARS 252.227-7017 - IDENTIFICATION AND ASSERTION OF USE, RELEASE, OR DISCLOSURE RESTRICTIONS (JUN 1995)

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

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

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

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

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

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

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

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

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

Date _____
 Printed Name and Title _____

 Signature _____

 (End of identification and assertion)

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

L-9 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-10 GOVERNMENT-FURNISHED PROPERTY

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

L-11 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-12 PROPOSAL ORGANIZATION

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

(2) Proposal Format and Length - 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-13 VOLUME I - TECHNICAL/MANAGEMENT PROPOSAL

REQUIRED COPIES: 1 ORIGINAL AND 3 COPIES .

(1) Include a matrix indicating proposed labor hours by skill category required to perform the statement of work. This matrix shall not contain labor rates or any other indication of price.

(2) The following information is required for evaluation of your technical/management :

TECHNICAL APPROACH AND UNDERSTANDING: Utilizing the following assumptions and directions, the offeror should provide responses to the problems listed below.

1. Problem 1- Structural Analysis

Given the **following assumptions:**

- a. A spacecraft model of 6000 degrees of freedom modeled with MSC/NASTRAN (MacNeal-Schwendler Corp.'s NASA Structural Analysis tool).
- b. Space Transportation System model(s) with a complete set of forcing functions and loading conditions for key load events.
- c. A list of elements and degrees of freedom at which forces, stresses, displacements and accelerations are desired.
- d. A computer system with MSC/NASTRAN and a matrix analysis program capable of performing standard matrix algebra functions, reading NASTRAN output files, and printing and plotting results resident.

Directions as follows:

1. Provide a brief description on the methodology required to reduce the payload model to a 250 degree of freedom dynamic model that has 1 grid point as a boundary.
2. Provide a brief description on the methodology required to couple the spacecraft dynamic model and the launch vehicle model.
3. Provide a brief description on the methodology required to perform the lift-off transient response analysis.
4. Provide a brief description on the methodology required to create the acceleration, loads and displacement .
5. Provide a brief description on how the results derived in Par. 4 will be used for spacecraft stress analysis.
6. Provide a brief description of the methodology required to validate the payload model.

Problem 2 - Thermal Control System Design

Given the following information:

A relatively small spacecraft in the 400/600 lb. range to be launched in a low earth orbit. After spending several days in LEO, the spacecraft is boosted into an orbit around the moon. the spacecraft spends several weeks in moon orbit, then is boosted into a solar orbit for the remainder of the spacecraft life. Once in solar orbit, electrical propulsion is used for orbital correction. The initial configuration of the space craft is spin stabilized. Once in orbit about the Moon, the spacecraft is configured as 3 axis stable. In this configuration, the solar arrays are deployed and are sun tracking. The propulsion system requires maintenance of temperatures to prevent freeze up of the propellants. The spacecraft experiment sensors require cooling to - 20 C. The LEO power levels are 100 watts + 50 watts heater power available. In the 3 axis stable configuration, there is 350 watts of power available with a 75 percent duty cycle.

Provide responses to the following, listing important assumptions where applicable:

1. Provide a brief description of the steps taken to develop and implement the thermal control system for the spacecraft described above.
2. Provide a brief description of the analysis process required to develop the thermal design and the analytical tools necessary to accomplish the design task.
3. Provide a brief description of the special considerations that must be taken into account for the spacecraft described and possible solutions to any unique problems.
4. Provide a brief description of the methods required to validate the thermal design.
5. Provide a brief description of the materials and techniques that may be used to implement the design.

PERSONNEL QUALIFICATIONS: The offeror should provide convincing proof that he has, or, has the ability to obtain personnel with relevant experience in the scientific and technical areas described in the Statement of Work. These are highly specialized fields and personnel without actual experience in these areas are not acceptable. Attachment No. 4 of the Solicitation sets forth the required qualifications. It is necessary for the offeror to demonstrate that personnel possess or will be capable of possessing a final favorable DoD TOP SECRET clearance commensurate with the level of access required for the performance of this contract prior to commencing work. It is essential for the offeror to demonstrate in the form of a brief how he will respond to diverse situations Workloads vary. Not all of the positions require a 100% utilization of the person's time. The offeror should describe how he will handle this NRL requirement in competition with other company requirements for the personnel's time. The proposal should indicate the specific personnel to be assigned to this effort, their background and pertinent experience, and the amount of effort each will be performing on this contract. This will include the education level, experience (both general and project related), and availability of sufficient key project professionals and technical personnel by the prime contractor as well as any proposed subcontractors.

CORPORATE EXPERIENCE AND CAPABILITIES: Proposals should provide a narrative description of company experience on projects with scientific and technical tasks similar to those required in the Statement of work. This description should clearly show the relationship between the company's experience and the tasks required under the Statement of Work; the particular sciences addressed below: and, provide details such as project descriptions and identification of the sponsoring agencies:

(1) Transient Loads Analysis -- Proposals should provide a narrative description demonstrating prior experience in performing Space Transportation System and expendable vehicle transient loads analyses. The description should describe the experience in detail, identify the payload program(s) for which the analyses was performed, and identify the organizations for which the analysis was performed.

(2) Finite Element Models -- Proposals should provide a narrative description demonstrating prior experience in developing finite element models for static and dynamic structural analysis. The offeror should describe the experience in detail, identify the finite element software used, describe the size(s) and complexity of the model(s) generated, and identify the organization(s) for which the analysis was performed.

I) Detailed Stress Analysis -- Proposals should provide a narrative description demonstrating prior experience in performing detailed stress analysis on aerospace structures. The description should describe the experience in detail, give the nature of the analysis, quantify the degree of complexity of the analysis, and identify the organization(s) for which the analysis(s) were performed.

(4) Attitude Control System - - Proposals should provide a narrative description demonstrating prior experience in performing analysis on aerospace systems. The description should describe the experience in detail, give the nature of the analysis, identify the standards and software programs used for the analysis, quantify the complexity of the analysis, and identify the organization(s) for which the analysis was performed.

(5) Other Related Experience - - Proposals should provide a narrative description demonstrating experience other than that given above that the offeror believes is specifically applicable to this NRL requirements. Offerors are cautioned not to include standard capability packages not applicable in the proposal. All applicable experience should be described in detail and the sponsoring organization(s) should be identified.

MANAGEMENT PLAN: 1. Transition Plan -- The offeror should provide a detailed transition plan that outlines his strategy for assuring a smooth and effective transition. The Transition Plan should describe how the offeror's organization will be staffed, trained, managed and ready to meet the requirements of the SOW at the end of the transition period. NOTE: The plan should be submitted with the technical proposal.

(a) The Transition Plan should identify, via a network schedule and a milestone chart, the proposed approach to the phase-in of management and technical personnel and the implantation of control procedures and methods. The offeror should indicate major interrelationships between transition events on the network schedule. The impact of these interrelationships on the transition schedule, as well as a description of how transition delays will be mitigated, should be explained in the offeror's Transition Plan. All transition activities should be completed within six months after contract award (ACA).

(b) Management Transition Phasing -- A smooth and effective transition of ongoing management tasks are of critical importance. The offeror should establish the management controls, procedures and methods necessary to assure the accomplishment of procurement, subcontracting, status reporting, security and personnel staffing. The offeror should provide convincing evidence that complete transition can be completed within 45 days after contract award (ACIA) .

(c) In-house Priority -- The offeror should discuss how he will treat this requirement in relation to the company's other commitments' that compete for the same company resources.

