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GLOBAL POSITIONING SYSTEM (GPS) III SYSTEM DEFINITION AND RISK REDUCTION (SD/RR)

STATEMENT OF OBJECTIVES (SOO)

30 August 2001

1.0 Program Overview

The GPS III program objective is to preserve and build on the successes of the Navstar Global Positioning System (GPS) by creating a new architecture (based on the operational requirements of the AFSPC/ACC 003-92-I/II/III GPS ORD, dated 18 Feb 2000) for the assured delivery of enhanced position, velocity, and timing (PVT) signals, and related services to meet the needs of the next generation of GPS users. The GPS III program includes an integrated space segment (SS) and control segment (CS) system that incorporates the Nuclear Detonation Detection System (NUDET) and defines the Signal-in-Space (SIS) to User Equipment (UE) interface. The system should provide a best value solution with the flexibility to anticipate and respond to future military and civilian needs. The GPS III security infrastructure should provide user access to and protection of the entire system. The GPS III system should facilitate the incorporation of additional mission capabilities (i.e. Blue Force Tracking (BFT), Search and Rescue (SAR) missions, etc.).

2.0 System Definition and Risk Reduction (SD/RR) Contract Objectives

SD/RR is the second effort in a multi-phased acquisition approach for GPS III that began with the System Architecture and Requirements Development (SA/RD) effort. This effort, also called Concept Exploration, evaluated military and civil utility as well as reduced the system performance trade space for the subsequent SD/RR effort. The technical requirements trade space derived from the SA/RD effort has been synthesized into a Draft System Specification (DSS). The DSS is intended to provide the technical performance thresholds and objectives for the SD/RR effort. Based on this DSS and the associated life cycle cost (LCC) estimates for its implementation, the Government estimates the bound for the LCC of GPS III to range from TBD to TBD. This Government cost bound is issued for guidance only. The GPS III development and acquisition includes the SD/RR effort as well as system development, demonstration, production, transition,

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deployment, operations, support, sustainment, and disposal of GPS III. Thus, the LCC estimate range covers the cost of the space, launch, and control segments, as well as development and management of the SIS interfaces to the UE and associated interface-working groups (ICWGs).

By conducting the SD/RR effort, the Government expects to understand both the risks and the costs/benefits inherent in the way the system, segment, and subsystem level requirements are allocated. Additionally, the Government expects to understand the risk and timeline associated with transitioning legacy GPS elements to GPS III. The contractor must demonstrate how they plan to provide the best value GPS III at an acceptable risk using Cost As an Independent Variable (CAIV) trades to optimize the system's performance and utility to users consistent with prudent LCC. The contractor must also demonstrate sound systems engineering, risk management, test and evaluation, program management, and system security engineering capabilities. The Government plans to use selected SD/RR products to help make the down select decision to a single GPS III Prime/System Integration (PSI) contractor for System Design and Demonstration (SDD) and all subsequent phases. By the end of the SD/RR effort, the Government expects to have a set of segment level specifications and an architecture description for development and demonstration.

The specific objectives for the SD/RR contract are divided into System Definition, Risk Management and Reduction, Program Management, and Prime/Systems Integrator (PSI) Study as described in the following sections.

3.0 System Definition

The contractor will define GPS III during the SD/RR effort through analysis and allocation of requirements to all segments and internal and external interfaces associated with the civil and military users as well as those for the applicable secondary payloads. The systems definition effort includes, but is not limited to, the following GPS III system definition activities and associated Life Cycle Cost/Total Ownership Cost (LCC/TOC) estimates:

- 3.1 Inter-segment trades for requirements allocation.
- 3.2 CAIV trades to optimize performance and utility.
- 3.3 Incorporation of C4ISR standards and GPS III specific systems security requirements and engineering practices.
- 3.4 Development of SIS to UE interfaces based on cooperative systems engineering and

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performance allocation trades with Government identified UE modernization contractors.

3.5 Systems modeling and simulation (M&S) to include tool development, CONOPS exploration, sensitivity analysis, etc.

3.6 Identification and maintenance of applicable external interfaces (i.e. DoT/FAA, Global Multi-mission Service Platform (GMSP), Wide Area Augmentation System (WAAS), Local Area Augmentation System (LAAS), NIMA, USNO, Milsatcom, etc.).

