OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5 PROJECT NO. (If applicable)
00047	See Block 16C	N/A	

6. ISSUED BY CODE 210.S
NASA Goddard Space Flight Center
Procurement Operations Division

7. ADMINISTERED BY (If other than Item 6) CODE 210.S
NASA/Goddard Space Flight Center
Space Sciences Procurement Office

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)
LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

CODE 04235 FACILITY CODE

(4) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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)

BNC: GJE PR: N/A AMT: N/A

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

(4) 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)
FAR 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clause J.1 to reflect the updated SOW, MRD and FRD documents and definitize Contractor's cost proposals of February 8, 9, and 15, 2012 for MAVEN LV/LC Purge Interface Connector (2012-SEP-CP-0005), MAVEN Magnetometer Bracket Design/Fabrication (2012-SEP-CP-0006), and MAVEN GDS Support for Integration of Backup MSA at GSFC (2012-SEP-CP-0009) and reflects action items MAVEN CCR 0376, 0449, and 0451 as approved.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

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)	
Scott J. Grillo, Contract Negotiator		Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Scott J. Grillo (Signature of person authorized to sign)	4/9/12	BY Amy A. Aqueche (Signature of Contracting Officer)	4/10/12

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA FAR (48 CFR) 53.243

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	FROM (Mod 42)	BY	TO
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)			
Base Fee (Phase CDE)			
Maximum Available Award Fee (Phase CDE)			
Maximum Positive Performance Incentive (Phase CDE)			
TOTAL CPAF (BCDE)	$247,097,648	$283,400	$247,381,048

2. Revise J.1, LIST OF ATTACHMENTS, to read as follows:

Attachment	Description	Date
A	Statement of Work (SOW) – Phase B only	January 28, 2010
A-2	Statement of Work (SOW) – Phase C/D/E Effort – REV F	March 8, 2012
B	Financial Reporting Requirements	March 26, 2009
C	Small Business Subcontracting Plan	March 22, 2010
D	Safety and Health Plan	March 30, 2009
E	IT Security Plan	July 9, 2010
F	Organizational Conflict of Interest Avoidance Plan (OCI)	March 30, 2009
G	MAVEN Mission Requirements Document (MRD) – REV W	March 20, 2012
H	Applicable/Reference Documents List	March 27, 2009
I	Contract Data Requirements List (CDRLs) – REV C	December 15, 2011
J	Functional Requirements Document (FRD) – REV J	March 20, 2012
K	Government Furnished Property List	December 13, 2010
L	Mission Assurance Requirements (MAR)	December 10, 2007
M	Personal Identity Verification (PIV) Card Issuance Procedures	March 10, 2010

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

MAVEN
Mars Atmosphere and Volatile Evolution Mission
CU/LASP • GSFC • UCB/SSL • LM • JPL

Mars Atmosphere and Volatile EvolutioN

(MAVEN)

Mission Requirements Document

MAVEN-PM-RQMT-0005

Revision W

Effective Date: March 20, 2012

Expiration Date: March 20, 2017

Prepared By: Martin Houghton
Mission Systems Engineer
Code: 5990

This is a MAVEN controlled document and only approved MAVEN CCRs can change the content of this document.

Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and Space Administration

CM FOREWORD

This document is a Mars Atmosphere and Volatile Evolution Project controlled document. Changes to this document require prior approval of the MAVEN Project CCB Chairperson. Proposed changes shall be submitted to the MAVEN Project Configuration Management Office (CMO), along with supportive material justifying the proposed change.

Questions or comments concerning this document should be addressed to:

MAVEN Configuration Management Office
Mailstop 432
Goddard Space Flight Center
Greenbelt, Maryland 20771

REVIEW/APPROVAL PAGE

All reviews and approvals are electronic via the MAVEN MIS at:

https://mavenmis.gsfc.nasa.gov.

MAVEN-CCR-0434

D. Mitchell PM

S. Cauffman DPM

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Mars Atmosphere and Volatile EvolutioN (MAVEN) Mission

Mission Requirements Document

DOCUMENT CHANGE RECORD

Sheet: 1 of 1

REVISION LEVEL	DESCRIPTION OF CHANGE	APPROVED BY	DATE APPROVED
Revision (-)	Initial Release, MAVEN Missioin Requirements Document as per MAVEN-CCR-0021.	D. Mitchell	12/10/2007
Revision A	Updates per MAVEN-CCR-0029.	D. Mitchell	12/10/2007
Revision B	Updates per MAVEN-CCR-0038.	D. Mitchell	7/24/2008
Revision C	Updates per MAVEN-CCR-0056.	D. Mitchell	8/6/2009
Revision D	Updates per MAVEN-CCR-0070.	D. Mitchell	9/29/2009
Revision E	Updates per MAVEN-CCR-0080.	D. Mitchell	1/14/2010
Revision F	Updates per MAVEN-CCR-0116.	D. Mitchell	3/4/2010
Revision G	Updates per MAVEN-CCR-0125, 0126 and 0127.	D. Mitchell	3/25/2010
Revision H	Updates per MAVEN-CCR-0115, 0119, 0134 and 0159.	D. Carson	5/6/2010

REVISION LEVEL	DESCRIPTION OF CHANGE	APPROVED BY	DATE APPROVED
Revision I	Updates per MAVEN-CCR-0144. CCR was approved/signed by Don Carson on the MIS on April 18, 2010, released officially on the MIS on September 16, 2010 after all CCB actions were complete.	D. Carson	6/6/2010
Revision J	Updates per MAVEN-CCR-0152 and CCR-0183.	D. Mitchell	6/11/2010
Revision K	Updates per MAVEN-CCR-0146 and missed requirement add (MRD410) from CCR-0125 and delete MRD20 from CCR-0126.	D. Mitchell	7/22/2010
Revision L	Updates per MAVEN-CCR-0200, CCR-0203, 0208 and CCR-0210.	D. Mitchell	9/16/2010
Revision M	Updates per MAVEN-CCRs-0194, 0201, 0212, 0216 and 0224.	D. Mitchell	11/12/2010
Revision N	Updates per MAVEN-CCRs-0222, 0223 and 0229.	D. Mitchell	12/10/2010
Revision O	Updates per MAVEN-CCRs-0129, 0130, 0131, 0138 and 0248.	D. Mitchell	2/10/2011
Revision P	Updates per MAVEN-CCRs-0249, 0251 and 0256.	D. Mitchell	3/3/2011
Revision Q	Updates per MAVEN-CCRs-0136, 0137, 0160, 0278 and 0282.	D. Mitchell	4/14/2011
Revision R	Updates per MAVEN-CCRs-0139, 0140, 0141, 0285, 0289 and 0299.	D. Mitchell	5/5/2011
Revision S	Updates per MAVEN-CCRs-0254, 0318, 0326, and 0331.	D. Mitchell	7/21/2011

Revision T	Updates per MAVEN-CCRs-0301, 0310, 0314, 0330, 0363 and 0381.	D. Mitchell	11/14/2011
Revision U	Updates per MAVEN-CCRs-0377 (MRD420 & MRD423) & 0426 (Update MRD16).	D. Mitchell	1/8/2012
Revision V	Update MRD373 per MAVEN-CCR-0429 and MRD174 per MAVEN-CCR-0433.	D. Mitchell	2/2/2012
Revision W	Update MRD435 & MRD436 per MAVEN-CCR-0434.	D. Mitchell	3/20/2012

ID : MRD2

Section : 1.

Title : Mission Lifetime

MAVEN shall be designed and built for a mission lifetime of 1-earth-year + Cruise duration (roughly 10 months) + transition from capture orbit to final orbit (roughly 1 month). All consumables shall be sized consistent with the TRAS (MAVEN-MDES-RQMT-0036).

ID : MRD3

Section : 1.

