

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1 6

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

1. DATE OF ORDER 02/12/2008	2. CONTRACT NO. (If any) NNL05AAD1B	8. SHIP TO: a. NAME OF CONSIGNEE NASA/ Langley Research Center	
3. ORDER NO. NNL08AB00T	4. REQUISITION/REFERENCE NO. 4200235974	b. STREET ADDRESS	
5. ISSUING OFFICE (Address correspondence to) NASA/Langley Research Center 9B Langley Blvd., Bldg. 1195B M/S 126 Hampton VA 23681-2199		c. CITY Hampton	e. ZIP CODE 23681-2199

7. TO: [REDACTED]	f. SHIP VIA
9. NAME OF CONTRACTOR SCIENCE APPLICATIONS INTL CORP	

b. COMPANY NAME	8. TYPE OF ORDER <input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY	
c. STREET ADDRESS 10260 CAMPUS POINT DR	REFERENCE YOUR: Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any, including delivery as indicated.	
d. CITY SAN DIEGO	e. STATE CA	f. ZIP CODE 92121-1522

9. ACCOUNTING AND APPROPRIATION DATA PR 4200235974	10. REQUISITIONING OFFICE NASA/Langley Research Center
---	---

11. BUSINESS CLASSIFICATION (Check appropriate box(es))		12. F.O.B. POINT Destination
<input type="checkbox"/> a. SMALL	<input type="checkbox"/> b. OTHER THAN SMALL	
<input type="checkbox"/> d. WOMEN-OWNED	<input type="checkbox"/> e. HUBZone	
<input type="checkbox"/> c. DISADVANTAGED	<input type="checkbox"/> f. EMERGING SMALL BUSINESS	
<input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED		

13. PLACE OF		14. GOVERNMENT B/L NO.	15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date) 02/28/2009	16. DISCOUNT TERMS NT30
a. INSPECTION Destination	b. ACCEPTANCE Destination			

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
001	INCO TERMS 1: FOB INCO TERMS 2: DESTINATION Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Continued ...				600,000.00	

18. SHIPPING POINT	19. GROSS SHIPPING WEIGHT	20. INVOICE NO.	17(b) TOTAL (Cont. pages)
21. MAIL INVOICE TO: a. NAME NSSC Shared Services Center			
b. STREET ADDRESS (or P.O. Box) Financial Management Division (FMD) Accounts Payable Bldg 1111, C. Road			\$99,948.00
c. CITY Stennis Space Center			d. STATE MS
			e. ZIP CODE 39529
			\$699,948.00

22. UNITED STATES OF AMERICA BY (Signature) 	23. NAME (Typed) Anthony Kram TITLE: CONTRACTING/ORDERING OFFICER
--	---

AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITION NOT USABLE

OPTIONAL FORM 347 (Rev. 3/2005)
Prescribed by GSA/FAR 48 CFR 53.213(b)

**ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION**

PAGE OF PAGES

2 6

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER
02/12/2008

CONTRACT NO.
NNL05AA01B

ORDER NO.
NNL08AB00T

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
002	<p>Lunar Architecture Team</p> <p>Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team 2</p> <p>Task Order entitled "Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team" in accordance with the attached task summary and the contractor's proposal dated 2/8/2008. *NOTE: This Task Order is subject to FAR 52.232-22, Limitation of Funds. The Contractor is only authorized to incur up to the cost limitation set forth in the summary of changes.</p> <p>ESTIMATED COST: ██████████ ESTIMATED FEE: ██████████ *TOTAL COST-PLUS-FIXED FEE:\$699,948.00</p> <p>Acknowledge receipt and acceptance of subject Task Order by signing below and returning to the address in Block 5:</p> <p><u>Robin Amburn Grob, Contracts Mgr.</u> (Printed Name) (Title)</p> <p><u>Robin Amburn Grob</u> 2/13/08 (Signature) (Date)</p>				99,948.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(1))

TASK ORDER SUMMARY

1. In accordance with Paragraph B.4, of the Basic Contract (NNL05AA01B), FAR 52.232-22 applies at the Task Order level. In accordance with this clause, NFS 1852.232-81 is incorporated as follows:

"CONTRACT FUNDING, (NFS 1852.232-81) (JUN 1990)

(a) For purposes of payment of cost, exclusive of fee, in accordance with the Limitation of Funds clause, the total amount allotted by the Government to this Task Order is [REDACTED]. This allotment is for this task order and covers the following estimated period of performance: 12 February 2008 through 28 February 2009.

