

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. Contract ID Code
Firm Fixed Price

Page 1 Of 13

2. Amendment/Modification No.

P00005

3. Effective Date

2013SEP27

4. Requisition/Purchase Req No.

SEE SCHEDULE

5. Project No. (If applicable)

6. Issued By

U.S. ARMY CONTRACTING COMMAND
MONTY MCCLELLAND
WARREN, MICHIGAN 48397-5000
HTTP://CONTRACTING.TACOM.ARMY.MIL

EMAIL: MONTY.MCCLELLAND@US.ARMY.MIL

Code W56HZV

7. Administered By (If other than Item 6)

DCMA DAYTON
AREA C, BUILDING 30
1725 VAN PATTON DRIVE
WRIGHT-PATTERSON AFB, OH 45433-5302

Code S3605A

8. Name And Address Of Contractor (No., Street, City, County, State and Zip Code)

BENDIX COMMERCIAL VEHICLE SYSTEMS LLC
901 CLEVELAND ST
ELYRIA, OH 44035-4109

9A. Amendment Of Solicitation No.

9B. Dated (See Item 11)

10A. Modification Of Contract/Order No.

W56HZV-11-C-0434

10B. Dated (See Item 13)

2011SEP28

Code 06853

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 amendments; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. Accounting And Appropriation Data (If required)

NO CHANGE TO OBLIGATION DATA

13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS

It Modifies The Contract/Order No. As Described In Item 14.

- A. This Change Order is Issued Pursuant To:** _____ **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:** MUTUAL AGREEMENT BETWEEN PARTIES
- D. Other (Specify type of modification and authority)**

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.)

SEE SECOND PAGE FOR DESCRIPTION

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) JOHN M. HOPFNER JOHN.HOPFNER@US.ARMY.MIL (586)282-7359	
15B. Contractor/Offeror (Signature of person authorized to sign)	15C. Date Signed	16B. United States Of America By _____ /SIGNED/ (Signature of Contracting Officer)	16C. Date Signed 2013SEP27

NSN 7540-01-152-8070

PREVIOUS EDITIONS UNUSABLE

30-105-02

STANDARD FORM 30 (REV. 10-83)

Prescribed by GSA FAR (48 CFR) 53.243

CONTINUATION SHEET	Reference No. of Document Being Continued	Page 2 of 13
	PIIN/SIIN W56HZV-11-C-0434 MOD/AMD P00005	
Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC		

SECTION A - SUPPLEMENTAL INFORMATION

Buyer Name: MONTY MCCLELLAND
 Buyer Office Symbol/Telephone Number: CCTA-ASG-B/(586)282-9750
 Type of Contract: Firm Fixed Price
 Kind of Contract: Research and Development Contracts
 Type of Business: Large Business Performing in U.S.
 Surveillance Criticality Designator: C
 Weapon System: No Identified Army Weapons Systems
 Contract Expiration Date: 2013DEC27

*** End of Narrative A0000 ***

PURPOSE: PERIOD OF PERFORMANCE EXTENSION

PREVIOUS CONTRACT AMOUNT: \$378,200.00
 AMOUNT OF THIS MODIFICATION: \$ 0.00
 TOTAL CONTRACT AMOUNT: \$378,200.00

1. This is a bilateral modification.
2. The purposes of this Modification P00005 are as follows:
 - a. Extend period of performance on CLINs 0006 and 0007 by 90 days at no additional cost to the Government.
 - b. Update ACO point of contact from James Baker to Dale Tomusko.
3. To implement the above purposes the following changes have been made:
 - a. Section B CLINs 0006 & 0007 performance completion date extended by 90 days from 27-Sep-2013 to 27-Dec-2013.
 - b. Section 'C.6.1 Period of Performance' updated to include performance timeframe for CLINs 0006 & 0007 of 27-Dec-2013.
 - c. Section F.3.3 and F.3.4 added to establish the period of performance timeframes for 'HI/MED/LO MU TESTING' & 'MATV TESTING' of 27-Dec-2013.
 - d. Section G clause 52.242-4016 updated ACO point of contact information from James Baker to Dale Tomusko.
4. The total amount on contract remains UNCHANGED as a result of this Modification P00005.
5. All other terms and conditions of Contract W56HZV-11-C-0434 as previously modified remain UNCHANGED and in full force and effect.