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

major or critical aspects of the requirement or for the proposed project manager or key personnel responsible for major or critical aspects of the requirement.

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

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

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

L-14 VOLUME II - BUSINESS PROPOSAL

REQUIRED COPIES: 1 ORIGINAL AND 3 COPIES

(1) COST PROPOSAL

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

(b) It is requested that offerors provide one copy of their cost proposal on a CD Rom using software that is compatible with Microsoft Excel 2000. Any supporting documentation that an offeror wishes to submit as part of their cost proposal should be submitted in a PDF format.

(c) The following travel, material and computer estimates are for evaluation purposes only. The government estimates the travel costs for this effort to be 400,000 per year, the material costs to be \$2,000,000 per year, and the computer costs to be \$300,000 per year. All offers will be evaluated using the estimated amounts provided above plus applicable indirect costs.

SECTION M EVALUATION FACTORS FOR AWARD

M-1 EVALUATION

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

M-2 EVALUATION FACTORS FOR AWARD

Proposals will be evaluated in accordance with the following criteria, which have been listed in descending order of importance, Corporate and Management considered equal. The technical factor is more important than the cost factor.

M-2-1. TECHNICAL/MANAGEMENT

(1) TECHNICAL APPROACH AND UNDERSTANDING

The proposal will be evaluated on the offeror's response to the problems posed in the Paragraphs under L-13, titled, Technical and Management Proposal. The offeror will be evaluated based on his response to the two (2) problems provided in Section L-13 herein. By his responses, the offeror will demonstrate his knowledge and competence to perform the types of work required under the contract. The offeror must show a thorough knowledge and understanding of the correct methodology, processes and techniques required to perform the analyses/work. The offeror must demonstrate a thorough understanding of the tools, materials and procedures required to achieve the end results. Any assumptions that the offeror makes should be clearly stated.

Specifically, for the structural problem, the offeror must demonstrate: (a) An understanding of the criteria for selecting appropriate degrees of freedom for model reduction and model reduction techniques; (b) A knowledge of correct techniques for coupling models; (c) An understanding of the current methodology for performing lift-off transient analysis; (d) A knowledge on how to create and use the transformation matrices to generate results; (e) A knowledge of how to perform structural payload analysis using the results; and (f) A knowledge of how to validate the payload model.

For the thermal problem, the offeror must demonstrate: (a) A knowledge of how to develop and implement the thermal control system; (b) An understanding of the analysis process required to develop the thermal design and analytical tools for the design task; (c) An understanding of the special solutions to any unique problems; (d) A knowledge

of the methods required to validate the thermal design; (e) a knowledge of the materials and techniques that can be used to implement the design.

(2) PERSONNEL QUALIFICATIONS

The proposal will be evaluated on the offeror's demonstrated ability to provide the personnel with (a) the appropriate qualifications set forth in Attachment No. 3 of Solicitation; and (b) actual relevant experience in the technical and scientific areas set forth in the Statement of Work and (c) the ability of all contractor personnel assigned to this contract to have a final favorable DoD TOP SECRET clearance commensurate with the level of access required for the performance of this contract prior to commencing work. Please note that all personnel assigned to this contract must also be US citizens. Further, the proposal will be evaluated on the availability of personnel. Evaluation will also be based on how the offeror responds to diverse situations - i.e., how will the offeror handle this NRL requirement in competition with other company commitments of the personnel's time.

(3) CORPORATE EXPERIENCE AND CAPABILITY

The proposal will be evaluated on the offeror's demonstrated corporate experience and capability in performing projects requiring scientific and technical effort which is closely similar or related to the effort required by the Statement of Work. Specifically, each of the following areas will be evaluated:

(a) Transient Loads Analysis -- Evaluation will be based on the discussion demonstrating prior experience in performing Space Transportation System and expendable vehicle transient loads analyses. Does the offeror describe the experience in detail, identify the payload program(s) for which the analysis was performed, and identify the organization(s) for which analysis was performed?

(b) Finite Element Models. -- Evaluation will be based on the discussion demonstrating prior experience in developing finite element models for static and dynamic structural analysis. Does the offeror describe the experience in detail, identify the finite element software used, describe the size(s) and complexity of the model(s) generated, and identify the organization(s) for which the analyses were performed.

(c) Detailed Stress Analysis -- Evaluation will be based on the discussion demonstrating prior experience in performing detailed stress analyses on aerospace structures. Does the offeror describe the experience in detail, give the nature of the analysis, quantify the degree of complexity of the analysis and identify the organization(s) for which the analysis was performed.

(d) Attitude Control System -- Evaluation will be based on the discussion demonstrating prior experience in performing analysis on aerospace systems. Does the offeror describe the experience in detail, give the nature of the analysis, identify the standards and software program used for the analysis, quantify the complexity of the analysis, and identify the organization(s) for which the analysis were performed.

(e) Other Related Experience -- Evaluation will be based on the discussion of experience other than that given above that the offeror believes is specifically applicable to this requirement. Does the offeror describe applicable experience in detail and is the sponsoring organizational(s) identified?

(4) MANAGEMENT PLAN

The proposal will be evaluated on the offeror's demonstrated ability to provide: (1) An appropriate transition plan, and (2) A demonstrated ability to effectively prioritize workload in such a manner to place this requirement as a high priority.

(5) PAST PERFORMANCE

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

M-2-2 COST TO THE GOVERNMENT

Proposed estimated cost to the Government. The Government may adjust the proposed cost for purposes of evaluation based upon an evaluation of cost realism. Cost Realism means that the costs in an offeror's proposal 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 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. It also includes 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).

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 an evaluation of cost realism. Cost Realism means that the costs in an offeror's proposal 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 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. It also includes evaluation of the likelihood that the risks inherent in the offeror's technical approach will result in higher actual costs than anticipated.

M-2-3 SMALL BUSINESS PARTICIPATION

- (a) The extent of participation of small businesses and historically black colleges or universities and minority institutions in performance of the contract will be evaluated on the basis of the proposed extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.
- (b) The extent of participation of small disadvantaged business concerns in performance of the contract will be evaluated on the basis of the proposed extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

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).

SOLICITATION NUMBER: N00173-05-R-LS01
ATTACHMENT NUMBER: (1)

NAVAL RESEARCH LABORATORY

**Statement of Work
for
Aerospace Vehicle Engineering Analysis
and
Design Services**

4555 Overlook Avenue, S.W.
Washington, D.C. 20375-5000

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List of ACRONYMS

ACA	After Contract Award
ATC	Attitude Control System
AVETS	Aerospace Vehicle Engineering Technical Services
CAP	Contractor Acquired Property
CCN	Configuration Change Notice
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CG	Center of Gravity
COTR	Contracting Officer's Technical Representative
EAC	Estimated At Completion
ECN	Engineering Change Notice
ESD	Estimated To Complete
FMEA	Failure Modes and Effects Analyses
GFM	Government Furnished Material
HR	Hazard Reports
ICD	Interface Control Drawings
MAGE	Mechanical Aerospace Ground Equipment
MIS	Management Information System
MOI	Moment of Inertia
MUA	Materials Usage Agreement
MSR	Monthly Status Report
NDI	Non-Destructive Inspection
NDT	Non-Destructive Testing
NMR	Nonconforming Material Report
NRL	Naval Research Laboratory
PDR	Preliminary Design Review
PM	Program Manager
RCS	Reaction Control System
SOW	Statement of Work
TCS	Thermal Control System
TDP	Technical Data Package

1.0 Introduction

This statement of work (SOW) establishes contractor tasks related to the spacecraft research, design, and development responsibilities for the Naval Research Laboratory (NRL) in Washington, DC. This SOW provides for the execution of engineering tasks to support the definition, development, assembly, test, and integration of aerospace platforms, structures, mechanisms, and subassemblies. These aerospace vehicle engineering technical services (AVETS) extend from mission concept and feasibility planning through the Initial Operational Capability (IOC) for Naval aerospace systems, and shall include: (i) defining systems requirements based on overall mission objectives; (ii) conducting detailed mechanical, structural, thermal, attitude control and other studies and analyses; (iii) designing, analyzing and testing aerospace structures, mechanisms, and systems to achieve optimal operational systems.

