As a minimum, the Contractor shall address the MS&A/Trade Studies identified in Table 3-5.

Table 3-5. Modeling, Simulation & Analysis/Trade Studies

Nomenclature	Description
Affordability	Affordability, both from an *acquisition cost* and *life cycle cost* perspective, is critical to the success of the SK Radar program. The SK Radar Contractor shall provide cost and performance trade-offs that may potentially offer a different system optimization (SOO 3.5.1)
Aircraft Integration Support	Tasks include, but are not be limited to, generation of mechanical, environmental, EMI, and I/O models
Airworthiness Analysis	The Contractor shall conduct analysis and prepare documentation for the Aircraft Configuration Control Board (CCB) to demonstrate that aircraft modifications meet Airworthiness Qualification requirements (section 3.3.3.1.4) (SOO 3.1.2) Aircraft Airworthiness Qualification for the SK System will be in accordance with (SRD 3.5.5): a. b. c.
Flight Test Data Analysis Tools	
SK System Performance	The Contractor shall perform analysis of SK System performance
SK Radar Performance Analysis	Development/maintenance of performance analysis models for the radar for all modes
Weight Control	The Contractor shall estimate, substantiate, and document the weight of the SK System. Following SDR, the Contractor shall update SK System weight and report status to USSOCOM monthly.

Table 3-5. Modeling, Simulation & Analysis/Trade Studies

Nomenclature	Description
(b)(2)High	
SKR B-Kit (b)(2)High	The Contractor shall investigate interface aspects of the MDS to (b)(2)High determine the cost/benefit analysis (b)(2)High
	Options for (b)(2)High SKR B-Kit software include:
	a) (b)(2)High
	b) (b)(2)High
	c) (b)(2)High
	Evaluation of each option will be made against the following criteria: design and development costs; factory test and verification; (b)(2)High verification and validation, including flight test time for airworthiness qualification; fielding cost; sparing, training and logistics footprint.

3.4.2 Software Development

The Contractor shall use commercial software engineering and best commercial practices for software (legacy, previously developed, and new) developed under this SOW. SK System Software developed under this program shall use open-architecture, integrated, software development environments.

3.4.2.1 Software Development Plan (SDP)

The Contractor Software Development Plan (SDP) shall detail software project planning, monitoring & control activities, and lifecycle(s) to be used in the software development process. The SDP shall address:

a. Software Development Management – responsibilities/authority, schedules, project tracking and reporting, risk management, formal reviews/audits, and problem/change reporting

b. General Software Development Activities – lifecycle model, development methods, reuse, safety/security, documentation requirements, development processes, methodology and tools, and design/coding standards for SK software development and Test Program Set software development

c. Detailed Software Development Activities – environment, build plan, architecture development, requirements analysis, design, design implementation, requirements verification; and test planning and execution

d. Software Evaluations – Reviews, Procedures, Tools and Records

e. Software Configuration Management – configuration identification, change control, status accounting, configuration audits, baselines, problem reporting, and change reviews

f. Software Development Folders – the data items and artifacts of Table A-1 through Table A-10 of DO-178B, software shall be documented and available for government review as required by the government agency responsible for software acceptance

The Contractor shall prepare and submit a Software Development Plan (SDP) in accordance with CDRL Sequence Number A00S.

The Contractor shall include Firmware Development activities in the SK Radar Hardware Development Plan described in 3.4.3.1.

3.4.2.2 Software Metrics

The Contractor will employ software development and quality metrics in the management of the software development effort. Software metrics will be developed and managed within the Program Metrics Plan (section 3.1.1.8).

3.4.2.3 Software Resources Data Report (SRDR)

SRDR is a DoD initiative with a primary purpose to improve the ability of the DoD to estimate the costs of software intensive programs. DoD Instruction 5000.2 requires that data be collected from software development efforts with a projected value greater than $25 million (FY 2002 dollars) contained within major automated information systems and major defense acquisition

programs. Data collected from applicable projects describe the type and size of the software development, and the schedule and labor resources needed for the development.[10]

The Contractor shall prepare/submit to USSOCOM "Developer" Software Resources Data Reports (SRDR) in accordance with DoD Instruction 5000.2 and DoD 5000.4-M-2.

3.4.2.4 Software Languages

All new application software shall be modular and written using only Higher Order Languages (HOL) employing the American National Standards Institute (ANSI) instruction sets or equivalent. (SRD 3.2.10.2)

3.4.2.5 Operating System

Silent Knight shall employ a POSIX-compliant and DO-178B certifiable operating system. All new or modified software shall adhere to a consistent OSA Application Program Interface (API) as defined by Open Systems Joint Task Force (OSJTF). The SK System Software shall provide a uniform, hardware-independent application program interface. (SRD 3.2.10.2)

3.4.2.6 Off-The-Shelf (OTS) Software

Unmodified Off-The Shelf (OTS) software shall be used where it reduces life-cycle costs, reduces development cost, is affordable, and meets operational requirements (SRD 3.2.10.2). OTS software used within the SK Radar software shall be DO-178B certifiable.

3.4.2.7

3.4.2.8 Developmental Software Inspections

The Contractor shall conduct reviews of all new and modified deliverable software work products. The Contractor's review process shall be described within the Contractor's SDP (section 3.4.2.1). The Contractor shall describe in detail the software review methods used for flight critical software (sections 3.4.2.15 and 3.6.1.3). Artifacts of these reviews shall be available for USSOCOM review.

3.4.2.9 Identification/Control of CSCI

The Contractor shall identify and control SK Computer Software Configuration Items (CSCI) and SK Firmware Configuration Items (CI) as defined in Sections 3.1.2.5.1 and 3.1.2.8.

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[10] Definition derived from Section 11.3.2.1 of the Defense Acquisition Guide.

3.4.2.10 Software Requirements Specification (SRS)

The Software Requirements Specification (SRS), described in Section 3.4.1.1, establish the requirements for Radar software CSCI functionality, operation, performance, and qualification. The Firmware Critical Item Development Specification (CIDS) establish the requirements for the Radar firmware CI functionality, operation, performance, and qualification.

3.4.2.10.1 Interface Requirement Specification (IRS)

A Software IRS specifies the requirements imposed on product/component interfaces. The Contractor shall prepare an IRS for the SK Radar software development. The IRS shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00K.

3.4.2.11 Software Design

The Contractor shall produce both Preliminary and Detailed Design for the software as documented in the SDP.

Preliminary Design is the process in which the CSCI requirements are converted into an initial design, usually at the detailed, partitioned block diagram stage, ready for a Preliminary Design Review (PDR) and, subsequently, for continuation into detailed design. SK Program PDR is detailed within Table 3-1 of the Program Management Section of this SOW.

Detailed Design is the process in which the detailed specifications are converted into a documented, validated design ready for the Critical Design Review (CDR) and, subsequently, for release for production. SK Program CDR is detailed within Table 3-1 of the Program Management Section of this SOW.

The Contractor shall produce firmware design information in the Firmware CIDS as documented in the Hardware Development Plan (HDP).

3.4.2.11.1 Software Design Document (SDD)

SDDs describe the design of CSCIs. The Contractor will prepare an SDD for each SK Radar CSCI (section 3.4.2.9). The SDDs shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00F.

3.4.2.11.2 Interface Design Document (IDD)

Software IDDs describe the interface characteristics for CSCIs. The Contractor will prepare an IDD for each SK Radar CSCI (section 3.4.2.9). The IDDs shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A046.

3.4.2.12 Software Testing

The following sections identify Software Test Plans, Procedures, and Reports required for execution of the SK Program.

3.4.2.12.1 Software Test Plan (STP)

The Contractor documents its software test planning activities within a Software Test Plan (STP). The STP contains test plans for the qualification testing of one or more Computer Software Configuration Items (CSCIs). The STP identifies the software test environment, test schedules, and individual tests to demonstrate compliance of the software requirements specified in the SK Radar PIDS (section 3.3.3.1.3) and the Software Requirements Specifications (section

Use or disclosure of data contained on this sheet is subject
to the restriction on the title page of this document.

