AWARD/CONTRACT

1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)

RATING

PAGE 1 OF PAGES 28

2. CONTRACT (Proc. Inst. Ident.) NO. HR0011-08-C-0102

3. EFFECTIVE DATE AUG - 8 2008

4. REQUISITION/PURCHASE REQUEST/PROJECT NO. HR0900

5. ISSUED BY CODE HR0011
DARPA
CMO
ATTN: MICHAEL D. BLACKSTONE
3701 N. FAIRFAX DR.
ARLINGTON VA 22203-1714

6. ADMINISTERED BY (If other than Item 5) CODE S3310A
DCMA NEW YORK
FT. WADWORTH BLDG 120
207 NEW YORK AVE
STATEN ISLAND NY 10305-5013

7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, state and zip code)
INTERNATIONAL BUSINESS MACHINES CORPORAT
1101 KITCHAWAN RD
YORKTOWN HEIGHTS NY 10598-0000

CODE 2G381 FACILITY CODE

8. DELIVERY [ ] FOB ORIGIN [X] OTHER (See below)

9. DISCOUNT FOR PROMPT PAYMENT
Net 30 Days

10. SUBMIT INVOICES 1 (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN: ITEM Section G

11. SHIP TO/MARK FOR CODE W7NBZJ
U.S. ARMY RESEARCH LABORATORY
WAYNE CHANG
2800 POWDER MILL RD
ADELPHI MD 20783

12. PAYMENT WILL BE MADE BY CODE HQ0337
DFAS COLUMBUS CENTER
NORTH ENTITLEMENT OPERATIONS
P.O. BOX 182264
COLUMBUS OH 43218-2264

13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION:
[ ] 10 U.S.C. 2304(c)( ) [ ] 41 U.S.C. 253(c)( )

14. ACCOUNTING AND APPROPRIATION DATA
See Schedule

15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
	SEE SCHEDULE				

15G. TOTAL AMOUNT OF CONTRACT $1,878,713.00

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CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17. [X] CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return 2 copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)

18. [ ] AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____ including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.

19A. NAME AND TITLE OF SIGNER (Type or print)
(b)(4)

20A. NAME OF CONTRACTING OFFICER
Michael D. Blackstone / PCO
TEL: 571-218-4804 EMAIL: michael.blackstone@darpa.mil

19B. NAME OF CONTRACTOR
(b)(4)
BY

19C. DATE SIGNED
8/7/08

20B. UNITED STATES OF AMERICA
(b)(6)
BY

20C. DATE SIGNED
8/8/08

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001					$2,505,632.00
	NOBS Phase I				
	CS				
	Conduct research entitled "Nanophotonic Optical Broadband Switches (NOBS)" in accordance with Attachment 1, Statement of Work, and Section C herein. Data deliverables/reports shall be provided in accordance with Sections C and F herein.				
	FOB: Destination				
	AO No. X670/00				

ESTIMATED COST	$2,505,632.00
GOVERNMENT SHARE	$1,878,713.00
CONTRACTOR SHARE	$626,919.00

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000101					
	Funding for CLIN 0001				
	CS				
	FOB: Destination				
	AO No. X670/00				
	ACRN AA				$932,358.00
	CIN: 00000000000000000000000000000				

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002			Lot		$2,563,170.00
OPTION	NOBS Phase II - Option				

CS

Conduct research entitled "Nanophotonic Optical Broadband Switches (NOBS)" in accordance with Attachment 1, Statement of Work, and Section C herein. Data deliverables/reports shall be provided in accordance with Sections C and F herein.

FOB: Destination

AO No. X670/00

ESTIMATED COST	$2,563,170.00
GOVERNMENT SHARE	1,921,865.00
CONTRACTOR SHARE	$641,305.00

Section C - Descriptions and Specifications

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C-1 Scope of Work

(a) The Contractor shall furnish the necessary personnel, materials, facilities and other services as may be required to perform Contract Line Item Numbers (CLIN) 0001 and, to the extent the Option is exercised, 0002 in accordance with the Statement of Work, Attachment 1 hereto, dated 26 June 2008.

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

C-2 Reports and Other Deliverables

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

(1) R&D STATUS REPORT **(QUARTERLY)**
This brief narrative, not to exceed five pages in length, shall contain the following:

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

R&D STATUS REPORT
PROGRAM FINANCIAL STATUS

Work Breakdown		Cumulative to Date			At Completion	
Structure or Task Element	Planned Expend	Actual Expend	% Budget Compl	At Compl	Latest Revised Estimate	Remarks

Subtotal: _____

Management Reserve: _____
Or
Unallocated Resources: _____

TOTAL: ==========

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

Based on currently authorized work:

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

YES NO

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

$ _____

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

YES NO

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

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

The Final Technical Report summary shall include:

Task Objectives
Technical Problems
General Methodology (i.e., literature review, laboratory experiments, surveys, etc.)
Technical Results
Important Findings and Conclusions
Significant Hardware Development
Special Comments
Implications for Further Research
Standard Form 298, September 1988

(3) ALL REPORTS

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

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

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

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

> Sponsored by
> Defense Advanced Research Projects Agency
> Microsystems Technology Office (MTO)
> Program: Nanophotonic Optical Broadband Switches (NOBS)
> Issued by DARPA/CMO under Contract No: HR0011-08-C-0102

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

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

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

(e) Distribution Statement B applies.

"Distribution authorized to U.S. Government agencies only due to the inclusion of proprietary information and to prevent Premature Dissemination of potentially critical technological Information. Other requests for this document shall be referred to DARPA Technical Information Office via email at tio@darpa.mil."

Note to contractor: In accordance with the applicable Data Rights clauses(s), all proprietary information within the data deliverables shall be clearly identified/marked as such for each such occurance (use of footnotes, or similar forms of reference, for purposes of such identification is encouraged).

(4) ADDITIONAL MISCELLANEOUS DATA DELIVERABLES

The Contractor shall also deliver those items listed in the Contract Attachment (1) - Statement of Work under the paragraph entitled "Deliverables", as applicable. The Contractor shall adhere to the schedule, as applicable, in the Statement of Work. Briefing materials (hard and softcopy) for all briefings given to the Government shall be provided in the Contractor's format.

(end of clause)

Section D - Packaging and Marking

CLAUSES INCORPORATED BY FULL TEXT

D-1 Packaging and Marking

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

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at destination by Contracting Officer's Representative identified in Section G herein.

Use of the DD 250 is required only for submission of the Program Final Report.
(end of clause).

CLAUSES INCORPORATED BY REFERENCE

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

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0001	7 mths. ADC		DARPA DR. JAGDEEP SHAH ATTN: MICROSYSTEMS TECHNOLOGY OFFICE 3701 NORTH FAIRFAX DRIVE ARLINGTON VA 22203-1714 703 696-2253 FOB: Destination	HR0011
000101	N/A	N/A	N/A	N/A
0002	N/A	N/A	N/A	N/A

CLAUSES INCORPORATED BY REFERENCE

52.247-34	F.O.B. Destination	NOV 1991
52.247-55	F.O.B. Point For Delivery Of Government-Furnished Property	JUN 2003

CLAUSES INCORPORATED BY FULL TEXT

F-1 Term of Contract

(a) The term of the contract commences on 2 June 2008 and continues through 31 December 2009.

(b) The period of performance for Option 1, as set forth in CLIN 0002, shall be from the effective date of the option exercise to and including 18 months thereafter.