*** END OF NARRATIVE A0006 ***

CONTINUATION SHEET

Reference No. of Document Being Continued

Page 4 of 13

PIIN/SIIN W56HZV-11-C-0434

MOD/AMD P00005

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	PRON: R33MC039R3 PRON AMD: 01 ACRN: AC AMS CD: 63300544100 (AMOUNT: \$ 32,400.00)				

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

C.1 Background and Scope

C.1.1 The Contractor, acting as an independent Contractor and not as an agent of the Government, shall provide all necessary personnel, facilities, materials, and services to complete the efforts described in this Scope of Work (SOW) as added to the contract by. This SOW was revised in modification P0004, which adds section C.3.2.1.3.5 and its subdivisions, and also added C.5.10.1.

C.1.2 Electronic Stability Control (ESC) has been proven effective in preventing accidents in passenger car and light truck vehicles. Similar studies are being conducted for vehicles over 10,000 pounds with ESC being mandated on these vehicles by 2015. The Government has begun seeing improvements in vehicle stability through the use of ESC Systems on the Mine Resistant Ambush Protected (MRAP) MaxxPro DXM. For this effort the Government intends to investigate the feasibility of utilizing current ESC hardware and software to develop an effective ESC system using the M-1240 MRAP All Terrain Vehicle (M-ATV) .

C.1.3 The primary goal of these efforts is to develop the unique ESC software calibrations necessary for optimal effectiveness of the ESC when installed on the M-ATV.

C.1.4 Upon contract completion, the Contractor shall provide a vehicle-specific ESC System for the M-ATV with all the necessary sensors installed on the Government-furnished development vehicle for use as a technical demonstrator and Army test vehicle.

C.2 Definitions

C.2.1 High Coefficient of Friction (High Mu) Surfaces

High Mu surfaces are defined as dry and wet road surfaces (asphalt or concrete).

C.2.2 Low Coefficient of Friction (Low Mu) Surfaces

Low Mu surfaces are defined as ice- and snow-covered road surfaces (asphalt, concrete, or gravel).

C.2.3 Medium Coefficient of Friction (Medium Mu) Surfaces

Medium Mu surfaces are defined as gravel or sand covered road surfaces.

C.2.4 Steady State Handling

Steady state handling exists when periodic (or constant) vehicle responses to periodic (or constant) control and/or disturbance inputs do not change over a long period.

C.2.5 Transient State Handling

Transient state handling exists when the motion responses, to external forces relative to the vehicle, or control positions are changing over time.

C.2.6 Tuning

Tuning is defined as using the ESC System and the unique software calibration to demonstrate that the ESC System can detect a possible roll-over event or yaw event that could lead to a loss of control by the vehicle and cut engine power and apply individual wheel brakes without driver intervention to regain control of the vehicle and prevent roll-over or loss of driver control.

C.2.7 gs

gs are the standard units for the acceleration of an object.

C.2.8 Nominal Speed

Nominal Speed is the steady-state vehicle speed being maintained by the driver, held within a range of +/- approximately 1.5 MPH of the values given in the test matrix.

C.2.9 Controlled Stop

A controlled stop is one that (i) does not require external assistance to stop (external refers to such things as hitting a snow bank, a curb, or any other object), and (ii) does not end with the vehicle aimed backwards as a result of stopping, and (iii) does not involve the vehicle spinning around during the stopping event.

C.3 Base: Development of ESC software for the MATV

C.3.1 Prior to Testing

C.3.1.1 Vehicle Preparation: Weight

The COR will provide and ship the Contractor, as Government Furnished Property, one M-ATV military vehicle weighing 25,500 pounds (as shipped) in accordance with (IAW) C.7.1 fourteen (14) days after modification P00003 award. The Contractor shall add additional weight to the vehicle, in the form of steel plates bolted to the vehicle floor and / or water based ballast, to bring the vehicle total weight to 32,000 pounds. The Contractor shall distribute the additional weight in a manner that does not overload any of the vehicles axles.

CONTINUATION SHEET**Reference No. of Document Being Continued**

Page 6 of 13

PIIN/SIIN W56HZV-11-C-0434

MOD/AMD P00005

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC**C.3.1.2 Vehicle Preparation: Out-riggers**

The Contractor shall purchase and install out-riggers on the MATV provided under C.3.1.1. The out-riggers shall be of a configuration and design that will not allow the Government-Furnished M-ATV to roll over during developmental testing.

