

<b>AWARD/CONTRACT</b>		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 766)		RATING NONE	PAGE OF PAGES 1   28
2. CONTRACT (Proc. Inst. Ident.) NO. HR0011-10-C-0125		3. EFFECTIVE DATE 9/24/2010		4. REQUISITION/PURCHASE REQUEST/PROJECT NO. C00000	
5. ISSUED BY DARPA C/O ATTN: ROBIN BRADLOW 3801 N PARKWAY DR ARLINGTON VA 22208-1714		CODE HR0011	6. ADMINISTERED BY (If other than item 5) DOMA BOERIS HUNTINGTON BEACH 3301 BOLSA AVENUE BUILDING 14, MC104-1407 HUNTINGTON BEACH CA 92647-0000		
7. NAME AND ADDRESS OF CONTRACTOR (file, street, city, county, state and zip code) MILL LABORATORIES, LLC 3011 BALBU CANYON RD MALIBU CA 90265-4707			8. DELIVERY [ ] FOB ORIGIN [X] OTHER (file listed)		
			9. DISCOUNT FOR PROMPT PAYMENT		
			10. SUBMIT INVOICE 2 (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN:		ITEM Section C
CODE 27457		FACILITY CODE			
11. SHIP TO MARK FOR DARPA DR. AARON LAZARUS STRATEGIC TECHNOLOGY OFFICE 3801 NORTH PARKWAY DRIVE ARLINGTON VA 22208-1714		CODE HR0011	12. PAYMENT WILL BE MADE BY OWAS COLUMBUS CENTER WEST ENTITLEMENT OPERATIONS P.O. BOX 182281 COLUMBUS OH 43218-2281		
13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: [ ] 19 U.S.C. 2304(c) [ ] 41 U.S.C. 253(c)			14. ACCOUNTING AND APPROPRIATION DATA See Schedule		
15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
SEE SCHEDULE					
15G. TOTAL AMOUNT OF CONTRACT					\$3,540,000.00
16. TABLE OF CONTENTS					
(X) SEC.	DESCRIPTION	PAGE(S)	(X) SEC.	DESCRIPTION	PAGE(S)
PART I - THE SCHEDULE			PART II - CONTRACT CLAUSES		
X A	SOLICITATION/CONTRACT FORM	1	X I	CONTRACT CLAUSES	22 - 27
X B	SUPPLIES OR SERVICES AND PRICES/ COSTS	2 - 3	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS		
X C	DESCRIPTION/SPCS/ WORK STATEMENT	4 - 6	X J	LIST OF ATTACHMENTS	28
X D	PACKAGING AND MARKING	7	PART IV - REPRESENTATIONS AND INSTRUCTIONS		
X E	INSPECTION AND ACCEPTANCE	8	K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	
X F	DELIVERIES OR PERFORMANCE	9 - 12	L	INSTRS. CONDS. AND NOTICES TO OFFERORS	
X G	CONTRACT ADMINISTRATION DATA	13 - 16	M	EVALUATION FACTORS FOR AWARD	
X H	SPECIAL CONTRACT REQUIREMENTS	16 - 21			
CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE					
17. [X] CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to attach this document and attach to each award.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)			18. [ ] AWARD (Contractor is not required to attach this document.) Your offer on Solicitation Number _____ including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award constitutes the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.		
(b)(6)			20A. NAME OF CONTRACTING OFFICER		
			TEL: _____ EMAIL: _____		
19B. NAME OF CONTRACTOR #1 LABORATORIES, LLC BY (b)(6)		19C. DATE SIGNED 9/24/10	20B. LIMITED STATES OF AMERICA BY (b)(6)		20C. DATE SIGNED 9/24/10
				(Signature of Contracting Officer)	

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STANDARD FORM 34 (REV. 4/2004)  
Prescribed by GSA  
FAR (48 CFR) 53.214(a)

## Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
0001	Structural Logic CPFF The contractor shall furnish the necessary personnel, material, facilities and other services as may be required to perform the effort outlined in Statement of Work, Attachment 1 and the contractor's technical proposal entitled (b)(4) (b)(4) (b)(4) dated 16 June 2010. FOB: Destination	(b)(4)	(b)(4)	\$3,580,909.00 \$3,580,909.00

ITEM NO	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
000101	Funding for CLIN 0001 CPFF FOB: Destination AO No. C897/00  ACRN AA	\$0.00	\$0.00	\$0.00 \$0.00   \$1,987,120.00

ITEM NO	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
0002	Reports and Deliverables CPFF The contractor shall provide reports and deliverables in accordance with Sections C- 2 and F-2. Not Separately Priced (NSP) - Preparation costs included in CLIN 0001. FOB: Destination	\$0.00	\$0.00	\$0.00 NSP

## Section C - Descriptions and Specifications

## CLAUSES INCORPORATED BY FULL TEXT

## C-1 Scope of Work

(a) The Contractor shall furnish the necessary personnel, materials, facilities, and other services as may be required to perform Contract Line Items (CLINs) 0001 and 0002, in accordance with the Statement of Work, Attachment 1 hereto. The work and services to be performed hereunder shall be subject to the requirements and standards contained in the Contractor's proposal entitled (b)(4) (b)(6) dated 16 June 2010, copies of which are in the possession of both parties.

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

## C-2 Reports and Other Deliverables

(a) The Contractor shall submit the following reports and other deliverables in accordance with the delivery schedule set forth in Section F. Reports and other deliverables shall be submitted in writing, as defined in FAR 2.101, or as specified below:

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

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

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

**R&D STATUS REPORT  
PROGRAM FINANCIAL STATUS**

Work Breakdown	Cumulative to Date			At Completion		
Structure or Task Element	Planned Expend	Actual Expend	% Budget Compl	At Compl	Latest Revised Estimate	Remarks
Subtotal: _____						
Management Reserve: _____						
Or Unallocated Resources: _____						
TOTAL: _____						

Note: Budget at completion changes only with the amount of any scope changes. (Not affected by underrun or overrun)

Based on currently authorized work:

Is current funding sufficient for the current fiscal year (FY)? (Explain in narrative if "NO")

YES NO

What is the next FY funding requirement at current anticipated levels?