(end of clause)

F-2 Reports and Other Deliverables

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

Item No.	Description	Due Date (on or before)
0001	Interim R&D Status Reports	Quarterly IAW Section C-2
0001	NOBS Final Report	36 months after date of contract award (6 August 2008) If option is exercised, 36 months after date of contract award (6 August 2008)
0001	Additional Misc. Deliverables	As required IAW Section C-2

(end of clause)

F-3 Report Distribution

(a) DARPA/MTO(program office)
Attn: Jagdeep Shah
3701 North Fairfax Drive
Arlington, VA 22203-1714
Email: Jag.Shah@darpa.mil
(one copy each report)

(b) DARPA
Attn: ADPM
3701 North Fairfax Drive
Arlington, VA 22203-1714
(one copy each report)

(c) DARPA/Library
3701 North Fairfax Drive
Arlington, VA 22203-1714
Email: library@darpa.mil
(one copy of the Final Technical Report)

(d) Defense Technical Information Center

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

OR

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

(e) DARPA/CMO
Attn: Michael Blackstone
3701 North Fairfax Drive
Arlington, VA 22203-1714
Email: Michael.Blackstone@darpa.mil
(one copy each report)

(f) COR
Attn: Wayne Chang
ARL/AD
2800 Powder Mill Road
Adelphi, MD 20783
Email: wchang@arl.army.mil
(one copy each report)

Note 1: (a) through (f) – submission of unclassified materials only. Submission of classified material shall be coordinated through DARPA SID and/or the DARPA Program Manager in accordance with the attached DD 254, as applicable.

Note 2: (a) through (f) – Interim Report submissions may be made electronically via e-mail. Final Report submissions shall be made in hardcopy and CD soft copy.

Note 3: For the Final Technical Report (s), the Contractor must also comply with the distribution requirements of DFARS 252.235-7011, as applicable.

F-4 Notice Regarding Late Delivery

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

(end of clause)

Section G - Contract Administration Data

ACCOUNTING AND APPROPRIATION DATA

AA: 9780400 1320 X670 P8H20 2525 DPAC 8 5213 S12136 63739E
AMOUNT: $932,358.00
CIN 00000000000000000000000000000000: $932,358.00

CLAUSES INCORPORATED BY FULL TEXT

252.204-7006 BILLING INSTRUCTIONS (OCT 2005)

When submitting a request for payment, the Contractor shall--

(a) Identify the contract line item(s) on the payment request that reasonably reflect contract work performance; and

(b) Separately identify a payment amount for each contract line item included in the payment request.

(End of clause)

G-1 Procuring Office Representative

(a) The Procuring Office Representative is Michael Blackstone, DARPA/CMO, 3701 North Fairfax Drive, Arlington, VA 22203-1714, telephone: 571-218-4804, e-mail: Michael.Blackstone@darpa.mil.

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

(end of clause)

G-2 Electronic Submission of Payment Requests

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

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

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

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

WAWF Invoice Type:	Cost Voucher
Issuing Office DoDAAC	HR0011
Admin Offfice DoDAAC	S3310A
Service Approver DoDAAC	S3310A
DCAA Office DoDAAC	HAA314
Paying Office DoDAAC	HQ0337

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

[redacted]

Picatinny Arsenal, Bldg 91
Picatinny, NJ 07806-5000

DoDAAC: HAA314
Phone No: (973) 724-4932
Fax No: (973) 724-2187
E-mail: *dcaa-fao2421@dcaa.mil*

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

Name	**E-mail**	**Phone**	**Role**
Wayne Chang	wchang@arl.army.mil	301-394-5798	COR
Michael Blackstone	Michael.Blackstone@darpa.mil	571-218-4804	PCO

G-3 Delegation of Authority for Contract Administration

(a) DCMA New York (S3310A) is hereby designated as the Contracting Officer's authorized representative for administering this contract in accordance with current directives.
(end of clause)

G-4 Contracting Officer's Representative (COR)

(a) Performance of work under this contract shall be subject to the technical direction of Wayne Chang, Army Research Laboratory (ARL), 2800 Powder Mill Road, Adelphi, MD 20783, telephone (301)394-5798, e-mail: wchang@arl.army.mil. Such technical direction includes those instructions to the Contractor necessary to accomplish the Statement of Work. The COR is not otherwise authorized to make any representations or commitments of any kind on behalf of the Contracting Officer or the Government. The COR does not have the authority to alter the Contractor's obligations or to change the specifications of the contract.

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

(1) Constitutes additional work outside the scope of work;

(2) Constitutes a change as defined in Section I contract clause entitled "Changes";

(3) In any manner causes an increase or decrease in the total estimated cost or the time required for contract performance; or

(4) Changes any of the stated terms, conditions, or specifications of the contract.

(5) See Attachment (3).

(end of clause)

G-5 Payment Instructions for Multiple Accounting Classification Citations

(a) Payments under contract line items funded by multiple accounting classification citations shall be made from the earliest available fiscal year funding sources. The earliest assigned ACRN must be fully disbursed before making disbursements from a succeeding ACRN.

(end of clause)

G-6 Incremental Funding

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

Phase	**CLIN**	**Funding Provided to Date**	**Funding Period of Performance End Date**
1	0001	$932,358	8 January 2009
2	0002	TBD	TBD

(end of clause)

G-7 Payment of Cost

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

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

(end of clause)

Section H - Special Contract Requirements

CLAUSES INCORPORATED BY FULL TEXT

H-1 Type of Contract

(a) This is a Cost Sharing, completion contract.
(end of clause)

H-2 Public Release or Dissemination of Information

(a) There shall be no dissemination or publication, except within and between the Contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval of the DARPA Technical Information Officer (DARPA/TIO). All technical reports will be given proper review by appropriate authority to determine which Distribution Statement is to be applied prior to the initial distribution of these reports by the Contractor. Papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and this review requirement, pursuant to DoD Instruction 5230.27 dated October 6, 1987.

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

(c) See also Section I, Clause 252.232-7010 "Acknowledgement of Support and Disclaimer."
(end of clause)

H-3 Key Personnel

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

IBM Key Personnel:

(b)(4)

(b)(4)

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

H-4 Restrictions on Printing

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

H-5 Contractor Representations and Certifications

(a) The Contractor's Representations and Certifications dated 4 April 2008 (ORCA) and 2 July 2008 (exluding IP cert contained therein. See clause H-18) are incorporated herein by reference.
(end of clause)

H-6 Insurance Schedule

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

H-7 Travel

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

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

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

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

(d) All foreign travel shall be authorized and approved in advance, in writing, by the Grants Officer. Request for such travel must be submitted to the Grants Officer at least [fill in number of days, TBD by Grants Officer] days in advance of traveler's anticipated departure date, and shall include traveler's itinerary of United States Flag Air Carriers.

(end of clause)

H-8 Metric System

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

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

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

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

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

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

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

(end of clause)

H-9 Consent to Subcontract

(a) Pursuant to the clause of the General Provisions entitled "Subcontracts (AUG 1998)," FAR 52.244-2, the Contracting Officer hereby consents to the placement of subcontract(s) with the following firm(s)/consultant(s) at the ceiling amounts specified:

NAME	TOTAL AMOUNT
(b)(4)	(b)(4)

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

(end of clause)

H-10 Pre-contract Costs

(a) The extent of allowability of costs incurred by the Contractor prior to the effective date of the contract shall be governed by the advance agreement listed in Section J as Attachment 4.
(end of clause)

H-11 Small Business Subcontracting Plan and Goals

(a) The Contractor's Small Business Subcontracting Plan, dated 25 July 2008 (as amended through 1 August 2008), is incorporated herein and made a part of this contract by reference.
(end of clause)

H-12 Government Furnished Property/Facilities and Services

(a) In accordance with the Section I contract clause entitled "Government Property", the following property, facilities and/or services shall be provided for use in the performance of this contract.