C.3.1.3 Vehicle Transportation

The Contractor shall transport the MATV (via trailer) to and from the test facilities selected in C.3.2.1.1, C.3.2.2.1 and C.3.2.3.1 IAW Defense Transportation Regulation Volume II Chapter 205-37, Section Y, Paragraph 4 to conduct the necessary development effort. The COR will provide this document to the Contractor no later than (NLT) 10 days after modification P00003 award.

C.3.1.4 Vehicle Maintenance

The Government will provide all maintenance and repair work required, if any, for the Government-Furnished M-ATV to be provided to the Contractor during the period of performance per C.3.1.1 above, excluding tire changes, brake repairs, and out-rigger and ESC System items provided by the Contractor per this Statement of Work. The Contractor shall notify the COR via telephone and email immediately (within 24 hours) of any breakage to or failure(s) with the M-ATV or any of its components.

C.3.2 Testing**C.3.2.1 High Mu Testing****C.3.2.1.1 Facility**

The Contractor shall select and secure a High Mu Test facility where the tests outlined in this section C.3.2.1 and its subdivisions can be performed. The Contractor shall identify to the COR which High Mu Test facility will be used to conduct the High Mu Tests NLT fourteen (14) days after modification P00003 award.

C.3.2.1.2 Calibration and Tuning

The Contractor shall develop the calibration and tuning algorithm for High Mu Testing of the ESC System it will install on the MATV at the High Mu Test facility selected in C.3.2.1.1, NLT 240 days after modification P00003 award. The Contractor shall calibrate and tune its installed ESC System using the calibration and tuning algorithm developed hereunder, prior to commencing the High Mu Testing described herein.

C.3.2.1.3 Testing Requirements

(a) After the Contractor completes calibration and tuning of the ESC System per C.3.2.1.2, the Contractor shall perform the following three test maneuvers (IAW C.3.2.1.3.1, C.3.2.1.3.2, and C.3.2.1.3.3) for verification of the ESC Systems performance. The Contractor shall notify the COR NLT 14 days prior to the scheduled testing to advise when and where the testing will be conducted. The goal of the tests is to demonstrate that the M-ATV vehicle, with the ESC system installed and active, achieves a safe and predictable handling response during all test maneuvers. A safe and predictable handling character shall be defined in the following manner: at no time during the testing shall any tire leave the road surface nor shall the vehicle exhibit a measureable level of over steer. All three tests shall be performed with the ESC System active (on) and disabled (off).

(b) A fourth test, known as the Ramp Steer Maneuver (RSM) Roll Stability Test, shall also be conducted by the Contractor to assess the vehicle roll stability (IAW C.3.2.1.3.4). This Roll Stability Test shall be performed with the ESC System active (on)

(c) All performance tests and requirements are summarized in Exhibit 1 herein.

(d) The Contractor shall collect both data and video footage during all High Mu Tests for the Governments verification that all High Mu Testing meets the Governments requirements IAW CDRL A001, CDRL A002, and CDRL A003.

(e) The Contractor shall summarize the results of the first three tests with the ESC system in both operational states (active and disabled), and the results of the Ramp Steer Maneuver (RSM) Roll Stability Test with the vehicle ESC system in only an active operational state IAW CDRL A001.

(f) Additionally, the High Mu test results shall be presented to the COR during the final presentation meeting IAW C.4.4.

(g) While performing all of the below High Mu Tests, the Contractors vehicle operator shall wear a helmet (either a soldiers helmet or a race helmet) and seatbelt.

C.3.2.1.3.1 North American Treaty Organization (NATO) Lane Change

The Contractor shall perform the NATO Lane Change test IAW NATO Allied Vehicle Testing Publication (AVTP) 03-160W. The COR will provide this document to the Contractor NLT 10 days after modification P00003 award. The threshold entrance speed shall be 45 miles per hour (MPH), and the threshold exit speed shall be 35 MPH or greater. The objective values are an entrance speed of 60 MPH, and an exit speed of 35 MPH or greater. The threshold testing shall be performed on dry pavement. The objective testing shall be performed on dry and wet pavement. These test requirements are summarized in Table 1 below. The goal is to determine whether the M-ATV vehicle with an ESC system installed and calibrated can operate equally safely and effectively on wet pavement as it does on dry pavement under the test conditions. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.1.3.2 Test Operating Procedure (TOP) Lane Change

The Contractor shall perform the TOP Lane Change test IAW TOP 2-2-002. The COR will provide this document to the Contractor NLT 10 days after modification P00003 award. The threshold entrance speed shall be 40 MPH, and the threshold exit speed shall be 30 MPH or greater.

