EXPRESS
TECHNICAL STATEMENT OF WORK
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Note: All mil-specs identified within this SOW are to be used for reference only.

1.0 INTRODUCTION AND SCOPE: The purpose of this Statement of Work (SOW) is to set forth the technical support requirements for the U.S. Army Aviation and Missile Command (AMCOM) and its customers managed systems/equipment/technology, hereinafter referred to as the Army. A current list of categories and representative examples of Army missions, to include all ancillary and support systems and training devices/aids, is included in Attachment 02. Tasks may also involve related non-US systems.

The contractor may be required to perform services at its own facility (off-site) or at a duty station at any U.S. Government facility or other designated facilities (on-site) within the Continental US (CONUS) or outside the Continental US (OCONUS), as specified by individual task orders.

The contractor shall have the capability to provide technical support required by this Statement of Work in the event of a deployment, whether contingency or for training purposes. In providing the support required by this SOW in a deployed status, the contractor will be required to abide by the rules of engagement, policies and procedures established for the particular operation supported.

2.0 G GENERAL TECHNICAL SUPPORT REQUIREMENTS. The contractor shall provide technical expertise for the specialty area(s) identified in this SOW. General technical effort for specialty area(s) may include:

G1. Provide technical expertise to basic research, research and development of exploratory and advanced development projects, and/or programs to advance technology.

G2. Provide research and development technical expertise in the technical specialty areas.

G3. Plan, develop, and conduct analysis programs or studies to establish the feasibility of systems/subsystems/components meeting requirements and/or adequacy of design.

G4. Develop and integrate advanced technologies including guidance, control, sensor, propulsion, airframe, launcher structures and interfaces, embedded computer hardware/software, embedded diagnostics and ancillary equipment, into suitable test bed systems and/or subsystems while maintaining total system safety and integrity.

G5. Design and develop recommended component specifications.

G6. Develop and evaluate recommended system requirements to determine technical feasibility and/or functional adequacy for current and future components/systems.

G7. Establish and/or provide recommended technical/test requirements, specifications, acceptance criteria and measuring programs consistent with design criteria.

G8. Provide technical expertise for timely consideration and integration of latest technological advances and military materiel requirements as these factors relate to and influence the execution of the technical tasks.

G9. Provide technical expertise so that proper influence is directed toward safety, human engineering, product assurance, manufacturing science and technology (MS&T), and value engineering in the technical specialty area.

G10. Maintain direct and continuing technical liaison with other Government centers, laboratories, and agencies; contractors; and universities in the technical specialty area.

G11. Provide design, fabrication, and bench test technical expertise to larger Government projects including: electronic circuit/breadboard/brassboard design and fabrication, machine shop fabrication including generation of shop drawings or from Government drawings, engineering mockups on stereo lithography models, and laboratory testing of such hardware to validate function or measure performance.

G12. Plan and develop recommended requirements for special laboratory and test facilities required in the technical specialty area.

G13. Provide technical recommendations and expertise to should cost, source selection, and other proposal evaluation/contracting efforts, and/or provide analysis of trade-off studies and risk assessments of competing technologies or systems.

G14. Provide input to the formulation of Request for Proposals (RFPs) to include recommendations for the preparation of SOWs with their corresponding Contract Data Requirements Lists (CDRLs) as well as design specifications.

G15. Provide technical expertise to Type Classification, standardization, materiel release, and/or materiel fielding actions.

G16. Provide scientific, engineering, and technical expertise for studies; evaluations of technologies; development, review, and maintenance of technical documentation/repositories and databases. Provide technical expertise for the planning, management and execution for representative systems listed in Attachment 02. Provide data base design, data base entry, and data base management related to the representative systems listed in Attachment 02.

G17. Provide technical expertise to conferences/briefings/meetings/working groups/teams to include on-site creation and delivery of high quality graphics and briefing material and tracking of action items.

G18. Analyze, evaluate, provide recommended revisions and/or generate for Government approval/signature draft technical documentation such as letters of agreement, memoranda of understanding, Mission Needs Statements, Operational and

Organizational Plans, Required Operational Capability, Operational Requirements Documents, system specifications, Test and Evaluation Master Plans, and training documentation.

G19. Provide technical expertise and/or recommendations for management of contractor computer and other communication networks necessary for the performance of tasks under this SOW. This does not include Government computers or Government communication networks, such as Local Area Networks (LANs) or Wide Area Networks (WANs).

G20. Provide technical expertise in the areas of inventory control, accountability and location of equipment within the laboratories. This includes the location and documentation of thousands of pieces of equipment used for research, development, and testing purposes. The contractor shall set up and maintain an automated property control system for the mission account and installation property. Updates shall be made on a timely basis to reflect additions due to turn-ins. The contractor shall contribute to the preparation of temporary hand receipts and property passes for equipment transfers to appropriate Government authorities for signature and maintain record files for accountability purposes. The contractor shall conduct annual 100 percent physical inventories and 6 month currency updates of property and report results to responsible Government personnel. The contractor shall maintain lists of equipment for contract maintenance, automated data processing, audio-visual, and test equipment calibration.

G21. Provide training workshops for the Government in the other technical tools used to analyze and improve technical processes, such as Robust Design and Integrated Product Development. Workshops shall include planning, course material, and coordination with Government personnel.

G22. Evaluate employee suggestions and provide appropriate recommendations regarding the material evaluated.

G23. Perform frequency management activities.

G24. Evaluate and provide recommendations for Source Approval Requests (SARs), Qualified Manufacturers' Lists, sources of repair and overhaul, and other technical evaluations of contractor/vendor capabilities.

3.0 TECHNICAL FUNCTIONAL SPECIALTY AREAS

3.1 AT AEROMECHANICS TECHNOLOGY

The contractor shall provide aeromechanics technology expertise. Effort may include:

AT1. Assess the impact of modifications on flutter margins, the effect of airframe/rotor modifications on handling qualities, the effects of proposed changes to flight control system hardware/software, the capability of each aircraft to perform new missions, and the effectiveness of drive train, engine, and transmission vibration diagnostic schemes.

AT2. Perform helicopter and missile aeroelastic and aeromechanical stability analysis of new designs as well as modifications of current designs. Use aeroservoelastic stability analysis methods to analyze the effect of proposed flight control system changes on total system stability.

AT3. Develop/evaluate recommended environmental vibration qualification requirements, test plans and reports.

AT4. Establish and maintain a mass properties database for aircraft, helicopters, and missiles.

AT5. Analyze rotor hover and forward flight performance, vehicle drag, and acoustics signature for various configurations using panel aerodynamics and computational fluid dynamics methodologies.

AT6. Review/evaluate actual performance capabilities and update the Army Aircraft Mission Planning Station.

AT7. Assess the effect of proposed changes to flight control system control laws on the handling qualities of Army helicopters and fixed wing aircraft.

AT8. Maintain and be able to modify structural dynamic models (such as NASTRAN). Be able to use these models to assess the impact of modifications on structural dynamics of the helicopter and missiles.

AT9. Maintain and modify the Army Aviation Vibration Analyzer software (written in Diagnostic Programming Language) which performs track and balance maintenance and vibration troubleshooting for all Army helicopter types.

AT10. Perform analytical review of flight test results and assure that actual vehicle capabilities (both performance and handling qualities) are properly reflected in the aircraft Operators Manuals for both normal operations and emergencies.

AT11. Maintain and be able to modify comprehensive models of Army helicopters. Be able to use these models to assess the impact of modifications on helicopter rotor loads.

3.2 AW AIRWORTHINESS QUALIFICATION/RELEASE.

AW1. The contractor shall provide technical expertise to the airworthiness qualification/release programs standard configurations and/or alterations/modifications to standard configurations. Effort may include the analysis, review, evaluation/ recommendation, preparation (in draft format)), issuance, and/or contributions to:

a. Airworthiness releases.

b. Contractor flight releases.

c. Airworthiness qualification specifications and/or plans.

d. Airworthiness qualification substantiation reports.

e. Interim and final statements of airworthiness.

f. Safety of flight reviews.

g. Design reviews.

AW2. Provide technical expertise for engineering testing of Critical Safety Item (CSI) Effort may include:

a. Identify support parts necessary to complete the test.

b. Analyze all parts that fail prematurely and determine the root cause of failure.