(b) An additional amount of [REDACTED] is obligated under this Task Order for payment of fee.

(End of Clause)"

2. Perform tasks in accordance with the statement of work titled "Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team"

SUMMARY OF TASK ORDER VALUE / FUNDING

TASK ORDER DOCUMENT	TASK VALUE SUMMARY			TASK FUNDING SUMMARY		
	ESTIMATED COST	FIXED FEE	TOTAL CPFF	ESTIMATED COST	FIXED FEE	TOTAL CPFF
BASE	[REDACTED]	[REDACTED]	\$699,948	[REDACTED]	[REDACTED]	\$699,948

NOTE: Period of performance for this task order is 12 February 2008 through 28 February 2009.

Contract NNL05AA01B
Task Order Statement of Work

Task Order Number: NNL08AB00T (Task 45)

Requesting Organization: NASA Langley Research Center (LaRC) Systems Analysis and Concepts Directorate (SACD) Space Mission Analysis Branch (SMAB), Organization Code E402

1. **Task Order Title:**

- 1.1 Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team (CxAT_Lunar)

2. **Contractual References:**

- 2.1 **Statement of Work Reference:** This requirement is pursuant to contract NNL05AA01B, between NASA Langley Research Center and [REDACTED]. Refer to Paragraphs 4.0 Assessments and 5.0 Studies.

- 2.2 **Limitation of Future Contracting Reference:** In support of this task order, the contractor:

- may have access to proprietary information and various other types of non-public data

As described in NASA Clause 1852.209-71 (Clause H.11, Limitation of Future Contracting, contained in contract NNL05AA01B), this work may give rise to a potential conflict of interest. Therefore, the contractor shall comply with Clause H.17, Handling of Data, and Exhibit D. Organizational Conflict of Interest Avoidance Plan, contained in contract NNL05AA01B.

3. **Purpose, Objective, and Background of Work to be Performed:**

- 3.1 As a follow on to the NASA Exploration Systems Architecture Study (ESAS) activity conducted during the summer of 2005 and Phase 1 and Phase 2 of the Lunar Architecture Team (LAT) analysis conducted in late 2006, NASA's Exploration Systems Mission Directorate (ESMD) has established an annual Lunar Architecture analysis cycle that requires an integrated approach for assessing performance, cost, and risk over the Lunar exploration life-cycle. This analysis activity is currently being managed from the Constellation Program Office under the leadership of the Constellation Architecture Team_Lunar (CxAT_Lunar). This task is being established to provide analytical support in the area of integrated Lunar exploration architecture campaign analysis which is managed by the Systems Analysis and Concepts Directorate (SACD) at the NASA Langley Research Center. Part of the strategy for managing this portion of the CxAT_Lunar activity from LaRC is to take advantage of their demonstrated integrated systems analysis assessment capability.

The results of the integrated Lunar exploration architecture campaign analysis will be used to provide information to senior NASA decision makers in the areas of potential investments for lunar surface systems, flight dates and manifests, and value enabled by NASA in the areas of science, Lunar and Mars mission extensibility, commercial opportunities, and international partner opportunities.

4. **Description of the Work to be Performed:** The Contractor shall perform the following task requirements:

- 4.1 **Assessment of Schedule Risk:** The contractor shall work with the NASA campaign analysis team to define and assess schedule risk and integrate into the campaign analysis. The contractor shall be responsible for incorporating key analyses of schedule risk into the overall campaign analysis.

