



**Search and Rescue Satellite-Aided Tracking (SARSAT)
United States Mission Control Center (USMCC) Operations,
Maintenance, and Technical Support**

Performance Work Statement (PWS)

October 13, 2026

C.1 Performance Work Statement/Specifications

The Contractor shall furnish the necessary personnel, material, equipment, services and facilities (except as otherwise specified) to perform the following Performance Work Statement.

C.2 Performance Work Statement

C.2.1 Introduction

This Performance Work Statement is for Operations, Maintenance, and Technical Support of the Search and Rescue Satellite-Aided Tracking (SARSAT) United States Mission Control Center (USMCC), which is managed by the National Oceanic and Atmospheric Administration's (NOAA) National Environmental Satellite, Data, and Information Service's (NESDIS) Office of Satellite and Product Operations (OSPO).

The SARSAT system relays distress signals from distress beacons carried by aviators, mariners and land-based users to search and rescue (SAR) services. The mission of the interagency SARSAT program is to:

Protect life and property by providing timely, accurate and reliable distress alerts to search and rescue services worldwide in an effective and efficient manner.

The mission of the SARSAT program is fulfilled by:

- collecting and distributing reliable and accurate distress alert data in a timely fashion using satellite receiving stations and a mission control center;
- coordinating with national and international organizations on frequency management, satellites, emergency beacons and search and rescue issues;
- maintaining a national register for 406 MHz distress beacons; and,
- NOAA is currently serving as the lead for SARSAT within the United States, and representing the United States in the international Cospas-Sarsat Program, with the expectation of the United States Coast Guard (USCG) taking over responsibilities in the future, possibly before the end of this contract.

The desired outcome of the SARSAT program is to reduce human risk and economic consequences as a result of natural or human-induced emergencies. These activities align with NOAA's goal to support the Nation's Commerce with information for safe, efficient, and environmentally sound transportation.

Operations support includes the 24/7 operation of the USMCC; NOAA has developed and maintained the USMCC applications/utilities deployed on Windows Servers since the early 1990's, maintenance and security of the USMCC hardware and accompanying internally developed software, manual entry of beacon registration into the 406 MHz Beacon Registration

Database (RGDB) and manual entry of feedback information in the Incident History Database (IHDB) – two key databases within the USMCC; help desk services for the 406 MHz RGDB; the performance of routine system and database backups and logging; and routine reporting; public outreach and configuration management.

Maintenance support includes USMCC software and hardware maintenance, including, but not limited to installation and troubleshooting of equipment including PCs, routers, switches, firewalls, and printers used in the USMCC and analysis related to the USMCC and SARSAT.

Technical support includes: the establishment and maintenance of communications links used by the USMCC; IT Security activities necessary to secure the USMCC and the SARSAT ground segment in the United States; writing and presenting papers for national and international meetings; the monitoring and reporting of interference to frequencies assigned to emergency beacons and satellite instruments; reporting system status; coordinating and conducting national and international tests; and planning for and exercising continuity of operations plans.

SARSAT/USMCC

The SARSAT program is part of the international Cospas-Sarsat System. Cospas is a Russian acronym that stands for “*Cosmicheskaya Sistyema Poiska Aariynyich Sudov*” which translates loosely into “Space System for the Search of Vessels in Distress.” The basic concept of the system involves the use of emergency beacons, satellites, and ground equipment to relay distress location and identification information (referred to as distress alerts) to SAR authorities. SAR instruments are flown on Low-Earth polar orbiting (LEO), Mid-earth orbiting (MEO), and Geostationary-orbiting (GEO) satellites provided by the United States, Russia, India and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT). For MEO satellites, the United States provides SAR/GPS MEO satellites, Russia provides Global Navigation Satellite System (Glonass) MEO satellites, and the EU provides Galileo MEO satellites. Canada and France provide the SAR instruments which fly onboard the satellites.

The search and rescue instruments on all of these satellites (LEOSAR, GEOSAR or MEOSAR) are capable of detecting signals on and near the Earth’s surface transmitted from distress beacons. Distress beacons include Emergency Locator Transmitters (ELTs), Emergency Position Indicating Radio Beacons (EPIRBs), Personal Locator Beacons (PLBs), and Ship Security Alerting System (SSAS) beacons. ELTs are primarily used by aircraft, EPIRBs by maritime vessels, PLBs by individuals on land and sea, and SSAS beacons are used by ships to alert authorities of piracy/terrorism activity.

Distress beacons operate on the 406 MHz frequency, which transmit a digital code that contains information about the type of beacon and possibly the location of the beacon. Location can be transmitted in the beacon message if the beacon has GNSS capabilities. Each 406 MHz beacon in the world has a unique identifier. The unique identifier allows for additional information called registration data to be linked to each beacon. After receipt of ELT, EPIRB or PLB signals by the satellite, the satellite relays the signals to earth stations referred to as Local User Terminals

(LUTs).

The LUT transmits location information to its respective Mission Control Center (MCC) via a data communication network. The MCC performs matching and merging of alert messages with other received messages, geographically sorts the data, and transmits a distress message to an appropriate search and rescue authority such as a national Rescue Coordination Center (RCC) or a foreign SAR Point of Contact (SPOC). The distress message may also be sent to another MCC. Figure 1 depicts the operational concept of the Cospas-Sarsat System.

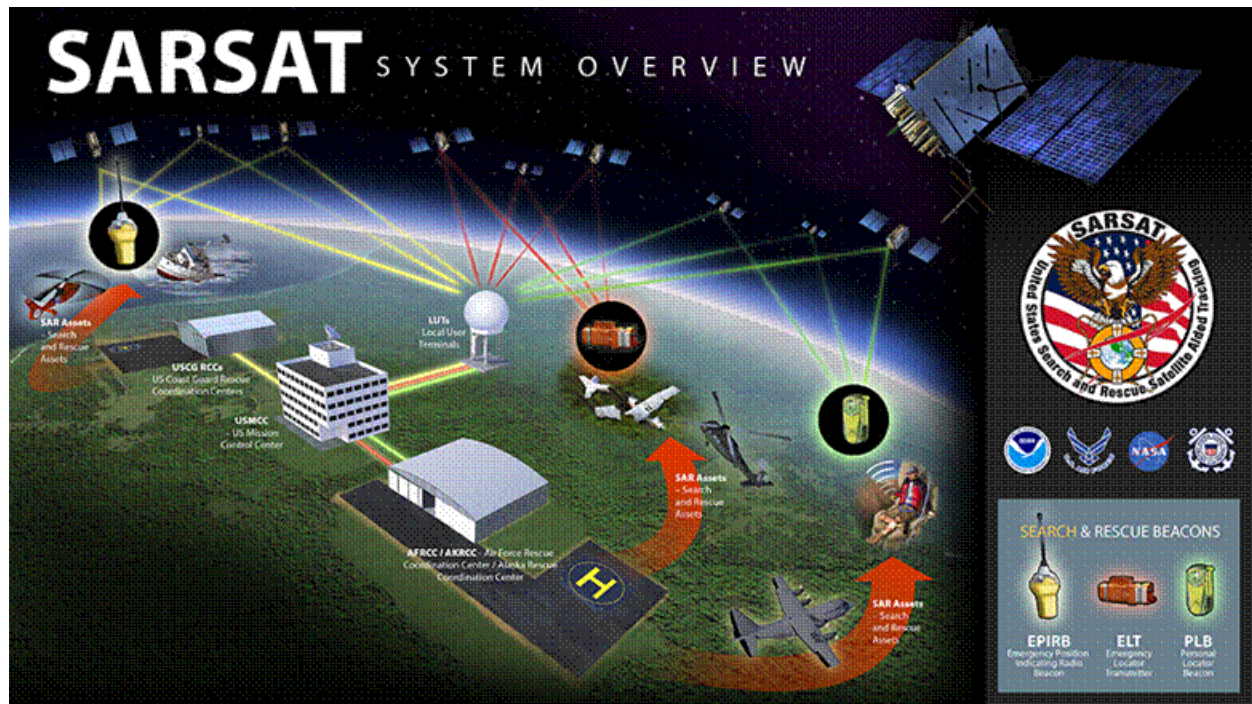


Figure 1: Operational Concept of Cospas-Sarsat System

The United States operates three types of LUTs to relay distress signals: LEOLUTs, MEOLUTs, and GEOLUTs. The SAR instruments are carried on board the NOAA Polar Orbiting Environmental Satellite (POES) (also known as LEO), Geostationary Operational Environmental Satellite (GOES) series of satellites, and the various MEO satellites. The POES satellites orbit the Earth at an altitude of approximately 850 kilometers and orbit the Earth once every 102 minutes. The relative motion between the POES satellites and a beacon on the surface of the Earth allows ground processing to use the Doppler Effect to determine the beacon's location.

The GOES satellites orbit the Earth in a geosynchronous orbit, which means they orbit the equatorial plane of the Earth at a speed matching the Earth's rotation. This allows them to "hover" continuously over one position on the surface. The geosynchronous plane is about

36,000 kilometers above the Earth, high enough to allow the satellites to view approximately 1/3 of the Earth. Because the GEO satellites stay above a fixed spot on the surface, they provide a constant vigil for emergency beacons activated within their footprint.

The MEO satellites orbit the Earth at approximately 20,000 kilometers above the surface. MEO satellites can see 38% of the Earth's surface at one time. Some of the benefits of MEOSAR are:

- near instantaneous global coverage with accurate independent location capability;
- robust beacon to satellite communication links, high levels of satellite redundancy and availability;
- resilience against beacon to satellite obstructions; and,
- the possible provision for additional (enhanced) SAR services, such as a ground to beacon return link.

NOAA manages and operates LEOLUTs to track, receive and process alerts from the NOAA, Russian and European Meteorological Operational (METOP) LEOSAR satellites. Two LEOLUTs are located at Andersen Air Force Base (AFB) on Guam; 2 at the U.S. Coast Guard (USCG) communication station on Hawaii; 2 at the NOAA Command and Data Acquisition station in Alaska; and 2 at the USCG communication station in Florida. NOAA manages and operates two GEOLUTs in Suitland, Maryland to track, receive and process alerts through the GOES East and GOES West satellites. Additionally, one LEO/MEOLUT (a hybrid LEOLUT that works as a MEO tracking antenna when a LEOSAR satellite is not in view), a GEOLUT and a Thales Phased Array MEOLUT (TPAM) are also in Maryland and serve as backup equipment and test beds. NOAA manages and operates two 6-channel MEOLUTs located in Miami, FL and Wahiawa, HI. NOAA manages approximately 25 antennas in total for 3 different satellite constellations.

Also depicted is a service offered by SAR/Galileo capability, "Return Link Service" (RLS), which provides for communication back to the beacon (RLS is currently limited to type1 which sends an 'acknowledge' of activation to the distress beacon). At this time, the Galileo constellation is the only system that has deployed this technology.

The USMCC receives alert data from national LUTs and foreign MCCs. It matches beacon signals to identify those coming from the other sources and merges them, as able, to improve position accuracy. The USMCC appends known U.S. registration information to distress alerts for 406 MHz beacons registered in the United States then geographically sorts data to determine the appropriate recipient. A recipient may be a national RCC (operated either by the U.S. Air Force or U.S. Coast Guard), a foreign SPOC, or another MCC. Based on special coding, the USMCC also transmits distress alerts to a number of special Government and military users. The USMCC filters redundant data and performs system support and monitoring functions. System support functions include relaying SAR instrument telemetry from the Environmental Satellite Processing Center (ESPC) to the Canadian MCC (CMCC) and to the French MCC (FMCC). System support also relays SAR instrument commands from the CMCC and FMCC to the Satellite Operations Control Center (SOCC). The U.S. LUTs have the

capability to detect and locate interference in the 406 MHz band. This information is automatically forwarded to the Federal Communications Commission (FCC) for further investigation. Also supporting the operations of the LUTs is the receipt of timing information from GPS satellites or from the National Institute of Standards and Technology.

