



Bull Dog (BD) Technical Demonstration

CONTRACT

DAU-2007-23-C-1111

27 November 20XX

SOLICITATION, OFFER, AND AWARD		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350) DX		RATING PAGE OF	
2. CONTRACT NO. DAU-2007-23-C-1111	3. SOLICITATION NO.	4. TYPE SOLICITATION SEALED BID <input checked="" type="checkbox"/> NEGOTIATED (RFP)	5. DATE ISSUED 27 November 20XX	6. REQUISITION NO.	
7. ISSUED BY USAF Aeronautical Systems Center Wright-Paterson Air Force Base Ohio			8. ADDRESS OFFER TO (If Other Than Item 7)		
NOTE: In Sealed Bid Solicitations "offer" and "offeror" mean "bid" and "bidder"					
SOLICITATION					
9. Sealed offers in original and _____ copies for furnishing supplies or services in the Schedule will be received at the place specified in Item 8, or of hand carried, in the depository located in _____ Buntil _____ local time CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-10. All offers are subject to all terms and conditions contained in this solicitation.					
10. FOR INFO CALL:		A. NAME		B. TELEPHONE NO. (NO COLLECT CALLS)	
11. TABLE OF CONTENTS					
SEC	DESCRIPTION	PAGE(S)	SEC	DESCRIPTION	PAGE(S)
PART I - THE SCHEDULE			PART II - CONTRACT CLAUSES		
A	SOLICITATION/CONTRACT FORM	2	I	CONTRACT CLAUSES	
B	SUPPLIES/SERVICES/COSTS	3		PART III - LIST OF DOCUMENTS, EXHIBITS, OTHER ATTCH	
C	DESCRIPTION /SPECS/SOW	4	J	LIST OF ATTACHMENTS	14
D	PACKAGING AND MARKING	8		PART IV - REPRESENTATIONS AND INSTRUCTIONS	
E	INSPECTION AND ACCEPTANCE	8	K	REPRESENTATIONS, CERTIFICATIONS	
F	DELIVERIES AND PERFORMANCE	8		AND OTHER STATEMENTS OF OFFERORS	N/A
G	CONTRACT ADMINISTRATION	9			
H	SPECIAL CONTRACT REQTS	10			
OFFER (Must be fully completed by offeror)					
NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.					
12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date of receipt of offers specified above, to furnish any or all items upon which prices are offered at the set price opposite each item, delivered at the designated point(s), within the time specified by the schedule.					
13. DISCOUNT FOR PROMPT PAYMENT		10 CALENDAR DAYS %	20 CALENDAR DAYS %	30 CALENDAR DAYS %	CALENDAR DAYS %
14. AMENDMENTS		AMENDMENT NO. _____	DATE _____	AMENDMENT NO. _____	DATE _____
15.A. NAME AND ADDRESS OF OFFEROR		CODE _____ FACILITY _____		16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or Print)	
15.B. TELEPHONE NO	15.C.	17. SIGNATURE		18. OFFER DATE	
AWARD (To be completed by Government)					
19. ACCEPTED AS TO ITEMS NUMBERED See Section B		20. AMOUNT		21. ACCOUNTING AND APPROPRIATION See Section G	
22. AUTHORITY FOR OTHER THAN FULL AND OPEN COMPETITION _____ 10 U.S.C. 2304 (C) () _____ 41 U.S.C. 253 (C) ()				23. SUBMIT INVOICE TO ADDRESS SHOWN IN ITEM (4 copies) See Section H	
24. ADMINISTERED BY (If Other Than Item 7)		25. PAYMENT WILL BE MADE BY			
26. NAME OF CONTRACTING OFFICER (Type)		27. UNITED STATES OF AMERICA (Signature of Contracting Officer)		28. AWARD DATE	

PART I - SECTION B

Supplies or Services and Prices/Costs

<u>Item No.</u>	<u>Supplies/Services</u>	<u>Quantity</u>	<u>Price/Cost</u>
0001	noun: BD type contract: CPFF descriptive data: The contractor shall design, fabricate, test and deliver one prototype BD Unmanned Ground Vehicle (UGV) and integrate this vehicle with both the Joint Command and Control System (JCCS) and the Unmanned Aerial Vehicle (UAV) to form the Joint Reconnaissance and Autonomous Targeting System (JRATS).	1 Job	
			Cost: \$30,000,000
			Fixed Fee: \$3,000,000
			Total Amount: \$33,000,000
0002	noun: Contract Data type contract: CPFF descriptive data: The contractor shall deliver data in accordance with the Contractor Data Requirements List (CDRL) attached to Section J of the contract.	1 Job	<u>Not separately priced</u>

PART I – SECTION C

JOINT RECONNAISSANCE AND AUTONOMOUS TARGETING SYSTEM (JRATS) STATEMENT OF WORK (SOW)

1.0 SCOPE. The objective of the Bull Dog – Unmanned Ground Vehicle (UGV) is to develop a multi-capable system as described in the BD Statement of Work (SOW) and the BD System Specification dated 27 November 20XX(Attachment J-1). This SOW specifies the tasks necessary to accomplish these objectives. You are responsible for both the delivery of the Unmanned Ground Vehicle (UGV) segment of BD and the demonstration of interoperability of the UGV with both the Joint Command and Control System (JCCS) and UAV (UAV) as component systems of JRATS.

2.0 APPLICABLE DOCUMENTS. The Government will accept contractor format in written deliverables and will permit the use of Contractor processes. Although electronic delivery is required, this does not imply that every document must be in electronic format. The use of commercial specifications and standards is encouraged. The following documents are cited, as guidance only, for use on the BD program.