\$ \_\_\_\_\_

Have you included in the report narrative any explanation of the above data and are they cross-referenced?

YES NO

(2) See Section F-2 for other Task 1 and Task 2 Deliverables.

(3) FINAL REPORT (For Both Task 1 and Task 2)

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

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

The Final Technical Report summary shall include:

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

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

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

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

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

Sponsored by  
 Defense Advanced Research Projects Agency  
 Strategic Technology Office (STO)  
 Program: Structural Logic  
 ARPA Order No. C897/00, Program Code: 0620  
 Issued by DARPA/CMO under Contract No. HR0011-10-C-0125

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

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

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

(end of clause)

Section D - Packaging and Marking

CLAUSES INCORPORATED BY FULL TEXT

D-1 Packaging and Marking

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

## Section E - Inspection and Acceptance

## INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	Destination	Government	Destination	Government
000101	N/A	N/A	N/A	N/A
0002	Destination	Government	Destination	Government

## CLAUSES INCORPORATED BY REFERENCE

52.246-8	Inspection Of Research And Development Cost Reimbursement	MAY 2001
252.246-7000	Material Inspection And Receiving Report	MAR 2008



## Section F - Deliveries or Performance

## CLAUSES INCORPORATED BY REFERENCE

52.247-34

F.O.B. Destination

NOV 1991

## CLAUSES INCORPORATED BY FULL TEXT

## F-1 Term of Contract

- (a) The term of the contract commences on the effective date of the contract and continues through 26 months thereafter.

(end of clause)

## F-2 Reports and Other Deliverables

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

Deliverable Description	Delivery Date
Deliverable for both Task 1 and Task 2	
R&D Status Reports on technical, milestones, schedule and financial progress	Monthly
Task 1 Deliverables	
Test results for an adaptive structural logic unit with >10dB isolation for 1 to 10 Hz loading frequencies: Fabricate and test an SLU design that demonstrates Task 1 metric vibration response characteristics with >10dB isolation.	9 Month ADC
Test results for a structural logic unit that (b)(4) (b)(4) Fabricate and test a high force SLU that achieves Task 1 (b)(4)	12 Month ADC
Application Analysis: An application analysis given requirements for high speed watercraft (from task 1.8) will be made to assess material requirements including fatigue, degradation and environmental effects for SLUs fabricated in task 1.3.	12 Month ADC
Final Report: Report to include (1) structural logic unit designs and software tools that quantify design parameter mapping to shock/vibration properties and performance for the selected structural material system(s); (2) SLU fabrication and data characterization package that includes quasi-static and dynamic testing of different "library" members that can meet the technical metrics for the study application; (3) details of fabrication and testing of SLU variants that achieve Task 1 metrics for (b)(4) and load attenuation and vibration response from 1 to 10 Hz (including an additional >10dB isolation metric).	12 Month ADC

Task 2 Deliverables	
Test results for structural logic assemblies: Response spectra data package for three or more prototype SLU assemblies fabricated in Task 2.2-HRL or Task 2.4-UTA that are designed to have performance sensitivities including, loading magnitude, response time of 0.01 seconds and tailored frequency response from 0.1 to 10 Hz.	19 Month ADC
Structural logic assemblies: Fabrication of three or more prototype SLU assemblies that vary due to element construction, configuration, and sensitivity to vibration and shocking loading conditions. One or more high force SLU assemblies will be made to test against the Task 2 goals (b)(4)	22 Month ADC
Test results for a high force SLU assembly (b)(4) (b)(4) A high force SLU assembly will be made and tested against the Task 2 performance goals.	26 Month ADC
SLU materials and component analysis Report: A materials and component analysis including a detailed understanding of fatigue and drift effects, along with a materials assessment for a high-speed watercraft marine application.	26 Month ADC
Final Report: Including (1) SLU assembly designs and software tools that quantify design parameter mapping to shock/vibration properties and performance for the selected structural material system(s); (2) SLU assembly fabrication and data characterization package that includes quasi-static and dynamic testing of different prototypes that can meet the technical metrics for the study application; (3) details of fabrication and testing of SLU variants that achieve Task 1 metrics (b)(4) (b)(4) and load attenuation and vibration response from 0.1 to 10 Hz and 0.01 second loading rates (including an additional >10dB isolation metric); and (4) details of materials and component analysis for high-speed watercraft application, including fatigue and environmental effects.	Month 26

(end of clause)

## F-3 Report Distribution

(a) DARPA/Strategic Technology Office (STO)  
 Attn: Aaron Lazarus (Program Manager)  
 3701 North Fairfax Drive  
 Arlington, VA 22203-1714  
 Phone: 703-526-4767

Email: [Aaron.Lazarus@darpa.mil](mailto:Aaron.Lazarus@darpa.mil)  
(one copy each report)

(b) DARPA/CMO  
Attn: Robin Swatloski  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
Phone: 571-218-4542  
Email: [Robin.Swatloski@darpa.mil](mailto:Robin.Swatloski@darpa.mil)  
(one copy each report)

(c) DARPA/STO (ADPM)  
Attn: Patrick Bailey  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
Phone: 703-696-5277  
Email: [Patrick.Bailey@darpa.mil](mailto:Patrick.Bailey@darpa.mil)  
(one copy each report)

(d) Dr. David M. Stepp  
U.S. Army Research Office  
AMSRD-ARL-RO-EM (Materials Science Division)  
P.O. Box 12211  
Research Triangle Park, NC 27709-2211  
Phone: 919-549-4329  
Email: [david.m.stepp@us.army.mil](mailto:david.m.stepp@us.army.mil)  
(one copy each report)

(e) DARPA/Research Services  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
Email: [ResearchServices@darpa.mil](mailto:ResearchServices@darpa.mil)  
(one copy of the Final Technical Report)

(f) Defense Technical Information Center

(1) Email: [TR@dtic.mil](mailto:TR@dtic.mil)  
(one electronic copy of the Final Technical Report, if unclassified)

OR

(2) Attn: DTIC-BCS  
8725 John J. Kingman Road, Suite 0944  
Fort Belvoir, VA 22060-0944  
(two hard copies of the Final Technical Report if unclassified)

Note 1: Hard-copy distribution to those persons in a) through d) shall be for the Final Report only. All other report distributions shall be made via E-mail.