3.3 EAVS ELECTRONICS/AVIONICS/VISIONICS/SURVIVABILITY EQUIPMENT

The contractor shall provide electronics/avionics/visionics/survivability equipment technical expertise at the component, assembly, subsystem and system levels, and integrate into the next higher assembly for both hardware and software. Effort may include:

EAVS1. Develop, analyze, review, and validate recommended avionics form, fit, function specifications, interface control documents, and aircraft integration documents.

EAVS2. Develop and/or evaluate and provide recommendations for electronics/ avionics/visionics/survivability armament related SOWs.

EAVS3. Provide analyses, studies, data review and recommendations concerning electromagnetic interference/electromagnetic compatibility/electromagnetic pulse/high energy radiation to ordnance/electromagnetic vulnerability/high energy radiation to personnel/high energy radiation to fuel/precipitation static/lightning/shipboard operations/TEMPEST/ and electromagnetic environmental effects.

EAVS4. Provide studies, analyses, data review and recommendations in threat analyses, electronic warfare, countermeasure (CM), and counter countermeasures (CCM).

EAVS5. Provide technical expertise in aviation electronic disciplines to include: antennas, multi-mode millimeter wave radar, targeting systems, pilot night vision systems, command and control interface, electronic warfare weapons, cockpit controls/displays, human factors, electromagnetic emissions (EME), communications security, processing systems, integrated systems/architectures, fault detection/diagnostics systems, automatic target recognition/ target acquisition, stand-off and intelligence gathering systems, and flight controls.

EAVS6. Analyze programs of other services to determine if interchangeability and/or interoperability can be obtained.

EAVS7. Provide technical expertise in the following armament disciplines: fire control, boresighting, armament interface and system performance.

3.4 ENV/SAF ENVIRONMENTAL & SAFETY INITIATIVES

The contractor shall provide technical expertise in the compliance with environmental and safety laws and regulations through applied management of safety and environmental issues. Effort may include:

ENV/SAF 1. Make recommendations to ensure adherence/compliance to all applicable laws, regulations and business plans between Government agencies/contractors. Provide recommendations to clearly define the environmental milestones/responsibilities and the authority to carry out these initiatives.

ENV/SAF 2. Make recommendations to set up and involve line management, establish accountability, and provide a system for developing/implementing environmental action plans.

ENV/SAF 3. Perform environmental and safety site assessments/studies to assure adequate consideration is given to environmental and safety risks.

ENV/SAF 4. Identify and evaluate the environmental impact of operations and major areas requiring support and effective management such as air quality protection, community noise protection, soil and water resources protection, waste management and reduction, and pollution control.

ENV/SAF 5. Review, analyze and provide recommendations to ensure that safety, industrial hygiene, and environmental impacts/risks are reviewed and incorporated into business planning processes and systems.

ENV/SAF 6. Develop and/or conduct training for Government employees to enhance their knowledge and general awareness of safety and environmental issues.

ENV/SAF 7. Evaluate/recommend procedures to promote the use of non-hazardous materials. If hazardous materials are used, provide recommended procedures necessary to minimize and control their use and to ensure the avoidance or reduction of potential health, safety, and environmental risks.

ENV/SAF 8. Provide technical expertise in investigation of accidents causing personal injury/illness, property damage, environmental damage, or business interruption and recommend the measures that can be taken to prevent their recurrence.

ENV/SAF 9. Provide recommendations to ensure facilities and operating equipment are maintained to minimize the risk to human health and the environment.

3.5 GT-GA GUIDANCE TECHNOLOGY - GUIDANCE ANALYSES

Guidance Technology. The contractor shall provide engineering and scientific expertise in all aspects of guidance systems including sensors for systems' functions of alerting, detection, acquisition, tracking, identification and damage assessment; terminal guidance technologies; missile navigation, control, and safety devices; data and guidance links required for guidance functions in semi-active, beam rider, command systems, seekers, and data and guidance links for unmanned systems; fire control functions; and computer/processor hardware and software systems for weapon systems.

The contractor shall provide technical expertise with respect to guidance laws, algorithms, and implementation and integrated fuzing. Effort may include:

GA1. Apply control and sampled data theory in a system approach to the design of vehicle control systems utilizing realistic modeling of guidance sensors, inertial sensors, control actuators, and system dynamics. Conduct design tradeoffs between the guidance hardware to allow factors such as gyro noise and drift rates, Kalman filters, actuator bandwidth, quaternion transforms, computation delays, and all real hardware concerns, to be incorporated in the models.

GA2. Develop and maintain facilities to integrate and perform real time test of both breadboard and flight ready guidance equipment and software, prior to assembly, which include the design perturbations expected in the development, deployment, and operation of systems.

3.6 GT – ECTS GUIDANCE TECHNOLOGY - ELECTRONICS AND COMPUTER TECHNOLOGY SUPPORT

The contractor shall provide technical expertise in electronic hardware and computer software technology. Efforts may include:

ECTS 1. Perform common functions and analysis for electronics, computers, processors, and fire control hardware and software technology.

ECTS 2. Design and develop recommended electronics for missile guidance and unmanned system applications including fire control and selected command and control functions necessary to support system operations.

ECTS 3. Develop recommended computer requirements, architecture, and hardware and software design for missile guidance and unmanned system applications including fire control and selected command and control functions necessary to support system operations.

ECTS 4. Develop recommended fire control requirements, architectures, and hardware and software design for missile and sensor systems.

ECTS 5. Develop digital simulations for evaluation of missile system hardware and software requirements and design.

ECTS 6. Develop and validate simulations for fire control and associated communications systems and concepts for analysis and evaluation under realistic operational scenarios.

ECTS 7. Perform research and development functions in: sensor and man-machine systems interfaces and fusion; information structures, processing, and transfer; digital hardware and software; computer systems; and expert systems, techniques, and concepts.

ECTS 8. Design, develop, and interface system trainers and large scale simulators for stand-alone application and use in distributive interactive simulations.

3.7 GT-WSG GUIDANCE TECHNOLOGY - WEAPON SYSTEM GUIDANCE

The contractor shall plan and conduct engineering activities in support of guided weapon systems. Conduct fundamental measurements, testing, modeling, and simulation of guidance components and subsystems under tactical environmental conditions. Effort may include:

WSG1. Conduct analysis, simulation, engineering design and evaluation of proposed developmental and operational guidance systems utilizing necessary physical principles.

WSG2. Establish and maintain a technological base to ensure timely and effective application of weapon system guidance technology to systems and ancillary equipment.

WSG3. Maintain cognizance of potential enemy activities weapon system guidance technology and perform research and development to provide, improve, and extend the CM and ECCM capabilities of Army guided weapon systems. Maintain an awareness of expected or possible battlefield environments to ensure maximum weapons component performance.

WSG4. Perform system engineering relative to weapon system functions of target detection, acquisition, identification, discrimination, position determination, weapon guidance, and integration of weapon system sensors for control of warhead functions. The system engineering function includes planning, system safety, concept generation, analysis, simulation, design, experimentation, evaluation, and integration.

WSG5. Perform detailed analysis, experiments, and simulations and utilize empirical and analytical techniques for subsystem identification, modeling and model validation.

WSG6. Develop, identify, and provide recommended potential design or fabrication improvements to developed weapon systems. Program includes hardware evaluation utilizing experimental devices, experimental systems design, equipment problem diagnosis, data collection and analysis, technological exploration, as well as laboratory and field test.

WSG7. Perform analytical and physical integration of guidance systems into experimental configurations. This may include "in-flight" evaluation of integrated

systems, related systems, related data acquisition techniques and pre-flight and post-flight diagnoses.

WSG8. Perform identification, modeling and design for realistic external phenomena, which interact with specific guidance systems such as electromagnetic interference (EMI), countermeasures, guidance data interruption, target signatures, background characteristics, and data rates.