Need Date	QTY	PROPERTY NOMENCLATURE	DELIVERY TO

NONE IDENTIFIED AT TIME OF AWARD
(end of clause)

H-13 Contractor-Acquired Property (Facilities)

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

Items To Be Acquired	Estimated Cost

NONE IDENTIFIED AT TIME OF AWARD

(b) The costs incurred by the Contractor in acquiring the facilities listed in paragraph (a) above shall be considered allowable costs under the contract provided that the total net amount of the facilities does not exceed $0.00. The Contractor shall have no obligation to acquire facilities and the Government shall have no obligation to reimburse any amount for facilities in excess of the amount set forth above unless the contract is amended to increase this amount.

(c) The facilities listed above shall be considered Government Property and shall be subject to the provisions of FAR 52.245-05, incorporated by reference in Section I.

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

H-14 Contractor-Acquired Property (Special Test Equipment)

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

Items To Be Acquired	Estimated Cost
NONE IDENTIFIED AT TIME OF AWARD	

(b) The costs incurred by the Contractor in acquiring the special test equipment listed in paragraph (a) above shall be considered allowable costs under the contract provided that the total net amount of the special test equipment does not exceed $0.00. The Contractor shall have no obligation to acquire special test equipment and the Government shall have no obligation to reimburse any amount for special test equipment in excess of the amount set forth above unless the contract is amended to increase this amount.

(c) The special test equipment listed above shall be considered Government Property and shall be subject to the provisions of FAR 52.245-05, incorporated by reference in Section I.

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

H-15 Contractor-Acquired Property (Special Tooling)
(a) The Contractor is authorized to acquire the following items of special tooling which are needed to accomplish this contract:

Items To Be Acquired	Estimated Cost
NONE IDENTIFIED AT TIME OF AWARD	

(b) The costs incurred by the Contractor in acquiring the special tooling listed in paragraph (a) above shall be considered allowable costs under the contract provided that the total net amount of the special tooling does not exceed $0.00. The Contractor shall have no obligation to acquire special tooling and the Government shall have no obligation to reimburse any amount for special tooling in excess of the amount set forth above unless the contract is amended to increase this amount.

(c) The special tooling listed above shall be considered Government Property and shall be subject to the provisions of FAR 52.245-05, incorporated by reference in Section I.

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

H-16 Contractor Acquired Property (IT)

(a) Performance of this contract will require use of the information technology (IT) resources listed below, acquisition of which (or equivalent) is hereby authorized:

ITEM	TOTAL AMOUNT
NONE IDENTIFIED AT TIME OF AWARD	

(b) The costs incurred by the Contractor in acquiring the IT listed in paragraph (1.) above shall be considered allowable costs under the contract provided that the total net amount of the IT does not exceed $_____. The Contractor shall have no obligation to acquire IT and the Government shall have no obligation to reimburse any amount for IT in excess of the amount set forth above unless the contract is modified to increase this amount.

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

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

(e) This authorization is subject to the Contractor's compliance with the approvals and screening requirements set forth in DFARS Subpart 239.73 and DoD 7950.1-M, "Defense Automation Resources Management Manual."

(1) Use of the DD Form 1851 for determining availability of excess information technology (IT) is only required for IT with a unit acquisition cost of $ _____ and above.
(2) On-line screening for excess IT, regardless of cost, via remote terminal dial-up, is available to contractors through their Administrative Contracting Officers.

(end of clause)

H-17 Proprietary Technical Data and Computer Software

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

(end of clause)

H-18 Consultants

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

Name	No. of Hours	Rate	Total Amount
NO CONSULTANTS AUTHORIZED AS OF THE EFFECTIVE DATE OF THIS CONTRACT.			

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

(end of clause)

H-19 Title to Equipment (Nonprofit Institutions of Higher Education and Nonprofit Organizations

(a) In accordance with FAR 35.014, "Government property and title", title to all equipment purchased with funds available for research under this contract shall vest in the acquiring nonprofit institution, namely Columbia University, upon acquisition without further obligation to the Government. The equipment shall be used for the conduct of basic or applied scientific research.

(end of clause)

H-20 Export Control Clause

Should this project develop beyond fundamental research (basic and applied research ordinarily published and shared broadly within the scientific community) with military or dual-use applications the following apply:

(a) The contractor shall comply with all U. S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this contract. In the absence of available license exemptions/exceptions, the Contractor shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of (including deemed exports) hardware, technical data, and software, or for the provision of technical assistance.

(b) The Contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at any Government installation (whether in or outside the United States), where the foreign person will have access to export-controlled technical data or software.

(c) The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(d) The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors.

(end of clause)

Section I - Contract Clauses

CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JUL 2004
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-6	Restrictions On Subcontractor Sales To The Government	SEP 2006
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	SEP 2007
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	SEP 2006
52.215-2 Alt II	Audit and Records--Negotiation (Jun 1999) - Alternate II	APR 1998
52.215-8	Order of Precedence--Uniform Contract Format	OCT 1997
52.215-10	Price Reduction for Defective Cost or Pricing Data	OCT 1997
52.215-12	Subcontractor Cost or Pricing Data	OCT 1997
52.215-14	Integrity of Unit Prices	OCT 1997
52.215-14 Alt I	Integrity of Unit Prices (Oct 1997) - Alternate I	OCT 1997
52.215-15	Pension Adjustments and Asset Reversions	OCT 2004
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other than Pensions	JUL 2005
52.215-21	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data--Modifications	OCT 1997
52.216-7	Allowable Cost And Payment	DEC 2002
52.216-12 Alt I	Cost-Sharing Contract--No Fee (Apr 1994) - Alternate I	APR 1984
52.219-4	Notice of Price Evaluation Preference for HUBZone Small Business Concerns	JUL 2005
52.219-8	Utilization of Small Business Concerns	MAY 2004
52.219-9	Small Business Subcontracting Plan	APR 2008
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.219-28	Post-Award Small Business Program Rerepresentation	JUN 2007
52.222-3	Convict Labor	JUN 2003
52.222-21	Prohibition Of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	MAR 2007
52.222-35	Equal Opportunity For Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-36	Affirmative Action For Workers With Disabilities	JUN 1998
52.222-37	Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-39	Notification of Employee Rights Concerning Payment of Union Dues or Fees	DEC 2004
52.222-50	Combating Trafficking in Persons	AUG 2007
52.222-51	Exemption from Application of the Service Contract act to Contracts for Maintenance, Calibration, or Repair of Certain Equipment--Requirements	NOV 2007