2.1 MILITARY SPECIFICATIONS & STANDARDS

MIL-HDBK-881A (WBS)

2.2 COMMERCIAL STANDARDS

- ANSI/EIA 632, *Processes for Engineering a System*
- IEEE 1220, *Application and Management of the Systems Engineering Process*
- EIA 748 (Earned Value)

3.0 REQUIREMENTS

3.1 VEHICLE DEVELOPMENT. The contractor shall provide all engineering, design, manufacturing, procurement, integration, test, and support efforts for the UGV segment of the BD system. This effort shall produce a UGV that meets the requirements of the BD System Specification, dated 27 November 20XX, that is adequate for use in further development and production of the system should the government choose to continue development via future contracts.

3.1.1 PROTOTYPES. The contractor shall construct one (1) end item prototype vehicle to be delivered for test.

3.1.2 OPERATIONAL PROCEDURES. The contractor shall develop procedures for control of the vehicle through the JCCS. These procedures shall be implemented by the contractor and observed by the Government during verification testing.

3.2 SYSTEMS ENGINEERING.¹ The Contractor shall employ a systems engineering process. The process employed shall include requirements development, logical analysis, design solution, integration, verification, validation, and transition. A program to accomplish systems engineering management shall include processes such as decision analysis, technical planning, technical assessment, requirements management, risk management, configuration management, technical data management and interface management.

3.2.1 REQUIREMENTS DEVELOPMENT. The Government will provide the draft Capability Development Document (CDD) to the Contractor. The Contractor shall participate with the Government in reviews of the CDD and the System Specification to clarify requirements.

3.2.2 LOGICAL ANALYSIS. Based on the BD System Specification, the contractor shall allocate system level requirements and goals to the vehicle and its major subsystems/items below vehicle level.

3.2.3 DESIGN SOLUTION, IMPLEMENTATION AND INTEGRATION/VERIFICATION. The system concept is described in the System Specification included in the contract package. During the course of this contract, the contractor shall develop a detailed UGV design and build and test a prototype UGV that meets the requirements detailed in the System Specification.

3.2.3.1 DESIGN FOR MANUFACTURING. The design for the Joint Unmanned Ground Vehicle (UGV) shall reflect producibility concerns as reflected by the total number of parts and assembly time of the vehicle. A producibility index (PI) will automatically be calculated by the Bull Dog simulation software as part of the design process.

3.2.3.2 DESIGN FOR LOGISTICS SUPPORTABILITY AND DEPLOYABILITY. The UGV will reflect a balanced design that minimizes parts replacement and number of stock items required in the supply system. The UGV design will reflect a balance between requirements for maximizing logistics supportability and minimizing operations and support costs. Logistics supportability is a factor of reliability, maintainability, and sustainability. The Logistics Supportability Index (LSI) will simulate the computer prediction of these characteristics. For a given design, the BD simulation software will automatically predict a single composite value for LSI based on an aggregate of these three factors. Design for supportability will be evaluated by assessment of the predicted value for LSI and demonstration of reliability, maintainability, and sustainability characteristics. In addition, a Deployability Index (DI) will be calculated by the BD simulation software to reflect the ability to deploy the UGV component system.

¹ Technical processes of systems engineering, e.g., design solution, implementation, integration, and verification, and the technical management processes of systems engineering, e.g., decision analysis, requirements analysis, configuration management, data management, and interface management, will be simulated using BD simulation software. Students will design, build and competitively test vehicles and demonstrate interoperability in a virtual environment.

3.2.4 SYSTEMS ENGINEERING TECHNICAL MANAGEMENT.

3.2.4.1 COST AS AN INDEPENDENT VARIABLE (CAIV). As part of systems engineering technical management activities, the Contractor shall estimate target unit procurement and life cycle design to cost (DTC) goals for the UGV. (See Section H, paragraph 6). This design-to-cost program shall be applied to the material costs for the single prototype ground vehicle delivered to the Government under the terms of this contract. (For purposes of this exercise, the BD software includes labor costs in the parts price.)

3.2.4.2 RISK MANAGEMENT/TRADE STUDIES. The Contractor shall implement a risk management program. The risk management program shall include an analysis, identification, and outline of specific areas that need to be the subject of trade studies.

3.3 MANAGEMENT AND TECHNICAL REVIEWS. The Contractor shall prepare for and conduct design reviews IAW SECTION H, paragraph 4 entitled "MANAGEMENT AND TECHNICAL REVIEWS" (CDRL MT-0001).

3.3.1 Combined MANAGEMENT/TECHNICAL REVIEW. The contractor shall prepare a presentation suitable for a formal review containing elements of both a Management and Technical Review in accordance with SECTION H-4 (a) of this contract.

3.3.2 INTEGRATED BASELINE REVIEW (IBR). The contractor shall prepare a presentation suitable for a formal IBR in accordance with Section H-4 (b) of this contract.

3.4 PROGRAM MANAGEMENT. The Contractor shall provide the management effort necessary to ensure the on-schedule completion of the detailed design and construction of the UGV and all reporting requirements. The Contractor shall identify and resolve all problems arising during contract performance that could impact the on-schedule completion of the BD program.

3.4.1 COST ACCOUNTING. Contractor ability to meet the unit procurement cost goal and minimize life cycle cost are best value considerations that will impact any government determination regarding future contracts for BD production.

3.4.2 PROGRAM SCHEDULE. The contractor shall develop a schedule depicting task relationships, order, and duration for all major BD design, development, integration, test, and management activities

3.4.3 PRELIMINARY CONTRACT WORK BREAKDOWN STRUCTURE. The Contractor shall extend the Work Breakdown Structure (Attachment J-3) included in this contract as required to design and develop the BD UGV.

3.4.4 EARNED VALUE MANAGEMENT. The contractor shall establish a performance measurement baseline (PMB), expressed in dollars and hours, necessary to accomplish all requirements.