1.1 Mission Background

The NRL is the designated lead laboratory for U.S. Navy space programs. NRL has the mission to preserve and enhance a strong space technology base and to provide expert assistance in the development and acquisition of space systems which support naval missions. Principle NRL functions include: understanding and clarifying mission requirements; conducting research and development activities; analyzing and testing systems to quantify their capabilities; developing operational concepts that exploit new technical capabilities; and developing, testing, and evaluating selected aerospace systems and subsystems.

NRL integrates space systems technologies and provides systems engineering and technical direction assistance for major space systems and other aerospace applications. These roles motivate a continuous search for new technologies and capabilities, and require the development of prototypes that demonstrate the integration of these technologies and capabilities.

1.1.1 Aerospace Engineering Responsibilities

NRL is responsible for designing and building aerospace vehicle platforms in support of Navy missions. NRL provides systems engineering and technical direction while maintaining an active in-house vehicle development, test, and fabrication capability. NRL provides analysis, design, and hardware expertise in structures and mechanisms, attitude control systems, propulsion and reaction control systems, thermal control systems, vehicle design integration, launch vehicle integration, and satellite-to-boost-stage integration. These skills are, also, applied to other aerospace applications. NRL uses both in-house resources and contracts to private industry to achieve its mission goals and objectives.

1.2 Scope of the SOW

This SOW defines the AVETS technical effort required of the Contractor. The work is primarily structural/mechanical in nature. This effort includes the functions listed below:

- Program Management
- Structural Static and Dynamic Modeling and Analysis
- Vehicle System Loads Analysis
- Structural Response Analysis
- Detailed Stress Analysis
- Fracture Mechanics Analysis
- Structural and Environmental Test Analysis
- Attitude Control System Analysis
- Interface Studies and Technical Reviews
- Structural Design
- Thermal Design and Analysis
- Electro-Mechanical Systems Design
- Optical Systems Analysis
- Research and Development
- Software Development
- Hardware Development

2.0 APPLICABLE DOCUMENTS

The following documents, of the issue in effect at the time of contract award, form a part of this SOW only to the extent specified herein. In the event of a conflict between any of the referenced documents and the requirements of this SOW, the contents of this SOW shall be considered a superseding requirement.

2.1 Military Specifications and Standards

Document Number	Description
DOD-STD-100	Engineering Drawing Practices
MIL-STD-490	Specification Practices
MIL-T-31000	General Specification For Technical Data Packages

2.2 Program Documents

The Contractor shall comply with the applicable requirements of the following specifications, standards, and publications as they apply to the tasks defined herein.

Document Number	Description
SSD-D-004	NRL Drawing Requirements
SSD-D-005	Configuration Management Plan
SSD-D-014	Engineering Data Control and Release Plan

2.3 Non-Government Documents

Document Number	Description
ANSI Y14.5M	Dimensioning and Tolerancing

Note: Documents will be available in NRL Bldg. A59. All other documents may be obtained from the Naval Publications and Forms Center, 5801 Tabor Avenue, ATTN: NPODS, Philadelphia, PA 19120-5099. Telephone (215)697-1187/2179.

3.0 REQUIREMENTS

The requirements of the SOW are described in this section. The Contractor shall perform the tasks, render the services and deliver complete to specification all services set forth herein.

3.1 General Requirements

3.1.1 Transition Plan

The Contractor shall implement his transition plan within 45 days ACA. Personnel added or replaced after contract award shall be trained within 30 days.

3.1.2 Quick Response

Due to the requirement for quick response and close coordination between NRL and the Contractor, key and resource personnel must be able to respond by telephone and travel between NRL and the Contractor site within 2 hours. The Contractor shall perform work relating to the functions detailed in Section 3.2.

3.1.3 Technical Documentation

Technical documentation is defined as drawings, detailed analyses, analytical models, reports, memoranda, presentation materials and background materials generated by the contractor in performing the work defined in this SOW. The format and style of the documentation generated shall comply with format and style currently being used by NRL. In general, the format and style is consistent with Military Standard and aerospace industry standard practices with minor variations for particular requirements. Documentation generated by the Contractor which is not submitted as a contract data deliverable shall be made available within 14 days of COR request.

3.2 Required Functions

3.2.1 Program Management - Introduction

The Contractor shall provide the leadership and management skills necessary to satisfy the SOW objectives and requirements.

3.2.1.1 Program Control

3.2.1.1.1 Program Manager

The Contractor shall appoint a Program Manager (PM) with overall responsibility for the contracted effort. The PM shall be the single point of interface with the Government for all matters concerning technical progress and

problems, program performance, schedule, resources, and other program-related activities.

3.2.1.1.2 Project Manager

The Contractor shall assign an on-site Project Manager from the on-site technical staff to oversee the efforts defined herein. The Project Manager shall be responsible for the first-line supervision of all Contractor employees assigned to support the on-site SOW task efforts.

3.2.1.2 Program Status and Reporting

3.2.1.2.1 Management Information System

The Contractor shall implement and maintain a computer-based Management Information System (MIS) of his own design to control and report on the work performed under the individual program tasks. The MIS shall be capable of comparing actual achievement to planned achievement, of comparing accrued costs to planned and budgeted costs, and of providing program control status, progress reporting, and review for each project task effort.

3.2.1.2.2 Monthly Status Report

The Contractor shall prepare and submit a MSR each month for the duration of the effort. The MSR shall identify any items that will impact, or have impacted, schedule performance, cost, or overall task schedules. The MSR shall provide a status of materials, subcontracts and data items. The MSR shall identify: (i) personnel staffing by name; (ii) manpower usage; (iii) current and cumulative monthly cost data; (IV) accrued costs (including fee); and (v) current and projected funding status. The MSR shall include physical descriptions, estimated and actual prices, and item quantities for all materials and services procured by the Contractor. The Contractor shall provide the MSR in electronic and paper format. The financial aspects of this MSR shall be provided in an ASIC file which can be automatically parsed for direct database entry (alternatively this file may be provided in a mutually agreed to database file format).

3.2.1.4 Program Support Services

3.2.1.4.1 Technical Documentation

The Contractor shall provide writing, editing, drafting, production, and documentation coordination expertise that includes: (i) developing manuscripts for plans and reports; (ii) preparing engineering-level designs and illustrations; (iii) reviewing manuscripts for technical consistency, completion, and

specification compliance; (IV) editing and enhancing written text; (v) presenting in-process, preliminary and final manuscripts at document review meetings; and (vi) incorporating "mark ups" and other comments provided by management and technically cognizant personnel. The Contractor personnel involved in this requirement shall communicate directly with managers, scientists, engineers, analysts, and technicians, and shall be familiar with military and NRL documentation specifications. Manuscripts, presentations, and illustrations shall be prepared using software compatible with Microsoft Word, EXCEL and PowerPoint.