3.4.2.10). Additionally, the STP will address verification of the process outputs, including post-testing independent reviews, and QA reviews/audits. The STP addresses requirements for witnessing testing activities. The STP will be prepared and submitted in accordance with CDRL Sequence Number A044.

The Contractor documents its firmware test planning activities within a Firmware Verification Plan.

3.4.2.12.2 Software Design Verification Test (DVT)

A DVT shall be executed for each SK CSCI and Firmware CI. The DVT comprises formal execution of its corresponding Software Test Description (STD) procedure or Firmware Verification Plan (FVP). The STD contains the test preparations, test cases, and test procedures to perform qualification testing of the Computer Software Configuration Items (CSCIs) identified in the Software Test Plan (STP). The STD verifies compliance of SRS requirements (section 3.4.2.10) for each CSCI. FQT of software and firmware shall be witnessed by Program Software Quality Assurance (SQA). Successful completion of the STD or FVP procedure indicates the CSCI or firmware is compliant with SRS or CIDS requirements and is ready to transition to SK Radar-level testing (section 3.4.4). The Contractor shall submit each Software Test Description (STD) to USSOCOM in accordance with CDRL Sequence Number A00A.

3.4.2.12.3 Software Test Report (STR)

A Software Test Report (STR) will be generated for each CSCI and Firmware CI documenting completion of the corresponding STD. The Contractor shall submit all Software Test Reports (STR) to USSOCOM in accordance with CDRL Sequence Number A00B.

3.4.2.12.4 Plan for Software Aspects of Certification (PSAC)

The Contractor shall perform Structure Coverage Analysis (SCA)/Testing for the SK Radar software. The Contractor shall develop a PSAC for the below listed SK Radar CSCIs and support tools, for USSOCOM review and approval in accordance with CDRL Sequence Number A034. The PSACs will apply the guidance of RTCA-DO-178B paragraph 11.1 and the following:

a.

b.

c. SK Radar models and simulations, as verification tools for SK Radar software development

d. SK test equipment, as verification tools for SK Radar software development

3.4.2.12.5 Software Structure Coverage Testing

The Contractor shall perform software and firmware verification, to include Level-A Structural Coverage Analysis (SCA)/testing, for the SK Radar software and firmware, in accordance with the SK Radar Plan for Software Aspects of Certification (PSAC) with the guidance of DO-178B, Section 6.0. SCA results shall be included in the respective STR (section 3.4.2.12.3). Automated SCA tools are qualified in accordance with DO-178B as described in the PSAC.

3.4.2.13 Software Quality Assurance (SQA)

The Contractor's SQA designate shall:

a. Participate in product evaluations and reviews

b. Create and perform audits of Processing Subsystems processes and products, tests, and product acceptance, including those for firmware

c. Conduct corrective action verification

d. Maintain Processing Subsystems quality records

e. Perform Processing Subsystems quality reporting

3.4.2.14 Software Delivery

The deliverable software and firmware shall be Software Configuration Management (SCM)-certified and Software Quality Assurance (SQA)-verified/accepted prior to shipment to USSOCOM. All software and firmware documentation must be readily available to substantiate conformance to the SRS or CIDS requirements (3.4.2.10) for each version of the deliverable software or firmware. The software documentation must clearly, accurately, and completely describe the software being delivered to USSOCOM. A software accomplishment summary shall be submitted for the SK Radar.

3.4.2.14.1 Software Product Specification (SPS)

The SPS describes and identifies the executable software, source files, and software support information, including "as built" design information and compilation, build, and modification procedures for a CSCI. The Contractor shall prepare and submit to USSOCOM a Software Product Specification (SPS) for each of the CSCIs, in accordance with CDRL Sequence Number A00E.

3.4.2.14.2 Version Description Document (VDD)

The Software VDD formally identifies the components of each product delivery and is developed for all executable software subsystems, including firmware. The Contractor shall deliver with each CSCI or firmware CI a Software VDD prepared in accordance with CDRL Sequence Number A00C.

3.4.2.14.3 Software Executables

The software (regardless of the media) and the software documentation being delivered to USSOCOM shall visibly illustrate the Contractor's Software Configuration Management (SCM) and Software Quality Assurance (SQA) acceptance. The deliverable software will be write-protected and tamperproof to preclude any possibility of its integrity or configuration being altered.

3.4.2.15

Table 3-6. DO-178B Software Life Cycle Data List

Title	Type	DO-178B Reference	Comments
Plan for Software Aspects of Certification (PSAC)	Document	11.1	Prepared/submitted in accordance with CDRL Sequence Number A034
Software Development Plan (SDP)	Document	11.2	As detailed in Section 3.4.2.1
Software Verification Plan (SVP)	Document	11.3	The SVP shall be developed, maintained and delivered per the guidance of RTCA DO 178B, paragraph 11.3.
Software Configuration Management Plan (SCMP)	Document	11.4	Addressed within the Software Development Plan (SDP) – Section 3.4.2.1 (e.)
Software Quality Assurance Plan (SQAP)	Document	11.5	Addressed within the Software Development Plan (SDP) – Section 3.4.2.1
Software Requirements Standards (SRS)	Document	11.6	As detailed in Section 3.4.2.10
Software Design Standard (SDS)	Document	11.7	Addressed within the Software Development Plan (SDP) – Section 3.4.2.1
Software Code Standards (SCS)	Document	11.8	Addressed within the Software Development Plan (SDP) – Section 3.4.2.1
Software Requirements Data (SRD)	Document	11.9	Addressed within the Software Requirements Specification (SRS) – Section 3.4.2.10
Software Design Description (SDD)	Document	11.10	As detailed in Section 3.4.2.11
Source Code	Software	11.11	As detailed in Section 3.4.2.14
Executable Object Code	Software	11.12	As detailed in Section 3.4.2.14
Software Verification Cases and Procedures (SVCP)	Document	11.13	Addressed within the Software Test Description (STD) – Section 3.4.2.12
Software Verification Results (SVR)	Records	11.14	Addressed within the Software Test Report (STR) – Section 3.4.2.12.3

Table 3-6. DO-178B Software Life Cycle Data List

Title	Type	DO-178B Reference	Comments
Software Life Cycle Environment Configuration Index (SECI)	Document	11.15	Addressed within the Software Development Plan (SDP) – Section 3.4.2.1
Software Configuration Index (SCI)	Document	11.16	Addressed within the Version Description Documents (VDD) – Section 3.4.2.14.2
Problem Reports (PR)	Records	11.17	All software problems shall be tracked from identification to correction per the guidance of DO-178B, paragraph 11.17. Monthly status shall be incorporated into the Contractor Monthly Status Report (section 3.1.3.1)
Software Configuration Management Records	Records	11.18	Addressed under Software Configuration Management – Section 3.1.2.5.1
Software Quality Assurance Records	Records	11.19	As detailed in Section 3.4.2.13
Software Accomplishment Summary (SAS)	Document	11.20	Addressed within the SPS (Section 3.4.2.14.1) and VDD (Section 3.4.2.14.2)

3.4.3 Hardware Development

The following sections identify the requirements, processes, and procedures for hardware development during the SK SDD Program.

3.4.3.1 Hardware Development Plan (HDP)

The Contractor documents its hardware development planning activities within a Hardware Development Plan (HDP). The HDP details hardware project planning, monitoring, and control activities. The HDP provides a tool for identifying and ensuring the control of the overall hardware engineering processes and serves as the controlling document for the project's hardware engineering management practices and procedures.

The HDP identifies the following:

a. Requirement sources

b. Key ISO related requirements

c. Hardware metrics

e. Requirements traceability, allocation, and compliance

f. Developmental inspections

d. Analysis, evaluation, and change control

g. Preliminary/Detail design practices

h. Requirements verification/validation

3.4.3.2 Hardware Metrics

The Contractor will employ hardware development and quality metrics in the management of the hardware development effort. Hardware metrics will be developed and managed within the Program Metrics Plan (section 3.1.1.8).