Cospas-Sarsat Operations

Cospas-Sarsat's ultimate mission is to assist in the saving of human lives. More than 50,000 persons have been rescued world-wide due to the Cospas-Sarsat Program since its inception in 1982. The current Cospas-Sarsat Program was established by an inter-governmental agreement signed in 1988 between the Governments of Canada, the Republic of France, the Russian Federation (formerly the Soviet Union) and the United States. The agreement created the Cospas-Sarsat Council, which is responsible for overall management of the Program, and the Cospas-Sarsat Secretariat, which serves as the permanent administrative organ of the Program.

The Joint Committee (JC), Operational Working Group (OWG), Technical Working Group (TWG), Task Groups (TG), and Experts Working Group (EWG) have been established to support the Council. The JC, OWG, and TWG typically meet once a year to address operational and technical issues, and to make recommendations to the Council. Experts Working Groups (EWG) and Task Groups (TG) meet as directed by the Council to address more immediate issues, and will make recommendations to either the Council or JC. Including the four Parties to the Agreement, 40 States and 2 organizations (the Participants) are formally associated with the Programme and actively participate in the management and the operation of the Cospas-Sarsat System (the System).

The Cospas-Sarsat Program is guided by System documentation that provides technical specifications for equipment, operational procedures and program structure. The documentation is separated into seven series:

- The "P" series contains documents that pertain to the management and policy of the Cospas-Sarsat Program.
- The "G" series contains general information.
- The "T" series contains technical documentation and specifications.
- The "A" series contains operational documentation and procedures.
- The "R" series contains reports and system test plans.
- The "S" series contains Secretariat directives
- The "D" series contains general information on the International Beacon Registration Database.

The documentation listed above can be found at <http://www.cospas-sarsat.int/en/pro> under the Documents/System Documents link.

The USMCC functions in accordance with specifications and procedures outlined in the above documents. In addition, the USMCC has to meet unique national requirements to fulfill its mission. These requirements are contained in documentation referenced in section C.2.3.2.

Programmatic Transition Support

Since January, 2021, the Transition Working Group (WG) has conducted Phase-2 of the SARSAT Leadership Transition Study. During Phase-2, Transition WG performed a detailed assessment of the NOAA SARSAT Program with a focus on the leadership and technical functions and responsibilities that will transition from NOAA to the USCG. Moreover, the Transition WG assessed the processes, procedures, documentation, systems, tools, and controls currently in use by NOAA and the PSG to operate the USMCC and ground system. Finally, the Transition WG assessed the existing systems engineering and systems evolution processes and procedures with respect to DHS/USCG policy and requirements, which are applicable to the post-transition environment.

With the space segment of the Search and Rescue Satellite Aided Tracking (SARSAT) Program transitioning to USAF Mid-Earth Orbiting Search and Rescue (MEOSAR) GPS satellites, the SARSAT Program Steering Group (PSG) had discussed how to best support the Program in the future. The National Oceanic and Atmospheric Administration (NOAA) Environmental Satellite Data Information Service (NESDIS) SARSAT Program suggested the transfer of leadership responsibility for the national SARSAT and international Cosmicheskaya Sistema Poiska Avariynyh Sudov (COSPAS-SARSAT) programs to support the continued success of the Program.

The United States (U.S.) SARSAT Program is currently implementing steps to transition program leadership and authority from NOAA to the U.S. Coast Guard. This process has been executed through a phased Transition Study, which the U.S. SARSAT PSG began in 2019. The first two phases of the Transition Study assessed the current state of the program, and identified the leadership and technical areas to be transitioned. The third and final phase of transition began in 2022, and will encompass the development and implementation of the transition plan, culminating in the transition of program management responsibility from NOAA to the U.S. Coast Guard

Strategic Program Objectives

The following long-term goals were defined by the U.S. SARSAT Program during the SARSAT Transition Retreat. The Transition WG has considered these goals in the definition and assessment of transition of SARSAT Leadership from NOAA to the USCG. The U.S. SARSAT Program long-term goals have been defined as follows:

Performance

- Maintain or improve program performance.

- Establish and maintain a framework for continuous innovation and improvements.
- Maintain the most effective and efficient lifesaving system (detection and notification of persons in distress).

Technology

- Maintain relevancy, identify, and deliver new proven technologies to address future emerging needs.
- Maintain flexibility regarding technology and services.
- Enhancing IT scalability, flexibility, maintainability, expandability, modularity, and agility while maintaining security.

Leadership

- Maintain world leadership in the COSPAS-SARSAT Program.
- Maintain and build upon the foundation and foundational services that U.S. SARSAT PSG provides.
- Maintain global influence and leadership as the gold standard for distress alerting.

Demonstrate Value

- Long-term sustainable funding
- Driven by protecting lives while minimizing risk to the agencies involved.
- Sustainability – user segment (continue long term to be a viable program)

C.2.2 Place of Performance

The Contractor shall operate, maintain and monitor the primary USMCC and system, including software, technical, functional and administrative support activities, onsite at the NOAA Satellite Operations Facility (NSOF) in Suitland, Maryland on a 24-hour, 7-days-per-week, 365 days per year schedule. Situational telework may be authorized by those positions expected to be on call 24/7/365.

The Contractor shall also operate and maintain the NOAA USMCC remote site located in the NOAA Center for Weather and Climate Prediction (NCWCP) in College Park, Maryland, and/or the backup alternate processing site for the NOAA USMCC at the Consolidated Backup (CBU) facility in Fairmont, WV when required for contingency operations. In the event of a contingency that renders the NSOF to be uninhabitable, the contractor shall operate the USMCC from the remote site or backup facility, depending upon the nature of the contingency, as specified in the NOAA SARSAT Contingency Plan.

C.2.3 Scope of Work

All personnel involved in the SARSAT USMCC contract shall be in compliance with the Office of Satellite Ground Services (OSGS) produced Application Reference Model (ARM) and

Infrastructure Reference Model (IRM).

C.2.3.1 USMCC System Support

The Contractor shall provide computer operations of the USMCC system on a 24/7 around-the-clock basis, comprehensive data entry, help desk services, and database administration functions. Software support shall consist of corrective, adaptive, and perfective maintenance across all operational subsystems and applications to support the USMCC mission. Technical support shall include maintaining IT hardware, Local Area Networks (LANs), and system software; executing IT security activities; performing detailed analytical studies and real-time monitoring; and supporting national and international interagency meetings. All of these activities directly sustain and advance the overarching SARSAT mission to protect life and property. The document "USMCC Requirements Analysis," provided as Appendix B, provides additional reference material to assist the Contractor in understanding the USMCC mission. It is provided for reference only.

C.2.3.2 Applicable Documents

The following documents define terms, requirements, guidelines, specifications, procedures, data formats and content, and plans. Unless otherwise specified, all USMCC relevant work shall be performed in accordance with these documents. Succeeding revisions shall be substituted or incorporated as appropriate. As noted previously, Cospas-Sarsat documents can be viewed under the documentation link of <http://www.cospas-sarsat.int/en/pro>.

Many of the relevant USMCC documents can be viewed under the System Documentation link at <http://www.sarsat.noaa.gov/>.

- C/S G.003, Introduction to the Cospas-Sarsat System
- C/S G.004, Cospas-Sarsat Glossary
- C/S G.005, Cospas-Sarsat Guidelines on 406 MHZ Beacon Coding, Registration, and Type Approval
- C/S T.001, Specification for Cospas-Sarsat 406 MHZ Distress Beacons
- C/S T.002, Specification for Cospas-Sarsat Local User Terminal Performance Specification and Design Guidelines
- C/S T.003, ,Description of the 406-MHz Payloads Used in the Cospas-Sarsat LEOSAR System
- C/S T.004, Cospas-Sarsat LEOSAR Space Segment Commissioning Standard
- C/S T.005, Cospas-Sarsat LEOLUT Commissioning Standard
- C/S T.006, Cospas-Sarsat Orbitography Network Specification
- C/S T.007, Cospas-Sarsat 406 MHZ Distress Beacon Type Approval Standard
- C/S T.008, Cospas-Sarsat Acceptance of 406 MHz Beacon Type Approval Test Facilities

- C/S T.009, Cospas-Sarsat GEOLUT Performance Specification and Design Guidelines
- C/S T.010, Cospas-Sarsat GEOLUT Commissioning Standard
- C/S T.011, Description of the 406 MHz Payloads Used in the Cospas-Sarsat GEOSAR System
- C/S T.012, Cospas-Sarsat 406 MHz Frequency Management Plan
- C/S T.013, Cospas-Sarsat GEOSAR Space Segment Commissioning Standard
- C/S T.014, Cospas-Sarsat Frequency Requirements and Coordination Procedures
- C/S T.015, Cospas-Sarsat Specification and Type Approval Standard for 406 MHz Ship Security Alert (SSAS) Beacons
- C/S T.016, Description of the 406 MHz Payloads Used in the Cospas-Sarsat MEOSAR System
- C/S T.017, Cospas-Sarsat MEOSAR Space Segment Commissioning Standard
- C/S T.018, Specification for Second-Generation Cospas-Sarsat 406-MHz Distress Beacons
- C/S T.019, Cospas-Sarsat MEOLUT Performance Specification and Design Guidelines
- C/S T.020, Cospas-Sarsat MEOLUT Commissioning Standard
- C/S T.021, Cospas-Sarsat Second-Generation 406-MHz Distress Beacon Type Approval Standard
- C/S T.022, Cospas-Sarsat MEOSAR Reference Beacon Network Design Guidelines
- C/S A.001, Cospas-Sarsat Data Distribution Plan
- C/S A.002, Cospas-Sarsat Mission Control Centers Standard Interface Description
- C/S A.003, Cospas-Sarsat System Monitoring and Reporting
- C/S A.005, Cospas-Sarsat Mission Control Center Performance Specification and Design Guidelines
- C/S A.006, Cospas-Sarsat Mission Control Centre Commissioning Standard
- USMCC Functional Requirements Document
- USMCC Data Structures Document
- USMCC Functional Description Document
- 406 MHz Registration Data Base (RGDB) Functional Requirements Document
- Incident History Data Base (IHDB) Functional Requirements Document
- USMCC Standard Operating Procedures (SOP)
- USMCC National Rescue Coordination Center and Search and Rescue Point of Contact Alert and Support Messages
- SARSAT Configuration Management Plan

C.2.4 System Description

C.2.4.1 USMCC

SARSAT represents a geographically distributed infrastructure comprising the USMCC, four remote LEOLUT facilities, three remote MEOLUT locations equipped with an additional phased array antenna, one GEOLUT facility, a web server network, and related equipment housed at the NSOF . The primary USMCC is physically located at the NSOF in Suitland,

Maryland, along with the web server network, and is one of the LUT locations. The equipment located at the NCWCP is used to remotely control either of the USMCCs in the event that physical access to the buildings are not available. The additional 5 (4 LEO/MEO and 1 MEO only) LUT locations are geographically dispersed to collect satellite data throughout the United States and its territories. These processing groups include:

- **MCC processing** – provides the main processing capability for Cospas-Sarsat related data (MCC Operational Segment)
- **Web application processing** – provides internet access and processing for the RGDB and IHDB functions (Web Based Registration and Related Systems)
- **FTP processing** – provides FTP & fax communications services for international points-of-contact (MCCs & SPOCs) and the Air Force Rescue Coordination Center (AFRCC) (FTP Internet Segment)
- **LUT FTP processing** – provides FTP communication services for US LUTs and Coast Guard RCCs (LUT FTP Segment)

The current NOAA USMCC is composed of 28 applications/utilities and approximately 720k lines of source code, developed internally by NOAA and evolving since the early 1990s. Not every subsystem below maps to a single application, as some applications run across several subsystems. These applications are hosted on Windows Servers, operated 24/7/365 with reliable backup capabilities to 99.5% availability, and have hardware (HW) upgraded/refresh on 5 year cycles. It is a DOC/NOAA and SARSAT program goal to have the USMCC study and analyze the ability to host the USMCC securely and fiscally responsibly in accordance with the ceilings in the contract, in a cloud environment during the next support contract.