Note: For the Final Technical Report(s), the contractor must also comply with the distribution requirements of DFARS 252-235-7011, as applicable.

F-4 Notice Regarding Late Delivery

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

(end of clause)

## Section G - Contract Administration Data

## ACCOUNTING AND APPROPRIATION DATA

AA: 9700400 1320 C897 P0620 2525 DPAC 0 5552 S12136 62715E  
 AMOUNT: \$1,987,120.00  
 CIN 000000000000000000000000000000: \$1,987,120.00

## CLAUSES INCORPORATED BY REFERENCE

252.204-7006

Billing Instructions

OCT 2005

## CLAUSES INCORPORATED BY FULL TEXT

## G-1 Procuring Office Representative

(a) The Procuring Office Representative is Robin Swatloski, DARPA/CMO, 3701 North Fairfax Drive, Arlington, VA 22203-1714, telephone: 571-218-4542, e-mail: Robin.Swatloski@darpa.mil.  
 (end of clause)

## G-2 Electronic Submission of Payment Requests

(a) Invoices for goods received or services rendered under this contract shall be submitted electronically through Wide Area Work Flow – Receipt and Acceptance (WAWF):

(1) Vendors that have never used WAWF shall follow the directions in the WAWF Vendor Getting Started Guide available at the following website: <http://www.dfas.mil/contractorpay/electroniccommerce/wideareaworkflow.html>. This website also contains links for Vendor training and practice. Additional support can be obtained by calling WAWF Customer Service at 866-618-5988.

(2) Back up documentation (such as timesheets, monthly status reports, etc.) can be included and attached to the invoice in WAWF. Attachments should be in PDF format, but Attachments created in any Microsoft Office product may be attached. Total limit for the size of files per invoice is 5 megabytes.

(b) The following information, regarding invoice routing DoDAAC's, must be entered for completion of the invoice in WAWF:

WAWF Invoice Type	Cost Voucher
Issuing Office DoDAAC	HR0011
Admin Office DoDAAC	S0530A
Service Approver DoDAAC (Cost Voucher)	S0530A
DCAA Office DoDAAC	HAA619
Paying Office DoDAAC	HQ0339

(c) Cost Vouchers from Contractors approved by DCAA for direct billing will be directly routed to DFAS. Cost Vouchers from Contractors not approved for direct billing will be routed to DCAA for approval before the Cost Voucher is routed to DFAS. All Final Cost Voucher submissions will be routed to the Service Approver for approval. The DCAA office for this award is:

San Fernando Valley Branch Office-04231  
DoDAAC: HAA619  
6230 Van Nuys Blvd, Federal Building  
Suite 2018  
Van Nuys, CA 91401-2724

(d) For each invoice/cost voucher submitted for payment, the contractor shall also e-mail the WAWF automated invoice notice directly to the following points of contact:

Name	Phone	E-mail	Role
Robin Swatloski	571-218-4542	Robin.Swatloski@darpa.mil	Contracting Officer
David M. Stepp	919-549-4329	david.m.stepp@us.army.mil	COR

#### G-3 Delegation of Authority for Contract Administration

(a) DCMA Boeing Huntington Beach, is hereby designated as the Contracting Officer's authorized representative for administering this contract in accordance with current directives.  
(end of clause)

#### G-4 Contracting Officer's Representative (COR)

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

Dr. David M. Stepp  
U.S. Army Research Office  
AMSRD-ARL-RO-EM (Materials Science Division)  
P.O. Box 12211  
Research Triangle Park, NC 27709-2211

Phone: 919-549-4329  
Email: david.m.stepp@us.army.mil

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

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

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

G-5 Payment Instructions for Multiple Accounting Classification Citations

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

G-6 Incremental Funding

(a) This contract shall be subject to incremental funding with \$1,987,120 presently made available for performance under this contract. It is estimated that the funds presently available are sufficient to permit the Contractor's performance through the first 12 months ADC. Except in accordance with the Section I clause FAR 52.232-22, "Limitation of Funds," no legal liability of the part of the Government for payment of any money in excess of \$1,987,120 shall arise unless and until additional funds are made available by the Contracting Officer through a modification to this contract.  
(end of clause)

G-7 Payment of Cost and Fee

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

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

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

## Special Contract Requirements

## CLAUSES INCORPORATED BY FULL TEXT

## H-1 Contracting Officer

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

## H-2 Type of Contract

(a) This is a cost plus fixed fee completion type of contract.

(end of clause)

## H-3 Public Release or Dissemination of Information

(1) With the exception of the work to be performed by University subcontractor(s) as noted at subparagraph (3) below, DARPA expects the work performed under this contract will NOT be fundamental research, and it is, therefore, subject to the following publication restrictions:

There shall be no dissemination or publication, except within and between the Contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval, which will be communicated to the Contractor by email through the DARPA Public Release Center (PRC) at [PRC@darpa.mil](mailto:PRC@darpa.mil). All technical reports will be given proper review by appropriate authority to determine which Distribution Statement is to be applied prior to the initial distribution of these reports by the Contractor. These restrictions must be flowed down to all subcontractors, with the exception of the subcontractors listed in paragraph (3) of this clause. Any publications shall incorporate an Acknowledgement of Support and Disclaimer in accordance with DFARs 252.235-7010.