3.5 SYSTEM TEST AND EVALUATION. The contractor shall implement a test and evaluation program for the BD system, to include the JCCS and airborne support systems, associated subsystems, and the logistics support system. The contractor shall provide all test equipment and be responsible for recording and analyzing all test data. The contractor shall provide personnel to operate and support the ground vehicle during Government Verification Testing.

3.6 SUPPORT SYSTEM. The contractor shall determine support system requirements.

3.7 TRAINING SYSTEM. The contractor shall establish the manpower and training requirements for operation and support of the BD and provide initial training for contractor personnel to support Government Verification Testing.

3.8 QUALITY ASSURANCE. The Contractor shall ensure the quality of all workmanship and services performed under this contract and shall demonstrate the application of reliability and maintainability principles through a process-focused approach to both design and fabrication.

-----Statement of Work Ends-----

PART I - THE SCHEDULE

SECTION D: PACKAGING AND MARKING

Packaging and marking of deliverable items called for hereunder shall be in accordance with Contractors' best commercial practices to ensure safe arrival at destination.

SECTION E: INSPECTION AND ACCEPTANCE

The place of final inspection and acceptance for all CLINS cited hereunder shall be at the DAU classroom.

APPLICABLE CLAUSES

FAR 52.246-8 Inspection of Research and Development Cost Reimbursement (Apr 1984)

SECTION F: DELIVERIES OR PERFORMANCE

(1) DELIVERIES OR PERFORMANCE

All supplies to be furnished hereunder shall be delivered free of expense to the Government in accordance with instructions specified in the clause hereof entitled "F.O.B. DESTINATION."

ITEM 0001

The Contractor shall deliver the vehicle fully outfitted in accordance with H-5 entitled "DELIVERY OF COMPLETED VEHICLE." The vehicle shall be delivered to the Government for verification and testing during Exercise 4.

ITEM 0002

Data - The Contractor shall deliver Data in accordance with the Contract Data Requirements List (CDRL), DD Form 1423.

(2) PERIOD OF PERFORMANCE

The contractor shall accomplish the work called for in Section B above during the period November 04 – September 20XX

SECTION G: CONTRACT ADMINISTRATION DATA

The Contract Administration Office is the office specified in Block 24 of Section A of the contract, Standard Form 33. The program office representative is as specified in Block 10 of the contract, Standard Form 33.

In the event that the Contractor's address is different from that shown on the Solicitation (Standard Form 33), enter below the address (street and number, city, county, state, and zip code) to which payment should be mailed by the Government under the contract:

SECTION H: SPECIAL CONTRACT REQUIREMENTS

The following are the Special Contract Requirements of this contract:

- H-1 Definitions
- H-2 Government Furnished Equipment
- H-3 Milestones
- H-4 Management and Technical Reviews
- H-5 Delivery of Completed Vehicle
- H-6 Contract Costs
- H-7 Contract Funding
- H-8 Rights in Data
- H-9 Notification of Changes

H-1 DEFINITIONS

As used throughout the contract, the following terms have meanings set forth below:

(a) **GOVERNMENT**: Instructors assigned to the Defense Acquisition University for the purpose of conducting instruction in the Systems Engineering Course (SYS-203).

(b) **SPECIFICATION**: The document that describes the functional and performance characteristics of a product or service procured by and for the government. The System Performance Specification for BD dated 27 November 20XX is included as Attachment J-1 of this contract.

H-2 GOVERNMENT FURNISHED EQUIPMENT (GFE)

The Government will provide BD software to simulate the design, testing and interoperability tasks to be demonstrate by the contractor.

H-3 MILESTONES

- (a) The contractor shall complete the following required contract milestones.

MILESTONES

Timing

Management/Technical Review	Monday
Verification (Contractor vs Software)	Wednesday
Oral Proposal Presentation and Evaluation	Friday
Validation (Contractor vs Contractor)	Friday

(b) Verification that the system meets system specification requirements will be conducted on Wednesday.

(c) Government verification testing is described in the System Specification at Section J-1, paragraph 4.4 of this document.

(d) Failure on the part of the Contractor to deliver a prototype vehicle that meets system requirements may preclude the contractor from further consideration for follow-on contracts related to the BD program.

H-4 MANAGEMENT & TECHNICAL REVIEW

(a) **COMBINED MANAGEMENT AND TECHNICAL REVIEW:** One management/technical review will be held during the period of performance of this contract and shall incorporate aspects of both a Management Review and a System Functional Review (SFR). The following areas shall be reviewed with each contractor:

(1) Top-level schedule depicting task relationships, order, and duration for UGV development and BD integration activities.

(2) Vehicle design. Design decisions and recommendations will be based upon Contractor analyses and use of the BD software. Producibility, Logistics Supportability, and Deployability Indices shall also be presented as described in Section J-1

(3) Requirements Development, i.e., comparison and analysis of the requirements contained in the draft CDD and System Specification.

(4) Cost-As-An Independent Variable (CAIV), i.e., the degree to which the system design meets government targets for unit procurement and life cycle costs as stated in Section H-6.

(5) Supporting rationale for the software development strategy and designation of software subcontractor.

(6) Risk Assessment to include technical, supportability, and software development risk factors.

(7) Planning for systems engineering

(8) Hard copies of each contractor presentation will be provided to the Government prior to the formal review.

(b) INTEGRATED BASELINE REVIEW (IBR). [Details not provided – IBR not played as part of this exercise.]

H-5 DELIVERY OF COMPLETED VEHICLE

The government will consider the completed vehicle to have been delivered when all Contractor and Government tests/inspections and management reviews have been successfully conducted.

H-6 CONTRACT COSTS

Cost as an Independent Variable will be implemented through trade studies to minimize both procurement and life cycle costs. The Life Cycle Cost threshold for the BD UGV shall be **\$3190M**. Wear out/overhaul data and expected usage data are incorporated in the BD software and are calculated as part of the design process.

H-7 CONTRACT FUNDING

It is expected that the contract requirement will be funded during the fiscal year in which the work is to be performed in accordance with the "Limitation of Cost" clause.