The USMCC sends approximately 1,270 messages a day, including messages sent to RCCs, MCCs, LUTs, and SPOCs. The USMCC receives about 6,040 messages a day. The USMCC receives about 358 satellite passes daily for the US LUTs. Beacon data is received from the GEO and MEO satellites on a continuous basis. There are more than 20 Structured Query Language (SQL) database transactions per second.

The USMCC comprises various types of hardware devices. Table 1 lists the hardware elements of the USMCC.

Table 1: USMCC Hardware List

Device Type	Make	Model	Quantity
Server	Dell	PowerEdge 2850	6
Server	Dell	PowerEdge 2950	1
Server	Dell	PowerEdge R610	12

Server	Dell	PowerEdge R620	1
Server	Dell	PowerEdge R710	1
Server	Dell	PowerEdge R720	11
Workstation	Dell	Dimension 9150	1
Workstation	Dell	Optiplex 7010	1
Workstation	Dell	Optiplex 760	4
Workstation	Dell	Optiplex 9010	10
Workstation	Dell	Optiplex 9020	3
Workstation	Dell	Precision T3500	2
Workstation	HP	Z400	2
Laptop	Apple	MacBook Pro	3
Laptop	Dell	Latitude E6440	3
Laptop	Dell	Latitude E6530	9
Laptop	Dell	Latitude E6540	8
Firewall	Cisco	ASA 5510	10
Firewall	Cisco	ASA 5512	2
Firewall	Cisco	ASA 5515	2
Firewall	Cisco	ASA 5525	2
IDS	IBM	Proventia GX4004	3
Load Balancer	Barracuda	Load Balancer 340	2
Printer	HP	CB514A	1
Printer	HP	CP2025dn	1
Printer	HP	E6B69A	1
Printer	HP	C8185A	1
Printer	Zebra	ZM410	2
Router	Cisco	1941	9
Router	Cisco	2811	1
Router	Cisco	2901	4

Storage	Dell	EqualLogic PS4110	5
Switch	Cisco	Catalyst 2960	4
Switch	Dell	N4032	5
Switch	HP	ProCurve 2810	10
Switch	HP	ProCurve 2824	11
Switch	HP	ProCurve 2920	4
Thin Client	HP	t510	4

The USMCC currently operates under several operating systems. Updates to the operating systems are performed as needed to meet current Department of Commerce benchmarks. Commercial-off-the-Shelf (COTS) software such as VMWare, MapInfo, MS SQL, FaxMan, Veritas, Visual Basic, C++, Visual C++, Java, and dBase are also an integral part of the software sub-systems. The languages used in the USMCC system include Visual BASIC, SQL, MapInfo, Visual C++, and JAVA. Table 2 lists the USMCC lines of code.

Table 2: USMCC Software Lines of Code

Subsystem	Lines of Code
Alert Processing (ALRT)	36,444
Communications Processing (COMM)	143,568
System Data Processing (SDAT)	27,416
System Monitoring (SMON)	20,051
Operator Interface (OPER)	189,339
Database/Data Maintenance (DBMN)	11,873
Incident History Database (IHDB)	54,507
Registration Database (RGDB)	53,345
Self test and Monitoring (SAMS)	12,071
LUT Monitoring Database (LMDB)	29,180
Interference Monitoring (INTF)	97,139
SAR Mapping/Geosort (SMAP)	41,848
Miscellaneous	1,631

C.2.4.1.1 Alert Processing

The Alert Processing sub-system is the major component of the USMCC. The sub-system processes all distress alert data and produces the distress alert messages destined for other MCCs, SPOCs and RCCs. Specifically, Alert Processing:

- transfers 406 MHZ alert data from the SQL server;
- validates all incoming alert data;
- filters alert data based on configuration;
- creates sites (sites combine and store satellite data originating from a unique beacon or signal source);
- matches alerts from different sources (LUTs/MCCs and/or satellites);
- merges beacon alerts from different sources to form a more probable position;
- determines if satellite passes should have detected a beacon on a given pass;
- determines the type of message to send;
- determines the appropriate recipient of the alert message;
- determines the content of alert messages;
- appends registration information for 406 MHZ beacons as appropriate; and
- performs housekeeping on the site.

The Alert Processing sub-system notifies the operator of alarm conditions and general status of the sub-system, as well as logs all routine operations and functions for later analysis.

C.2.4.1.2 Communications Processing

The Communications sub-system communicates with US LUTs, foreign MCCs, SPOCs, and national RCCs for alert and system data. It also communicates with the Naval Bulletin Board (NBB) by way of telephone line for ephemeris data, the National Institute of Standards and Technology (NIST) by way of the Internet for time data, the ESPC by way of the Internet for satellite payload telemetry data, the GPS via satellite receiver for time data, and a communication vendor. The Communications Processing sub-system also formats alert messages based on the destination.

The primary path of data communications between the USMCC and USCG RCCs is through a private IP network provided by a commercial telecommunications vendor. Backup data communications between the USMCC and USCG RCCs is through a facsimile server.

The primary data path between the USMCC and USAF RCC at Joint Base Langley-Eustis AFB is the Internet (through a VPN Concentrator), with a backup path utilizing the Aeronautical Fixed Telecommunications Network (AFTN).

The primary data path between the USMCC and national LUTs is a private IP network.

The USMCC communicates with other nations' MCCs through AFTN and the Internet. The USMCC communicates with foreign SPOCs through the AFTN, FTP over VPN, facsimile, IMSAR and the Public Switched Telephone Network (PSTN) for facsimile.

C.2.4.1.3 System Data Processing

The System Data sub-system is responsible for processing satellite payload telemetry data, identifying out-of-limit conditions and reporting to the appropriate payload provider (i.e., France or Canada), and notifying payload providers of changes in the status of their instruments. The sub-system processes commands from the French and Canadian MCCs, and routes them to the NOAA Satellite Operations Control Center in Suitland, Maryland.

The System Data sub-system also creates ephemeris data to send to foreign MCCs and U.S. LUTs. In addition, the sub-system creates pass schedules daily for the U.S. LUTs. Pass schedules are used by the LUTs to determine which satellites are tracked. Lastly, the sub-system creates and processes system status and narrative messages for and from foreign MCCs.

C.2.4.1.4 Operational Real-Time System Monitoring

The System Monitoring sub-system performs real-time monitoring of the USMCC, national LUTs, and communications links. The sub-system ensures that all the critical USMCC sub-systems are functioning, the LUTs are providing data, and operators are being notified if there are any large location errors.

C.2.4.1.5 Operator Interface

The Operator Interface allows the operator to monitor the USMCC system, retrieve data, perform queries, initiate processes, access other sub-systems as appropriate, and change configuration of the USMCC system. The operator has the capability to search for alert data based on type of data, geographic location, and time. The results of the query can then be transmitted to any destination. The operator can also search for input or output messages based on specific criteria, and can access system logs. The Operator Interface sub-system contains the NOAA encode/decode software for 406 MHZ beacons. This software allows users an interface to the digital information contained in a 406 MHZ message. The software can also perform error checking on the digital message as described in Cospas-Sarsat documentation.

C.2.4.1.6 Interference Monitoring

The Interference Monitoring sub-system processes 406 MHz interference position data from U.S. LUTs and foreign MCCs. Interference data is matched and merged, and reports on sources of interference are generated.

C.2.4.1.7 Database Maintenance

The Database Maintenance sub-system performs the archive, purge and backup of all data as well as the monitoring of database performance. All data is archived at the USMCC. Database backups are performed daily and all database executive software and configuration data is archived monthly.

C.2.4.1.8 Incident History Database

The Incident History Database (IHDB) sub-system consists of software which transfers key site information from the active site database to the Incident History Database. Software also exists to input/edit feedback from RCCs either manually or online, validate feedback, and send reminders to RCCs for incidents on which they have not reported.

Software also exists to extract the “Distress Incident Report for Documentation of Saves” and “Report on Beacon Signals” for the Cospas-Sarsat System. Additional software exists to prepare reports on performance of beacon models, compliance of feedback by RCCs, and reports of rescues.

C.2.4.1.9 Registration Database

The Registration Database (RGDB) sub-system consists of software which is used to enter and edit beacon registrations and to prepare reports. The software validates information before it is accepted into the database; creates mailing labels; generates bi-annual confirmations; and creates decals to be affixed to the beacon.

C.2.4.1.10 Self-test and Monitoring

The Self-test and Monitoring Sub-system (SAMS) provides near real-time, long term, and trend monitoring from data collected at the USMCC. Information on availability and performance is generated for the USMCC, U.S. LUTs and Cospas-Sarsat satellites. The sub-system also generates graphics files for display and reports.

C.2.4.1.11 LUT Monitoring Database

The LUT Monitoring Database maintains the daily schedule of satellite passes that the U.S. LUTs have been scheduled to track, and reports on the outcome of each satellite pass per LUT. The information is used to monitor LUT performance, report on missed passes for LEO satellites, and create Cospas-Sarsat reports on LUT availability.

C.2.4.1.12 SAR Mapping/GEOSORT

The SAR Mapping sub-system performs the geographical sorting of alert data for the Alert Processing sub-system. The software determines in whose search and rescue area an alert position is located. The software also provides the real-time geographical display of alert sites. Additional information on the USMCC may be found in the documents listed in section C.2.3.2.

C.2.5 Specific Work Requirements

All work described below shall be performed in accordance with the appropriate documents listed in section C.2.3.2 and any additional guidance provided by the USMCC Contracting Officer Representative (COR) or the USMCC Program Manager.

C.2.5.1 Transition to a New Contractor (if applicable)

A phase-in period of 30 calendar days is anticipated during which the follow-on Contractor shall become familiar with the USMCC, associated sub-systems and operation. The follow-on Contractor shall have fully qualified and trained staff available on day one. The follow-on Contractor shall bear responsibility for the operations, software, maintenance and technical support of the USMCC concurrently during the transition period. The incumbent contractor shall provide controller training and transfer documentation to the follow-on Contractor.

The final 30 calendar days of the contract shall be a phase-out period during which the incumbent Contractor continues to bear full responsibility concurrently with the follow-on of the operations, software, maintenance and technical support, but is also responsible for training and guiding the follow-on Contractor in learning its duties.

C.2.5.2 Operations Support

Specifically, the Contractor shall:

- operate the USMCC software and hardware and notify MCCs, SPOCs and RCCs of outages in accordance with the USMCC Standard Operating Procedures (SOP)s;
- monitor the U.S. ground segment (LUTs, USMCC, communications and the USMCC environment), identify anomalies, and initiate corrective action according to configuration management procedures and USMCC SOPs;
- be the operational point of contact for RCCs and SPOCs by responding to queries, re-transmitting alert messages, providing registration information, changing the destination/routing of alert messages, providing satellite pass schedules, confirming communications, interpreting system performance, requesting incident feedback, and providing other operational assistance as required;
- be the operational point of contact for MCCs by responding to queries, re-transmitting alert messages, providing registration information, changing the destination/routing of alert messages, requesting alert messages from other MCCs, confirming communications, requesting incident feedback, ensuring system and ephemeris data are properly transmitted,

providing coordination support to the Cospas-Sarsat System, and providing other assistance as required;

- provide and update Cospas-Sarsat quality management system (QMS) reports and other performance indicators and metrics as required by Cospas-Sarsat;
- be the operational point of contact for NOAA SAR payload operations by notifying MCCs, RCCs and SPOCs of payload failures, and coordinating with the SOCC on NOAA polar and geostationary satellite issues;
- be the operational point of contact for U.S. LUT operations by requesting alert and graphic data from LUTs; configuring and commanding the LUTs; assisting with pass schedules; monitoring satellite data; sending commands to LUTs; coordinating LUT outages with Government, LUT maintenance Contractor, and site personnel; and performing additional duties within the general scope of the SRSAT USMCC Operations, Maintenance and Technical Support contract as required;
- be the operational point of contact for telemetry and ephemeris data received from the ESPC;
- be the operational point of contact for ephemeris data received from the NOAA Bulletin Board;
- perform periodic (daily and weekly and monthly depending on the SOP) backups, retrieve data from backups and maintain archives; and
- maintain and prepare appropriate logs and reports as described in section C.2.7 and in the most recent revision of NIST Special Publication (SP) 800-53 document which lists logging and reporting requirements for IT security .