3.8 IO INDUSTRIAL OPERATIONS

The contractor shall provide scientific, engineering, and technical expertise for studies, evaluations of technologies, development and review of technical documentation in industrial operations type support to include:

IO1. Plan, facilitate, and provide recommendations for the execution of an Industrial Base (IB) Program to create and maintain a thorough and effective IB that will support peacetime, wartime, and other contingency military requirements. Effort may include:

a. Provide technical expertise to assess delivery schedules and production status for ongoing production contracts and/or evaluate resources and mission performance to develop, support and retain capabilities to respond to current and emergency procurement/production actions.

b. Monitor product deliveries and fluctuations in production performance indicators and/or conduct assessments of performance relative to cost, schedule, technical requirements, and productivity.

c. Perform industry/Government comparisons, document findings, and recommend System Acquisition Management improvements.

IO2. Facilitate the coordination of cost reduction initiatives/programs such as Value Engineering (VE), Operation & Support Cost Reduction (OSCR), Spare/Repair Parts Review Initiative (SPRINT), and Modernization Through Spares. Effort may include:

a. Provide recommendations in the area of all VE directives and policies.

b. Provide technical expertise in establishing VE targets/goals, which will ensure cost effectiveness engineering while maintaining producibility readiness and performance requirements of weapon systems.

IO3. Provide spare and repair parts engineering expertise and technical expertise to the Reverse Engineering (RE) and Technology Insertion (TI) Programs.
Effort may include:

a. Perform and provide recommendations for Defense Federal Acquisition Regulation Supplement (DFARS) Appendix E Technical Review and Engineering Screening, which may include producibility reviews. Provide technical expertise for

repair parts procurement for Defense Logistics Agency managed items that are used on Army managed systems.

b. Facilitate the coordination and/or execution of the Diminishing Manufacturing Sources (DMS) effort.

c. Perform analysis to alleviate microcircuit/component obsolescence and improve weapon system reliability.

d. Plan and facilitate the coordination and implementation of engineering effort to maintain a production base for the fabrication and delivery of spare parts for fielded Army Systems.

e. Perform reverse engineering activities.

3.9 IR INFRARED (IR)

The contractor shall provide technical expertise with respect to techniques, components, devices, subsystems, and systems which function in the IR region of the spectrum such as focal plane arrays, detectors, scanners, radomes, optical elements including reflectors and refractors, cryogenic devices, signal processors, algorithms, displays, cameras, seekers, and sensor systems. Effort may include:

IR1. Plan, develop, and conduct research and development tests via bench, laboratory, ground based, tower, captive flight, and flight experiments. Record experimental/test data using appropriate analog or digital media, and perform data reduction and data analysis to obtain quantitative results for assessment and evaluation purposes.

IR2. Execute, modify and/or develop models to determine additional performance envelopes, extended boundary performance, or operational conditions not conducive to testing because of time, economic, or other constraints.

IR3. Evaluate against CM and conduct ECCM investigations, designs, developments, tests, and evaluations.

3.10 ISP IMAGE AND SEISMIC, ACOUSTIC, MAGNETIC (SAM) ELECTROMAGNETIC (EM) SIGNAL PROCESSING

The contractor shall provide technical expertise associated with image and seismic, acoustic, magnetic (SAM), EM and signal processing developments as they relate to target discrimination, target acquisition, clutter rejection, target tracking, automatic target recognition, and aim point selection. The contractor shall provide technical expertise with respect to techniques, components, devices, subsystems, and systems with SAM and EM Functions . This would include SAM and EM sensors, microphones, transducers, phased arrays and associated signal processing hardware and software. The contractor shall plan, develop, and conduct research and development tests via bench, laboratory, ground-based, lower, and captive flight, and flight experiments. The contractor shall record experimental/test data using appropriate analog or digital media,

and perform data reduction and data analysis to obtain quantitative results for assessment and evaluation purposes. The contractor shall execute, modify and/or develop models to determine additional performance envelopes, extended boundary performance, or operational conditions not conducive to testing because of time, economic or other constraints. The contractor shall also evaluate against CM and conduct ECCM investigations, designs, development, test and evaluations. Effort may include:

ISP1. Develop algorithms to perform these functions within the image SAM and EM signatures, and signal processing technology area.

ISP2. Define and develop processors to implement these functions; incorporate military target image SAM and EM signatures embedded in complex battlefield or natural environments with or without countermeasures.

ISP3. Provide technical expertise in the development, modification, and execution of target detection and tracking algorithms and models to predict critical sensor and missile guidance performance parameters.

ISP4. Provide technical expertise in the measurement, analysis, modeling, and processing of target and background SAM and EM signatures utilizing interdisciplinary sensors that support target acquisition and missile guidance development and evaluation.

ISP5. Pursue and evaluate data and guidance link technology and developments to support target acquisition and guidance functions for missile systems and remote fire control/ground stations.

ISP6. Develop data compression techniques and perform evaluations to assess quality and utility of required transmitted data.

ISP7. Develop and validate target and background 2D and 3D digital models utilizing empirical and first principles methods.

3.11 MP MANPOWER & PERSONNEL TECHNICAL SUPPORT

The contractor shall provide technical engineering expertise in the Manpower & Personnel Requirements Integration (MANPRINT) areas of human factors, systems safety, and safety/health hazards analyses.

MP1 Provide technical expertise in human factors engineering during system design and for the system/operation/maintainer crew interface. Effort may include:

a. Evaluate the recommendations for changes to the materiel contractor's documentation or approach.

b. Contribute to Human Factors Working Board meetings, system or system segment design reviews, and test activities related to human factors.

c. Report issues or problems and recommend actions to the Government.

d. Conduct independent human factors engineering analyses to resolve specific human factor problems.

e. Provide display/control interaction expertise to include rapid prototyping of dynamic interactive workstation for the review of proposed display modes, logic, and symbolology presentations.

MP2 Provide technical expertise in safety hazard analyses and risk assessment. Effort may include:

a. Review and evaluate system safety documentation for technical competence, completeness and accuracy such as materiel contractor proposed system safety program plans and safety assessments.

b. Provide the Government with recommended changes to the materiel contractor documentation.

c. Provide technical experts for system safety related working groups and review boards.

MP3 Provide technical expertise in health hazards assessments. Effort may include:

a. Evaluate materiel contractor's health hazards reports for technical competence, completeness, and accuracy.

b. Perform independent health hazard evaluations of systems.

c. Provide the Government with recommended changes to materiel contractor's documentation.

MP4 Assess the impact of MANPRINT technical elements on life cycle Operating and Support (O&S) costs and provide alternatives with cost variables and readiness considered. These analyses shall include both design and supportability alternatives. Current high cost drivers will also be identified for potential MANPRINT analysis/studies.

MP5 Conduct studies and analyses designed to evaluate and improve existing safety, health hazard, or human factor technologies and develop new technologies to alleviate deficiencies in the technology base.

3.12 MST MANUFACTURING SCIENCE AND TECHNOLOGY

The contractor shall provide technical expertise for the planning, management, technical direction, and/or execution of MS&T and Reliability, Maintainability & Sustainability (RM & S) programs. Effort may include:

a. Manufacturing research, development, and applications effort in the diverse technological fields of metals, non-metals, composites, propulsion systems, electronics, optics, photonics, and chemical processing.

b. Modification/development of recommended computerized production management tools and controls required to assure production availability and affordability of complex weapon systems and system end items and components, and related test and support equipment.

MST1. Facilitate the execution and/or coordination of a program of manufacturing activities for weapon systems which ensures adequate consideration of factory-floor requirements are incorporated into product designs during the weapon systems' development and transition to production. Effort may include:

a. Identify manufacturing cost drivers as they relate and apply to generic system functions.

b. Forecast manufacturing environments for the purpose of identifying critical material and other potential productivity problems requiring application of MS&T, or RM & S program effort, Flexible Manufacturing Systems, Integrated Product/Process Design (IPPD), or Concurrent Engineering (CE) principles.

MST2. Establish and/or maintain a manufacturing productivity expertise and technical data base(s) on production cost experience and productivity trends in projecting and evaluating weapon system production performance. Effort may include:

a. Facilitate coordination of productivity improvement programs.

b. Evaluate manufacturing technology effectiveness in support of the defense industrial base.

MST3. Prepare and evaluate system and development productivity specifications to ensure technical production specification compatibility with user system performance requirements.

