

C.1 STATEMENT OF WORK

Except for the Government Furnished Information (GFI) described in C.8, the contractor, as an independent contractor and not as an agent of the Government, shall provide all necessary personnel, facilities, materials, and services to complete the effort described in this statement of work.

C.2 BACKGROUND

The purpose of this Statement of Work (SOW) is to take Tank Automotive Research Development and Engineering Center (TARDEC) supplied tactical wheeled or combat vehicle underbody and floor concepts and transfer them into 3-D Computer Aided Design (CAD) models and level II drawing sets suitable for fabrication. The contractor shall mature the designs and provide analysis of the concepts being provided by TARDEC. Concept analysis and design maturation shall be based upon design and modeling characteristics such as: shock, impulse, energy distribution, accelerative loading, and energy management. The blast impulse parameters will be provided by TARDEC Ground System Survivability (GSS) at the Start of Work Meeting (SOWM) (see C.4.1 below). The modeling analysis shall be performed utilizing software capable of modeling high strain-rate blast events. Based on the analysis provided to the Government by the contractor, the Government will decide which design parameters to modify for subsequent design and analysis iterations.

C.3 TASKS

C.3.1 CAD, Finite Element Analysis (FEA), Modeling & Simulation (M&S):

C.3.1.1 Concept Designs/CAD Models

The contractor shall design one underbody CAD model and one floor CAD model based on concepts (provided by TARDEC at the SOWM) using Pro-E version 5 (computer software format and version that is compatible with that used by the Government) IAW CDRL A006; both models shall be based on readily available and cost efficient materials (with lead times not to exceed two weeks from the time the materials are ordered). The contractor shall design the flooring concept in such a way that it is compatible with the TARDEC GSS Flooring Evaluation Fixture (which has a 3 ft by 3 ft opening and a specified bolt pattern) provided by the Government at the SOWM. The contractor shall design the underbody concept in such a way that it is compatible will with TARDEC GSS Underbody Evaluation Fixture provided by the Government at the SOWM.

The Contractor shall capture each concept in CAD such that they are manufacturable designs to include the following: full system and subsystem or component assembly; mass properties; material specifications; tolerances; dimensions; mass; manufacturing processes and details; fastener details; weld details; and quality assurance checks.

C.3.1.2 Blast Impulse Reduction Analysis

The contractor shall analyze accelerative blast load inputs and outputs of each CAD model concept and conduct FEA and M&S to predict the performance of blast and mobility loading concepts. The outputs shall include predictions of structural performance and change in velocity (i.e. delta-v) at various locations throughout the concept structures in its blast load reduction analysis. The baseline blast parameters the contractor shall use in its analysis will be provided by the Government at the SOWM. The contractor shall provide the blast and mobility loading performance predictions as a result of output from FEA and M&S data to the Government at the Weekly Teleconference (reference para C.4.2, A010, A011). Within two business days, the Government will determine which design parameters the contractor shall modify for subsequent design and analysis iterations for the underbody and the floor CAD models based on the information received during the weekly teleconference or any other ad-hoc meeting. The contractor shall continue its design and analysis iterations, and present its progress and results weekly (IAW para C.4.2) until the Government determines the concepts are ready for the contractor to produce Level II Drawing Sets; the Government COR will make their determination for concept readiness based primarily on blast performance.

C.3.2 Level II Drawing Sets:

The contractor shall produce two Level II Drawing Sets as a result of the developed CAD models developed IAW para C.3.1, after the Government COR provides written approval. The Level II Drawing Sets shall be delivered IAW CDRL A007. The contractor shall indicate any and all manufacturing and assembly process necessary for the fabrication of underbody structures and flooring designs in CDRL A005.

The Developmental Level (Level II Technical Data Package (TDP)) drawings are defined in the Department of Defense Standard Practice Technical Data Packages, MIL-STD-31000, dated 2009.11.05.

C.3.3 Bill of Materials (BOM):

The contractor shall prepare a BOM for each of the two Level II Drawing Sets created under para C.3.2 (underbody and floor concepts) to be utilized for fabrication. The contractor shall include all materials; material properties; cost; tolerances; and welding processes in each BOM IAW CDRL A008. The BOM shall also include procurement (i.e. company name or method) source information for commercial-off-the-shelf (COTS) technologies, detailed attachment specifications (e.g., welding materials, bolt, adhesives); timing requirements to include intermediate milestones, reviews and deliverables; as well as reporting requirements for cost and schedule tracking.