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

The objective values for this test are an entrance speed of 60 MPH, and an exit speed of 30 MPH or greater. The threshold testing shall be performed on dry pavement. The objective testing shall be performed on dry and wet pavement. These test requirements are summarized in Table 1 below. The goal is to determine whether the M-ATV vehicle with an ESC system installed and calibrated can operate equally safely and effectively on wet pavement as it does on dry pavement under the test conditions. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.1.3.3 Steady State Circular Steering Test (200-Foot Diameter Skid Pad Test).

The Contractor shall perform the Steady State Circular Steering test IAW the Society of Automotive Engineers (SAE) Test Standard J2181. Unless the Contractor already has access to this SAE Test Standard, the COR will provide this document to the Contractor NLT 10 days after modification P00003 award. The threshold value for this test shall be to have a maximum lateral acceleration of 0.32 gs. The objective value for this test is to have a maximum lateral acceleration of 0.38 gs. The threshold testing shall be performed on dry pavement. The objective testing shall be performed on dry and wet pavement. These test requirements are summarized in Table 1 below. The goal is to determine whether the M-ATV vehicle with an ESC system installed and calibrated can operate equally safely and effectively on wet pavement as it does on dry pavement under the test conditions. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.1.3.4 Ramp Steer Maneuver (RSM) - Roll Stability Test

The Contractor shall perform [one set of a] RSM Roll Stability test maneuver that is similar to the maneuver that was developed during the National Highway and Traffic Safety Administration (NHTSA) Heavy vehicle roll stability research, and published as NHTSA NPRM FMVSS-136. The test procedure shall use a NHTSA slowly increasing steer (SIS) test that is run at 30 mph to determine the steering wheel angle during the RSM Roll Stability testing. One-hundred percent of the steering wheel angle at 0.4 gs lateral acceleration shall be used for the final steering position during the maneuver. A Steering Control Profile, described in Exhibit 1 Figure 1, with ramp rate of 150 deg/sec and dwell of five seconds shall be used for this test. This test shall be a dropped-throttle maneuver, and the initial test speed shall be 20 MPH. Test speed shall successively increase in 2 MPH increments until either (i) 2-wheel tip-up occurs or 46 MPH vehicle speed is achieved. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.1.3.5 Sine with Dwell Test Federal Motor Vehicle Safety Standard (FMVSS) 136 Proposed.

The Contractor shall perform two sets of runs of a sine with dwell test (Federal Motor Vehicle Safety Standard (FMVSS) 136 Proposed) test maneuver that was developed by the National Highway and Traffic Safety Administration (NHTSA) Heavy vehicle roll stability research, and published as NHTSA NPRM FMVSS-136. The two sets of runs will be performed at different loading conditions of the vehicle. Those two loading conditions for the test vehicle are detailed in sections C.3.2.1.3.5.1 and C.3.2.1.3.5.2 below. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001 as well as a summary of the data in the NHTSA proposed format as described in FMVSS-136 proposed documentation.

C.3.2.1.3.5.1 Curb Weighting (Curb) Condition for MATV FMVSS-136 testing. The MATV is loaded to a driver-only configuration. For this configuration the MATV is loaded with (i) a test driver (augmented as described below), (ii) test instrumentation, and (iii) the fuel tanks filled to at least 75 percent capacity. The augmented test driver load is obtained by taking the drivers weight plus the instrumentation weight and subtracting it from 165-kg (363.7-lb), which represents the total weight of a single-soldier crew member. The remaining weight then becomes ballast which represents the augmented test driver load: it is to be secured to the floor at the commanders seat. If any rating is exceeded the ballast load is reduced until the respective rating or ratings are no longer exceeded.

C.3.2.1.3.5.2 Gross Vehicle Weight Rating (GVWR) Condition for MATV FMVSS-136 testing. The MATV is loaded to a full passenger configuration. For this configuration the MATV is loaded with (i) test driver (augmented as described below), (ii) test instrumentation, (iii) simulated occupants in each of the vehicles designated seating positions, and with (iv) the fuel tanks filled to at least 75 percent capacity. The augmented test driver load is obtained by taking the drivers weight plus the instrumentation weight and subtracting it from 153-kg (337.3-lb), which represents the total weight of a fully outfitted driver in a five-soldier crew MATV. The simulated occupant loads are attained by securing a 102-kg (225-lb) water dummy in each of the test vehicles designated seating positions with an additional 50-kg (111-lb) on the floor at the occupants seats without exceeding the vehicles GVWR or each axles Gross Axle Weight Rating (GAWR). Since the additional drivers weight as calculated above cannot be added to the drivers floor it is to be evenly distributed throughout the rest of the occupants floor locations and secured. If GVWR is not reached, the remaining weight will be secured to the bed of the vehicle. If any rating is exceeded, the ballast load is reduced until the respective rating or ratings are no longer exceeded.

