


UNCLASSIFIED

AWARD/CONTRACT		1. THIS CONTRACT IS A: <input type="checkbox"/> ORDER UNDER DPAS (15 CFR 101.10) <input type="checkbox"/> REQUEST		PAGE 1 OF 25																																																																													
2. CONTRACT (Proc./Inv./Ident.) NO. 2014-14082800003		3. EFFECTIVE DATE 09/04/2014		4. REQUISITION/PURCHASE REQUEST/PROJECT NO.																																																																													
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19B. NAME OF CONTRACTOR BY 			20B. DATE SIGNED 9/4/14																																																																														
19C. DATE SIGNED 9/4/14			20C. DATE SIGNED 9/4/14																																																																														

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NSN 7540-01-155-9059
Previous edition is obsolete

STANDARD FORM 26 (REV. 5/2011)
(Prescribed by GSA FPMR (41 CFR) 101-11.6)

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19A. NAME AND TITLE OF SIGNER (Type or print)				20A. NAME OF CONTRACTING OFFICER			
19B. NAME OF CONTRACTOR				20B. UNITED STATES OF AMERICA			
BY _____ (Signature of person authorized to sign)				BY _____ (Signature of Contracting Officer)			
19C. DATE SIGNED				20C. DATE SIGNED			

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Section A - Solicitation/Contract Form**152.204-721 Use of Facsimile Signatures (JUN 2002)**

This Contract document may be executed in counterparts, each of which shall be deemed an original, all of which together shall constitute one and the same instrument. Facsimile signatures will be regarded as authentic by all parties.

Section B - Supplies or Services and Prices/Costs**CLIN DETAILS**

Number	Commodity Name	Quantity	Unit	Unit Price	Total (inc. disc. / tax / fees)
0001	SERVICE	Total: 1.000000		Total: \$258,908.0000	Total: \$258,908.00
	Delivery Schedule:				
	Period of Performance: 09/04/2014 - 09/03/2016				
	Description: CLIN 0001/COST/Base/Tasks 1.1- 1.3				
	Pricing Options:	Period: Base		Quantity:	
	Funding: Accounting Line 1: \$258,908.00				
0002	SERVICE	Total: 1.000000		Total: \$439,133.0000	Total: \$439,133.00
	Delivery Schedule:				
	Period of Performance: 09/04/2014 - 09/03/2015				
	Description: CLIN 0002/COST/Base/Task 2.1				
	Pricing Options:	Period: Base		Quantity:	
	Funding: Accounting Line 1: \$439,133.00				
0003	SERVICE	Total: 1.000000		Total: \$471,840.0000	Total: \$471,840.00
	Delivery Schedule:				
	Period of Performance: 09/04/2015 - 09/03/2016				
	Description: CLIN 0003/COST/Option/Task 2.2				
	Pricing Options:	Period: Unexercised Option		Quantity:	
	Funding:				

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Contractor Name: UNIVERSITY OF MARYLAND
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	CLIN Funding	Cost
Period Base Totals:	\$698,041.00	\$698,041.00
Period Exercised Options Totals:	\$0.00	\$0.00
Period Current (Base + Exercised Options) Totals:	\$698,041.00	\$0.00
Period Unexercised Options Totals:	\$0.00	\$471,840.00
Period Base and Options Totals:	\$698,041.00	\$1,169,881.00
Quantity Base Totals:	\$0.00	\$0.00
Quantity Exercised Options Totals:	\$0.00	\$0.00
Quantity Current (Base + Exercised Options) Totals:	\$0.00	\$0.00
Quantity Unexercised Options Totals:	\$0.00	\$0.00
Quantity Base and Options Totals:	\$0.00	\$0.00

152.216-757 Type of Contract and Consideration (Cost) (OCT 2003)

This is a Cost contract as identified under Federal Acquisition Regulation (FAR) 16.302, bearing no fee and in the estimated cost of \$698,041.

152.216-774 Scope of Contract (Statement of Work) (OCT 2003)

The Contractor shall, in accordance with the terms and conditions set forth hereafter, furnish the necessary qualified personnel, services, travel, facilities, and materials (except those specifically designated to be provided by the Government) and do all things necessary and incident to completion of the contractual effort in accordance with the Section C, Statement of Work (SOW).

Section C - Descriptions/Specifications/Statement of Work**152.211-701 Statement of Work (OCT 2003)**

The Sponsor's Statement of Work entitled "Solid Electrolytes for Lithium-ion Batteries, Rev 5" dated 11 June 2014, which is incorporated by reference or attached hereto, is made a part of this contract.

Section E - Inspection and Acceptance

Contractor Name: UNIVERSITY OF MARYLAND
Contract Number: 2014-14082800003

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52.246-9 Inspection of Research and Development (Short Form) (Apr 1984)

The Government has the right to inspect and evaluate the work performed or being performed under the contract, and the premises where the work is being performed, at all reasonable times and in a manner that will not unduly delay the work. If the Government performs inspection or evaluation on the premises of the Contractor or a subcontractor, the Contractor shall furnish and shall require subcontractors to furnish all reasonable facilities and assistance for the safe and convenient performance of these duties.

(End of clause)

Section F - Deliveries or Performance

PERIOD OF PERFORMANCE

ITEM	START	END
0001	09/04/2014	09/03/2016
0002	09/04/2014	09/03/2015
0003	09/04/2015	09/03/2016

152.211-704 Late Delivery (AUG 1996)

When the Contractor encounters difficulty in meeting performance requirements, or anticipates difficulty in complying with the contract delivery schedule or date, it shall immediately notify the Contracting Office in writing giving pertinent details; provided, however, that this data shall be informational only in character and that this provision shall not be construed as a waiver by the Government of any delivery schedule or any rights or remedies provided by law or under this contract.

152.211-705 Period of Performance (AUG 1996)

The period of performance of this contract shall be from 04 September 2014 to 03 September 2016.

152.211-707 Place of Performance (AUG 1996)

The principal place of performance under this contract shall be the Contractor's facility located at College Park, MD.

152.242-708 Contract Status Report (JUL 2009)

(a) Monthly contract status reports shall be submitted in two copies to the Contracting Officer not later than 15 calendar days after the close of the invoice/billing cycle covered by the report. Such report shall be in the format as provided in the attached Monthly Contract Status Report exemplar.

(b) The Monthly Contract Status Report for this contract will consist of the following template sections:

- Contract Summary
- Program Actuals
- Financial/Hourly Summary

Contractor Name: UNIVERSITY OF MARYLAND
Contract Number: 2014-14082800003

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52.242-15 Alt I Stop-Work Order (Aug 1989) - Alternate I (Apr 1984)

(a) The Contracting Officer may, at any time, by written order to the Contractor, require the Contractor to stop all, or any part, of the work called for by this contract for a period of 90 days after the order is delivered to the Contractor, and for any further period to which the parties may agree. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop-work is delivered to the Contractor, or within any extension of that period to which the parties shall have agreed, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Termination clause of this contract.

(b) If a stop-work order issued under this clause is canceled or the period of the order or any extension thereof expires, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract that may be affected, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to the adjustment within 30 days after the end of the period of work stoppage; provided, that, if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon the claim submitted at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(End of clause)

Section G - Contract Administration Data

152.232-701 Billing Cycle (SEP 2010)

Pursuant to the "Electronic Submission of Payment Requests using IPP" clause, the Government will issue payment only after services have been rendered. Consequently, Contractors shall submit invoices in arrears and no more frequently than monthly.

152.232-719 SUBMISSION OF INVOICES (JAN 2004)

Notwithstanding the provisions of the clause of this contract at FAR 52.216-7, Allowable Cost and Payment, Contractors shall not submit invoices or requests for contract interim payment more often than once a month.

152.232-721 Billing Instructions (APR 2006)

Contractor shall submit invoices on a monthly basis in arrears. Contractors shall combine delivery tickets on a consolidated invoice with each ticket listed as a separate line item by number, date, and amount.

Contractor Name: UNIVERSITY OF MARYLAND
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152.232-725 Electronic Submission of Payment Requests Using IPP (APR 2014)

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

- (1) "Contract financing payment" and "invoice payment" have the meanings given in FAR section 32.001.
- (2) "Electronic form" means using the Invoice Processing Platform (IPP) to transmit information electronically from the Contractor to the internal contract management system. The Agency does not consider facsimile, e-mail, and scanned documents to be electronic forms.
- (3) "Payment request" means any request for contract financing payment or invoice payment submitted by the Contractor under a contract.

(b) Except as provided in paragraphs (e) and (g) of this clause, the Contractor shall submit payment requests using the Invoice Processing Platform (IPP). The payment period designated by the Prompt Payment Act will begin on the date a proper and complete invoice is received in the payment office via IPP. The status of submitted invoices is available in IPP. For other invoice or payment questions relating directly to this contract, call the payment office on

(b)(3)

(c) The Contract Line Item Numbers (CLINs) and associated CLIN descriptions as provided in IPP must be utilized to create invoices. An Invoice Line Item Number must reference the Contract Line Item Number (CLIN) against which the Contractor is billing. An invoice may have multiple Invoice Lines billing against one CLIN, but the Invoice Line Item Descriptions must closely relate to the CLIN descriptions in the contract. For Material Line Item CLINs, the vendor must match the "Unit Price" to the penny on the referenced CLIN or the invoice will be rejected. Do not attach any documents to the invoice submitted in IPP as the attachments will be discarded. Any additional documentation must be submitted to the COTR in a method mutually agreed to by the Contractor and the COTR.

(d) The Invoice shall not include any sensitive and/or classified information, nor identify the Sponsor or any of its facilities. Any invoice including sensitive and/or classified information will not be considered a proper invoice in accordance with the Prompt Payment Act and will be rejected. Further, the submission of such an invoice may be considered a security incident. Any questions concerning this matter should be directed to the Contracting Officer.

(e) If the Contractor is unable to submit a payment request in electronic form, or the Agency is unable to receive a payment request in electronic form, the Contractor shall submit the payment request using a method mutually agreed to by the Contractor, the Contracting Officer, and the payment office.

(f) In addition to the requirements of this clause, the Contractor shall meet the requirements of the appropriate payment clauses in this contract when submitting payment requests.

(g) The Contractor shall submit the final invoice or voucher for cost reimbursement contracts in accordance with the "Contract Settlement Documentation" clause of this contract.

152.232-727 Invoice Processing Platform Initial Registration and Account Maintenance (MAY 2014)

(a) The Invoice Processing Platform (IPP) is a secure, web-based electronic invoicing system (accessible via the Internet) provided by the Department of the Treasury's Financial Management Service (FMS), in partnership with the Federal Reserve Bank of Boston. The Contractor shall provide the Contracting Officer with the following information required for IPP registration:

- (1) Company Name (primary corporate location);
- (2) Company Tax Identification Number (TIN); and
- (3) Company designated IPP account administrator, to include: name, position, phone number, e-mail address.

Contractors currently registered with IPP through another Government agency do not need to register again in IPP, but must still register separately through the Agency's Contracting Officer for payments from this Agency.

(b) Within 1-2 weeks after the contract is signed, the information provided in paragraph (a) will be forwarded to IPP and the company designated IPP account administrator will then receive two e-mails from the Treasury Web Applications

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Infrastructure's (TWAI) e-mail address twai.gov@mail.eroc.twai.gov.

(1) From "IPP User Administration" - the Company's IPP User ID, a link to the IPP Application, and the IPP Helpdesk phone number.

(2) From "Treasury UPS User Administration" - the Company's IPP password (sent within 24 hours of the first e-mail).

(c) During registration, one (1) initial administrative user account is created for the company for the submitted TIN, regardless of the number of contracts or locations associated with the TIN. The IPP account administrator is required to set up all other company user accounts, including other administrators. Registration is complete when the IPP account administrator logs into the IPP website with the User ID and password provided by TWAI and accepts the "rules of behavior".

(d) The Contractor shall access a first time login video found on the IPP homepage, which provides step-by-step instructions for logging into IPP for the first time. Other self-help videos, to include creating and submitting invoices, are available only after logging into IPP.

(e) Passwords in IPP expire every 180 days. Fourteen days prior to the end of the 180-day period, IPP will send an e-mail notification prompting you to change your password. If you do not change your password once during the 180 days, or if you do not change your password when prompted to do so, you must contact the IPP Helpdesk at 1-866-973-3131 to unlock your account and to reset your password.

(f) IPP requires that all contractors re-certify annually. Failure to recertify will result in their accounts being disabled. Recertification requests are sent by e-mail to the address designated as the IPP account administrator for the contractor. The contractor shall be responsible for ensuring that any information requested by IPP for the purposes of recertification is provided to IPP within the timeframe designated in the correspondence. If the contractor has any questions about the recertification process or if their account becomes disabled, the contractor shall contact the IPP Help Desk at 1-866-973-3131 for assistance.

(g) When entering invoice description fields into IPP, the contractor shall not use classified and/or sensitive words and phrases in any portions of their submitted invoices. The Agency has sole discretion on what constitutes a classified and/or sensitive word or phrase. Failure to follow this direction will result in the Agency rejecting any invoices containing such words as invalid. The contractor shall consult with the Contracting Officer and the Vendor Service Center for clarifications on questionable words and phrases.

(h) For application specific questions such as how to create an invoice or how to set up notifications, contact the IPP Helpdesk. For questions related to the contract, contact the Vendor Service Center at

(b)(3)

152.242-701 Authority and Designation of a Contracting Officer's Technical Representative (COTR) (OCT 2008)

(a) Authority: Performance of this contract is subject to the technical guidance, supervision and approval of the Contracting Officer or a designated Contracting Officer's Technical Representative (COTR). As used herein, "technical guidance" is restricted to scientific, engineering or other technical field-of-discipline matters directly related to the work to be performed. Such guidance may be provided for the purposes of filling in details, clarifying, interpreting or otherwise serving to accomplish the technical objectives and requirements of the contract. In addition, and unless specified elsewhere in this contract, the authority of the designated COTR is specifically limited to the technical administration of this contract and the inspection of supplies being produced, services being provided or work being performed to assess compliance with the scope, estimated cost (if cost-reimbursement), schedule, and technical requirements of the contract.

