

## **USMC-SPONSORED GBAD CAPABILITY DEMONSTRATION (USGCD) STATEMENT OF WORK (SOW)**

1.0 SCOPE. The objective of the United States Marine Corps (USMC) Ground Based Air Defense (GBAD) Capability Demonstration (USGCD) is to collect data on the demonstrated capability of short range, ground based air defense systems as described in this Statement of Work (SOW) and the USGCD Performance Specification. This capability is to be demonstrated at a government specified exercise. This SOW specifies the tasks necessary to accomplish these objectives. The Contractor is responsible for the transportation of a contractor-owned USGCD system, the demonstration of interoperability of the USGCD with both the Black Dart and Control System (BDCS) and a tactical launch platform, and the successful intercept of a representative threat UAS.

2.0 APPLICABLE DOCUMENTS. The Government will accept contractor formatted 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 USGCD effort.

### 2.1 MILITARY SPECIFICATIONS & STANDARDS

MIL-HDBK-881B

### 2.2 COMMERCIAL STANDARDS

- ANSI/EIA 632, *Processes for Engineering a System*
- IEEE 1220, *Application and Management of the Systems Engineering*

## 3.0 REQUIREMENTS

3.1 SYSTEM DEVELOPMENT. The contractor shall provide all engineering, design, manufacturing, procurement, integration, test, and support efforts for the USGCD, prior to start of the demonstration. This effort shall provide a contractor-owned USGCD system that meets the requirements of the USGCD Performance Specification and is safe and adequate for live fire during the demonstration.

3.1.1 PROTOTYPES. The contractor shall provide at least one (1) contractor-owned end item prototype system to be delivered for demonstration.

3.1.2 OPERATIONAL PROCEDURES. The contractor shall develop procedures for the safe control and launch of the system at the USGCD. These procedures shall include all efforts necessary to implement and execute the negation effort. For example, for a missile system, these procedures shall include loading and unloading procedures and instructions. Where applicable, procedures may require execution by Government representatives. An example of Government execution would

be loading and unloading of live ordnance. These procedures shall be implemented by the contractor and observed by the Government during the demonstration.

3.2 SYSTEMS ENGINEERING. The Contractor shall employ a systems engineering process. The process employed shall include technical and technical management processes, as appropriate.

3.2.1 DESIGN SOLUTION, IMPLEMENTATION AND INTEGRATION/VERIFICATION. During the course of this contract, the contractor shall develop a detailed USGCD design and build a contractor-owned prototype USGCD that meets the requirements detailed in the Performance Specification.

3.2.2 SYSTEMS ENGINEERING TECHICAL MANAGEMENT.

3.2.2.1 COST AS AN INDEPENDENT VARIABLE (CAIV). As part of systems engineering technical management activities, the Contractor shall estimate target unit procurement cost for a production USGCD.

3.2.2.2 RISK MANAGEMENT. The Contractor shall implement a risk management program. The risk management program shall include an analysis, identification, and outline of specific areas of risk and associated mitigation strategies.

3.3 MANAGEMENT AND TECHNICAL REVIEWS. The Contractor shall prepare for and conduct design reviews In Accordance With (IAW) internal processes.

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 Order To (IOT) ensure system and personnel readiness to participate in BD 2011. This review shall include an assessment of system safety, and shall be conducted with government representatives in attendance.

3.3.2 IN PROGRESS REVIEW (IPR). The contractor shall prepare a presentation suitable for a formal IPR Not Later Than (NLT) February 2011. The IPR shall be conducted at the Contractor's facility.

3.4 PROGRAM MANAGEMENT. The Contractor shall provide the management effort necessary to ensure the on-schedule completion of the design and construction of the contractor-owned USGCD system 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 USGCD effort.

3.4.1 PROGRAM SCHEDULE. The contractor shall develop a schedule depicting task relationships, order, and duration for USGCD development, integration, and management activities. The period of performance for this effort is date of contract award to 30 September 2011.

3.5 SYSTEM DEMONSTRATION AND EVALUATION. The contractor shall implement a demonstration and evaluation strategy for the contractor-owned USGCD system that complies with all policies, rules, and regulations associated with the demonstration. The contractor is responsible for attendance at all government directed USGCD planning conferences and any/all additional coordination with demonstration organizers. The contractor shall provide all equipment and be responsible for recording and analyzing all data. The contractor shall provide personnel to operate and support the USGCD system during the demonstration. Additionally, the contractor shall provide for adequate work space (i.e., tables, chairs, tent/trailer, etc...) for contractor personnel and up to five government representatives on site at the demonstration.

