SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS
OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, & 30

1. REQUISITION NUMBER	PAGE	OF
REQ-4400-14-0023	1	9

2. CONTRACT NO.	3. AWARD/ EFFECTIVE DATE	4. ORDER NUMBER	5. SOLICITATION NUMBER	6. SOLICITATION ISSUE DATE
CPSC-D-11-0003	09/15/2014	0006		

7. FOR SOLICITATION INFORMATION CALL:	a. NAME	b. TELEPHONE NUMBER (No collect calls)	8. OFFER DUE DATE/LOCAL TIME
	Eddie Ahmad	(301) 504-7884	ET

9. ISSUED BY	CODE	10. THIS ACQUISITION IS
CONSUMER PRODUCT SAFETY COMMISSION DIV OF PROCUREMENT SERVICES 4330 EAST WEST HWY ROOM 517 BETHESDA MD 20814	FMPS	☒ UNRESTRICTED OR ☐ SET ASIDE: % FOR: ☐ SMALL BUSINESS ☐ HUBZONE SMALL BUSINESS ☐ SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS ☐ WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOMEN-OWNED SMALL BUSINESS PROGRAM ☐ EDWOSB ☐ 8(A) NAICS: 541380 SIZE STANDARD: $11.0

11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED	12. DISCOUNT TERMS	13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)	13b. RATING	14. METHOD OF SOLICITATION
☐ SEE SCHEDULE	Net 30	☐		☒ RFQ ☐ IFB ☐ RFP

15. DELIVER TO	CODE	16. ADMINISTERED BY	CODE
CONSUMER PRODUCT SAFETY COMMISSION ROCKVILLE CAMPUS 5 RESEARCH PLACE ROCKVILLE MD 20850	LSE2	CONSUMER PRODUCT SAFETY COMMISSION DIV OF PROCUREMENT SERVICES 4330 EAST WEST HWY ROOM 517 BETHESDA MD 20814	FMPS

17a. CONTRACTOR/ OFFEROR	CODE	FACILITY CODE	18a. PAYMENT WILL BE MADE BY	CODE
SEA LTD 7349 WORTHINGTON-GALENA RD COLUMBUS OH 43085-1519 TELEPHONE NO.	[redacted]		CPSC Accounts Payable Branch AMZ 160 P. O. Box 25710 Oklahoma City OK 73125	FMFS

☐ 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER

☐ 18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED ☐ SEE ADDENDUM

19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	DUNS Number: [redacted] COR: Caroleene Paul cpaul@cpsc.gov 301-987-2225 Task order 0006 to Contract CPSC-D-11-0003 is hereby issued to perform Recreational Off-Highway Vehicle Association (ROHVA) testing in accordance with the attached statement of work and contractor proposal dated August 8, 2014. *(Use Reverse and/or Attach Additional Sheets as Necessary)*				

25. ACCOUNTING AND APPROPRIATION DATA	26. TOTAL AWARD AMOUNT (For Govt. Use Only)
0100A14DSE-2014-2263800000-EXHR004400-252B0	$348,336.11

☐ 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA ☐ ARE ☐ ARE NOT ATTACHED.

☐ 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA ☐ ARE ☐ ARE NOT ATTACHED.

☐ 28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED.

☐ 29. AWARD OF CONTRACT: _____ OFFER DATED _____. YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:

30a. SIGNATURE OF OFFEROR/CONTRACTOR	31a. UNITED STATES OF AMERICA (SIGNATURE OF CONTRACTING OFFICER)
	[signature]

30b. NAME AND TITLE OF SIGNER (Type or print)	30c. DATE SIGNED	31b. NAME OF CONTRACTING OFFICER (Type or print)	31c. DATE SIGNED
		Kim Miles	9/15/14