3.13 NC NAVIGATION AND CONTROL

The contractor shall provide technical expertise in navigation and control research, development, and/or engineering activities in the following areas:

a. Control force generation systems including:

(1) Pneumatic, hydraulic, and electro-mechanical control actuation systems.

(2) Reaction and thrust vector control systems.

b. Digital/analog control electronics and fire control systems including weapon system/launcher/platform interface and digital image processing for mission planning, navigation, and control of unmanned vehicles.

c. Fiber optics including fiber winding, splicing, layout, payout, data-linking, cable pack mechanics, application and integration utilizing advanced electronics to inertial instruments, photogenic sensing integrated optics devices; and navigation systems including global positioning sensors (GPS), gyros, accelerometers, rate sensors, stabilized platforms, inertial measurement units (IMU), position navigation, altimeters, north seekers, and laying and alignment devices.

3.14. OL OPTICS AND LASER

The contractor shall provide technical expertise with respect to techniques, components, devices, phenomenology, processing, interfacing, and integrating into weapon systems and subsystems which function in the ultraviolet (UV) through near infra red (IR) spectrum such as:

a. Optical beacons and trackers.

b. Beam rider projectors and receivers/decoders.

c. Image intensifiers and TV sensors.

d. Photonic components and processors.

e. Visual displays.

f. Laser detection and ranging (LADAR), lasers at all wavelengths, laser range finders, designators and seekers; differential absorption LADAR (DIAL), doppler, scattering and other laser sensor/probe equipment.

Optics and laser effort may include:

OL1. Assess emerging LADAR sensors using one or more of the following: scattering, fluorescence, remote spectroscopy, vibration and 3-D mensuration, optical stealth and counter-stealth sensors, line-of-sight direct-fire guidance laws, new predictive laser guidance laws, and optical communication and guidance links in such environments.

OL2. Provide laboratory and/or field evaluations of optical and multi-spectral sources, sensors and seekers for guidance in tactical environmental conditions.

OL3. Provide technical expertise in optical CM and CCM functions and laser identification, friend or foe (IFF) functions in adverse military environments.

3.15 PA PRODUCT ASSURANCE

The contractor shall provide Product Assurance (PA) technical expertise to include:

PA1. Utilize PA management and technical principles, inspection techniques and other analytical and empirical tools during the development and production of systems and subsystems. Provide technical expertise for PA activities throughout the materiel life cycle such as quality audits, materiel release, acceptance testing, metric conversion, calibration, reliability, availability, and maintainability (RAM) engineering, system assessment, conformance inspection and first article/quality verification tests.

PA2. Provide input for the selection/development and evaluation of workmanship standards, statistical quality control improvement methods, sampling plans, inspection/test methods and procedures, and acceptance criteria. Review specifications and drawings to assure inclusion of adequate quality requirements. Monitor and evaluate quality programs and inspections systems for procurement of products and services.

PA3. Contribute to reviews, assessments, and audits to determine the degree of the system contractor's compliance with the contract quality requirements.

PA4. Evaluate acceptance test systems to include the review and verification of inspection gauges, acceptance test equipment designs, and calibration systems.

PA5. Analyze Reports/Studies, Government Industry Data Exchange Program (GIDEP) alerts and Materiel Review Board actions. Recommend actions necessary to minimize impact on program.

PA6. Analyze other contractors' PA programs and data deliveries to identify deficiencies and recommend changes to PA programs and documentation.

PA7. Provide technical expertise for corrosion prevention programs such as the Corrosion Prevention Action Team, engineering change proposal and request for proposal corrosion prevention control (CPC) evaluations, fielded CPC surveys, data sources investigations and recommendations for CPC problems, and CPC test support.

PA8. Provide technical expertise in the Critical Safety Item (CSI) program to include:

a. Maintenance and enhancements to CSI database management system.

b. Modifications/development of recommendations for CSI life cycle management policy documentation to maximize CSI critical characteristics (CC) operational safeguards.

c. Surveillance and recommended corrective actions on CSI managed by other agencies, item recall activities and program screening methods.

d. Analyses and recommendations for additions or deletions of critical safety items based on life cycle performance, mission requirements, and system application.

e. Review and recommend changes to CSI CC in technical documentation, technical manuals and depot maintenance work requirements.

f. Evaluate and recommend corrective action on life cycle management of safety critical class III fasteners.

PA9. Provide RAM technical expertise to include review, assessment, analysis, evaluation, recommendations and trade-studies in areas such as stockpile reliability, design analysis, RAM programs and engineering services, RAM requirements and testing, environmental stress screening, and electronic parts circuits' tolerance and re-screening.

PA10. Perform PA failure analysis including analysis of hardware to determine root cause. Establish new and or maintain existing automated databases and software programs to provide detailed analysis and report capabilities for failure analysis.

PA11. Provide technical expertise in the performance of quality engineering programs to include quality program specification requirements, performance specifications, environmental stress screening, critical safety item program, integrated product development, first article/quality verification, quality assurance lot verification testing and technical data package issues.

3.16 PE PRODUCTION ENGINEERING (PE)

The contractor shall provide PE technical expertise throughout the acquisition and development life cycle. Effort may include:

PE1. Perform life cycle producibility and system engineering analyses to ensure materiel production readiness and the necessary planning, facilities, and producibility assurance to efficiently manufacture and deliver the materiel at desired rates subject to cost and schedule constraints and performance requirements.

PE2. Develop and implement new computer-aided tools and methodologies utilizing simulation and artificial intelligence techniques to contribute to producibility analysis and production planning.

PE3. Analyze design options for producibility utilizing in-house rapid prototyping capabilities such as stereolithography.

PE4. Provide technical expertise for integrated product development (IPD) and implementation through policies, training and education, IPD strategy recommendations, and input to IPD team participation in the areas of producibility, manufacturing, and systems engineering.

3.17 PT. PROPULSION SYSTEMS/TECHNOLOGY

The contractor shall provide a broad-based research, development, and systems engineering capability in propulsion systems and technologies. The contractor shall

provide propulsion expertise for engines and engine installation, drive systems, and propulsion systems (e.g., solid, liquid, gel, hybrid, air breathing) including hardware and software. Effort may include:

PT1. Perform turbine engine and component analyses such as torsional stability analysis, steady-state and transient thermal/stress/life analysis, vibration/dynamic analysis, performance analysis, and turbine engine installed performance analysis.

PT2. Perform propulsion system/engine and engine installation/drive/control system functional, technical and safety analysis support and assessment for design, test, performance compliance, life and qualification compliance.

PT3. Provide assessments on all aspects of propulsion systems.

PT4. Provide an engineering capability in propulsion to include:

a. Manufacturing, fabrication, design, engineering analysis, electrical/electronics, vibration, modal analysis, dynamic simulation, test, systems integration and assembly of components, subsystems, and systems.

b. Mechanical property tests and analyses of energetic and inert materials.

c. Electrical, structural, engineering and ballistic tests, analysis, hardware integration, computer hardware integration and programming.

PT5. Provide technical expertise in propellant processing and maintenance of propellant formulation and processing equipment.

PT6. Establish recommended qualification requirements, review test plans, monitor testing and review results from engine qualification testing.

PT 7. Perform propulsion subsystem (fuel, hydraulics, and environmental control) functional and analytical support to include component or system design, test or performance compliance.

PT 8. Perform propulsion system functional and analytical support to include structural integrity, service life, and Insensitive Munitions (IM) test design, testing, data reduction and analyses.

3.18 RF RADIO FREQUENCY (RF) TECHNOLOGY

The contractor shall provide technical expertise in the areas of RF (to include milimeter wave (MMW) surveillance, fire control, guidance sensors and sensor systems which are utilized for target search, detection, classification, guidance, control, and navigation. This includes those RF sensors and sensor subsystems used for radar, seekers, designators, illuminators, trackers, CM/CCM equipment, and other components and subsystems of systems. Effort may include:

RF1. Enhance RF sensor performance, collect RF target and background signatures, develop signal processing and CM/CCM techniques and processing, and evaluate RF sensor performance.

RF2. Develop and validate models and simulation of RF sensors and associated phenomenology and apply in the assessment and prediction of RF sensor capability and RF sensor affect on system performance.