3.5.1 INITIAL PLANNING CONFERENCE (IPC). The Contractor shall attend the IPC, currently scheduled for December 2010.

3.5.2 FINAL PLANNING CONFERENCE (FPC). The Contractor shall attend the FPC, currently scheduled for March 2011.

3.5.3 CONDUCT OF DEMONSTRATION. The Contractor shall conduct the demonstration of the contractor-owned USGCD system during the USGCD event in July/August 2011. System effectiveness will be demonstrated against a government approved target flying a government approved profile.

3.5.3.1 KINETIC ENERGY EFFECTOR. If the Contractor demonstrates a kinetic energy solution, the results of the kinetic energy effector demonstration shall be further extrapolated via modeling and simulation to provide an assessment of its  $P_k$  against the UAS representative threats. Analyses shall pay close attention to the existence / non-existence of a warhead, the capabilities of any fusing function and how it may or may not require modification to effectively prosecute engagements and intercepts of this target class.

3.5.3.2 NON-KINETIC ENERGY EFFECTOR. If the Contractor demonstrates a non-kinetic energy solution, the Contractor shall provide an assessment of the type of kill and/ or kill mechanisms and the demonstrated capabilities of the weaponized system to accomplish these kills. This assessment shall be provided in two steps: first, as an integral portion of the exercise, the offeror shall provide a real-time or near-real-time assessment of its weaponized system's performance; and second, as part of the post exercise data analyses, the Contractor shall provide an assessment of its real-time / near-real-time assessment capabilities and identify limitations. For its limitations, the Contractor shall identify at least one and / or more risk reduction path(s) to a tactical configuration.

3.5.4 DATA COLLECTION AND FINAL REPORT. The Contractor shall make all data collected during the USGCD event available to the government. Additionally, the Contractor shall provide the quick-look report no later than 30 days of the completion of the USGCD live fire event and a final report no later than 90 days after the completion of the USGCD live fire event. The quick look report will follow the

format specified at the event planning conferences. The final report may follow a Contractor specified and government approved format, and shall include an evaluation of system performance, to include the results of post demonstration analysis and any modeling and simulation. All data and data reduction programs, tools and techniques shall be provided to Government as deliverables. Data reduction programs, tools and techniques shall be based on commercially available software packages and shall be adequately and comprehensively documented for their utilization.

3.5.5 LOG BOOKS. Engineering log books and system records shall be maintained by the Contractor during the USGCD to characterize the capabilities and limitations of the system.

3.6 SUPPORT SYSTEM. The Contractor shall determine support system requirements for the USGCD.

3.7 SYSTEM TRAINING. The contractor shall establish the manpower and training requirements for operation and support of the USGCD system at the demonstration and provide training for Contractor personnel upon request.

3.7.1 TRAINNG OF GOVERNMENT PERSONNEL. The system shall be trainable to a Low Altitude Air Defense (LAAD) Battalion Marine. The Contractor shall provide a ½ day training class to the USMC Air Defense Weapons Systems Program Office and clearly and unequivocally identify and / or demonstrate the activities associated with safe and successful operation of the Contractor's system, for both threat tracking and engagement exercises. The Contractor shall identify any unique activities associated with the track and engagement of each threat class.

3.8 QUALITY ASSURANCE. The Contractor shall ensure the quality of all workmanship and services performed under this contract.

4.0 PERIOD OF PERFOMANCE. The period of performance for this contract shall extend from date of contract award to 30 September 2011.

**USMC-SPONSORED GBAD CAPABILITY DEMONSTRATION (USGCD)  
DESIGN/ PERFORMANCE SPECIFICATION**

1. In those situations where the Marine Corps is operating outside of the joint force’s protective air and missile defense umbrella, it must be prepared to provide a point defense capability against specific air and missile threats to include unmanned aerial systems, cruise missiles, and rotary and fixed wing aircraft, while accepting a level of risk for those threats outside of their defensive capability, i.e. theater ballistic missiles. The objective of the USGCD is to demonstrate solutions, technologies, and state of the art approaches that provide advantages over existing platforms by meeting some or all of the following objectives.
2. The functional objectives documented in the GBAD Initial Capabilities Document (ICD) describe desirable system characteristics that allow the recommended system(s) to defend the Marine Corps against maneuverable Low Observable/Low Radar Cross Section threats. The ICD will not be provided to Contractors as a part of this RFP, however, the non-classified design and considerations contained in the ICD that are pertinent to this RFP are listed in the following paragraphs.

Note: In the following paragraphs, (T) = Threshold and (O) = Objective.