Title : Mission Assurance

The MAVEN mission shall meet the Safety and Mission Assurance (S&MA) requirements in the Mission Assurance Requirements Document.

ID : MRD4

Section : 1.

Title : Compliance with GSFC-STD-1000

All MAVEN elements shall comply with GSFC-Std-1000. Exceptions to this will require waiver approval from GSFC Engineering.

ID : MRD5

Section : 1.

Title : Planetary Protection

As a Mars orbiter, MAVEN is a Category III mission and shall comply with requirements specified in Planetary Protection documents NPD 8020.7F and NPR 8020.12C.

ID : MRD7

Section : 1.

Title : Orbiter Coordinate System

All orbiter coordinate systems shall be consistent with those defined in the Coordinate Systems Document.

ID : MRD410

Section :

Title : Technical Resource Allocation Specification

All elements shall comply with Technical Resource Allocation Specification

SC, PF, NGIMS, RS must provide links.

ID : MRD409

Section :

Title : Relay

MAVEN shall perform no more than one relay session per 4.5 hour (orbit) period, comprised of no more than one 60-minute DSN uplink, one 30-minute MAVEN proximity link session, and one 30 minute DSN downlink, not accounting for the intermediate slew durations, Earth-link occultations, and/or other intermediate spacecraft/Electra operations (including warmup and shutdown of the Electra hardware).

ID : MRD14

Section : 1.

Title : Mars Orbit Telecommunications Durations

During the mapping phase, MAVEN shall support two dedicated DSN passes, each 5 hours in duration, per week.

ID : MRD15

Section : 1.

Title : Ground Contact Frequency

During nominal operations, the MAVEN orbiter shall be designed to operate without ground intervention outside of the nominal communication schedule of 2 passes per week.

D : MRD16

Section : 1.

Title : Data Availability

When in normal operation mode, i.e., not safe hold, MAVEN shall lose no more than 2% of the transmitted engineering and science data.

ID : MRD21

Section : 1.2

Title : Nominal Science Orbit Parameters

The nominal MAVEN science orbit shall be an elliptical orbit, with an inclination of 75 +/-1.875 degrees, and a period of 4.5 +/- .11 hours, targeted to a periapsis density corridor of 0.05 to 0.15 km/kg3.

ID : MRD22

Section : 1.2

Title : Deep Dip Orbit Parameters

During the deep dips, the orbit periapsis shall be lowered to target a density of 2 - 3.5kg/km3.

ID : MRD23

Section : 1.2

Title : Deep Dip Orbit Duration

Each deep-dip shall last a minimum of 20 orbits.

ID : MRD24

Section : 1.2

Title : Deep Dip Frequency

MAVEN shall be capable of performing up to five "deep-dips" during its nominal mission.

ID : MRD31

Section : 1.3

Title : Mass Range of Neutrals Measurements

MAVEN shall measure planetary neutrals in a mass range bounded by 4 to 46 AMU with unit mass resolution.

ID : MRD32

Section : 1.3

Title : Mass Range of Ions Meausurements

MAVEN shall measure thermal planetary ions in a mass range bounded from 12 to 46 AMU with unit mass resolution.

ID : MRD33

Section : 1.3

Title : Adjacent Mass Cross-Talk

The adjacent mass cross-talk of in-situ MAVEN neutral gas measurements shall be less than 1E-4.

ID : MRD34

Section : 1.3

Title : Neutrals Measurement Density Range

MAVEN shall measure neutral densities from 120km to 400km with density precision of 25% or better.

ID : MRD35

Section : 1.3

Title : Ions Measurement Density Range

MAVEN shall measure thermal ion densities from 120km to 400km with density accuracy of 25% or better.

ID : MRD36

Section : 1.3

Title : Open Source Field-Of-View

MAVEN measurements of distributions of reactive species and ions shall have a field-of-view about RAM of 10deg or better.

ID : MRD37

Section : 1.3

Title : Closed Source Filed-of-View

MAVEN measurements of distributions of non-reactive species shall have a field-of-view about RAM or 45deg or better.

ID : MRD38

Section : 1.3

Title : Vertical Spatial Measurement Resolution of Neutrals

MAVEN shall have a spatial vertical resolution of better than one half of a scale height for neutrals (< 6 km for CO2).

ID : MRD424

Section : 1.3

Title : Vertical Spatial Measurement Resolution of Ions

MAVEN shall have a spatial vertical resolution of better than one half of a scale height for ions (< 30km for O2+).

ID : MRD39

Section : 1.4

Title : Deuterium-to-Hydrogen Measurement Accuracy

MAVEN shall measure the ratio of Deuterium-to-Hydrogen with an precision of 30%

ID : MRD40

Section : 1.4

Title : Spectral Line Measurement Wavelength Range

MAVEN shall measure spectral lines from H (wavelength of 120nm) to CO2 (wavelength of 330nm).

ID : MRD41

Section : 1.4

Title : Major Species Spectral Line Measurement Wavelength Resolution

The science data spectral resolution of RS shall be better than 0.5nm from 120 to 180 nm. (FUV Channel)

ID : MRD413

Section :

Title :

The science data spectral resolution of RS shall be better than 1.0nm from 180 to 330 nm. (MUV Channel)

ID : MRD42

Section : 1.4

Title : Deuterium and Hydrogen Spectral Line Wavelength Resolution

To resolve spectral lines for D and H, MAVEN shall have wavelength resolution of 13,000 or better.

ID : MRD44

Section : 1.4

Title : Horizontal Spatial Measurement Resolution

For UV measurements, MAVEN shall have a horizontal spatial resolution of 340km or better at the center of the FOV.

ID : MRD45

Section : 1.5

Title : In Situ Electron Density Measurement Range

MAVEN shall measure electron densities in the Mars atmosphere in a range from 1E2 to 1E6 cm-3 with an precision of at least 20% below the ionopause

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ID : MRD46

Section : 1.5

Title : In Situ Electron Temperature Measurement Range

MAVEN shall measure electron temperatures in the Mars atmosphere over a temperature range of 500 to 5,000 k with an precision of 20% or better below the ionopause

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ID : MRD47

Section : 1.5

Title : Electric Field Measurement Frequency Range

MAVEN shall measure electric field over a frequency range of 0.05 to 10Hz with a wave power sensitivity of at least 1E-8 (V/m)-squared/Hz.

ID : MRD48

Section : 1.5

Title : Electron Temperature Spatial Resolution

MAVEN shall measure electron temperatures with spatial resolution of 60km or better.

ID : MRD49

Section : 1.5

Title : Solar Lyman-Alpha Flux Monitoring

MAVEN shall monitor the solar Lyman-alpha irradiance with a precision of at least 30%

ID : MRD50

Section : 1.5

Title : Solar Coronal EUV Flux Monitoring

MAVEN shall monitor the coronal EUV irradiance to 15%

ID : MRD51

Section : 1.5

Title : Solar Activity Time Measurement Resolution

MAVEN shall measure solar activity such as flares and CMEs with a temporal resolution of 10 minutes

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ID : MRD52

Section : 1.6

Title : Ion Flux Measurement Range Below 800km

MAVEN shall measure ion outflow below 800km at 20s resolution and 25% precision

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ID : MRD53

Section : 1.6

Title : Ion Flux Measurement Range Above 800km

MAVEN shall measure sheath and pick-up ions above 800km at 30 minute resolution and 25% precision

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ID : MRD54

Section : 1.6

Title : Ion Mass Measurement Range

MAVEN shall measure ions at Mars with a mass range from 1amu (H+) to 44amu (CO2+).

ID : MRD55

Section : 1.6

Title : Ion Mass Measurement Resolution

The mass resolution for suprathermal ion measurements shall be at least 2 (m/dm).

ID : MRD405

Section : 1.6

Title : Ion Energy Measurement Resolution

MAVEN ion measurements shall have an energy resolution of dE/E 30% or better.