RF3. Provide technical expertise in the CM/CCM Lead Function.

RF4. Provide technical expertise in the planning, conduct, and evaluation of laboratory and field tests/experiments.

RF5. Provide technical expertise in the research and development of RF technology techniques, hardware, and systems for reducing the effects of environments and countermeasures on performance.

3.19 SE SYSTEMS ENGINEERING

The contractor shall provide technical engineering expertise for operational support systems and major items. Effort may include:

SE1. Perform design implementation and facilitate coordination of engineering activities on out-of-production systems and major items.

SE2. Provide technical recommendations and expertise in the planning and assumption of engineering services.

SE3. Plan, facilitate coordination, recommend, and/or provide technical liaison to the system design and engineering actions.

SE4. Provide technical expertise and engineering support to the integrated logistics support engineering activities such as new equipment training, depot maintenance, logistics support analysis, and technical publications.

SE5. Review, evaluate, and propose necessary action to resolve Category I & II Deficiency Report (DR) problems and other reported field problems that may have design implications.

SE6. Develop and recommend field and depot maintenance/overhaul inspection criteria, limits, repair procedures, quality standards, hazardous materials replacements, and commercial replacements for military specifications/standards in technical manuals (TMs) and Depot Maintenance Work Requirements (DMWRs).

SE7. Provide technical expertise in the areas of advance systems concepts, technology integration, scientific information missions and system engineering support/materials consistent with R&D/technology plans and programs. Develop unique database and network

requirements; provide specified hardware and software; and implement necessary modifications and improvements to existing hardware and software.

SE8. Update and maintain the technology integration system engineering information assets, technical reports/presentations, and technology base program assets.

SE9. Provide technical expertise in technology transfer and technology base programs.

SE10. Prepare draft documentation for the technology development and engineering support to produce such plans as the Strategic Plan, Performance Plan, Research, Development, Test and Evaluation (RDTE) Plan, Technology Transition Agreements, International and Cooperative Programs/APCP-5 transactions, the Advance Planning Briefing, Best Lab Report, the Annual Report and other required documentation and conference support.

SE11. Provide technical advice and engineering input concerning accident investigation report recommendations, aircraft grounding actions, Safety-of-Flight messages, Aviation Safety Actions, Safety of Use, and Maintenance Information messages and prepare draft messages for transmittal to the field.

SE12. Provide technical expertise in the form of studies, analyses, evaluation, plans development, and consultations such as materiel transfer plans and implementation; Theater Readiness Monitoring Facilities (TRMF) requirements definition; technology assessments, system surveys, and system integration; and preparation and review of draft international agreements.

SE13. Review system documentation, recommending purging information not authorized for transfer under the terms of the co-production memorandum of understanding (MOU) from the system documentation. Provide technical expertise for the development and implementation of plans, studies, briefings, letters of agreement, and MOUs related to co-production of U.S. weapon systems, subsystems, and selected major components.

SE14. Provide technical expertise in conducting market research and evaluations of Non-Developmental and commercial off the shelf items.

SE15. Provide technical expertise during the transition of systems.

SE16. Develop, assemble, and deliver prototype kit(s) to prove-in proposed hardware changes and to verify application procedures. Prepare draft documentation for use in future competitive procurements.

3.20 SM STRUCTURES AND MATERIALS

The contractor shall provide technical engineering expertise for all aspects of structures and materials and associated processes. Tasks include design, analysis, fabrication, testing, data acquisition and reduction, draft documentation preparation/review/comment, laboratory equipment and facility operation and maintenance, and modeling and simulation. Effort may include:

SM1. Review, prepare, conduct, and recommend evaluations, testing, and analyses of materials and processes to include metals, composites, adhesives, elastomers, plastics, organic compounds, paints, coatings, plating, corrosion prevention compounds, solvents, fuels, and lubricants. Evaluate the effects of materials and processes on the environment and recommend environmentally safe alternate materials and/or processes. Evaluate the effect on structural integrity of changes to critical processes during manufacturing.

SM2. Apply classic structural methods and advanced finite element modeling techniques to evaluate possible new design alternatives, repairs, and/or redesign efforts. Develop structural design criteria, internal and external loads, structural models, stress analyses and/or strength assessments of systems and their component structures. Review contractor generated strength analyses and drawings for technical accuracy and completeness.

SM3. Provide structural testing expertise to include fatigue, static, and flight test at the component, subsystem, and system levels. Identify test requirements for airframe and dynamic components. Generate and evaluate test plans and test results reports. Define the test setup, instrumentation/equipment requirements and locations, load levels and distribution and interpret results. Structural testing may include dynamic component fatigue tests, airframe component and system fatigue test, component static load tests, rotor whirl testing and landing gear drop tests, control system proof load tests, ground tie-down testing, flight load survey and structural demonstration testing.

SM4. Conduct mechanical design studies, trade-off analyses, and fabrication of various types of system and sub-system structures, including concept analysis and concept development for container concepts, container/launch tube, launchers, missiles, power systems, mobility, transportability, fire control systems, ground robotics, fixed wing/rotary wing aircraft and unmanned aerial and ground vehicles.

SM5. Provide technical engineering expertise in fatigue and fracture analysis to include:

a. Apply classical and computerized state-of-the-art fatigue and fracturing mechanics techniques to the evaluation of safe life and damage tolerant aircraft configurations.

b. Develop stress versus cycles (S-N) fatigue strength curves and crack growth rate curves and utilize with flight load survey and usage spectrum data to establish component retirement lives and/or inspection intervals, methods, and locations.

c. Review generated fatigue and fracture analyses for technical accuracy and completeness.

d. Conduct statistical evaluations of fatigue lives using Weibull analysis, Monte Carlo simulations and reliability analysis.

SM6. Provide technical engineering expertise in support of fatigue life tracking to include planning, designing, development, implementation, performance, and assessment of fatigue life tracking systems. Evaluate flight recorder hardware and software, analyze recording methodologies including regime recognition, direct load measurement and load synthesis and data retrieval and processing methods.

SM7. Provide technical engineering expertise in support on non-destructive inspections. Review, plan, prepare instructions and analysis for the application on NDT test equipment and procedures on selected aircraft components.

SM8. Provide technical engineering expertise in support of the Critical Safety Items evaluations. Develop critical characteristics, define new source test requirements, define critical manufacturing processes, evaluate manufacturing non-conformances.

SM9. Provide technical support for developing new and updating existing design guides, specifications/standards, handbooks, and Aeronautical Design Standards.

SM10. Perform 1-D, 2-D, and 3-D transient and steady state thermal analysis with the application of complex boundary conditions using both classical and numerical heat transfer methods.

SM11. Perform computational fluid dynamics studies for the full range of regimes from natural convection to high speed flow, with mach numbers up to and in excess of 20, including transient and steady state conditions.

SM12. Perform structural analysis using classical, finite element, and other State-of-the Art (SOA) techniques with static, dynamic, and temperature dependent loads and boundary conditions to obtain resultants stresses, displacements, and modal shapes/frequencies for viscoelastic, non-metallic, metallic, and composite structures.

SM13. Perform modal analysis of missile systems and associated hardware including test article fabrication, instrumentation, modal testing, and data reduction.

SM14. Develop rigid and flexible body dynamic simulations of missile systems and components using classical and computer based numerical techniques.

SM15. Analyze, design, fabricate, test, and evaluate missile and rocket system, unmanned vehicle, and ground support equipment components, subassemblies, and assemblies.

SM16. Apply thermal coating/barriers and high temperature aerospace insulation on missile surfaces and perform mechanical properties testing, bench testing, and flight testing.

SM17. Conduct mechanical failure and design studies and trade-off analyses on various types of missile/rocket/ground support equipment structures and subsystems, missiles and propulsion systems.

SM18. Generate mechanical and electrical design/modeling using Computer Aided Design (CAD) software packages.