A functional mathematical model shall be provided as an interim product to ensure that study results will provide applicable products. The model must interact with other campaign analysis models, including the manifesting model and cost model. The model shall have the capability to support probabilistic campaign analysis and to evaluate potential changes in scheduling and contingency plans.

- 4.2 **Technology Risk Study:** The contractor shall collect Technology Development Risk data related to identified technology development efforts for the lunar campaign. This data shall be incorporated into the probabilistic campaign model to evaluate technology insertion plans for the Lunar Campaign.

The contractor shall be responsible for incorporating key analyses from this model into the overall campaign analysis.

- 4.3 **Assessment of Micro Logistics:** The contractor shall work with the NASA campaign analysis team to assess micro logistics as part of the campaign analysis. The contractor shall be responsible for incorporating key analyses into the overall campaign analysis.

A functional mathematical model shall be provided as an interim product to ensure that study results will provide applicable products. This model will be System Dynamics based and focus on lunar logistics resupply and consumption. This model shall be integrated with other campaign analysis models to allow for concurrent analysis of cases. The effort shall include development of dynamic element failure models, dynamic consumptions models, and logistics packing models.

The contractor shall integrate element data from the element teams within the CxAT_Lunar.

- 4.4 **Campaign Model Verification, Validation, and Accreditation:** The contractor shall evaluate the performance of the campaign model in relation to other models being developed by the CxAT_Lunar team internally and externally. This effort shall include the comparison and validation of assumption sets, as well as matching of campaign descriptions to ensure that the model meets the requirements accurately and that the algorithms are correctly implemented.

This effort shall include documentation of element designs, coordination of element assumptions, and validation and integration of the overall campaign assumptions.

- 4.5 **Conduct Campaign Analysis of Trade Study Alternatives:** The contractor shall utilize the developed campaign models in order to evaluate potential Lunar exploration campaign alternatives. Surface element and transportation element data will be provided by other portions of the CxAT_Lunar team.

5. **Deliverables:**

- 5.1. The contractor shall deliver an interim and final report, in Microsoft Word format, documenting the analysis methodology and analysis results.
- 5.2. The contractor shall deliver an interim and final presentation package to support NASA's Synthesis activity schedule.

5.3. The contractor shall demonstrate the CxAT_Lunar Integrated Campaign Assessment model to NASA.

Changes to interim delivery dates shall be coordinated with and approved by the TM. Changes to the completion date must be approved by the Contracting Officer.

6. **Government Furnished Items:** In order to support the completion of the Task, the contractor will have access to Lunar Exploration Architecture mission element performance, cost, and risk data that will be supplied by a number of NASA-wide Surface System Teams. This data will cover initial estimates based on Pre-Phase A levels of definition for, but not limited to, lunar habitat elements, lunar surface mobility elements (pressurized and rovers), Extra-Vehicular Activity suit elements, lunar lander elements, and science instruments.

7. **Other Information Needed for Task Performance:** The contractor shall plan for the estimated travel to the NASA Langley Research Center, Hampton, VA to support one-day working meetings and travel to NASA Johnson Space Center, Houston, TX, to support 4 CxAT_Lunar integration meetings (2-4 days in duration).

8. **Period of Performance/Schedule:**

Milestone Number	SOW Paragraph	Milestones	Dates
1	5.1	Microsoft Word reports	[REDACTED]
2	5.2	PowerPoint presentations	[REDACTED]
3	5.3	Presentation at NASA LaRC	[REDACTED]

9. **NASA Task Monitor**

NASA TM: Kandyce E. Goodliff
Mall Stop (M/S): 462
Phone Number: (757)864-4969 / Fax Number: (757)864-1975
E-Mail Address: Kandyce.E.Goodliff@nasa.gov

10. **Concurrences and Approval**

Concurrence: Kandyce E. Goodliff Date 1/25/2008
Kandyce E. Goodliff, NASA/LaRC/SACD SMAB TM