The Contractor shall also review and edit incident feedback data from RCCs, create incident summaries for public release, generate periodic and special reports at the Government's request, and resolve incident feedback issues with external organizations.

Registration Database Operations - The Contractor shall register new beacons within 2 business days of receiving paper/faxed/emailed registration forms from beacon owners. The Contractor shall also:

- update registration information;
- notify beacon owners 60 days in advance of bi-annual registration renewal;
- notify beacon owners 1 day after bi-annual registration has expired;
- notify beacon owners 30 days after bi-annual registration has expired;
- electronically scan and file copies of beacon registration information within 2 business days;
- prepare and mail proof of registration letters and decals to beacon owners;
- resolve beacon registration issues with owners;
- generate periodic and special reports at the request of the Government;
- ensure adequate supplies are available; and
- liaise with external organizations on registration issues.

Registration Database Quality Control - Registration entries, renewals, and updates performed by the Contractor shall follow established quality control processes. Registration database records, both electronic and hardcopy, must be easily identified and properly filed. These records typically contain Personally Identifiable Information and must be protected in accordance with Department of Commerce, NOAA, and other United States Government guidelines, including SORN [NOAA-20, Search and Rescue Satellite Aided Tracking \(SARSAT\) 406 MHz Emergency Beacon Registration Database](#).

Documentation – The Contractor shall develop, revise, and/or review software, standard operating procedures, and operations documentation in accordance with applicable federal and/or agency standards during the appropriate phase of the life cycle including technical reports to document algorithm analysis, feasibility studies, trade-off, and impact analysis. The Contractor shall update all documentation to remain current with the USMCC system.

The Contractor shall also perform engineering analysis of implemented software products and develop new, or modify existing, documentation to correctly reflect the implemented code. The documentation shall provide the necessary information to support life cycle maintenance of the software product(s) by the Government.

The Contractor shall update as required and maintain all documentation related to the USMCC including, but not limited to, the following:

- USMCC Functional Description Document
- USMCC Operations Guide
- SARSAT System Administrators Guide
- USMCC Detail Design Document
- USMCC Functional Requirements Document
- 406 Registration Data Base Functional Requirements Document
- Incident History Data Base Functional Requirements Document
- USMCC Data Structures Document
- USMCC Baseline Source
- USMCC National Rescue Coordination Center and Search and Rescue Point of Contact Alert and Support Messages
- USMCC Standard Operating Procedures
- SARSAT IT Architecture
- SARSAT Security Plan
- SARSAT Contingency Plan
- SARSAT Configuration Management Plan
- 406 MHz Beacon Coding Guidelines for USA National Use Fields
- Interconnection Security Agreements
- Interface Control Documents

Configuration Management – The Contractor shall support the existing SARSAT configuration management plan and shall support the Government as required to provide storage of, and

controlled access to, software, documentation and associated tools and procedures. The Contractor shall utilize a Government approved tool to manage all aspects of configuration management for the USMCC. The contractor shall generate reports from this tool as needed and assist SARSAT stakeholders in gaining access to the tool while adhering to Government policy

Communication and Outreach – The Contractor shall support the SARSAT and Cospas-Sarsat program by interfacing with the public as required by the Government. The interface may include public meetings, conferences, and trade or professional events, among others. Activities will also include developing literature, providing briefings and tours of the USMCC, and other educational activities as required by the Government. The Contractor shall also maintain an accurate count of the number of people rescued as a result of the SARSAT system and provide periodic reports on rescues, with reporting periods to be established by the Government.

Meeting Support – The Contractor shall support the SARSAT and Cospas-Sarsat programs at national and international meetings. Such meetings include: SARSAT PMO meetings Cospas-Sarsat Council, Joint Committee, Task Group, Expert Working Group Meetings, Data Distribution Region Meetings, Interface Meetings with US RCCs, Beacon Manufacturers Meeting, Bi-lateral Meetings, National Search and Rescue Committee (NSARC) General Meetings, Civil Air Patrol Meetings, RTCA, Inc Meetings, Radio Technical Commission for Maritime services (RTCM) Meetings, and United Nations (UN) Conferences. The Contractor shall review and analyze domestic and international meeting documents, write position papers for US Government review/discussion and give presentations as directed, and attend meetings as members of the U.S. delegation as required by the Government.

Certification of Operations and Data Entry Personnel - The Contractor shall develop and employ training programs to certify the operations personnel and data entry personnel are fully capable to operate the USMCC and enter/update beacon registration information in the 406 RGDB. Part of the certification process should include customer service training of the RGDB and USMCC duty controllers that interface with primary customers, the Rescue Coordination Centers, and beacon owners.

C.2.5.3 Maintenance Support

C.2.5.3.1 USMCC

The Contractor shall maintain all USMCC application software as referenced in the USMCC, the RGDB, and IHDB Functional Description Documents, USMCC Detail Design Document, and USMCC Baseline Source. The Contractor shall provide a complete range of software maintenance activities including corrective maintenance, adaptive maintenance and perfective maintenance.

Corrective maintenance is required to correct unexpected software problems, meet published requirements, and/or fix corrupted files or databases. The Contractor shall perform corrective maintenance on a 24-hour, 7 days-per-week, 365 days per year schedule. The Contractor shall provide appropriate personnel to analyze problems detected in applications software and take appropriate action to minimize or eliminate the problems including the development of software to correct or work around the problems.

Adaptive maintenance is required to support changes in the processing environment, which include the addition of, or conversion to, new hardware, operating environments, data structures or new algorithms.

Corrective or adaptive maintenance for critical software sub-systems or elements shall be initiated within one (1) hour of notification by the Government or appropriate personnel and performed on a 24-hour, 7 days-a-week basis, 365 days per year.

Perfective maintenance is required to better meet operational objectives and to support planned changes to improve efficiency, performance or maintainability of operational software. As part of perfective maintenance, the Contractor shall develop and analyze requirements and provide design, integration, and testing support to upgrade/replace existing USMCC software. This includes the support for the periodic (as stipulated by the programmatic document, which could be monthly, quarterly, bi-annually, annually) technical refresh of software, hardware and network equipment included in the USMCC. Perfective maintenance and non-critical changes shall be implemented during regular business hours as requested by the Government.

In accordance with all system and software maintenance requirements, the Contractor shall strictly adhere to established configuration management plans and procedures. This ensures that any and all modifications are appropriate, officially approved by the program, comprehensively documented, and compliant with established SARSAT Change Control Board (CCB) protocols.

The Government/Program shall have unlimited data rights to all software developed or modified for the USMCC. The Government reserves the right to witness all Contractor efforts to accomplish the PWS requirements and maintains the right to approve or reject resulting processes. The Contractor shall maintain an interface with Government project personnel, users, software quality and configuration management personnel throughout the process.

USMCC System PC and Local Area Network (LAN) –The Contractor is required to maintain all hardware and systems software associated with the USMCC system. The Contractor shall perform requirements analysis, design, hardware implementation, configuration, and maintenance of the software on the USMCC System PC workstations and USMCC System Local Area Networks and associated hardware. The current notional hardware configuration is described in section C.2.4.1. The Contractor shall be responsible for maintaining all hardware (including, but not limited to: routers, firewalls, servers, and other network appliances) in support

of the SARSAT mission.

The Contractor shall provide software design to develop and apply PC technology in networked applications for the USMCC system. This work shall include procurement of software applications procurement, software upgrades and patches, networking, rapid prototyping, and integration with PC hardware, software, and peripherals. Additionally, on behalf of the Government, the Contractor shall procure and maintain all software licenses required to operate and maintain the USMCC system. These licenses may include software development licenses required to perform the maintenance activities described below.

The Contractor shall maintain USMCC System PC workstations and LANs according to configuration management procedures. Change and configuration management tasks include the technical preparation, impact evaluation/analysis, required CCB documentation, security assessment, and other planning necessary to implement the changes. Hardware and COTS changes may result from any of the following types of maintenance:

- Corrective maintenance – maintenance in response to a system problem.
- Adaptive maintenance – maintenance to accommodate a change in requirements to the data or the environment.
- Perfective maintenance – maintenance to better meet operational requirements or to improve processes.

As noted above, corrective or adaptive maintenance for critical sub-systems or elements shall be initiated within one (1) hour of notification by the Government or appropriate personnel and performed on a 24-hour, 7 days-a-week, 365 days a year basis. Perfective maintenance and non-critical changes shall be implemented during regular business hours.

The Contractor shall support transition of current capabilities to web-based services, and use of the Internet to support the SARSAT and USMCC missions. The Contractor shall support the Government by maintaining and updating web pages, suggesting web enhancements, and performing routine web updates as needed (such as posting notifications of impending outages or maintenance activities).

C.2.5.4 Technical Support

C.2.5.4.1 SARSAT/USMCC

The Contractor shall be responsible for a wide range of technical support to sustain and enhance the national SARSAT and international Cospas-Sarsat program. All technical work in support of SARSAT and Cospas-Sarsat missions shall be coordinated with the NOAA USMCC Management Team. Key required activities are described below.

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Corrective maintenance is required to correct unexpected technical problems, meet published requirements, and/or fix connections and other technical issues. The Contractor shall perform corrective maintenance on a 24-hour, 7 days-per-week, 365 days per year schedule. The Contractor shall provide appropriate personnel to analyze problems detected in the technical issues, and take appropriate action to minimize or eliminate the problems including the development of software to correct or work around the technical problems.

LUT Support – Although the Local User Terminals (LUTs) and Phased Array Antennas are maintained under a separate contract, the USMCC Operations Contractor shall analyze LUT and Phased Array data to assist with anomaly resolution. Furthermore, the Contractor shall verify that the testing and deployment of new LUT and Phased Array software does not adversely affect MCC operations. The Contractor shall also furnish technical support to enhance the LUT/Phased Array-to-MCC interface, establish functional requirements and specifications, and facilitate the integration of new technologies throughout the period of performance.

Data Communications – The Contractor shall provide data communications technical support that includes studying, identifying, planning, implementing, and maintaining required data communications for the transfer of distress alert and system data. Communication paths include the use of the Federal Aviation Administration's (FAA) Aeronautical Fixed Telecommunication Network (AFTN), Common Message Handling Protocol (CMHP), facsimile, and VPN. The Contractor shall be responsible for establishing new communication links for the USMCC, troubleshooting data communication problems, and maintaining data communication configurations. As needed by the Government, the Contractor shall coordinate and test communications links back to the USMCC for MEOSAR and associated local user terminals (MEOLUTs).

The Contractor shall coordinate with the USAF, USCG, and other organizations to develop the capability to transmit alert messages directly to their automated mapping and display systems and search tools. The Contractor shall also be responsible for the maintenance of NOAA provided Communications and Data Terminal Equipment at the LUTs.

Analysis – The Contractor shall perform analysis of reported or observed anomalies and on additional topics as requested by the Government. Analysis can include collecting or extracting data, providing software for analysis, and documenting results.