H-8 RIGHTS IN DATA

The government's right to use, release, or disclose all technical data, including software, shall be unrestricted and unlimited. The contractor must disclose any exceptions to these rights.

H-9 NOTIFICATION OF CHANGES

The Contracting Officer's Representative (COR) is the lead instructor assigned to this SYS 203 course. The COR is authorized to provide technical and minor administrative judgments regarding the work to be performed under this contract. The COR is not authorized to make any change in the substantive terms and conditions of this contract.

PART III - LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

SECTION J: LIST OF ATTACHMENTS

The attachments forming a part of this contract are as follows:

ATTACHMENT NUMBER

J-1 System Specification for BD Unmanned Ground Vehicle, 27 November 20XX.

J-2 UGV Contract Data Requirements List (CDRL), 27 November 20XX.

J-3 Work Breakdown Structure (WBS), 27 November 20XX.

J-4 Draft Section M criteria for Post MS B R&D RFP

27 November 20XX

ATTACHMENT J-1

SYSTEM PERFORMANCE SPECIFICATION

For The

**Bull Dog
Unmanned Ground Vehicle (UGV)**

**** NOTE:** The Bull Dog UGV pre-Milestone B technology demonstration contract focuses on the use of mature technology and competitive prototyping to manage program risks.

SECTION 1 - SCOPE

1.1. Identification. This specification establishes the operational and interface requirements for the Unmanned Ground Vehicle (UGV) of the Joint Reconnaissance and Autonomous Targeting System (JRATS).

1.2 System Overview. BD will be used in a variety of critical, high-risk warfighting situations requiring an integrated suite of unmanned air and ground vehicles across the spectrum of conflict. The UGV and the UAV components of BD will also be capable of independent operation. BD will be integral to the successful completion of reconnaissance, surveillance, and target acquisition (RSTA); mine detection; vehicle recovery; maneuver; and indirect and direct fire missions with reduced casualties; also conforms to specific statutory requirements for unmanned ground and air combat vehicles. The UGV will be capable of destroying fixed and mobile targets and be capable of line-of-sight (LOS) remote control from the Joint Command and Control System (JCCS) and non-LOS (NLOS) control via relay using the UAV.

SECTION 2 - APPLICABLE DOCUMENTS

(deleted for academic brevity)

SECTION 3 - REQUIREMENTS

3.1 Functional and Performance Requirements

3.1.1 Missions. Missions include: intelligence; RSTA; mine detection; direct and indirect fire support; attack of moving targets; reduction of bunkers and other strong point defenses; and communication of target locations to indirect fire and command and control systems such as the Advanced Field Artillery Tactical Data System (AFATDS), Joint Surveillance Target Attack Radar System (JSTARS) and the Army Tactical Missile System (ATACMS). These missions will be performed predominately in areas too hazardous to send humans or manned vehicles. BD will facilitate the remote performance of high value, high risk missions through the integrated use of the Joint Command and Control System (JCCS), the UGV, and UAV in combination, or singly, with greatly reduced casualties. The UGV shall also be capable of operations by LOS remote control without the UAV.

3.1.2 Threat. Specific threats to UGV include electronic warfare, obscurants and directed energy weapons. While conducting unmanned vehicle operations, UGV will be subject to the same threats as any host vehicles, including antitank and antipersonnel mines used in complex obstacles; surface, buried, and scatterable minefields; over-watching enemy direct and indirect fire systems; side-attack mines; and wide area munitions. UGV will be capable of operating in Biological/Chemical (BC) contaminated environments.

3.1.3 Required States and Modes.

3.1.3.1 Operational State. This state refers to the UGV immediately prior to, or while performing, any of the operational modes described below.

3.1.3.1.1 Offensive / Defensive Firepower Refers to the mode during which the vehicle is conducting offensive operations against a fixed or mobile land target. UGV shall close with the target under remote control, firing one or more weapons, to neutralize the target. Time to engage maneuverability and weapons accuracy are important to this mode. This is a secondary mission.

3.1.3.1.2 Reconnaissance Mode. Refers to the mode during which the vehicle is navigating terrain in search of targets/intelligence in conjunction with airborne weapons support. A targeting laser shall be capable of allowing an airborne weapon to strike the enemy. Onboard sensors shall be capable of detecting the presence of mines. Positive vehicle control in restricted space and time to finish the mission are important to this mode. This is a primary mission.

3.1.4 Entity Capability Requirements (see also paragraph 4.4, Special Tests).

3.1.4.1 Offensive / Defensive Firepower. The UGV shall be capable of neutralizing enemy targets. The operator shall direct the UGV into a position where a weapon can be directed at the target. The weapon may be from an airborne platform.

3.1.4.1.1 Target Attack/Weapons. The UGV shall be capable of carrying a variety of armaments targeting laser, 7.62 mm machine guns, and anti-armor missiles/ rockets. Quickly closing and targeting the enemy to avoid counter fire is a primary consideration.

3.1.4.1.2 Probability of Kill (Pk) (Lethality). The UGV shall be capable of carrying and autonomously targeting and/or launching one or more weapons with a probability of kill of 0.75 (threshold), 0.90 (objective). [KPP]

3.1.4.1.3 Control. The UGV shall be capable of conducting operations by either remote control using line-of-sight (LOS) or non-LOS (NLOS) communications. JCCS relay for long-range operation shall be accomplished through data link on an UAV.

3.1.4.1.4 Speed. Speed and ease of operation are closely intertwined. The UGV shall be capable of moving at a minimum speed of 15 kilometers per hour (kph) (threshold), 40 kph (objective).