3.2.2 Structural Modeling and Analysis

The contractor shall perform finite element modeling and analysis tasks to support the design, analysis and test efforts. This function provides finite element models for further analyses in vehicle loads analysis, structural response analysis and analysis results for the detailed stress. All major models will be developed for analysis by the NASTRAN finite element code. Structural Dynamics Research Corp.'s Master Series software will be used for pre- and post- processing. Subtasks shall include:

- a) Develop, modify and update mathematical structural models of the spacecraft and related structures.
- b) Perform static analyses on the structures to determine internal loads, stress levels and other parameters of interest for structural strength analysis.
- c) Perform normal modes analyses on the spacecraft structures to determine the modes of vibration and mode shapes, strain energies and other parameters of interest for structural modal analysis.
- d) Review the results of the analyses to determine if the results meet the overall program specifications and safety requirements.
- e) Develop specialized NASTRAN DMAP routines, where necessary, to accomplish the required analyses.
- f) Prepare reports documenting the models and the analyses performed.

3.2.3 Vehicle System Loads Analysis

The contractor shall perform coupled loads analyses on the flight systems. These analyses will provide the vehicle system with accurate internal loads for use in the final analysis and design. The launch vehicle systems of interest include the Space Shuttle and a variety of expendable launch vehicles. The analyses will be accomplished using NASTRAN and/or custom developed software that performs large matrix and special mathematical operations. Subtasks shall include:

- a) Couple the vehicle system models and the launch system models to form the overall system coupled loads model.
- b) Perform coupled loads analyses on the system using the launch system forcing functions for required load events.
- c) Develop the acceleration, loads and displacement transformation matrices for use in recovering the parameters of interest.
- d) Perform the required data recovery.
- e) Review and analyze the results for accuracy and consistency with program requirements.
- f) Develop and/or modify NASTRAN DMAP routines to accomplish the required analysis task.
- g) Develop and/or modify custom software to perform the required analysis task.
- h) Prepare reports on the analyses performed.

3.2.4 Structural Response Analysis

The contractor shall perform structural response analyses to satisfy program analysis requirements. These analyses are directed at providing results to support vibration analysis and modal test responses. Subtasks shall include:

- a) Assemble the vehicle system dynamic models to satisfy the analysis requirements.
- b) Develop the appropriate acceleration, loads and displacement transformation matrices for the particular analysis.
- c) Perform a transient analysis using the required loads spectrum.
- d) Perform the data recovery for accelerations, displacements, loads, stresses and strain energies at select locations in the models.
- f) Review and analyze the results to determine if the vehicle system meets the requirements set forth by the program.
- g) Prepare reports on the analyses performed.

3.2.5 Detailed Stress Analysis

The contractor shall perform detailed stress analyses on the vehicle system and related structures. These analyses are directed at assuring that the structures meet the program objectives and the strength and safety requirements. Analyses are required to support design development, design changes, design improvements, hardware manufacture and the structural test programs. Subtasks shall include:

- a) Review preliminary designs to assure that proper load paths have been developed.
- b) Review material selections to assure that the selected materials meet strength requirements and the overall requirements of the program.
- c) Perform detailed stress analyses on the components of the spacecraft structures, ground support systems and test hardware to assure that the structures have adequate Margins of Safety to meet program requirements. Prepare stress reports on all detailed analyses.
- d) Review the results of structural static tests to determine if the tests properly loaded the structures being tested. Compare the test results with the analytical results and modify the analyses as required to conform with the tests. Prepare comparison reports to document the reviews.

3.2.6 Fracture Mechanics Analysis

The contractor shall perform detailed fracture mechanics analyses on Shuttle based spacecraft system structures. These analyses will determine the adequacy of the structural parts to meet the program and STS safety requirements. Analyses will also support proposed design changes, design improvements and hardware manufacture. Subtasks shall include:

- a) Prepare written fracture control plans that define the analysis and inspection requirements for NCST programs
- b) Perform detailed fracture analyses on spacecraft structural components and systems to determine if the fracture requirements are met. Document the analyses performed.
- c) Review and update existing fracture analyses when changes in requirements or loads occur.
- d) Prepare and/or revise inspection procedures for special nondestructive testing applications in the fracture mechanics inspection process.
- e) Review inspection reports for correctness of procedures and disposition of flawed parts.

3.2.7 Structural and Environmental Test Analysis

The contractor shall perform analysis and test planning to support the static loads, modal survey, vibro-acoustic and other environmental tests for the flight systems and the associated structures.

- a) Develop mathematical structural models of the test article.
- b) Conduct analyses to determine the loads application requirements, the instrumentation requirements and locations, and test predictions.

- c) Review test plans and procedures for conformance to structural analysis requirements and needs.
- d) Conduct test functions such as real-time data monitoring to assist in assuring that the test objectives are being met.
- e) Review test data results and correlate the results with the analysis results.
- f) Review test reports.
- g) Prepare reports documenting the analyses performed and the results achieved.

3.2.8 Attitude Control System Analysis

The contractor shall perform design, analysis, simulation, test and evaluation of complex attitude determination and control systems for a NRL's spacecraft, launch vehicle and other vehicle systems. The support shall cover the following topics:

- a) Configuration analysis
- b) Feasibility studies
- c) Rigid and flexible spacecraft attitude dynamics
- d) Slew, tracking and pointing control strategies
- e) Control system/structure interaction theory
- f) Experimental digital control techniques
- g) Flexible boom deployment dynamics
- h) Aerodynamic, geomagnetic and solar disturbance environments
- i) Stability analysis
- j) Actuator sizing
- k) Sensor modeling
- l) Damping mechanisms
- m) System performance evaluation

This effort shall include support for documenting the design, analysis and other activities and the preparation of reports and presentations when required by the program.

3.2.9 Interface Studies and Technical Reviews

The contractor shall review, evaluate and analyze mechanical design interfaces and the Launch Vehicle/Spacecraft system mechanical interfaces. The contractor shall attend and provide inputs to design reviews of the structural subsystems and components. Documentation resulting from these studies and reviews shall be available per the requirements of Para. 3.1.2.

3.2.10 Structural Design

The contractor shall perform trade studies and detailed structural and mechanical design to support aerospace vehicle development programs, development of ground handling hardware and test hardware.

3.2.11 Thermal Design and Analysis

The contractor shall perform thermal design and analyses to support design development, modifications, improvements and additions. Subtasks shall include:

- a) Develop geometrical and analytical thermal models and apply the required environments to satisfy the mission requirements.
- b) Perform thermal analyses to determine the TCS design that meets the mission requirements.
- c) Review thermal designs, models, analyses and tests to determine the adequacy of the results.
- d) Prepare test plans, procedures and perform model correlation for thermal tests.
- e) Develop advanced thermal control technology concepts to support advanced mission requirements.
- f) Prepare reports for analyses performed and reviews conducted.

3.2.12 Electro-Mechanical Systems Design

The contractor shall perform trade studies and detailed design of electro-mechanical devices and systems for operation in space. Subtasks shall include:

- a) Conduct analyses to verify performance and margin.
- b) Prepare specifications and development and qualification plans.
- c) Review and assess test results and correlate with analysis predictions.
- d) Prepare reports on the analyses performed.

3.2.13 Optical Systems Analysis

The contractor shall perform analyses and trade studies in support of Optical/IR systems concepts and implementation. This support shall include component designs, analyses, modeling and test evaluation of optical/IR sensor to determine their adequacy in their planned mission. The contractor shall attend and provide inputs to meetings relating to optical/IR sensors program planning and execution.