19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
0001	Line item 0013 A -VIMF Static Measurements - Two load conditions and 1005 Dynamic Tests - Two load conditions.	7	EA	3,939.75	27,578.25
0002	Line item 0016 - Dynamic Occupant Protection Performance Tests - Roll Simulation - First Day	7	EA	23,209.86	162,469.02
0003	Line item 0018 - Transportation of Vehicles One Way - 1 or 2 vehicles	4	EA	1,417.00	5,668.00
0004	Line item 0018 A - Support Services	40	EA	406.85	16,274.00
0005	Line item 0015 A - Dynamic Tests - Two load conditions The total amount of award: $348,336.11. The obligation for this award is shown in box 26.	7	EA	19,478.12	136,346.84

32a. QUANTITY IN COLUMN 21 HAS BEEN

☐ RECEIVED ☐ INSPECTED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED: _____

32b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE	32c. DATE	32d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

32e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE	32f. TELEPHONE NUMBER OF AUTHORIZED GOVERNMENT REPRESENTATIVE
	32g. E-MAIL OF AUTHORIZED GOVERNMENT REPRESENTATIVE

33. SHIP NUMBER ☐ PARTIAL ☐ FINAL	34. VOUCHER NUMBER	35. AMOUNT VERIFIED CORRECT FOR	36. PAYMENT ☐ COMPLETE ☐ PARTIAL ☐ FINAL	37. CHECK NUMBER

38. S/R ACCOUNT NUMBER	39. S/R VOUCHER NUMBER	40. PAID BY

41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT		42a. RECEIVED BY *(Print)*	
41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER	41c. DATE	42b. RECEIVED AT *(Location)*	
		42c. DATE REC'D *(YY/MM/DD)*	42d. TOTAL CONTAINERS

Statement of Work
Task Order 0006 for Testing Seven Additional Newer Model
Recreational Off-Highway Vehicles (ROVs)
Contract CPSC-D-11-0003

A. Background

Test protocols have been developed by CPSC for testing ROVs to determine rollover resistance, handling performance, and occupant protection performance. These protocols have been developed using test data and vehicle measurements compiled from vehicles that were produced between years 2007 and 2010. Since 2011, when the agency's test data was released, there have been changes to the ROVs available on the market. Some models have gone out of production, some models have been redesigned, and new models have been created.

CPSC staff requires test data on newer model ROVs to stay current with changes in the ROV market population. Staff initiated a test and evaluation program to perform static and dynamic tests to characterize five ROV models that reflect the current US ROV market. As a follow-up to that effort, staff identified seven more ROV models and the work described here will collect technical data on those vehicles.

B. Objective

The objective for this testing is to obtain vehicle measurement data, dynamic test data, and occupant protection data for ROV models that have been developed or revised since the issuance of the Advance Notice of Proposed Rulemaking (ANPR) on ROVs.

C. Work

Contract line item numbers (CLIN) are shown in parenthesis for each task item.

1. Using the SEA VIMF, take static measurements of five vehicles in two loading conditions each. (CLIN 0013A)
    a. Load condition #1is driver plus one front seat passenger.
    b. Load condition #2 is the driver, instrumentation, and outrigger loading used to simulate load condition #1.
2. Conduct the J-turn test protocol of Appendix A for five vehicles. (Included in CLIN 0015 A)
3. Conduct the 100 foot constant radius turn test protocol of Appendix A for five vehicles. (Included in CLIN 0015 A)
4. Conduct constant speed, slowly increasing steer turn tests for five vehicles. (Included in CLIN 0015 A)
    a. Load condition will be load condition #2 described above.

b. The constant speed value will be based on the results of the constant radius turn test results.
c. Steering angle will start at 0° and will be increased by a steering controller at the rate of 5 degrees per second.
d. Plots of steering gradient and vehicle path will be constructed from the data. Plots versus time of steering angle, speed, lateral acceleration, roll angle, and yaw rate will also be provided.