(b) If an Associate COTR (ACOTR) or a Government Task Manager (GTM) is designated by this clause, the ACOTR will assist the COTR in his/her responsibilities and will function as the technical representative of the Contracting Officer in the absence of the COTR. The GTM will assist the COTR in performing his/her responsibilities for a specific task(s). However, the COTR remains ultimately responsible for the technical performance of the contract.

(c) Designation: The individual(s) identified below is/are authorized access to all information concerning this contract during the life of the contract unless this authorization is reassigned by an administrative change to the contract:

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COTR: Name Telephone No.
Provided Separately

(b)(3)

(d) Notification: The Contracting Officer is the only representative of the Government authorized to negotiate, enter into, modify or take any other action with respect to this contract. Therefore, no other employee or representative of the Government has the authority to initiate a course of action which may alter the terms or conditions of this contract. All revisions to specifications, requirements or informal commitments that may involve a change in either the total cost/price, scope, delivery schedule, or legal aspects of this contract must be done by change order or supplemental agreement, to be negotiated and signed by the Contracting Officer. Should any action by Government personnel (other than the Contracting Officer) imply a commitment on the part of the Government that would affect the terms of this contract, the Contractor must notify the Contracting Officer and obtain approval before proceeding. Otherwise, the Contractor proceeds at its own risk.

152.242-718 Novation/Change-of-Name Notification Requirement (MAR 2011)

(a) For the purposes of this contract, any transfer of the contractor's assets to a third party, or change to the contractor's name, that fall under FAR 42.12, will be processed in a centralized manner by the staff at the following address:

Office of the Procurement Executive

Washington, DC 20505

Unclassified Fax:

(b)(3)

(b)(3)

(b) Until the settlement of this contract is completed, the Contractor shall provide written notification to this staff via facsimile within (30) thirty days of any fore-mentioned changes. Along with details of the change, your notification shall provide a point of contact name, title, clearance level, and phone and fax numbers.

(c) After receiving this notification, your designee will receive a letter with instructions to assist in the preparation of the novation/change-of-name package. Our organization will typically recognize Other Government Agency (OGA) Agreements; however, we have unique security requirements that must be addressed before formally accepting these agreements.

(d) You are reminded that you must continue to invoice under your former name on existing contracts until this Agency accepts your novation and/or change-of-name agreement by issuance of a letter recognizing the agreement. In addition, you are NOT authorized to request changes to your banking information to recognize a successor company on existing contracts until this Agency accepts your novation and/or change-of-name agreement. Any delays in submitting the required information may impact your ability to invoice.

(e) A submission of a novation or name change agreement does not guarantee approval by this organization and if a change is deemed unacceptable, the contractor will remain under contractual obligation to perform. The contract may be terminated for reasons of default should the contractor not perform.

152.245-716 Quarterly Financial Reporting of Contractor Acquired Property (MAY 2014)

(a) *General:* The Contractor shall maintain adequate property control procedures, records, and a system of identification of all Contractor Acquired Property (CAP), to include contractor fabricated property, authorized for acquisition under this contract. CAP is accountable to this contract in accordance with FAR Part 45 and the Government Property clauses incorporated in this contract.

(b) *Financial Reporting - General:* The Government must account for and report assets in accordance with 31 U.S.C. 3512 and 31 U.S.C. 3515, Federal Accounting Standards, and Office of Management and Budget (OMB) instructions. Because Contractors maintain the custodial records for Government assets in their possession, the Government must periodically obtain data from those records to complete its financial reports. Changes in Federal Accounting Standards

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and OMB reporting requirements may occur from year to year, requiring Contractor submission of supplemental information. The specific Statements of Federal Financial Accounting Standards (SFFAS) to be used for property records are SFFAS No. 3 "Accounting for Inventory and Related Property," SFFAS No. 6, "Accounting for Property, Plant and Equipment (PP&E)", and "SFFAS No. 11, "Amendments to PP&E: Definitional Changes" issued by the Federal Accounting Standards Advisory Board.

(c) *Submitting Quarterly Financial Reports:* The Contractor's property control system shall record and report the total acquisition cost of CAP for which the Contractor is accountable under this contract. The Contractor shall submit Quarterly Financial Reports, as a Microsoft Excel document, to the Government Property Administrator at the address indicated in clause 152.245-714, Government Property, in accordance with the detailed instructions set forth in the Section J attachment entitled "Quarterly Financial Reporting Requirements for Contractor Acquired Property (CAP)."

(d) *Property Disposition Report:* The Contractor shall include in its Quarterly Financial Reports all applicable disposition (e.g., returned, transferred, abandoned in place) of Government Property reported as Contractor Acquired or Contractor Fabricated Property on a previous Quarterly Financial Report. The Contractor shall maintain a copy of supporting documentation for all applicable dispositions of CAP in the quarterly reporting period following a change in CAP status. At a minimum, documentation shall support the date, reason, and authorization for each change in CAP status.

(e) *Documentation Required to Support Contractor Acquired Property Assets:* The Contractor shall maintain a copy of all documentation to support the reported total acquisition cost and acquisition date/date placed in service for all CAP valued at \$50,000 and above on the first quarterly reporting period following the date purchased or upon completion and acceptance by the Government of Contractor fabricated assets. Contractor fabricated assets should only be reported once completed, accepted by the Government and only if delivered in place. Contractor fabricated assets delivered to the Government shall be the responsibility of the Government for inclusion into financial reporting. All CAP purchases since the last submitted quarterly financial report must be reported on the next quarterly financial report. Total acquisition cost includes all costs incurred to bring the CAP to the form and location of its intended use. This might include cost such as materials, labor, overhead, shipping, inspection, testing, etc.

(f) *Subject to Audit:* The Contractor is required to maintain accurate and complete supporting documentation for all assets reported on the Quarterly Financial Report for the life of the asset or the duration of the contract, whichever comes first. This documentation, verification, and condition of the assets are subject to audit by the Government.

(End of Clause)

152.204-732 Contract Settlement Documentation (AUG 2014)

Upon completion of the subject contract, the Contractor shall submit the following documents:

- (a) Electronic Funds Transfer Information (EFT) - The submission of this information is required to keep our payment database current. (One copy required within 60 days after contract completion)
- (b) Final Property Closeout Statement (Government Furnished Property (GFP) and Contractor Acquired Property (CAP) - Form is available in the Government Property manual, see contract clause 152.245-714. (One copy required within 60 days after contract completion)
- (c) Final Patent and Royalty Statement (in accordance with FAR 52.227-11 or 52.227-13, as appropriate) (One copy required within 90 days after contract completion)
- (d) Final Level-of-Effort Certification (*Applicable to contracts with LOE type CLINs*) (Submit in accordance with contract clause 152.216-766)
- (e) Final Cleared Personnel Certification Report (If contract required security clearances) (Submit in accordance with contract clause 152.204-729)
- (f) Final Invoice or Voucher (also referred to as Final Cumulative Claim and Reconciliation [FCCR]) (*Applicable to contracts with cost-type CLINs. Exemption: Cost-type CLINs established for Other Direct Costs or travel on a fixed*

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price contract). Once final annual indirect cost rates have been established, the Contractor shall submit a "FINAL" invoice or voucher. If final annual indirect cost rates have not been established and the parties have agreed to use negotiated quick-close rates, the Contractor shall submit a "FINAL" invoice or voucher. The receipt of an invoice marked "FINAL" shall initiate the settlement of this contract. This "FINAL" invoice is not to be transmitted via electronic submission, but must be submitted in hard copy to the address listed below. (One copy required within 120 days after settlement of final indirect cost rates)

The closeout documentation required in (a), (b), (c), (d), and the Contracting Officer's copy of (e) shall be mailed, postage prepaid, to the Contracting Officer at the Issuing Office address on page 1 of this contract.

The closeout documentation required in (f) shall be mailed, postage prepaid, to:

Contract Settlements



Washington, DC 20505

(b)(3)

If you have any questions in regard to the closeout procedure, please contact the Contracting Officer, or the settlements office at

(b)(3)

Section H - Special Contract Requirements

152.203-701 Fraud, Waste, and Abuse, and Other Matters of Urgent Concern - Unclassified Association (APR 2009)

Anyone who suspects fraud, waste, or abuse in any aspect of the acquisition process or during performance of this contract by either Government or Contractor personnel, or wishes to report an "urgent concern" to Congress, should contact the Office of Inspector General, Investigations Staff, at phone number . The term "urgent concern" means: (a) a serious or flagrant problem, abuse, violation of law or Executive Order, or deficiency relating to the funding, administration, or operations of an intelligence activity involving classified information; (b) any false statement made to Congress, or willful withholding from Congress, on an issue of material fact relating to the funding, administration, or operations of an intelligence activity involving classified information; or (c) an action constituting reprisal or threat of reprisal in response to any person reporting an urgent concern pursuant to this provisions.

(b)(3)

152.204-703 Non-Publicity (DEC 2011)

(a) The Contractor shall not use or allow to be used any aspect of this solicitation and/or contract for publicity. "Publicity" means, but is not limited to, advertising (e.g. trade magazines, newspapers, Internet, radio, television etc.), communications with the media, marketing, or a reference for new business. This shall include, but, is not limited to, the use of the terms "ISSA or ISA" or any other sponsor specific terms in any public advertisements. It is further understood that this obligation shall not expire upon completion or termination of this contract, but will continue indefinitely. The Contractor may request a waiver or release from the foregoing but shall not deviate therefrom unless authorized to do so in writing by the Contracting Officer. Contractors are not required to obtain waivers when informing offices within this Agency of contracts it has performed or is in the process of performing provided there are no security restrictions. Contractors may include the requirement for security clearances up to the TS, SCI level in public employment advertisements; however, these advertisements may not describe the scope of polygraph requirements in any manner. Violations of this clause constitute a major breach of contract, and the contract may be terminated for default, without the requirement of a 10-day cure notice.

(b) The Contractor shall include the substance of this clause, including this paragraph (b), in each subcontract issued under this contract.

152.204-723 Prohibition Against Recruiting on Agency Controlled Facilities (OCT 2008)

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(a) The Contractor shall inform its employees and subcontractors that they are not permitted to engage in employment recruitment while on any facility owned, leased, or otherwise controlled by the Agency or to use Agency communications systems (e.g. cable and computer systems) and nonpublic information in connection with recruitment without written approval of the Contracting Officer. For purposes of this clause, recruitment refers to discussions of future employment with the contractor or subcontractor initiated by an employee of the contractor or subcontractor; distribution of employment forms or other employment paperwork, or similar activities directed towards obtaining the employment of any individual by the contractor or subcontractor. Any Contractor or subcontractor employee who violates this policy may be denied further access to Agency controlled facilities and systems. The Contractor shall emphasize this fact to its employees and subcontractors and shall include the substance of this clause in each subcontract issued under this contract.

(b) The prohibition set forth in paragraph (a) above does not apply to the recruitment of Agency personnel enrolled in the Agency's Career Transition Program.

(c) Denial of access to Agency controlled facilities and systems as described in paragraph (a) of this clause shall not relieve the Contractor from full performance of the requirements of this contract, nor will it provide the basis for any claims against the Government.

152.204-725 Foreign Nationals Performing Unclassified Work (NOV 2005)

(a) The Contractor shall identify any and all personnel who are foreign nationals (personnel who are not United States citizens or Permanent Resident Aliens) that are proposed to perform work under this contract in a prime contractor and/or subcontractor capacity. The Contractor must receive written approval from the Contracting Officer prior to allowing any foreign nationals not listed in paragraph (c) to work on this contract.

(b) Throughout the performance of this contract, the Contractor shall provide the Contracting Officer with the following information at least thirty (30) days prior to the contemplated use of such individuals:

Full Name,
Date and Place of Birth,
Citizenship,
Social Security Number,
Visa Number and Type,
Title.

It should be understood that the Contracting Officer may exclude any person(s) who are not United States citizens from performing on this contract without providing a reason for the exclusion.

(c) The following foreign nationals are hereby authorized to work on this contract:

Name	Title
TBD	

152.204-727 Restrictions Regarding Former Sponsor Employees (APR 2009)

(a) Except as authorized in writing by the Contracting Officer, the Contractor shall not use any person in the direct performance of this contract who:

- (1) Has resigned from employment with the Sponsor within the previous 18 months;
- (2) Has been barred from performing Sponsor contracts for a period of time as a result of a recommendation from a Sponsor Advisory Board; or
- (3) Was terminated from employment with the Sponsor.

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(b) Paragraph (a) includes the use of a person as a contractor employee, subcontractor employee, consultant, independent contractor, or similar arrangement.

(c) Paragraph (a)(1) does not apply to persons who retired from the Sponsor.

(d) The Contractor agrees to include in each subcontract a clause requiring compliance with these restrictions by the subcontractor and succeeding levels of subcontractors.

152.215-719 Incorporation of Section K Representations, Certifications, and Other Statements of Offerors or Respondents (OCT 2003)

SECTION K, which has been completed and submitted with Contractor's proposal dated 14 August 2014 is incorporated herein by reference and made a part of this contract.

152.215-721 Order of Precedence (OCT 2003)

(a) Any inconsistency in this contractual document (inclusive of documents, provisions or exhibits referenced herein or attached hereto) shall be resolved by giving precedence in the following order:

- (1) The Schedule (excluding the SOW and specifications)
- (2) Attachment A - Incentive and Award Fee Plan (if applicable)
- (3) Statement of Work
- (4) Other provisions of the contract when attached or incorporated by reference
- (5) Specifications
- (6) Technical Provisions of the Contractor's Proposal(s)

(b) If a conflict or inconsistency arises out of any of the contract elements listed above, the Contractor shall notify the Contracting Officer of the conflict or inconsistency for final and unilateral resolution. Under no circumstances will such conflicts or inconsistencies result in increases to target cost, fee, award fee or schedule extensions.