(2) When submitting material for written approval for open publication as described in subparagraph (a) above, the Contractor must submit a request for public release request to the PRC and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: event type (conference, principle investigator meeting, article or paper), event date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) Contractor's Information: POC name, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to [PRC@darpa.mil](mailto:PRC@darpa.mil) or via hard copy to 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to [www.darpa.mil/prc](http://www.darpa.mil/prc) for information about DARPA's public release process.

(3) At this time, DARPA expects the work performed under this contract by the below listed University subcontractor(s) to be fundamental research, and it is, therefore, not subject to publication restrictions. Papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and requirements, pursuant to DoD Instruction 5230.27 dated October 6, 1987. Should the character of the research change during performance of this subaward so that the research is no longer considered fundamental, the contract between the prime and University subcontractor listed below will be modified to impose the restrictions on public



release and dissemination of information that apply to those research efforts that are not considered fundamental research.

(b)(4)

(end of clause)

#### H-4 Key Personnel

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

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

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

(end of clause)

#### H-5 Restrictions on Printing

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

(end of clause)

#### H-6 Contractor Representations and Certifications

The Contractor's Representations and Certifications dated 09 March 2010 (ORCA submission), and as supplemented on 17 September 2010, are incorporated herein by reference.

#### H-7 Insurance Schedule

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

(end of clause)

#### H-8 Travel

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

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

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

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

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

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

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

#### H-9 Metric System

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

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

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

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

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

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

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

#### H-10 Consent to Subcontract

(a) Pursuant to the clause of the General Provisions entitled "Subcontracts (JUN 2007)," FAR 52.244-2(j), the Contracting Officer hereby consents to the placement of subcontract(s) with the following firm(s)/consultant(s) at the ceiling amounts specified:



(b) Approval must be obtained from the Administrative Contracting Officer to increase the use or number of subcontractors from the level established in subparagraph (a).  
(end of clause)

#### H-11 Small Business Subcontracting Plan and Goals

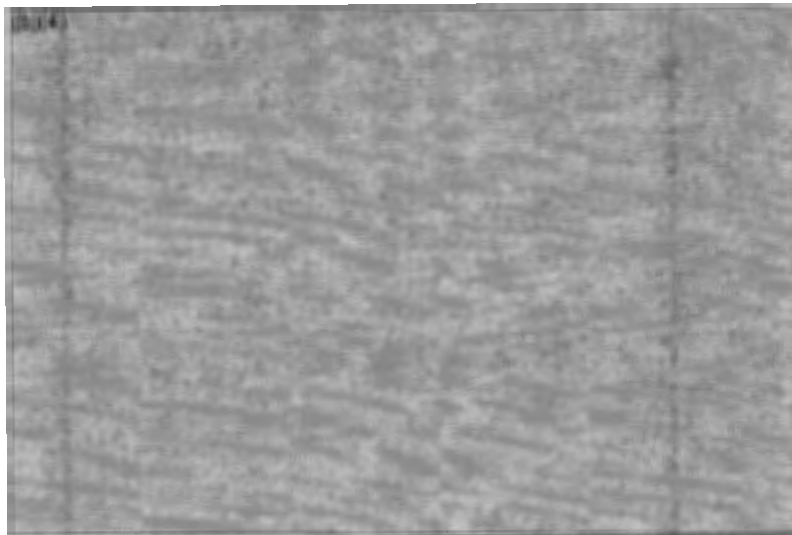
(a) The Contractor's Small Business Subcontracting Plan, dated 14 June 2010, is incorporated herein and made a part of this contract by reference.  
(end of clause)

#### H-12 Contractor-Acquired Equipment

(a) The Contractor is authorized to acquire the following items of equipment which are needed to accomplish this contract:

Items To Be Acquired

Estimated Cost





(b) The costs incurred by the Contractor in acquiring the equipment listed in paragraph (a) above shall be considered allowable costs under the contract provided that the total net amount of the equipment does not exceed (b)(4). The Contractor shall have no obligation to acquire equipment and the Government shall have no obligation to reimburse any amount for equipment in excess of the amount set forth above unless the contract is amended to increase this amount.

(c) The equipment listed above shall be considered Government Property and shall be subject to the provisions of FAR 52.245-1, incorporated by reference in Section I.

(d) The Contractor shall not use Contractor-acquired property listed above for work other than that performed pursuant to this contract unless so authorized in writing by the Contracting Officer.  
(end of clause)

#### H-13 Proprietary Technical Data and Computer Software

(a) Any deliverable technical data or computer software developed or generated at private expense and considered to be proprietary by the Contractor or subcontractors shall be delivered in accordance with DFARS 252.227-7013 and 252.227-7014. A list of such data and/or software is incorporated into the contract as Attachment No. 2.  
(end of clause)

#### H-14 Consultants

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

Name	No. of Hours	Rate	Total Amount
(b)(4)			

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

#### H-15 Contractor Performance Information

Contractor performance information for this contract will be collected in the Contractor Performance Assessment and Reporting System (CPARS) web-enabled tool. The contractor designated representative is:



Only this individual will be granted access to the CPARS website (<http://cpars.navy.mil/>) to review individual assessment reports as they are prepared by the Assessing Official, prior to their being finalized and posted.

The Contractor will be given 30 days to comment on the assessment report prior to its being finalized. Should the Contractor nonconcur with the Assessing Official's report, the report will be reviewed by the appropriate Reviewing Official prior to being finalized. The Contractor will be informed of the Reviewing Official's comments, and the report will be finalized. There will be no further opportunity for Contractor comment.  
(end of clause)

#### H-16 Invention Disclosure and Reports

All written communications required for invention disclosures and reports shall be submitted to the Administrative Contracting Officer (ACO). All unclassified required reporting shall be accomplished using the i-Edison.gov reporting website (<http://s-edison.info.nih.gov/i-Edison/>).