ID : MRD406

Section : 1.6

Title : Ion Energy Measurement Angular Resolution

MAVEN ion measurements shall have an angular resolution of 30deg or better.

ID : MRD57

Section : 1.6

Title : Thermal Ion Measurement Below 800 km Viewing

To simultaneously measure thermal and suprathermal ions, MAVEN shall have field-of-view in both the nadir and RAM directions of at least 60deg by 180deg.

ID : MRD58

Section : 1.7

Title : Electron Flux Measurement Range

MAVEN shall make solar wind electron measurements with differential energy range from 1E4 to 1E8 eV/cm2-sec-ster-eV.

ID : MRD59

Section : 1.7

Title : Electron Energy Measurement Sensitivity

MAVEN shall have sufficient sensitivity to measure expected electron fluxes from 10 to 500 eV at Mars with the required temporal resolution (MRD61).

ID : MRD60

Section : 1.7

Title : Impact Ionization Rate Measurement Energy Range

MAVEN shall make solar wind electron measurements in an energy range from 10eV to 1000eV with a resolution of 30% or better.

ID : MRD61

Section : 1.7

Title : Electron Measurement Temporal Resolution

MAVEN shall make electron measurements at Mars with a temporal resolution of 20s or better. (MRD59)

ID : MRD62

Section : 1.7

Title : Electron Measurement Angular Resolution

MAVEN shall make electron measuremets at Mars with an angular resolution of 45 degrees or better.

ID : MRD63

Section : 1.7

Title : Electron Measurement Field of View

MAVEN shall make electron measurements over at least 50% of the Mars sky.

ID : MRD64

Section : 1.8

Title : Solar Wind Ion Flux Measurement Range

MAVEN shall make solar wind ion measurements with differential energy range from 1E7 to 1E10 eV/cm2-sec-ster-eV.

ID : MRD65

Section : 1.8

Title : Solar Wind Ion Velocity Measurement Range

MAVEN shall measure solar wind ion flows with velocities ranging from 50 to 1000 km/s

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ID : MRD66

Section : 1.8

Title : Solar Wind Ion Energy Measurement Resolution

MAVEN shall measure solar wind ion energy with an energy resolution of 15% or better .

ID : MRD67

Section : 1.8

Title : Solar Wind Ion Energy Measurement Angular Resolution

MAVEN shall measure solar wind ion energy with an angular resolution of 30deg or better and 10deg or better in the direction of the sun.

ID : MRD68

Section : 1.8

Title : Solar Wind Ion Energy Measurement Temporal Resolution

MAVEN shall measure the solar wind ion energy with a temporal resolution to 1 minute or better.

ID : MRD69

Section : 1.8

Title : Solar Wind Ion Energy Measurement Field of View

MAVEN shall be capable of measuring ion energy in a field-of-view of 30deg or greater centered on the sun

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ID : MRD70

Section : 1.9

Title : Magnetic Field Measurement Dynamic Range

The dynamic range of MAVEN magnetic field measurements shall encompass 3 to 3000 nT.

ID : MRD71

Section : 1.9

Title : Magnetic Field Measurement Accuracy

MAVEN shall measure the magnetic field at Mars with a precision of 1% or better over the range of 3 to 3000nT.

ID : MRD72

Section : 1.9

Title : Magnetic Field Measurement Resolution

MAG shall have a precision of better than 1% over its dynamic range

---

ID : MRD73

Section : 1.9

Title : Magnetic Field Measurement Temporal Resolution

MAVEN shall measure the magnetic field at Mars with a temporal resolution of 20s or better.

ID : MRD74

Section : 1.10

Title : SEP Flux Measurement Range

MAVEN shall make solar energetic particle measurements in a differential energy flux range from 10 to 10E6 eV/cm2-sec-ster-eV and a precision of 30%.

ID : MRD75

Section : 1.10

Title : Solar Energetic Particle Energy Detection Range

MAVEN shall measure solar energetic particles in a measurement range from 50keV to 5MeV.

ID : MRD76

Section : 1.10

Title : Solar Energetic Particle Energy Measurement Resolution

MAVEN shall measure solar energetic particles with an energy resolution of at least 50%.

ID : MRD77

Section : 1.10

Title : Solar Energetic Particle Energy Temporal Resolution

MAVEN shall measure solar energetic particle energy with a temporal resolution of 1 hour or better.

ID : MRD80

Section : 2.1

Title : Compatibility with Natural and Induced Environments

The MAVEN flight segment shall be compatible with the natural and induced environments as specified in the ERD (MAVEN-SYS-RQMT-0010)

ID : MRD83

Section : 2.1

Title : Electrostatic

All orbiter external surfaces shall meet the conductance and grounding requirements defined in the ERD and controlled by the MAVEN EMI/EMC Plan (MAVEN-SYS-PLAN-0078). All waivers to these requirements will need concurrence from the MAVEN ESC board.

ID : MRD85

Section : 2.1

Title : Magnetic Cleanliness Controls

The Orbiter, including the solar arrays, and the instruments shall meet the magnetic requirements defined in the ERD and controlled by the MAVEN EMI/EMC Plan (MAVEN-SYS-PLAN-0078). All waivers to these requirements will need concurrence from the MAVEN Magnetics Control Board.

ID : MRD90

Section : 2.4.1

Title : Atmospheric Density Indication

The spacecraft shall provide density sensitivity protection for atmospheric density sensitivities above 2.5 kg/km^3

ID : MRD93

Section : 2.4.1

Title : Spacecraft Fault Tolerance

No single credible failure in the spacecraft, payloads, spacecraft-payload interfaces, and/or single ground error shall permanently preclude meeting the baseline Level 1 requirements.

ID : MRD95

Section : 2.4.1

Title : Autonomous Operations

The spacecraft shall be capable of operating autonomously for 7 days during normal operations

---

ID : MRD96

Section : 2.4.1

Title : Fault Management

The Orbiter shall perform autonomous fault management, configurable by ground command

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ID : MRD97

Section : 2.4.1

Title : Payload Safing

MAVEN shall actively protect from known conditions that could damage the instruments as defined in the spacecraft-to-instrument ICDs.

ID : MRD101

Section : 2.4.1

Title : Return to Normal Operations

Within 24 hours of being commanded out of safe mode, the orbiter shall be capable of returning to an operational state that allows the orbiter to resume planned activities

---

ID : MRD414

Section : 2.4.1

Title : Science During Solar Flares

MAVEN shall collect science data with at least a 70% probability throughout a worst week solar flare event as defined in MAVEN-SYS-SPEC-0014, section VI.A.2.

ID : MRD102

Section : 2.4.2

Title : Atlas V Compatibility

MAVEN shall be compatible with Atlas V requirements as defined in the MAVEN Launch Vehicle Interface Requirements Document (IRD).

ID : MRD103

Section : 2.4.2

Title : Payload Accommodation

The spacecraft shall accommodate the payloads per the Spacecraft to Instrument Interface Control Document (ICDs).

ID : MRD104

Section : 2.4.2

Title : Minimum First Mode Natural Frequency of Deployables

The first mode natural frequencies of all deployed masses (deployed appendage mass + mass carried by the appendage) shall be at least a decade away from the spacecraft ACS controller bandwidth (will waive for LPW).

ID : MRD108

Section : 2.4.2

Title : LPW Boom Stiffness

The deployed LPW and boom assembly shall have a minimum first mode natural frequency > 0.25 Hz.

ID : MRD109

Section : 2.4.2

Title : Thruster Plume Avoidance

Booms, solar arrays, instrument apertures, and HGA shall be mounted so that they remain clear of the modeled thruster plumes.

ID : MRD117

Section : 2.4.3

Title : Spacecraft Operations

MAVEN shall be capable of operating spacecraft subsystems and all of the instruments as defined in the Design Reference Mission.