Analysis of anomalies is one of the most important activities for the Contractor, as anomalous data has a direct impact on the users of the data. This impact can range from loss of confidence in data provided to the users to unnecessary allocation of resources by the users. It is imperative for the Contractor, in a timely manner (normally within one hour), to be able to:

- identify problems through monitoring or analysis;
- identify the causes of the problems;
- collect and analyze data; and,
- recommend solutions and their implementation.

This activity shall include, but is not limited to, analysis of:

- USMCC Functions;
- Data Distribution Procedures;
- False Alerts;
- Interferers;
- Orbit Vector Processing;
- Potential Satellite Problems;
- Large Location Errors;
- Beacon Problems;
- Communications;
- LUT Performance;
- MEOSAR testing, such as proof of concept (POC) and in-orbit validation (IOV) activities.

Monitoring – The purpose of monitoring is two-fold: 1) to detect anomalies in the performance of the national and international Sarsat and Cospas-Sarsat space and ground segments; and 2) to ensure the integrity and validity of the data provided to MCCs, SPOCs and RCCs. The Contractor may have to perform monitoring and trend analysis over and above what is performed as part of the usual 24-hour operation. The Contractor shall also support the monitoring required by the Cospas-Sarsat System as outlined in C/S A.003 “Cospas-Sarsat System Monitoring & Reporting.” The areas of monitoring include, but are not limited to:

- U.S. and foreign LUTs;
- Communications Links;
- Orbitography Beacons, (e.g. beacon simulators);
- Operational Beacons;
- Satellites;
- USMCC Software and Hardware; and
- Large Location Errors.

In addition, the Contractor shall perform routine monitoring and reporting of harmful interference in the distress frequency band. The Contractor shall coordinate with internal and external regulatory agencies to eliminate interference and coordinate with appropriate agencies and organizations on frequency management issues.

Testing – At the direction of the Government, the Contractor shall support testing in addition to that involved with software life-cycle activities. This includes support for commissioning of new equipment in the Cospas-Sarsat Ground Segment, support for on-orbit testing of SAR payloads, the annual Cospas-Sarsat system test, support for other federal, state, or local agencies, private agencies and support for U.S. LUTs, LUTServer, and MEOLUT development. The Contractor shall also act as the point of contact for test transmissions of beacons, and shall coordinate NOAA approved testing in order to minimize harmful impacts to the operational system.

C.2.5.4.2 IT Security Compliance

In the performance of its work, the Contractor shall meet all applicable requirements in the *U.S. Department of Commerce IT Security Program Policy* and the *NESDIS IT Security Handbook*, to be provided by the government at the request of the Contractor.

The Contractor shall comply with the IT Security requirements of the Department of Commerce as outlined in Commerce Acquisition Regulation (CAR) 1352.239-72, Security Requirements For Information Technology Resources (April 2010). CAR 1352.239-72, section (d) includes the DOC IT Security Program Plan, the NOAA IT Security Manual, and the NESDIS IT Security Handbook. The contractor must also comply with FAR Clauses 52.204-21, 52.224-1, 52.224-2 and 52.239-1.

The Contractor shall support the transition of applicable SARSAT systems to comply with additional cybersecurity requirements of the U.S. Coast Guard (Department of Homeland Security) as documented in U.S. Coast Guard Cybersecurity Manual, COMDTINST M5500.13 (series) (current version is M5500.13F) [FOUO]. The contractor shall document this compliance within the SARSAT IT Security Plan.

Contractor personnel shall be screened in accordance with the requirements for High Risk contracts as specified by CAM 1337.70 section 2.2 (Oct 2015); specifically, in accordance with CAR 1352.237-70, Security Processing Requirements—High or Moderate Risk Contracts (April 2010). Any access by contract personnel who are Foreign Nationals must be in accordance with the requirements of CAR 1352.237-73, Foreign National Visitor and Guest Access to Departmental Resources (APR 2010).

The contractor must submit security forms required by CAR clause 1352.237-70 two (2) weeks prior to each new contract employee's start of work so NOAA staff has sufficient time to process requests for background checks, NOAA badges, and network access.

Security Controls – The Contractor shall employ appropriate security controls in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance. In accordance with the SARSAT IT Security Plan, the Contractor shall be responsible for developing, implementing, and maintaining and testing technical IT Security controls within the mission critical SARSAT system and web applications.

Contractor software and hardware developers shall build and maintain specific security controls — as specified by the Government and based on the recommendations of the most recent revision of NIST Special Publication (SP) 800-53, *Recommended Security Controls for Federal Information Systems and Organizations* — into the system/component at the level required by the system's Federal Information Processing Standards Publication (FIPS) 199 security categorization. (The Government has determined the SARSAT system to be “**High**” impact).

FIPS Publication 200 requires the selection of security controls based on the FIPS 199 categorization. System components shall permit updating security controls as new threats/vulnerabilities are identified and as new technologies are implemented.

Continuous Monitoring – NIST SP 800-37 establishes the Continuous Monitoring requirement to ensure oversight and monitoring of security controls in the information system on an ongoing basis and that the authorizing official be informed when changes occur which may impact the security of the system. The Contractor shall support continuous monitoring assessments and reporting requirements based on the SARSAT Continuous Monitoring Plan and information technology security policies, procedures and guidance. The Contractor shall assist the government with reviewing the FIPS 200 security controls, at least annually as part of the System Security Plan (SSP) and risk assessment annual review, as well as whenever a significant event occurs. The contractor shall update the security controls if necessary based on findings from continuous monitoring assessments performed by independent or third-party reviewers.

Developmental and Evaluation-Related Assurance Requirements – Contractor software and hardware developers shall follow security engineering principles (including secure coding practices and code review for software development) consistent with NIST SP 800-27, *Engineering Principles for Information Technology Security (A Baseline for Achieving Security)*, to follow a configuration management process in accordance with NIST SP 800-128, *DRAFT Guide for Security Configuration Management of Information Systems*, and to perform security testing and evaluation before delivery to the Government. Specifically, the Contractor shall:

- Create and implement a Configuration Management Plan;
- Create and implement a Security Test and Evaluation Plan;
- Implement a verifiable flaw remediation process to correct weaknesses and deficiencies identified during the security testing and evaluation process; and
- Document the results of the security testing/evaluation and flaw remediation processes in a Security Test and Evaluation Plan, Requirement, Objectives, and Results Report.

In addition, specific Contractor's responsibilities shall include, though are not limited to, the installation, configuration, and maintenance of firewalls, intrusion detection systems, and routers; the application of security patches and operating system upgrades, the maintenance of virus protection tools and documenting and reporting these activities through scans. The Contractor shall support the Government in IT Security related activities including but not limited to risk and vulnerability assessments and testing, Assessment & Authorization (A&A), and Plan of Action and Milestones (POAM) reporting. The Contractor shall update the relevant security documents, such as the System Security Plan, consistent with the Configuration Management Plan. The NOAA OCIO is developing an Enterprise Wide Security A&A (EWSAA) Acquisition. The Contractor shall transition the A&A work to the EWSAA when it becomes available.

Use of Tested, Evaluated, and Validated Products – Contractor software and hardware developers shall, to the extent technically possible, incorporate products that have been tested,

evaluated, and validated by the Government. NIST SP 800-23, *Guidelines to Federal Organizations on Security Assurance and Acquisition/Use of Tested/Evaluated Products*, provides guidance on the acquisition and use of tested/evaluated information technology products. NIST SP 800-36, *Guide to Selecting Information Technology Security Products*, provides guidance on the selection of information security products.

Documentation Requirements – Contractor software and hardware developers shall provide the government with adequate documentation of the system/component developed, to include a narrative description of the system operating environment, architecture (including diagrams and hardware/software inventories), and user/operator manuals. The documentation shall address user and systems administrator guidance and information regarding the implementation of the security controls in the information system. The documentation shall include, but is not limited to:

- Vendor supplied documentation of software;
- Supporting narratives as required by the government to prepare a comprehensive system security plan;
- Standard operating procedures;
- Emergency procedures;
- User rules/procedures;
- Implementation Plans;
- User and Administrator manuals;
- Backup procedures; and
- Software code and notes as appropriate.

At a minimum, documentation shall be reviewed and updated by the Contractor annually, or more frequently if there is a significant change or update to the system, or as requested by the Government.

Configuration Settings and Implementation Guidance – NIST provides requirements for compliance with OMB's Federal Desktop Core Configuration (FDCC) requirements for some Microsoft Windows products at <http://nvd.nist.gov/fdcc/index.cfm>, and NIST SP 800-70, *National Checklist Program for IT Products – Guidelines for Checklist Users and Developers*, provides guidance on selecting secure configuration settings for other information technology products. For the current configuration of the USMCC system, the following secure benchmarks are required:

- Windows Server 2012 R2 - CIS Benchmark
- Windows Server 2012 - CIS Benchmark
- Windows Server 2016 – DISA STIG
- Windows Server 2012 R2 – DISA STIG
- Windows 10 – DISA STIG
- VMware ESXi 7 – CIS Benchmark

- Cisco Firewalls and Routers - CIS Benchmark

As the Contractor is responsible for testing and implementing application patches and firmware and operating system upgrades, it shall be necessary for the Contractor to follow additional secure benchmarks for these upgrades or new configurations. The Contractor shall be responsible for adhering to the secure benchmarks commensurate to the system configuration.

The contractor shall note that Homeland Security Presidential Directive 12 (HSPD-12) includes requirements from FAR 4.1302 stating (a) in order to comply with FIPS Publication 201, agencies must purchase only approved personal identity verification products and services; (b) Agencies may acquire the approved products and services from the GSA, Federal Supply Schedule 70, Special Item Number (SIN) 132-62, HSPD-12 Product and Service Components, in accordance with ordering procedures outlined in FAR Subpart 8.4., as well as Internet Protocol Version 6 (IPv6) requirements from FAR part 11.002 (g) stating: unless the agency Chief Information Officer waives the requirement, when acquiring information technology using Internet Protocol, the requirements documents must include reference to the appropriate technical capabilities defined in the USGv6 Profile (NIST Special Publication 500-267) and the corresponding declarations of conformance defined in the USGv6 Test Program. The applicability of IPv6 to agency networks, infrastructure, and applications specific to individual acquisitions shall be in accordance with the agency's Enterprise Architecture (see OMB Memorandum M-05-22 dated August 2, 2005).

Personnel Screening and Physical Access Security – Any contractor personnel required to work on-site at a Federally-controlled facility must meet the requirements of FAR 52.204-9, Personal Identify Verification of Contractor Personnel.

Suitability Requirements—High or Moderate Risk Contracts - Personnel shall be screened in accordance with the requirements for **High Risk** contracts as specified by CAM 1337.70 section 2.2; specifically, in accordance with CAR 1352.237-70. Any access by contract personnel who are Foreign Nationals shall be in accordance with the requirements of CAR 1352.237-73, *Foreign National Visitor and Guest Access to Departmental Resources* (April 2010). In addition, the USMCC COR may designate the need for contractor personnel not working on-site, but working on this order, to undergo security processing.

The contractor shall submit security forms required by CAR clause 1352.237-70 two (2) weeks prior to each new contract employee's start of work so that the NOAA staff has sufficient time to process requests for background checks, NOAA badges, and network access.

C.2.5.5 Program Support

The Contractor shall provide operational support to the SARSAT Program, primarily focusing on executing action items designated by the PCB. Additionally, the Contractor shall assist in

evaluating and developing Program-designated initiatives by contributing operational subject matter expertise to program-led Integrated Product Teams (IPTs).