C.3.2.2 Low Mu Testing

C.3.2.2.1 Facility

The Contractor shall secure a Low Mu Test facility where the tests outlined in this section C.3.2.2 and its subdivisions can be performed. The Contractor shall identify to the COR which Low Mu Test facility will be used to conduct the Low Mu Tests NLT 180 days after modification P00003 award.

C.3.2.2.2 Calibration and Tuning

The Contractor shall develop the calibration and tuning algorithm for Low Mu Testing of the ESC System it will install on the M-ATV at the Low Mu testing facility selected in C.3.2.2.1, NLT 330 days after modification P00003 award. The Contractor shall calibrate and tune

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

its installed ESC System using the calibration and tuning algorithm developed hereunder, prior to commencing the Low Mu Testing described herein.

C.3.2.2.3 Testing Requirements

- (a) After the Contractor completes calibration and tuning of the ESC System in C.3.2.2.2, the Contractor shall perform the following two test maneuvers (IAW C.3.2.2.3.1 and C.3.2.1.3.2) for verification of the ESC Systems performance.
- (b) The Contractor shall notify the COR NLT 14 days prior to the scheduled testing to advise when and where the testing will be conducted.
- (c) The Contractor shall demonstrate, through data collected during testing, a measureable reduction (measured from the baseline data generated with the ESC system turned off) in the level of over steer exhibited by the vehicle during steady state and transient handling maneuvers in both simulated highway exit ramp maneuvers and brake-in-turn maneuvers.
- (d) Each maneuver shall start at 15 MPH, and increase in speed by 5 MPH increments until the vehicle can no longer be controlled safely as determined by the operator on a Low Mu surface. The goal is to reach safe operation of the M-ATV on Low Mu surfaces at speeds up to 60 mph.
- (e) The Contractor shall collect both data and video footage during all Low Mu Tests for the Governments verification that all Low Mu Testing meets the Governments requirements IAW CDRL A001, CDRL A002, and CDRL A003.
- (f) All performance tests and requirements are summarized in Exhibit 1 Table 1 herein.
- (g) The Contractor shall summarize the results of the two test maneuvers with the ESC system in both operational states (active and disabled) IAW CDRL A001.
- (h) The Low Mu test results shall be presented to the COR during the final presentation meeting IAW C.4.4.
- (i) While performing all of the below Low Mu Tests, the Contractors vehicle operator shall wear a helmet and seatbelt.

C.3.2.2.3.1 Simulated Highway Exit Ramp Maneuvers

The Contractors operator shall drive the vehicle on a line that is tangent to a 900-foot radius circle at a nominal test speed. The operator shall then turn the steering wheel and attempt to maintain contact of the vehicles front tire to the circle. The test is deemed successful when a 90-degree turn can be negotiated with the vehicles front tire in contact with the circle, and the vehicle is still under control. The operator shall start at a speed of 15 MPH, and increase the speed of the vehicle by 5 MPH increments until contact with the circle can no longer be maintained or the test operator deems that continuing at any further increased speeds would be unsafe. The last speed at which the operator successfully negotiated the maneuver shall be recorded and deemed the vehicles maximum speed. The objective value for this test is 60 MPH. The testing shall be performed on both snowy and icy surfaces. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.2.3.2 Brake-in-Turn Maneuvers

The Contractors operator shall drive the vehicle in a straight line at a nominal test speed. The operator shall then turn the steering wheel 120-degrees at 90-degrees per second, which represents full steering wheel input. When the full steering wheel input is complete, the operator shall then apply the foot brake as hard as possible, simulating a panic apply. The test is deemed successful when the vehicle can be brought to a controlled stop without any additional steering wheel inputs. The operator shall start at a speed of 15 MPH, and increase the speed of the vehicle by 5 MPH increments until the vehicle can no longer be operated in a controlled and safe manner, as determined by the operator. The last speed at which the operator successfully negotiated the maneuver shall be recorded and deemed the vehicles maximum speed. The objective value for this test is 60 MPH. The testing is to be performed on both snowy and icy surfaces. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.3 Medium Mu Testing

C.3.2.3.1 Facility

The Contractor shall select and secure a Medium Mu Test facility. The Contractor shall identify to the COR which Medium Mu Test facility will be used to conduct the Medium Mu Tests NLT 120 days after modification P00003 award.