3.4.3.3 Off-The Shelf (OTS) Hardware

Unmodified Off-The Shelf (OTS) hardware shall be used where it reduces life-cycle costs, reduces development cost, is affordable, and meets operational requirements.

3.4.3.4 Developmental Hardware Inspections

The Contractor shall conduct reviews on all new and modified hardware work products. The Contractor's review process shall be described within the Contractor's HDP (section 3.4.3.1).

3.4.3.5 Identification/Control of Hardware Configuration Items (HWCI)

The Contractor shall identify/control HWCIs as defined in Section 3.1.2.5.

3.4.3.6 Hardware Requirements Specification (HRS)

This Hardware Requirements Specification (HRS) establishes the requirements for HWCI functionality, operation, performance, and qualification. HWCI Specifications are the responsibility of System Engineering as detailed in Section 3.4.1.

3.4.3.7 Hardware Design

The Contractor shall produce both preliminary and detailed design for the hardware as documented in the HDP.

Preliminary design is the process in which the HWCI requirements are converted into an initial design, usually at the detailed, partitioned block diagram stage, ready for a Preliminary Design Review (PDR) and, subsequently, for continuation into detailed design. SK Program PDRs are detailed within Table 3-1 of the Program Management Section of this SOW.

Detailed design is the process whereby the detailed specifications are converted into a documented, validated design ready for the Critical Design Review (CDR) and, subsequently, for release for production. SK Program CDRs are detailed within Table 3-1 of the Program Management Section of this SOW.

3.4.3.8 Hardware Testing

The following sections identify Hardware test plans, procedures, and reports required for execution of the SK Program.

3.4.3.8.1 Design Verification Test (DVT) Plan

The DVT Plan contains the strategy for design verification testing of Hardware Configuration Items (HWCIs). The DVT Plan will identify the test environment, test schedules, and individual tests to demonstrate compliance to requirements specified in the Hardware Requirements Specifications (section 3.4.3.6).

3.4.3.8.2 Design Verification Tests (DVT)

The Contractor will perform Verification of the SK Radar hardware elements as defined in Section 3.3.3.2.2. Design Verification Testing is conducted for each SK Radar HWCI and is comprised of execution of its corresponding DVT Procedure. The DVT Procedure contains the test preparations, cases, and procedures to perform design verification of the Hardware Configuration Items (HWCIs) identified in the DVT Plan. The DVT Procedure verifies compliance of HRS requirements (section 3.4.3.6) for each HWCI. Successful completion of the DVT procedure indicates the HWCI is compliant with HRS requirements and that it is ready to transition to SK Radar-level testing (section 3.4.4).

3.4.3.8.3 DVT Test Report

A DVT Test Report will document completion of the DVT for each HWCI.

3.4.3.9 Hardware Quality Assurance

The Contractor's Quality Assurance (QA) department shall conduct hardware quality audits to verify Hardware Engineering's conformance to company processes and program plans as detailed in Section 3.2.

3.4.4 Integration and Test

The following paragraphs detail the planning, integration, and test activities for the SK Radar.

3.4.4.1 Radar Integration and Test Planning

The Contractor will develop a Radar Test and Evaluation Plan that identifies integration and SK Radar PIDS compliance testing strategies. Software testing (section 3.4.2.12) and hardware testing (section 3.4.3.8) will be including within the Radar Test and Evaluation Plan.

3.4.4.2 Radar Integration

The Contractor shall perform product-level integration of the Radar as defined in Section 3.3.3.2.1.

3.4.4.3 Radar Testing

All requirements identified within the SK Radar PIDS' Requirements Verification Matrix (RVM) as "Test" shall require Contractor testing. Testing shall be subdivided into one of the following three categories:

a. Final Qualification Test

b. Environmental Qualification testing

c. Electromagnetic Environmental Effects (E^3)

d. Acceptance Testing (AT)

3.4.4.3.1 Formal Qualification Test (FQT)

The Contractor will perform product-level verification of the SK Radar as defined in Section 3.3.3.2.2. The Contractor will use a Final Qualification Test (FQT) to demonstrate that the design is compliant with PIDS requirements (section 3.3.3.1.3). Verification testing may be supported by a series of smaller, incremental tests. In some cases, design verification activities may be performed at lower levels (e.g., software [section 3.4.2.12] and Hardware [section

3.4.3.8]) against derived requirements without an additional SK Radar-level design verification activity.

3.4.4.3.1.1 FQT Test Report

A FQT Test Report will be generated documenting completion of the Radar FQT. The Contractor shall submit the report to USSOCOM in accordance with CDRL Sequence Number A009.

3.4.4.3.2 Environmental Qualification Testing

The Contractor shall conduct environmental qualification testing of the SK Radar to verify compliance with the environmental constraints identified within the SK Radar PIDS (section 3.3.3.1.3). The PIDS environmental requirements are based on/derived from Paragraph 3.2.6 of the SK System Specification (section 3.3.3.1.2). Qualification testing for the SK Radar shall be identified within the SK CIV2 Plan (section 3.3.1.2.2).

The Contractor shall submit a Qualification Test Procedure (QTP) for each performance category (SOO 3.1.5).

The Contractor shall submit a Qualification Test Report (QTR) for each performance category (SOO 3.1.5).

3.4.4.3.3 Electromagnetic Environmental Effects (E^3)

This section addresses the Electromagnetic Interference (EMI) and Electrostatic Discharge (ESD) requirements for the SK Radar.

3.4.4.3.3.1 Electromagnetic Interference (EMI)

The contractor shall perform analyses, studies, and testing to establish EMI control requirements and features to be implemented in the design of the SK Radar as identified in the SK Radar PIDS (section 3.3.3.1.3). The contractor shall perform inspections, analyses, and tests, as necessary, to verify that the SK Radar meets its EMI control requirements. MIL-HDBK-237 may be used for guidance.

3.4.4.3.3.1.1 Electromagnetic Interference (EMI) Control Procedure

The Contractor will prepare an Electromagnetic Interference (EMI) Control Procedure for the SK Radar using MIL-STD-461 as a guide. The EMI Control Procedure provides data to evaluate the design procedures and techniques used to meet the EMI control requirements identified within SK Radar PIDS (section 3.3.3.1.3).

3.4.4.3.3.1.2 Electromagnetic Interference (EMI) Test Procedure

The Contractor will prepare an Electromagnetic Interference (EMI) Test Procedure for the SK Radar using MIL-STD-461 as a guide. The EMI Test Procedure describes the measurement procedures that will be used to demonstrate that the SKR complies with the EMI control requirements identified within SK Radar PIDS (section 3.3.3.1.3). The EMI Test Procedure will describe the apparatus and verification methods (Table 3-3) for all requirements identified in the specification. The testing will be conducted with interconnecting wiring electrically representative of the aircraft installation to include:

a. ▮▮▮▮▮▮▮▮▮▮▮

b.

c.

d.

3.4.4.3.3.1.3 Electromagnetic Interference Test Report (EMIR)

The Contractor shall prepare an Electromagnetic Interference Test Report (EMIR) in accordance with CDRL Sequence Number A012 using MIL-STD-461 as a guide. The EMIR provides the information necessary to evaluate compliance of the SK Radar with its electromagnetic interference (EMI) control requirements within the SK Radar PIDS (section 3.3.3.1.3).

3.4.4.3.3.2 Electrostatic Discharge (ESD)

The SK Radar shall be designed to be protected from ESD damage using the following documents as a guide:

a. Electrostatic Discharge Control Program Standard – ANSI/ESD-S20.20

b. Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (excluding electrically initiated explosive devices) – MIL-HDBK-263B

3.4.4.3.4 Radar Acceptance Testing (AT)

The Contractor shall submit a Radar Acceptance Test (AT) procedure to USSOCOM in accordance with CDRL Sequence Number A008. The Contractor shall use the AT as a formal test of specific performance parameters used to ensure that the Radar has been manufactured correctly. Each Radar shall be subjected to, and successfully complete, a Radar AT procedure. Any failures, malfunctions, or out of tolerance condition shall be cause for rejection. USSOCOM representatives shall be allowed to witness SK Radar acceptance testing. The Contractor shall submit Acceptance Test Reports to USSOCOM in accordance with CDRL Sequence Number A009.