C.3.4 Report Preparation:

C.3.4.1 The Contractor shall prepare Weekly Situation Reports (SITREPs) IAW CDRL A001.

C.3.4.2 The Contractor shall prepare Manufacturing Steps and Process IAW CDRL A005.

C.3.4.3 The Contractor shall prepare 3-D CAD Models IAW CDRL A006.

C.3.4.4 The Contractor shall prepare Modeling and Simulation (M&S) data IAW CDRL A010.

C.3.4.5 The Contractor shall prepare FEA data IAW CDRL A011.

C.3.4.4 The Contractor shall prepare Science & Technical reports IAW CDRL A012.

C.4 MEETINGS

C.4.1 Start of Work Meeting

The Contractor shall conduct a Start of Work Meeting within 10 business days after task order award. The meeting shall be held via teleconference and shall not exceed four hours. The contractor shall coordinate with the COR to schedule the date, time, and attendees. The contractor shall prepare Meeting Minutes within five calendar days of the SOWM IAW CDRL A003.

C.4.2 Weekly Teleconference

The contractor shall conduct a weekly meeting via teleconference or web-conference. A meeting Agenda shall be prepared for each meeting IAW CDRL A004. The purpose of the meetings includes, but is not limited to, discussion of potential design changes, review of the previous weeks F&A results, and discussion to promote design advancement. Minutes of each meeting shall be prepared IAW CDRL A003.

C.4.3 Preliminary Design Review (PDR) (20 percent Concept Design Review) Meeting

The contractor shall plan, coordinate, and conduct a Concept Design Review Meeting, via teleconference or web-conference, within 15 business days after the SOWM. The purpose of this meeting is for contractor to provide its 20 percent completed concept designs for each of the one underbody structure and one flooring concept design developed IAW para C.3.1. At this meeting, the contractor shall present its 3-D model review. The date, time, attendees, and

agenda for this meeting shall be mutually agreed upon by the COR and Contractor no later than five business days prior to the meeting. The contractor shall prepare Presentation Material(s) no later than five days prior to the meeting IAW CDRL A002. Additionally, the contractor shall prepare Meeting Minutes within five calendar days of this meeting IAW CDRL A003.

C.4.4 Complete Design Review (CDR) (80 percent Concept Design Review) Meeting

The contractor shall plan, coordinate, and conduct a Concept Design Review Meeting, via teleconference and web-conference, within 60 business days after the SOWM. The purpose of this meeting is for contractor to provide its 80 percent completed concept designs for each of the one underbody structure and one flooring concept designs developed IAW para C.3.1. At this meeting, the contractor shall present its 3-D model review. The date, time, attendees, and agenda for this meeting shall be mutually agreed upon by the COR and Contractor no later than five business days prior to the meeting. The contractor shall prepare briefing materials no later than five days prior to the meeting IAW CDRL A002. Additionally, the contractor shall prepare Meeting Minutes within five calendar days of this meeting IAW CDRL A003.

C.4.5 Ad Hoc Meeting(s)

The contractor may request a teleconference meeting with the Government technical staff should the need for further information arise. The contractor shall submit all meeting requests through the Government COR and shall include with the request the following: topics for discussion, proposed date and time for the meeting, and estimated length of meeting. The contractor shall prepare Meeting Minutes of any meetings held within five calendar days of the meeting IAW CDRL A003.

C.4.5.1 Progress Report

The Contractor shall notify the FTR immediately by telephone or email if the period of performance dates for design completion or completion of technical data to be delivered will not be met. The Contractor shall follow up with a letter to the FTR no later than five (5) days after the above notification.

C.4.6 Design Review Presentation

The Contractor shall deliver the draft Design Review Presentation no later than five (5) business days prior to the scheduled Concept Review Meeting IAW CDRL A002. The Contractor shall deliver a final Design Review Presentation no later than five (5) business days after the scheduled Concept Review Meeting to include all changes discussed during the meeting.

C.5 DELIVERABLES

C.5.1 The Contractor shall deliver Weekly SITREPs IAW CDRL A001.

C.5.2 The Contractor shall deliver Design Review Presentations IAW CDRL A002.