3. Expeditionary and deployable: The system weight and dimensions shall allow it to be transportable on expeditionary shipping, air transportable by strategic and theater airlift, and have mobility ashore. When mounted on an armored M1165A1 or M1152A1 High Mobility Multipurpose Wheeled Vehicle (HMMWV), the combined dimensions of the system and HMMWV must conform to the following C-130-based capacities.

	<b>Width</b>	<b>Height</b>	<b>Length</b>	<b>Weight</b>
<b>(T)</b>	< 115 inches	< 102 inches	< 206 inches	< 30k lbs
<b>(O)</b>	< 102 inches	< 96 inches	< 192 inches	< 25k lbs

4. Agile and mobile: The system shall be maneuverable within the operations environment to maintain the air defense umbrella over the maneuvering forces.
  - a. System shall be able to achieve and maintain a minimum speeds on cross-country terrain, with full armor, at least two Marine operators, and all associated equipment. Assume 300 lbs of personal equipment per Marine.
  - b. (T) 12 mph
  - c. (O) 18 mph

5. Networked: The system shall align with future air defense integration initiatives, including: fire control, combat ID, and Single Integrated Air Picture (SIAP).
  - a. (T) The system shall be capable of using USMC Program of Record (POR) data radios.
  - b. (O) The system shall use USMC POR data radios.
  - c. (T) System shall employ a self-destruct mechanism.
  - d. (O) System shall employ a command divert and command destruct capability.
6. Lethal: The system shall have the capability to defeat the threats mentioned in paragraph one.
  - a. (T) System shall have negation capability against the UAS threat set.
  - b. (O) System shall have negation capability against the entire threat set.
7. Precise and Effective: System shall provide 360 degree protection and be capable of intercepting/negating UAS targets at tactically significant ranges.
  - a. (T) System shall be capable of a maximum range at target intercept of 7 kilometers from the launch platform.
  - b. (O) System shall be capable of a maximum range at target intercept of 20 kilometers from the launch platform.
8. Interoperable: During joint force operations, GBAD will serve as an element of the Joint Integrated Air Defense System (JIADS), under control of the Area Air Defense Commander (AADC) with other joint force air defense assets.
  - a. (T) Contractor must explain how the proposed system is interoperable.
9. Persistent: System shall provide 24-hour, day/night, and all weather capabilities.
  - a. (T) System shall have negation capability against more than two target-types (i.e. fixed wing and rotary wing) in the threat set, during day and night, and with up to 5mm of rainfall per hour.
  - b. (O) System shall have negation capability against the entire threat set, during day and night, and with up to 5mm of rainfall per hour.
  - c. (T) Contractors must describe system performance in fog.
10. Flexible: Scalable capability between missions and threats.
  - a. (T) System shall retain its effectiveness against the threat set (UAS, cruise missiles, and rotary and fixed wing aircraft) when deployed singularly, in small quantities, and in large quantities.

- b. This effectiveness shall be limited by the number of weapons / rounds available on the prime mover platform and / or in the number of weapons / rounds available on the prime mover platform and one re-load.
- c. Because values that constitute small and large quantities will vary by system type, each vendor must define these respective quantities and provide the rationale for such definitions.
- d. (T) System shall have the capability to perform Lock-On-Before-Launch capability.
- e. (O) System shall have the capability to perform Lock-On-After-Launch capability.

11. Adaptable/Tailorable: System shall support austere operations in support of deployed Marine forces as well as integration into the JIADS.

- a. (T) System capabilities shall be characterized for operation with a non-organic sensor providing 1) a fire control quality cue and 2) a situational awareness air picture.
- b. (T) System shall be capable of effective operation (able to defeat all or some of the threat set) with the availability of a non-organic sensor to provide a cue or air picture.
- c. (O) System shall be capable of effective operation (able to defeat all or some of the threat set) with or without the availability of a non-organic sensor to provide a cue or air picture.
- d. (O) System shall be capable of interfacing and integrating with the current, as well as future, USMC prime mover platforms of the Low Altitude Air Defense battalions.

12. Developed utilizing the Open System Architecture: Vendors shall describe how the system can make use of the Open System Architecture.

- a. (T) Shall be able to accommodate system improvements and allow for inclusion/addition of future passive, kinetic, non-kinetic material/technology, and air defense solutions.

13. Self Protection: System shall allow for self protection against ground attacks.

- a. (T) System shall retain current capability to allow for deployment of a crew-served weapon that can also be man portable.
- b. (O) System shall be capable of utilizing a crew-served weapon to engage not only ground targets but aerial targets as well.