3.4.4.4 Contractor Flight Test

The Contractor shall perform engineering flight test of the Silent Knight Radar using contractor furnished aircraft. The Contractor Flight Test includes, but is not limited to:

a. Initial check out of modes & radar performance

b. Test planning

c. Troubleshooting

d. Data collection and evaluation for DT TRR

e. Unique test equipment

f. Radar modifications and repairs

g. Six(6) month overlap with the start of Developmental Testing

3.5 SK Radar Production and Test Equipment

The Contractor shall produce the following hardware to support the SDD Phase of the SK Program:

    a. SK Radar Engineering Evaluation Units (EEU) – quantities recommended by the Contractor

    b. SK Radar Pilot Production Units (PPU) ███████

    c. Engineering Design Support Test Equipment (TE)

3.5.1 Management

The Contractor shall provide management oversight of the SK Radar EEU production/test equipment development. EEU production/test equipment management includes the following tasks:

a. Program Planning and Control – Section 3.1.1.2

b. Subcontract Management – Section 3.5.1.1

c. Performance reporting – Section 3.1.3.1

d. Data Management (DM) – Section 3.1.5

e. GFI/GFE Management – Section 3.1.1.6

f. Configuration Management – Section 3.1.2

g. Quality Assurance (QA) – Section 3.2

h. Reviews and Meetings – Section 3.1.1.7

Production/Test Equipment Management activities identified herein are subservient to SK SDD Program Management (section 3.1.1).

3.5.1.1 Subcontractor Management

The Contractor shall implement a subcontract management system, process, and organization that provides Contractor/USSOCOM mutually agreed "best value" in the purchase of SK Radar LRU/LRM, as defined in Section 3.5.3, to support SK Radar integration and test (section 3.4.4), MDS verification testing (section 3.6.2), and DT/OT (section 3.7) under the SK System SDD contract. The Contractor's subcontract management organization shall implement best practices to maximize competitive, performance-based acquisition principles, and foster a competitive supply base for the SK System SDD program.

3.5.1.2 Production Planning

This element includes the effort to establish and maintain uniform and consistent operations and Supply Chain Management (SCM) for production planning during the SK Radar design/PPU production phases of the SK Program. Throughout these phases the Contractor's operations staff at both the program and fabrication shop levels will conduct and provide a variety of plans, inputs, directions, recommendations, and other guidance to SDD Program Management (section 3.5.1) to influence and assist the design process. Using Contractor manufacturing processes, this support will be focused at the product's anticipated readiness for production and the anticipated cost of production builds. SK Radar EEU/PPU production activities are defined within Sections 3.5.2/3.5.3 respectively of this SOW.

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[1] Raytheon will provide a fifth PPU on internal funding.

3.5.2 Engineering Evaluation Units (EEU)

The Contractor shall fabricate Engineering Evaluation Units (EEU) of the SK Radar. The EEU assemblies are prototypes used for hardware/software design verification testing. The EEU assemblies will be considered scrap/no-value at the completion of the contract.

3.5.3 Pilot Production Units (PPU) and Spares

The Contractor shall build sufficient quantities of SK Radar PPU and spares to support SK Radar Integration and Test (section 3.4.4), MDS Integration and Test (section 3.6.2), MH-47G Qualification Flight Test (section 3.7.1), and ▓▓▓▓▓▓▓▓▓▓▓ Two categories of SK Radar hardware shall be provided (SOO 3.1.3 and 3.1.6):

a. Line Replaceable Units (LRU) – Pilot Production Units (PPU)

b. Line Replacement Modules (LRM) – SK Radar subassemblies (Spares)

Each LRU shall pass acceptance testing (section 3.4.4.3.4) and ownership transferred to USSOCOM.

3.5.4 Test Equipment

The Contractor shall design and produce test equipment to support SK System and SK Radar production test as detailed within the following paragraphs. At the end of the SDD Phase of the SK Program, ownership of all production test equipment shall be transferred to USSOCOM.

3.5.4.1 SK System – Test Equipment

System testing categories supported by development of Production Test Equipment are:

a. Acceptance Test (AT)

b. Field and in-house programming and maintenance

c. SK System software integration and test

d. Formal Qualification Test (FQT)

e. Aircraft/Radar integration

The Contractor shall develop a SK Radar Emulator to support integration and test of SK Radar functionality into the Aircraft Avionics software (section 3.6.1.3).

3.5.4.2 Radar – Test Equipment

The Contractor shall develop test equipment to support testing requirements for the SK Program. SK Radar testing categories supported by development of production test equipment are:

a. Unit tests

b. Incoming acceptance tests

c. Module In-Circuit Test (ICT)

d. Radar software integration and test

e. Environmental Stress Screening (ESS)

f. Acceptance Test (AT)

3.6 Mission Design Series (MDS)

The following sections address the design, qualification flight testing, and operational suitability flight testing of the SK System ▓▓▓▓▓▓▓▓▓▓

3.6.1 Design

▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓

a. Management oversight	f. Electrical load analysis
b. Requirements definition/preliminary design	g. Material Properties
c. Avionics software design/development	h. Corrosion Prevention
d. A-Kit design/development	i. Working Groups
e. Trainer modification source data	

3.6.1.1 Management

The Contractor shall provide management oversight of the MDS Design. MDS Management includes the following tasks:

a. Program planning and control – Section 3.1.1.2

b. Performance reporting - Section 3.1.3.1

c. Data Management (DM) – Section 3.1.5

d. GFI/GFE Management – Section 3.1.1.6

e. Configuration Management – Section 3.1.2

f. Quality Assurance (QA) – Section 3.2

g. Reviews and meetings – Section 3.1.1.7

MDS Management activities identified herein are subservient to SK SDD Program Management (section 3.1.1).

3.6.1.2 Requirements Definition and Preliminary Design

The Contractor shall perform the following tasks associated with incorporation of the SK System on board the Mission Design Series (MDS) aircraft:

a. Generation of documentation to identify the modifications to the aircraft displays, controls, and avionics

b. Generation of documentation to identify the mechanical modifications to the aircraft to incorporate the A-Kit/SK Radar

c. Aircraft Integration Analysis and Modeling – MS&A effort to support aircraft integration. The tasks include developing mechanical, environmental, EMI, and Input/Output (I/O) models

d. Aircraft Integration Development – SE efforts to support the design, build, and verification of the modified MDS platform. The modified platform products consists of avionics modification components along with the aircraft structure and cables (Group A-kit)

MDS aircraft integration requirements shall be derived from the SK System Specification (section 3.3.3.1.2) within the Requirements Management Database (section 3.3.2) and documented in a Prime Item Development Specification (PIDS) as detailed in Section 3.3.3.1.3.

MS&A and Trade Studies to support SK Radar MDS Integration are identified in Table 3-5.

The System Engineering processes and procedures identified within Integrated Systems Engineering (section 3.3) shall be applicable to MDS System Engineering.

3.6.1.2.1 MDS Interface Management

The Contractor, in coordination with USSOCOM, shall establish an Interface Control Working Group (ICWG), as detailed in Table 3-1, to facilitate development of SK System interfaces. Proposed interface changes are collected by the Contractor and submitted to ICWG members for review. Changes to released system interface requirements documents shall require USSOCOM approval; change management is as detailed in section 3.1.2.7. Interfaces between the SK System and the MDS Aircraft are as detailed within the MDS interface documents described in the following paragraphs.

3.6.1.2.2 MDS Interface Control Documents (ICD)

The ICD provides a record of all interface information (e.g., drawings, diagrams, tables, and textual information) generated for the system

Approval authority for each ICD shall be retained by the USSOCOM Silent Knight Program Office during SK SDD and transfer to the USSOCOM Aircraft Integration Program Office holding configuration management authority for the SOF Mission Design Series (MDS) aircraft (SOO 3.6.3).