C.5.3 The Contractor shall deliver Meeting Minute(s) IAW CDRL A003.

C.5.4 The Contractor shall deliver Agenda(s) IAW CDRL A004.

C.5.5 The Contractor shall deliver Manufacturing Steps and Process IAW CDRL A005.

C.5.6 The Contractor shall deliver 3-D CAD Models IAW CDRL A006.

C.5.7 The Contractor shall deliver Level II Drawing Sets IAW CDRL A007

C.5.8 The Contractor shall deliver a BOM for each Level II Drawing Set IAW CDRL A008.

C.5.9 The Contractor shall prepare Fabrication Report(s) IAW CDRL A009.

C.5.10 The Contractor shall deliver M&S and meshed models IAW CDRL A010.

C.5.11 The Contractor shall deliver FEA Reports IAW CDRL A011.

C.5.12 The Contractor shall deliver Science & Technical Reports IAW CDRL A012.

C.6 PERIOD OF PERFORMANCE

The period of performance for the base period of this task order shall be six months from the date of task order award.

The options periods of performance are as follows:

Option 1 - six (6) months after the date of option exercise

Option 2 - two (2) months after the date of option exercise

Option 3 - two (2) months after the date of option exercise

C.7 GOVERNMENT FURNISHED INFORMATION

C.7.1 The Contractor will be provided with concept sketches for each underbody structure and flooring concept, which are government furnished

information (GFI). The contractor shall handle these documents in accordance with the distribution statements and export control warnings contained on each such document.

C.7.2 If the Government provides an existing Level II Drawing Set as GFI, then the contractor shall revise the change record legend whenever the design is modified to annotate any changes it made to the Government provided Level II Drawing Set as a result of work completed under this TO.

C.8 SECURITY

C.8.1 Security Classification Requirement for individuals accomplishing this SOW is UNCLASSIFIED.

C.8.2 All information or data developed under this effort belongs to and is the property of the U.S. Government and shall be marked and handled as For Official Use Only (FOUO).

C.8.3 The Contractor shall not release any information or data to third parties without the prior express written approval of the Contracting Officer.

C.9 UNEXERCIZED OPTIONS

C.9.1 Option 1

C.9.1.1 Tasks

C.9.1.1.1 The Contractor shall develop and provide detailed designs for two additional vehicle underbody concepts and two additional flooring concepts (over and above those provided per C.3.3 above). The additional concepts will be provided by the Government at the time of Option 1 exercise.

C.9.1.1.2 The contractor shall perform the same tasks as required by para C.3.1, C.3.2, C.3.3, and C.3.4; however, these tasks shall pertain to the two additional vehicle underbody concepts and two additional flooring concepts IAW para C.9.3.1.1.

C.9.1.2 Meetings

C.9.1.2.1 The contractor shall plan, coordinate, and conduct the meetings required by C.4; however, these meetings shall pertain to the two additional vehicle underbody concepts and two additional flooring concepts IAW para C.9.3.1.1. All meetings shall occur as of the date of Option 1 exercise.

C.9.1.2.2 Ad Hoc Meeting(s)

The contractor may request a teleconference meeting with the Government technical staff should the need for further information arise. The contractor shall submit all meeting requests through the Government COR and shall include with the request the following: topics for discussion, proposed date and time for the meeting, and estimated length of meeting. The contractor shall prepare Meeting Minutes of any meetings held within five calendar days of the meeting IAW CDRL A003.

C.9.1.2.2.1 Progress Report

The Contractor shall notify the FTR immediately by telephone or email if the period of performance dates for design completion or completion of technical data to be delivered will not be met. The Contractor shall follow up with a letter to the FTR no later than five (5) days after the above notification.

C.9.1.3 Deliverables

C.9.1.3.1 The contractor shall deliver the data as required by C.5; however, this data shall pertain to the two additional vehicle underbody concepts and two additional flooring concepts IAW para C.9.3.1.1.

C.9.2 Option 2

C.9.2.1.1 The Contractor shall fabricate prototypes of the detailed designs for the one vehicle underbody and one flooring sub-system concepts that were designed IAW the base period (paras C.3.1, C.3.3, and C.3.3). Unless otherwise specified by the COR, the contractor shall fabricate the prototypes using A36 Mild Steel with the exception of the underbody hull and structure which shall be fabricated of 5083 Aluminum. The contractor shall fabricate two each of the underbody concept developed and three each of the flooring concept developed under the base period (paras C.3.1, C.3.2, C.3.3) for a total of five assets.