## Section I - Contract Clauses

## CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JUL 2004
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-6	Restrictions On Subcontractor Sales To The Government	SEP 2006
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	SEP 2007
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.204-7	Central Contractor Registration	APR 2008
52.204-10	Reporting Executive Compensation and First-Tier Subcontract Awards	JUL 2010
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	SEP 2006
52.215-2	Audit and Records--Negotiation	MAR 2009
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
52.215-16	Facilities Capital Cost of Money	JUN 2003
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other than Pensions	JUL 2005
52.215-21	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data--Modifications	OCT 1997
52.216-7	Allowable Cost And Payment	DEC 2002
52.216-8	Fixed Fee	MAR 1997
52.219-4	Notice of Price Evaluation Preference for HUBZone Small Business Concerns	JUL 2005
52.219-8 (DEV)	Utilization of Small Business Concerns (DEVIATION)	MAY 2004
52.219-9 (Dev)	Small Business Subcontracting Plan (Deviation)	APR 2008
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.219-28	Post-Award Small Business Program Rerepresentation	APR 2009
52.222-3	Convict Labor	JUN 2003
52.222-21	Prohibition Of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	MAR 2007
52.222-35	Equal Opportunity For Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-36	Affirmative 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	SEP 2006
52.222-50	Combating Trafficking in Persons	FEB 2009
52.222-54	Employment Eligibility Verification	JAN 2009

52.223-6	Drug-Free Workplace	MAY 2001
52.225-13	Restrictions on Certain Foreign Purchases	JUN 2008
52.226-1	Utilization Of Indian Organizations And Indian-Owned Economic Enterprises	JUN 2000
52.227-1 Alt I	Authorization And Consent (Dec 2007) - Alternate I	APR 1984
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	DEC 2007
52.228-7	Insurance--Liability To Third Persons	MAR 1996
52.230-2	Cost Accounting Standards	OCT 2008
52.230-6	Administration of Cost Accounting Standards	JUN 2010
52.232-9	Limitation On Withholding Of Payments	APR 1984
52.232-17	Interest	OCT 2008
52.232-20	Limitation Of Cost	APR 1984
52.232-22	Limitation Of Funds	APR 1984
52.232-23	Assignment Of Claims	JAN 1986
52.232-25	Prompt Payment	OCT 2008
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration	OCT 2003
52.233-1 Alt I	Disputes (Jul 2002) - Alternate I	DEC 1991
52.233-3 Alt I	Protest After Award (Aug 1996) - Alternate I	JUN 1985
52.233-4	Applicable Law for Breach of Contract Claim	OCT 2004
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
52.242-15 Alt I	Stop-Work Order (Aug 1989) - Alternate I	APR 1984
52.243-2 Alt V	Changes--Cost-Reimbursement (Aug 1987) - Alternate V	APR 1984
52.244-2	Subcontracts	JUN 2007
52.244-5	Competition In Subcontracting	DEC 1996
52.244-6	Subcontracts for Commercial Items	APR 2010
52.245-1 (Dev)	Government Property (Deviation)	JUN 2007
52.245-9	Use And Charges	JUN 2007
52.246-23	Limitation Of Liability	FEB 1997
52.247-1	Commercial Bill Of Lading Notations	FEB 2006
52.249-6	Termination (Cost Reimbursement)	MAY 2004
52.249-14	Excusable Delays	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7000	Requirements Relating to Compensation of Former DoD Officials	JAN 2009
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2008
252.203-7002	Requirement to Inform Employees of Whistleblower Rights	JAN 2009
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004 Alt A	Central Contractor Registration (52.204-7) Alternate A	SEP 2007
252.204-7006	Billing Instructions	OCT 2005
252.204-7008	Export-Controlled Items	APR 2010
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	DEC 2006
252.211-7003	Item Identification and Valuation	AUG 2008
252.211-7007	Reporting of Government-Furnished Equipment in the DoD Item Unique Identification (IUID) Registry	NOV 2008
252.215-7000	Pricing Adjustments	DEC 1991

252.215-7002	Cost Estimating System Requirements	DEC 2006
252.219-7003 (Dev)	Small Business Subcontracting Plan (DoD Contracts) (Deviation)	APR 2007
252.225-7001	Buy American Act And Balance Of Payments Program	JAN 2009
252.225-7002	Qualifying Country Sources As Subcontractors	APR 2003
252.225-7004	Report of Intended Performance Outside the United States and Canada--Submission after Award	MAY 2007
252.225-7006	Quarterly Reporting of Actual Contract Performance Outside the United States	MAY 2007
252.225-7012	Preference For Certain Domestic Commodities	DEC 2008
252.226-7001	Utilization of Indian Organizations and Indian-Owned Economic Enterprises, and Native Hawaiian Small Business Concerns	SEP 2004
252.227-7000	Non-estoppel	OCT 1966
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
252.227-7027	Deferred Ordering Of Technical Data Or Computer Software	APR 1988
252.227-7030	Technical Data--Withholding Of Payment	MAR 2000
252.227-7037	Validation of Restrictive Markings on Technical Data	SEP 1999
252.227-7038	Patent Rights--Ownership by the Contractor (Large Business)	DEC 2007
252.231-7000	Supplemental Cost Principles	DEC 1991
252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	MAR 2008
252.232-7010	Levies on Contract Payments	DEC 2006
252.235-7011	Final Scientific or Technical Report	NOV 2004
252.239-7001	Information Assurance Contractor Training and Certification	JAN 2008
252.242-7004	Material Management And Accounting System	JUL 2009
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts)	AUG 2009
252.247-7023	Transportation of Supplies by Sea	MAY 2002
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000

#### CLAUSES INCORPORATED BY FULL TEXT

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

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

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

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

(b) The Contractor shall--

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



- (2) Provide the ACO or designated representative ready access to the records upon request;
- (3) Ensure that all individual and grouped assets, their capitalized values, accumulated depreciation or amortization, and remaining useful lives are identified accurately before and after each of the Contractor's ownership changes; and
- (4) Retain and continue to maintain depreciation and amortization schedules based on the asset records maintained before each Contractor ownership change.