3.6.1.2.3 MDS Interface Design Description (IDD)

The MDS

3.6.1.3 Avionics Software Development

Any exceptions or warnings from said toolsets shall be documented in the appropriate Software VDD (section 3.6.1.3.7.2) and submitted to USSOCOM for review and approval.

3.6.1.3.1 Software Development Plan (SDP)

The Contractor SK Radar SDP (section 3.4.2.1) shall include or reference the approved SDPs of software subcontractors.

3.6.1.3.2 Software Requirements Specification (SRS)

The SRS shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00D.

3.6.1.3.3 Interface Requirement Specification (IRS)

The IRS shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00K.

3.6.1.3.4 Software Design Description (SDD)

The Software SDD shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00F.

3.6.1.3.5 Interface Design Document (IDD)

The IDD shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A046.

3.6.1.3.6 Software Testing

3.6.1.3.6.1 Software Test Description (STD)

The STD shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00A

3.6.1.3.6.2 Software Verification Plan (SVP)

The Contractor shall prepare/submit Software Verification Plans with the following guidelines:

a.

b.

3.6.1.3.6.3 Software Test Plan (STP)

3.6.1.3.6.4 Final Qualification Test (FQT)

3.6.1.3.7 Software Delivery

3.6.1.3.7.1 Software Test Report (STR)

The Contractor shall develop a STR for the testing performed on the updates The STRs shall include test results, procedures used for testing, and personnel witnessing the FQT. The STR shall be submitted for USSOCOM review/approval in accordance with CDRL Sequence Number A00B.

3.6.1.3.7.2 Version Description Document (VDD)

The Version Description Document (SVD) formally identifies the components of each product delivery and is developed for all executable software subsystems.

3.6.1.3.8 Plan for Software Aspects of Certification (PSAC)

The Contractor shall perform Structure Coverage Analysis (SCA)/Testing for the MDS avionics software. The Contractor shall develop a PSAC for the MDS avionics software for USSOCOM review and approval in accordance with CDRL Sequence Number A045. The PSAC will apply the guidance of RTCA-DO-178B paragraph 11.1 and the following:

a.

b.

3.6.1.3.9 Software Structure Coverage Testing

3.6.1.3.10 Problem Reports

All software problems shall be tracked from identification to correction per the guidance of DO-178B, paragraph 11.17. Monthly status shall be incorporated into the Contractor Monthly Status Report (section 3.1.3.1).

3.6.1.3.11 Software Development Folders

The Contractor will maintain software development artifacts, either directly or by reference, in the Software Development Folders (SDF) as detailed within the SDP (section 3.4.2.1.f).

3.6.1.4

a.

b.

c. Dummy Mass – The Contractor shall provide a dummy mass having suitable mass and aerodynamic properties to permit host MDS to operate with the B-Kit/Radome removed (SRD 3.3.1).

3.6.1.5

The Contractor shall provide sufficient behavioral and performance source data, system characterization models, and documentation to enable USSOCOM to make modifications or replacements to the existing SOF training systems in order to incorporate the SK System capabilities into their simulation baseline. These modifications will include information of SK System behavior for use in the following elements affected by Silent Knight

a. Maintenance units

b. Aircraft/Aircrew training devices

c. SOF System Integration Facilities (SIF)

The Contractor shall provide early delivery of data to allow the Government to begin work on modifying training devices (SRD 3.5.4).

3.6.1.6 Electrical Loads Analysis

3.6.1.7 Material Properties

The Contractor shall use MIL-HDBK-5 and MIL-HDBK-17 for obtaining material property data. Any material and processes not adequately covered by these resources should be addressed through the SEIT and communicated via the Contractor electronic collaborative environment (section 3.1.1.3) for Government review. The contractor shall provide a material allowables test report covering externally mounted components. Areas to be covered in this report shall include, but not be limited to, sources for existing design allowables, test methods used to develop design allowables, processes used to manufacture test coupons, environmental and operational effects on material properties, how test results will be used to develop the design allowables, and data and analyses to substantiate compliance with applicable design requirements.

3.6.1.8 Corrosion Prevention and Control (CPC)

a. Preventive and corrective procedures utilized during design/development, testing, modification, manufacturing, materials handling, packaging and shipping

b. Data collected through design studies, failure analysis reports, and aircraft system inspections

c. Description of how system corrosion requirements are translated into sub-tier requirements, considering criticality of particular hardware (as determined by the Failure Modes and Effects Criticality Analysis), severity of local environment and difficulty of maintenance

d. Description of how the Contractor verifies subcontractor compliance with the requirements prior to acceptance of the design for production

3.6.1.9 Working Groups

3.6.2 MDS Integration and Test

3.6.2.1 Integration and Test Planning

a. M-SIL integration and test
b.

3.6.2.2 M-SIL Integration and Test

The Contractor shall perform product-level integration, as defined in Section 3.3.3.2.1, in the MDS System Integration Lab (M-SIL).

3.6.2.3

The effort consist of

a.

b. [REDACTED]

3.6.2.3.1 Aircraft [REDACTED] Installation and Integration

[REDACTED]

a. Mechanical and electrical fit checks of the SK System

b. Aircraft mechanical/electrical modification to the radar pod structure

c. Installation of the SK Radar within the aircraft

d. Integration of the SK Radar within the aircraft

3.6.2.3.2 [REDACTED]

[REDACTED] This includes basic operational verification test that can be reasonably accomplished in the aircraft on the ground. The Contractor shall use SK System/Aircraft Verification Testing, as defined in Section 3.3.3.2.2, to demonstrate compliance with Aircraft Integration PIDS requirements. Testing shall include:

a. Acceptance Test (AT)

b. Electromagnetic Environmental Effects (E^3)

c. [REDACTED]

d. Line Replaceable Unit (LRU) and Systems Installation Level Structural Substantiation

e. Resonance Frequencies

3.6.2.3.2.1 SK System Acceptance Test (AT)

[REDACTED] Each SK System shall be subjected to, and successfully complete, an acceptance test using USSOCOM-approved Acceptance Test (AT) procedure submitted in accordance with CDRL Sequence Number A008. USSOCOM representatives shall be allowed to witness the acceptance test. The Contractor shall submit Acceptance Test Reports to USSOCOM in accordance with CDRL Sequence Number A009.

3.6.2.3.2.2 Electromagnetic Environmental Effects (E^3)

[REDACTED] The following government documents may be used for guidance:

a. *MIL-STD-464 (Interface Standard Electromagnetic Environmental Effects Requirements for Systems)*

b. *MIL-HDBK-237 (Electromagnetic Environmental Effects and Spectrum Certification guidance for the Acquisition Process)*

c. *ADS-37A-PRF (Aeronautical Design Standard - Electromagnetic Environmental Effects (E³) Performance and Verification Requirements)*

The Contractor shall implement and document an E³ Control Program for the SK System ▓▓▓▓▓▓▓▓▓▓▓▓▓ in accordance with MIL-STD-464 supported by the following plan, procedure, and report.

3.6.2.3.2.2.1 E³ Integration & Analysis Report (E³IAR)

The Contractor shall prepare an E³ Integration & Analysis Report (E³IAR) in accordance with CDRL Sequence Number A00Y using MIL-STD-464 as a guide that describes the application of the E³ requirements of the SK System Specification (section 3.3.3.1.2) and translation of these requirements into the system software and hardware to achieve a cost-effective system. The E³IAR shall address the overall integration of the requirements into a single system design which complies with the interface and performance requirements.

3.6.2.3.2.2.2 E³ Verification Procedure (E³VP)

The Contractor shall prepare an Electromagnetic Environmental Effects Verification Procedure (E³VP) in accordance with CDRL Sequence Number A010 using MIL-STD-464 as a guide that describes the overall verification methods (Table 3-3) being used and shall provide detailed verification procedures for each E³ Requirement identified within the SK System Specification (section 3.3.3.1.2).