3.2.14 Research and Development

The contractor shall perform analyses and trade studies in support of flexible structures, thermal control systems and attitude control systems. This support shall include evaluation of designs, modeling, analyses and test evaluation of the systems in order to determine their adequacy in their planned missions. The contractor shall attend and provide inputs to meetings relating to optical/IR sensors program planning and execution.

3.2.15 Software Development

The contractor shall develop and/or modify small software programs to support the activities listed in this Statement of Work. The software shall be developed for the UNIX, DOS or MS Windows operating systems depending on the application requirement. FORTRAN, C, PERL and MatLab are the preferred languages.

3.2.16 Orbit Maneuver Analysis and Flight Operations Support

The contractor shall perform analysis, simulation, test and evaluation of complex orbit maneuver systems for NRL's spacecraft, launch vehicle and other vehicle systems. The support shall cover the following topics:

- a) Advanced concept feasibility studies
- b) Orbit maneuver and rendezvous strategies
- c) Flight operations support
- d) Thruster sizing to support maneuver requirements

3.2.17 Hardware Development

The contractor shall develop hardware for prototype, flight, ground support and test applications. The hardware shall include structural components, mechanisms, electromechanical devices, electronic components, heat pipes, thermal blankets and other devices that support NRL's programs. Subtasks shall include:

- a) Fabrication of hardware items per program drawings and specifications.
- b) Inspection of hardware items in order to assure that the parts meet the requirements and specifications.

- c) Apply protective coatings such as iridite, anodize and paints to protect metal surfaces.
- d) Assemble parts per drawing/specification requirements to form higher level assemblies including fully assembled systems.
- e) Test parts, assemblies and/or systems to assure that program requirements/specifications are met. Generate test procedures, fabricate support hardware and install instrumentation to support this activity.
- f) Create and maintain documentation records that log the manufacturing, inspection and test processes subjected to each part/assembly. Note all anomalies and discrepancies.

3.2.18 System Safety Analyses

The Contractor shall perform analyses and prepare documentation to support payload safety and readiness reviews for STS and ELV launches. Subtasks include:

- a) Perform and/or review Failure Modes and Effects Analyses (FMEA's).
- b) Develop, evaluate and review Hazard Reports (HR's), Materials Usage Agreements (MUA's), Payload Safety Non-Compliance Reports and Payload Safety Data Packages.

3.2.19 Electrical Engineering

The Contractor shall analyze, design, fabricate, test and integrate electronic systems for the measurement and control of thermal, mechanical and electromechanical systems for ground support and operational applications. Subtasks shall include:

- a) Development of Phase Locked Loop motor speed controllers and Pulse Width Modulated proportional temperature controllers.
- b) Development of solenoids, motors, eddy current dampers and tachometers.
- c) Development of power circuits for drive and commutation of motors.

- d) Development of low noise signal conditioning and interface electronics for sensors, optical encoders and thermistors.
- e) Development of microprocessor based controllers for performing command and telemetry functions.
- f) Development of microprocessor based systems to perform data acquisition, filtering, processing and analysis.

3.2.20 Contamination Control

The Contractor shall perform contamination control planning, analysis, assessment and reporting to support aerospace hardware development.

Subtasks shall include:

- a) Determine contamination control requirements for sensitive payload hardware.
- b) Develop contamination control plans and procedures for protecting sensitive hardware/instruments.
- c) Develop analytical transport models and generate contamination hazards predictions.
- d) Perform detailed environmental analyses for all activities/events related to the life of sensitive hardware and provide comparison with requirements.

CONTRACT DATA REQUIREMENTS LIST

Form Approved
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A. CONTRACT LINE ITEM NO. ALL	B. EXHIBIT A	C. CATEGORY: TDP _____ TM _____ OTHER _____
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D. SYSTEM/ITEM	E. CONTRACT/PR NO. N00173-05-R-LS01	F. CONTRACTOR
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1. DATA ITEM NO. A001	2. TITLE OF DATA ITEM Monthly Status Report	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.1.2.2	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY Monthly	12. DATE OF FIRST SUBMISSION 30 DAC	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES	
					Draft	Final

16. REMARKS Report shall include a summary of schedules, expenditures by delivery order specifying the period covered, man-hours expended by personnel name, direct, indirect and total labor costs. Separate on-site and off-site expenditures. The contractor shall deliver the report NLT five (5) days after the end of each month.				Code 8221			
				Code 8202			
				15. TOTAL →	0	2	0

1. DATA ITEM NO. A002	2. TITLE OF DATA ITEM Finite Element Model Report(s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.2 f	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES	
					Draft	Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221			
				15. TOTAL →	0	1	0

1. DATA ITEM NO. A003	2. TITLE OF DATA ITEM Coupled Loads Analysis Report(s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.3 h	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES	
					Draft	Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221			
				15. TOTAL →	0	1	0

1. DATA ITEM NO. A004	2. TITLE OF DATA ITEM Structural Response Analysis Report(s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.4 g	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES	
					Draft	Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221			
				15. TOTAL →	0	1	0

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
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17. PRICE GROUP

18. ESTIMATED TOTAL PRICE

17. PRICE GROUP

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CONTRACT DATA REQUIREMENTS LIST

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A. CONTRACT LINE ITEM NO. ALL	B. EXHIBIT A	C. CATEGORY: TDP _____ TM _____ OTHER _____
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D. SYSTEM/ITEM	E. CONTRACT/PR NO. N0173-05-R-LS01	F. CONTRACTOR
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1. DATA ITEM NO. A005	2. TITLE OF DATA ITEM Stress Analysis Report(s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.5 c	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY Ar Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) documenting the results of the detailed stress analysis performed. Report shall include the calculated stress and margin of safety for the structure being analyzed. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A006	2. TITLE OF DATA ITEM Structural Test Comparison Report(s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.5 d	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) documents the results of the comparison analysis performed. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A007	2. TITLE OF DATA ITEM Fracture Mechanics Analysis	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.6 a	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8202		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A008	2. TITLE OF DATA ITEM Structural and Environmental Test Model	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.7 a	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis on spacecraft structures. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
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A. CONTRACT LINE ITEM NO. ALL	B. EXHIBIT A	C. CATEGORY: TDP _____ TM _____ OTHER _____
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D. SYSTEM/ITEM	E. CONTRACT/PR NO. N00173-05-R-LS01	F. CONTRACTOR
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1. DATA ITEM NO. A009	2. TITLE OF DATA ITEM Attitude Control System Design and Analysis	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.8	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY Ar Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) documenting the results of the detailed analysis performed. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
15. TOTAL —→				0	1	0	

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A010	2. TITLE OF DATA ITEM Structural Design	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.10	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Drawings documenting the trade studies and designs performed. Specific requirements and delivery schedule in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
15. TOTAL —→				0	1	0	

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A011	2. TITLE OF DATA ITEM Thermal Analysis Report (s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.11 f	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
15. TOTAL —→				0	1	0	

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A012	2. TITLE OF DATA ITEM Electro-Mechanical Systems Analysis	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.12 d	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
15. TOTAL —→				0	1	0	

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
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A. CONTRACT LINE ITEM NO. ALL	B. EXHIBIT A	C. CATEGORY: TDP _____ TM _____ OTHER _____
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D. SYSTEM/ITEM	E. CONTRACT/PR NO. N00173-05-R-LS01	F. CONTRACTOR
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1. DATA ITEM NO. A013	2. TITLE OF DATA ITEM Optical Systems Analysis Report(s)	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.13	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY Ar Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A014	2. TITLE OF DATA ITEM Research and Development Trade Studies	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.14	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Report(s) defining the detailed description of techniques and models used to perform analysis and/or trade studies. Reports shall include any bulk data and plots describing analysis results, conclusions and recommendations. Reports are due in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A015	2. TITLE OF DATA ITEM Software	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE SOW Par. 3.2.15	6. REQUIRING OFFICE NRL COR
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7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY As Required	12. DATE OF FIRST SUBMISSION See Item 16	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS Software and associated documentation. Specific requirements and delivery schedule in accordance with the delivery order SOW's and DD1423's.				Code 8221		1	
				15. TOTAL →	0	1	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	b. COPIES
						Final