3.21 SS SYSTEMS SIMULATION AND MODELING

The contractor shall provide engineering and scientific expertise in modeling and simulation theory, high level architecture, technology, planning, development, verification and validation, and simulation execution in support of system and subsystem development, operation, system analysis and use. The term simulation shall include constructive, virtual, distributed, detailed engineering (digital and hardware-in-the-loop) and live. Tasks will include analytical model and simulation planning, development, oversight, and integration with materiel acquisition programs. Efforts include:

SS1. Perform modeling and simulation tasks associated with the development of high-fidelity, Integrated Flight Simulations (IFS) which combine high fidelity missile modeling with tactical missile flight code, missile flight processors, and high fidelity target, clutter, and countermeasure environments. Develop open-source, low cost all-digital computer image generation for stimulation of high-fidelity sensor models and tracking algorithms which may be contained within an all-digital IFS. Develop and execute verification, validation and recommended accreditation plans to support milestone acquisition decisions.

SS2. Perform modeling and simulation tasks associated with support of hardware-in-the-loop (HWIL) simulation facilities. These tasks shall include: develop realtime target and background scenario signatures and methods of their validation; implementation of realtime and non-realtime scene generation systems for radio frequency, infrared, visible and ultraviolet signals projection within specialized facilities; develop software to project and control realtime target signals using special purpose scene projection hardware configured for various regions of the electromagnetic spectrum and various types of target sensing methods (for example, passive, semiactive, and active signals); develop, debug and operate software for control of HWIL simulation facilities, including digital signal networks and shared computer resources, flight motion simulators, and synthetic line-of-sight applications. Implement realtime dynamic 6 degree-of-freedom models of missiles, submunitions and other vehicles including mass, inertia, aerodynamic, control systems effects, guidance and naviation laws, target sensing and tracking devices, inertial guidance units, and GPS components; application of verification, validation and accreditation techniques to HWIL simulations using measured data from field and other tests.

SS3. Independently evaluate/analyze analytical model and simulation plans developed by third parties (e.g. other contractors) of systems, subsystems and components. Develop recommended simulation support plans. Develop and provide recommendations for the development and execution of Simulation Based Acquisition (SBA) and Simulation and Modeling for Acquisition, Requirements and Training (SMART).

SS4. Design, develop, modify, and maintain computer hardware, software and associated peripherals in support of simulation and other scientific applications. Design, develop, modify, and maintain computer models and simulations. Develop high fidelity non-real time and real time simulations that include tactical flight code. Apply these models and simulations to support the development and testing of system hardware. Analyze and evaluate the in-flight survivability for the system against selected worldwide defense systems such as TMD and AD THREATS. Provide planning, test documentation, data analysis, survivability and effectiveness analysis, test evaluations, and technical support for designed tests. Provide recommended accreditation requirements for test planning and incorporate the test results into the accreditation for specified survivability or effectiveness models.

SS5. Perform modeling and simulation tasks associated with targets development. These tasks shall include: the creation of digital geometry target models of range equipment used in Developmental and Operational Test and Evaluation; the development of simulation targets and signatures to support activities across the spectrum of Army and DoD simulations such as Computer Generated Forces, Hardware in the Loop and all digital simulations, and predictive signatures codes; The development of tools and methodologies to analyze and evaluate target model effectiveness; The development and utilization of tools and methods for the verification and validation of simulation targets using measured data from field and other tests; and the design and development of aerial targets, aerial tows, and target surrogates.

SS6. Design, develop, modify, operate, maintain, and update computer hardware, software, peripherals, equipment, and data in support of constructive, virtual, and instrumented live experimentation and analysis. Conduct the design of experiments and scenarios in coordination with other government agencies. Execute tasks in collaboration with other agencies and facilities to design and produce interoperable distributed simulations. Design and develop Local-Area-Network (LAN) and Wide-Area-Network (WAN) simulation events, including demonstrations and experiments in local and remote facilities. Develop Man-In-the-Loop (MIL) simulators, man-machine interfaces, and real-time simulations in stand-alone and distributed configurations including Distributed Interactive Simulation (DIS) protocols and High Level Architecture (HLA). Develop Simulation Object Models (SOM's) and Federation Object Models (FOM's) and associated enumerations and interface data to enable federated operation of multiple simulations. Integrate heterogeneous simulations to interoperate with compatible terrain databases, data representations, and interfaces. Implement interfaces between simulations and tactical and commercial hardware and software for hybrid live/simulated systems. Develop models and representations of systems, subsystems, platforms, features, and terrain, in simulation-appropriate formats, to populate virtual and constructive environments for representation of synthetic battlespaces. Develop and translate geo-specific and geo-typical Synthetic Natural Environments from source data into SEDRIS, commercial, and custom formats. Implement scenarios and vignettes in constructive simulations for Monte-Carlo and MIL execution. Develop distributed and virtual capabilities and simulations in support of force protection studies and homeland defense initiatives. Verify and validate (V&V) models and simulations against empirical data, subject matter expertise, physics-based data, and higher fidelity sources. Document design, developments, modifications,

configurations, object models, V&V, experiments, analyses, results, and lessons learned in appropriate formats for customer use and advancement of state-of-the-art in the modeling and simulation community.

3.22 SW SOFTWARE ENGINEERING

The contractor shall provide a broad-based capability in general systems and computer resources expertise to include:

a. Life cycle software engineering (LCSE).

b. Systems facilities assessments and analyses.

c. Development/demonstration/training/implementation of state-of-the-art hardware and software tools.

d. Hardware and software technology evaluation and/or insertion.

e. Systems/software process assessment, improvement planning and documentation, and organization metrics collection, analysis, and reporting.

f. LCSE training, seminars and overviews.

Software engineering expertise requirements may also include:

SW1. Develop, review or evaluate all computer software documentation. This may include, Software Quality, Program Plans, Software Configuration Management Plans and Software Development Plans.

SW2. Review, evaluate or develop recommended software program documentation such as system requirements and specifications, contract requirements, and Independent Verification and Validation (IV & V) Plans.

SW3. Perform IV & V of contractor/government computer software systems. Prepare draft plans and documentation using the software development and test facilities designated for life cycle support of the particular software.

SW4. Contribute to and report on formal software reviews, formal software quality reviews and design/test implementation reviews.

SW5. Develop/support training aids and devices, system and computer resource training, and end user training.

SW6. Develop software to support systems and subsystems development, integration, test, and deployment to include performing/supporting quality and configuration management of systems.

SW7. Facilitate coordination and maintain a software engineering environment that contains host computers, associated peripherals, and related devices and equipment.

SW8. Review,analyze and develop recommended software support techniques and development tools.

SW9. Provide technical expertise in software measurement, software quality, software reliability, software maintainability, and metrics.

SW10. Perform hardware requirements definition/analysis, hardware design, development of brassboard hardware for initial design checkout and initial software testing. Develop prototype hardware for integration testing, production prove out, and formal software testing.

SW11. Perform investigations/assessments concerning relevant issues associated with systems/software evaluations and/or transition of system software support responsibility to the government.

SW12. Perform engineering analysis of systems and/or software for battlefield automated systems for development, transition, and/or sustainment.

SW13. Perform interoperability engineering and interoperability tests to include analysis of system requirements, development of plans/procedures for interface with other systems, analysis of standards, and post test analysis.

SW14. Perform software airworthiness assessments and evaluation of airworthiness releases for safety-critical software.

SW15. Provide technical expertise in software safety.

3.23 TD TECHNICAL DATA MANAGEMENT

The contractor shall provide technical expertise for the centralized planning, direction, and control of configuration management, status accounting, data management, and standardization programs. The contractor shall maintain physical network connectivity to all automation resources required to perform the tasks outlined below.

TD1. (STANDARDIZATION) The contractor shall provide technical, engineering, and management support in the areas of the Defense Standardization Program (DSP), International Standardization Program, Acquisition Reform and Pollution Prevention. Standardization tasks will include the preparation of technical documentation such as evaluations, reports, studies, briefings, recommended specifications, draft standards, and commercial item descriptions. Effort may include:

a. Review, evaluate, and/or prepare recommended Defense Specifications and Standards, Non-Government Standards, Commercial Item Descriptions, Guide

Specifications, Aeronautical Design Standards, and Missile Interim Specifications in accordance with DoD 4120.3-M.

b. Provide technical expertise in lead standardization activity functions.

c. Prepare coordination packages and provide input for Item Reduction Studies and Interchangeability/Substitutability Studies.

d. Provide technical expertise in the parts management program, nomenclature, and GIDEP.

e. Provide technical expertise in international standardization activities of North Atlantic Treaty Organization (NATO), American-British-Canadian- Australian (ABCA), and Air Standardization Coordination Committee (ASCC).

f. Provide technical expertise in acquisition reform initiatives and activities.

g. Provide technical expertise in ozone depleting chemicals/ozone depleting substances/hazardous material studies/activities.

h. Provide technical expertise in execution of the DSP.

