0102 Requirements Exercise

1. The selected/developed GPS Receiver shall be compatible with and be capable of upgrading to incorporate the new civil signal L5, and M-code, and shall utilize new satellite constellation (IIR, IIF) enhancements. The selected/developed GPS Receiver shall use the new signals and codes, and incorporate them to improve the TSPI solution. Backward compatibility with the existing satellite signals should be addressed in the plug and play architecture for the participant system.
2. Modularity shall be built into the system to allow the pods and internal mounts to be reconfigured to meet the various test and training mission requirements and customer needs.
3. The system shall be designed to allow new technology insertion with as little redesign as possible.
4. As an objective requirement, no module shall be dependent upon specific functionality of any other module with the exception of the encryption device.
5. GPS Receiver design shall allow use of antenna splitters and preamplifiers to maximize the use of existing antennas on host vehicles.
6. Subsystems in the pod and internal mount shall run on MIL-STD-704 28 VDC power (5-32 VDC).
7. The participant assemblies including all installed components/subsystems shall operate off of participant electrical power without the need for power conditioning. If power conditioning is required, each individual subsystem used in the installation assembly shall be capable of performing its own unique power conditioning.
8. In order to utilize the modularity offered by the subsystem design, electrical harnesses in the installation shall be designed to accommodate alternate subsystems without harness removal/replacement.
9. Antenna designs for both reception of GPS signals and datalink communications shall be optimized for operation during high-dynamic aircraft maneuvering and to provide maximum transmission and reception coverage for both air-to-air and air-to-ground operations.
10. The system parts shall be industrial grade COTS to the maximum extent possible and still meet operational requirements.
11. The pod nosecone antenna design shall be designed for easy change or retrofit for the new GPS frequencies, L5, and Lm, and shall be capable of changing to different antennas for different transceiver frequencies.
12. The system shall consider using a standard bus structure based on the P2 Participant Study results.
13. The central processor shall be supported by commercial development and support tools.
14. The recording device shall be capable of being erased via the datalink.
15. The standard recording media shall be easy to access and remove, and easy to read on a COTS computer.
16. The system shall interface with aircraft missile launchers using the MIL-STD-1760 Advanced Medium Range Air-to-Air Missile (AMRAAM) connector. A double-male buffer adapter plug shall be used between the MIL-STD-1760 AMRAAM connector and the system connector.
17. This configuration shall provide a real-time rangeless air combat training capability including a unclassified clear text air-to-air data link, real-time in-

the-pod weapons simulations, aircrew kill notification, and real-time ground monitoring for up to and including 36 high-activity aircraft (HAA). The post mission debrief shall display up to and including 36 HAA weapon simulation engagements derived from ground based data recording and P4R1 and P4R2 AIS-recorded mission data. Appendix C specifies the detailed requirements of this configuration.