152.215-724 Key Personnel (AUG 1996)

(a) The Contractor shall identify the key technical, management and administrative personnel to be assigned to work under this contract:

Name	Title
Dr. Peter Kofinas	Principal Investigator
Dr. Eric Wachsman	Principal Investigator

(b) The personnel specified above are considered to be essential to the work performed hereunder. Prior to diverting any of the specified individuals to other programs, the Contractor shall provide advance notification of at least thirty (30) calendar days to the Contracting Officer and shall submit resumes of the proposed substitutes in sufficient detail to permit evaluation of the impact on the program. No diversion from the above procedure shall be made by the Contractor without the written consent of the Contracting Officer, provided that the Contracting Officer may ratify in writing such diversion and such ratification shall constitute the consent of the Contracting Officer required by this clause.

Section I - Contract Clauses

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152.203-700 Compliance With the Constitution and Statutes of the United States (AUG 1996)

Nothing in this contract shall be construed to authorize any activity in violation of the Constitution or Statutes of the United States.

152.204-733 Timely Notice of Litigation (DEC 2011)

- (a) The Contractor hereby agrees to immediately give written notice to the Contracting Officer of any current litigation or any anticipated litigation that may arise during the course of the performance of this contract or thereafter, that involves or in any way relates to or affects: (1) any aspect of this contract, (2) its terms or costs, (3) pertinent subcontracts, or (4) the Customer's relationship with the Contractor or its subcontractors. This notice shall include all relevant information with respect to the litigation. This notice requirement is a continuing obligation and survives termination, settlement or close-out of the contract.
- (b) The Contracting Officer shall have access to and the right to examine any pertinent books, documents, papers and records of the Prime Contractor or subcontractor(s) involving customer transactions related to any contract litigation.
- (c) Notwithstanding the foregoing, nothing in this agreement shall constitute a waiver of either party's right in litigation, including but not limited to, the rights of attorney-client privilege, to obtain injunctive relief, and/or any rights or remedies available.
- (d) The Contractor agrees to insert paragraphs (a) through (d) of this clause in any subcontract under this contract. In the event of litigation, the subcontractor shall immediately notify its next tier subcontractor or the Prime Contractor, as the case may be, of all relevant information with respect to such litigation.
- (e) The Prime Contractor shall fax a copy of the notice of litigation to the Contracting Officer and to the Contract Law Division at the following fax numbers:

Contracting Officer

Contract Law Division

(b)(3)

(b)(3)

152.209-701 Organizational Conflicts Of Interest: General (JUL 2003)

- (a) The contractor warrants that, to the best of its knowledge and belief, there are no relevant facts that could give rise to Organizational Conflicts of Interest, as defined in FAR 9.501. Or, alternatively, the contractor warrants that it has disclosed all relevant information regarding any actual or potential organizational conflict of interest.
- (b) The contractor agrees that if an organizational conflict of interest with respect to this contract is discovered during its performance, an immediate and full disclosure in writing shall be made to the Contracting Officer. Such notification shall include a description of the action the contractor has taken or proposes to take to avoid, neutralize or mitigate such conflicts. The contractor shall continue performance until notified by the Contracting Officer of any contrary actions to be taken. The Government may, however, terminate the contract for its convenience if it deems such termination to be in the best interest of the Government.
- (c) If the contractor was aware of an organizational conflict of interest before award of this contract and did not fully disclose the conflict to the Contracting Officer, the Government may terminate the contract for default.
- (d) The contractor shall insert a clause containing all the terms and conditions of this clause in all subcontracts for work to be performed similar to the services provided by the prime contractor, and the terms "contract", "contractor", and "contracting officer" modified appropriately to preserve the Government's rights.
- (e) Before a contract modification is made that adds new work or significantly increases the period of performance, the contractor shall agree to submit either an organizational conflict of interest disclosure or representation or an update of a previously submitted disclosure or representation, if requested by the Government.
- (f) Contractor further agrees that Government may periodically review contractor's compliance with these provisions or require such self-assessments or additional certifications as Government deems appropriate.

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152.209-708 Agency Suspension and Debarment (AUG 2004)

The Agency has established suspension and debarment procedures consistent with FAR Subpart 9.4. The Agency will provide a copy of said procedures to the Contractor in the event a notice of proposed suspension or a notice of proposed debarment is issued by the Agency or upon written request to the Contracting Officer.

152.215-700AII Audit and Records - Negotiation - Alternate II (OCT 2013)

(a) As used in this clause, "records" includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.

(b) Examination of costs. If this is a cost-reimbursement, incentive, time-and-materials, labor-hour, or price redeterminable contract, or any combination of these, the Contractor shall maintain and the Contracting Officer, or an authorized representative of the Contracting Officer, shall have the right to examine and audit all records and other evidence sufficient to reflect properly all costs claimed to have been incurred or anticipated to be incurred directly or indirectly in performance of this contract. This right of examination shall include inspection at all reasonable times of the Contractor's plants, or parts of them, engaged in performing the contract.

(c) Certified cost or pricing data. If the Contractor has been required to submit certified cost or pricing data in connection with any pricing action relating to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the certified cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to -

- (1) The proposal for the contract, subcontract, or modification;
- (2) The discussions conducted on the proposal(s), including those related to negotiating;
- (3) Pricing of the contract, subcontract, or modification; or
- (4) Performance of the contract, subcontract or modification.

(d) Reports. If the Contractor is required to furnish cost, funding, or performance reports, the Contracting Officer or an authorized representative of the Contracting Officer shall have the right to examine and audit the supporting records and materials, for the purpose of evaluating -

- (1) The effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports; and
- (2) The data reported.

(e) Availability. The Contractor shall make available at its office at all reasonable times the records, materials, and other evidence described in paragraphs (a), (b), (c), and (d) of this clause, for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in Subpart 4.7, Contractor Records Retention, of the Federal Acquisition Regulation (FAR), or for any longer period required by statute or by other clauses of this contract. In addition -

- (1) If this contract is completely or partially terminated, the Contractor shall make available the records relating to the work terminated until 3 years after any resulting final termination settlement; and
- (2) The Contractor shall make available records relating to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to this contract until such appeals, litigation, or claims are finally resolved.

(f) The Contractor shall insert a clause containing all the terms of this clause, including this paragraph (f), in all subcontracts under this contract that exceed the simplified acquisition threshold, and -

- (1) That are cost-reimbursement, incentive, time-and-materials, labor-hour, or price-redeterminable type or any combination of these;

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- (2) For which certified cost or pricing data are required; or
- (3) That require the subcontractor to furnish reports as discussed in paragraph (d) of this clause.

The clause may be altered only as necessary to identify properly the contracting parties and the Contracting Officer under the Government prime contract.

(g) The provisions of OMB Circular No. A-133, "Audits of States, Local Governments, and Nonprofit Organizations," apply to this contract.

152.229-700 Tax Audits (JAN 2004)

If federal, state, or local tax officials request access to information under this contract, the contractor shall immediately notify the Contracting Officer. The contractor shall also request that the tax officials identify, in writing, the specific information sought for review and shall forward the response and any related documentation to the Contracting Officer. Failure to provide notice to the Contracting Officer may be grounds for denying a cost/price adjustment for the resulting tax liability, if an adjustment is otherwise authorized by law and the terms of this contract.

152.233-700 Independent Review of Agency Protests (JAN 2004)

An independent review of protests to the agency, as defined in FAR 33.103(d)(4), is available as an alternative to consideration by the Contracting Officer. Requests for an independent review shall be submitted directly to the Contracting Officer, along with the protest.

52.216-7 Alt II Allowable Cost and Payment (Jun 2013) - Alternate II (Aug 2012)

(a) Invoicing

(1) The Government will make payments to the Contractor when requested as work progresses, but not more often than once every two weeks, in amounts determined to be allowable by the Contracting Officer in accordance with subpart 31.3 in effect on the date of this contract and the terms of this contract. The Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as the representative may require, an invoice or voucher supported by a statement of the claimed allowable cost for performing this contract.

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

(3) The designated payment office will make interim payments for contract financing on the 30th day after the designated billing office receives a proper payment request. In the event that the Government requires an audit or other review of a specific payment request to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the specified due date.

(b) Reimbursing costs.

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

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

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

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

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

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

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

(C) Direct labor;

(D) Direct travel;

(E) Other direct in-house costs; and

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

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

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

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

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

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

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

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

(d) Final indirect cost rates.

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

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

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

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

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

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

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

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

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- (E) Claimed allocation bases, by element of cost, used to distribute indirect costs.
- (F) Facilities capital cost of money factors computation.
- (G) Reconciliation of books of account (i.e., General Ledger) and claimed direct costs by major cost element.
- (H) Schedule of direct costs by contract and subcontract and indirect expense applied at claimed rates, as well as a subsidiary schedule of Government participation percentages in each of the allocation base amounts.
- (I) Schedule of cumulative direct and indirect costs claimed and billed by contract and subcontract.
- (J) *Subcontract information.* Listing of subcontracts awarded to companies for which the contractor is the prime or upper-tier contractor (include prime and subcontract numbers; subcontract value and award type; amount claimed during the fiscal year; and the subcontractor name, address, and point of contact information).
- (K) Summary of each time-and-materials and labor-hour contract information, including labor categories, labor rates, hours, and amounts; direct materials; other direct costs; and, indirect expense applied at claimed rates.
- (L) Reconciliation of total payroll per IRS form 941 to total labor costs distribution.
- (M) Listing of decisions/agreements/approvals and description of accounting/organizational changes.
- (N) Certificate of final indirect costs (see 52.242-4, Certification of Final Indirect Costs).
- (O) Contract closing information for contracts physically completed in this fiscal year (include contract number, period of performance, contract ceiling amounts, contract fee computations, level of effort, and indicate if the contract is ready to close).
- (iv) The following supplemental information is not required to determine if a proposal is adequate, but may be required during the audit process:
 - (A) Comparative analysis of indirect expense pools detailed by account to prior fiscal year and budgetary data.
 - (B) General organizational information and limitation on allowability of compensation for certain contractor personnel. See 31.205-6(p). Additional salary reference information is available at http://www.whitehouse.gov/omb/procurement_index_exec_comp/.
 - (C) Identification of prime contracts under which the contractor performs as a subcontractor.
 - (D) Description of accounting system (excludes contractors required to submit a CAS Disclosure Statement or contractors where the description of the accounting system has not changed from the previous year's submission).
 - (E) Procedures for identifying and excluding unallowable costs from the costs claimed and billed (excludes contractors where the procedures have not changed from the previous year's submission).
 - (F) Certified financial statements and other financial data (e.g., trial balance, compilation, review, etc.).
 - (G) Management letter from outside CPAs concerning any internal control weaknesses.
 - (H) Actions that have been and/or will be implemented to correct the weaknesses described in the management letter from subparagraph (G) of this section.
 - (I) List of all internal audit reports issued since the last disclosure of internal audit reports to the Government.
 - (J) Annual internal audit plan of scheduled audits to be performed in the fiscal year when the final indirect cost rate submission is made.
 - (K) Federal and State income tax returns.
 - (L) Securities and Exchange Commission 10-K annual report.
 - (M) Minutes from board of directors meetings.
 - (N) Listing of delay claims and termination claims submitted which contain costs relating to the subject fiscal year.

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

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

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

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

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

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

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

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

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

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

(1) Shall be the anticipated final rates; and

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

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

(g) *Audit.* At any time or times before final payment, the Contracting Officer may have the Contractor's invoices or vouchers and statements of cost audited. Any payment may be -

(1) Reduced by amounts found by the Contracting Officer not to constitute allowable costs; or

(2) Adjusted for prior overpayments or underpayments.

(h) *Final payment.*

(1) Upon approval of a completion invoice or voucher submitted by the Contractor in accordance with paragraph (d)(5) of this clause, and upon the Contractor's compliance with all terms of this contract, the Government shall promptly pay any balance of allowable costs and that part of the fee (if any) not previously paid.

(2) The Contractor shall pay to the Government any refunds, rebates, credits, or other amounts (including interest, if any) accruing to or received by the Contractor or any assignee under this contract, to the extent that those amounts are properly allocable to costs for which the Contractor has been reimbursed by the Government. Reasonable expenses incurred by the

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Contractor for securing refunds, rebates, credits, or other amounts shall be allowable costs if approved by the Contracting Officer. Before final payment under this contract, the Contractor and each assignee whose assignment is in effect at the time of final payment shall execute and deliver -

- (i) An assignment to the Government, in form and substance satisfactory to the Contracting Officer, of refunds, rebates, credits, or other amounts (including interest, if any) properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract; and
- (ii) A release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract, except -
 - (A) Specified claims stated in exact amounts, or in estimated amounts when the exact amounts are not known;
 - (B) Claims (including reasonable incidental expenses) based upon liabilities of the Contractor to third parties arising out of the performance of this contract; provided, that the claims are not known to the Contractor on the date of the execution of the release, and that the Contractor gives notice of the claims in writing to the Contracting Officer within 6 years following the release date or notice of final payment date, whichever is earlier; and
 - (C) Claims for reimbursement of costs, including reasonable incidental expenses, incurred by the Contractor under the patent clauses of this contract, excluding, however, any expenses arising from the Contractor's indemnification of the Government against patent liability.

(End of clause)

52.227-1 Alt II. Authorization and Consent (Dec 2007) - Alternate II (Apr 1984)

(a) The Government authorizes and consents to all use and manufacture in the performance of any order at any tier or subcontract at any tier placed under this contract for communication services and facilities for which rates, charges, and tariffs are not established by a government regulatory body, of any invention described in and covered by a United States patent--

(1) Embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract; or

(2) Used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with specifications or written provisions forming a part of this contract or with specific written instructions given by the Contracting Officer directing the manner of performance.

(b) The Contractor shall include the substance of this clause, including this paragraph (b), in all subcontracts that are expected to exceed the simplified acquisition threshold. However, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.

(End of clause)

52.227-11 Patent Rights - Ownership by the Contractor (May 2014)

(a) As used in this clause--

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

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"Made" means--

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(j) *Communications.*

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

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

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

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

(End of clause)

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52.233-1 Alt I Disputes (May 2014) - Alternate I (Dec 1991)

(a) This contract is subject to 41 U.S.C. chapter 71, Contract Disputes.