ID : MRD121

Section : 2.4.3

Title : Electra Power During Nominal Science Operations

After achieving the primary science orbit, the spacecraft shall be capable of providing the Electra Payload with the energy necessary for Electra relay passes. If this requires reducing the energy allocated to the instruments, as a minimum, instrument survival heaters shall remain powered during relay passes.

ID : MRD126

Section : 2.4.4

Title : Receipt of Commands and Generation of Telemetry

Once separated from the launch vehicle, the orbiter shall be capable of continuously receiving commands and transmitting real time and stored telemetry, except during spacecraft processor reboot.

ID : MRD129

Section : 2.4.4

Title : Spacecraft Telemetry Storage

The spacecraft shall provide on-board storage for at least 7 days of Orbiter housekeeping and science data assuming an aggregate instrument orbit average data rate of 5.8 kbps.

ID : MRD130

Section : 2.4.4

Title : Critical Event Telemetry

For critical events (as defined in GSFC-STD-1000), the spacecraft shall store spacecraft engineering and health data for subsequent playback.

ID : MRD133

Section : 2.4.4

Title : Data Link Anomaly

The instruments shall safe themselves in response to data link anomalies, as documented in the spacecraft-to-instrument ICDs.

ID : MRD137

Section : 2.4.4

Title : Spacecraft Clock Drift

The spacecraft on-board time reference (spacecraft clock) shall drift by no more than +/-100 milliseconds (3-sigma) over seven days.

ID : MRD138

Section : 2.4.4

Title : Spacecraft to Ground Clock Correlation

The correlation between the spacecraft clock and the ground clock shall be less than 15 msec (3-sigma).

ID : MRD144

Section : 2.4.4

Title : Science Data Characterization

The spacecraft shall provide ancillary engineering data that enables correlation of the orbiter's state and environment with the science data.

ID : MRD149

Section : 2.4.4

Title : Unambiguous Orbiter State

The spacecraft shall provide sufficient time tagged engineering telemetry to define an unambiguous orbiter state within 30 minutes of DSN lockup at the minimum telemetry data rate.

ID : MRD152

Section : 2.4.4

Title : Retransmission of Onboard Data

The spacecraft shall provide, by ground command, the capability to retransmit previously transmitted data if that data has not been overwritten by ground command or onboard storage.

ID : MRD153

Section : 2.4.4

Title : Electra Data Volume

Relay Return Link Data

The spacecraft shall be capable of storing 1 GB of Electra return link relay data and delivering that data to the Mars Exploration Program.

ID : MRD154

Section : 2.4.4

Title : Relay Forward Link Data

Relay Forward Link Data

The spacecraft shall be capable of storing 14 MB of Mars Exploration Program forward link relay data and delivering that data to the Electra payload.

ID : MRD156

Section : 2.4.4

Title : Short Frames

The spacecraft shall produce downlink telemetry frame lengths as short as allowed by CCSDS when the downlink rate is 40 bps or lower.

ID : MRD157

Section : 2.4.4

Title : Command/Accountability Verification

MAVEN shall ensure integrity of commands and software loads including patches prior to execution and report information to the ground operators to assess verification of command and software load receipt and execution.

ID : MRD160

Section : 2.4.4

Title : Uplink Loss

MAVEN shall autonomously initiate emergency telemetry in the event that no commands are received within a ground-selectable time period

---

ID : MRD163

Section : 2.4.5

Title : Payload Pointing

The Orbiter shall provide the pointing and stability performance, defined in MRD422, within the operational constraints defined in the Design Reference Mission, except during reaction wheel de-saturations, slews, control vector singularities, and entering and exiting solar eclipse.

ID : MRD422

Section : 2.4.5

Title : Payload Pointing

Payload Pointing and Stability Requirements Table

Instrument	Accuracy (3 sigma)		Knowledge (3 sigma)		Stability (3 sigma)		
EUV	1.00 deg	Per Axis	0.15 deg	Per Axis	0.05 deg/10 sec	Per Axis	
LPW	5.00 deg	Total	4.49 deg	Total	2 deg/64 sec	Total	L
SWEA	5.00 deg	Total	2.00 deg	Total	1 deg/64 sec	Total	
SWIA	5.00 deg	Total	1.00 deg	Total	1 deg/64 sec	Total	SC z
SEP	3.00 deg	Per Axis	1.90 deg	Per Axis	1 deg/64 sec	Per Axis	
MAG	N/A	N/A	1.43 deg	Per Axis	0.25 deg/1/8 sec	Per Axis	
IUVS (Limb Scan @ Periapsis)	1.00 deg	Per Axis	0.30 deg	Per Axis	0.06 deg/1 sec 0.15 deg/60 sec	Per Axis	APP i-axis to
IUVS (Disc Map @ Apoapsis)	3.00 deg	Per Axis	1.00 deg	Per Axis	0.22 deg/15 sec 0.25 deg/15 min 0.5 deg/70 min	Per Axis	APP j-axis to line
IUVS (Stellar Occultation)	0.30 deg	Per Axis	0.30 deg	Per Axis	0.06 deg/1 sec 0.25 deg/4 min	Per Axis	APP j-axis t
IUVS (Inward D/H and O Scan)	3.00 deg	Per Axis	1.00 deg	Per Axis	0.5 deg/1 hr 0.25 deg/15 min	Per Axis	APP i-axis to orbit n
IUVS (Outward D/H Scan)	3.00 deg	Per Axis	1.00 deg	Per Axis	1 deg/1 hr	Per Axis	APP i-axis to orbit n
STATIC	5.00 deg	Per Axis	1.00 deg	Per Axis	1 deg/64 sec	Per Axis	APP i-j plan
NGIMS	2.50 deg	Total	0.25 deg	Total	0.1 deg/20 sec	Total	APP i-axis to s
Electra	5.00 deg	Total	N/A	N/A	N/A	N/A	

ID : MRD166

Section : 2.4.5

Title : Momentum Management Delta-V Uncertainty during Cruise

The delta-v uncertainty due to momentum management during cruise (transfer trajectory) shall be less than 1 mm/s (3-sigma) per axis per event. This requirement applies to all predicted values.

ID : MRD417

Section :

Title : Momentum Management Delta-V Uncertainty in Mars Orbit

The delta-v uncertainty due to momentum management in Mars orbit shall be less than 2 mm/s (3-sigma) per axis per event. This requirement applies to predicted values up to 10 days in advance.

ID : MRD167

Section : 2.4.5

Title : Frequency of Momentum Management

Momentum management event shall nominally occur no more frequently than once per orbit during the science and extended mission phases.

ID : MRD168

Section : 2.4.5

Title : Orbit Maintenance - Mapping Phase

MAVEN shall be capable of performing orbit trim maneuvers (OTMs) as frequently as every 7 days

---

ID : MRD169

Section : 2.4.5

Title : Orbit Maintenance - Deep Dips

MAVEN shall be capable of performing OTMs as frequently as once per day during deep dips

ID : MRD172

Section : 2.4.5

Title : Ephemeris Reconstruction

Positional knowledge of the orbiter shall be reconstructed to within 3 km (3-sigma, 3D), excluding DSN tracking gaps and atmospheric blooming events.

ID : MRD174

Section : 2.4.5

Title : Response to Mars Atmospheric Density Increases

MAVEN shall autonomously respond to unpredicted Mars atmospheric density increases.

ID : MRD178

Section : 2.4.6

Title : Safehold

Spacecraft safehold shall be capable of being maintained for at least 28 days without ground intervention

---

ID : MRD181

Section : 2.4.6

Title : Safehold

The spacecraft shall exit SafeHold only by ground command except during MOI.

ID : MRD182

Section : 2.4.7

Title : Delta V

The Orbiter shall provide the delta-V for all translational and rotational propulsive maneuvers required for all mission phases as defined in the Design Reference Mission.