16. REMARKS							
				15. TOTAL →	0	0	0

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
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DEPARTMENT OF DEFENSE CONTRACT SECURITY CLASSIFICATION SPECIFICATION <i>(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)</i>				1. CLEARANCE AND SAFEGUARDING SER: 060-04 a. FACILITY CLEARANCE REQUIRED <p style="text-align: center;">TOP SECRET</p> b. LEVEL OF SAFEGUARDING REQUIRED <p style="text-align: center;">NONE</p>	
2. THIS SPECIFICATION IS FOR: (X and complete as applicable)			3. THIS SPECIFICATION IS: (X and complete as applicable)		
X	a. PRIME CONTRACT NUMBER		X	a. ORIGINAL (Complete date in all cases)	DATE (YYYYMMDD) 20040916
	b. SUBCONTRACT NUMBER			b. REVISED (Supersedes all previous specs)	REVISION NO. DATE (YYYYMMDD)
	c. SOLICITATION OR OTHER NUMBER 82-0058-04	DUE DATE (YYYYMMDD)		c. FINAL (Complete Item 5 in all cases)	DATE (YYYYMMDD)
4. IS THIS A FOLLOW-ON CONTRACT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO. If Yes, complete the following: Classified material received or generated under _____ (Preceding Contract Number) is transferred to this follow-on contract.					
5. IS THIS A FINAL DD FORM 254? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO. If Yes, complete the following: In response to the contractor's request dated _____, retention of the classified material is authorized for the period of _____.					
6. CONTRACTOR (Include Commercial and Government Entity (CAGE) Code)					
a. NAME, ADDRESS, AND ZIP CODE		b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)		
FOR RFP PURPOSES ONLY, NOT VALID FOR ACTUAL CONTRACT AWARD			N/A		
7. SUBCONTRACTOR					
a. NAME, ADDRESS, AND ZIP CODE		b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)		
N/A			N/A		
8. ACTUAL PERFORMANCE					
a. LOCATION		b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)		
N/A			N/A		
9. GENERAL IDENTIFICATION OF THIS PROCUREMENT					
JOINT PROJECT OFFICE GUARDIAN, INSTALLATION PROTECTION PROGRAM (IPP) LEAD SYSTEMS INTEGRATOR CONTRACT.					
10. CONTRACTOR WILL REQUIRE ACCESS TO:		YES	NO	11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:	
a. COMMUNICATIONS SECURITY (COMSEC) INFORMATION			<input checked="" type="checkbox"/>	a. HAVE ACCESS TO CLASSIFIED INFORMATION ONLY AT ANOTHER CONTRACTOR'S FACILITY OR A GOVERNMENT ACTIVITY	<input checked="" type="checkbox"/>
b. RESTRICTED DATA			<input checked="" type="checkbox"/>	b. RECEIVE CLASSIFIED DOCUMENTS ONLY	<input checked="" type="checkbox"/>
c. CRITICAL NUCLEAR WEAPON DESIGN INFORMATION			<input checked="" type="checkbox"/>	c. RECEIVE AND GENERATE CLASSIFIED MATERIAL	<input checked="" type="checkbox"/>
d. FORMERLY RESTRICTED DATA			<input checked="" type="checkbox"/>	d. FABRICATE, MODIFY, OR STORE CLASSIFIED HARDWARE	<input checked="" type="checkbox"/>
e. INTELLIGENCE INFORMATION				e. PERFORM SERVICES ONLY	<input checked="" type="checkbox"/>
(1) Sensitive Compartmented Information (SCI)			<input checked="" type="checkbox"/>	f. HAVE ACCESS TO U.S. CLASSIFIED INFORMATION OUTSIDE THE U.S., PUERTO RICO, U.S. POSSESSIONS AND TRUST TERRITORIES	<input checked="" type="checkbox"/>
(2) Non-SCI			<input checked="" type="checkbox"/>	g. BE AUTHORIZED TO USE THE SERVICES OF DEFENSE TECHNICAL INFORMATION CENTER (DTIC) OR OTHER SECONDARY DISTRIBUTION CENTER	<input checked="" type="checkbox"/>
f. SPECIAL ACCESS INFORMATION			<input checked="" type="checkbox"/>	h. REQUIRE A COMSEC ACCOUNT	<input checked="" type="checkbox"/>
g. NATO INFORMATION			<input checked="" type="checkbox"/>	i. HAVE TEMPEST REQUIREMENTS	<input checked="" type="checkbox"/>
h. FOREIGN GOVERNMENT INFORMATION			<input checked="" type="checkbox"/>	j. HAVE OPERATIONS SECURITY (OPSEC) REQUIREMENTS	<input checked="" type="checkbox"/>
i. LIMITED DISSEMINATION INFORMATION			<input checked="" type="checkbox"/>	k. BE AUTHORIZED TO USE THE DEFENSE COURIER SERVICE	<input checked="" type="checkbox"/>
j. FOR OFFICIAL USE ONLY INFORMATION			<input checked="" type="checkbox"/>	l. OTHER (Specify)	
k. OTHER (Specify)					

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

COMMANDING OFFICER, NAVAL RESEARCH LABORATORY, WASHINGTON, DC 20375-5320, CODE 8221

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

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

Access to classified information is not required for the purpose of submitting a bid/proposal for this statement of work. However, prior to award of contract, the successful contractor will be required to have a TOP SECRET facility clearance, and contractor personnel assigned to this contract must be US citizens, have a final favorable DoD adjudicated clearance commensurate with the level of access required for the performance of this contract.

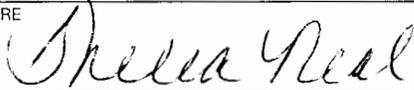
14. ADDITIONAL SECURITY REQUIREMENTS. Requirements, in addition to ISM requirements, are established for this contract. Yes No
 (*If Yes, identify the pertinent contractual clauses in the contract document itself, or provide an appropriate statement which identifies the additional requirements. Provide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

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

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

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

e. SIGNATURE


17. REQUIRED DISTRIBUTION

<input checked="" type="checkbox"/>	a. CONTRACTOR
<input type="checkbox"/>	b. SUBCONTRACTOR
<input checked="" type="checkbox"/>	c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR
<input type="checkbox"/>	d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION
<input type="checkbox"/>	e. ADMINISTRATIVE CONTRACTING OFFICER
<input checked="" type="checkbox"/>	f. OTHERS AS NECESSARY 1226.2, 8221, 8202

Personnel Qualifications

1. General Description

It is anticipated that the contractor shall have some form of multilevel position structure for his staff. The position descriptions defined herein assumes a three level system consisting of senior, mid-level and junior positions. Unless noted otherwise, a BS in engineering, mathematics or physics from an accredited institution and the ability to obtain a TOP SECRET security clearance are required for all professional positions. The desired qualifications for these positions are as follows:

1.1. Senior Engineer

The desired level of experience sought for this position is a minimum of 10 years in the professional field with experience in the aerospace or aerospace related fields. At least one half of the experience must be directly related to the specified field. Technical team leadership is required.