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

(End of clause)

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

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

- (1) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;
- (2) By indirect-labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;
- (3) To perform tests, industrial processes, laboratory procedures, loading or unloading of transportation conveyances, and operations in flight or afloat that are continuous in nature and cannot reasonably be interrupted or completed otherwise; or
- (4) That will result in lower overall costs to the Government.

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

- (1) Identify the work unit; e.g., department or section in which the requested overtime will be used, together with present workload, staffing, and other data of the affected unit sufficient to permit the Contracting Officer to evaluate the necessity for the overtime;
- (2) Demonstrate the effect that denial of the request will have on the contract delivery or performance schedule;
- (3) Identify the extent to which approval of overtime would affect the performance or payments in connection with other Government contracts, together with identification of each affected contract; and
- (4) Provide reasons why the required work cannot be performed by using multishift operations or by employing additional personnel.

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

(End of clause)

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

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

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

"Transportation is for authorized supplies under Contract # HR0011-10-C-0125 and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the Government."

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

"Transportation is for authorized supplies under Contract # HR0011-10-C-0125 and the actual total transportation charges paid to the carrier(s) by the consignor or consignee shall be reimbursed by the Government, pursuant to cost-reimbursement Contract # HR0011-10-C-0125. This may be confirmed by the Contracting Officer."

(End of clause)

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

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

(End of clause)

52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

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

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

(End of clause)

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

(a) The Contractor shall include an acknowledgment of the Government's support in the publication of any material based on or developed under this contract, stated in the following terms: This material is based upon work supported

## Section J - List of Documents, Exhibits and Other Attachments

## Exhibit/Attachment Table of Contents

DOCUMENT TYPE	DESCRIPTION	PAGES	DATE
Attachment 1	Statement of Work	6	20-SEP-2010
Attachment 2	Identification and Assertion of IP Restrictions	1	17-SEP-2010

**ATTACHMENT 1**  
**Statement of Work (SOW)**  
**20 September 2010**

HRL's Ideal Networked sStructures (b)(4) approach seeks to develop a design paradigm for passively adaptive structural systems that combine (b)(4) to mitigate shock and vibrations. The contractor will focus on using novel structural configurations of (b)(4). (b)(4) In Task 1 HRL, in conjunction with (b)(4) (b)(4) will develop a basis set of robust non-linear structural building blocks or structural logic units (SLUs) that exhibit (b)(4). In Task 2, the contractor will create a topology engine that uses accurate simulation of building blocks to construct optimized structural assemblies that deliver unprecedented combinations of (b)(4). Subsequently, optimized assemblies will be built and tested.

**Task 1 – Structural Logic Unit (SLU) Development (HRL, 12 months)**  
**(Sept. 1, 2010 – Sept. 1, 2011)**

**Task 1.1 SLU concept development (HRL, 9 months)**

HRL will develop (b)(4) structural logic unit (SLU) designs that include combinations of (b)(4) (b)(4) that have their architecture and performance characteristics mapped based on constraints of common structural materials properties and manufacturability. **Completion Criteria:** Generation of (b)(4) (b)(4) with consideration of manufacturing and performance sensitivities (such as (b)(4)) (Milestone M5)

**Task 1.2 SLU modeling and simulation (HRL, 9 months)**

HRL will model and simulate quasi-static performance of SLUs from Task 1.1 to generate a range of response characteristics of interest for the targeted application. HRL will integrate SLU design tools from (b)(4) (Task 1.4, Task 1.5) (b)(4) (Task 1.6, Task 1.7) milestones. HRL will compute and map the achievable SLU performance range for the "library" based on in-house data and information acquired from prototype architectures using common structural materials properties. **Completion Criteria:** Development of "library" of three or more models and their simulated performance envelopes. (M6)

**Task 1.3 SLU fabrication and testing (HRL, 12 months)**

HRL will fabricate and test three or more candidate SLU "library" designs that demonstrate the desired response characteristics over the range of vibration and shock conditions as specified (b)(4) (Task 1.8). The SLUs will be built from common structural materials and will include combinations of (b)(4).

(b)(4) Based on testing and analysis of designed components, an application analysis (b)(4) (Task 1.8) will be made to assess materials requirements. **Completion Criteria:** Completed package of load-response spectra for at least one SLU design that can respond with >10dB isolation across 1 to 10Hz loading frequencies (Deliverable D1-month 9, major milestone). HRL will produce load-response data for a high force SLU that achieves (b)(4) (D2-month 12, major milestone). Completion of an application analysis given requirements for high-speed watercraft, including materials requirements for fatigue, degradation and environmental effects (D3 - month 12, major milestone).

**Task 1.4 SLU design optimization (b)(4) 12 months)**

(b)(4) perform topology optimization of structural logic unit (SLU) designs formed from (b)(4) (b)(4) to generate preliminary SLU designs (M2) and then place constraints in manufacturability, reliability performance and materials properties to generate Refined SLU designs (M7). (b)(4) at least three SLUs (M10) using rapid prototyping technology (b)(4). **Completion Criteria:** Fabrication of at least three SLUs and generate SLU dynamic test data (M11).

**Task 1.5 SLU characterization and network analysis (b)(4) 12 mos.)**

(b)(4) using bond graph representations and lumped parameter equivalent network methods to generate specific dynamic structural response characteristics. (b)(4) of model SLUs to generate SLU simulation and results (M8). (b)(4) three or more SLU constitutive models and simulation results (M12) that create different types of structural filters using constitutive models of SLUs. **Completion Criteria:** Generation of simulation/experiment comparison data (M13) from the models and measurements of prototype systems.