3.1.4.1.5 Range. The UGV shall be capable of operations at ranges of not less than 10 kilometers (threshold), 30 kilometers (objective). [KPP]

3.1.4.1.6 Terrain. The UGV shall be capable of operating across grass, dirt and loose sand and climb inclines up to 15 degrees (threshold), 30 degrees (objective). The vehicle shall be capable of maneuvering over small obstacles and around large obstacles while conducting any mission [KPP].

3.1.4.1.7 IFF Accuracy. The UGV shall be capable of identifying friendly targets with an accuracy of .90 (threshold), .99 (objective). [KPP]

3.1.4.1.8 Chemical / Biological Detection. The UGV shall be capable of detecting chemicals with an accuracy of .80 (Threshold) and .95 (Objective) ; and Biological agents .90 (Threshold) and .98 (Objective) [KPP]

3.1.4.1.9 Automatic fire override. Should the IFF system detect a friendly target, the UGV shall automatically override any firing command, stop, and provide a message to the JCCS.

3.1.4.2 Reconnaissance Mode. The UGV shall be capable of traveling through a restricted course and going over and around obstacles and locating and avoiding mines.

3.1.4.2.1 Mine Detection. The UGV shall be capable of locating buried land mines. The system shall be capable of warning the operator of a buried mine so that the system can avoid the mine.

3.1.5 Deployability. The UGV shall be designed to be easily transported and deployed. The contractor will be evaluated on the predicted deployment footprint of the total UGV component system. The Deployability Index (DI) is defined as including three vehicles plus associated support and test equipment and will automatically be calculated by the BD simulation software for each vehicle design. The lower the Index the better. [Note: The “Deployability Index” is not an actual in-use index – it is an academic tool to illustrate logistics and deployability concerns.]

3.1.6 Operational Availability/Readiness. There are no requirements for this phase of development.

3.1.7 Environmental Conditions. Government verification testing shall be conducted to determine potential operational effectiveness and suitability in accordance with the requirements of the draft CDD for each candidate system. All environmental conditions shall be "as is" on the day of verification testing. Verification testing shall be as directed by government representatives (i.e., instructors).

3.1.8 Transportability. The UGV shall be capable of shipment, in assembled or unassembled states, to any area of the world via airlift or sealift.

3.1.9 Electromagnetic Radiation. No requirements.

3.1.10 Producibility. A judgment will be made as to vehicle producibility based upon the total number of parts and the total number of part types. A Producibility Index (PI) will automatically be calculated by the BD simulation software for each vehicle design. The lower the Index the better. [Note: The “Producibility Index” is not an actual in-use index – it is an academic tool to illustrate producibility concerns.]

3.1.11 System Safety. The UGV system must remain under positive control at all times. A manual system abort that stops all programmed operations shall be required.

3.1.12 Human Factors Engineering. No functions associated with the functional requirements established in 3.1 shall be allocated to personnel with the exception of remote control operations.

3.1.13 Security and Privacy. There are no classification requirements associated with contract. Protection of proprietary or contractor sensitive data is the sole responsibility of the contractor.

3.1.14 Computer Resource Requirements. Laptops and BD simulation software will be provided to each Contractor to accomplish design, development, and test and evaluation required under this contract. (**You are not to alter the settings or execute new scenarios without instructor approval.**)

3.1.15 Logistics.

3.1.15.1 Logistics Supportability. An assessment of the logistic supportability of the vehicle will be made using the number of type parts and weight and be expressed as an overall Logistics Supportability Index (LSI). An LSI will automatically be calculated for each vehicle design by the BD simulation software. The lower the Index the better. [**Note:** The “Logistics Supportability Index” is not an actual in-use index – it is an academic tool to illustrate logistics supportability concerns.]

3.1.15.2 Operational Availability (Ao). The UGV Ao shall not be less than 93% with a desired Ao of being 98%. Ao is defined as $MTBF / (MTBF + MTTR + MLDT)$ (KPP)

3.1.15.3 System Disposal. UGV system disposal costs shall be calculated as part of the Life Cycle Cost estimate. System disposal shall be calculated by summing the individual part disposal cost of all parts used over the life cycle of the vehicle.

3.1.16 Personnel and Training.

3.1.16.1 Personnel. Contractor personnel participating in any test described in 4.4 shall be limited to persons directly assigned to that team.

3.1.16.2. Training. Contractors shall provide for the training needed by their own teams in order to demonstrate the capabilities of their designs as required in “Section 4, VERIFICATION.”

3.1.17 Requirements Traceability. System requirements must be traceable to operational and other requirements, where identified by the government.

3.2 Interface Requirements

3.2.1 Government Furnished Equipment (GFE) Interfaces. The UGV must be interoperable with the Joint Command and Control System (JCCS) and the UAV/C-130. The government will provide this equipment for test and demonstration. The government will also provide interface information. An open systems architecture shall be used for all interfaces to the maximum extent possible.

3.2.2 External Interface Requirements.

3.2.2.1 Joint Command and Control System. Remote control for the interoperability demonstration shall be accomplished through the JCCS. The JCCS and all test scenarios will be simulated using BD simulation software and a laptop PC with joystick.

3.2.2.2 UAV. The UAV will provide a color television picture of the battlefield. The UAV/C-130 also contains an IR transmitter/receiver for sending commands to the UGV and receiving messages from the UGV.

3.3 Design and Construction

3.3.1 Drawings. Not Applicable

3.3.2 Software Design. System software shall be developed by modifying “reuse software” to be provided by the government.

3.3.3 Workmanship. The UGV prototype to be delivered to the government is a demonstration model to be used to evaluate feasibility of concepts. It is not intended for long duration employment under field conditions. As such, quality of workmanship is required only to extent necessary to fabricate an item that can perform the requirements established in 3.1 for the duration of the verification tests.

3.3.4 Design Approach. While maximum use of contractor innovation and creativity is encouraged, the contractor shall design the UGV to perform the missions as described within this contract.