52.222-53	Exemption from Application of the Service Contract Act to Contracts for Certain Services--Requirements	NOV 2007
52.223-14	Toxic Chemical Release Reporting	AUG 2003
52.223-16 Alt I	IEEE 1680 Standard for the Environmental Assessment of Personal Computer Products (Dec 200&0 Alternate I	DEC 2007
52.225-13	Restrictions on Certain Foreign Purchases	JUN 2008
52.226-1	Utilization Of Indian Organizations And Indian-Owned Economic Enterprises	JUN 2000
52.227-1 Alt I	Authorization And Consent (Dec 2007) - Alternate I	APR 1984
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	DEC 2007
52.228-7	Insurance--Liability To Third Persons	MAR 1996
52.232-9	Limitation On Withholding Of Payments	APR 1984
52.232-20	Limitation Of Cost	APR 1984
52.232-22	Limitation Of Funds	APR 1984
52.232-23 Alt I	Assignment of Claims (Jan 1986) - Alternate I	APR 1984
52.232-25	Prompt Payment	OCT 2003
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration	OCT 2003
52.233-1	Disputes	JUL 2002
52.233-3 Alt I	Protest After Award (Aug 1996) - Alternate I	JUN 1985
52.242-1	Notice of Intent to Disallow Costs	APR 1984
52.242-3	Penalties for Unallowable Costs	MAY 2001
52.242-4	Certification of Final Indirect Costs	JAN 1997
52.242-13	Bankruptcy	JUL 1995
52.243-2 Alt V	Changes--Cost-Reimbursement (Aug 1987) - Alternate V	APR 1984
52.244-5	Competition In Subcontracting	DEC 1996
52.244-6	Subcontracts for Commercial Items	MAR 2007
52.245-1	Government Property	JUN 2007
52.245-9	Use And Charges	JUN 2007
52.249-5	Termination For Convenience Of The Government (Educational And Other Nonprofit Institutions)	SEP 1996
52.249-14	Excusable Delays	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2004
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004 Alt A	Central Contractor Registration (52.204-7) Alternate A	SEP 2007
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	DEC 2006
252.209-7005	Reserve Officer Training Corps and Military Recruiting on Campus	JAN 2000
252.211-7007	Item Unique Identification of Government Property	SEP 2007
252.215-7000	Pricing Adjustments	DEC 1991
252.215-7002	Cost Estimating System Requirements	DEC 2006
252.219-7003	Small Business Subcontracting Plan (DOD Contracts)	APR 2007
252.225-7006	Quarterly Reporting of Actual Contract Performance Outside the United States	MAY 2007
252.225-7012	Preference For Certain Domestic Commodities	MAR 2008

252.226-7001	Utilization of Indian Organizations and Indian-Owned Economic Enterprises, and Native Hawaiian Small Business Concerns	SEP 2004
252.227-7013	Rights in Technical Data--Noncommercial Items	NOV 1995
252.227-7014	Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation	JUN 1995
252.227-7015	Technical Data--Commercial Items	NOV 1995
252.227-7016	Rights in Bid or Proposal Information	JUN 1995
252.227-7019	Validation of Asserted Restrictions--Computer Software	JUN 1995
252.227-7027	Deferred Ordering Of Technical Data Or Computer Software	APR 1988
252.227-7037	Validation of Restrictive Markings on Technical Data	SEP 1999
252.227-7038	Patent Rights--Ownership by the Contractor (Large Business)	DEC 2007
252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	MAR 2008
252.232-7010	Levies on Contract Payments	DEC 2006
252.235-7010	Acknowledgment of Support and Disclaimer	MAY 1995
252.235-7011	Final Scientific or Technical Report	NOV 2004
252.239-7001	Information Assurance Contractor Training and Certification	JAN 2008
252.242-7004	Material Management And Accounting System	NOV 2005
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts)	JAN 2007
252.247-7023	Transportation of Supplies by Sea	MAY 2002
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000

CLAUSES INCORPORATED BY FULL TEXT

52.216-12 COST-SHARING CONTRACT--NO FEE (APR 1984)

(a) The Government shall not pay to the Contractor a fee for performing this contract.

(b) After paying 80 percent of the Government's share of the total estimated cost of performance shown in the Schedule, the Contracting Officer may withhold further payment of allowable cost until a reserve is set aside in an amount that the Contracting Officer considers necessary to protect the Government's interest. This reserve shall not exceed one percent of the Government's share of the total estimated cost shown in the Schedule or $100,000, whichever is less.

(End of clause)

52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 2000)

(a) The Government may extend the term of this contract by written notice to the Contractor within 18 months (insert the period of time within which the Contracting Officer may exercise the option); provided that the Government gives the Contractor a preliminary written notice of its intent to extend at least 14 days (60 days unless a different number of days is inserted) before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option clause.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed 36

months.
(End of clause)

52.222-2 PAYMENT FOR OVERTIME PREMIUMS (JUL 1990)

(a) The use of overtime is authorized under this contract if the overtime premium cost does not exceed $0 or the overtime premium is paid for work --

(1) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;

(2) By indirect-labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;

(3) To perform tests, industrial processes, laboratory procedures, loading or unloading of transportation conveyances, and operations in flight or afloat that are continuous in nature and cannot reasonably be interrupted or completed otherwise; or

(4) That will result in lower overall costs to the Government.

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

(1) Identify the work unit; e.g., department or section in which the requested overtime will be used, together with present workload, staffing, and other data of the affected unit sufficient to permit the Contracting Officer to evaluate the necessity for the overtime;

(2) Demonstrate the effect that denial of the request will have on the contract delivery or performance schedule;

(3) Identify the extent to which approval of overtime would affect the performance or payments in connection with other Government contracts, together with identification of each affected contract; and

(4) Provide reasons why the required work cannot be performed by using multishift operations or by employing additional personnel.

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

(End of clause)

52.233-4 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (OCT 2004)

United States law will apply to resolve any claim of breach of this contract.

(End of clause)

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

When the Contracting Officer authorizes supplies to be shipped on a commercial bill of lading and the Contractor

will be reimbursed these transportation costs as direct allowable costs, the Contractor shall ensure before shipment is made that the commercial shipping documents are annotated with either of the following notations, as appropriate:

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

"Transportation is for the Defense Advanced Research Projects Agency (DARPA) and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the Government."

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

"Transportation is for the Defense Advanced Research Projects Agency (DARPA) and the actual total transportation charges paid to the carrier(s) by the consignor or consignee shall be reimbursed by the Government, pursuant to cost-reimbursement contract no. HR0011-08-C-0102. This may be confirmed by contacting the Administrative Contracting Officer at DCMA New York.

(End of clause)

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

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

https://farsite.hill.af.mil

(End of clause)

52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

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

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

(End of clause)

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

(a) The Contractor shall include an acknowledgment of the Government's support in the publication of any material based on or developed under this contract, stated in the following terms: This material is based upon work supported by the [name of contracting agency(ies)] under Contract No. [Contracting agency(ies) contract number(s)].

(b) All material, except scientific articles or papers published in scientific journals, must, in addition to any notices or disclaimers by the Contractor, also contain the following disclaimer: Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of

the [name of contracting agency(ies)].

Section J - List of Documents, Exhibits and Other Attachments

LIST OF ATTACHMENTS

DOCUMENT TYPE	PAGES	DATE
Attachment 1 – Statement of Work	6	26 June 2008
Attachment 2 – Intellectual Property	1	01 August 2008
Attachment 3 – COR Letter	3	17 July 2008
Attachment 4 – Precontract Cost Letter	2	2 June 2008
Precontract Cost Letter	2	27 June 2008

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
3701 NORTH FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

August 08, 2008

MEMORANDUM FOR ADMINISTRATIVE CONTRACTING OFFICER, DCMA NEW YORK (ATTN: COGNIZANT ADMINISTRATIVE CONTRACTING OFFICER)

SUBJECT: Specific Delegation of Authority for Administrative Functions for Contract No. HR0011-08-C-0102 with International Business Machines Corporation (IBM).

The subject contract, a copy of which has been transmitted to DCMA via EDA, designates your activity as the Administrative Office for performance of the contract functions listed in the attached checklist of administration functions. Subject to your concurrence, you are requested to perform the functions identified. It is requested that you confirm acceptance of this delegation in writing to the undersigned. A copy of the Contracting Officer's Representative (COR) assignment letter is available upon request to the undersigned.

Please note that this is a Cost contract of which includes use of WAWF for invoicing and i-edison for submission of invention disclosures and patent reports.

If you have any questions, please contact me at (571) 218-4804 or michael.blackstone@darpa.mil.