(b) Except as provided in 41 U.S.C. chapter 71, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under 41 U.S.C. chapter 71 until certified. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under 41 U.S.C. chapter 71. The submission may be converted to a claim under 41 U.S.C. chapter 71, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2)(i) The Contractor shall provide the certification specified in paragraph (d)(2)(iii) of this clause when submitting any claim exceeding \$100,000.

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows: I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am authorized to certify the claim on behalf of the Contractor.

(3) The certification may be executed by any person authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in 41 U.S.C. chapter 71.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative dispute resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the offer.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date that the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in FAR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

(End of clause)

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52.233-3 Alt I Protest after Award (Aug 1996) - Alternate I (Jun 1985)

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as *provided* in the Termination clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract that may be affected, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

(End of clause)

52.243-2 Alt V Changes - Cost-Reimbursement (Aug 1987) - Alternate V (Apr 1984)

(a) The Contracting Officer may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in any one or more of the following:

(1) Drawings, designs, or specifications.

(2) Method of shipment or packing.

(3) Place of inspection, delivery, or acceptance.

(b) If any such change causes an increase or decrease in the estimated cost of, or the time required for, performance of any

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part of the work under this contract, whether or not changed by the order, or otherwise affects any other terms and conditions of this contract, the Contracting Officer shall make an equitable adjustment in the--

- (1) Estimated cost, delivery or completion schedule, or both;
- (2) Amount of any fixed fee; and
- (3) Other affected terms and shall modify the contract accordingly.

(c) The Contractor must assert its right to an adjustment under this clause within 30 days from the date of receipt of the written order. However, if the Contracting Officer decides that the facts justify it, the Contracting Officer may receive and act upon a proposal submitted before final payment of the contract.

(d) Failure to agree to any adjustment shall be a dispute under the Disputes clause. However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

(e) Notwithstanding the terms and conditions of paragraphs (a) and (b) of this clause, the estimated cost of this contract and, if this contract is incrementally funded, the funds allotted for the performance of this contract, shall not be increased or considered to be increased except by specific written modification of the contract indicating the new contract estimated cost and, if this contract is incrementally funded, the new amount allotted to the contract. Until this modification is made, the Contractor shall not be obligated to continue performance or incur costs beyond the point established in the Limitation of Cost or Limitation of Funds clause of this contract.

(End of clause)

Clauses By Reference

Clause	Title
52.202-1	Definitions (Nov 2013)
52.203-3	Gratuities (Apr 1984)
52.203-5	Covenant Against Contingent Fees (May 2014)
52.203-7	Anti-Kickback Procedures (May 2014)
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity (May 2014)
52.203-10	Price or Fee Adjustment for Illegal or Improper Activity (May 2014)
52.203-12	Limitation On Payments To Influence Certain Federal Transactions (Oct 2010)
52.204-4	Printed or Copied Double-Sided on Postconsumer Fiber Content Paper (May 2011)
52.209-6	Protecting The Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment (Aug 2013)
52.215-17	Waiver of Facilities Capital Cost of Money (Oct 1997)
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other than Pensions (July 2005)
52.216-11	Cost Contract - No Fee (Apr 1984)
52.217-2	Cancellation Under Multiyear Contracts (Oct 1997)
52.222-1	Notice to the Government of Labor Disputes (Feb 1997)
52.222-3	Convict Labor (June 2003)
52.222-21	Prohibition of Segregated Facilities (Feb 1999)
52.222-26	Equal Opportunity (Mar 2007)
52.222-35	Equal Opportunity for Veterans (Sep 2010)
52.222-36	Affirmative Action for Workers with Disabilities (Oct 2010)

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Clause	Title
52.222-37	Employment Reports on Veterans (Sep 2010)
52.222-44	Fair Labor Standards Act and Service Contract Labor Standards - Price Adjustment (May 2014)
52.222-50	Combating Trafficking in Persons (Feb 2009)
52.223-6	Drug Free Workplace (May 2001)
52.223-18	Encouraging Contractor Policies To Ban Text Messaging While Driving (Aug 2011)
52.225-13	Restrictions on Certain Foreign Purchases (June 2008)
52.227-2	Notice and Assistance Regarding Patent and Copyright Infringement (Dec 2007)
52.227-14 Alt IV	Rights in Data - General (May 2014) - Alternate IV (Dec 2007)
52.229-3	Federal, State and Local Taxes (Feb 2013)
52.232-20	Limitation Of Cost (Apr 1984)
52.232-24	Prohibition of Assignment of Claims (May 2014)
52.232-25	Prompt Payment (Jul 2013)
52.232-39	Unenforceability of Unauthorized Obligations (Jun 2013)
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 2014)
52.242-13	Bankruptcy (July 1995)
52.244-6	Subcontracts for Commercial Items (May 2014)
52.245-9	Use and Charges (Apr 2012)
52.246-23	Limitation of Liability (Feb 1997)
52.249-5	Termination For Convenience Of The Government (Educational And Other Nonprofit Institutions) (Sept 1996)
52.249-14	Excusable Delays (Apr 1984)

Section J - List of Attachments

Identifier	Title	Date	Number of Pages
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J-1 List of Attachments

- 1) Statement of Work entitled, "Solid Electrolytes for Lithium-ion Batteries, Rev 5" dated 11 June 2014

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►Fax

02 September 2014

From:

Phone:

Fax:

Company Name: Contracts

To: Stephanie Swann/Monique Anderson

Phone: 301.405.6269/301.415.6272

Fax: 301.314.9569

Company Name: University of Maryland

(b)(3)

Comments:

Marcine- Attached is the most recent SOW I sent Stephanie while she was in the office.

Thanks,



(b)(3)

☒ Urgent ☒ For Review ☐ Please Comment ☒ Please Reply ☐ Please Recycle

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STATEMENT OF WORK

FOR

SOLID ELECTROLYTES FOR LITHIUM-ION BATTERIES

11 June 2014

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DOCUMENT		REV BY	SECTIONS AFFECTED
REV	DATE		
V. 1	6/11/14		ALL
v.2	6/26/14		All
V.3	6/26/2014		Contractor Tasks
V.4	7/14/2014		Contractor Tasks
V.5	8/19/2014		Contractor Tasks

(b)(3)

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1.0 (U) INTRODUCTION

1.1 (U) Problem / Background

(U) This SOW defines the Sponsor's requirements for developing solid electrolytes for lithium-ion batteries. One of the key barriers to wide-spread use of lithium-ion batteries is their potential for catastrophic failure due to their lack of inherent abuse tolerance. When cells are thermally or electrically abused, as is often the case during high temperature operations, their temperature can rise and exothermic reactions between combustible, liquid electrolyte and the charged electrodes can cause the cells to undergo thermal runaway. This inherent safety obstacle demonstrates a clear need for a more stable lithium ion battery electrolyte. In addition, Agency operations frequently require the capability to make thin cells of various shapes in short periods that meet QRC (quick reaction capability) constraints. The ionic liquid polymer electrolytes and garnet-type solid lithium-ion electrolytes described herein will further enable that capability.

1.2 (U) Project Objectives/Scope

The project has two main objectives:

1.2.1 Develop a novel flexible solid polymer electrolyte possessing the conductivity of a conventional liquid electrolyte with the low volatility and mechanical properties of a solid.

1.2.2 Develop thin-film high-conductivity garnet-type solid lithium-ion electrolytes in low-interfacial-impedance tailored micro/nano-structures.

2.0 (U) CONTRACTOR TASKS

The Contractor shall perform the following tasks:

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2.1 (U) Safe, High-Performance, Polymer Electrolytes for Lithium-Ion Batteries

These tasks involve developing a novel flexible solid polymer electrolyte possessing the conductivity of a conventional liquid electrolyte with the low volatility and mechanical properties of a solid.

2.1.1 Fabricate coin cells containing Sulfur based polymer electrolyte systems

The Contractor will synthesize and process a library of sulfur based ionic liquids blended with lithium conducting polymers. The Contractor will construct coin cells composed of these hybrid polymer electrolytes as well as mutually agreed upon anode and cathode materials in order to make initial conductivity and transference measurements.

2.1.2 Fabricate pouch cells containing Sulfur based polymer electrolyte systems

The Contractor will produce complete microstructure, electrochemical characterization and safety performance of polymer ionic liquid hybrid electrolyte systems. The Contractor will develop and test single cells as fully functional lithium-ion battery systems. The Contractor will deliver 5 pouch cells demonstrating thicknesses of 0.5mm or thicker that can operate in the temperature range of 0-60° C.

2.1.3 Technology transfer

The Contractor will aid in the transfer of all developed technology developed in Tasks 2.1.1 and Task 2.1.2 to the Sponsor's Facility.

2.2 (U) High-Energy-Density Solid-State Lithium-Ion Batteries with Customizable Form Factors

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These tasks involve developing thin-film high-conductivity garnet-type solid lithium-ion (Li-ion) electrolytes in low-interfacial-impedance tailored micro/nano-structures.

2.2.1 Fabricate SSLiBs by ceramic processing with Sulfur and Lithium Cobalt Oxide cathodes

The contractor will fabricate SSLiBs via tape casting and screen printing and optimize the chemical and mechanical stability of the garnet-type solid Li-ion electrolyte with Lithium metal anodes and both Sulfur and Lithium Cobalt Oxide cathodes. The contractor will fabricate complete packaged SSLiBs with both cathode materials that possess various shapes and thicknesses in the range of 100 μm to 2 mm. The performance of these SSLiBs will be evaluated to determine which cathode material is best capable of achieving the desired performance metrics discussed below. The packaged SSLiBs performance goals will be at least 10 years of calendar life and cycle life in excess of 5,000 cycles, with energy densities of at least 600 Wh/kg and at least 600Wh/L. The SSLiBs will be optimized for and evaluated over the temperature range from -30°C to 150°C and voltage range from 0 V to 5 V. The Contractor will fabricate and deliver 5 optimized performance batteries in form factors and cathode type specified by the Sponsor.

2.2.2 Option Task: 3D printing complete SSLiBs

The Contractor will transition cathode fabrication to additive 3D printing to create linear SSE rod cathode scaffold structure and optimize the SSE rod aspect ratio and spacing to maximize energy and power density. The Contractor will fabricate, via 3D printing, complete packaged SSLiBs with a Sponsor selected cathode material that possess various shapes and thicknesses in the range of 100 μm to 2 mm. The packaged SSLiBs performance goals will be at least 10 years of calendar life and cycle life in excess of 5,000 cycles, with energy density of at least 600 Wh/kg and at least 600Wh/L. The SSLiBs will be optimized for and evaluated over the temperature range from -30°C to 150°C and voltage range from 0 V to 5 V. The Contractor will fabricate and deliver 5 3D printed optimized performance batteries in form factors and cathode type specified by the Sponsor.

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2.2.3 Technology transfer

The Contractor will aid in the transfer of all developed technology developed in **Tasks 2.2.1 and Option Task 2.2.2** to the Sponsor's Facility.

3.0 (U) REPORTING REQUIREMENTS AND DELIVERABLES

3.1 (U) Reporting Deliverables

The Contractor shall demonstrate that all performance obligations are met by providing monthly status reports on cost, schedule, and technical progress.

3.1.1 Kick Off Meeting – a kick off meeting / initial contract review for this program will be held at the Contractor's facility within 10 days of contract initiation.

3.1.2 Program Plan and Milestones – As part of the initial contract review, a program plan will be delivered that outlines the work to be performed and defines the milestone delivery dates. The plan will be updated as required to remain current with the program.

3.1.3 Program Spend Plan/ tracking budget – As part of the initial contract review, a program spend plan will be delivered that details the costs associated with the work to be performed. The plan will be updated as required to remain current with the program.

3.1.4 Monthly Highlights/Technical Report – the Contractor shall provide an electronic technical report of monthly progress to the COTR. A brief report is acceptable and expected. This report is due no later than the 10th day of the month after the reporting period.

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3.1.5 Monthly Financial Report – the Contractor shall submit one copy to the contracting officer and one copy to the Sponsor's COTR monthly in a mutually agreed upon format, no later than the 10th day of the month after the reporting period.

3.1.6 Quarterly Reviews –shall be held as required but generally on a quarterly basis. All reviews shall include current status and projections for both progress and schedule. The Contractor shall provide the COTR with electronic copies of the status review.

3.1.7 A Final Report and Final Briefing that summarize the technical accomplishments of this effort shall be delivered to the Sponsor at the project completion. The Final Report shall contain manufacturing process procedures and specifications for the materials to be developed and studied in this effort. Electronic copies of viewgraphs and technical summary materials shall be provided to the Sponsor's Technical Monitor.

3.1.8 Manufacture Control Documents for each task. Electronic copies of these documents will contain details of the fabrication procedure, the parts and supplier's information and quality controls.

3.2 (U) Polymer Electrolyte for Lithium-Ion Batteries Hardware Deliverables

The Contractor will provide each hardware deliverable after the completion of each of the following tasks:

3.2.1 Per Task 2.1.1: All test data for hybrid polymer electrolytes investigated

3.2.2 Per Task 2.1.2: 5 optimized performance pouch cell batteries in a form factor specified by the sponsor.

3.2.3 Per Task 2.1.3: All test data and manufacturing documentation pertaining to the transfer of technology developed in **Tasks 2.1.1 and Task 2.1.2** to the Sponsor's Facility.

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3.3 (U) Solid-State Lithium-Ion Batteries Hardware Deliverables

The Contractor will provide each hardware deliverable after the completion of each of the following tasks:

3.3.1 Per Task 2.2.1: 5 optimized performance batteries in a form factor specified by the Sponsor.

3.3.2 Per Option Task 2.2.2: 5 3D printed optimized performance batteries in a form factor specified by the Sponsor.

3.3.3 Per Task 2.2.3: All test data and manufacturing documentation pertaining to the transfer of technology developed in **Tasks 2.2.1 and Option Task 2.2.2** to the Sponsor's Facility.