TD2. (Configuration Management) The contractor shall provide technical expertise and/or conduct studies and monitor the effectiveness of the configuration management (CM) program to provide a continuing program to control, improve, and simplify the system. Effort may include:

a. Perform review of CM packages.

b. Develop and facilitate coordination of recommended configuration corrective actions and evaluate subsequent effectiveness.

c. Develop and monitor budgeting, regulations, management principles, planning, and programming in order to establish economic and technical impact of the various CM programs.

d. Contribute to configuration audits, technical audits, configuration control boards (CCBs), and provide ECP rate information to the production readiness database; review other contractor prepared audit plans and in-process reviews (IPRs).

e. Develop and analyze recommended specifications, perform sensitivity analyses, and provide technical expertise in allocating the functional system baseline and controlling subsystem interfaces. Prepare recommended performance specifications IAW MIL-STD-961.

f. Perform specialty technical area engineering evaluations and/or generation of recommended ECPs, requests for waiver (RFWs), and requests for deviation (RFDs) and recommend approval/disapproval of ECPs, RFDs, and RFWs. Develop or provide

all engineering data, System Safety Risk Assessment, Economic Analysis, Cost and Operating Effectiveness Analysis, and engineering schedule and cost estimates for the material changes effort. Furnish recommended Airworthiness Qualification Plans/Specifications for all material changes.

g. Provide technical expertise in the preparation of configuration management programs and plans.

h. Provide technical expertise to ensure adequacy of TDPs and performance specifications.

i. Perform engineering analysis of technical documentation to support procurements.

j. Identify and document the performance, interoperability, interface, physical, and/or functional characteristics for each hardware or software configuration item, including controlling changes to those characteristics. Record and report change processing and implementation status throughout the life cycle of the system.

k. Provide technical expertise and implement procedures for configuration identification verification audits, change control, and status accounting.

l. Review ECPs and other technical documentation for recommended foreign disclosure determination.

m. Plan, develop, and facilitate coordination of configuration management program for systems in consonance with established directives, policies, and international agreements.

TD3. (STATUS ACCOUNTING**)** The contractor shall conduct studies directed toward the improvement of the Command Status Accounting Program. Efforts may include:

a. Input, compile, and prepare data to load status accounting system files as described in the government furnished data entry manual. Data loaded into status accounting system files shall be analyzed as described in the government furnished quality assurance plan. Change either the data entry manual or the quality assurance plan as approved by the government.

b. Provide technical expertise and input for the preparation of TDPs.

c. Maintain a training facility and provide audience-specific status accounting system end user training and/or capability demonstrations to personnel up to and including DOD-level staff and command level.

d. Provide technical expertise/advice in the development of next generation automated configuration management systems.

e. Provide drafting support as described in the government furnished Computer Aided Drafting (CAD) Manual and CAD Desk Procedures. Change/update either the CAD Manual or CAD Desk Procedure as approved by the government.

f. Maintain the repository of original hard copy drawings utilizing existing government furnished automated tools. Develop, maintain and/or revise the source code for government automation tools.

3.24 TE TEST AND EVALUATION

The contractor shall provide test and evaluation (T&E) technical, engineering, and management expertise.

TE1. Prepare, facilitate coordination, maintain, update, review, and evaluate T&E documentation such as charters; Test and Evaluation Master Plans (TEMP); evaluation and assessment plans; test plans, procedures, and reports; design plans; software T&E documentation; T&E automation requirements and automation plans; T&E matrices, crosswalks, schedules; T&E issues, criteria, characteristics, and parameters; and T&E associated annexes and attachments.

TE2. Provide technical expertise to monitor, observe, witness, facilitate coordination, and report on tests, demonstrations, special investigations, and inspections to include:

a. Test photographic and video documentation.

b. Testability analyses.

c. Identification of required test resources and facilities.

d. T&E related analyses and studies.

e. Test incident reports (TIR) preparation and maintenance, and corrective actions process support.

TE3. Provide technical expertise in test data and information database management and tracking such as:

a. Prepare, update, collect, automate, store, and maintain test, demonstration, special investigation, inspection data and information.

b. Maintain and automate TIR, corrective action, and closure status.

c. Provide statistical and graphical analysis of T&E data.

d. Develop, automate, update, maintain and or improve T&E data.

e. Provide digitization support to T&E documentation.

TE4. Provide technical expertise in T&E policy, regulation, guidance, and management such as:

a. Review T&E regulatory, policy, and guidance documents and draft development, facilitate coordination, and recommend updating proposed T&E regulations, policy, and guidance documents.

b. Review and provide recommendations for T&E assets and resources.

c. Review and provide recommendations on fleet and quick reaction.

d. Review and provide recommendations on program interchange.

e. T&E training preparation, coordination, and presentation support.

f. Preparation (in draft format) of future T&E requirements reports.

g. Review and provide recommendations on the T&E Reliance Program and T&E Corporate Information Management.

h. Review and provide input to T&E management studies and analyses.

i. Review and provide input to T&E process development and management support.

TE5. Provide general T&E technical expertise such as:

a. Independent support services in areas of T&E technical project management.

b. Design, develop, and report on test methodologies and technologies.

c. T&E support of test technology and future T&E requirements.

d. T&E support of scientific and technology (S&T) programs.

e. Analysis of test range capabilities and support of facility and asset studies.

f. Modify existing and/or develop new test tools and simulators for conducting system integration and interoperability tests and demonstrations to include the review of requirements, and the traceability of requirements to design.

3.25 TP TEST PROGRAM SET (TPS)/ AUTOMATED TEST EQUIPMENT (ATE)

The contractor shall provide technical expertise in TPSs, ATE, and built-in-test/built-in-test equipment (BIT/BITE) to include analyses, evaluation, updates, prototyping, fielding,and specialized maintenance support. Provide TPS/ATE expertise in all phases of system life cycle. Efforts may include:

TP1. Perform development, proof-of-principle evaluations, prototype fabricating, testing, evaluation and updating, analysis and review, configuration audits and reviews, network scheduling, studies, independent analyses, and formulate and recommend alternative solutions to engineering and technical problems associated with the development and sustainment of TPSs, ATE, and BIT/BITE.

a. Review and evaluate hardware and software to determine adequacy and efficiency of functional and diagnostic test procedures.

b. Design and validate hardware and software changes to overcome ATE/TPS deficiencies, and changes in design requirements; and to enhance present testing capabilities, resolve operational problems and replace obsolete parts.

c. Assess the impact of ECPs on the hardware and/or software of ATE and/or TPSs.

TP2. Provide on-site technical expertise for ATE/TPSs at CONUS, OCONUS, and customer locations (including FMS customers).

a. Perform specialized maintenance on ATE, TPSs, and ATE/TPS line replaceable units (LRUs) and shop replaceable units (SRUs).

b. Incorporate approved hardware and software changes in the ATE and TPSs.

TP3. Operate the TPS Digital Design Studio (TPS-DDS).

a. Evaluate TPS software to determine appropriateness and efficient application of digital imagery to TPSs.

b. Operate digital image capture equipment and associated software processing of images for technical documentation, TPS information screens and executive presentation material.

TP4. Perform special projects/feasibility studies on critical support or readiness problems in connection with deployments, new programs, new concepts, and similar selected projects as they relate to ATE/TPS issues.

a. Design and input schedule and resource data into a networking tool and provide analytical expertise to assist in determining program activities and milestones.

b. Perform process and risk analyses of the Integrated Family of Test Equipment (IFTE) network support environment to ensure optimized utilization of computer network resources and embedded diagnostics.

c. Perform economic analyses and prepare lifecycle cost estimates/analyses and cost/benefit analyses on projects.