ID : MRD186

Section : 2.4.7

Title : Trajectory Correction Maneuvers (TCM)

MAVEN shall be capable of performing the first TCM anytime after launch plus 8 days.

ID : MRD187

Section : 2.4.7

Title : Late TCM Execution

MAVEN shall have the ability to perform a TCM as late as 6 hours prior to MOI.

ID : MRD188

Section : 2.4.7

Title : Maneuver Orientations

MAVEN shall be capable of executing a Delta V maneuver in any inertial direction, subject to the accommodation of payload sun time-of-travel requirements as stated in the payload ICDs.

ID : MRD189

Section : 2.4.8

Title : Interleaved Communications

MAVEN shall be capable of transmitting real-time housekeeping data and stored orbiter data simultaneously.

ID : MRD192

Section : 2.4.8

Title : Safe Mode Comm Coverage

MAVEN shall autonomously transition to a low-rate telemetry mode capable of supporting recovery operations in the case of any conceivable Safehold condition.

ID : MRD197

Section : 2.4.8

Title : Link Margins

MAVEN shall be meet its uplink and downlink data rate requirements with > 3 dB of link margin.

ID : MRD198

Section : 2.4.8

Title : Bit Error Rates

The Orbiter to DSN link shall have a maximum bit error rate (BER) of 1 x 10-5 for uplink and 1 x 10-6 for downlink.

ID : MRD199

Section : 2.4.8

Title : Modulation and Encoding

MAVEN shall support all modulation and encoding schemes and data rates detailed in the Flight to Ground ICD Document (ICD).

ID : MRD205

Section : 2.4.8

Title : DSN Compatibility

MAVEN shall be compatible with the Deep Space Network (DSN) at X-band as described in the DSN Interface Document JPL 810-005, as tailored by the Flight to Ground ICD Document (ICD).

ID : MRD206

Section : 2.4.8

Title : CCSDS Compatibility

MAVEN shall use CCSDS standards for communications between the space segment and ground segment as described in the Flight to Ground ICD Document (ICD).

ID : MRD208

Section : 2.4.8

Title : Delta Differential One-Way Ranging (DDOR) Capability

MAVEN shall be capable of supporting DDOR for the purposes of ground based navigation during select portions of the Cruise phase.

ID : MRD210

Section : 2.4.8

Title : Combined Electra and X-Band Operations

The Orbiter shall be capable of transmitting simultaneously at X-band (LGA) and Electra UHF

ID : MRD214

Section : 2.4.9

Title : Instrument Thermal Management

Each instrument shall be responsible for managing its operational thermal environment provided that the spacecraft meets the thermal interface requirements specified in the spacecraft to instrument ICDs

---

ID : MRD217

Section : 2.4.10

Title : Spacecraft Absolute Time and Relative Time Commands

The spacecraft FSW shall support absolute time commands and relative time commands

---

ID : MRD219

Section : 2.4.10

Title : Spacecraft Table Uplink Accommodation

The spacecraft FSW shall accommodate spacecraft and instrument flight table uplinks

---

ID : MRD222

Section : 2.4.10

Title : In Flight Software Updates

The spacecraft FSW architecture shall provide for in-flight software updates. It shall be possible to both patch selected FSW tasks and to upload an entire image

---

ID : MRD226

Section : 2.4.10

Title : Spacecraft Boot Memory

The spacecraft shall implement a boot memory segment that is non-writable on-orbit in-flight.

ID : MRD231

Section : 2.4.10

Title : Invalid and Restricted Commands

The spacecraft shall prevent the execution of invalid and restricted commands, and safety critical commands without proper enables.

ID : MRD235

Section : 2.5

Title : Sudden Removal of Power

All instruments shall be designed such that the sudden removal of power will not cause damage to the instrument

---

ID : MRD239

Section : 2.5

Title : Interface Requirements

All instruments shall conform to the interface requirements contained in the spacecraft to instrument ICDs.

ID : MRD241

Section : 2.5

Title : Commanding

Instrument mode changes during each orbit shall be commanded by a stored sequence

---

ID : MRD242

Section : 2.5

Title : Instrument Health and Safety Out-of-Limits Assessment

The DPU FSW shall detect out-of-limit conditions while monitoring its associated instrument health and safety.

ID : MRD244

Section : 2.5

Title : Boot Memory

The instruments shall implement a boot memory segment that is non-writable in-flight.

ID : MRD246

Section : 2.5

Title : Long-Term Instrument Trending

Instrument teams shall be responsible for long term instrument trending.

ID : MRD247

Section : 2.5

Title : Instrument Calibration At Delivery To ATLO

At delivery for integration to the Orbiter, all instruments shall be sufficiently calibrated to meet their performance requirements

---

ID : MRD340

Section : 3.1

Title : LSC Interface with the Flight

The Launch Services Contractor (LSC) shall interface with the Flight Segment as specified in the MAVEN Launch Vehicle Interface Control Document.

ID : MRD347

Section : 4.1

Title : General MOS-GDS Capability

The MOS-GDS shall provide mission management, orbiter operations, data routing and navigation for the life of the MAVEN mission

---

ID : MRD348

Section : 4.1

Title : MOS-GDS Interface with the Flight Segment

The MOS-GDS shall interface with the flight segment as specified in the Flight to Ground Interface Control Document (ICD).

ID : MRD351

Section : 4.1

Title : MOS-GDS Single Point Failures

The MOS-GDS shall have no single point of failure for the orbiter operations functions required for critical orbiter operations

---

ID : MRD354

Section : 4.1

Title : MOS-GDS Mission Test Support

The MAVEN MOS-GDS shall support spacecraft, instrument, end-to-end and pre-launch test and simulation activities

---

ID : MRD355

Section : 4.1

Title : Mission Operations Security

The MAVEN MOS-GDS shall meet the requirements of NPR2810.1A, Security and Information Technology for mission information

---

ID : MRD371

Section : 4.3

Title : MSA Interfaces To DSN

The MSA shall interface with the DSN as specified in the MSA to DSN ICD

ID : MRD372

Section : 4.3

Title : MSA Interfaces To The SOC

The MSA shall interface with the SOC as specified in the MSA to SOC ICD

ID : MRD373

Section : 4.3

Title : MSA Interfaces To Navigation

The MAVEN MSA shall interface with the Jet Propulsion Laboratory (JPL) Navigation element for interplanetary navigation and maneuver support activities as described in the MAVEN Operational Interface Agreement Document.

ID : MRD375

Section : 4.3

Title : MSA Interfaces To Instrument Teams

The MSA shall provide a direct interface (i.e., not via the SOC) to each of the instrument package organizations during ATLO as documented in the relevant ICDs

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ID : MRD391

Section : 4.4

Title : Science Data Archive

The MAVEN mission shall archive data in the Planetary Data System (PDS) in accordance with the MAVEN-to-PDS Memorandum of Understanding (MOU)

ID : MRD407

Section : 4.5

Title : Use of Metric Units

The MAVEN mission shall use metric units unless design or manufacturing heritage makes this impractical.

ID : MRD408

Section : 4.5

Title : Use of Non-Metric Units

All uses of non-metric units used on the MAVEN mission shall be documented and approved as a Project waiver request.

ID : MRD419

Section : 4.6

Title : MOS/GDS MCI Frame

The MOS/GDS shall predict the Earth and Sun ephemeris in the MCI frame to within 1 km, per axis, 3-sigma.