SECTION 4 - VERIFICATION

4.1 Methods of Verification. Methods utilized to accomplish verification include:

4.1 Verification Methods.

Requirements verification will be accomplished through the use of demonstration, inspection, analysis, and test. The verification methods are defined below.

4.1.1 Demonstration.

Demonstration is the performance of operations at the system/sub-system level where visual observations are the primary means of verification. Demonstration is used when quantitative assurance is not required for verification of the requirements.

4.1.2 Inspection / Examination.

Visual inspection of equipment and evaluation of drawings and other pertinent design data and processes will be used to verify conformance with characteristics such as physical, material, part and product marking and workmanship.

4.1.3 Analysis.

Analysis is the use of recognized analytical techniques (including computer models) to interpret or explain the behavior/performance of the system element. Analysis of test data or review and analysis of design data will be used as appropriate to verify requirements.

4.1.4 Test.

Test is an activity designed to provide data on functional features and equipment operation in an operational environment under fully controlled and traceable conditions. The data is subsequently used to evaluate quantitative characteristics. Evaluation includes comparison of the demonstrated characteristics with requirements. Tests are conducted when an acceptable level of confidence cannot be established by other methods, or if testing can be shown to be the most cost-effective method.

4.2 Design Verification. Contractors shall recommend to the government the methods to be employed and those methods, once approved, shall be incorporated into the final system specification as a part of the system functional baseline documentation.

4.3 Inspections. The government will approach testing of the UGV primarily as a series of contractor-operated tests during which the major functional requirements established in paragraph 3.1.4 will be verified. The government will provide the test environment to measure the performance capabilities of the UGV at a government test facility and will officiate during verification tests. The government will be the sole arbiter regarding the extent to which the UGVs meet, or fail to meet, requirements.

4.4 Special Tests.

4.4.1 Formal Tests. The performance requirements and other system characteristics of Section 3 shall be verified by demonstration and testing. Contractor personnel shall operate all UGV/JRATS components during developmental tests and the government conducted runoff as specified by the government representative.

4.4.2 BD Seek and Destroy Test. Each contractor will be required to develop a test plan with an 80% confidence rate. Runs will be made against an active enemy target that will return fire under certain conditions. *Desired performance:* Successfully destroy the target on at least 75% of the runs and achieve an average health of 75% or better over the all runs in which the target is destroyed.

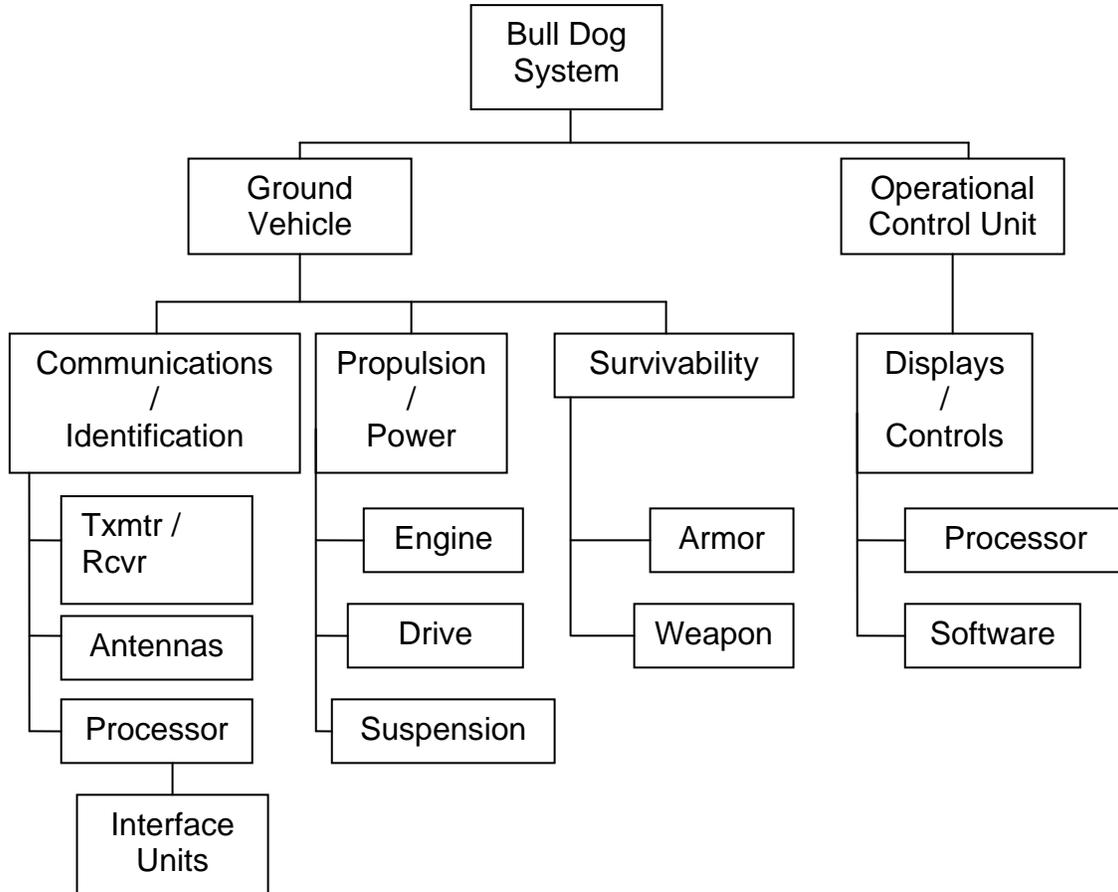
ATTACHMENT J-2: BD CONTRACT DATA REQUIREMENTS LIST (CDRL)