Michael D. Blackstone
Contracting Officer
Contracts Management Office

Attachments: (1) Checklist of Administration Functions

ATTACHMENT 1
CONTRACT ADMINISTRATION FUNCTIONS

Contract Number: HR0011-08-C-0102

Michael D. Blackstone
Contracting Officer

08 August 2008
Date

The items listed in FAR 42.302(a), DFARS 242.302, and Class Deviation 99-O0010 are the contract administration functions to be performed by the cognizant contract administrative office (CAO), to the extent they apply on this contract, as prescribed in 42.202.

~~The CAO shall perform the functions in FAR 42.302(b) only when and to the extent specifically authorized by the contracting office as identified below:~~

- [ ] Negotiate or negotiate and execute supplemental agreements incorporating contractor proposals resulting from change orders issued under the Changes clause. Before completing negotiations, coordinate any delivery schedule change with the contracting office.
- [ ] Negotiate prices and execute priced exhibits for unpriced orders issued by the contracting officer under basic ordering agreements.
- [X] Negotiate or negotiate and execute supplemental agreements changing contract delivery schedules.
- [X] Negotiate or negotiate and execute supplemental agreements providing for the deobligation of unexpended dollar balances considered excess/remaining to known contract requirements.
- [ ] Issue amended shipping instructions and, when necessary, negotiate and execute supplemental agreements incorporating contractor proposals resulting from these instructions.
- [X] Negotiate changes to interim billing prices.
- [ ] Negotiate and definitize adjustments to contract prices resulting from exercise of an economic price adjustment clause (see Subpart 16.2).
- [ ] Issue change orders and negotiate and execute resulting supplemental agreements under contracts for ship construction, conversion, and repair.

STATEMENT OF WORK

1. Work Items

1.1 Summary

The primary goals of this program are to develop a 2x2 unidirectional Nanophotonic Optical Broadband Switch (NOBS) using CMOS-compatible silicon nanophotonic technology, and to use NOBS as a building block element to create larger bidirectional switches. These larger optical switches include a 4x4 Photonic Switching Element (PSE) and a MxN Advanced Photonic Switch (APS).

1.2 Nanophotonic optical broadband switch (NOBS) element

1.2.1 Experimental testing of several alternative versions of the optical design of a broad-optical bandwidth switch with a variety of design approaches including cascaded ring resonators, digital optical switch, broadband MZI, resonator-enhanced MZI, etc. Comparative analysis and down-selection of various optical designs in view of smallest footprint, lowest power, fastest modulation, lowest insertion loss.

1.2.2 Extensive modeling and experimental testing of several alternative versions of the electrical design of a broad-band deflection switch including both thermo-optic and electro-optic approaches with PIN, PN, or MOS-type injection.

1.2.3 Design, fabricate and test a single NOBS optical switch, satisfying the metrics criteria of Section 3.3.

1.3 CMOS drive circuits and CMOS/Photonic integration

1.3.1 Development of mixed photonic/CMOS design libraries within an automated design environment (e.g. Cadence) compatible with advanced IBM technologies. Development of automated testing tools for design rules checking and checking mixed electronic/photonic circuit layout compatible as needed with standard IBM LVS and DRC procedures.

1.3.2 Design of low-power single and double-ended drivers for NOBS in advanced IBM CMOS technology. Fabrication and testing of standalone CMOS drivers in advanced IBM CMOS technology.

1.3.3 Integration of a CMOS driver with a single NOBS optical switch. Fabrication and testing of a single NOBS with CMOS driver.

1.4 Non-blocking Photonic Switching Element (PSE)

1.4.1 Experimental testing of several alternative versions of small footprint waveguide crossing elements with a variety of design approaches including MMI couplers, resonant enhancement, etc. Comparative analysis and down-selection of various optical designs in view of smallest footprint, lowest insertion loss, smallest inter-channel cross-talk, fabrication tolerances, and broader optical bandwidth.

1.4.2 Design, fabricate and test 4x4 non-blocking PSE switching element satisfying the metrics criteria of Section 3.3.

1.4.3 Design, fabricate and test 4x4 non-blocking PSE switching element, composed of NOBS integrated with CMOS drivers. Fabricate and test multiple (>5) integrated PSEs on a single die.

1.5 MXN switch scaling to a full Advanced Photonic Switch (APS)

1.5.1 Develop photonic switching fabric model, iterate closely with tasks 0 and 1.3 to fully incorporate building block device physical characterization and layout.

1.5.2 Model high-radix MxN photonic switch configurations; extract physical performance metrics for scaling structures. Iterate design with measurements from fabricated small radix devices.

1.5.3 Perform design exploration of large scale photonic switching fabrics with inserted MxN elements. Develop high-radix MxN switch metrics for cascading requirements in full non-blocking interconnect fabric.

1.5.4 Explore various designs for efficient coupling of light form a fiber to the nanophotonic waveguides including grating-based vertical coupling and inverted-taper-based edge coupling. Down-selection of appropriate designs based on their coupling efficiency, broad bandwidth, easiness of incorporation into the front-end-of-line CMOS flow, chip packaging flow, and efficient cooling approaches.

1.5.5 Develop a CMOS processing module to incorporate dense arrays of fiber-to-chip couplers with large port counts (>10) into front-end-of-line CMOS flow.

1.5.6 Design, fabricate and test a non-blocking Advanced Photonic Switch (APS) composed of at least 4 individual PSE switching elements satisfying the metrics criteria of Section 3.3.

1.5.7 Design, fabricate and test a non-blocking APS composed of at least 4 individual PSEs integrated with a corresponding number of CMOS drivers.

2. Deliverables

There are no material deliverables for this program.

3. Phase I and Phase II Tasks and Milestone Schedules

3.1 Phase 1 Milestones:

1. Develop switch fabric modeling environment which includes a model for the physical NOBS element. (Work Item 1.5)
2. Determine and model initial layout with inserted NOBS fabrication design for a 4x4 PSE. (Work Item 1.5)
3. Complete photonic switching fabric modeling tool with modular building block physical characterization and layout functions. Demonstrate corroboration of experimentally measured parameters and scaled performance evaluation. (Work Item 1.5)
4. Optimize design for a scalable MxN broadband advanced photonic switch (APS). Develop complete physical performance and layout metrics for a 4x4 PSE and a full MxN fabric. (Work Item 1.5)
5. Several alternative optical designs of NOBS switch are designed, fabricated and tested. Comparative analysis of their performance and scalability is performed. (Work Item 0)

6. Most promising designs capable of meeting the metrics in Section 3.3 are down-selected, fabricated and tested. (Work Item 0)
7. Several alternative electrical designs of NOBS are modeled, fabricated and tested including both thermo-optic and electro-optic approaches. Comparative analysis of their performance and scalability is performed. (Work Item 0)
8. Single NOBS switch is fabricated and tested both optically and electrically. (Work Item 0)
9. Various designs of efficient and broadband fiber-to-chip couplers are designed, fabricated and tested including grating-based vertical couplers and inverted-taper based edge couplers. (Work Item 1.5)
10. A CMOS processing module for incorporation of a down-selected fiber coupler into FEOL CMOS flow is developed. Low insertion loss and large port counts (>10) fiber coupler array is fabricated and tested. (Work Item 1.5)
11. Mixed photonic/electronic design libraries are built within an automated CAD environment (e.g. Cadence), compatible with advanced IBM CMOS technologies. Automated testing tools including DRC and LVS for mixed photonic/electronic circuits are developed. A first generation CMOS mask set is taped out and sent to the mask house. (Work Item 1.3)
12. Low-power single and double-ended CMOS drivers for NOBS are designed and fabricated in advanced IBM CMOS technology. Electrical testing is performed. (Work Item 1.3)
13. An individual NOBS integrated with a CMOS driver is fabricated and tested both optically and electrically. (Work Item 1.3)
14. Various alternative versions of low-loss broadband waveguide crossings are designed, fabricated and tested. Comparative analysis and down-selection of most promising design capable of delivering metrics of Section 3.3 is performed. A passive waveguide network consisting of 4cm silicon waveguide and 40 passive waveguide crossings with total on-chip optical loss less than 20dB is demonstrated. (Work Item 1.4)
15. A single non-blocking bidirectional PSE element is designed, fabricated and tested that satisfies criteria of Section 3.3. (Work Item 1.4)
16. A single non-blocking bidirectional PSE element integrated with CMOS drivers is fabricated and tested. The PSE is equipped with 8 fiber couplers for in- and out-coupling. Switching functionality is demonstrated for all switches in the array with targeted specs for crosstalk, extinction ratio, insertion loss, etc. (Work Item 1.4)
17. Demonstration of routing functionality (east-west, east-south, east-north, etc.) of a PSE using modulated multi-wavelength optical signals (~100Gbps aggregate data rate) with BER<10^{-12}. (Work Item 1.4)