4.0 SPECIAL CONSIDERATIONS

5.0 (U) PERIOD OF PERFORMANCE

The overall period of performance for this contract as set forth in Section F of the contract Schedule. Options detailed above may be exercised during this POP, but not to exceed 2 years.

6.0 SECURITY

All work done and data and documentation generated under this contract will be unclassified. The association between the Contractor and the sponsor is unclassified.

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7.0 (U) GOVERNMENT FURNISHED PROPERTY

No Government Furnished Property will be supplied to the Contractor.

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BUDGET JUSTIFICATION /COST PROPOSAL

Contract Line Item Number 1 Cost Breakdown on Task 1 (Dr. Kofinas) Place of Performance: University of Maryland, College Park 2 Years (No Option Year)			
Annual and Total Budget			
	Yr 1	Yr 2	Totals
	9/15/14-9/14/15	9/15/15-9/14/16	09/14-09/16
P. Kofinas, Co-PI, 1 cal mo (8.33%)	17,062	17,744	34,806
Fringe benefits @30%	5,119	5,323	10,442
Graduate Student II, 12 cal mos (100%)	31,964	33,243	65,207
Fringe benefits @30%	9,589	9,973	19,562
Subtotal	63,734	66,283	130,017
Graduate Student tuition, 20credits/year @\$602/credit	12,040	12,762	24,802
Total Salaries	49,026	50,987	100,013
Total Fringe Benefits	26,748	28,058	54,806
Personnel Total	75,774	79,045	154,819
Equipment:	0	0	0
Travel:	0	0	0
Supplies:	12,000	12,000	24,000
Total Direct Costs	87,774	91,045	178,819
Indirect @52.0% MTDC	39,382	40,707	80,089
TOTAL REQUEST	127,155	131,753	258,908
F&A Base	75,734	78,283	154,017
Cost Breakdown by Task			Total Costs Requested
Contract Line Item Number 1 (for 2 Years)			
Task 1.1 – Fabricate coin cells containing Sulfur based polymer electrolyte systems (Sept 15, 2014 – March 14, 2016)			\$124,552
Task 1.2 – Fabricate pouch cells containing Sulfur based polymer electrolyte systems (March 15, 2015 – September 14, 2016)			\$120,320
Task 1.3 – Technology Transfer (July 15 – September 14, 2015 and July 15 – September 14, 2016)			\$14,036

Cost Breakdown on Task 2 (Dr. Wachsman) Place of Performance: University of Maryland, College Park Base: 12 months Option: 12 months		
Annual and Total Budget	Base Period CLIN 2	Option Period CLIN 3
	9/15/14-9/14/15	9/15/15-9/14/16
E. Wachsman, PI, 1 cal mo (8.33%)	25,253	26,263
Fringe benefits @30%	7,576	7,879
Graduate Student II, 12 cal mos (100%)	31,964	33,243
Fringe benefits @30%	9,589	9,973
Post Doc, 12 cal mos (100%)	67,000	69,680
Fringe benefits @30%	20,100	20,904
Post Doc, 12 cal mos (100%)		69,680
Fringe benefits @30%		20,904
Subtotal	161,482	258,526
Graduate Student tuition, 20credits/year @\$602/credit	12,040	12,762
Total Salaries	124,217	198,866
Total Fringe Benefits	49,305	72,422
Personnel Total	173,522	271,288
Equipment:	76,000	0
Travel: Domestic	4,500	4,500
Supplies:	39,000	39,000
Total Direct Costs	293,022	314,788
Indirect @52.0% MTDC	146,111	157,052
TOTAL REQUEST	439,133	471,840
F&A Base	280,982	302,026
Cost Breakdown by Task		Total Costs Requested
Contract Line Item Number 2 (Base Year)		
Task 2.1 – Fabricate SSLiBs by ceramic processing and compare performance with Sulfur and Lithium Cobalt Oxide cathodes (Sept 15, 2014 – September 14, 2015)		\$412,078
Technology Transfer (July 15 – September 14, 2015)		\$27,055
CLIN 2 -Total in Base Year		\$439,133

Contract Line Item Number 3 (Option Year)	
Task 2.2 - <i>Integrate 3D printing to optimize performance of complete SSLiBs (Sept 15, 2015 – September 14, 2016)</i>	\$443,703
Technology Transfer (<i>July 15 – September 14, 2016</i>)	\$28,137
CLIN 3 - Total in Option Year	\$471,840

Task 1 - Dr. Peter Kofinas group will be responsible for Task 1 of the proposed effort.

Senior/Key Person - Dr. Peter Kofinas (Co-PI) for 1 month per year (8.33% effort).

Graduate Student - One graduate student (100% effort) in Dr. Kofinas group will be responsible for the monitoring and conducting of ongoing grant experiments and serve as lead experimenter on tasks dealing with polymer synthesis, characterization of microstructure, electrolyte processing, measuring conductivity and other metrics of performance, as well as battery cell construction. The graduate research assistant will be responsible for the collection and review of the data, and preparation of manuscripts for publication.

Task 2 - Dr. Eric Wachsman group will be responsible for Task 2 of the proposed effort.

Senior/Key Person - Dr. Eric Wachsman (PI) 1 month per year (8.33% effort).

Other Personnel:

One postdoc (100% effort) will work in Base Year 1 & Option Year (Year 2). He/she will supervise graduate students in the fabrication and testing of solid state batteries and be responsible for optimization of cell design and implementation of packaging.

One postdoc (100% effort) will work in Option Year (Year 2). He/she will develop 3D printing techniques for fabrication of controlled micro/nano-structures and form factor flexibility.

Graduate Student - One graduate student (100% effort) in Dr. Wachsman group will be working on fabrication and testing of solid state batteries.

The University of Maryland certifies faculty time expended on research projects as a percentage of effort rather than by using hours in accordance with OMB circular A-21.

Graduate student stipend as shown in the budget is determined by the A. James Clark School of Engineering.

Salaries for PI's, Post docs, and graduate students include a 4% increase in year 2 as to cover both merit and cost of living allowance.

Fringe Benefits

Benefits for faculties, postdocs and graduate students are estimated at 30%, based on previous experience for similar research agreements. University of Maryland provides a range of optional employment benefits for both faculty and graduate students including health care, dental and

vision insurance, life insurance and retirement plans. Because of the varying costs for different programs and differences in selections by employees, it is impossible to predict exact benefit costs and the University does not provide a single benefit rate on which to base calculations. The benefits charged to the award will be actual costs.

Tuition for graduate students for 10 credits/semester (20 credits/year) @ \$602/credit. A 6% is added in year 2 for anticipated increase in cost.

Equipment (on CLIN2 – Task 2 Base Year): The requested funds will be used to purchase a Glove box (\$9,290) and Battery tester (\$66,668) in year1. Glove box is necessary for use with lithium metal anode for half cell testing to optimize cathode structure and initial anode infiltration work. Battery tester is necessary to take on additional battery development research. Currently PI has to use test stations by collaborating with other faculty on joint projects and these would not be available for this project.

Travel (\$4500 on CLIN2 – Task 2 Base Year, \$4500 on CLIN 3 – Task 2 Option Year): Funds are requested for domestic travel. Domestic travel is generally for attending scientific meetings such as the Electrochemical Society meeting/symposia on batteries to present the results of scientific research. An average estimated cost of \$1500 per domestic trip is used based on a 4 day trip with a per diem (food and lodging) of \$150, \$400 for airfare, \$400 for conference registration and \$100 for incidentals (parking, taxi, etc.); $4 * \$150 + \$400 + \$400 + \$100 = \$1500$.

Materials and Supplies: The requested funds will be used to purchase the following list of materials and supplies, including the usage of the laboratory facilities in Maryland NanoCenter at the University of Maryland (www.nanocenter.umd.edu).

Task 1 (Year 1)	Vendor	Unit(s)	Unit Price	Sum \$
Silver Trifluoroacetate	Sigma	178	\$2.00	\$356.00
Ethyl 2-cyanoacrylate	Sigma	148.5	\$3.00	\$445.50
Universal Vise (Adjustable SEM sample holder)	Electron Microscopy Sciences	120	\$5.00	\$600.00
Argon UPC Gr 5.5 Size 300	AirGas	194.04	\$12.00	\$2,328.48
Bis(trifluoromethane)sulfonimide lithium salt	Sigma-Aldrich	114.5	\$8.00	\$916.00
Polyethylene Oxide 300k MW, 100g	Alfa Aesar	44.8	\$5.00	\$224.00
C-MAG HS 7 IKAMAG® Package	IKA® Works, Inc.	620	\$2.00	\$1,240.00
NMR/ TEM/ SEM Facility time	U. of Maryland		\$1.00	\$889.54
Eppendorf® epTIPS, Sterile > Volume: 2 to 200µL	Fisher	142.58	\$3.00	\$427.74
Eppendorf® epTIPS, Sterile > Volume: 50-1000µL	Fisher	142.58	\$3.00	\$427.74

N-(3-Aminopropyl)methacrylamide hydrochloride	Polysciences	123	\$20.00	\$2,460.00
Poly(ethylene glycol) (n) monomethyl ether monomethacrylate	Polysciences	114	\$10.00	\$1,140.00
Triethylsulfonium bis(trifluoromethylsulfonyl) imide	Sigma-Aldrich	109	\$5.00	\$545.00
Task 1 Year 1 budget total=\$12,000 (rounded)				
Task 2 (Base Year – Year 1)	Vendor	Unit(s)	Unit Price	Sum \$
99.9% Lithium foil - 100g	Alfa Aesar	4	\$160.00	\$640.00
99% Li ₂ CO ₃ - 2000g	Alfa Aesar	1	\$106.00	\$106.00
99.9% La ₂ O ₃ - 2500g	GFS Chemicals	1	\$247.50	\$247.50
99.9% ZrO ₂ - 500g	Sigma Aldrich	4	\$92.80	\$371.20
99.9% CaCO ₃ - 500g	Sigma-Aldrich	1	\$146.00	\$146.00
99.9% Nb ₂ O ₅ - 500g	Sigma Aldrich	1	\$377.00	\$377.00
3% Y ₂ O ₃ stabilized ZrO ₂ - 1000g	Tosoh, Inc.	2	\$127.00	\$254.00
99% Ba(NO ₃) ₂ - 2500g	Alfa Aesar	1	\$132.00	\$132.00
99.85% Ta ₂ O ₅ - 500g	Alfa Aesar	1	\$657.00	\$657.00
99.99% Al ₂ O ₃ - 1000g	Inframat Advanced Materials	1	\$185.00	\$185.00
99.9% MnCO ₃ - 5000g	Inframat Advanced Materials	1	\$190.00	\$190.00
99.7% Co ₃ O ₄ - 2500g	Alfa Aesar	1	\$777.00	\$777.00
99.9% Fe ₂ O ₃ - 5000g	Materion	1	\$250.00	\$250.00
99.8% NiO - 250g	Sigma Aldrich	1	\$251.00	\$251.00
99.9% Carbon black - 250g	Alfa Aesar	1	\$40.90	\$40.90
Isopropanol - 1L	UMD Chemistry Store	70	\$13.00	\$910.00
Toluene (1L)	UMD Chemistry Store	50	\$54.20	\$2,710.00
Tapecasting mylar 6"	Tape Casting Warehouse, Inc.	2	\$214.00	\$428.00
Benzyl butyl phthalate (1L)	Sigma Aldrich	3	\$128.50	\$385.50
Polyvinyl butyral (100g)	Sigma Aldrich	20	\$22.40	\$448.00
Menhaden fish oil (1L)	Tape Casting Warehouse, Inc.	1	\$25.00	\$25.00
Highly Conductive Corrosion-Resistant 6101 Aluminum 3 ft bar for current collector	McMaster Carr	20	\$15.61	\$312.20
Aluminium foil - 0.001"x18"x500'	Sigma Aldrich	1	\$107.00	\$107.00
Super-Conductive 101 Copper 2 ft bar for current collector	McMaster Carr	30	\$29.83	\$894.90

99.8% Copper foil - 0.025mmx30cmx1000cm	Alfa Aesar	1	\$115.00	\$115.00
LDPE sheet 1/16" 48"x96"	McMaster Carr	2	\$37.00	\$74.00
Titanium sputtering target 3" dia, 0.125" thick	Sigma-Aldrich	2	\$574.00	\$1,148.00
3-pack synthetic sponge for spring	McMaster Carr	10	\$16.92	\$169.20
1/8" thick high strength carbon fiber panel 12"x24"	McMaster Carr	20	\$175.00	\$3,500.00
Misc nuts, bolts and screws	McMaster Carr	1	\$300.00	\$300.00
High speed steel drill bits	Drill Master	4	\$15.99	\$63.96
Thermocouples	Omega	10	\$50.00	\$500.00
Sensor-computer interface boards	National Instruments	3	\$179.00	\$537.00
Kimtech wipes (1 pack)	Fisher	50	\$8.42	\$421.00
Yttrium(III) nitrate hexahydrate	Sigma-Aldrich	2	\$57.50	\$115.00
Zirconium(IV) acetylacetonate	Sigma-Aldrich	2	\$37.60	\$75.20
Lanthanum(III) nitrate hexahydrate	Sigma-Aldrich	2	\$108.00	\$216.00
Niobium(V) ethoxide	Sigma-Aldrich	2	\$81.10	\$162.20
Tantalum(V) chloride	Sigma-Aldrich	2	\$40.60	\$81.20
Terpineol - 2.5L	Alfa Aesar	1	\$283.00	\$283.00
Glass screwcap vials - 100pk	UMD Chemistry Store	4	\$30.00	\$120.00
800 grit SiC sandpaper - 100pk	Fisher	5	\$217.00	\$1,085.00
Weigh paper - 500pk	Fisher	5	\$7.00	\$35.00
Weigh boat - 250pk	Fisher	6	\$39.00	\$234.00
50 mL Al ₂ O ₃ furnace crucibles	Advalue Technology	1	\$14.67	\$14.67
Al ₂ O ₃ crucible covers	Advalue Technology	18	\$6.78	\$122.04
Cotton-tipped applicators - 1000pk	Fisher	10	\$20.40	\$204.00
SEM (1 hour)	UMD	100	\$40.00	\$4,000.00
XRD (1 hour)	UMD	180	\$25.00	\$4,500.00
TEM (1 hour)	UMD	50	\$63.00	\$3,150.00
XPS (1 sample)	UMD	20	\$200.00	\$4,000.00
FIB-SEM (1 hour)	UMD	40	\$50.00	\$2,000.00
ALD process (1 hour)	UMD	15	\$62.00	\$930.00
Task 2 Base Year (Year 1) budget total=\$39,000 (rounded)				