5. Conduct one day of dynamic occupant protection performance testing using the SEA roll simulator for each of three vehicles. (CLIN 0016)
    a. The three vehicles to use for roll simulator testing will be specified at a later date.
    b. Load conditions for roll simulator testing will be specified at a later date.
6. Transport vehicles from Columbus, Ohio and to Rockville, MD when contracted work is complete. (CLIN 0018)
7. Provide support services to review, evaluate, analyze, and report findings for technical information as required. (CLIN 0018 A)

D. Vehicles

A total of seven vehicles will be used in the testing. The vehicles will be purchased in new condition by CPSC and provided to the contractor.

E. Shipping

Vehicles will be shipped from point of purchase to the contractor. Upon completion of contract work, contractor will ship vehicles to CPSC's Rockville facility unless other arrangements are made.

F. Deliverables

1. The contractor shall reduce the data, plot significant events, analyze the data, and prepare a report on the outcomes of the dynamic testing and the static measurements for all five vehicles.
2. The contractor shall reduce the data, plot significant events, analyze the data, and prepare a separate report on the outcomes of the occupant protection performance testing.

G. Schedule

The period of performance for this task order is from September 15, 2014 through September 14, 2015. The contractor will provide final reports of the test results and analysis within 45 days of completion of the respective tests.

Appendix A

Statement of Work
Task Order for Testing Seven Additional Newer Model Recreational Off-Highway Vehicles (ROVs)
Contract CPSC-D-11-0003

A. J-Turn Test

1. Acceptance Limits and Requirements – The average lateral acceleration threshold at rollover value as measured in a thirty (30) mph drop throttle J-turn test. The average value of lateral acceleration threshold at rollover will be the value calculated from lateral acceleration data obtained by the process described below.

2. Instrumentation – At minimum, the vehicle must be instrumented to record lateral acceleration, vertical acceleration, longitudinal acceleration, forward speed, hand wheel steering angle, hand wheel steering angle rate, vehicle roll angle, pitch angle rate, roll angle rate, and yaw angle rate. Ground plane lateral acceleration shall be calculated by correcting the body fixed acceleration value to account for roll angle. Ground plane lateral acceleration shall also be corrected to reflect the value at the test vehicle center of gravity (CG) location. A roll motion inertia measurement sensor that provides direct output of ground plane lateral acceleration at the vehicle CG may also be used in lieu of manual correction to obtain ground plane lateral acceleration. Video with time display may be used for the determination of two wheel lift. Roll angle may be calculated from roll rate data. Other instrumentation may be used to facilitate the processing of data or to collect other data not directly associated with the J-turn maneuver.

3. Test Equipment – The test vehicle must be equipped with a programmable steering controller (PSC) capable of responding to vehicle speed, with a minimum steering angle input rate of 500 degrees per second, and accurate within ± 1 degree. The hand wheel setting for 0.0 degrees of steering angle is defined as the setting which controls the properly aligned vehicle to travel in a straight path on a level surface. The PSC should be operated in absolute steering angle mode. That is, the amount of steering used for each test is measured relative to the PSC reading when the vehicle steering is at zero degrees. The test vehicle must be equipped with outriggers capable of preventing a full vehicle rollover and with minimal effect on the loaded vehicle center of gravity location.

4. Test Conditions – The test surface must be dry asphalt or dry concrete with a peak braking coefficient greater than or equal to 0.90 and a sliding skid coefficient greater than or equal to 0.80. The test surface must be flat and have a grade slope equal to or less than 1%. Average wind speed must be less than 20 mph.

5. Load Condition – The required load condition is a driver and a front seat passenger, each equivalent to a 95th percentile male. The test load condition shall be achieved by loading the vehicle with a test driver, instrumentation, outriggers, and ballast (if required). The test loading condition is required to simulate the test vehicle center of gravity (CG) location of the required load condition to within a total of 2.0 inches, with the exception that the displacement of the CG along the z-axis may not be more than 0.5 inches in the positive direction in a z-down-positive coordinate system.