Approval: _____ Date _____
Jennings B. Cherry, NASA/LaRC/SSO COTR

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE	PAGE OF PAGES 1 2
2. AMENDMENT/MODIFICATION NO. 000001	3. EFFECTIVE DATE 02/24/2009	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (if applicable)
6. ISSUED BY NASA/Langley Research Center 9B Langley Blvd., Bldg. 1195B M/S 126 Hampton VA 23681-2199	CODE LARC	7. ADMINISTERED BY (if other than item 6) NASA/Langley Research Center 9B Langley Blvd., Bldg. 1195B M/S 126 Hampton VA 23681-2199	CODE LARC
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) SCIENCE APPLICATIONS INTL CORP Attn: [REDACTED] 10260 CAMPUS POINT DR SAN DIEGO CA 92121-1522		(X) 9A. AMENDMENT OF SOLICITATION NO.	
CODE		9B. DATED (SEE ITEM 11)	
FACILITY CODE		X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNL05AA01B NNL09AB00T	
		10B. DATED (SEE ITEM 13) 02/12/2008	

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 Offers is extended is not extended. Offers 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 ACKNOWLEDGEMENT 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 ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation 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) Mutual Agreement and FAR 52.249-14 Excusable Delays

E. IMPORTANT: Contractor is not. 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.)
1. The purpose of this modification is to extend the Period of Performance as listed in the attached summary of changes.

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) Robin Amburn Grob, Contracts Manager		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Ronald King	
15B. CONTRACTOR/ORDER <i>Robin Amburn Grob</i> (Signature of person authorized to sign)	15C. DATE SIGNED 3/5/09	16B. UNITED STATES OF AMERICA <i>Ronald King</i> (Signature of Contracting Officer)	16C. DATE SIGNED 3/5/09

NSN 7540-01-152-9070
Previous edition unusable

STANDARD FORM 30 (REV. 11-83)
Prescribed by GSA
FAR (48 CFR) 53.243

TASK ORDER SUMMARY

1. The period of performance is extended from 28 February 2009 to 31 August 2009 at no additional cost to the government due to NASA internal schedule delays.

2. In accordance with Paragraph B.4, of the Basic Contract (NNL05AA01B), FAR 52.232-22 applies at the Task Order level. In accordance with this clause, NFS 1852.232-81 is updated as follows:

"CONTRACT FUNDING, (NFS 1852.232-81) (JUN 1990)

(a) For purposes of payment of cost, exclusive of fee, in accordance with the Limitation of Funds clause, the total amount allotted by the Government to this Task Order is [REDACTED]. This allotment is for this task order and covers the following estimated period of performance: 12 February 2008 through 31 August 2009.

(b) An additional amount of [REDACTED] is obligated under this Task Order for payment of fee.

(End of Clause)"

2. Perform tasks in accordance with the statement of work titled "Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team"

SUMMARY OF TASK ORDER VALUE / FUNDING

TASK ORDER DOCUMENT	TASK VALUE SUMMARY			TASK FUNDING SUMMARY		
	ESTIMATED COST	FIXED FEE	TOTAL CPFF	ESTIMATED COST	FIXED FEE	TOTAL CPFF
BASE	[REDACTED]	[REDACTED]	\$699,948	[REDACTED]	[REDACTED]	\$699,948
Mod 1	[REDACTED]	[REDACTED]	\$699,948	[REDACTED]	[REDACTED]	\$699,948

NOTE: Period of performance for this task order is 12 February 2008 through 31 August 2009.