Task 1 (Year 2)	Vendor	Unit(s)	Unit Price	Sum \$
Bis(trifluoromethane)sulfonimide lithium salt	Sigma-Aldrich	114.5	\$8.00	\$916.00
Triethylsulfonium bis(trifluoromethylsulfonyl) imide	Sigma-Aldrich	109	\$4.00	\$436.00

Feather Safeshield Blade #11 10/Box	Fisher Scientific	42.4	\$6.00	\$254.40
Fisherbrand General-Purpose Broad-Tipped Forceps	Fisher Scientific	10.93	\$5.00	\$54.65
Tooled Neck Vial, N-51A Borosilicate Glass, 5 dram capacity	Kimble Chase	131.33	\$5.00	\$656.65
Tooled Neck Vial, N-51A Borosilicate Glass, 1 dram capacity	Kimble Chase	233.9	\$4.00	\$935.60
Ammonium Chloride	Sigma	47.9	\$5.00	\$239.50
Copper(II) oxide	Sigma	54.3	\$5.00	\$271.50
Poly(ethylene glycol) diacrylate	Sigma	71	\$5.00	\$355.00
2-Hydroxyethyl methacrylate	Sigma	8.11	\$3.00	\$24.33
Poly(ethylene glycol) diacrylate average Mn 700	Sigma	28.7	\$5.00	\$143.50
Ethanol	Sigma	52.5	\$5.00	\$262.50
Iron(II) sulfate heptahydrate	Sigma	45.5	\$3.00	\$136.50
Silver nitrate	Sigma	112.5	\$4.00	\$450.00
Sulfuric Acid	Sigma	328	\$7.00	\$2,296.00
Hydrogen Peroxide	Sigma	104.5	\$2.00	\$209.00
Nafion Membrane	Ion Power Inc	132	\$4.00	\$528.00
Round Bottom Flask	SPI Supplies	61.16	\$12.00	\$733.92
CG-1530-01 Flask, Round-bottom, 250 ml, 4 neck flask	Chemglass	124.95	\$3.00	\$374.85
Argon UPC Gr 5.5 Size 300	AirGas	194.04	\$10.00	\$1,940.40
Eppendorf* epTIPS, Sterile > Volume: 0.1 to 20µL	Fisher	121.46	\$3.00	\$364.38
NMR/ TEM/ SEM Facility time	U. of Maryland			\$417.32
Task 1 Year 2 budget total=\$12,000 (rounded)				
Task 2 (Option Year – Year 2)	Vendor	Unit(s)	Unit Price	Sum \$
LDPE powder – 2000g	Goodfellow	1	\$400.00	\$400.00
3D printer microliter tips	Nscrypt	10	\$100.00	\$1,000.00
99.9% Lithium foil - 100g	Alfa Aesar	4	\$160.00	\$640.00
99% Li2CO3 - 2000g	Alfa Aesar	1	\$106.00	\$106.00
99.9% La2O3 - 2500g	GFS Chemicals	1	\$247.50	\$247.50
99.9% ZrO2 – 500g	Sigma Aldrich	4	\$92.80	\$371.20
99.9% CaCO3 – 500g	Sigma-Aldrich	1	\$146.00	\$146.00
99.9% Nb2O5 – 500g	Sigma Aldrich	1	\$377.00	\$377.00
3% Y2O3 stabilized ZrO2 - 1000g	Tosoh, Inc.	2	\$127.00	\$254.00
99% Ba(NO3)2 - 2500g	Alfa Aesar	1	\$132.00	\$132.00

99.85% Ta ₂ O ₅ - 500g	Alfa Aesar	1	\$657.00	\$657.00
99.99% Al ₂ O ₃ - 1000g	Inframat Advanced Materials	1	\$185.00	\$185.00
99.9% MnCO ₃ - 5000g	Inframat Advanced Materials	1	\$190.00	\$190.00
99.7% Co ₃ O ₄ - 2500g	Alfa Aesar	1	\$777.00	\$777.00
99.9% Fe ₂ O ₃ - 5000g	Materion	1	\$250.00	\$250.00
99.8% NiO - 250g	Sigma Aldrich	1	\$251.00	\$251.00
99.9% Carbon black - 250g	Alfa Aesar	1	\$40.90	\$40.90
Isopropanol - 1L	UMD Chemistry Store	50	\$13.00	\$650.00
Toluene (1L)	UMD Chemistry Store	30	\$54.20	\$1,626.00
Tapecasting mylar 6"	Tape Casting Warehouse, Inc.	2	\$214.00	\$428.00
Benzyl butyl phthalate (1L)	Sigma Aldrich	3	\$128.50	\$385.50
Polyvinyl butyral (100g)	Sigma Aldrich	20	\$22.40	\$448.00
Menhaden fish oil (1L)	Tape Casting Warehouse, Inc.	1	\$25.00	\$25.00
Highly Conductive Corrosion-Resistant 6101 Aluminum 3 ft bar for current collector	McMaster Carr	20	\$15.61	\$312.20
Aluminium foil - 0.001"x18"x500'	Sigma Aldrich	1	\$107.00	\$107.00
Super-Conductive 101 Copper 2 ft bar for current collector	McMaster Carr	30	\$29.83	\$894.90
99.8% Copper foil - 0.025mmx30cmx1000cm	Alfa Aesar	1	\$115.00	\$115.00
LDPE sheet 1/16" 48"x96"	McMaster Carr	2	\$37.00	\$74.00
Titanium sputtering target 3" dia, 0.125" thick	Sigma-Aldrich	2	\$574.00	\$1,148.00
3-pack synthetic sponge for spring	McMaster Carr	10	\$16.92	\$169.20
1/8" thick high strength carbon fiber panel 12"x24"	McMaster Carr	20	\$175.00	\$3,500.00
Misc nuts, bolts and screws	McMaster Carr	1	\$300.00	\$300.00
High speed steel drill bits	Drill Master	5	\$15.99	\$79.95
Thermocouples	Omega	10	\$50.00	\$500.00
Sensor-computer interface boards	National Instruments	3	\$179.00	\$537.00
Kimtech wipes (1 pack)	Fisher	45	\$8.42	\$378.90
Yttrium(III) nitrate hexahydrate	Sigma-Aldrich	1	\$57.50	\$57.50
Zirconium(IV) acetylacetonate	Sigma-Aldrich	2	\$37.60	\$75.20
Lanthanum(III) nitrate hexahydrate	Sigma-Aldrich	2	\$108.00	\$216.00
Niobium(V) ethoxide	Sigma-Aldrich	2	\$81.10	\$162.20
Tantalum(V) chloride	Sigma-Aldrich	2	\$40.60	\$81.20

Terpineol - 2.5L	Alfa Aesar	1	\$283.00	\$283.00
Glass screwcap vials - 100pk	UMD Chemistry Store	4	\$30.00	\$120.00
800 grit SiC sandpaper - 100pk	Fisher	1	\$217.00	\$217.00
Weigh paper - 500pk	Fisher	1	\$7.00	\$7.00
Weigh boat - 250pk	Fisher	2	\$39.00	\$78.00
50 mL Al ₂ O ₃ furnace crucibles	Advalue Technology	15	\$14.67	\$220.05
Al ₂ O ₃ crucible covers	Advalue Technology	15	\$6.78	\$101.70
Cotton-tipped applicators - 1000pk	Fisher	5	\$20.40	\$102.00
SEM (1 hour)	UMD	100	\$40.00	\$4,000.00
XRD (1 hour)	UMD	200	\$25.00	\$5,000.00
TEM (1 hour)	UMD	50	\$63.00	\$3,150.00
XPS (1 sample)	UMD	20	\$200.00	\$4,000.00
FIB-SEM (1 hour)	UMD	50	\$50.00	\$2,500.00
ALD process (1 hour)	UMD	15	\$62.00	\$930.00
Task 2 Option Year (Year 2) budget total=\$39,000 (rounded)				

Facilities and Administrative (F&A) Costs:

University of Maryland calculates its overhead cost rates and negotiates these with the U.S. Health and Human Services Audit Agency acting on behalf of all federal Agencies. The current on-campus rate is 52.0%.

Federal Cognizant Audit Agency:

DHHS Office of Audit, Region III
 150 South Independence Mall West, Suite 316, Philadelphia, PA 19106-3499
 Point of Contact: Stephen Virbitsky
 Phone: (215) 861-4470



Bio-Logic USA, LLC
 9050 Executive Park Drive
 Financial Plaza
 Suite 1050
 Knoxville, TN 37923
 Telephone: 865-769-3600 Fax: 865-769-3801
 Web: www.bio-logic.us

QUOTATION

Liangbing Hu
 University of Maryland
 Energy research Center
 120 Engineering Lab Building
 College Park, MD 20742-2115
 Tel.: (301) 405-9303
 Email: binghu@umd.edu

Date: 8/6/2014
 Quote No.: **023721UMDWE**
 Inquiry No.:
 Valid Until: Tuesday, November 4, 2014
 Terms: Net 30 Days
 F.O.B.: Knoxville, TN PP & Add
 Delivery: 30 Days ARO

Item	Qty	Description	Unit Note	List Price	Unit Price	Extended Price
1	1	Model VMP3-CHAS. VMP3 chassis - 16 slots - NO channel- including EC-Lab Express & EC- Lab software		\$21,515.00	\$19,793.80	\$19,793.80
2	14	Model VMP3-01. Potentiostat/galvanostat board (including 1.5m cell cable) - uses one slot - ±400 mA / 20 V adjustable		\$2,940.00	\$2,704.80	\$37,867.20
3	2	Model VMP3/Z-01. Potentiostat/galvanostat board w/EIS - (includes 1.5m cell cable) - uses 1 slot - ±400 mA / 20 V adjustable / EIS from 10 µHz to 1 MHz		\$4,895.00	\$4,503.40	\$9,006.80
Total Extended Price:						\$66,667.80

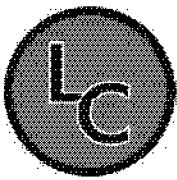
Authorized by:

William F. Eggers, Sales Engineer
 Phone: 865-769-3600 Fax: 865-769-3801
 e-mail: william.eggers@bio-logic.us

Federal Identification Number: 26-0530341
 Remittance: Bio-logic USA, LLC; P.O. Box 38009; Knoxville, TN 37930

New sales are subject to credit approval. Prices are for USA domestic use. This quote, and any subsequent order, is subject to applicable Bio-logic USA, LLC terms and conditions. If required, sales tax will be invoiced and collected by Bio-logic USA, LLC. Unless specifically quoted otherwise, "Best Way" shipping charges will be added to invoices for any products shipped by Bio-logic USA, LLC. Bio-logic USA, LLC products are manufactured and distributed by Bio-logic SAS, Claix. Any purchase order or contract for sale generated from Bio-logic USA, LLC's quotation for the export of goods, technology or services is subject to the Export Control Laws and Regulations of the United States. As a result, the export of such goods, and consequent re-export of such goods, may require an export license prior to shipment.

All past due invoices will be charged 1.5% of the amount past due, per month, or the maximum allowed by law.

**LC Technology Solutions Inc.**

2C Fanaras Drive
Salisbury, MA 01952
USA

QUOTATION

Quote Number: LCT-14-660

Quote Date: Aug 6, 2014

Page: 1

Voice: 978-255-1620

Fax: 978-428-0222

Quoted To:

Dr. Eric D. Wachsman
University of Maryland
1206 Engineering Lab Building
University of Maryland
College Park, MD 20742-2115
United States

Customer ID	Good Thru	Payment Terms	Sales Rep
U of MD-7	11/5/14	Net 30 Days	Jimmy Dumey

Quantity	Item	Description	Unit Price	Amount
1.00	LCBT-210	Double length bench top glovebox with antechamber.	8,925.00	8,925.00
	TC-101	System will be labeled for Self Installation. LC Technology will supply unlimited phone and email support at no additional charge.		
	TC-201	1 Year Limited Manufacturer Warranty		
	TC-304	Delivery Terms: 45 - 90 Days ARO & Approval of Engineering Drawings		
	TC-402	FOB Shipping Point Prepay & Add - Freight Charges Additional		
1.00	CR-023	Crating & Processing Fee. This charge is for add'l packaging to ensure your sensitive equipment is transported safely. (1) Crate: 84"Lx36"Wx47"H, Gross: 660lbs	365.00	365.00
	TC-601	Net 30 Days Please note the above referenced equipment pricing reflects a 15% academic discount.		
			Subtotal	9,290.00
			Sales Tax	
			TOTAL	9,290.00