3.6.2.3.2.2.3 E³ Verification Report (E³VR)

The Contractor shall prepare an Electromagnetic Environmental Effects Verification Report (E³VR) in accordance with CDRL Sequence Number A011 using MIL-STD-464 as a guide that describes the overall verification results for each E³ requirement specified within the SK System Specification (section 3.3.3.1.2).

3.6.2.3.2.2.4 Life Cycle E3 Analysis

▓▓▓ Analysis Reports shall be submitted in accordance with CDRL Sequence Number A041. The analysis shall provide requirements to maintain E³ quality for the life of the item.

3.6.2.3.2.3 ▓▓▓▓▓▓▓▓▓▓▓▓

Aircraft ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ critically affect system performance. This report provides up-to-date information required to maintain awareness of deleterious trends that may require program action, provide data for use by various engineering activities, and provide safety of flight information to the field.

▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓

3.6.2.3.2.3.1 Sample Chart A & E Report for Aircraft

The purpose of this report is to provide engineering data in the format necessary for the preparation of field weight and balance technical orders. Sample Charts A & E, approved by the acquiring engineering activity, shall be used as the contents of the weight and balance technical

orders.

3.6.2.3.2.4 Line Replaceable Unit (LRU) and Systems Installation Level Structural Substantiation

Structural integrity shall be assessed to ensure that all new or modified structural members have been analyzed and exhibit prescribed safety margins and that the structural integrity and the fatigue strength of the existing structure is not compromised. This analysis shall include a structural substantiation to verify that all SK components can withstand the loads in a crash sequence without causing the equipment to break loose, causing degradation to surrounding structure and equipment, or harming personnel.

3.6.2.3.2.5 Resonant Frequencies

The contractor shall prepare a ▮▮▮▮ documenting results of the testing in accordance with CDRL Sequence Number A039.

3.7 Test and Evaluation

This section addresses the Contractor effort to support Qualification Flight Test, Operational Suitability Flight Test, and Airworthiness Certification.

3.7.1 Qualification Flight Test

a. MDS Development Test

b. ▮▮▮▮

c. Post-flight test support

3.7.1.1 MDS Development Test

MDS developmental test shall be supported by:

a. Reviews

b. Airworthiness release (initial)

c. Development testing

d. Flight data analysis

e. Repairs and field support

3.7.1.1.1 Reviews

3.7.1.1.1.1 Development Test Readiness Review (DTRR)

[REDACTED]

3.7.1.1.1.2 Flight Test Program Reviews

During the flight testing portion of the SK System SDD Program, the Contractor shall conduct quarterly Flight Test Program Reviews (Table 3-1) to disseminate details on the flight test program.

3.7.1.1.2 Airworthiness Qualification (Initial)

[REDACTED]

3.7.1.1.3 SK System Developmental Testing (DT)

[REDACTED] Development flight testing includes:

a. Installed testing

b. Troubleshooting

c. Evaluation

d. Statistical data collection and analysis required to verify that the system is ready to perform qualification testing

e. Flight planning

f. Data collection and evaluation

g. Periodic presentation of results

Developmental Flight Testing is an iterative process of flight, test, analysis, and corrective actions.

[REDACTED] Qualification flight test occurs after development flight test is complete (for a given mode or regime of flight or for all modes/regimes). Little or no modification will be made to the SK System during qualification flight test. The system is exercised under the conditions described in the flight test plan and statistical data is collected to verify repeatability of system performance. This effort includes day-to-day flight planning, data collection and evaluation, periodic presentation of results and a qualification flight test final report (SOO 3.1.6).

3.7.1.1.4 Flight Test Data Analysis

The Contractor shall provide Modeling, Simulation and Analysis (MS&A) necessary to support the various flight tests (section 3.4.1.2). MS&A efforts include generation of data analysis tools as identified in Table 3-5 (MS&A/Trade Studies).

3.7.1.1.5 Development Flight Test – Training

The Contractor shall provide the Government Maintainers/Flight Crews SK System training as defined in Section 3.3.9.3.

3.7.1.1.6 Repairs and Field Support

The Contractor shall provide repairs and field support during development/qualification flight tests as detailed in Section 3.3.9.7.

3.7.1.2

3.7.1.3 Post-Flight Test Support

The Contractor shall be required to close all flight/mission critical actions resulting from DT before the start of operational suitability test (section 3.7.2) and provide a status report at the Operational Test Readiness Review (OTRR) defined in Section 3.7.2.1.1.1.

3.7.2 Operational Suitability Test and Airworthiness Certification

The Contractor will support the Government's operational suitability test as defined in the following paragraphs.

3.7.2.1 Management

The Contractor shall provide management oversight of the operational flight test efforts which includes the following tasking:

a. Program planning and control – Section 3.1.1.2

b. Subcontract management – Section 3.5.1.1

c. Performance reporting – Section 3.1.3.1

d. Data Management (DM) – Section 3.1.5

e. GFI/GFE Management – Section 3.1.1.6

f. Configuration Management – Section 3.1.2

g. Quality Assurance (QA) – Section 3.2

h. Reviews and meetings – Section 3.1.1.7

Operational flight test management activities identified herein are subservient to SK SDD program management (section 3.1.1).

3.7.2.1.1 Reviews

3.7.2.1.1.1 Operational Test Readiness Review (OTRR)

[(b)(2)high]

3.7.2.1.1.2 Production Readiness Review (PRR)

Upon award of the LRIP Option (section 3.8.2), the Contractor shall support a PRR for the SK System. A successful PRR indicates the SK System is ready for LRIP.

3.7.2.1.1.3 Flight Test Program Reviews

During the flight testing portion of the SK System SDD Program, the Contractor shall conduct quarterly flight test program reviews (Table 3-1) to disseminate details on the flight test program.

3.7.2.2 System Engineering (SE) Operational Test Support

The Contractor shall provide support to USSOCOM's execution of operational flight testing. This includes support of installed equipment and investigation of issues encountered in flight. (SOO 3.1.6)

Operational suitability flight test support does not include detailed test planning or data analysis or day to day oversight by the contractor as is required for development and qualification flight tests.

3.7.2.2.1 Operational Suitability Flight Test – Training

The Contractor shall provide the Government maintainers/flight crews SK System training as defined in Section 3.3.9.3.

3.7.2.2.2 Repairs and Field Support.

The Contractor shall provide repairs and field support during operational suitability flight test as detailed in Section 3.3.9.7.

3.7.2.3 Airworthiness Qualification (Final)

3.7.2.4

3.7.2.5 Operator and Maintainer (O&M) Training

The Contractor shall provide the Government maintainers/flight crews SK System training in support of operational suitability testing as defined in Section 3.3.9.3.

3.7.2.5.1 Repairs and Field Support

The Contractor shall provide repairs and field support during operational suitability flight tests as detailed in Section 3.3.9.7.

3.8 Options

3.8.1 Test Aircraft Return to Service – Option (CLIN 1001)

As an option, the Contractor shall de-modify flight test aircraft to return them to service in the configuration in which they arrive to the flight test program. (SOO 3.1.7)

a. Reinstallation of the original TF radar to original configuration

b. Perform performance testing to ensure the system functions in accordance with the aircraft baseline performed before SK modification

3.8.2 Low Rate Initial Production (LRIP) – Option (CLIN 1002)

3.8.2.1 LRIP Management

As an option, the Contractor shall provide management oversight of the LRIP efforts which includes the following tasking:

a. Program planning and control – Section 3.1.1.2

b. Subcontract management – Section 3.5.1.1

c. Performance reporting – Section 3.1.3.1

d. Data Management (DM) – Section 3.1.5

e. GFI/GFE Management – Section 3.1.1.6

f. Configuration Management – Section 3.1.2

g. Quality Assurance (QA) – Section 3.2

h. Reviews and meetings – Section 3.1.1.7

LRIP Management activities identified herein are subservient to SK SDD Program Management (section 3.1.1).