received 7/17/09

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1 CONTRACT ID CODE	PAGE OF PAGES	
2 AMENDMENT/MODIFICATION NO 000000	3 EFFECTIVE DATE See Block 16C	4 REQUISITION/PURCHASE REQ NO See Schedule	5 PROJECT NO (if applicable) 1 3	
6 ISSUED BY NASA/Langley Research Center 98 Langley Blvd., Bldg. 1195B M/S 126 Hampton VA 23681-2199	CODE LARC	7 ADMINISTERED BY (if other than item 6) NASA/Langley Research Center 98 Langley Blvd., Bldg. 1195B M/S 126 Hampton VA 23681-2199	CODE LARC	
8 NAME AND ADDRESS OF CONTRACTOR (no street county State and ZIP Code) SCIENCE APPLICATIONS INTL CORP Attn: [REDACTED] 10260 CAMPUS POINT DR SAN DIEGO CA 92121-1602		(X) 9A AMENDMENT OF SOLICITATION NO	9B DATED (SEE ITEM 13)	
CODE		FACILITY CODE	9C MODIFICATION OF CONTRACT/ORDER NO NNL05AAB1B NNL06AB00T	
			9D DATED (SEE ITEM 13) 02/12/2006	
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<p>The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers is extended is not extended</p> <p>Offers 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 ACKNOWLEDGEMENT 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.</p>				
12 ACCOUNTING AND APPROPRIATION DATA (if required) PR: 4200292642		Net Increase:		5620,000.00
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A			
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation 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) Mutual Agreement-Increase Level of Effort			
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)				
<p>The purpose of this modification is to (i) revise the Statement of Work (SOW); (ii) increase the task estimate; (iii) allot additional funding in the amount of \$620,000 [REDACTED]; and (iv) extend the period of performance through 4/7/10. As a result, the following changes are hereby made:</p> <p>a. Reference the Task SOW. The SOW is hereby deleted in its entirety and replaced with the revised SOW attached hereto.</p> <p>b. Reference the Task Cover Page, Optional Form (OF) 347, Block 15. The task completion date is hereby changed to read 4/7/10.</p> <p>c. Reference the Task Cover Page, Optional Form (OF) 347, Block 17(e). The Task Estimated Cost Plus Fixed Fee Amount is hereby changed to read \$1,319,948 [REDACTED].</p> <p>Continued ...</p>				
Except as provided herein, all terms and conditions of the document referenced in item 9A or 10A, as hereinafter changed, remains unchanged and in full force and effect.				
15A NAME AND TITLE OF SIGNER (Type or print) Robin Amburn Grob, Contracts Manager		15B NAME AND TITLE OF CONTRACTING OFFICER (Type or print) David O. Garner		
15C CONTRACTING OFFICER [Signature of Robin Amburn Grob]		15C DATE SIGNED 7/17/09	15B UNITED STATES OF AMERICA [Signature of David O. Garner]	
15C DATE SIGNED 7/17/09		15B UNITED STATES OF AMERICA 7/17/09		15C DATE SIGNED 7/17/09
NSN 7540-01-152-8076 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR 48 CFR 153.243		

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED
NNL05AA01B/NNL08AB00T/000002

PAGE OF
2 8

NAME OF OFFEROR OR CONTRACTOR
SCIENCE APPLICATIONS INTL CORP

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Fee). d. Reference Contract Summary, Task Order Page 2. Delete subject page and incorporate the attached revised Contract Summary page reflecting the changes to the Task Summary, Funding Summary, and Period of Performance.</p>				

TASK ORDER SUMMARY

1. The period of performance is extended from 28 February 2009 to 7 Apr 2010.
2. FAR 52.232-20 entitled Limitation of Cost applies at the Task Order level.
3. Perform tasks in accordance with the statement of work titled "Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team"

SUMMARY OF TASK ORDER VALUE / FUNDING

TASK ORDER DOCUMENT	TASK VALUE SUMMARY			TASK FUNDING SUMMARY		
	ESTIMATED COST	FIXED FEE	TOTAL CPFF	ESTIMATED COST	FIXED FEE	TOTAL CPFF
BASE	[REDACTED]	[REDACTED]	\$699,948	[REDACTED]	[REDACTED]	\$699,948
Mod 1	[REDACTED]	[REDACTED]	\$699,948	[REDACTED]	[REDACTED]	\$699,948
Mod 2	[REDACTED]	[REDACTED]	\$1,319,948	[REDACTED]	[REDACTED]	\$1,319,948