C.3.2.3.2 Calibration and Tuning

The Contractor shall develop the calibration and tuning algorithm for Medium Mu Testing of the ESC System it will install on the M-ATV at the Medium Mu Test facility selected per C.3.2.3.1 NLT 240 days after modification P00003 award. The Contractor shall calibrate and tune its installed ESC System using the calibration and tuning algorithm developed hereunder, prior to commencing the Medium Mu Testing described herein.

C.3.2.3.3 Testing Requirements

- (a) After the Contractor completes calibration and tuning of the ESC System per C.3.2.3.2, the Contractor shall perform the following two test maneuvers (IAW C.3.2.3.3.1 and C.3.2.3.3.2) for verification of the ESC Systems performance.
- (b) The Contractor shall notify the COR NLT 14 days prior to the scheduled testing to advise when and where the testing will be conducted.
- (c) The Contractor shall demonstrate, through data collected during testing, a measureable reduction (measured from the baseline data generated with the ESC system turned off) in the level of over steer exhibited by the vehicle during steady state and transient handling maneuvers in both simulated Gravel NATO Lane Change and the Road Edge Departure / Recovery Maneuvers.

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

(d) Each maneuver shall start at 20 MPH, and increase in speed by 5 MPH increments until the vehicle can no longer be controlled safely as determined by the operator on a Medium Mu surface.

(e) The Contractor shall collect both data and video footage during all Medium Mu tests for the Governments verification that all Low Mu Testing meets the Governments requirements IAW CDRL A001 , CDRL A002, and CDRL A003. The goal is to reach safe operation up to 60 MPH.

(f) All performance tests and requirements are summarized in Exhibit 1 Table 1 herein.

(g) The Contractor shall summarize the test data of the two test maneuvers with the system in both operational states (active and disabled) IAW CDRL A001.

(h) The Medium Mu test results shall be presented to the COR during the final presentation meeting IAW C.4.4.

(i) While performing all of the below Medium Mu Tests, the Contractors vehicle operator shall wear a helmet and seatbelt.

C.3.2.3.3.1 Gravel NATO Lane Change

The Contractor shall perform the Gravel NATO Lane Change test IAW NATO Allied Vehicle Testing Publication (AVTP) 03-160W. The COR will provide this document to the Contractor NLT 10 days after modification P00003 award. The threshold entrance speed shall be 40 MPH, and the threshold exit speed shall be 25 MPH or greater. The objective values for this test are an entrance speed of 50 MPH, and an exit speed of 35 MPH or greater. The threshold and objective testing shall be performed on a hard packed gravel surface. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.3.3.2 Road Edge Departure / Recovery Maneuver

The Contractor shall perform the Road Edge Departure / Recovery Maneuver IAW NATO Allied Vehicle Testing Publication (AVTP) 03-160W, but with the middle lane change gates being entirely on a hard packed gravel surface. The COR will provide this document to the Contractor NLT 10 days after modification P00003 award. The threshold entrance speed shall be 35 MPH, and the threshold exit speed shall be 20 MPH or greater. The objective values for this test are an entrance speed of 50 MPH, and an exit speed of 30 MPH or greater. The threshold and objective testing shall be performed on a hard packed gravel surface as defined above. The Contractor shall provide a summary of the test data to the COR IAW CDRL A001.

C.3.2.4 Comparative Matrix

The Contactor shall develop a comparative matrix and provide it to the COR IAW CDRL A002. The comparative matrix shall summarize all tests included in C.3.2.1.3, C.3.2.2.3, and C.3.2.3.3 with shall show test results when the ESC System was both active and disabled.

C.3.2.5 Test Video Footage

The Contractor shall create a video containing all High Mu, Low Mu, and Medium Mu test video footage and provide to the COR IAW CDRL A003. The Government intends to use the video for proof of performance improvement as well as for promotional purposes.

C.3.2.6 Shipping

Once development and testing are complete, the Contractor shall prepare the MATV and support equipment, leaving the ESC hardware and software installed and operational in the MATV (reference C.5.10 below) but removing the out-riggers, and shipping them to the COR at the following address:

U.S. Army TARDEC
ATTN: Joseph Mazur
RDTA-RS, M/S 121
6501 E. 11 Mile Road
Warren, MI 48397-5000

The Contractor shall notify the COR via email NLT 10 days prior to shipping the MATV if any parts and/or equipment are damaged and need to be replaced.