C.9.2.2 Meetings

C.9.2.2.1 Ad Hoc Meeting(s)

The contractor may request a tele-conference meeting with the Government technical staff should the need for further information arise. The contractor shall submit all meeting requests through the Government COR and shall include with the request the following: topics for discussion, proposed date and time for the meeting, and estimated length of meeting. The contractor shall prepare Meeting Minutes of any meetings held within five calendar days of the meeting IAW CDRL A003.

C.9.2.2.1.1 Progress Report

The Contractor shall notify the FTR immediately by telephone or email if the period of performance dates for design completion or completion of technical data to be delivered will not be met. The Contractor shall follow up with a letter to the FTR no later than five (5) days after the above notification.

C.9.2.3 Deliverables

C.9.2.3.1 The Contractor shall deliver a report IAW CDRL A005 which documents any deviations from the drawings and manufacturing/assembly processes developed no later than five business days after fabrication is complete. The report shall discuss why the deviation was needed, identify all part numbers affected by the change, provide new drawings and models, and identify any changes to manufacturing or assembly processes.

C.9.2.3.2 The contractor shall deliver two of each of the three flooring concept assets fabricated IAW para C.9.2.1.2 to Nevada Automotive Test Center in Silver Springs, NV. The contractor shall deliver one of the three flooring concept assets fabricated IAW para C.9.2.1.2 to TARDEC in Warren, MI. All assets shall be shipped FOB Destination.

C.9.2.3.3 The contractor shall deliver all two of the underbody concept assets fabricated IAW para C.9.2.1.2 to Nevada Automotive Test Center in Silver Springs, NV. These assets shall be shipped FOB Destination.

C.9.2.3.4 The Contractor shall deliver Fabrication Report(s) IAW CDRL A009.

C.9.3 Option 3

C.9.3.1 Tasks

C.9.3.1.1 The Contractor shall fabricate prototypes of the detailed designs for the two vehicle underbodies and two flooring sub-system concepts that were designed IAW the Option period 1 (para C.9.1). Unless otherwise specified by the COR, the contractor shall fabricate the prototypes using A36 Mild Steel with the exception of the underbody hull and structure which shall be fabricated of 5083 Aluminum. The contractor shall fabricate two each of the underbody concept developed and three each of the flooring concept developed under the base period (paras C.9.1) for a total of ten assets.

C.9.3.2 Meetings

C.9.3.2.1 Ad Hoc Meeting(s)

The contractor may request a teleconference meeting with the Government technical staff should the need for further information arise. The contractor shall submit all meeting requests through the Government COR and shall include with the request the following: topics for discussion, proposed date and time for the meeting, and estimated length of meeting. The contractor shall prepare Meeting Minutes of any meetings held within five calendar days of the meeting IAW CDRL A003.

C.9.3.2.1.1 Progress Report

The Contractor shall notify the FTR immediately by telephone or email if the period of performance dates for design completion or completion of technical data to be delivered will not be met. The Contractor shall follow up with a letter to the FTR no later than five (5) days after the above notification.

C.9.3.3 Deliverables

C.9.3.3.1 The Contractor shall deliver a report IAW CDRL A005 which documents any deviations from the drawings and manufacturing/assembly processes developed in the no later than five business days after fabrication is complete. The report shall discuss why the deviation was needed, identify all part numbers affected by the change, provide new drawings and models, and identify any changes to manufacturing or assembly processes.

C.9.3.3.2 The contractor shall deliver four of the six flooring concept assets (two of each flooring concept) fabricated IAW para C.9.3.1.1 to Nevada Automotive Test Center in Silver Springs, NV. The contractor shall deliver two of the six flooring concept assets fabricated IAW para C.9.3.1.1 to TARDEC in Warren, MI. These assets shall be shipped FOB Destination.

C.9.3.3.3 The contractor shall deliver all four of the underbody concept assets fabricated IAW para C.9.3.1.1 to Nevada Automotive Test Center in Silver Springs, NV. These assets shall be shipped FOB Destination.

C.9.3.3.4 The Contractor shall deliver Fabrication Report(s) IAW CDRL A009.