4. All other terms and conditions remain unchanged.

Contract NNL05AA01B
Task Order Statement of Work

Task Order Number: NNL08AB00T (Task 45)

Requesting Organization: NASA Langley Research Center (LaRC) Systems Analysis and Concepts Directorate (SACD) Space Mission Analysis Branch (SMAB), Organization Code E402

1. **Task Order Title:**

- 1.1 Integrated Campaign Analysis and Cost Analysis to Support Lunar Architecture Systems Analysis for the Constellation Lunar Architecture Team (CxAT_Lunar)

2. **Contractual References:**

- 2.1 **Statement of Work Reference:** This requirement is pursuant to contract NNL05AA01B, between NASA Langley Research Center and [REDACTED]. Refer to Paragraphs 4.0 *Assessments* and 5.0 *Studies*.

- 2.2 **Limitation of Future Contracting Reference:** In support of this task order, the contractor:

- may have access to proprietary information and various other types of non-public data

As described in NASA Clause 1852.209-71 (Clause H.11, Limitation of Future Contracting, contained in contract NNL05AA01B), this work may give rise to a potential conflict of interest. Therefore, the contractor shall comply with Clause H.17, Handling of Data, and Exhibit D, Organizational Conflict of Interest Avoidance Plan, contained in contract NNL05AA01B.

3. **Purpose, Objective, and Background of Work to be Performed:**

- 3.1 As a follow on to the NASA Exploration Systems Architecture Study (ESAS) activity conducted during the summer of 2005 and Phase 1 and Phase 2 of the Lunar Architecture Team (LAT) analysis conducted in late 2006, NASA's Exploration Systems Mission Directorate (ESMD) has established an annual Lunar Architecture analysis cycle that requires an integrated approach for assessing performance, cost, and risk over the Lunar exploration life-cycle. This analysis activity is currently being managed from the Constellation Program Office under the leadership of the Constellation Architecture Team_Lunar (CxAT_Lunar). This task is being established to provide analytical support in the area of integrated Lunar exploration architecture campaign analysis which is managed by the Systems Analysis and

Concepts Directorate (SACD) at the NASA Langley Research Center. Part of the strategy for managing this portion of the CxAT_Lunar activity from LaRC is to take advantage of their demonstrated integrated systems analysis assessment capability.

The results of the integrated Lunar exploration architecture campaign analysis will be used to provide information to senior NASA decision makers in the areas of potential investments for lunar surface systems, flight dates and manifests, and value enabled by NASA in the areas of science, Lunar and Mars mission extensibility, commercial opportunities, and international partner opportunities. The results will also aid in the successful completion of the Mission Concept Review (MCR) for the Lunar Surface Systems (LSS) Project Office.

4. **Description of the Work to be Performed:** The Contractor shall perform the following task requirements:

4.1 **Campaign Analysis:** To support the Lunar Surface Systems (LSS) Mission Concept Review (MCR) and current NASA/International Partner architecture activities, the contractor shall perform the following analysis tasks:

- a. Assist in the review of inputs from Transportation Systems and LSS data inputs to ensure the team understands the data received
- b. Iterate with Transportation System & Lunar Surface Systems Leads to assess, update, and/or expand proposed trade space and sensitivity analysis cases based on initial deterministic reference campaign results
- c. Perform trade studies and sensitivity analyses of proposed campaign options; Sensitivities would include but not be limited to characterizing Affordability, Technology, and Transportation System uncertainty
- d. Complete probabilistic analyses based on the deterministic results; incorporate integrated risk model provided by SAT risk team
- e. Run Lunar Value model and create outputs to distinguish differences between reference campaigns and sensitivities. Incorporate the integrated affordability and risk as required to support the generation of the Figures of Merit.

4.2 **Assessment of Schedule Risk:** The contractor shall work with the NASA campaign analysis team to define and assess schedule risk and integrate into the campaign analysis. The contractor shall be responsible for incorporating key analyses of schedule risk into the overall campaign analysis.

A functional mathematical model shall be provided as an interim product to ensure that study results will provide applicable products. The model must interact with other campaign analysis models, including the manifesting model and cost model.