The Contractor shall strictly adhere to established Program processes and procedures, while providing relevant information upon request to partner agencies

C.2.5.5.1 Program Support Tasks

In support of the SARSAT Program, the Contractor shall provide expertise in ground and space segment operations and IT Security in order to:

- Support the definition and refinement of requirements (requirement-task-product),
- Support development, integration, test, and maintenance of operations transition products,
- Support risk assessments and risk board through the Transition Team IPTs,
- Serve and support program or project control boards, change boards, and internal review boards,
- Support the development of reports including test reports, product status reports, weekly and monthly reports,
- Provide formal input for Integrated Master Schedule (IMS) updates as necessary, and support Project Milestone Reviews in accordance with program requirements
- Providing subject matter expert attendance at Integrated Product Team (IPT) meetings,
- Reviewing and providing feedback to documentation and schedules,
- Reviewing IT security policies and revise documentation and procedures as necessary
- Integrating and validating processes and procedures, and
- Supporting the review and, where appropriate, revision of existing documentation.

C.2.5.6 Program Support Services

The Contractor shall support the SARSAT Program in the management, operation, and advancement of both the national SARSAT and the international Cospas-Sarsat System in the areas of program support services. The types of services covered in this task include interagency and international meeting support, including planning logistics to host meetings. The scope of this task also covers, but is not limited to: consulting services, support for office business processes, library services to maintain existing technical library documents, collect new documents as required, outreach and education support, and property management. This task also includes administrative support for weekly and monthly reporting to NESDIS management, which includes, but is not limited to, metric gathering for reporting on the SARSAT

system, updating program risk briefings, updating Exhibit 300, and other NOAA databases as needed.

Project Management – The Contractor shall provide a Program Support Services Project Manager that is responsible for all aspects of field and/or task-level project performance (i.e. technical, contractual, administrative, and financial). The Project Manager may work on multiple projects simultaneously. The Project Manager supervises personnel involved in all aspects of project activity, organizes and assigns responsibilities to subordinates, oversees the successful completion of all assigned tasks, and maintains customer contacts to ensure conformity to all contractual obligations. The Project Manager exercises independent judgment, as well as a high-level of analytical skill, in solving non-routine technical, administrative, and managerial problems.

Program Support - The Contractor shall provide program support that includes the labor and materials required to update and maintain SARSAT Program documents and agreements. The Contractor effort shall include the solicitation and coordination of inputs from NOAA, NASA, USAF, USCG, and other participating U.S. agencies. The contractor shall provide support that includes the documentation of tasks and objectives of the various agencies, as well as providing input to program schedules and milestones. The Contractor's program support efforts shall also include development of cost benefit analysis and interagency cost-sharing methodologies.

Library Services & Documentation Support - The Contractor shall provide labor and materials to support SARSAT operational, technical, and program management documentation efforts. This effort shall include maintenance of the Government-owned SARSAT technical library, including all operational, technical, and program management documentation, and routine distribution of selected documents. The Contractor shall provide distribution in a variety of methods including, but not limited to, electronic or web-based methods.

The Contractor shall provide services that document program management functions that include, but are not limited to operational and technical studies, reports, working and position papers developed by the SARSAT Program, and meeting agendas and minutes.

Outreach and Education Support - The Contractor shall advance the public, national, and international awareness of both SARSAT and Cospas-Sarsat programs by supporting educational and promotional outreach event coordination and presentation materials development. The Contractor shall provide support that includes the labor and materials to support SARSAT educational and promotional outreach efforts. These efforts shall include the review, preparation, and update of selected SARSAT educational and promotional outreach materials, as well as original production and /or mass production of educational and promotional outreach material. Contractor generated materials shall include, but are not limited to, documentation, graphics, presentations, articles, posters, pamphlets, and web based media.

Meeting Support - Upon Government approval, the Contractor shall provide meeting support, including the labor and materials to provide logistical conference and event coordination.

Meeting, conference, and event coordination efforts provided by the contractor shall include facility selection, negotiation with facility representatives, reservation and confirmation of facilities (and associated fees/deposits), arrangement for meeting rooms, exhibits and exhibit space, if applicable. The Contractor shall provide event coordination services, including the arrangement of breaks and receptions, securing audio/visual aids and equipment, and the overall setup of the conference/meeting facilities. The Contractor will also be responsible for the recording of the proceedings or minutes, their distribution, and the handling of materials and registration packages. Virtual Meeting support when required.

The Contractor shall provide meeting support that includes the pre-conference and meeting development call for papers, preparation of the conference/meeting program agendas, creation of mailing lists, mailing, scheduling and preparation of letters of invitation, as well as preparation, publication, and dissemination of minutes and proceedings.

The Contractor shall provide meeting support for, *but not limited to*, the following:

- Beacon Manufacturer's Workshop;
- International Cospas-Sarsat Council (CSC) and CSC ad hoc meetings;
- International Joint Committee (JC) Meeting;
- International Technical Working Groups (TWG);
- International Expert Working Groups (EWG);
- International Western Data Distribution Meetings (WDDR);
- International Bi-Lateral Meetings;
- Inter-Agency Program Steering Group (PSG);
- Inter-Agency Joint Working Group (JWG);
- US SARSAT Program Transition to another Government agency;
- National Search and Rescue Committee (NSARC);
- GPS/GLONASS Working Group;
- SAR/GPS Management Working Groups; and
- PSG and JWG sub committees as needed

Property Management – The Contractor shall provide property management support to enable efficient asset management of office resources. This support includes, but is not limited to, inputting, updating and maintaining all SARSAT property records in NOAA's property management system. The Contractor shall perform property inventories and follow all NOAA and NESDIS property management policies and procedures. The Contractor shall maintain up-to-date records and generate status reports as needed. The Contractor shall develop appropriate reports for lost, missing, stolen, destroyed, damaged or unserviceable accountable property. Property is located at the NOAA Satellite Operations Facility (NSOF), Wallops Island Command and Data Acquisition facility, and the NOAA Center for Weather and Climate Prediction.

Travel – Occasional local area, domestic, or international travel may be required to support some of the meetings listed in the Meeting Support section of this task. All travel must be

authorized by the Government prior to travel. A trip report and other appropriate documentation shall be furnished to the Government within one week of completion of travel.

Material and Support Costs Other Than Travel - The Contractor may be required to purchase materials, provide shipping for outreach material, enter into contracts for meeting and outreach events, and other support as required. All expenditures must be authorized by the Government in advance.

C.2.5.7 Optional -USMCC Cloud Migration Effort

*This work is conditional based on funding availability and DOC/NOAA directives. The COR will provide direction to the contractor after a task order award regarding the level of support, if any, that is required in the option period(s) defined in the task order award period of performance.

The NOAA USMCC comprises 28 applications/utilities with approximately 720k lines of source code. These applications are currently hosted on Windows Servers that are refreshed on 5 year cycles (per DOC IT requirements) and the goal of this effort is to have these applications/utilities hosted securely in a cloud environment with the same reliability and back-up capabilities as the current HW based USMCC.

To complete this, the Contractor shall;

- 1) Perform Requirements gathering for all 28 applications/utilities:
 - Determine the function of each application/utility and if source code is available in CM.
 - When source code is available, generate a Software Requirements Specification (SRS).
 - If source code doesn't exist, reverse engineer the source code with a tool like .NET Reflector or rely on a programmer/analyst to create the requirements.
- 2) Create a backlog of user stories that depict the requirements:
 - Create a theme of functionality that is implemented. This shall be represented in an Epic, which comprises one or more features. Each feature comprises one or more user stories.
 - Refine the backlog of user stories. [NOTE: A determination can be made to account for the functionality in some of the stand-alone utilities. This functionality can be implemented within a microservice being developed, leave as a separate service, or move to a cloud function.]
 - Plan the release which represents a quarter containing 6 two week sprints.
 - Plan each sprint and generate tasks per user story.
- 3) Implement USMCC Cloud product development:

- Track and illustrate progress on whether the team is behind, ahead, or on track.
- Ensure the framework is in place to instantly stand-up each feature as it's completed.
- Given this is an iterative process, ensure each piece will have been documented, coded, tested, and deployable to one or more environments upon completion of the sprint.

4) Sprint Schedule:

- Ensure each sprint will result in having a product that is built and at a minimum deployed to a Development (DEV) and Quality Assurance (QA) area. [NOTE: When deemed ready and approved at a "gate", code can be deployed to a User Acceptance (UAT) and/or Staging area.]
- Ensure each release will result in having a product with one or more features that correlate to one or more micro services, cloud functions, etc.
- Code shall be developed in parallel with legacy applications/utilities that are currently being used. After UAT and Staging has been completed for a set of features, the associated cloud micro services and/or functions shall be deployed and turned on in production, then retired in legacy.

5) Summary for Cloud USMCC effort:

Ensure the legacy code shall be run on a Virtual Machine (VM) in a cloud environment. However, some of the issues with this approach is that currently there is missing source code, so it is indeterminable when modifications are needed or what happens when functionality becomes obsolete and no longer can be run.

In addition, the benefits to moving to a newer technology potentially includes capturing all of the requirements, improving coding architecture, and automating the build process and deployments. Ensure refactoring and implementation in a newer technology will assure that code is archived (in CM), builds are automated (removing human error, passing code reviews and unit tests) and are properly deployed (gate acceptance to deploy to multiple areas).

The Contractor shall demonstrate that the Continuous Integration/Continuous Delivery (CI/CD) model lends itself to major cost savings over the long term. Some of the events supporting this are:

1. Faster Development Cycles
2. Minimized Downtime
3. Reduced Compute Costs

4. Reduces the Cost of Promotion and Release
5. Reduces Switching Costs

C.2.5.8 Minimum Performance Level Payments

The Government will apply payments in accordance with minimum performance levels. Payments will apply to a particular month's invoice dependent upon the average system availability or beacon registrations for that month. The monthly percentages shall be included in the contractor's monthly report. Additionally, meeting/not meeting minimum performance levels will be reflected in the Contractor Performance Assessment Reporting System (CPARS), and will be accompanied by a positive/negative Government correspondence.

a) USMCC system availability is computed based on how well the USMCC performs its basic function, which is to distribute timely, reliable alert data to assist SAR (per document Cospas-Sarsat (C/S) P.011). The monthly USMCC availability is calculated automatically through queries to the system.

A failed or retransmitted message can be considered successful when shown that it was a false failure. An example of a false failure is:

- Successful retransmission of a message within 15 minutes of original failure;
- Failed message caused by an issue external to the USMCC; or,
- General requests for retransmission of messages previously successfully transmitted.

Any failures greater than 15 minutes are manually investigated to determine if they were a false failure. Any false failures are then removed from the system and the query is run again to determine the monthly system availability.

b) The determination that a registration is entered in a timely manner (within two business days) is automatically calculated by the Workload Management System (WMS) by subtracting the received date from the date first entered and adjusting for non-business days (e.g., weekends, holidays). The received date for registrations is determined as the first business day the form is physically retrieved from the NSOF mailroom or fax machine. The system corrects for non-business days based on a configurable calendar, and for registrations that cannot be entered immediately due to beacon ID problems (e.g., incomplete ID, foreign coded, illegible handwriting, etc).

C.2.6 Processing Environment

The Government shall provide all USMCC hardware, operating system software, COTS, and the necessary data telecommunications equipment. The Government shall also provide all

computer supplies (tapes, disks, paper, etc.).