6. Test Method –The steering controller will be programmed to input the desired steering angle at 500 degrees per second when speed descends to 30 mph. The test will be conducted by driving the vehicle in a straight path while holding the speed just above 30 mph. As the vehicle approaches the desired test location the steering controller will be engaged and the throttle will be released. The steering controller will be programmed to trigger the desired steering angle when the vehicle speed descends to 30 mph to produce the event. The test steering angle will be held for a minimum of four seconds. Instrumentation will be recorded through the entire event.

The objective to determine the minimum threshold steering angle is an iterative process. In order to estimate the steering angle, analysis or experience may be used. Discretion is required to prevent a violent roll-over event; therefore starting with lower steering angles is preferred. A starting hand wheel steering angle of 90 degrees is safe for most ROVs.

7. Test Procedure – While recording data and starting with a relatively low steering angle to produce a right turn, conduct 30 mph drop throttle J-turns, holding steering angles for a minimum of 4 seconds before returning steering to zero. The steering rate when returning to zero may be less than 500 degrees per second. Conduct additional J-turns, increasing the steering angle in 10 degree increments as required until a two wheel lift event is achieved. Then, decrease the test steering angle in 5 degree increments to find the lowest steering angle that will produce a two wheel lift event. Repeat for left turns.

8. Verification – While recording data, conduct trials in two opposite directions on the test surface using the minimum steering angle for left or right determined in the Test Procedure to verify that the steering angle produces two wheel lift events in both directions on the test surface. Conduct five trials with visually verified, successful tip-up in each direction, while recording data for each trial. All data for each trial should be reviewed to detect trials that were not executed correctly. Any trials that do not produce tip-up should be diagnosed for cause. If a cause is identified, the data may be discarded and the trial should be repeated to replace the data. If no cause can be identified, repeat item 7, Test Procedure, to assure that the correct steering angle has been determined. A minimum of five trials yielding two wheel lift must be recorded for

each turn direction in each direction on the test surface, which will result in twenty (20) total J-turns to complete the minimum data set. Addition J-turns may be added to the minimum data set in groups of four with one for each turn direction in each direction on the test surface

9. Determine lateral acceleration threshold at rollover value – The data recorded in step 8 shall be digitally low-pass filtered to 2.0 hertz using a phase less, eighth order, Butterworth filter to eliminate noise artifacts on the data. Plot data for ground plane lateral acceleration corrected to the test vehicle CG location, hand wheel steer angle, and roll angle recorded for each trial in the Verification step. Find and record the peak ground plane lateral acceleration occurring between the time of the steering input and the time of the two wheel lift.

If a body fixed acceleration sensor is used, correct the lateral acceleration data for roll angle using the ROHVA method described in the standard ANSI ROHVA 1 - 2011:

$$Ay\ ground = Ay \cos Phi - Az \sin Phi$$

Calculate the lateral acceleration threshold at rollover value which is the average of the peak values for ground plane lateral acceleration for all of the trials conducted in the verification step that produced a two wheel lift event. The minimum value for lateral acceleration threshold at rollover is required to be 0.70 g or greater

B. Constant Radius Turn Test

1. Acceptance Limits -For Recreational Off-Highway Vehicles (ROV) as defined above, sub-limit handling performance shall be measured by the manufacturer and shall be verified to exhibit positive understeer gradients for the range of corrected ground plane lateral acceleration values from 0.10 g to 0.50 g. Negative understeer gradients (oversteer) shall not be exhibited by the vehicle in the ground plane lateral acceleration range specified. The measurements shall be made for the vehicle conditions and the test conditions described below.

2. Load Condition – The required load condition is a driver and a front seat passenger, each equivalent to a 95^{th} percentile male. The test load condition shall be achieved by loading the vehicle with a test driver, instrumentation, outriggers, and ballast (if required). The test loading condition is required to simulate the test vehicle's center of gravity (CG) location, with the required load condition, to within a total of 2.0 inches, with the exception that the displacement of the CG z-axis may not be more than 0.5 inches in the positive direction in a z-down-positive coordinate system. Testing shall be conducted on a randomly selected representative production vehicle.