3.8.2.2 LRU Production

As an option, the Contractor shall produce, under a LRIP Program, Radars to demonstrate production readiness. (SOO 3.1.8)

3.8.2.3 LRM Production

As an option, the Contractor shall manufacture a sufficient number of SK Radar spares for interim contractor support of the LRIP units (SOO 3.1.8).

3.8.2.4 Physical Configuration Audit (PCA)

The Contractor shall support a PCA on SK Radar LRIP assets as detailed in Table 3-1.

3.8.3 LRIP Interim Contractor Support (ICS) – Option (CLIN 1003)

As an option, the Contractor shall provide interim contractor support for maintenance/repair of the LRIP systems[12]. The Contractor shall ensure adequate provisioning is completed and provide ICS for the maintenance and sustainment of the LRIP assets until a complete maintenance package is in place to support the SK System-modified aircraft. (SOO 3.4.2)

3.8.4 Hardware Re-Procurement Package – Option (CLIN 1004)

As an option, the Contractor shall provide a complete data package of the radar hardware design in sufficient detail to compete radar production. This data package shall include unlimited data rights and be delivered in accordance with CDRL Sequence Number B001. (SOO 3.6.7)

3.8.5 Software Maintenance Package – Option (CLIN 1005)

As an option, the Contractor shall provide a complete software design data package in sufficient detail to permit competing software and firmware sustainment and maintenance. This element shall include the effort to provide unrestricted data rights to USSOCOM for maintenance of the SK software and firmware (SOO 3.6.8). The software maintenance package consists of the following elements:

a. Software and firmware transition plan

b. SDD software and firmware work products

c. Sustainment/maintenance software work products

3.8.5.1 Software Transition Plan

The Contractor shall produce a Software Transition Plan (STRP) for long term support of the Silent Knight Radar software and firmware. The STRP will include software and firmware maintenance planning.

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[12] In accordance with paragraph 3.4.2 of the SK SOO, the LRIP aircraft utilization is expected to be 21 flight hours per month per aircraft.

3.8.5.2 SDD Software Work Products

Typical software development work products produced and delivered under the SDD phase of the SK Program, as detailed in Sections 3.4.2 and 3.6.1.3, are as follows:

a. Software and firmware requirement specifications

b. Test plans/procedures

c. Design documentation

d. Code

e. Version description documents

f. Software product specifications

3.8.5.3 Sustainment/Maintenance Software Work Products

Beyond the SDD software work products identified above, the following elements shall be produced to support government sustainment and maintenance of the SK software and firmware:

a. Computer Engineering Automation (EA) plan for software and firmware development

b. Software and firmware environment user manuals

c. Software and firmware build manuals

d. Software and firmware maintenance manuals

e. Custom software tools and associated documentation

f. Test equipment requirements specifications, and quotes for replicas of actual test equipment

3.8.5.4 Firmware Support Package

The Contractor shall deliver a Firmware Support Manual for each SK Radar programmable device in accordance with CDRL Sequence Number A00H.

3.8.6 Engineering Trade Studies – Option (CLIN 1006)

As an option, the Contractor shall support level-of-effort trade studies· for SK System development as described in USSOCOM directional tasking letters (which shall designate applicable SOW paragraph(s)). The Contractor shall document the results of these engineering trade studies within a scientific and technical report in accordance with CDRL Sequence Number A00N.

APPENDIX A
CONTRACTOR DATA REQUIREMENTS LIST (CDRL)

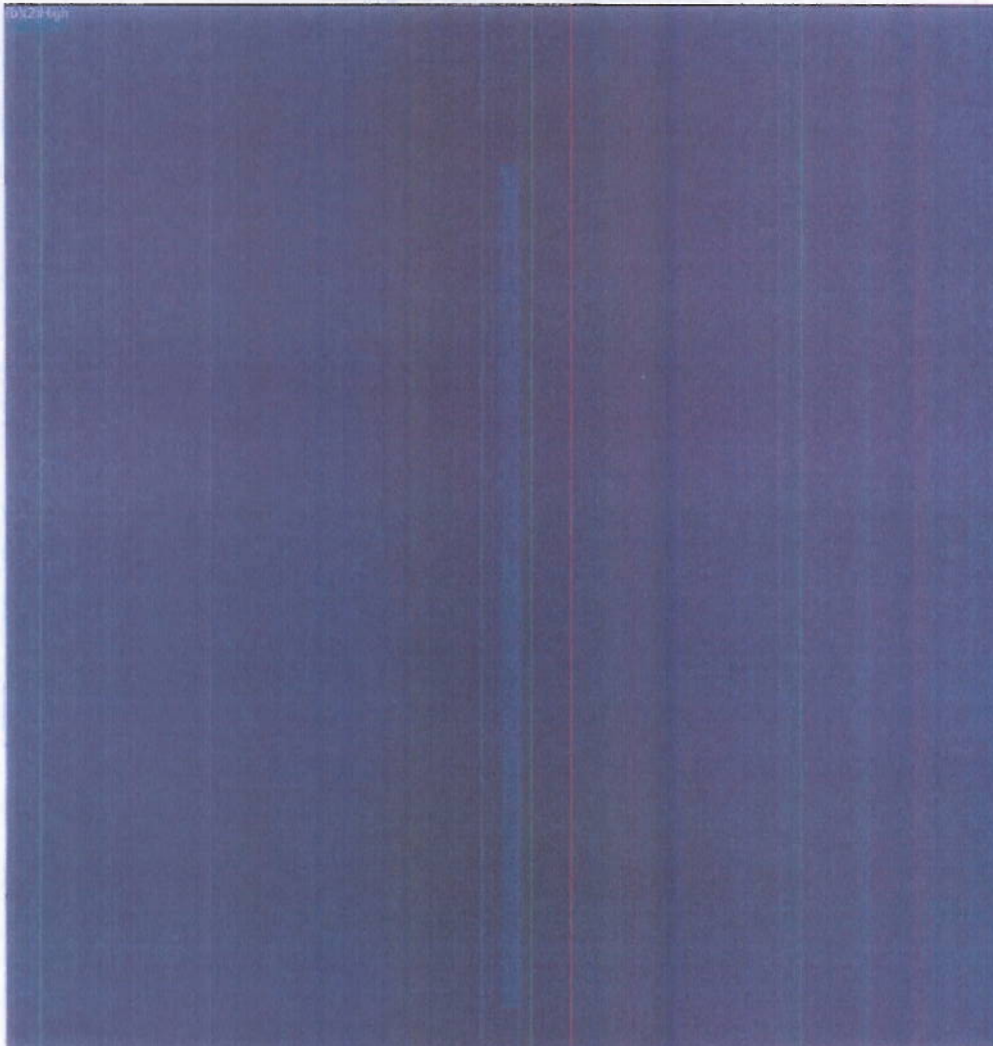## APPENDIX A - CONTRACTOR DELIVERABLE REQUIREMENTS LIST (CDRL)