C.2.7 Reporting

The Contractor shall produce many different types of reports to document system status and performance and to inform users and USMCC stakeholders. These reports shall include:

- Kick-off Meeting and Minutes - If the Contracting Officer determines that a Kick-off meeting is necessary, it shall be conducted in accordance with FAR 42.5. The Contractor shall provide a Kick-off meeting within 10 days after award at a Government directed location and the meeting minutes in the Contractor's chosen format within 3 days after the Kick-off meeting.
- Daily Briefings and Report – The Contractor shall be required to present a brief summary of operational activities by 09:05 AM ET of each business day for the period since the last briefing. Major problems, trends, outages (USMCC, LUTs, satellites or communications), number of scheduled LUT passes not received, feedback regarding 406 MHz beacon activations, rescues attributed to the Cospas-Sarsat System, and status of beacon registrations shall be documented and presented in the “SARSAT Daily Report.” (Sample attached as Appendix C).
- Bi-weekly Status Meeting and Report – At this meeting, the Contractor shall provide the NOAA USMCC Management Team with an update on the progress of activities and tasks. The Contractor shall arrange the meeting and coordinate with the USMCC COR's schedule to ensure their availability. A report reflecting the status shall be emailed or uploaded to the approved document sharing repository, such as Google Drive or SharePoint, no later than one day prior to the meeting. Per the direction of the COR, this may include Standard Operations Procedures (SOPs), LUT and Communications Outage Logs, Anomaly Reports, RGDB and IHDB Audit Reports, Maintenance Plans, Schedules and Reports, IT Security documentation (SSP, A&A, POAM, etc.), Trade Study Reports/White Papers (for any known studies), Test plans, procedures and reports, Verification and Validation plans, QMS Reports, and Outreach plans and literature.
- SARSAT Weekly Saves Report - This report shall capture all of the lives and/or property saved during a week due to information provided to rescue coordinators that came directly from the SARSAT system. An example of the report can be found in Appendix D.
- Monthly Reports – These reports shall summarize the progress of activities during the previous month. The key elements for each report consist of the following but are not limited to:
 - o Progress to date on each tasks and activities;
 - o Planned activities for the next period;
 - o Significant changes;
 - o Problem areas, recommended solution, and ways to prevent reoccurrence;

- o Cost issues that affect operational analysis reporting and how they are being addressed.

Monthly Reports shall be provided to the Contracting Officer, USMCC COR and the USMCC PM or delegate on or before the 15th calendar day of each month.

- Monthly Configuration Control Board Meetings – The Contractor shall attend monthly configuration control board meetings at which the Contractor shall present proposed System Change Proposals (SCPs), and detail the status of SCPs in progress and System Problem Reports (SPRs). Change control processes shall follow the SARSAT Configuration Management Plan. Examples and definitions of SCPs and SPRs are provided in the SARSAT Configuration Management Plan.
- Cospas-Sarsat Annual Report – This report shall include information from the USMCC databases, particularly the IHDB, as described in the annual report template provided by the Cospas-Sarsat Secretariat. The Annual Report is required by the Government to be delivered to Cospas-Sarsat Secretariat by March 15th of each year. The Cospas-Sarsat Secretariat will provide the template to be used for this report.
- Miscellaneous Reports – The Contractor shall produce several additional regular reports that provide information to the USMCC data users and other national agencies, as requested by the Government. These reports shall include a monthly report for the FCC (and Cospas-Sarsat) detailing detections of signals that may interfere with 406 MHz beacon detection and monthly distress reports and a final USMCC cloud migration results report (if the option is exercised). The Contractor shall also provide other reports, studies, and minutes, such as inter-agency technical meeting minutes, performance metric analysis, MCC performance case studies looking at actual distress cases, and other related matters as required by the Government.
- Schedule of Deliverables - The schedule of deliverables is included in section F.2 of the contract.

C.2.8 Travel

Some of the Contractor staff will occasionally be required to travel nationally or internationally. All travel must be authorized by the Government prior to travel. A trip report and other appropriate documentation shall be furnished to the USMCC COR within one week of completion of travel.

C.2.9 Materials and Supplies

The Contractor may be required to purchase materials and supplies to sustain the operation and maintenance of the USMCC and SARSAT ground system. All purchases must be authorized by the Government prior to purchase, with purchases greater than the Micro-Purchase Threshold (MPT) requiring Contracting Officer approval.

Materials below the MPT shall be reviewed by the USMCC PM approved by the COR. Materials above the micro-purchase level shall be reviewed by the USMCC PM, approved in advance by the COR with concurrence from the Contracting Officer. If these material purchases are for Information Technology (IT) commodity items, said items (the purchase), must adhere to the NESDIS Procurement Request Form (PRF) and processes that are in place to directly support the Federal Information Technology Acquisition Reform Act (FITARA). Adherence to the aforementioned form and process must be done prior to routing the purchase(s) to AGO.

The objective of FITARA is to improve the management of IT within an agency (NOAA) and hence, improve the ability for that agency (NOAA) to deliver its mission and conduct its business.

C.2.10 Key Personnel

At a minimum, the Contractor shall identify a key personnel resource for the following functional areas:

1. USMCC Chief
2. Systems Analysis – Senior Systems Analysts
3. Senior Network and IT Security Lead
4. Program Support Manager
5. Contract Program Manager
6. RGDB Manager
7. Lead Software Engineer
8. System engineer - liaison with NASA

The Lead Network and IT Security person shall possess a Certified Information Systems Security Professional (CISSP) credential and maintain it throughout the life of the contract.

C.3 Security Requirements

Contractor employees must have a secret security clearance prior to the start of the contract period of performance. The Department of Defense (DOD) 5220.22M National Industrial Security Program Operating Manual (NISPOM) applies to this contract. DD form 254 applies to the base contract, and optional years.

Sensitive Information Storage Disclosure

Equipment shall be disclosed only to authorized personnel on a Need-To-Know basis. The holder shall ensure that appropriate administration, technical, and physical safeguards are established to ensure the security and confidentiality of this information, data, and/or equipment is returned to Government control; destroyed; or held until otherwise directed. Destruction of items shall be accomplished by tearing into small parts; burning; shredding or any other method that precludes the reconstruction of the material, consistent with DOC guidelines.

Classified information, data, and/or equipment are not authorized for removal from DOC facilities.

Protection of Information

All information about the DOC networks and /or the security posture of any DOC information assets gathered or created under this PWS shall be considered as a minimum of "For Official Use Only", dependent upon the classification of the source network. It is anticipated that this information shall be gathered, credited and stored within the primary Government work location.

The following position under this contract shall possess a SECRET level security clearance:

- **Senior Network and IT Security Lead** - To access the intelligence information on Cyber Security Threats and Vulnerabilities, attend meetings where classified materials are being briefed, and access Secret information at secure locations. The position may require access to Secret information on a regular basis. The position is required to interface with the Department of Defense, and classified programs implemented by other Agencies. They are also required to receive, digest and respond to sensitive information associated with threat assessments and vulnerabilities. The position will require insight, coordination, information sharing with the Defense Information Systems Agency (DISA), US Air Force, US Coast Guard, and other DoD entities.

Attachments:

Appendix A – List of Acronyms

Appendix B – USMCC Requirements Analysis

Appendix C – Sample Morning Report

Appendix D - Sample Weekly Saves Report

Appendix A: List of Acronyms

AFB	Air Force Base
AFRCC	Air Force Rescue Coordination Center
AFTN	Aeronautical Fixed Telecommunications Network
CDA	Command and Data Acquisition
CITS	Common IT Services

CMCC	Canadian Mission Control Center
CMHP	Common Message Handling Protocol
COSPAS	“Cosmicheskaya Sistyema Poiska Aariynyich Sudov” which translates loosely into “Space System for the Search of Vessels in Distress.”
COTS	Commercial off the Shelf
CNES	Centre Nationale d'Etudes Spatiales which translates loosely into “National Center for Space Studies”
DCS	Data Collection System
ELT	Emergency Locator Transmitter
EPIRB	Emergency Position-Indicating Radio Beacon
ESPC	Environmental Satellite Processing Center
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
FCC	Federal Communications Commission
FMCC	French Mission Control Center
GEO	Geostationary-Earth Orbit
GEOLUT	GEOSAR Local User Terminal
GEOSAR	Geostationary-Earth Orbiting Search and Rescue
GOES	Geostationary Operational Environmental Satellite
GPS	Global Positioning System
JC	Joint Committee
LEO	Low-Earth Orbit
LEOLUT	LEOSAR Local User Terminal
LEOSAR	Low-Earth Orbiting Search and Rescue
LUT	Local User Terminal
MCC	Mission Control Center
MEOLUT	MEOSAR Local User Terminal
MEOSAR	Medium-Earth Orbiting Search and Rescue
METOP	Meteorological Operational (satellite)
MOU	Memorandum of Understanding
NBB	Naval Bulletin Board
NCWCP	NOAA Center for Weather and Climate Prediction
NESDIS	National Environmental Satellite, Data, and Information Service
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NSARC	National Search and Rescue Committee
NSOF	NOAA Satellite Operations Facility
OSPO	Office of Satellite Processing and Operations
OWG	Operations Working Group
PLB	Personal Locator Beacon

POAM	Plan of Actions and Milestones
POES	Polar-orbiting Operational Environmental Satellite
PSDN	Packet-Switched Data Network
PSTN	Public Switched Telecommunication Network
RCC	Rescue Coordination Center
RTCM	Radio Technical Commission for Maritime services
SAR	Search and Rescue
SARSAT	Search and Rescue Satellite Aided Tracking
SOCC	Satellite Operations Control Center
SPOC	SAR Point of Contact
SPSD	Satellite Products and Services Division
SQL	Structured Query Language
SSAS	Ship Security Alerting System
SSP	System Security Plan
SUA	System Use Agreement
TG	Task Group
TWG	Technical Working Group
UN	United Nations
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USMCC	United States Mission Control Center

Appendix B: USMCC Requirements Analysis

1. USMCC Operational Requirements

A. 24/7 Operation of the United States Mission Control Center (USMCC)

The 24/7 operation of the USMCC assumes that the following functions are performed around the clock 365 days a year. The Government expects these functions to remain relatively unchanged through the period of performance of the task order.

1. Operate the USMCC system at Suitland, Maryland, or at the designated remote control site or backup facility.
 2. Operate the USMCC per Volume 2 of USMCC Standard Operating Procedures (SOPs) and in accordance with Cospas/Sarsat (C/S) A.005 "Cospas-Sarsat Mission Control Centre (MCC) Performance Specification and Design Guidelines."
 3. Notify MCCs, Search and Rescue Points of Contact (SPOCs), and Rescue Coordination Centers (RCCs) of outages.
 4. Monitor the C/S Ground Segment in the United States in accordance with Volume 2 of USMCC SOPs and C/S A.003 "Cospas-Sarsat System Monitoring and Reporting."
- a. USMCC
 - initiate corrective action for critical problems per applicable SOP;
 - switch and configure backup capabilities as necessary and appropriate;
 - respond to system alarms; and,
 - monitor the operating environment and respond to environmental alarms such as HVAC and power systems.
 - b. Local User Terminals (LUTs)
 - monitor inputs from the LUTs to ensure that all aspects are functioning correctly;
 - initiate action for alarms and critical problems;
 - coordinate with LUT Vendor to resolve problems;
 - monitor LUT communication links; and,
 - record LUT and Communication outages in the approved log repository.
 - c. Communications
 - respond to alarms generated on the USMCC system;
 - initiate corrective actions to critical problems according to SOP;
 - initiate anomaly reports; and,
 - switch to backup communications links as required.
5. Serve as the NOAA Point of Contact for:
 - a. Rescue Coordination Centers (RCCs)

- respond to queries from RCCs;
 - provide registration data;
 - re-route and retransmit alert messages as needed;
 - provide satellite pass schedules for active beacons;
 - interpret system performance;
 - request feedback data for the Incident History Data Base (IHDB) as appropriate;
- and,
- other assistance as required.
- b. Mission Control Centers (MCCs)
- respond to queries from other MCCs;
 - retransmit data upon request or per procedure;
 - provide registration data as needed;
 - re-route data as needed or per procedure or request;
 - request alert data from other MCCs;
 - request feedback on operational beacons;
 - ensure system data (e.g. ephemeris) is properly transmitted; and,
 - coordinate international system events (international tests, backups, downtime etc.).
- c. SPOCs
- respond to queries from SPOCs;
 - retransmit data upon request or per procedure;
 - provide registration data as allowed; and,
 - re-route data as needed or per procedure or request.
- d. Satellite SAR Payload Activities and the Satellite Operations Control Center (SOCC)
- notify MCCs, SPOCs, and RCCs of satellite instrument failures or degradations, satellite movement, satellite commissioning and decommissioning, and other satellite related activities;
 - act as POC for command requests from the French Centre National d'Etudes Spatiales (CNES) and Canadian Department of National Defense (DND) respectively for the Search and Rescue Repeater (SARR) and Search and Rescue Processor (SARP) instruments and interfaces with the SOCC to request and verify the command execution; and,
 - act as POC for GOES SARR instrument command requests and interfaces with the SOCC to request and verify the command execution.
- e. LUT Operations
- respond to queries from LUT vendors; and,
 - maintain open dialogue with each LUT vendor.
- f. Environmental Satellite Processing Center (ESPC)

- create and submit Product Outage/Anomaly notices to ESPC;
 - monitor the retrieval of satellite; and,
 - monitor the retrieval of satellite ephemeris.
- g. Naval Bulletin Board
- monitor and retrieve Two Line Elements (TLEs).
- h. NOAA Management
- report the status of the SARSAT ground system in the United States;
 - reply to any queries from the Government; and,
 - notify of critical outages in the SARSAT ground system in the United States.