**Task 1.6 SLU stability modeling (b)(4) 12 months)**

(b)(4) of SLUs (M3) using (b)(4) for combinations of (b)(4) will use these models to assess (b)(4). **Completion Criteria:** Generation of stability predictions for time/rate sensitivities for SLUs (M14).

**Task 1.7 SLU experimental validation and testing (b) 12 months)**

(b)(4) in SLU concept (M8) generation and fundamental understanding of SLU concepts and characteristics. (b)(4) SLU concepts based upon (b)(4). (b)(4) SLUs from all team members for time, rate and temperature sensitivities. **Completion Criteria:** Validation of modeled stability range in different SLU (b)(4) from experimental testing data (M15).

**Task 1.8 Requirements development (b)(4) 12 months)**

(b)(4) the technical requirements to HRL for watercraft structures subjected to a range of operational vibration and shock conditions including engine-induced vibrations and "wave slap." These metrics include displacement and acceleration load magnitudes, directions and frequency / rate response needed to damp dynamic shock and vibrations. (b)(4) in team meetings to provide fabrication and implementation guidance. **Completion Criteria:** *Completed package of displacement, load, magnitude, rate, and frequency response data for several different vibration and shock conditions (M1).*

**Task 1.9 Program management (HRL, 12 months)**

HRL will manage this program, prepare monthly financial and quarterly technical documentation, lead biannual technical exchanges and prepare a final report. **Completion Criteria:** *HRL will prepare monthly financial and quarterly technical documentation. Task 1 final report (D4).*

**Deliverables:**

- **Reports:** Quarterly program status on technical progress, milestones, schedule and monthly financial reports.
- **D1: Test results for an adaptive structural logic unit with >10dB isolation for 1 to 10Hz loading frequencies (month 9):** In Task 1.3 we will fabricate and test an SLU design that demonstrates Task 1 metric vibration response characteristics with >10dB isolation.
- **D2: Test results for a structural logic unit that exhibits (b)(4) (month 12):** In Task 1.3 we will fabricate and test a high force SLU that achieves Task 1 stiffness and damping metrics.
- **D3: Application Analysis (month 12):** An application analysis given requirements for high speed watercraft (from task 1.8) will be made to assess material requirements including fatigue, degradation and environmental effects for SLUs fabricated in task 1.3.
- **D4: Final report (month 12):** Report to include (1) Structural logic unit designs and software tools that quantify design parameter mapping to shock / vibration properties and performance for the selected structural material system(s); (2) SLU fabrication and data characterization package that includes quasi-static and dynamic testing of different "library" members that can meet the technical metrics for the study application; (3) Details of fabrication and testing of SLU variants that achieve Task 1 metrics for high stiffness / high damping and load attenuation and vibration response from 1 to 10 Hz (including an additional >10dB isolation metric).

**Task 2 – Structural Logic Unit Assembly (SLUA) Development (HRL, 14 months)  
(Sept. 1, 2011 – Nov. 1, 2012)**

**Task 2.1 Structural Logic Unit Assembly (SLUA) Development (HRL, 9 months)**

HRL will develop concepts for integrating SLUs into assemblies and help develop a methodology with Task 2.4-UTA and Task 2.6-UW to integrate SLU models from Task 1 into a network formation tool. This network formation tool will allow assessment of (b)(4)

(b)(4) in different SLU configurations. **Completion Criteria:** Initial version of network formation tool that explore material and design sensitivities for stability, stiffness, and loss of structural logic assemblies (M16).

**Task 2.2 SLUA prototype fabrication (HRL, 14 months)**

HRL will identify construction and fabrication methods for (b)(4) (b)(4) SLU variants based on results from design optimization Task 2.4 and modeling in Task 2.6 that reduce sensitivity to manufacturing tolerances, material property variations and environmental temperature and maximize performance. **Completion Criteria:** Fabrication of three or more prototype SLU assemblies using integrated design methodologies and tools that vary due to element construction, configuration, and sensitivity to vibration and shocking loading conditions. A high force SLU assembly that will be tested against Task 2 technical metric goals (b)(4) in Task 2.3 (D6-month 22, major milestone).

**Task 2.3 SLUA dynamic testing and validation (HRL, 14 mos.)**

HRL will perform mechanical testing under a variety of loading conditions, rates and frequencies to test and validate the SLU assemblies made in Task 2.2 – HRL and Task 2.4 – (b)(4) HRL will perform dynamic and static structural response testing (in coordination with (b)(4) for validation) between 0.1 to 10 Hz and response times of 0.01 seconds in prototype (b)(4) SLU assemblies. HRL will analyze the capabilities and materials requirements of said assemblies against application needs defined in task 2.8. **Completion Criteria:** Completed package of measure and report response spectra data for three or more prototype SLU assemblies fabricated in Task 2.2-HRL or Task 2.4- (b)(4) that are designed to have performance of 10dB loading attenuation, response time of 0.01 seconds and tailored frequency response from 0.1 to 10 Hz. (D5-month 19, major milestone). A high force SLU assembly that achieves Task 2 technical metric goals (b)(4) (D7-month 26, major milestone), HRL will perform a materials and component analysis given input from task 2.8 including a detailed understanding of fatigue and drift effects and a materials assessment for a high-speed watercraft application.