3. Vehicle Conditions - The vehicle shall be operated in two wheel drive mode with all selectable differential locks off during the conduct of the tests. The tires shall be the manufacturer's production original equipment tires and inflated to the manufacturer's recommended inflation pressure. The tires shall be scuffed or lightly broken-in, but otherwise new. Heavily worn tires shall not be used for handling verification testing. Springs or shocks that have adjustable spring or damping rates shall be set to the manufacturer's recommended settings for delivery and general use.

4. Test Equipment - The test vehicle must be equipped with outriggers capable of preventing a full vehicle rollover and with minimal effect on the loaded vehicle center of gravity location.

5. Test Conditions - Testing shall be conducted on a uniform hard and stable surface of asphalt or concrete. The test surface shall have a high friction finish and shall be smooth, dry, and free of contaminates. The peak braking coefficient of the test surface must be greater than or equal to 0.90 and the sliding skid coefficient of the test surface must be greater than or equal to 0.80. The grade slope of the test surface shall not be greater than 1% in any direction. Average wind speed must be less than 20 mph.

6. Test Method - Handling performance testing shall be conducted using the constant radius test method described in SAE Surface Vehicle Recommended Practice J266. The minimum radius for constant radius testing shall be 100 feet. In this test method the instrumented and loaded vehicle is driven around a constant radius circle marked on the test surface with the driver making every effort to maintain compliance of the vehicle path relative to the circle. The vehicle is operated at a variety of increasing speeds and data is recorded for those various speed conditions in order to obtain data to describe the vehicle handling behavior across the prescribed range of ground plane lateral accelerations. Data shall be recorded for the speed range from 0.0 mph to 28 mph. This speed range will cover the lateral acceleration range from 0.0 g to 0.5 g.

7. Data Acquisition - Continuous Data Collection - In this data acquisition method the driver maintains compliance with the circular path while slowly increasing vehicle speed and data from the vehicle instrumentation is recorded continuously, so long as the vehicle remains on radius. The rate of speed increase shall not exceed 0.93 mph (1.5 km/h) per second. Initial speed should be as low as is practicable to obtain an approximation of the vehicle's Ackerman steering angle. The speed range shall be 0.0 mph to 28.0 mph which will be sufficient to produce corrected lateral accelerations from near 0.0 g to 0.50 g.

8. Vehicle Dimension Coordinate System - The coordinate system described in SAE Surface Vehicle Recommended Practice J670 shall be used.

9. Instrumentation – At minimum, the vehicle must be instrumented to record lateral acceleration, vertical acceleration, longitudinal acceleration, forward speed, hand wheel steering angle, hand wheel steering angle rate, roll angle, pitch angle rate, roll angle rate, and yaw angle rate. Lateral acceleration shall be corrected for roll angle and to reflect the value at the center of gravity location. Roll angle may be calculated from roll rate data. A roll motion inertia measurement sensor that provides direct output of ground plane lateral acceleration at the vehicle CG may also be used in lieu of manual correction to obtain ground plane lateral acceleration. Other instrumentation may be used to facilitate the processing of data or to collect other data not directly associated with the vehicle handling test maneuver.

10. Data Analysis - The lateral acceleration data shall be corrected for roll angle using the ROHVA method described in the standard ANSI ROHVA 1 - 2011. The ground plane lateral acceleration shall also be corrected to reflect the value at the test vehicle's center of gravity. The data shall be digitally low-pass filtered to 1.0 Hz using a phase-less, eighth-order, Butterworth filter and plotted with ground plane lateral acceleration on the abscissa versus hand wheel steering angle (not road-wheel steer angle) on the ordinate. A second-order polynomial curve fit of the data shall be constructed in the range from 0.01 g to 0.5 g. The slope of the constructed plot determines the understeer gradient value in the units of degrees of hand-wheel steering angle per g of ground plane lateral acceleration (degrees/g). Using the coordinate system specified in step 8, positive values for understeer gradient are required for values of ground plane lateral acceleration values from 0.10 g to 0.50 g.