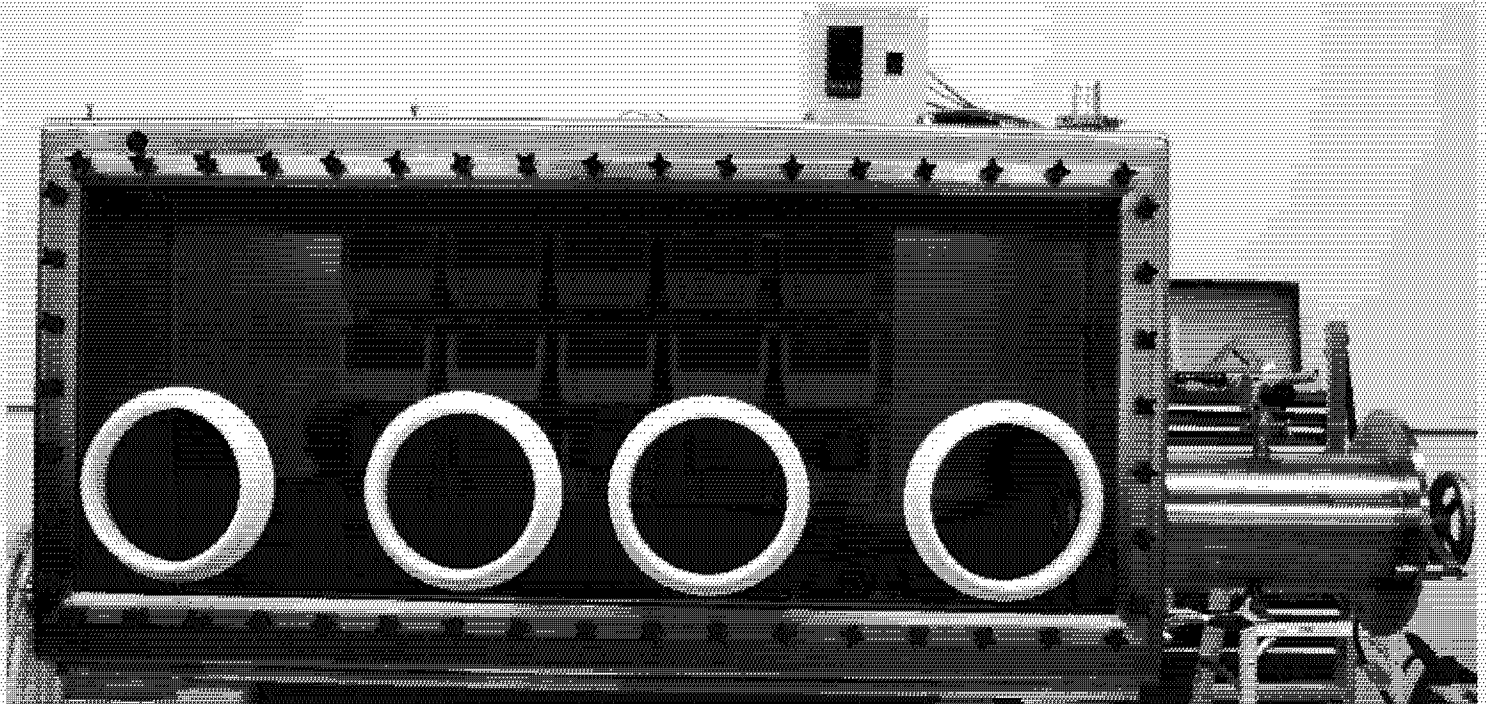
LC Technology Solutions Inc.

2C Fanaras Drive, Salisbury, MA 01952

Tel: (978) 255-1620

Email info@lctechinc.com

LCBT-210 Bench Top Glovebox



LCBT-210 Bench Top Glovebox Shown with Optional Accessories

Features:

- Compact design fits on any standard bench top.
- All stainless steel construction.
- All welded one piece radius corner design.
- All stainless steel antechamber.
- Quick release front window.
- Positive or negative pressure design.

The LCBT-210 glovebox is a system specifically designed for your laboratory bench top. It easily fits on any standard bench top. This system is available as a purge system.

The system has a one piece radius corner construction that allows for easy cleaning. It is compact and light weight in design. Easily moved from room to room or location to location.

A small antechamber is supplied for easy transfer of samples/parts into and out of the system.

The system is also equipped with a quick release window.

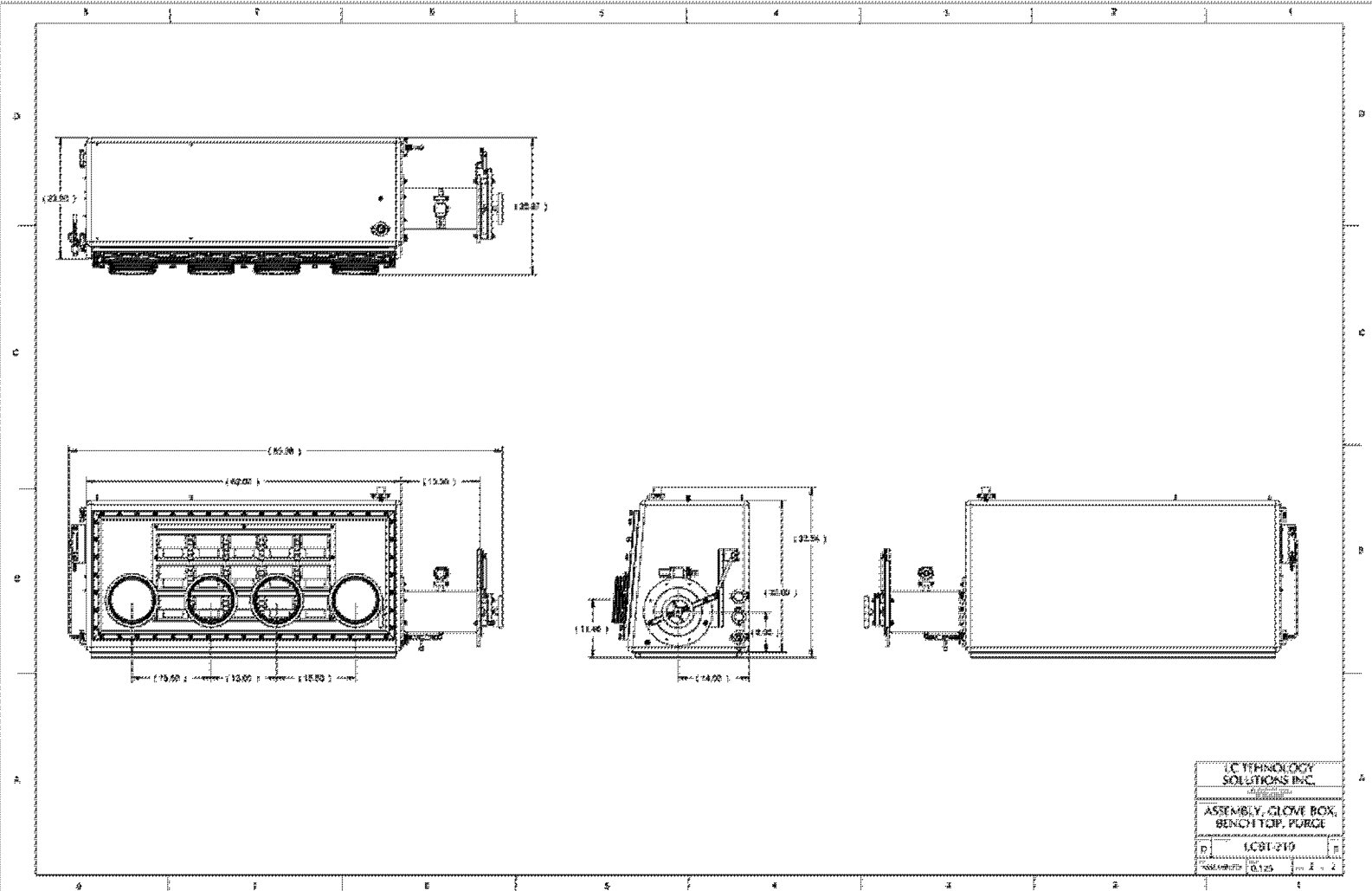
Application(s):

- Containment of powders
- Weighing of air sensitive samples
- Potent compound handling
- Air sensitive chemistry
- Humidity controlled experiments
- Storage of air sensitive materials
- Inert gas welding
- Hermetic sealing
- Crystal mounting
- Worker protection/safety
- Handling of biohazards

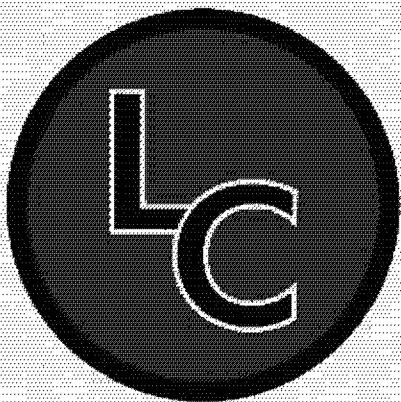
Standard Items List for the LCBT-210 Bench Top Glovebox

- All stainless steel construction
- All stainless steel Swagelok valves and fittings
- One piece radius corner design (for easy cleaning)
- Lexan front window
- Quick release front window
- Adjustable bin storage unit (adjustable shelving)
- Four (4) glove ports
- Two (2) pairs butyl gloves
- One (1) 115V Electrical feedthrough with a six (6) outlet power strip
- Two (2) LED light fixtures
- All stainless steel antechamber; size 8" diameter x 15"L
- All stainless steel door arms
- All stainless steel doors; 8" diameter opening
- Flowmeter with shutoff valve for gas inlet
- Automatic overpressure release valve for gas outlet
- Dimensions: 62"W x 30"H x 24"D

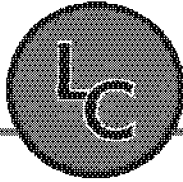
LCBT-210 Layout Drawing



LC Technology Solutions Inc.



2C Fanaras Drive
Salisbury, MA 01952
Phone: 978-255-1620
Fax: 978-428-0222
E-mail: info@lctechinc.com



LC TECHNOLOGY SOLUTIONS INC.

2C Fenwick Drive, Salisbury, MA 01952 • Phone: 978-255-1620 • Fax: 978-428-0222
E-mail: Info@lctechinc.com • Web: www.lctechinc.com

TERMS & CONDITIONS

Quotations for equipment manufactured by LC Technology Solutions, Inc., including pricing and delivery information, are valid for 30 days from date of issuance. The quotation remains valid unless otherwise noted in writing. LC Technology Solutions, Inc. will adjust the quotation if the customer calls for engineering changes, if additional features are added to the equipment or otherwise if a design change is made.

Purchase Orders submitted to LC Technology Solutions, Inc. will be accepted in writing by LC Technology Solutions, Inc. within fourteen days of receipt. Terms and conditions specified on the customer purchase order will be void unless consistent with all terms and conditions outlined by LC Technology Solutions, Inc. in writing. Once a customer purchase order is submitted, LC Technology Solutions, Inc. recognizes a contract with the customer for goods to be supplied. Alterations or cancellation of the purchase order will result in additional charges, penalties or restocking fees to be determined by LC Technology Solutions, Inc. based upon the specific circumstances presented by the alteration or cancellation. A typical cancellation will result in a 30% restocking charge.

Terms of payment for LC Technology Solutions, Inc. equipment are net 30 days from date of shipment without exception unless specified in writing. 1.5% Finance charge will be added monthly to all invoices past Net 30 days.

Delivery indicated on the quotation, in business days, is estimated from the date of receipt of the customer purchase order, pending receipt of completed information allowing LC Technology Solutions, Inc. to proceed with the process of producing the specified equipment. Design alterations and approval requirements supersede previously indicated delivery information. Customer is responsible for all shipping and packaging material charges unless noted otherwise on the provided quotation.

Taxes related to the sale of merchandise by LC Technology Solutions, Inc. will be invoiced where applicable. The customer is responsible for advising LC Technology Solutions, Inc. about any tax exemptions.

Warranty is granted to all customers purchasing LC Technology Solutions, Inc. equipment for one year from the receipt of merchandise, unless otherwise specified in writing including blowers, vacuum pumps, and compressors. Customers must perform the required preventative maintenance as described in the Operations Manual or the warranty becomes null and void, i.e., changing dust filters and oil in the vacuum pumps. Expendable items, such as filters, filter material, gloves, etc., are not covered by the LC Technology Solutions, Inc. warranty. In addition to expendable items, additional equipment not covered by the LC Technology Solutions, Inc. warranty includes any and all equipment LC Technology Solutions, Inc. purchases from a third party such as chillers, spin coaters, evaporators, etc. Such equipment will carry the OEM's standard warranty.

The warranty implies that LC Technology Solutions, Inc. will do everything appropriate within its power to rectify problems with defective equipment. LC Technology Solutions, Inc. will repair or replace any part that is determined to be defective from the time it was received by the customer. In matters of components returned to LC Technology Solutions, Inc. for warranty claims, shipping charges are to be paid by the customer.

Any component or system that is altered, modified or misused according to its set purpose will not be applicable under the terms of the LC Technology Solutions, Inc. warranty. **Warranty on custom systems will be voided unless installed by trained LC Technology Solutions, Inc. personnel.**

Claims for shortage, damage or other purposes are to be made to LC Technology Solutions, Inc. within 30 days of receipt or at the time of installation, whichever comes first. Claims for damages incurred in shipping are the responsibility of the customer, unless specified in writing. Customers are advised to scrutinize the equipment upon delivery and to note any sign of physical disturbance to the shipment. Claims for shipping related damages should be directed to the trucking company or the customer's shipping insurer. LC Technology Solutions, Inc. will assist its customer with equipment damaged or rendered inoperable due to damage in shipping in any way possible and each case will be treated on an individual basis.

**A. James Clark School of Engineering
Graduate Assistant Scale
FY 15**

9 Month Assistantship		12 Month Assistantship		Summer	
Step I as of 7/1/14	17,738.27	Step I as of 7/1/14	29,563.78	Step I	5,912.76
Step I as of 1/1/15	18,093.03	Step I as of 1/1/15	30,155.05	Step I (full rate)	11,825.51
Step II as of 7/1/14	18,802.56	Step II as of 7/1/14	31,337.60	Step II	6,267.52
Step II as of 1/1/15	19,178.61	Step II as of 1/1/15	31,964.36	Step II (full rate)	12,535.04
Step III as of 7/1/14	19,930.72	Step III as of 7/1/14	33,217.86	Step III	6,643.57
Step III as of 1/1/15	20,329.33	Step III as of 1/1/15	33,882.22	Step III (full rate)	13,287.14

Per Graduate School Policy, all graduate assistants at a particular step, in a particular unit, should receive the same stipend rate.