**Task 2.4 SLUA design and optimization (b)(4) 14 mos.)**

(b)(4) of SLU assemblies by performing computational search, combinatorial synthesis and optimization routines that simulate numerous assembly variations (b)(4) among individual SLUs. (b)(4) of SLUs for different structural response conditions. The synthesis tool (topology engine) will enable mix-and-match of SLUs developed in Task 1 and rapid analysis and parametric refinement/optimization of the assembly (b)(4) manufacturability, and reliability characteristics. (b)(4) macro-scale prototypes of candidate assemblies of SLUs using (b)(4) Dynamically test candidate assemblies (in coordination with Task 2.5) and use results to update assembly optimization and analysis tools. **Completion Criteria:** Provide HRL with a SLU assembly synthesis tool for integration in Task 2.1 (M17); Create SLU assembly rapid prototypes used to validate optimized SLU assembly by testing the accuracy of prototype

structural response characteristics and comparison with network models in Task 2.5 (M21).

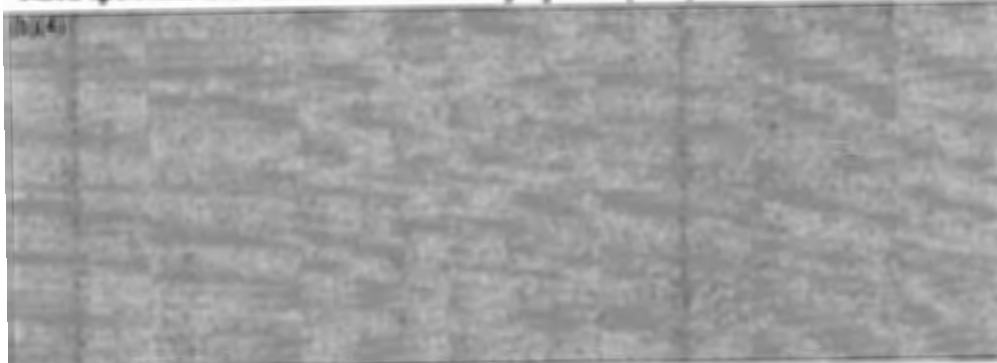
**Task 2.5 Adaptive SLUA development and testing** (b)(4) 14 months

(b)(4) testing of the SLU assemblies to meet different dynamic structural response characteristics. (b)(4) (b)(4) dynamic models and network toolkits developed in Task 1.5.1 to devise SLU networks tailored for targeted dynamic loading conditions given available prototype SLUs. (b)(4) SLU networks modeled in the previous subtask using macroscale prototypes developed in Task 2.4.2 and characterize the dynamic response. (b)(4) compare experimental and theoretical results. Use measured results to inform future SLU network design and make recommendations for SLU network effectiveness. (b)(4) (b)(4) SLU dynamic models and results to HRL for integration into SLU assembly design tool. **Completion Criteria:** Creation and delivery of theoretical SLU assembly models (M18); Dynamic model of SLU assemblies (M22); Simulation/experiment comparison data of SLU assemblies (M26); SLU assembly design tool (M27).

**Task 2.6 SLUA modeling** (b)(4) 14 months

(b)(4) (b)(4) of SLUs assemblies from HRL (b)(4) and how these (b)(4) (b)(4) to derive static stability guidelines in SLU assemblies. **Completion Criteria:** Completed package of model results and design tool for SLU assemblies (M19); Completed data package of SLU assembly performance changes

based upon time and rate sensitive materials properties (M23).



**Task 2.8 SLUA fabrication** (b)(4) 8 months

(b)(4) one or more structural logic unit assemblies for HRL, according to test article deliverable to validate the (b)(4) (b)(4) in team meetings to provide fabrication and implementation guidance. **Completion Criteria:** Fabrication of one or more structural logic unit assemblies provided to HRL for structural response testing (M25).



**Task 2.9 Program management (HRL, 14 months)**

HRL will manage the program, prepare monthly financial and quarterly technical documentation, lead biannual technical exchanges and prepare a final report. **Completion**

**Criteria:** *HRL will prepare monthly financial and quarterly technical documentation. Final report and presentation. Quarterly and final report deliverables are labeled D7, D9, D11, D13.*

**Deliverables:**

- **Reports:** Quarterly program status on technical progress, milestones, schedule and monthly financial reports.
- **D5: Test results for structural logic assemblies (month 19):** In Task 2.3, response spectra data package for three or more prototype SLU assemblies fabricated in Task 2.2-HRL or Task 2.4- (b)(4) that are designed to have performance sensitivities including, loading magnitude, response time of 0.01 seconds and tailored frequency response from 0.1 to 10 Hz.
- **D6: Structural logic assemblies (month 22)** In Task 2.2 fabrication of three or more prototype SLU assemblies that vary due to element construction, configuration, and sensitivity to vibration and shocking loading conditions. One or more high force SLU assemblies will be made to test against the Task 2 goals (b)(4)  
(b)(4)
- **D7: Testing of a high force SLU assembly (b)(4)**  
(month 26): A high force SLU assembly will be made and tested against the Task 2 performance goals.
- **D8: SLU materials and component analysis (month 26):** A materials and component analysis including (b)(4) along with a materials assessment for a high-speed watercraft marine application.
- **D9: Final report (month 26):** Report to include (1) SLU assembly designs and software tools that quantify design parameter mapping to shock / vibration properties and performance for the selected structural material system(s); (2) SLU assembly fabrication and data characterization package that includes quasi-static and dynamic testing of different prototypes that can meet the technical metrics for the study application; (3) Details of fabrication and testing of SLU variants that achieve Task 1 metrics (b)(4) and load attenuation and vibration response from 0.1 to 10 Hz and 0.01 second loading rates (including an additional >10dB isolation metric); and (4) details of materials and component analysis for high-speed watercraft application, including fatigue and environmental effects.

**ATTACHMENT NUMBER 2**

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

**17 September 2010**

HRL Laboratories, LLC under DFARS 252.227-7017 asserts for itself that the Government's rights to use, release, or disclose the following technical data or computer software should be restricted:

<b>Technical Data To Be Furnished With Restrictions</b>	<b>Basis For Assertion</b>	<b>Asserted Rights Category</b>	<b>Name Of Person Asserting Restrictions</b>
(b)(4)			