C.3.2.7 Final Technical Report

The Contractor shall prepare and provide a Final Technical Report not later than the end of the period of performance of work on the scope added by Modification P00005, to the COR IAW CDRL A004.

C.3.2.8 Work Plan

The Contractor shall create a Work Plan and provide to the COR IAW CDRL A005.

C.3.2.9 Interface Design Description

The Contractor shall create an Interface Design Description (IDD) Document and provide to the COR IAW CDRL A009.

C.4 Meetings

C.4.1 Start of Work Meeting (SOWM)

The Contractor shall conduct a Start of Work Meeting with the COR and other program representatives at TARDEC within 30 days after modification P00003 award to review the project scope, objectives, and the Contractors Work Plan. The Contractor and COR shall mutually agree on the date and time of the SOWM NLT 10 days prior to the meeting. The Contractor shall record and deliver meeting minutes IAW CDRL A006. Additionally, the Contractor shall prepare and deliver presentation materials IAW CDRL A008.

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC**C.4.2 Bi-Monthly Teleconference**

the Contractor shall plan and attend a bi-monthly (every other month) teleconference to discuss current progress on the calibration and testing of the ESC system relative to the originally agreed upon Work Plan. The Contractor shall prepare and deliver a meeting agenda IAW CDRL A007. The bi-monthly teleconference dates and times shall be mutually agreed upon by both parties at the SOWM IAW C.4.1. The Contractor shall record and deliver meeting minutes for each teleconference IAW CDRL A006.

C.4.3 Site Visit

The COR will visit the Contractors facilities (and/or its test facilities) during the course of work performance. The COR and Contractor shall set the date(s) and time(s) of the visits. The visits shall be planned NLT seven days in advance. The purpose of the site visits will be to discuss the Contractors test plan details and surface conditions at the test site to ensure that the testing and development are on schedule to be completed within the contractual timeline.

C.4.4 Final Presentation Meeting

The Contractor shall orally present its Final Report to the COR at TARDEC (Warren, MI) NLT 30 days prior to the end of the contractual ESC performance period. The date and time shall be mutually agreed upon by both parties, and shall be scheduled NLT 30 prior to the planned presentation date. The Contractor shall prepare and deliver presentation materials IAW CDRL A008.

C.5 Deliverables**C.5.1 Test Data Summary**

Test Data shall be delivered IAW CDRL A001 and C.3.2.1.3, C.3.2.1.3.1, C.3.2.1.3.2, C.3.2.1.3.3, C.3.2.1.3.4, C.3.2.1.3.5, C.3.2.2.3, C.3.2.2.3.1, C.3.2.2.3.2, C.3.2.3.3, C.3.2.3.3.1, and C.3.2.3.3.2.

C.5.2 Comparative Matrix

Comparative Matrix shall be delivered IAW CDRL A002 and C.3.2.1.3, C.3.2.2.3, C.3.2.3.3, C.3.2.4.

C.5.3 Test Video Footage

Test Video Footage shall be delivered IAW CDRL A003 and C.3.2.1.3, C.3.2.2.3, C.3.2.3.3, C.3.2.5.

C.5.4 Final Technical Report

Final Technical Report shall be delivered IAW CDRL A004 and C.3.2.7.

C.5.5 Work Plan

Work Plan shall be delivered IAW CDRL A005 and C.3.2.8.

C.5.6 Meeting Minutes

Meeting Minutes shall be delivered IAW CDRL A006 and C.4.1 and C.4.2.

C.5.7 Meeting Agenda

Meeting Agenda shall be delivered IAW CDRL A007 and C.4.2.

C.5.8 Presentation Material

Presentation Material shall be delivered IAW CDRL A008 and C.4.1 and C.4.4.

C.5.9 Interface Design Description

An Interface Design Description (IDD) shall be delivered IAW CDRL A009 and C.3.2.9

C.5.10 Final System Delivery

The Contractor shall deliver (i) the Government Furnished MATV with the operational ESC System installed to the COR at completion of the scope of work added by Modification P00004, as well as (ii) the outriggers detached and shipped separately (reference C3.2.6 above). The ESC System shall be fully operational. The Contractor shall also deliver all of the required hardware and software to allow the ESC System to function properly to the COR at contract completion.