18. The MTBF for the subsystem shall be no less than 500 hours subject to the contractor's reliability analysis that will determine the true subsystem requirement needed to achieve a system MTBF of 500 hours.
19. Built-in Test (BIT) shall be an inherent part of the system design. All subsystems shall conduct BIT on power-up, when commanded by an operator, and in the background when the system is operational. Power-up and operator-commanded BIT shall isolate failures to the Shop replaceable Assembly (SRA) level. All commercial processor equipment shall be capable of BIT. The systems' equipment shall provide the operator the capability to display the complete BIT results (including commercial equipment BIT results) or record complete BIT results to storage media for later hardcopy printout.
20. The system T&E shall consist of pre-site and site qualification T&E (QT&E). Formal testing shall be coordinated via test plan working groups (TPWG) conducted by the Government and supported by the contractor. A process of deficiency reporting (DR) shall be conducted by the contractor that is compatible with, and provides useable results to, the Government's (TO 00-35D-54) process. The Government reserves the right to witness any or all tests. The contractor shall notify the Government 14 days prior to conducting formal test activities. System QT&E shall be successfully completed prior to system acceptance.
21. The system shall contain the capability to create, update, and modify missions and mission scenarios. The operator shall have the capability to update all the data pre-mission on all systems. Default values and valid configurations for platforms shall be user editable.
22. The operator shall have the capability to update all the data pre-mission on all systems and during missions when ground control is available.
23. Mission data shall include range partitions, surface threats, and the definition of surface targets. Surface threats shall be included as targets for air-to-surface weapons employment and scoring, including no drop weapons scoring (NDWS). The managed data shall consist of target data, range partition data, and surface threat data. Default values and valid configurations for targets, threats and range partitions shall be user editable.
24. The range partition data shall consist of geographical areas, such as military operating areas and restricted areas, indexed by name. It will serve as a display feature that the range operator can use for informing aircrews of partition spill outs. The capabilities to add, delete, and modify the range partition data shall be provided. A range partition shall include Range partition name, Range operating area names, Range partition boundary, and Range Partition Frequency (if multiple channels available).
25. The mission preparation function shall have the capability to generate scenarios and to perform operations as listed below.
    (1) Merge Mission Scenarios – provides the capability to merge scenarios

(2) Generate Scenarios – provides the capabilities to create and modify scenarios
(3) Manage Scenario Files – provides file operation capabilities such as opening, copying, and deleting scenario

26. Mission scenarios shall be capable of being generated at remote locations to support the same mission.
27. The system shall support concurrent creation, modification, or deletion of at least 10 independent mission scenarios.
28. The mission description shall be a textual narrative describing the mission.
29. The capability shall be provided to define a set of participants to be part of the mission. Participants are defined as HAA. The capability shall be provided to add, delete, or modify the set of participants during a mission. The capability shall be provided to modify the attributes of a participant in the scenario. The capability shall be provided to specify everything in the static data (see paragraph 3.1.1.1.1) plus tail number, Participant Subsystem (PS) serial number, station that the system is loaded on, and the debrief site of the participant. Additions, deletions, and modifications to the set of aircraft defined in a scenario shall be made as a result of operator actions.
30. BIT reports shall report PS anomalies, hardware or software that result in an out of tolerance condition, a functional failure, or a degraded system performance condition. All BIT failure codes shall be stored in non-volatile memory within the failed subsystem and have the ability to be downloaded to a PC in English text format. In the event of multiple failures, the failures shall be prioritized in a most frequently repeated failure order and displayed one at a time to maintenance personnel. System critical failures detected by BIT shall be displayed on an external GO/NO-GO indicator clearly visible to maintenance and operations personnel. The GO/NO-GO indicator shall not interfere with aircrew night vision equipment. Continued operations of the system shall not be hindered as the result of a reported BIT failure code. A detected failure of any security feature by BIT shall disable the subsystem data link capability.
31. The contractor shall establish and maintain a Configuration Management Plan (CMP) for the system. The plan shall meet or exceed the guidelines established in ANSI EIA 649-1998 and with the guidance provided in MIL-HDBK-61. It shall include both hardware and software configurations. The CM Plan shall describe the contractor's configuration management processes to include how it is organized, how it will be conducted, and the methods, procedures and controls for effective configuration identification, change control, status accounting, and configuration audits for both physical configuration audit (PCA) and functional configuration audit (FCA). The Government shall be included in the engineering change control process as an active member of the configuration control board.
32. The contractor shall minimize the use of all support equipment. Existing common USAF and USN test and support equipment (excluding current subsystem test set) shall be the first option for all support equipment. Unique test and support equipment shall undergo validation for its particular purpose. Any unique test and support equipment and its associated documentation required for the subsystem shall be provided with the system.
33. The system equipment intended for shore facilities shall meet the electrical installation requirements of NFPA-70 (National Electrical Code).

34. The contractor shall establish a System Engineering Process for the system. The process shall meet or exceed the guidelines established in ANSI EIA 632-1999. The process shall be documented in a System Engineering Management Plan.