3.2 Phase 2 Milestones

1. Complete an optimized design for a scaled photonic non-blocking interconnect fabric in Clos or equivalent configuration, with cascaded MxN high-radix switches. (Work Item 1.5)
2. Evaluate performance of an APS with fully integrated physical layer metrics and microarchitectural layout. Determine scaling limitations for on-chip interconnect fabrics. (Work Item 1.5)

3. Design second generation low-power CMOS drivers in advanced IBM CMOS technology. Fabrication and electrical testing is performed. (Work Item 1.3)
4. A non-blocking Advanced Photonic Switch (APS) composed of at least 4 individual PSE switching elements and equipped with a corresponding number of integrated fiber couplers is designed, fabricated and tested. Metrics of Section 3.3 are satisfied. (Work Item 1.5)
5. A non-blocking bidirectional APS composed of at least 4 individual PSE switching elements and integrated with a corresponding number of CMOS drivers and fiber couplers is fabricated and tested. Demonstration of switching functionality of all switches in array with targeted specs for crosstalk, extinction ratio, insertion loss, etc. (Work Item 1.5)
6. Demonstration of routing functionality (east-west, east-south, east-north, etc.) of an APS using modulated multi-wavelength optical signals (~100Gbps aggregate data rate) with BER<10^{-12}. (Work Item 1.5)

3.3 Metrics Tables

The tables below outline the key metrics for the NOBS, PSE, and APS that are targeted for the NOBS program:

		End of Phase I	End of Phase II
2x2 Nanophotonic Optical Broadband Switch (NOBS)	**Unit**		
(b)(4)			

(b)(4)

		End of Phase I	End of Phase II
4x4 Photonic Switching Element (PSE) and MxN Advanced Photonic Switch (APS)	**Unit**		
(b)(4)			

Identification and Assertion of Restrictions on the Government's Use, Release, or Disclosure of Technical Data or Computer Software per 252.227-7017 (JUN 1995)

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

Technical Data or Computer Software to be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(b)(4)			

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
3701 NORTH FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

MEMORANDUM FOR CONTRACTING OFFICER'S REPRESENTATIVE

FROM: DARPA, Contracts Management Office

TO: Wayne Chang, Army Research Laboratory (ARL)

SUBJECT: Appointment as Contracting Officer's Representative (COR)

1. You are hereby appointed as the Contracting Officer's Representative for:

   Contract Number: HR0011-08-C-0102

   Contractor: International Business Machines Corporation (IBM)
   Thomas J. Watson Research Center
   P.O. Box 218
   Yorktown Heights, New York 10598

   Program: Nanophotonic Optical Broadband Switches (NOBS)

2. This appointment authorizes and designates you to perform the following duties and/or responsibilities as specified herein:

   a. Furnish plans, schedules, specifications, descriptions, and other documents to the contractor as required by the contract.

   b. Assist the contractor in interpreting technical aspects of the contract specifications/statement of work. Differences of opinion and interpretations which could affect the terms and conditions of the contract will be referred to the contracting officer for resolution.

   c. Provide Government recommendations/approvals to the contractor promptly in all cases where the contract calls for technical approval.

   d. Observe, monitor, and assess the contractor's performance under the terms of the contract. This includes reporting promptly to the contracting officer any failures, delays, or significant deviations of performance, quality, costs, or other actions which might jeopardize contract performance.

3. In the performance of the duties delegated to you in this letter, you are cautioned that you could be held personally liable for actions taken or directions given by you to the contractor that are beyond the authorities given to you in this letter. The duties or authorities in this

letter are not delegable; therefore, you must advise the Contracting Officer or the Contract Administrator/Specialist immediately when you are unable to perform these duties.

4. In your dealings with the contractor you must not give technical direction as though the contractor's employees are Government employees. You must maintain a formal, arms-length relationship with the contractor in order to avoid even an appearance that the contract is one for personal services. If the contractor's performance takes place in a Government facility, then to the maximum extent practicable, the contractor's work area should be physically separated from areas in which Government employees work, and communication with the contractor's employees on contractual matters should be only through that contractor employee(s) designated by the contractor to supervise them. You must not give any direction to the contractor that is not authorized by the statement of work because it is not the intent of the Government that a contractor be required to do anything that is not included in the contract.

5. You are responsible for providing prompt notification to the contracting officer any significant deficiencies with respect to contractor performance or other actions which might jeopardize contract performance.

6. You are not authorized by this letter to take any action, either directly or indirectly, that could result in a change in the pricing, quantity, quality, place of performance, delivery schedule or any other terms and conditions of the basic contract, or to direct the accomplishment of effort which would exceed the scope of the basic contract. You must be especially cautious in providing interpretation of the specifications/ statement of work. The agreement reached or technical direction given must be formalized in writing with copies to the contracting officer. You shall also inform the contractor that if he believes that the COR's interpretation is erroneous, the contractor must notify the contracting officer in writing concerning the details of his position.

7. Specific duties in addition to those above are as follows:

    a. Control all government technical interfaces with the contractor.

    b. Ensure that copies of government technical correspondence are forwarded to the contracting officer for placement in the contract file unless otherwise posted to TFIMS by the contractor in accordance with the contract.

    c. Promptly furnish documentation on any requests for change, deviation, or waiver (whether generated by the Government or the contractor) to the contracting officer for appropriate action.

    d. Review and, if required (i.e., Fixed Price Payments), accept invoices submitted through WAWF as stipulated in Section G of the Contract.

e. Provide required review of Patent/Invention Disclosures made in I-Edison (http://www.iedison.gov).

f. The COR must maintain a separate file for each contract for which he/she acts as COR. The file should serve as a repository and record of all documents and communications between the contractor and the COR. At a minimum, the file must include a copy of the contract and all modifications as well as the COR appointment letter. Examples of other file documentation may include:

- Reports required per the contract, e.g. interim and final technical or patent reports
- Memoranda for Record documenting important contract discussions
- Records of formal meetings, e.g. post award conference, program reviews, etc.

g. Assist ACO and/or PCO, as requested, with closeout activities at completion of contract period of performance.

8. If this is your first appointment as a COR or if you have not performed COR duties within the last two years, and in order to comply with DFARS 201.6-2, you must complete COR training immediately so that you can properly execute your responsibilities under this contract. A good source of COR training is available via a web-based module, CLC 106, "Contracting Officer Representative with a Mission Focus" at www.dau.mil.

9. Your appointment as COR for this effort expires on final disposition of the contract.

10. Your good judgment in performing your duties under the contract will have an important effect on the value of the performance obtained by the Government.