CONTRACT DATA REQUIREMENTS LIST <i>(1Data Items)</i>				<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
A. CONTRACT LINE ITEM NO. 0002		B. EXHIBIT	C. CATEGORY TDP _____ TM- _____ OTHER <u> X </u>		
D. SYSTEM/ITEM JRATS		E. CONTRACT/PR NO. DAU-2007-23-C-1111		F. CONTRACTOR	
1. DATA ITEM NO. MT-0001	2. TITLE OF DATA ITEM Combined Management and Technical Review Presentation		3. SUBTITLE Design/Progress Reviews		
4. AUTHORITY (Data Acquisition Doc No.)		5. CONTRACT REFERENCE SOW para 3.3		6. REQUIRING OFFICE	
7. DD 250 REQ	9. DIST STATEMENT REQD	10. FREQUENCY 1 time	12. DATE OF 1st SUBMISSION	14. DISTRIBUTION	
8. APP CODE		11. AS OF DATE	13. DATE SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES DRAFT FINAL
16. REMARKS a. UGV Requirements Analysis to include supportability analysis b. Risk Assessment (includes technical, supportability, and software risk factors) c. Top-level schedule. d. Selection of UGV candidate with rationale e. Top-level software acquisition strategy f. Selection of BD Gen III software subcontractor with rationale					
				Gov't Rep	1 1
				Gov't Rep	1 1
				15. TOTAL	2 2
PowerPoint Presentation					

ATTACHMENT J-3: BD WORK BREAKDOWN STRUCTURE

The Program work breakdown structure (PWBS) is provided below. Contractors are encouraged to tailor this WBS for their needs, but any changes to the WBS must be coordinated with the government technical representative.

The following WBS is provided to Level 3.



Samples of WBS Dictionary:

WORK BREAKDOWN DICTIONARY			
WBS LEVEL 2		CONTRACT NUMBER DAU-2007-23-C-1111	
WBS Element 1100		WBS Title JRATS System	CONTRACT LINE ITEM: 0001, 0002
Date	Revision	Revision Auth	
Spec. Number MTS-1294		Spec. Title System Specification, JRATS	
ELEMENT TASK DESCRIPTION The complete development and delivery of the entire JRATS System. This includes all prototype and end item system design, modification, manufacturing, fabrication, procurement, integration, and subsystem development testing. This also includes the necessary management, data, training, support, equipment, software, plus test and evaluation of the completed system.		COST DESCRIPTION Costs accumulated against this element include all costs required to design, develop, fabricate, and test the JRATS system. This element also includes costs for necessary management, data, training and software.	

WORK BREAKDOWN DICTIONARY			
WBS LEVEL 3		CONTRACT NUMBER DAU-2007-23-C-1111	
WBS Element 1110		WBS Title JUGV	CONTRACT LINE ITEM: 0001
Date	Revision	Revision Auth	
Spec. Number MTS-1294		Spec. Title System Specification, JRATS	
ELEMENT TASK DESCRIPTION This element includes all materials and labor required for development, fabrication, and assembly of the primary vehicle. Includes integration of the vehicle's subsystems.		COST DESCRIPTION This element includes all costs for materials and labor required for development, fabrication, and assembly of the primary vehicle. Also includes costs associated with integration of the vehicle's subsystems.	

**ATTACHMENT J-4: Draft Post MS B R&D RFP
(Section M only)**

**DRAFT
Post-Milestone (MS) B Research &
Development (R&D) RFP
Section M**

DRAFT Section M

M.1 Introduction.

The Government will award a contract to the offeror whose proposal offers the best value to the Government as determined by the Section M evaluation criteria. This document contains the evaluation factors and standards that will be used by the Source Selection Authority (SSA) to make the final award decision. The Government intends to award only one contract for the BD post-MS B R&D effort, but reserves the right to award more than one contract. Proposals that are unrealistic in terms of performance or management commitments, or unrealistically high or low in cost, will be deemed high risk and indicative of the offeror's failure to comprehend the contract requirements. Unless otherwise noted, performance evaluations will be based on the "as tested" units from the run-off.

M.2 Evaluation Factors.

a. Evaluation Factors and Subfactors and their Relative Order of Importance.

Award will be made to the offeror proposing the combination most advantageous to the Government based upon an integrated assessment of the evaluation factors and subfactors described below. The evaluation factors are listed in descending order of importance; however, factors 3 and 4 are of equal importance. Within the Performance, Producibility-Logistics Supportability-Deployability, and Cost factors, the subfactors are listed in descending order of importance. Within the Risk factor, the subfactors are of equal importance.

Factor 1: Performance :

Subfactor 1: Reconnaissance Mode

- Mine Avoidance (survive mine field)
- Laser targeting for airborne weapon delivery (destroy target)

Factor 2: Logistics Supportability

Subfactor 1: Operational Availability (Ao) at 90 percent or greater

Factor 3: Test and Evaluation Plan

Subfactor 1: Test confidence level of 80 percent or greater

Subfactor 2: Test focus on prioritized requirement

Factor 4: Risk (Planning Minimizes Risk)

Subfactor 1: Integration Planning for Immature technology

2: Disposal Plan

Factor 5: Cost

Subfactor 1: UGV Life Cycle Cost

Factor 6: Design Process

Subfactor 1: Requirements Determination

Subfactor 2: Traceability of Requirements

Subfactor 3: Technical Performance Metrics

b. Factor and Subfactor Rating.

(1) Ratings will be determined in accordance with paragraphs M.2.1 – M2.5. A color rating will be assigned to each subfactor as well as an overall color rating for each factor. The color rating depicts how well the offeror's proposal meets the requirements in accordance with the stated explanation and focuses on the proposal strengths and inadequacies. The offeror may submit mitigation data related to the runoff results, e.g., developmental test results, for consideration by the government in the evaluation of performance.

(2) Proposal risk, a subfactor of risk, represents the risks identified with an offeror's proposed approach as it relates to Performance, Logistics Supportability, Design Process, Test and Evaluation, and Cost.

(3) Performance ratings will be considered in the order of importance listed. Any of these considerations can influence the SSA's decision.

c. Importance of Cost.