ID : MRD420

Section : 4.6

Title : Orbit and SC position

The Nav system shall predict the MAVEN orbit and spacecraft position to within the following accuracies (3-sigma) for at least 9.5 days from the orbit determination cutoff time during nominal science and relay orbits:

* Semi-major axis: +/- 50 km

* Eccentricity: +/-0.025

* Inclination: +/-0.20 deg

* Longitude of Ascending Node: +/-0.04 deg

* Argument of periapsis: +/-0.3 deg

ID : MRD423

Section : 4.6

Title : Orbit and SC position

The Nav system shall predict the MAVEN orbit and spacecraft position to within the following accuracies (3-sigma) for at least 2.8 days from the orbit determination cutoff time during deep dip orbits:

* Semi-major axis: +/- 50 km

* Eccentricity: +/-0.025

* Inclination: +/-0.20 deg

* Longitude of Ascending Node: +/-0.04 deg

* Argument of periapsis: +/-0.3 deg

ID : MRD434

Section : 4.6.1

Title : Coherent Ranging

The MAVEN mission end to end coherent (2-way) ranging data shall provide position accuracy better than 2 m (1 sigma) for a 60 second sampling interval and a range clock frequency of 1 MHz.

ID : MRD435

Section : 4.6.1

Title : X-band Doppler Error (High Sun Angle)

The MAVEN mission reconstructed end to end coherent (2-way) X band Doppler error for a 10 second sampling interval shall be better than 0.23 mm/s (1 sigma) for Sun Earth Probe angles >= 45 deg.

ID : MRD436

Section : 4.6.1

Title : X-band Doppler Error (Low Sun Angle)

The MAVEN mission reconstructed end to end coherent (2-way) X band Doppler error for a 10 second sampling interval shall be better than 0.31 mm/s (1 sigma) for Sun Earth Probe angles >=15 deg.

ID : MRD425

Section :

Title : Supportable Relay Contacts During Primary Science Phase

The MAVEN flight and ground segments shall implement a capability to support relay passes at a rate of 1 per sol during the primary science phase if the relay communication link closes, at the direction of the Mars Program Office, and with significant and non-recoverable impact to MAVEN science.

ID : MRD426

Section :

Title : Supportable Relay Contacts After Primary Science Phase

The MAVEN flight and ground segments shall implement a capability to support relay passes at a rate of 4 per sol after the 1 Earth year primary science phase if the relay communication link closes.

ID : MRD427

Section :

Title : End-to-End Return Link Latency

MAVEN shall implement the capability to deliver a user's return link data product to the DSN no later than 90 min after the end of the intended relay service, assuming available DSN coverage and no additional delays due to occultations, and a return link data volume of up to 250 Mb. The 90 minute period is allocated as follows: slew time 20 min, DSN lockup 10 min, downlink duration 20 min, one way propagation delay 25 min, unallocated margin 15 min.

ID : MRD428

Section :

Title : Forward Link File Handling - Number of Products

MAVEN shall support onboard storage of up to 20 individual uniquely-named forward link data products per relay session.

ID : MRD429

Section :

Title : Forward Link File Handling - Product Size

MAVEN shall support cumulative on board storage of individual uniquely-named files not to exceed 1 MB total.

ID : MRD430

Section :

Title : Forward Link File Handling - File Ordering

MAVEN shall provide a file-naming mechanism for specifying the file order and the capability to associate multiple named forward link data products with a specific relay contact and of directing these products to the Electra UHF transceiver for forward link transmission during that pass, without any gaps or fill frames between individual products.

ID : MRD431

Section :

Title : Data Quality - High Value Products

MAVEN shall have the capability to transmit a designated return link relay product to Earth multiple times, storing the product on the orbiter until positive confirmation of complete receipt of the product

on the ground is received, in order to achieve enhanced reliability for high-value return link relay products.

ID : MRD432

Section :

Title : Phasing of Orbit Anomaly

MAVEN shall be capable of adjusting its true anomaly to any specified value in the range of 0 - 2 pi, with a time-of-flight accuracy of 60 s, assuming a minimum of 3 months advance notification of the desired true anomaly target.

ID : MRD433

Section :

Title : Compatibility Test Capability

MAVEN shall maintain a spacecraft testbed capability to support ground-based relay compatibility testing and end-to-end relay data flow testing.

MAVEN PROJECT
CCB Controlled Document
ASchmidt 3/20/2012

MAVEN
Mars Atmosphere and Volatile Evolution Mission
CU/LASP • GSFC • UCB/SSL • LMT • JPL

MOS/GDS Functional Requirements Document (FRD)

MAVEN-MOPS-RQMT-0022

Revision J

Effective Date: March 20, 2012

Expiration Date: March 20, 2017

Prepared By: Robert Kozon

Approved: Carlos Gomez-Rosa

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		3

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000048	See Block 16C	N/A	

6. ISSUED BY CODE 210.S
NASA Goddard Space Flight Center
Procurement Operations Division

7. ADMINISTERED BY (If other than Item 6) CODE 210.S
NASA/Goddard Space Flight Center
Space Sciences Procurement Office

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)
LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

(4) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED (SEE ITEM 13) 04/02/09

CODE CAGE 04235 DUNS 928784042 FACILITY CODE

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: N/A AMT: N/A

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

(4) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

X D. OTHER Specify type of modification and authority)
FAR 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clauses B.1 and B.7 and definitize Contractor's cost proposal of April 5,2012 for the replenishment of MAVEN level of effort/special studies hours – additional 2,000 hours (CCR-0505). This reflects MAVEN-CCR-0505 as approved.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

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)
Scott Grillo, Contract Negotiator	Amy A. Aqueche
15B. CONTRACTOR/OFFEROR: Scott Grillo (Signature of person authorized to sign)	15C. DATE SIGNED: 4/20/12
16B. UNITED STATES OF AMERICA: BY Amy A. Aqueche (Signature of Contracting Officer)	16C. DATE SIGNED: 4/23/12

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA FAR (48 CFR) 53.243

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	FROM:	BY	TO
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)			
Base Fee (Phase CDE)			
Maximum Available Award Fee (Phase CDE)			
Maximum Positive Performance Incentive (Phase CDE)			
TOTAL CPAF (BCDE)	$247,381,048	$413,070	$247,794,118

(End Clause)

2. Revise Clause B.7 LEVEL OF EFFORT SPECIAL STUDIES to read as follows:

B.5 LEVEL OF EFFORT FOR SPECIAL STUDIES

The Contracting Officer may issue task assignments for special studies related to new/potential requirements for the MAVEN mission, or alternatives to existing requirements which are not in the current MAVEN baseline. The Contractor shall perform the studies described in the task assignments, delivering at least 3240 but not more than 3960 direct productive hours by professional scientists or engineers, a range that represents a target level of effort of 3600 hours plus or minus 10 percent.

The Contractor shall perform the special studies in response to task assignments that are issued by the Contracting Officer within the period of the contract, using level-of-effort hours to deliver reports as stipulated in the task assignments. Each task assignment shall contain the following elements:

- Description of study objectives and the study effort the contractor is to perform
- Preliminary estimate of the number of hours for the study effort and the schedule for completion
- Ceiling cost for the study effort

The Contractor will not exceed the ceiling cost for performance of a task assignment without authorization from the Contracting Officer.

The Contractor shall address each active task assignment in technical reporting submitted under the contract. NASA Form 533 Financial Management reports shall contain a summary for the task assignments issued under this clause as well as a separate report for each active task assignment.

The level of effort stipulated herein may be increased or decreased using the Changes clause of the contract.