(b)(6) [redacted]

DARPA PCO (b)(6) [redacted]
Contracting Officer

7/15/08
Date

Appointee
Contracting Officer's Representative

7/17/08
Date

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
3701 NORTH FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

ADVANCE AGREEMENT TO AUTHORIZE INCURRENCE OR PRE-AWARD COSTS UNDER CONTRACT HR0011-08-C-0102

Reference: (a) DARPA Procurement Guidance X670/00, dated 1 May 2008
(b) IBM's Technical Proposal entitled, "Nanophotonic Optical Broadband Switches," dated 10 January 2008
(c) NOB Program Cost Proposal, dated 10 January 2008
(d) NOBS 45 day Projected Funding Requirements, total and by task

The Contracts Management Office (CMO), Defense Advanced Research Projects Agency (DARPA) has received a valid and properly funded procurement request (reference (a)) in support of DARPA's Advanced Photonic Switches (Technical) Program. This request follows upon receipt of reference (a) and reference (b) and its evaluation under Broad Agency Announcement (BAA) 07-18. The issuance of a cost-plus-fixed-fee contract is intended.

Since the Contracting Officer has determined that incurrence of costs before the effective date of the contract is necessary to ensure compliance with the proposed delivery schedule, the Government and the Contractor agree as follows:

FIRST: **In the event a contract is awarded,** pre-award costs, not to exceed $146,333.00 shall be allowable under the contract provided that the individual costs therein shall be:

(1) Otherwise allowable, reasonable and allocable;
(2) Incurred no sooner than 20 May 2008; and
(3) Incurred specifically and exclusively to accomplish work scheduled for the initial 45-day period of performance as so defined in reference (a). Pre-award costs shall only be allocated to tasks 7.1 through 7.4, for a **45-day** period of performance, as referenced in IBM's 45 day Projected Funding Requirements, reference (d).

SECOND: Contract specifications and price shall be agreed to by the earlier of:

(1) 1 July 2008; and
(2) The date on which the amount of funds obligated, committed or expended under this Advance Agreement is equal to no more than $146,333.00.

ADVANCE AGREEMENT TO AUTHORIZE INCURRENCE OR PRE-AWARD COSTS UNDER CONTRACT HR0011-08-C-0102

THIRD AND FINALLY: It is the intention of the Government to award a contract to the Contractor, subject to final agreement on the contract terms, specifications and price(s). Any resulting contract shall incorporate this Advance Agreement. It is understood and agreed by both parties that this Agreement concerns the treatment of pre-award costs **in the event of Contract award**. This Agreement does not require the Contractor to incur any such costs, and any such costs incurred are at the risk of the Contractor, pending the award of a contract.

For the Contractor:

(b)(4) May 20, 2008

(Signature and Date)

(b)(4)

(Print Name)

(b)(4)

(Title)

For the Government:

(b)(6) 25 May 08

Michael D. Blackstone (b)(6) Date

Contracting Officer

Defense Advanced Research Projects Agency

Contracts Management Office

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
3701 NORTH FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

ADVANCE AGREEMENT TO AUTHORIZE INCURRENCE OF PRE-AWARD COSTS UNDER CONTRACT HR0011-08-C-0102

Reference: (a) DARPA Procurement Guidance X670/00, dated 1 May 2008
(b) IBM's Technical Proposal entitled, "Nanophotonic Optical Broadband Switches," dated 10 January 2008
(c) NOB Program Cost Proposal, dated 10 January 2008
(d) NOBS 45 and 90 day Projected Funding Requirements, total and by task

The Contracts Management Office (CMO), Defense Advanced Research Projects Agency (DARPA) has received a valid and properly funded procurement request (reference (a)) in support of DARPA's Advanced Photonic Switches (Technical) Program. This request follows upon receipt of reference (a) and reference (b) and its evaluation under Broad Agency Announcement (BAA) 07-18. The issuance of a cost-plus-fixed-fee contract is intended.

Since the Contracting Officer has determined that incurrence of costs before the effective date of the contract is necessary to ensure compliance with the proposed delivery schedule, the Government and the Contractor agree as follows:

FIRST: **In the event a contract is awarded**, pre-award costs, not to exceed $348,919.00 shall be allowable under the contract provided that the individual costs therein shall be:

(1) Otherwise allowable, reasonable and allocable;
(2) Incurred no sooner than 20 May 2008; and
(3) Incurred specifically and exclusively to accomplish work scheduled for the initial 90-day period of performance as so defined in reference (a). Pre-award costs shall only be allocated to tasks 7.1 through 7.4, for a **90-day** period of performance, as referenced in IBM's 45 and 90 day Projected Funding Requirements, reference (d).

SECOND: Contract specifications and price shall be agreed to by the earlier of:

(1) 15 August 2008; and
(2) The date on which the amount of funds obligated, committed or expended under this Advance Agreement is equal to no more than $348,919.00.

ADVANCE AGREEMENT TO AUTHORIZE INCURRENCE OF PRE-AWARD COSTS UNDER CONTRACT HR0011-08-C-0102

THIRD AND FINALLY: It is the intention of the Government to award a contract to the Contractor, subject to final agreement on the contract terms, specifications and price(s). Any resulting contract shall incorporate this Advance Agreement. It is understood and agreed by both parties that this Agreement concerns the treatment of pre-award costs in the event of Contract award. This Agreement does not require the Contractor to incur any such costs, and any such costs incurred are at the risk of the Contractor, pending the award of a contract. This Advance Agreement to authorize incurrence of pre-award costs under Contract HR0011-08-C-0102 hereby supersedes the Agreement dated 2 June 2008.

For the Contractor:

(b)(4) 6/27/08

(Signature and Date)

(b)(4)

(Print Name)

(b)(4)

(Title)

For the Government:

(b)(6) 6/27/08

Michael D. Blackstone (b)(6) Date

Contracting Officer

Defense Advanced Research Projects Agency

Contracts Management Office

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
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2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
P00001	28-Oct-2008	X670/00	

6. ISSUED BY CODE HR0011

DARPA
CMO
ATTN: MICHAEL D. BLACKSTONE
3701 N. FAIRFAX DR.
ARLINGTON VA 22203-1714

7. ADMINISTERED BY (If other than item 6) CODE S3310A

DCMA NEW YORK
FT. WADWORTH BLDG 120
207 NEW YORK AVE
STATEN ISLAND NY 10305-5013

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

INTERNATIONAL BUSINESS MACHINES CORPORAT
1101 KITCHAWAN RD
YORKTOWN HEIGHTS NY 10598-0000

CODE 2G381 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. HR0011-08-C-0102
X	10B. DATED (SEE ITEM 13) 08-Aug-2008

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended 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 you 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 APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

☐ 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 date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: Mutual Agreement of the parties

☐ D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, [X] is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Modification Control Number: mvessill0924

The purpose of this modification is to revise paragraph (d) of clause H-7,"Travel." See page 2.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) MICHAEL D. BLACKSTONE / PCO TEL: (571) 218-4804 EMAIL: michael.blackstone@darpa.mil	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (b)(6) (Signature of Contracting Officer)	16C. DATE SIGNED 28-Oct-2008

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

Contract HR0011-08-C-0102 is modified as indicated in bold below.