C.5.10.1 Additional Hardware Delivery

The Contractor shall provide four (4) additional vehicle sets of required ESC components for the MATV, henceforth known as a kit, to be installed by the Government on four (4) Government owned MATVs after the contracts period of performance has ended. Each kit hardware set shall include the following items:

- one (1) yaw sensor,
- one 1 set of yaw sensor connectors/terminals,
- twenty-five (25) feet of twisted quad cable,
- one (1) steering angle sensor (SAS),
- one (1) drawing of current MATV SAS mounting bracket,
- one (1) three foot SAS cable with connectors,
- two (2) pressure sensors,

CONTINUATION SHEET**Reference No. of Document Being Continued**

Page 11 of 13

PIIN/SIIN W56HZV-11-C-0434

MOD/AMD P00005

Name of Offeror or Contractor: BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

two (2) sets of connectors/terminals for pressure sensors,
one (1) R-12 relay valve,
one (1) AT-3 automatic traction control (ATC) valve,
one (1) set of connectors/terminals with strain relief for AT-3 valve,
one (1) EC-60 electronic control unit (ECU) with MATV ESC calibrations pre-programmed in it,
one (1) set of X1, X2, X3, and X4 connectors for EC60 ECU, and
one (1) set of connectors/terminals to mate to previous ECU to re-route to EC-60 ECU.

C.6 Period of Performance

C.6.1 The total period of performance for Modification P00003 to the base contract is 12 months from the date of modification P00003 award. Modification P00004 does not change the period of performance. Modification P00005 revises period of performance for CLINs 0006 and 0007 to 27-Dec-2013.

C.7 Government-Furnished Equipment/Materials/Property/Software

C.7.1 The COR will provide one (1) MATV weighing 25,500 lbs (as shipped) to the Contractor NLT 14 days after modification P00003 award.

C.7.2 The Government will provide the following Government-Furnished Information NLT 10 days after modification P00003 award: NATO AVTP 03-160W; TOP 2-2-002; SAE J2181; and Defense Transportation Regulation Volume II.

*** END OF NARRATIVE C0001 ***

CONTINUATION SHEET**Reference No. of Document Being Continued****Page 12 of 13****PIIN/SIIN** W56HZV-11-C-0434**MOD/AMD** P00005**Name of Offeror or Contractor:** BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

SECTION F - DELIVERIES OR PERFORMANCE

F.1 Data Deliverables

F.1.1 The contractor shall submit all data deliverables electronically as specified in the Section J Contract, Exhibit A, Contract Data Requirements List (CDRL), DD Form 1423.

F.2 Hardware Deliverables

The contractor shall deliver all hardware deliverables, or any other deliverables that cannot be submitted electronically to the COR at the following address:

Joseph S. Mazur
U.S. Army Tank Command LCMC
ATTN: RDTA-RS, MS 121
6501 E. 11 Mile Road
Warren, MI 48397-5000

F.3 Period of Performance

F.3.1 Base Contract

All work required under the base contract (C.1 through C.6) shall be completed by 12 months after contract award.

F.3.2 Option 1

All work required under Option 1, if that option is exercised, shall be completed by 6 months after the date of option exercise in accordance with the Section H Option clause.

F.3.3 HI/MED/LO MU TESTING

All work required under CLIN 0006 and subCLIN 000601 shall be completed by 27-Dec-2013.

F.3.4 MATV TESTING

All work required under CLIN 0007 and subCLIN 000701 shall be completed by 27-Dec-2013.

*** END OF NARRATIVE F0001 ***

CONTINUATION SHEET**Reference No. of Document Being Continued****Page 13 of 13****PIIN/SIIN** W56HZV-11-C-0434**MOD/AMD** P00005**Name of Offeror or Contractor:** BENDIX COMMERCIAL VEHICLE SYSTEMS LLC

SECTION G - CONTRACT ADMINISTRATION DATA

<u>Status</u>	<u>Regulatory Cite</u>	<u>Title</u>	<u>Date</u>
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G-1 CHANGED	52.242-4016	COMMUNICATIONS	MAY/2000
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Communications on technical matters pertaining to the contract shall be direct between the contractor and the Technical Representative. Communications for the Technical Representative shall be addressed to:

Name: Joseph S. Mazur

E-mail: joseph.s.mazur4.civ@mail.mil

The Administrative Contracting Officer's (ACO) name and email address are also provided if known at this time:

ACO: Dale Tomusko

E-mail: Dale.Tomusko@dcma.mil

Please see the appointment letters prepared at time of contract award for functions the Technical Representative and ACO will perform on this contract.

[End of Clause]