1.2. Engineer

The desired level of experience sought for this position is a minimum of 5 years in the professional field with experience in the aerospace or aerospace related fields. At least one half of the experience must be directly related to the specified field.

1.3. Junior Engineer

The desired level of experience sought for this position is a minimum of 1 year in the professional field. Where applicable, training in the use of the indicated commercial software packages is required.

2. Positions

2.1. Program Manager

The desired level of experience sought for this position is a minimum of 10 years with an interdisciplinary background in the development of aerospace hardware and management of aerospace programs. This experience must include aerospace project assignments with tasks that include a minimum of 5 years of supervisory/management responsibilities and significant interaction with program management. A minimum of 5 years of aerospace design, analysis and/or hardware test experience is required.

2.2. Project Engineer

The desired level of experience sought for this position is a minimum of 10 years with an interdisciplinary background in the development of aerospace hardware. This experience must include aerospace project assignments with tasks that include a minimum of 5 years of supervisory/management

responsibilities and significant interaction with program management. A minimum of 5 years of aerospace structural analysis and hardware test experience is also required.

2.3. Senior Staff Engineer

This position requires experience in developing computer simulations of structural/mechanical phenomena and significant exposure in the development of structural analysis techniques. Experience in structural dynamic modeling and aerospace vehicle transient loads analysis is required. Experience in FORTRAN coding and the use of the Windows and UNIX operating systems is required.

2.4. Structural Analysis Engineer

2.4.1. Senior Level: This level provides leadership in developing new analytical tools, supports the development of structural designs, analyzes and evaluates structural performance to show that specified requirements are satisfied. This experience must include the analysis of aerospace structural systems and components when subjected to static, transient/steady state dynamic, and random vibration loads. A minimum of 5 years of experience with the MSC/NASTRAN finite element code, FEMAP or equivalent pre- and post-processor software package, and numerical analysis techniques in general is required. A minimum of 3 years of experience with the calculation and spreadsheet software packages, Mathcad and Excel, or equivalent, and use of the MS Windows operating system is required.

2.4.2. Mid Level: This position requires experience in structural analysis, development of analysis techniques, and computer simulation of aerospace hardware. This experience is to include the analysis of aerospace subsystems and components when subjected to static, transient/steady state dynamic, random vibration loads. A minimum of 3 years of experience in finite element modeling with at least 2 years of experience with the MSC/NASTRAN analysis program, FEMAP or equivalent pre- and post-processor software package. A minimum of 2 years of experience with the calculation and spreadsheet software packages, Mathcad and Excel, or equivalent, and use of the MS Windows operating system is required.

2.4.3. Junior Level: The desired level of experience sought for this position is a minimum of 2 years in the structural analysis and computer simulation of aerospace hardware using the MSC/NASTRAN program. This experience is to include the analysis of structures when subjected to static, transient/steady-state dynamic loads and launch vehicle loads. A minimum of 1 year of experience with the calculation and spreadsheet software packages, Mathcad and Excel, or equivalent, and use of the MS Windows operating system is required.

2.5. Stress Analysis Engineer

2.5.1. Senior: This position requires experience in aerospace detailed stress analysis. The experience must include thorough knowledge of materials, material properties and specific background with aerospace hardware. Some experience in fracture mechanics analysis required. A minimum of 5 years of experience in the use of MSC/NASTRAN or equivalent finite element code results for internal structural loads and stresses is required. Experience in the use of the MS windows operating system is required.

2.5.2. Mid-level: This position requires direct experience in aerospace detailed stress analysis. The experience must include a working knowledge of materials, material properties and specific background with aerospace hardware. Some experience in fracture mechanics analysis is desired. A minimum of 2 years of experience in the use of MSC/NASTRAN or equivalent finite element code results for internal structural loads and stresses is desired. The ability to read engineering drawings is required. Experience in the use of the MS windows operating system is required.

2.5.3. Junior Level: This position requires experience in the analysis of structures and a knowledge of material properties and structural analysis techniques. Familiarity with MSC/NASTRAN or equivalent finite element code and the ability to read engineering drawings is required. Experience in the use of the MS windows operating system is required.

2.6. Attitude Control Engineer

2.6.1. Senior Level: This position requires broad experience in the analysis and design of spacecraft control systems. The experience must include orbital analysis, spacecraft dynamics, stability analysis, spin stabilization methods, and experience in computer simulation techniques. The candidate must have a demonstrated ability in developing control laws and algorithms for the control of spacecraft. Experience with Windows and UNIX operating systems is required. A MS degree in engineering, mathematics or physics from an accredited institution is required.

2.6.2. Mid Level: This position requires experience in the analysis and design of spacecraft control systems. The experience should include orbital analysis, spacecraft dynamics, stability analysis, spin stabilization methods, and experience in computer simulation techniques. Experience with the Windows and UNIX operating systems is required.

2.7. Astrodynamics Engineer

The desired level of experience sought for this position is a minimum of 5 years in the analysis and design of orbits for spacecraft. This experience should include orbit mechanics analysis, orbit mission planning, fuel budget analysis, flight operations experience, and experience in computer simulation techniques. Programming experience in software languages such as C++, Matlab and FORTRAN and experience with UNIX, Linux, and Windows based workstations and VAX-VMS systems is required. Working knowledge of Satellite Tool kit (STK) is required.

2.8. Thermal Engineer

2.8.1. Senior Level: This position requires experience in thermal design and thermal analyses of spacecraft systems. This experience must include development of thermal analytical models and thermal analyses of spacecraft and instruments for free fliers and/or Shuttle attached payloads. A minimum of 5 years of experience with the thermal analysis software packages, TRASYS, SINDA, Thermal Desktop, or equivalent is desired. Experience in FORTRAN and PYTHON coding and the use of the Windows and UNIX operating systems is required.

2.8.2. Mid Level: This position requires experience in thermal design and thermal analyses of spacecraft systems. This experience must include development of thermal analytical models and thermal analyses of spacecraft and instruments for free fliers and/or Shuttle attached payloads. A minimum of 3 years of experience with thermal analysis software packages, TRASYS and SINDA, Thermal Desktop, or equivalent and use of the MS Windows operating system is desired.

2.8.3. Junior Level: This position requires basic experience in thermal design and thermal analysis. The experience must include development of thermal analytical models and thermal analyses of spacecraft or instruments for free fliers. A minimum of 1 year of experience using the thermal analysis software packages, TRASYS and SINDA, Thermal Desktop, or equivalent and use of the MS Windows operating system is desired.

2.9. Mechanical Engineer

2.9.1. Senior Level: This position requires experience in the design, analysis and testing of aerospace hardware. Specific experience with

spacecraft mechanical systems, mass property control, material stability, interface definition and test plans and procedures is required.

2.9.2. Mid Level: This position requires experience associated with the design, analysis and testing of aerospace hardware. Specific experience with spacecraft mechanical systems, mass property control, material stability, interface definition and test plans and procedures is required.

2.9.3. Junior Level: This position requires experience associated with the design, analysis and testing of aerospace hardware. Specific experience with spacecraft mechanical systems, mass property control, material stability, interface definition and test plans and procedures is required.

2.10. Mechanical Designer

2.10.1. Senior Level: This position requires experience in the design and development of aerospace structures and mechanisms. This background must include specific spacecraft hardware design experience and detailed knowledge of current aerospace design practices and hardware. CAD experience, preferably Unigraphics II, and familiarity with Mil-Std-100 and ANSI Y14.5 is required.