1. SECTION H - SPECIAL CONTRACT REQUIREMENTS

H-7 Travel

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

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

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

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

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

(end of clause)

2. Except as modified herein, all terms and conditions of Contract No. HR0011-08-C-0102 shall remain in full force and effect.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
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2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
P00002	31-Mar-2009	SEE SCHEDULE	

6. ISSUED BY CODE HR0011

DARPA
CMO
ATTN: MICHAEL D. BLACKSTONE
3701 N. FAIRFAX DR.
ARLINGTON VA 22203-1714

7. ADMINISTERED BY (If other than item 6) CODE S3310A

DCMA NEW YORK
FT. WADWORTH BLDG 120
207 NEW YORK AVE
STATEN ISLAND NY 10305-5013

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

INTERNATIONAL BUSINESS MACHINES CORPORAT
1101 KITCHAWAN RD
YORKTOWN HEIGHTS NY 10598-0000

CODE 2G381 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. HR0011-08-C-0102
X	10B. DATED (SEE ITEM 13) 08-Aug-2008

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended 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 you 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)

See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

☐ 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 date, 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:

X D. OTHER (Specify type of modification and authority)
Unilateral IAW FAR 52.232-22, "Limitation of Funds."

E. IMPORTANT: Contractor [X] is not, ☐ 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 subject matter where feasible.)
Modification Control Number: mvessill09587

The purpose of this modification is to provide incremental funding in the amount of $946,355 (AO No. X670/18) for Phase I of Contract HR0011-08-C-0102. This action fully funds Phase I of the effort. See page two (2).

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) MICHAEL D. BLACKSTONE / PCO TEL: (571) 218-4804 EMAIL: michael.blackstone@darpa.mil	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (b)(6) (Signature of Contracting Officer)	16C. DATE SIGNED 31-Mar-2009

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

Contract HR0011-08-C-0102 has been revised as follows:

1. SECTION B - SUPPLIES OR SERVICES AND PRICES

SUBCLIN 000102 is added as follows:

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000102					$0.00
	funding for CLIN 0001 only				
	CS				
	FOB: Destination				
	AO No. X670/18				
				ESTIMATED COST SHARE RATIO	$0.00
	ACRN AB				$946,355.00
	CIN: 00000000000000000000000000000				

2. SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $946,355.00 from $932,358.00 to $1,878,713.00.

SUBCLIN 000102:
Funding on SUBCLIN 000102 is initiated as follows:

ACRN: AB

CIN: 00000000000000000000000000000

Acctng Data: 9790400 1320 X670 P9H20 2525 DPAC 9 5049 S12136 63739E

Increase: $946,355.00

Total: $946,355.00

3. Except as modified herein, all terms and conditions of Contract HR0011-08-C-0102 shall remain unchanged and in full force and effect.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
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2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
P00003	10-Nov-2009	SEE SCHEDULE	

6. ISSUED BY CODE HR0011

DARPA
CMO
ATTN: MICHAEL D. BLACKSTONE
3701 N. FAIRFAX DR.
ARLINGTON VA 22203-1714

7. ADMINISTERED BY (If other than item 6) CODE S3310A

DCMA NEW YORK
FT. WADWORTH BLDG 120
207 NEW YORK AVE
STATEN ISLAND NY 10305-5013

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

INTERNATIONAL BUSINESS MACHINES CORPORAT
1101 KITCHAWAN RD
YORKTOWN HEIGHTS NY 10598-0000

CODE 2G381 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. HR0011-08-C-0102
X	10B. DATED (SEE ITEM 13) 08-Aug-2008

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended 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 you 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 APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

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 date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: Mutual Agreement of the parties.

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, [X] is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Modification Control Number: mvessill1055

The purpose of this modification is to extend the Period of Performance of contract HR0011-08-C-0102 for an additional three (3) months at no cost to the Government. See paget tw o (2).

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) MICHAEL D. BLACKSTONE / PCO TEL: (571) 218-4804 EMAIL: michael.blackstone@darpa.mil	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (b)(6) (Signature of Contracting Officer)	16C. DATE SIGNED 10-Nov-2009

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The following has been modified as bolded below:

1. SECTION F - DELIVERIES OR PERFORMANCE

F-1 Term of Contract

(a) The term of the contract commences on 2 June 2008 and continues through **31 March 2010**.

(b) The period of performance for Option 1, as set forth in CLIN 0002, shall be from the effective date of the option exercise to and including 18 months thereafter.
(end of clause)

F-2 Reports and Other Deliverables

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

Item No.	Description	Due Date (on or before)
0001	Interim R&D Status Reports	Quarterly IAW Section C-2
0001	NOBS Final Report	**21 months** after date of contract award If option is exercised, **39 months** after date of contract award
0001	Additional Misc. Deliverables	As required IAW Section C-2

(end of clause)

2. SECTION G - CONTRACT ADMINISTRATION DATA

The following have been modified as bolded below:

G-6 Incremental Funding

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

Phase	**CLIN**	**Funding Provided to Date**	**Funding Period of Performance End Date**
1	0001	$1,878,713	**31 March 2010**
2	0002	TBD	TBD

(end of clause)

3. Except as modified herein, all terms and conditions of Contract HR0011-08-C-0102 shall remain unchanged and in full force and effect.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
T	1	3

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
P00004	08-Mar-2010	SEE SCHEDULE	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
DARPA CMO ATTN: MICHAEL D. BLACKSTONE MICHAEL.BLACKSTONE@DARPA.MIL 3701 N. FAIRFAX DRIVE ARLINGTON VA 22203-1714	HR0011	DCMA NEW YORK FT. WADWORTH BLDG 120 207 NEW YORK AVE STATEN ISLAND NY 10305-5013	S3310A

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
INTERNATIONAL BUSINESS MACHINES CORPORAT 1101 KITCHAWAN RD YORKTOWN HEIGHTS NY 10598-0000		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MOD. OF CONTRACT/ORDER NO. HR0011-08-C-0102
CODE 2G381 FACILITY CODE	X	10B. DATED (SEE ITEM 13) 08-Aug-2008

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended 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 you 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)

See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	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 date, 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:
X	D. OTHER (Specify type of modification and authority) Unilateral IAW 52.217-9

E. IMPORTANT: Contractor [X] is not, [ ] 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 subject matter where feasible.)

Modification Control Number: mvessill10454

The purpose of this modification is to exercise Phase II, Option 1 (CLIN 0002) and provide incremental funding in the amount of $322,644 (AO No. #X670/20). See page two (2).

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) MICHAEL D. BLACKSTONE / PCO TEL: (571) 218-4804 EMAIL: michael.blackstone@darpa.mil	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (b)(6) (Signature of Contracting Officer)	16C. DATE SIGNED 08-Mar-2010

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The following has been modified as indicated below:

1. SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $1,921,865.00 from $1,878,713.00 to $3,800,578.00.

2. SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0002
The option status has changed from Option to Option Exercised.

SUBCLIN 000201 is added as follows:

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000201					$0.00
	funding for CLIN 0002 only				
	CS				
	FOB: Destination				
	AO No. X670/20				
				ESTIMATED COST SHARE RATIO	$0.00
	ACRN AB				$322,644.00
	CIN: 00000000000000000000000000000				

3. SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $322,644.00 from $1,878,713.00 to $2,201,357.00.

SUBCLIN 000201:
Funding on SUBCLIN 000201 is initiated as follows:

ACRN: AB

CIN: 00000000000000000000000000000

Acctng Data: 9790400 1320 X670 P9H20 2525 DPAC 9 5049 S12136 63739E

Increase: $322,644.00

Total: $322,644.00

G-6 Incremental Funding

The following has been modified as bolded below:

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

Phase	**CLIN**	**Funding Provided to Date**	**Funding Period of Performance End Date**
1	0001	$1,878,713	31 March 2010
2	**0002**	**$322,644**	**3 June 2010**

(end of clause)

4. Except as modified herein, all terms and conditions of contract HR0011-08-C-0102 shall remain unchanged and in full force and effect.