In accordance with FAR 15.304(e) the evaluation factors other than cost or price, when combined, are significantly more important than cost or price.

M.2.1 FACTOR 1: PERFORMANCE. Performance subfactors are listed in descending order of importance. The results of the test run-off and contractor mitigation will be used to evaluate these subfactors. The results of the test run-off will be rolled-up into one color rating at the Performance Factor level.

Note: The government reserves the right to increase the color rating of individual performance subfactors by up to one level (i.e., Red to Yellow, Yellow to Green, or Green to Blue) based on the mitigation information presented.

[**Student Administrative Note:** the detailed criteria below are based upon objectives and thresholds in the System Specification.]

FACTOR STANDARD: Based upon performance requirements in UGV system specification.

Blue Rating: Performance of UGV meets objective requirements

Green Rating: Performance of UGV meets threshold but not objective requirements

Yellow Rating: Performance of UGV fails to meet threshold requirements

Red Rating: Performance of UGV significantly fails to meet threshold requirements

a. Subfactor 2. Reconnaissance Test

STANDARD: Based on the Battle Royale competition.

Student Note : Based on the mine and interoperability scenario scopes
--

Blue rating: successfully destroys all competition with no losses.

Green rating: Successful win – loss record of 50 percent or better.

Yellow rating: Win – loss record less than 50 percent.

Red rating: No wins

M.2.2 FACTOR 2: UGV LOGISTICS SUPPORTABILITY. For academic purposes student brief-out (Lesson 9) will be used to represent the offeror’s proposal. The results will be rolled-up into one color rating at the Factor level.

FACTOR STANDARD: Based upon Logistics Supportability, requirements in UGV system specification.

Blue Rating: Performance of UGV meets objective requirements

Green Rating: Performance of UGV meets threshold but not objective requirements

Yellow Rating: Performance of UGV fails to meet threshold requirements

Red Rating: Performance of UGV significantly fails to meet threshold requirements

M.2.3 FACTOR 3: TEST AND EVALUATION PLAN. The evaluation of this factor will assess the merits, credibility and completeness of the students test and evaluation approach. In particular, this includes evaluation of testing of the prioritized performance requirements (they are to be identified). Also, identify how you accomplished an 80 percent “confidence level” in all competed testing (Identify successful –vs- unsuccessful runs).

a. Subfactor 1. Test Confidence: Offeror test confidence rate shall be 80 percent.

Blue rating: Test “confidence” rate exceeds 80 percent for all tests.

Green rating: Test “confidence” rate exceeds 80 percent for the critical performance test areas.

Yellow rating: Test “confidence” rate is greater than 50 percent but does not reach 80 percent for the critical performance test areas.

Red rating: Test “confidence” rate is less than 50 percent

b. Subfactor 2. Identifying Prioritized Performance Requirements

M.2.4 FACTOR 4: RISK. Risk will be evaluated at the subfactor level and rolled up to the factor level. The risk will be based upon adequate planning for the integration of immature technology and disposing of the UGV products during and after it's service life.

a. Subfactor 1. Integration of Immature Technology.

b. Subfactor 2. Disposal Risk

STANDARD: The briefed plan for integrating immature technology and disposal will be evaluated on the potential for disruption of schedule, increased cost, performance problems. The number and severity of potential problems and the brief ability to effectively identify and recommended actions to abate risks will be considered when assessing the risk.

Low: Has little potential to cause disruption of schedule, increased cost, or degradation of performance. Normal offeror effort and normal Government monitoring will probably be able to overcome difficulties.

Medium: Can potentially cause some disruption of schedule, increased cost, or degradation of performance. Special offeror emphasis and close Government monitoring will probably be able to overcome difficulties

High: Can potentially cause severe disruption of schedule, increased cost, or degradation of performance. Special offeror emphasis and close Government monitoring may not be able to overcome difficulties

M.2.5 FACTOR 5: COST. The Government will independently evaluate each offeror's proposed costs to determine **best value for the government**, that is, whether the estimated proposed costs are realistic for the work to be performed, reflect a clear understanding of the requirements, and are consistent with the unique methods of performance and materials described in the offeror's technical proposal. Cost/price subfactors are listed in descending order of importance.

a. Subfactor 1. UGV Life Cycle Cost (LCC). The purpose of this subfactor is to insure offerors consider the total cost of ownership for the UGV. The LCC of the tested UGV will be briefed in the final proposal oral presentation. Low UGV LCC cost will be evaluated favorably by the government.

M.2.6 FACTOR 6: DESIGN PROCESS. The evaluation of this factor will assess the merits, credibility, and completeness of the student's Design Process steps. In particular, this includes requirements determination, requirements traceability, and technical performance measures in support of risk mitigation and all major decision points

- a. Subfactor 1. Requirements Determination
- b. Subfactor 2. Requirements Traceability
- c. Subfactor 3. Technical Performance Metrics

STANDARD: The design process will be evaluated on the application of process steps and requirements traceability to the desired war fighter capabilities to support government decision points.

Blue rating: Adequate time is allocated for the overall schedule and for particular test events/sequences; test events are properly sequenced; test events are placed in the appropriate phase/effort of the life cycle to support the next decision point.

Green rating: Adequate time is allocated for the overall schedule but particular test events/sequences may not have been allocated sufficient time; test events are properly sequenced; test events are placed in the appropriate phase/effort of the life cycle to support the next decision point.

Yellow rating: Marginally adequate time is allocated for the overall schedule but particular test events/sequences may not have been allocated sufficient time OR one or more test events are improperly sequenced OR one or more test events are not placed in the appropriate phase/effort of the life cycle to support the next decision point.

Red rating: Insufficient time is allocated for the overall schedule or to particular test events/sequences AND test events are improperly sequenced AND test events are not properly placed in the life cycle to support the next decision point.