3.26 WH WARHEADS

The contractor shall provide technical expertise in warhead design, development, analysis, modeling, production, test and evaluation for missile systems; integration of lethal mechanisms on systems; hypervelocity and other technology test bed demonstrations; and fuzing support to electronic and mechanical safe and arm devices and target detection systems and associated hardware and software. Effort may include:

WH1. Develop, prepare, and/or provide test matrices, lethal mechanism tests, system integration and test expertise, data analysis for lethal mechanism system performance evaluation against future threat configurations and overall systems engineering and advanced component integration.

WH2. Conduct and evaluate requirements for live fire testing. Provide recommendations regarding implementation of lethal mechanisms, fuzing, and system integration into missiles and validation of component and system performance qualification. Conduct design studies and trade-off analyses on various types of lethal mechanisms, fuzing, and target detection systems and missile subsystems.

WH3. Provide technical expertise in kinetic energy, explosively formed penetrators, chemical energy, fragmenting, and interceptor lethal mechanisms design, characterization, performance analysis, integration, fabrication, testing, and qualification.

WH4. Provide technical expertise for fuzing related tasks, testing, development, or production support. Facilitate coordination of requirements with other commands and services. Develop codes for modeling fuzing algorithms. Interface endgame simulations to appropriate models and ground effects simulations. Interface endgame simulations to pre- and post- engagement simulations.

WH5. Provide technical expertise for evaluating the storage reliability, design, operation, and testing of electronic safe and arming fuze (ESAF) firing circuit elements, and coordination for electronic safe and arming device (ESAD) and fuzing designs that can be common to any missile. Evaluate, develop, and implement proposed fuze designs or changes. Facilitate coordination of fuzing community and fuze board interface.

WH6. Develop and operate endgame simulation tools for survivability, vulnerability, penetration, damage, lethality, and ground effects evaluations.

3.27 WS WEAPONS SCIENCE

The contractor shall support research, exploratory and advanced development, technology demonstrations, and provide engineering and scientific expertise in all aspects of advanced systems technology including functions associated with photonics, directed energy, micro-device design, fabrication, and evaluation.

WS1. Provide technical expertise in the measurement, analysis, modeling, and processing of automatic/assisted target recognition and surveillance systems/sub-

systems including optical processing technology, hyperspectral technology, polarization, and neural network processing.

WS2. Provide technical expertise with respect to techniques, components, devices, phenomenology and subsystems, which are a part of directed energy systems. These functions shall include target detection, electromagnetic beam generation, beam control, propagation, beam maintenance, kill assessment, retargeting, and countermeasures. Directed energy technologies range from ultra short pulse (femto-second) lasers operational in the visible and ultraviolet portions of the spectrum to microwave devices.

WS3. Provide technical expertise in the development of optical and advanced computing concepts to include: holographic components, optical interconnects, neural networks, and quantum information processing. Provide input and analysis of theoretical and experimental research in laser cooling and trapping of atoms, controlled laser excitation of quantum systems, decoherence efforts for quantum states, and the controlled interaction of quantum systems for information storage and processing.

WS4. Provide technical expertise in the design, fabrication, measurement, packaging, and testing of microfabricated or photonics components and devices. This support shall include the development of processes, hardware, software, and materials for nanotechnology, microfabrication, and microfabricated or photonic devices.

WS5. Provide engineering design services for components used in brassboard demonstration hardware, prototype devices, and laboratory instrumentation. The design technologies represented are optical, electro-optical, and micro-electromechanical systems. Develop conceptual solutions and carry out numerical analysis to formulate an optimum configuration, provide engineering drawings, and predict design requirements to validate the resulting product.

WS6. Provide microfabrication of pre-established designs for components used in brassboard demonstration hardware, prototype devices, nanotechnology and concept evaluation experiments. The microfabrication shall include high-resolution photolithography, etching, material deposition, bonding, and packaging. The technologies represented are optical, electro-optical, electronic, and micro-electromechanical systems. Establish the required parameters for precise fabrication and material choice; perform parameter studies to determine optimum fabrication conditions; and predict, calibrate, validate fabrication details.

WS7. Develop and execute evaluation procedures for components used in brassboard demonstration hardware and prototype devices for both limited experimentation as well as system integration. The analysis shall include appropriate modeling to establish relevant parameters and numerical constraints. The testing shall provide assessment of required parameters for evaluation of fabrication tolerances and design comparisons. Procedures shall be developed for optimization and rework with documentation sufficient to provide accurate statistical accounting and traceability

4.0 DATA REQUIREMENTS:

The contractor shall prepare the following data as specified in individual task orders.

Data Item No.	Title
DI-MGMT-80368A	Status Report
DI-MISC-80508B	Technical Report-Study/Services
DI-MGMT-80227	Contractor's Progress, Status and Management Report
DI-ADMN-81373	Presentation Material
DI-MGMT-81117	Technical and Management Work Plan
DI-ADMN-81505	Report, Record of Meeting/Minutes
DI-MGMT-80004A	Management Plan
DI-FNCL-80331A	Funds and Manhour Expenditure Report
DI-ADMN-81313A	Progress Report (Studies)
DI-MGMT-81334D	Contract Work Breakdown Structure
DI-MGMT-81467	Cost/Schedule Status Report (C/SSR)
DI-MGMT-81468	Contract Funds Status Report (CFSR)
DI-MGMT-80555 A	Program Progress Report
DI-ADMN-81249A	Conference Agenda
DI-ADMN-81250A	Conference Minutes
DI-MISC-80711A	Scientific and Technical Reports
DI-MCCR-80700	Computer Software Product End Items
DI-ADMN-80925	Revision to Existing Government Document
DI-SESS-81758	Logistics Management Information (LMI) Data Product(s)
DI-MGMT-80061A	Engineering and Technical Services Accomplishment

DI-ATTS-80283B	Test Program Set (TPS) and Operational Test Program Set (OTPS) Acceptance Test Procedures (ATPS)
DI-ATTS-80285C	Engineering Support Data (ESD)
DI-CMAN-80463C	Engineering Release Record
DI-QCIC-80553 a	Acceptance Test Plan
DI-NDTI-80566 A	Test Plan
DI-CMAN-80639C	Engineering Change Proposal
DI-CMAN-80642C	Notice of Revisions
DI-CMAN-80643C	Specification Change Notice
DI-DRPR-80651	Engineering Drawings Review Report
DI-MISC-80750	Technical Data Package Review Report
DI-CMAN-80792A	Validation Report
DI-SESS-81000D	Product Drawing and Associated Lists
DI-SDMP-81261	Commercial Item Description
DI-IPSC-81427A	Software Development Plan
DI-IPSC-81428A	Software Installation Plan
DI-IPSC-81429A	Software Transition Plan
DI-IPSC-81430A	Operational Concept Description
DI-IPSC-81431A	System/Subsystem Specification
DI-IPSC-81433A	Software Requirements Specification
DI-IPSC-81435A	Software Design Description
DI-IPSC-81437A	Database Design Description
DI-IPSC-81438A	Software Test Plan
DI-IPSC-81439A	Software Test Description
DI-IPSC-81440A	Software Test Report

DI-IPSC-81441A	Software Product Specification
DI-IPSC-81442A	Software Version Description
DI-IPSC-81443A	Software User's Manual
DI-IPSC-81444A	Software Center Operator Manual
DI-IPSC-81445A	Software Input/Output Manual
DI-IPSC-81446A	Computer Operation Manual
DI-SDMP-81465A	Performance Specification
DI-ILSS-81523B	Training Conduct Support Document
DI-CMAN-80858B	Contractor's Configuration Management Plan
DI-MISC-80508B	Technical Report Study Services
DOD 4120.3-m	Defense Standardization Program (DSP) Policies and Procedures

5.0 SECURITY REQUIREMENTS

The contractor shall, in the performance of individual task orders or technical instructions (TIs), be required to provide security certified personnel and facilities. The contractor, team members and subcontractors will provide functional support services using intelligence information, foreign intelligence information, Sensitive Compartmented Information, Special Access Program information and be responsible for appropriate conduct involving Operational Security (OPSEC) and For Official Use Only (FOUO) information. General guidance is provided in each BPA. Specific requirements above and beyond the basic DD254 will be provided on a case-by-case basis.