2.10.2. Mid Level: This position requires experience in the design and development of aerospace hardware. This background must include specific spacecraft hardware design experience and detailed knowledge of current aerospace design practices and hardware. CAD experience, preferably Unigraphics II, and familiarity with Mil-Std-100 and ANSI Y14.5 is required.

2.11. Electro-Mechanical Systems Engineer

2.11.1. Senior Level: This position requires experience in the design, development and qualification of electromechanical devices and systems for high reliability operation in space. This experience must include work on angular and linear positioning systems, latching and deploying mechanisms, scanning systems, solar array drives, slip rings and position sensors.

2.11.2. Mid Level: This position requires experience in the design, development and qualification of electromechanical devices and systems for high reliability operation in space. This experience must include work on angular and linear positioning systems, latching and deploying mechanisms, scanning systems, solar array drives, slip rings and position sensors.

2.11.3. Junior Level: The desired level of experience sought for this position is a minimum of one year in the design and development of electromechanical devices and systems for space use. This experience is to include the analysis of such devices to predict performance in the variety of

environments experienced in space. Some experience in the use of the UNIX operating system is required.

2.12. Electro-Optical Engineer

2.12.1. Senior Level: This position requires experience in the analysis, design and management of optical/IR sensing systems. This experience must include the major disciplines of electro-optical engineering including visible/IR electromagnetic propagation, radiometric and image evaluation, optical systems and data processing in both design and analysis as well as implementation techniques. A BS degree in Physics or Electrical Engineering with advanced studies in optics required.

2.12.2. Mid Level: This position requires experience in the analysis, design and management of optical/IR sensing systems. This experience must include the major disciplines of electro-optical engineering including visible/IR electromagnetic propagation, radiometric and image evaluation, optical systems and data processing in both design and analysis as well as implementation techniques. A BS degree in Physics or Electrical Engineering with advanced studies in optics required.

2.12.3. Junior Level: The desired level of experience sought for this position is a minimum of 2 years in the analysis of optical systems. This experience should include optical system modeling, image quality evaluation, error budgeting, sensitivity analyses and wave front error analysis.

2.13. Software Development Engineer

The desired level of experience sought for this position is a minimum of 2 years in the development of software programs in the FORTRAN, C++ and Perl programming languages. This experience should include work in UNIX and Windows operating systems.

2.14. Mechanical Technician

The desired level of experience sought for this position is a minimum of 5 years in mechanical fabrication and assembly of space flight and prototype hardware. This experience should include the use of machine shop tools and familiarity with a variety of laboratory equipment such as scales, pressure/vacuum gauges and temperature sensors. The ability to read mechanical drawings is required.

2.15. Technical Writer

The desired level of experience sought for this position is a minimum of 3 years in the preparation of technical documentation related to aerospace systems, operational and test environments and system operations. This must include experience with word processing and document publication systems.

2.16. Electrical Engineer

2.16.1. Senior Level: This position requires experience in the design, analysis, fabrication, test and integration of electrical systems for ground support and space based systems. This experience must include design, analysis and test of analog and digital circuitry for the measurement and control of thermal and electromechanical systems, control systems and instrumentation systems. A thorough understanding of component ratings, performance limitations due to cosmic radiation, impacts of grounding, shielding and electromagnetic compatibility and thermal effects due to power dissipation is required. Experience in the use of computer aided analysis, design and simulation tools such as OrcadTM, PspiceTM, ELECTROTM, MAGNTOTM as well as electronic instrumentation and test equipment is required.

2.16.2. Mid Level (Analog Electronics): This position requires experience in the design, analysis, fabrication, test and integration of electrical systems for ground support and space-based systems. The experience must include development of analog signal processing and power electronics for measurement and control applications of thermal and electromechanical systems including the design of low noise electronics circuits for analog to digital and digital to analog conversion. Hands-on fabrication, testing and integration experience is required. Experience in the use of computer aided analysis, design and simulation tools such as OrcadTM and PspiceTM.

2.16.3. Mid Level (Digital Electronics): This position requires experience in the design, analysis and development of digital and microprocessor based electronic system for the measurement and control of thermal and electromechanical systems. The experience must include the design, development and testing of microprocessor code for processing digital data real time. Hands on fabrication, testing and integration and on-orbit operation of flight electronics hardware is required. Knowledge in the use of computer aided design tools and digital electronic test hardware is required.

2.17. Contamination Control Engineer

2.17.1. Mid Level: This position requires experience in performing contamination management, analyses and impact assessments. The experience must include development of requirements, performing environmental analyses and developing impact reports. Experience in the use of contamination programs such as CAP, MOLFLUS, ISEM and DSMC are required.

2.17.2. Junior Level: This position requires experience in performing contamination analyses and contamination management. Experience in contamination requirement development and the knowledge of FORTRAN are required.

2.18 Analytical Dynamics Engineer

2.18.1 Senior Level: This level provides leadership in the development of new analytical and numerical simulation tools in the area of dynamics, including orbit and attitude dynamics, mechanisms, multi-body dynamical systems (e.g., robotic manipulators and tethers), propellant slosh, as well as other complex phenomena related to spacecraft and the space environment. The Senior Analytical Dynamics Engineer should hold a minimum of a Masters degree in Aerospace or Mechanical Engineering, Physics, or a related discipline and have at least 5 years of experience in the analysis and simulation of aerospace-related dynamical systems. This engineer should be familiar with existing software packages such as SD/FAST and ADAMS, and be should able to generate simulation code from scratch in programming languages such as ANSI C and C++ that will be provided to other engineers for integration into larger simulation codes. This engineer will support spacecraft design efforts as an expert in analytical and computational dynamics, and may be called upon to act as an external reviewer to other spacecraft programs. The Senior Analytical Dynamics Engineer will support all phases of a spacecraft program, from concept design to detailed design, fabrication, testing and mission operations. This engineer may also be required to support proposal efforts in his areas of expertise.

2.18.2 Mid Level: This level requires a proficiency in the application of existing dynamics software packages such as SD/FAST and ADAMS to complex dynamical systems related to spacecraft and the space environment. A minimum of a Bachelors degree in Aerospace or Mechanical Engineering, Physics, or a related discipline is desired. It is also desired that the individuals proposed to fill this position have a minimum of 2 years of experience related to spacecraft engineering and a desire to work in the analytical and computational dynamics field are required. The engineer should have a demonstrated proficiency in programming languages such as FORTRAN, ANSI C, C++, and/or Matlab. This engineer will work as part of a larger team to support spacecraft programs from concept design through detailed design, fabrication, testing and mission operations. It would be highly desirable if this engineer has experience with application of commercial software such as SD/FAST and ADAMS to spacecraft systems.

2.19 Opto-Mechanical Engineer, Senior Level

This position provides leadership in the development and application of new opto-mechanical analysis and simulation tools to space-based telescope and other precision space-based optical systems. It is desired that individuals proposed to fill this position have a Masters degree in Aerospace, Mechanical or Electrical Engineering, Physics, or a related discipline, as well as 3 years of

experience in the analysis, prediction and test-verification of opto-mechanical system performance. The Senior Opto-Mechanical Engineer should be expert in diffraction analysis, structural finite-element modeling, ray tracing and image processing. Experience in the development of optical metrology systems and wavefront control are highly desirable, as well as experience in a research and development environment. The engineer should also be knowledgeable of existing software tools such as NASTRAN, ZEMAX, MACOS and Matlab, and be proficient in programming languages such as ANSI C and C++. The engineer will participate in all phases of the optical system development including concept design, prototyping, testing, detailed instrument design, fabrication and integrated system testing. This engineer will also support external reviews of related programs and proposal development.