CDRL No.	Data Item Title	DID	SOW Para.
A001	Contractor's Progress, Status and Mgmt Report	DI-MGMT-80227/T	3.1.3.1
A002	Integrated Master Schedule	DI-MISC-81650/T	3.1.4.1.2 and 3.1.5.1
A003	Conference Agenda	DI-ADMN-81249A/T	3.1.1.7
A004	Conference Minutes	DI-ADMN-81250A/T	3.1.1.7
A005	Scientific and Technical Report	DI-MISC-80711A/T	3.4.1.2
A006	System Safety Hazard Analysis Report (SSHA)	DI-SAFT-80101B/T (Use MIL-STD-882D as a guide)	3.3.8.1
A007	Test & Evaluation Master Plan	DI-NDTI-81284/T DI-NDTI-80566/T	3.3.1.2.1
A008	Test Procedures	DI-NDTI-80603/T	3.4.4.3.4 and 3.6.2.3.2.1
A009	Test/Inspection Reports	DI-NDTI-80809B/T	3.4.4.3.4, 3.6.2.3.2.1 and 3.4.4.3.1.1
A010	Electromagnetic Environmental Effects (E^3) Verification Procedures (E^3VP)	DI-EMCS-81541A/T	3.6.2.3.2.2.2
A011	Electromagnetic Environmental Effects (E^3) Verification Reports (E3VR)	DI-EMCS-81542A/T	3.6.2.3.2.2.3
A012	Electromagnetic Interference Test Report (EMITR)	DI-EMCS-80200B/T	3.4.4.3.3.1.3
A013	Human Engineering Test Plan	DI-HFAC-80743B/T	3.3.5.2.5
A014	Human Engineering Test Report	DI-HFAC-80744B/T	3.3.5.2.5
A015	Contract Performance Report	DI-MGMT-81466A/T	3.1.3.1
A016	Contract Work Breakdown Structure (CWBS)	DI-MGMT-81334B/T	3.1.3.3
A017	Airworthiness Qualification Specification	ADS-51-HDBK/T (Airworthiness Qualification Plan/T)	3.3.3.1.4
A034	SK Radar Plan for Software Aspects of Certification (PSAC)	DI-MISC-80508A/T	3.4.2.12.4
A038	Internal Loads and Static Strength Analysis Report	DI-GDQR-80198A/T	3.6.2.3.2.4
A040	Electrical Load Analysis	DI-MISC-80711A/T	3.6.1.6
A041	Life Cycle E3 Analysis	DI-MISC-80711A/T	3.6.2.3.2.2.4
A042	Material Allowable Plan	DI-MISC-80711A/T	3.6.1.7

CDRL No.	Data Item Title	DID	SOW Para.
A043	Corrosion Prevention and Control (CPC) Plan	DI-MISC-80711A/T	3.6.1.8
A044	Software Test Plan (STP)	DI-IPSC-81438A/T	3.4.2.12.1 and 3.6.1.3.6.3
A046	Interface Design Description (Software)	DI-IPSC-81436A/T	3.4.2.11.2 and 3.6.1.3.5
A00A	Software Test Description	DI-IPSC-81439A/T	3.4.2.12.2 and 3.6.1.3.6.1
A00B	Software Test Report (STR)	DI-IPSC-81440A/T	3.4.2.12.3 and 3.6.1.3.7.1
A00C	Software Version Description Document	DI-IPSC-81442A/T	3.4.2.14.2 and 3.6.1.3.7.2
A00D	Software Requirements Specification (SRS)	DI-IPSC-81433A/T	3.4.2.10 and 3.6.1.3.2
A00E	Software Product Specification	DI-IPSC-81441A/T	3.4.2.14.1
A00F	Software Design Description	DI-IPSC-81435A/T	3.4.2.11.1 and 3.6.1.3.3
A00G			
A00H	Firmware Support Manual (CLIN 1005/Option)	DI-IPSC-801448/T	3.8.5.4
A00J	System Specification	DI-IPSC-81431A/T	3.3.3.1.2
A00K	Interface Requirements Specification (Software)	DI-IPSC-81434A/T	3.4.2.10.1 and 3.6.1.3.3
A00L			
A00M	Configuration/Data Management Plan	DI-CMAN-80858B/T	3.1.2
A00N	Technical Reports – Study/Services (CLIN 1006/Option)	DI-MISC-80508A/T	3.8.6
A00P	Data Accession List (DAL)	DI-MGMT-81453/T	3.1.5.4
A00Q	Weight & Balance Report for Aircraft	DI-MGMT-81501/T	3.6.2.3.2.3
A00R	Engineering Change Proposal	DI-CMAN-80639C/T	3.1.2.7.2
A00S	Software Development Plan (SDP)	DI-IPSC-81427A/T	3.4.2.1
A00T	Program Management Plan	DI-MGMT-80004/T	3.1.1.2.1
A00U	System Engineering Plan (SEP)	DI-MGMT-81024/T (use SEP Prep Guide, Version 1.02, 02/1/0/6 as a guide)	3.3.1.1

CDRL No.	Data Item Title	DID	SOW Para.
A00V	Specification Verification Requirements Matrix	DI-MISC-81283/T	3.3.3.1.2.1
A00W	Safety Assessment Report (SAR)	DI-SAFT-80102B/T (Use MIL-STD-882D as a guide)	3.3.8.5
A00X	Sample Chart A & E Report for Aircraft	DI-MGMT-81502/T	3.6.2.3.2.3.1
A00Y	Electromagnetic Environmental Effects Integration and Analysis Report	DI-EMCS-81540A/T	3.6.2.3.2.2.1
B001	Product Drawings/Models & Assoc. Lists (CLIN 1004 / Option)	DI-SESS-81000C/T	3.8.4
B002	Developmental Design Drawings & Assoc. Lists	DI-SESS-81002D/T	3.1.2.11
D001	Request for Nomenclature (DD Form 61)	DI-CMAN-81254A	3.1.2.5.2
D002	Integrated Logistics Support Plan	DI-ILSS-80095/T	3.3.9.1
D003	Planned Maintenance System (PMS) Failure Modes and Effects Analysis (FMEA)	DI-MNTY-80980/T	3.3.5.2.2
D004	Failure Modes, Effects and Criticality Analysis Report	DI-ILSS-81495/T	3.3.5.2.1
D005	Silent Knight Radar - Prime Item Development Specification	DI-IPSC-81431A/T	3.3.3.1.3

**APPENDIX B
GOVERNEMENT FURNISHED INFORMATION/EQUIPMENT (GFI/GFE)**

APPENDIX B -
GOVERNMENT FURNISHED INFORMATION/EQUIPMENT

D=Design and Development	R=Radar Integration and Test	M= MDS Integration
T=DT Execution	O=OT Execution	* = Suggested location
1. Critical item, program ceases	4. Use existing information/equipment (reduced fidelity)	
2. Lease / procure from other source	5. Use alternate facility (reduced effectiveness/efficiency)	
3. Develop or reverse engineer	6. Verification of capability via analysis rather than test	

Government Furnished Information/Property (GFI/GFE) is addressed within Section 3.1.1.6 of this SOW.

APPENDIX C
SOO TO SOW MAPPING

APPENDIX C - SOO to SOW MAPPING

SOO Paragraphs	SOW Paragraphs/Tables References
1.0 (Program Overview)	Heading - No requirements
2.0 (Scope of SDD)	3.3.3.4, 3.3.9.4, and 3.6.2.3
3.0 (Objectives)	Heading - No requirements
3.1 (System Development Objectives)	Heading - No requirements
3.1.1	3 and 3.6.2.1
3.1.2	Table 3-1 and Table 3-5
3.1.3	3.3.9.7 and 3.5.3
3.1.4	3.6.2.1
3.1.5	3.3.1.2.2, , 3.4.4.3.2, 3.7 and Table 3-5
3.1.6	3.5.3 , 3.6.2.1, 3.7.1.1.3 and 3.7.2.2
3.1.7	3.8.1
3.1.8.	3.8.2.2 and 3.8.2.3
3.2 (Management Objectives)	Heading - No requirements
3.2.1	3.6.2.1
3.2.2	3.1.1.6
3.2.3	Table 3-1
3.2.4	3.1.1.4
3.2.5	3.1.3.2
3.3 (Technical Objectives)	Heading - No requirements
3.3.1	Table 3-5
3.3.2	3.3.3.4
3.3.3	3.3.1.1
3.4 (Logistics)	Heading - No requirements
3.4.1	3.3.9.1 and 3.3.9.5
3.4.2	3.8.3
3.4.3	3.3.9.6
3.5 (Financial Objectives)	Heading - No requirements
3.5.1	3.1.1 and Table 3-5
3.5.2	3.1.1
3.6 (Data Management)	Heading - No requirements
3.6.1	3.1.5
3.6.2	3.3.3.1.2
3.6.3	3.6.1.2.2
3.6.4	3.3.9.4
3.6.5	3.1.1.3 and 3.3.2
3.6.6 - Intentionally left blank	No requirements
3.6.7	3.8.4
3.6.8	3.8.5