ORIGINAL

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: 15-20710851

DATE:06/28/2012

ORGANIZATION:

University of Maryland - College Park
 1132 Main Administration Building
 College Park, MD 20742-5035

FILING REF.: The preceding
 agreement was dated
 06/07/2011

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)					
<u>EFFECTIVE PERIOD</u>					
<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	07/01/2010	06/30/2011	50.00	On-Campus	Organized Research
PRED.	07/01/2011	06/30/2015	52.00	On-Campus	Organized Research
PRED.	07/01/2010	06/30/2015	26.00	Off-Campus (A)	Organized Research
PRED.	07/01/2010	06/30/2015	27.50	Off-Campus (B)	Organized Research
PRED.	07/01/2010	06/30/2011	50.00	On-Campus	Instruction
PRED.	07/01/2011	06/30/2015	56.00	On-Campus	Instruction
PRED.	07/01/2010	06/30/2015	26.00	Off-Campus (A)	Instruction
PRED.	07/01/2010	06/30/2015	27.50	Off-Campus (B)	Instruction
PRED.	07/01/2010	06/30/2015	38.50	On-Campus	Other Spons Activities
PRED.	07/01/2010	06/30/2015	26.00	Off-Campus (A)	Other Spons Activities
PRED.	07/01/2010	06/30/2015	27.50	Off-Campus (B)	Other Spons Activities
PRED.	07/01/2010	06/30/2015	10.00	Off-Campus (A) & (B)	IPA*

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PROV.	07/01/2015	Until Amended			Use same rates and conditions as those cited for fiscal year ending June 30, 2015.

*BASE

Total direct costs excluding capital expenditures (buildings, individual items of equipment; alterations and renovations), that portion of each subaward in excess of \$25,000; hospitalization and other fees associated with patient care whether the services are obtained from an owned, related or third party hospital or other medical facility; rental/maintenance of off-site activities; student tuition remission and student support costs (e.g., student aid, stipends, dependency allowances, scholarships, fellowships).

(A) Off-Campus, Remote - Activities performed outside commuting area of College Park, Maryland.

(B) Off-Campus, Adjacent - Activities performed within commuting area of College Park, Maryland.

IPA* - Intergovernmental Personnel Act Agreements

ORGANIZATION: University of Maryland - College Park

AGREEMENT DATE: 06/28/2012

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

The fringe benefits are specifically identified to each employee and are charged individually as direct costs. The directly claimed fringe benefits are listed below.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-SITE DEFINITION: For all activities performed in facilities not owned by the organization and to which rent is directly allocated to the project(s), the off-site rate will apply. Projects partially performed off-site are apportioned between their on-site/off-site components when projects activity is conducted off-site for at least three consecutive months.

Fringe Benefits Include: FICA, Retirement, Tuition Remission, Vision Care, TIAA/CREF, Unemployment Insurance and Health Insurance.

Equipment means an article of nonexpendable tangible personal property having a useful life of more than one year, and an acquisition cost of \$5,000 or more per unit.

The RESEARCH base includes University expenditures related to grants and contracts conducted at the following facilities: Agricultural Experiment Station, Cooperative Extension Service.

Effective 07/01/10, the RESEARCH base no longer includes grants and contracts conducted by the University of Maryland Biotechnology Institute (UMBI). The Center for Advanced Research in Biotechnology (CARB) is now the Institute for Bioscience and Biotechnology Research (IBBR) and is a department of the University of Maryland - College Park.

This is an amendment of the June 7, 2011 Rate Agreement to include Off-Campus, Adjacent rates for Instruction and Other Spons Activities. All other terms and conditions are unchanged.

ORGANIZATION: University of Maryland - College Park

AGREEMENT DATE: 06/28/2012

SECTION III: GENERALA. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted; such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Office of Management and Budget Circular A-21 Circular, and should be applied to grants, contracts and other agreements covered by this Circular, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.


E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

University of Maryland - College Park

(INSTITUTION)



(SIGNATURE)

Wallace D. Loh

(NAME)

President

(TITLE)

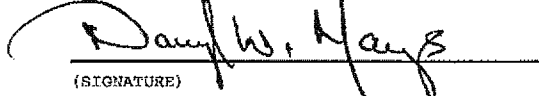
7/6/2012

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)



(SIGNATURE)

Darryl W. Mayes

(NAME)

Director, Mid-Atlantic Field Office

(TITLE)

6/28/2012

(DATE) 0445

HHS REPRESENTATIVE:

Steven Zuraf

Telephone:

(301) 492-4855

ORIGINAL

COMPONENTS OF PUBLISHED FACILITIES AND ADMINISTRATIVE COST RATE

Institution:

University of Maryland, College Park

FY Covered by Rate:

July 01, 2010 - June 30, 2015

Type of Rate:

RATE COMPONENTS:

Bldg & Improv - Depr/Use Allow
 Equipment - Depr/Use Allow
 Interest
 Operations & Maintenance
 Library
 Administrative Component
 Total

Organized Research				Instruction				Other Sponsored Activity			
ON FY '11	ON FY '12 - '15	OFF FY '11 - '15	OFF Adjacent FY '11 - '15	ON FY '11	ON FY '12 - '15	OFF FY '11 - '15	OFF Adjacent FY '11 - '15	ON FY '11	OFF FY '11 - '15	OFF Adjacent FY '11 - '15	OFF Adjacent FY '11 - '15
2.5	3.5			2.5	3.5			1.5			
3.0	2.0			3.0	1.0			1.0			
2.0	1.0			2.0	1.0			0.5			
15.0	18.0			15.0	16.0			8.0			
1.5	1.5		1.5	1.5	8.5		1.5	1.5			1.5
26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
50.0	52.0	26.0	27.5	50.0	56.0	26.0	27.5	38.5	26.0	26.0	27.5

CONCURRENCE:

Signature



Name

Wallace D. Loh

Title

President

Date

7/6/2012

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1 CONTRACT ID CODE	PAGE 1 OF 3
2 AMENDMENT/MODIFICATION NO 001	3 EFFECTIVE DATE 08/28/2015	4 REQUESTOR/PURCHASE REQ NO	5 PROJECT NO (if applicable)		
6 ISSUED BY	CODE	7 ADMINISTERED BY (if other than item 6)	CODE		
8 NAME AND ADDRESS OF CONTRACTOR (No street, country, state and ZIP Code) UNIVERSITY OF MARYLAND 3121 lee building COLLEGE PARK, MD 20742					
CODE		FACILITY CODE	9A AMENDMENT OF SOLICITATION NO <input checked="" type="checkbox"/>		
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS					
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offeror must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as extended, by one of the following methods: (a) By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.					
12 ACCOUNTING AND APPROPRIATION DATA (if required)					
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.					
CHECK ONE A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.					
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).					
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____					
D. OTHER (Specify type of modification and authority) <input checked="" type="checkbox"/> No Cost Period of Performance Extension of CLIN 0002 per letter dated 25 August 2015					
E. IMPORTANT: Contractor <input checked="" type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return copies to the issuing office.					
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract award number where feasible) No Cost Period of Performance Extension of CLIN 0002 per letter dated 25 August 2015					
15A. NAME AND TITLE OF SENDER (Type or print) _____ 15B. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) _____					
15B. CONTRACTING OFFICER _____ (Signature of person authorized to sign)		15C. DATE SIGNED _____ By	15D. LIMITED STATE OF AVERGIA _____ By		
NSN 7540-01-132-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-63) Prescribed by GSA FPMR (48 CFR) 53.243			

UNCLASSIFIED

8/28/15

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Section	Description	Page Number
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Contractor Name: UNIVERSITY OF MARYLAND
 Contract Number: 2014-1408280003
 Modification Number: 001

Section B - Supplies or Services and Prices/Costs

CLIN DETAILS

Item/Line	Period of Performance	Commodity Code	Unit	Quantity	From	By	To
0001	08/04/2014 - 08/03/2016	SERVICE					
		COST					
		Base					
		Line Description:					
		CLIN 0001/COST/Options 1 1-1 3					
		Cost			\$256,908.00	\$0.00	\$256,908.00
		Fixed Fee			\$0.00	\$0.00	\$0.00
		Incentive Fee			\$0.00	\$0.00	\$0.00
		Award Fee			\$0.00	\$0.00	\$0.00
		Net Total			\$256,908.00	\$0.00	\$256,908.00
		Funding			\$256,808.00	\$0.00	\$256,908.00
		Total Cost (including Fee/Price)					
		From					
		By					
		To					
0002	08/04/2014 - 11/21/2015	SERVICE					
		COST					
		Base					
		Line Description:					
		CLIN 0002/COST/Task 2 1					
		Cost			\$439,133.00	\$0.00	\$439,133.00
		Fixed Fee			\$0.00	\$0.00	\$0.00
		Incentive Fee			\$0.00	\$0.00	\$0.00
		Award Fee			\$0.00	\$0.00	\$0.00
		Net Total			\$439,133.00	\$0.00	\$439,133.00
		Funding			\$439,133.00	\$0.00	\$439,133.00
		Total Cost (including Fee/Price)					
		From					
		By					
		To					
0003	08/04/2015 - 08/03/2016	SERVICE					
		COST					
		Unrestricted Option					
		Line Description:					
		CLIN 0003/COST/Option Task 2 2					
		Cost			\$471,840.00	\$0.00	\$471,840.00
		Fixed Fee			\$0.00	\$0.00	\$0.00
		Incentive Fee			\$0.00	\$0.00	\$0.00
		Award Fee			\$0.00	\$0.00	\$0.00
		Net Total			\$471,840.00	\$0.00	\$471,840.00
		Funding			\$0.00	\$0.00	\$0.00
		Total Cost (including Fee/Price)					
		From					
		By					
		To					
Contract Total							
		Current (Base + Unrestricted Option) Total:			\$698,041.00	\$0.00	\$698,041.00
		Unrestricted Option Total:			\$471,840.00	\$0.00	\$471,840.00
		Contract (Base + ALL Option) Total:			\$1,169,881.00	\$0.00	\$1,169,881.00
		Funding			\$698,041.00	\$0.00	\$698,041.00

Problem and Project Objective

One of the key barriers to the wide-spread use of lithium-ion batteries for DoD applications is their potential for catastrophic failure due to their lack of inherent abuse tolerance. When cells are thermally or electrically abused, their temperature can rise and exothermic reactions between the combustible, liquid electrolyte and the charged electrodes can cause the cells to undergo thermal runaway. There is a clear need for a more stable Lithium-ion battery electrolytes. The aim of this project is to better understand the electrochemical properties and microstructure of novel thin film non-flammable solid polymer electrolytes and solid state (ceramic) garnet based electrolytes with enhanced performance. The proposed project has two objectives: (1) Develop a novel flexible solid polymer electrolyte possessing the conductivity of a conventional liquid electrolyte with low volatility and mechanical properties of a solid; and (2) Develop thin-film high-conductivity garnet-type solid lithium-ion electrolytes in low-interfacial-impedance tailored micro/nano structures. The corresponding research would follow two parallel tasks:

Task 1: Safe, High-Performance Polymer Electrolyte for Lithium Batteries

Dr. Kofinas' research group at University of Maryland has developed a novel flexible solid polymer electrolyte that promises the conductivity of a conventional liquid electrolyte with the low volatility and mechanical properties of a solid. Previous efforts based on the complex of PEO and alkali metals salts resulted in low ionic conductivity (~ 0.01 mS/cm) at room temperature and was inadequate for practical use at higher current densities. Inclusion of a secondary block copolymer, lower molecular weight polymers, ceramic particles or carbonate solvents also resulted in poor performance. The Kofinas group has developed electrolytes with conductivities as high as (0.7 mS/cm at 37°C, and 0.1 mS/cm at room temperature) by blending sulfur based ionic liquids (IL) with ionically conductive polymer matrices. The polymer / IL films form homogeneous free standing solid membranes (Figure 1), which are strong enough to be rolled and manipulated by hand and possess wide electrochemical stability while remaining non-combustible.



Figure 1 Thin film electrolyte ~ 5cm x 2cm

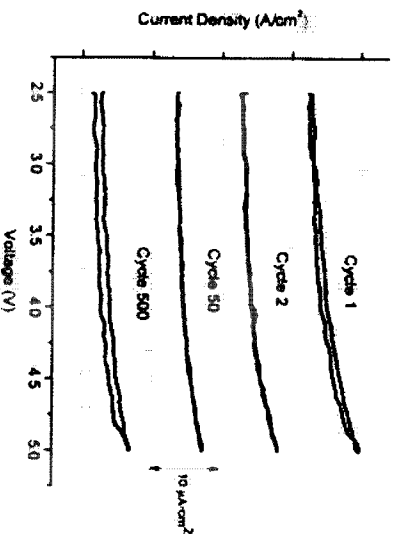


Figure 3 Cyclic voltammetry of a Li/V/Li-1.0/Al cell, 25 °C. Voltage cycled from 2.5 to 5.0 V at a rate of 5 mV/s.

Reversible cathodic stability in the polymer-IL hybrid electrolyte was attained using cyclic voltammetry of a Li/electrolyte/Al cell. In Figure 2 the electrolyte is cycled from 2.5 to 5 V against Li/Li⁺ for 500 cycles, with minimal current decay over the entire cycling process. The hybrid electrolyte as formulated does indicate stability that would provide a buffer zone above cathodes with a 5 V discharge potential, ultimately presenting further ability for the development of safer high power lithium batteries that rely on high voltage cathodes.

To document the long-term stability of the electrolyte against lithium, galvanostatic

cycling was conducted that involves aggressively stripping and plating lithium. A current density of 0.1 mA/cm² was reversed every hour for 100 cycles at 45 °C with intermittent testing of the conductivity via impedance spectroscopy. The overvoltage at the end of each half-cycle, plotted in Figure 3, shows there is minimal increase over 100 cycles in the voltage indicating long term stability against anodic materials.

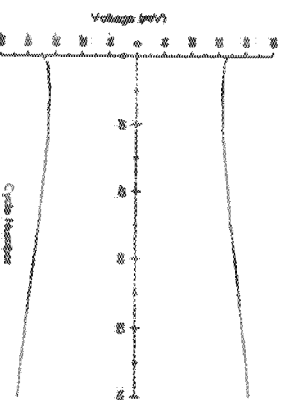


Figure 2 Overpotential of electrode-electrolyte interface at end of each 2 hr cycle (at 0.1 mA/cm²) at 45 °C