The model shall have the capability to support probabilistic campaign analysis and to evaluate potential changes in scheduling and contingency plans.

- 4.3 Technology Risk Study:** The contractor shall collect Technology Development Risk data related to identified technology development efforts for the lunar campaign. This data shall be incorporated into the probabilistic campaign model to evaluate technology insertion plans for the Lunar Campaign.

The contractor shall be responsible for incorporating key analyses from this model into the overall campaign analysis.

- 4.4 Assessment of Micro Logistics:** The contractor shall work with the NASA campaign analysis team to assess micro logistics as part of the campaign analysis. The contractor shall be responsible for incorporating key analyses into the overall campaign analysis.

A functional mathematical model shall be provided as an interim product to ensure that study results will provide applicable products. This model will be System Dynamics based and focus on lunar logistics resupply and consumption. This model shall be integrated with other campaign analysis models to allow for concurrent analysis of cases. The effort shall include development of dynamic element failure models, dynamic consumptions models, and logistics packing models.

The contractor shall integrate element data from the element teams within the CxAT_Lunar.

- 4.5 Campaign Model Verification, Validation, and Accreditation:** The contractor shall evaluate the performance of the campaign model in relation to other models being developed by the CxAT_Lunar team internally and externally. This effort shall include the comparison and validation of assumption sets, as well as matching of campaign descriptions to ensure that the model meets the requirements accurately and that the algorithms are correctly implemented.

This effort shall include documentation of element designs, coordination of element assumptions, and validation and integration of the overall campaign assumptions.

- 4.6 Conduct Campaign Analysis of Trade Study Alternatives:** The contractor shall utilize the developed campaign models in order to evaluate potential Lunar exploration campaign alternatives. Surface element and transportation element data will be provided by other portions of the CxAT_Lunar team.
- 4.7 Campaign Level Mission Success Analysis:** Activity to update and refine the Probability of No Second Launch Technical Performance Measures required to track the viability of an Ares I – Ares V launch order decision.

5. Deliverables:

- 5.1. The contractor shall deliver an interim and final report, in Microsoft Word format, documenting the analysis methodology and analysis results.
- 5.2. The contractor shall deliver an interim and final presentation package to support NASA's Synthesis activity schedule.
- 5.3. The contractor shall demonstrate the CxAT_Lunar Integrated Campaign Assessment model to NASA.
- 5.4. The contractor shall support milestone reviews with the creation of presentation material to relay important results and findings to senior level management.

Changes to interim delivery dates shall be coordinated with and approved by the TM. Changes to the completion date must be approved by the Contracting Officer.

6. **Government Furnished Items:** In order to support the completion of the Task, the contractor will have access to Lunar Exploration Architecture mission element performance, cost, and risk data that will be supplied by a number of NASA-wide Surface System Teams. This data will cover initial estimates based on Pre-Phase A levels of definition for, but not limited to, lunar habitat elements, lunar surface mobility elements (pressurized and rovers), Extra-Vehicular Activity suit elements, lunar lander elements, and science instruments.
7. **Other Information Needed for Task Performance:** The contractor shall plan for the estimated travel to the NASA Langley Research Center, Hampton, VA to support one-day working meetings and travel to NASA Johnson Space Center, Houston, TX, to support 4 CxAT_Lunar integration meetings (2-4 days in duration).

8. Period of Performance/Schedule:

Milestone Number	SOW Paragraph	Milestones	Dates
1	5.1	Microsoft Word reports	[REDACTED]
2	5.2	PowerPoint presentations	[REDACTED]
3	5.3	Presentation at NASA LaRC	[REDACTED]
4	5.4	Presentation Material	[REDACTED]

9. NASA Task Monitor

NASA TM: Kandyce E. Goodliff

Mail Stop (M/S): 462

Phone Number: (757)864-4969 / Fax Number: (757)864-1975

E-Mail Address: Kandyce.E.Goodliff@nasa.gov