3.7 Description of the architecture through updated specifications.

4.0 Risk Management and Reduction

Provide the following support to define GPS III risk management and reduction during the SD/RR effort to achieve a flexible and acceptable GPS III process and appropriate levels of risk to enter the next phase.

4.1 The contractor will develop a risk management process that includes risk discovery, identification, isolation, mapping, prioritization, sources and drivers, root cause analyses (where applicable), tracking, reporting, and specific, prioritized mitigation activities. The risk management and reduction activities apply to all future phases of GPS III including, but not limited to, development, manufacturing, test and evaluation, production, transition, on-site space vehicle storage, launch, deployment, and operations and support.

4.2 Based on the assessed risk and proposed mitigation activities, the contractor will conduct studies, demonstrations, breadboard testing, and/or software prototyping to achieve an acceptable level of risk by Preliminary Design Review (PDR).

5.0 Prime/System Integrator (PSI) Study

The contractor will conduct a PSI study in close collaboration with the Government during the SD/RR effort. This study will review the full range of potential roles and responsibilities of the GPS III PSI contractor. The contractor will develop a timeline and a transition plan to migrate responsibilities into the GPS III contract. The full range of non-inherently Government roles, responsibilities, and functions will be evaluated in cooperation with the JPO to determine which should migrate to the GPS III contractor.

6.0 Program Management

The contractor should address the necessary SD/RR program management activities within a comprehensive plan for the conduct of this and all subsequent phases of GPS III. The fundamental management plan will cover the system definition, risk management and reduction, and PSI tasks performed over the next two years. Nevertheless, the contractor should develop a comprehensive management concept that allows for a smooth transition from SD/RR to SDD and beyond.

Attachment:

1. Areas of Concern

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SOO Attachment 1

AREAS OF CONCERN

The areas of concern listed below (not exhaustive) provide areas the Government has noted for risk reduction activities and should be addressed. Consideration of these items during the SD/RR effort, whether for risk reduction activities during this effort or planning for them in subsequent phases in the GPS III Program, is recommended.

1. Resource allocation (including existing and new frequencies) among military and civil services
2. Integration of/transition to GPS III (constellation, monitoring, inter-satellite, user-uplink/downlink)
3. Dependence on external systems (i.e. NIMA, USNO, Milsatcom, etc.)
4. System robustness (i.e. fault tolerance, self-diagnostic, redundancy)
5. Incorporation of protection and assurance activities
6. Support for JPO developed CARD
7. Support for JPO developed Evaluation Strategy/Test and Evaluation Master Plan
8. Government interaction (contractor team proposed interaction process/activities)
9. Support for acquisition Milestone B/C Life Cycle Cost/CAIV/TOC (including specific tools and products)
10. Prevention and its Command and Control and concept of operations
11. GMSP
12. NDS
13. Team structure/competencies (including Small Disadvantaged Businesses/Disadvantaged Veteran-owned Business Enterprises/communications strategy)
14. Contractor managed design documentation and control
15. Software design/development
16. IMP/IMS feedback and control

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17. Compliance with present and evolving DoD C4ISR Standards (DII/COE/JTA, etc.)
18. Support for environmental impact determination process
19. International PVT systems
20. System simulation development (including flexible segment capability allocation/"Monte Carlo" system sensitivity analysis)
21. Technology road mapping and P3I scheduling
22. High-risk hardware assessments
23. Test planning
24. Government CONOPS development support
25. Reserve capability/capacity/design margin
26. Schedule margin/critical path analysis
27. Rapid activity start after contract award
28. Program management toolbox and tool integration
29. Integration of classified activities
30. Support strategy development and system support integration in developmental decision process
31. Staff and facilities planning for the life cycle
32. SIS ICD development, control, and management
33. Economic benefit analysis
34. ORD development support (if necessary)
35. EMI de-confliction fidelity/flexibility/design margin
36. System Design Review planning and exit criteria
37. Preliminary Design Review planning and exit criteria
38. Proprietary software and hardware development and use
39. Critical technologies transfer
40. De-conflict coupled requirements (spotbeam and signal interference)
41. Constellation inter-connectivity
42. Clock technology and industrial base
43. Vehicle life and sparing strategy
44. Control Segment cost control

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