(End of Clause)

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000049	See Block 16C	N/A	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 8)	CODE
NASA Goddard Space Flight Center Procurement Operations Division	210.S	NASA/Goddard Space Flight Center Space Sciences Procurement Office	210.S

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)

LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

CODE CAGE 04235 DUNS 926784042 FACILITY CODE

(4) | 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X | 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: N/A AMT: N/A

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

(4) 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)
FAR 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clauses B.1 and definitize Contractor's cost proposal of April 12, 2012 for the MAVEN EUT Time Update FSW Commanding and the MAVEN Electra Shipping (CCR-0504). This reflects MAVEN-CCR-0504 as approved.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

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)	
Scott Grillo, Contract Negotiator		Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Scott Grillo (Signature of person authorized to sign)	4/24/12	BY Amy A. Aqueche (Signature of Contracting Officer)	4/26/12

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	[redacted] (Mod 48)	[redacted]	TO
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)	[redacted]		
Base Fee (Phase CDE)	[redacted]		
Maximum Available Award Fee (Phase CDE)	[redacted]		
Maximum Positive Performance Incentive (Phase CDE)	[redacted]		
TOTAL CPAF (BCDE)	$247,794,118	$30,592	$247,824,710

(End Clause)

1. SOW REVISION

Section 6.2.6 is revised as follows:

6.2.6 PAYLOAD ACCOMMODATIONS AND SUPPORT

Add:

"LM shall provide flight software for Electra in accordance with the Electra to Spacecraft ICD."

The named revision is reflected within the SOW revision as updated and attached hereto

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000050	See Block 16C	N/A	

6. ISSUED BY CODE 210.S
NASA Goddard Space Flight Center
Procurement Operations Division

7. ADMINISTERED BY (If other than Item 6) CODE 210.S
NASA/Goddard Space Flight Center
Space Sciences Procurement Office

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)
LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

CODE CAGE 04235 DUNS 926784042 FACILITY CODE

(4) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: N/A AMT: N/A

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

(4) 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)
FAR 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clauses B.1 and definitize Contractor's cost proposal of April 11, 2012 for the MAVEN IMU Spare. This reflects MAVEN-CCR-0486 as approved.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

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)
Scott J. Carillo, Contract Negotiator	Amy A. Aqueche

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Scott J. Carillo (Signature of person authorized to sign)	5/3/12	BY Amy A. Aqueche (Signature of Contracting Officer)	5/4/12

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	[redacted]	[redacted]	[redacted]
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)			
Base Fee (Phase CDE)			
Maximum Available Award Fee (Phase CDE)			
Maximum Positive Performance Incentive (Phase CDE)			
TOTAL CPAF (BCDE)	$247,824,710	$1,678,207	$249,502,917

(End Clause)

2. SOW REVISION

Add to Section 6.2.2.2 Spares

LM shall procure the following spare flight hardware and test hardware

" 10. Spare Inertial Measurement Unit (IMU) without Printed Wiring Board (PWB) coupons. LM will be required to submit a waiver similar to MAV-VR 1-11-0010 that provides the rationale for procuring the PWB coupons to MIL-P-55110 E instead of IPC 6012B Class 3/A. This will preclude delivering PWB coupons to GSFC for evaluation."

The named revision will be reflected in the SOW revision when updated

3. This annotation serves as an administrative correction to the text of item 2 in MOD 000048, which calls out an update to Clause B.7 and incorrectly annotates Clause B.5. The modification language should read as follows: "B.7 Level of Effort for Special Studies", which corrects the clause annotation (B.7).

4. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

5. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
000051	See Block 16C	N/A	

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
NASA Goddard Space Flight Center Procurement Operations Division	210.S	NASA/Goddard Space Flight Center Space Sciences Procurement Office	210.S

8. NAME AND ADDRESS OF CONTRACTOR *(No. Street, county, State and ZIP: Code)*

LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

CODE 04235 FACILITY CODE

(4) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED *(SEE ITEM 11)*

X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED *(SEE ITEM 13)* 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

BNC: GJE PR: N/A AMT: $544,768 *Funds Are Available on Contract*

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

(4) 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 Pursuant to 1852.216-77 Award Fee for End Items (JUNE 2000)

E. IMPORTANT: Contractor ☒ 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.)*

This modification documents the amount of interim award fee earned by the Contractor for the Phase C/D/E Period 3 Award Fee for performance during the period from November 1, 2011 – April 30, 2012.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

Except at 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)*	
		Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY Amy Aqueche	16C. DATE SIGNED 6/15/12

1. The Government has determined that the Contractor has earned interim award fee in the amount o[redacted] for the period of November 1, 2011 through April 30, 2012, Evaluation Period 3 (Phase C/D/E). This earned amount represents approximately 97% of the [redacted] vailable for Evaluation Period 3.

2. In recognition of the foregoing, Clause B.1, Estimated Cost and Award Fee (1852.216-85) (SEPT 1993) is revised as follows:

	Period 3
Interim Available Award Fee	[redacted]
Interim Earned Award Fee	
Available Fee for Final Evaluation	
Provisional Award Fee Paid	$ 0

3. Clause G.1, Award Fee for End Item Contracts (1852.216-77) (APR 2012), limits interim award fee payments to the lesser of the interim evaluation score or 80 percent of the fee allocated to that period, less any provisional payments made during the period. For this period, the interim evaluation score of approximately 97% represents the greater amount, so the 80% limit does apply; 80% of the fee allocated for Period 3 equal[redacted] There were no provisional award fee payments made during the period. Thus, upon execution of this modification, the Government shall pay the Contractor award fee in the amount of [redacted]

4. All other terms and conditions shall remain in full effect.

END OF MODIFICATION

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
00052	See Block 16C	4200438252	

6. ISSUED BY CODE 210.S
NASA Goddard Space Flight Center
Procurement Operations Division

7. ADMINISTERED BY *(If other than Item 6)* CODE 210.S
NASA/Goddard Space Flight Center
Space Sciences Procurement Office

8. NAME AND ADDRESS OF CONTRACTOR *(No. Street, county, State and ZIP: Code)*
LOCKHEED MARTIN CORP.
12257 STATE HWY
LITTLETON CO 80127-0000

CODE 04235 FACILITY CODE

(4) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED *(SEE ITEM 11)*

X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED *(SEE ITEM 13)* 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

BNC: GJE PR: 4200438252 AMT: $28,296.00

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

(4) 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)
NFS 1852.232-81 CONTRACT FUNDING (JUN 1990)

E. IMPORTANT: Contractor ☒ 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.)*

This modification provides incremental funding for continued contract performance and revises clause B.3 accordingly.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

Except at 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)* Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY Amy Aqueche	16C. DATE SIGNED 07/10/2012

1. Revise Clause B.3 – CONTRACT FUNDING (1852.232-81) (JUN 1990) is revised to increase funds as set forth below:

	FROM (MOD 45)	BY	TO
Estimated Cost	[redacted]		
Base Fee			
Award Fee			
CPAF	$185,641,331	$28,296	$185,669,627

*The allotment date is through October 6, 2012.

2. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1. CONTRACT ID CODE	PAGE OF PAGES
		1 | 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000053	See Block 16C		432

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
NASA/Goddard Space Flight Center Procurement Operations Division Greenbelt MD 20771	GSFC	NASA/Goddard Space Flight Center Procurement Operations Division Attn: Amy Aqueche, Code 210.S Greenbelt MD 20771	GSFC

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)		9A. AMENDMENT OF SOLICITATION NO.
LOCKHEED MARTIN SPACE SYSTEMS COMPANY 12257 STATE HWY LITTLETON CO 80127-0000	(x)	9B. DATED (SEE ITEM 11)
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C
		10B. DATED (SEE ITEM 13) 04/02/2009
CODE 04236	FACILITY CODE	

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)
BNC: GKT PR: N/A AMT: N/A

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

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) FAR 52.243-2 Changes - Cost Reimbursement (Aug 1987)

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.)

The purpose of this modification is to revise Clause B.1 and definitize Contractor's proposal dated June 19, 2012 for the MAVEN Forward Error Correction for Payload Science Data. This reflects MAVEN-CCR-516 as approved.

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)	
Scott Grillo, Contract Negotiator		Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR Scott Grillo (Signature of person authorized to sign)	15C. DATE SIGNED 7/12/12	16B. UNITED STATES OF AMERICA Amy A. Aqueche (Signature of Contracting Officer)	16C. DATE SIGNED 7/12/12

NSN 7540-01-152-8070
Previous edition unusable

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	FROM (Mod 50)	BY	TO
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)			
Base Fee (Phase CDE)			
Maximum Available Award Fee (Phase CDE)			
Maximum Positive Performance Incentive (Phase CDE)			
TOTAL CPAF (BCDE)	$249,502,917	$345,835	$249,848,752

(End Clause)

2. SOW REVISION

Section 6.2.6 is revised as follows:

6.2.6 PAYLOAD ACCOMMODATIONS AND SUPPORT

Add:

"LM shall design the spacecraft to provide a Forward Error Correction (FEC) capability that provides correction of data corruption due to Single Event Functional Interrupts (SEFIs) affecting data stored in spacecraft mass memory."

The named revision will be reflected in the Statement of Work (SOW) revision when updated

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000054	See Block 16C	N/A	432

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
NASA Goddard Space Flight Center Procurement Operations Division	GSFC	NASA/Goddard Space Flight Center Space Sciences Procurement Office	GSFC

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)

LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

CODE CAGE 04235 DUNS 928784042 FACILITY CODE

(4) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C

10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12 ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: N/A AMT: N/A

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

(4) 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)
FAR 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clause B.1 and the SOW language to incorporate the MAVEN added thermal support for payloads and provide full and equitable adjustment. This reflects MAVEN-CCR-0556 as approved.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

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)	
Scott J. Grillo, LM Contracts Negotiator		Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Scott J Grillo (Signature of person authorized to sign)	7/31/12	BY Amy A. Aqueche (Signature of Contracting Officer)	8/1/2012

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	FROM (Mod 53)	BY	TO
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)			
Base Fee (Phase CDE)			
Maximum Available Award Fee (Phase CDE)			
Maximum Positive Performance Incentive (Phase CDE)			
TOTAL CPAF (BCDE)	$249,848,752	$78,389	$249,927,141

(End Clause)

2. SOW REVISION

Add to Section 6.2.6 Payload Accommodations and Support "LM shall provide payload thermal engineering analysis and support in support of the payload Pre Environmental Reviews."

The named revision will be reflected in the SOW revision when updated

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

1960MB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000055	See Block 16C	N/A	432

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
NASA Goddard Space Flight Center Procurement Operations Division	GSFC	NASA/Goddard Space Flight Center Space Sciences Procurement Office	GSFC

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP. Code)

LOCKHEED MARTIN CORP.
12257 S WADSWORTH BLVD
LITTLETON CO 80125-8504

CODE CAGE 04235 DUNS 926784042 FACILITY CODE

(4)	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C
	10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: N/A AMT: N/A

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

(4)	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) FAR 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clause B.1 and the SOW language to incorporate the MAVEN ½ FTE future Additional Thermal Support for Payloads and provide full and equitable adjustment. This reflects MAVEN-CCR-0565 as approved.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

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)
Scott J. Grillo, LM Contracts Negotiator	Amy A. Aqueche

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Scott J Grillo (Signature of person authorized to sign)	7/31/12	BY Amy A. Aqueche (Signature of Contracting Officer)	8/1/2012

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	[illegible] Mod 54)	BY	TO
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)			
Base Fee (Phase CDE)			
Maximum Available Award Fee (Phase CDE)			
Maximum Positive Performance Incentive (Phase CDE)			
TOTAL CPAF (BCDE)	$249,927,141	$218,099	$250,145,240

(End Clause)

2. SOW REVISION

Add to Section 6.2.6 Payload Accommodations and Support: LM shall provide additional thermal engineering support for incorporation of payload thermal models into system model, preparation for system thermal vacuum testing and post test data analysis and correlation.

The named revision will be reflected in the SOW revision when updated

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF PAGES
	1	2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
00056	See Block 16C	4200446796/4200447520	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
NASA Goddard Space Flight Center Procurement Operations Division	210.S	NASA/Goddard Space Flight Center Space Sciences Procurement Office	210.S

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)	(4)	9A. AMENDMENT OF SOLICITATION NO.
LOCKHEED MARTIN CORP. 12257 STATE HWY LITTLETON CO 80127-0000		9B. DATED (SEE ITEM 11)
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C
CODE 04235 FACILITY CODE		10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: 4200446796 & 4200447520 AMT: $28,328,869.41

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

(4)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER Specify type of modification and authority) NFS 1852.232-81 CONTRACT FUNDING (JUN 1990)

E. IMPORTANT: Contractor ☒ 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.)

This modification provides incremental funding for continued contract performance and revises clause B.3 accordingly.

POC: Amy Aqueche. Email: amy.a.aqueche@nasa.gov

Continued....

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)	
		Amy A. Aqueche	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY Amy A. Aqueche (Signature of Contracting Officer)	8/10/12

1. Revise Clause B.3 – CONTRACT FUNDING (1852.232-81) (JUN 1990) is revised to increase funds as set forth below:

	FROM (MOD 52)	BY	TO
Estimated Cost	[redacted]		
Base Fee			
Award Fee			
CPAF	$185,669,627	$28,328,869.41	$213,998,496.41

*The allotment date is through March 26, 2013.

2. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)

198OMB Approval 2700-0043

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
000057	See Block 16C		432

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
NASA Goddard Space Flight Center Procurement Operations Division	GSFC	NASA/Goddard Space Flight Center Space Sciences Procurement Office	GSFC

8. NAME AND ADDRESS OF CONTRACTOR (No. Street, county, State and ZIP: Code)	(4)	9A. AMENDMENT OF SOLICITATION NO.
LOCKHEED MARTIN CORP. 12257 S WADSWORTH BLVD LITTLETON CO 80125-8504		9B. DATED (SEE ITEM 11)
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. NNG09EK34C
CODE CAGE 04235 DUNS 926784042 FACILITY CODE		10B. DATED (SEE ITEM 13) 04/02/09

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 one (1) copy 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 DATA 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 data specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

BNC: GJE PR: N/A AMT: N/A

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

(4)	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER Specify type of modification and authority) 52.243-2 CHANGES - COST REIMBURSEMENT (AUG 1987)

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.)

The purpose of this modification is to revise Clause B.1 and the SOW language to incorporate the MAVEN Additional Software Build for Payloads and provide full and equitable adjustment. This reflects MAVEN-CCR-0577 as approved.

POC: Amy Aqueche, Email: amy.a.aqueche@nasa.gov

Continued....

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)
Scott J. Grillo, LM Contracts Negotiator	Amy A. Aqueche

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Scott J. Grillo (Signature of person authorized to sign)	8/23/12	BY Amy Aqueche (Signature of Contracting Officer)	8/24/12

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA FAR (48 CFR) 53.243

1. Revise Clause B.1 – ESTIMATED COST AND AWARD FEE (1852.216-85) (SEPT 1993) as indicated below:

	[redacted]	[redacted]	[redacted]
Estimated Cost	[redacted]		
Maximum/Final Award Fee (Phase B)	[redacted]		
Base Fee (Phase CDE)	[redacted]		
Maximum Available Award Fee (Phase CDE)	[redacted]		
Maximum Positive Performance Incentive (Phase CDE)	[redacted]		
TOTAL CPAF (BCDE)	$250,145,240	$85,399	[redacted]

(End Clause)

2. SOW REVISION

Add to Section 6.2.6 Payload Accommodations and Support LM shall provide an interim flight software build in response to changes to the Particles and Fields Build 2.0 software updates, allowing ATLO to have the latest payload commands and telemetry to match Build 2.0 from PFP.

The named revision will be reflected in the SOW revision when updated

3. In consideration of this modification agreed to herein as complete equitable adjustment, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustment attributable to such facts or circumstances giving rise to the proposal for adjustment.

4. All other terms and conditions remain unchanged and in full force and effect.

(END MODIFICATION)