B. 406 MHz Beacon Registration Database

1. Manually register new beacons using paper forms mailed or faxed to NOAA.
Table 1 shows the total number of beacons registered per year from 2011 through 2021.
Table 2 shows the percentage of beacons registered online via the web interface for the period February 2019 to January 2022.

Table 1: Example of New Beacon Registrations

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
31,917	36,716	33,446	35,398	41,732	43,802	43,882	44,326	42,794	43,327	47,199

Table 2: Example of Use of Web Interface by Beacon Owners

Month	Online (Web)	Paper (Mail/Fax)	Total Registration s and Updates	Percent Online	Percent Manual Entry
Feb-19	38,447	8,392	46,839	82%	18%
Mar-19	42,866	11,275	54,141	79%	21%
Apr-19	40,056	10,385	50,441	79%	21%
May-19	43,352	11,005	54,357	80%	20%
Jun-19	42,591	10,380	52,971	80%	20%
Jul-19	38,395	9,620	48,015	80%	20%
Aug-19	33,894	8,245	42,139	80%	20%
Sep-19	32,159	7,655	39,814	81%	19%
Oct-19	40,750	7,926	48,676	84%	16%
Nov-19	29,597	7,058	36,655	81%	19%
Dec-19	32,938	7,412	40,350	82%	18%

Jan-20	37,794	9,378	47,172	80%	20%
Feb-20	34,906	8,739	43,645	80%	20%
Mar-20	36,532	8,665	45,197	81%	19%
Apr-20	39,849	9,023	48,872	82%	18%
May-20	41,307	8,911	50,218	82%	18%
Jun-20	41,452	10,281	51,733	80%	20%
Jul-20	48,883	9,768	58,651	83%	17%
Aug-20	36,077	10,813	46,890	77%	23%
Sep-20	33,945	8,774	42,719	79%	21%
Oct-20	32,288	9,588	42,719	76%	22%
Nov-20	30,223	7,640	37,863	80%	20%
Dec-20	32,260	7,345	39,605	81%	19%
Jan-21	39,436	8,158	47,594	83%	17%
Feb-21	36,145	8,196	44,341	82%	18%
Mar-21	41,285	9,304	50,589	82%	18%
Apr-21	48,197	10,195	58,392	83%	17%
May-21	45,921	8,644	54,565	84%	16%
Jun-21	44,054	10,091	54,145	81%	19%
Jul-21	40,063	7,544	47,607	84%	16%
Aug-21	36,988	8,178	45,166	82%	18%
Sep-21	34,337	8,504	42,841	80%	20%
Oct-21	35,578	6,969	42,547	84%	16%
Nov-21	33,016	6,917	39,933	83%	17%
Dec-21	32,612	6,949	39,561	82%	18%
Jan-22	36,053	7,050	43,103	84%	16%

2. Provide beacon registration “help desk” services via telephone according to SARSAT Customer Service Delivery Standards. The “help desk” currently receives about 80 calls per calendar workday.
3. Maintain daily counts including new registrations by paper and online, total beacon registration count, and number of confirmations.
4. File all copies of beacon registration forms and correspondence for a minimum of one year on-site at the NSOF. After the one year period, all beacon registration forms shall be scanned and filed electronically, and held in a designated repository for fifty (50) years.
5. Prepare and mail information data sheets, letters, and decals to beacon owners.

C. Incident History Database (IHDB)

1. Manually enter feedback faxed or emailed from RCCs into the IHDB database. Table 4 provides registration usage and accuracy as reported in the IHDB for one month, for illustration purposes.

**Table 4: Example Registration Usage and Accuracy as Reported in the IHDB
(9/1/11 to 9/30/11)**

	Contributed to Case Resolution	Primary Means to Resolve Case	Total Usage	Registratio n Data Not Used	Total
Distress	5	10	15	2	17
Non-Distress	80	225	305	13	318
Ceased	24	10	34	35	69
Total	109	245	354	50	404

D. Database and File Maintenance

1. Perform regular backups
2. Maintain archives
3. Retrieve archived data as required
4. Log all actions

E. Reporting

1. Prepare morning report. (See Attached Example).
2. Maintain configuration logs

2. Maintenance

A. USMCC Software Maintenance

1. Maintain the subsystems in Table 2 which are coded in C++, Visual BASIC, SQL, MapInfo, Visual C++, and JAVA, and other languages as needed.
2. Perform corrective, adaptive and perfective maintenance. Critical maintenance is to be initiated within one (1) hour, non-critical maintenance according to configuration management plan.

B. USMCC Equipment Maintenance

1. Primary USMCC site
 - a. Maintain the following:
 - PCs with Windows Operating System;

- LUT Display Monitors;
 - Map Display Monitor;
 - Routers and firewalls, including LUT sites as needed;
 - switches; and,
 - registration database support, and all associated equipment.
 - b. Perform corrective Maintenance
 - critical maintenance to be initiated within 1 hour; and,
 - non-critical maintenance according to CMP.
 - c. Perform adaptive Maintenance – according to CMP
 - d. Perform perfective Maintenance – according to CMP
2. Backup and Remote Control USMCC Site
- a. Maintain the following:
 - PCs with Windows Operating System; and,
 - Router and firewall(s).
 - b. Perform corrective Maintenance
 - critical maintenance to be initiated within 1 hour; and,
 - non-critical maintenance according to CMP.
 - c. Perform adaptive Maintenance – according to CMP
 - d. Perform perfective Maintenance – according to CMP

3. Technical Support

A. Communications

1. Establish and maintain communications links for Frame Relay network, Common Message Handling Protocol (CMHP), AFTN, FTP over VPN, and dedicated fax.
2. Perform corrective maintenance, adaptive, and perfective maintenance according to published guidelines.

B. IT Security

1. Maintain operational Systems (USMCC and Communication equipment) according to the DOC, NOAA, and SARSAT IT security policies and plans.
2. All COTS shall be kept up to date with security patches and updates.
3. Generate periodic and special reports including scanning, vulnerability, and intrusion reports.
4. Develop, implement, test, and maintain security controls according to DOC, NOAA, and SARSAT guidance.
5. Maintain network hardware to meet DOC, NOAA and SARSAT security guidelines.
6. Support all aspects of certification and accreditation activities.
7. Support Plan of Action and Milestone (POAM) generation, tracking, implementation and reporting.

4. Analysis

1. Study, recommend, design, or configure new hardware or software to improve or optimize USMCC performance.
2. Integrate new hardware/software systems into the USMCC as required by NOAA, The SARSAT Program Office or configuration management.
3. Perform studies and prepare reports on the various aspects of the operation as required by NOAA, The SARSAT Program Office, Configuration Management, or Performance plan .
4. Plan, conduct, and analyze tests and tests results with LUT vendors, other MCCs, SPOCs, RCCs, and others as required. This includes activities such as the annual Cospas-Sarsat system and backup tests, and MCC and satellite commissioning tests.
5. Support beacon False Alert analysis.
6. Retrieve data in support of responding to FOIA requests and investigations.
7. Assist in integrating new technologies into the USMCC and Cospas-Sarsat.
8. Assist in further development and implementation requirements for the MEOSAR system). This may include working with LUT and MCC vendors that are different from the US assets.
9. Review and write papers/studies on behalf of the government.
10. Monitor SAR payloads.
11. Provide and update Cospas-Sarsat quality management system (QMS) reports and other performance indicators and metrics as required by Cospas-Sarsat.

5. Meeting Support

1. Writing and review papers and presentations for international meetings.
2. Attend meetings:
 1. Task Groups;
 2. Joint Committee;
 3. Cospas-Sarsat Council;
 4. Bi-lateral / Multilateral;
 5. Beacon Manufacturer's Workshop; and,
 6. Other meetings required by the Government.
3. Review and write USMCC technical and operational papers for SARSAT and Cospas-Sarsat meetings (number reviewed can range from 10-300 and number written can range from 1-75 per meeting).

6. Interference Monitoring

1. Maintain subsystem to automatically track and report interference.
2. Coordinate with federal and international agencies to eliminate harmful interference.
3. Coordinate with appropriate agencies and organizations on frequency management issues.

7. Outreach

1. Attend conferences and trade or professional events as required by the Government.
2. Develop outreach literature.
3. Provide outreach briefings, and support tours of the USMCC.

4. Support educational outreach.

8. Reporting

1. Generate Morning Reports (See attached example).
2. Provide data for Performance Management Reporting.
3. Generate IHDB reports.
4. Provide responses to DOC, NOAA, NESDIS and OSDPD data calls.
5. Perform *ad hoc* reporting as needed.

9. Testing

1. Support spacecraft and MCC commissioning, and associated analysis. Support LUT commissioning with LUT vendor as needed.
2. Support Satellite testing (on orbit support) and associated analysis.
3. Serve as a point of contact for test coordination.
4. Conduct and participate in demonstrations and associated analysis.
5. Test changes and enhancements to ground segment and associated analysis.
6. Coordinate annual systems test and associated analysis.
7. Perform Risk Reduction related testing and associated analysis.

10. Develop and Maintain Documentation

- A.** Maintain USMCC Technical Documentation:
 - a. Functional Requirements Document;
 - b. Standard Operating Procedures/Guide;
 - c. Operators Manual;
 - d. Data Structures Document;
 - e. Functional Description Document;
 - f. Detailed Design Document;
 - g. Software Baseline Document;
 - h. RCC Messages Document;
 - i. RCC Training Document;
 - j. Interface Control Document (IPD-DSD);
 - k. Special Beacon Programs ;
 - l. Communications Description Document; and,
 - m. Any other documentation required by the Government.
- B.** Develop other documentation:
 - a. Public Awareness;
 - b. US Government registers;
 - c. Trade publications; and,
 - d. Web pages.

11. Configuration Management

1. Coordinate Configuration Management activities.
2. Support NOAA's configuration manager.
3. Manage configuration documentation.

Appendix C – Sample Daily Report

This report shall be updated as needed to reflect MEOSAR

SARSAT DAILY STATUS REPORT

05 Oct 2011 04/0000 UTC Oct 2011 - 04/2400 UTC Oct 2011

1. **AS OF 0001 UTC THIS MORNING**, THE SYSTEM IS FULLY OPERATIONAL.
2. **MCC STATUS** - UP.
3. **LUT STATUS**.

LUT	AK1/2	CA1/2	FL1/2	GU1/2	HI1/2	MD1/2
MISSED	0	0	0	0	0	0
PASSES	3	0	0	0	0	0

LUT(S) CONFIGURED DOWN (NEXT PASS PREDICTION) - **None**.

LUT(s) ON TEST SYSTEM - **LSE, GSE**

LUT	SAT	ORBIT	AOS	LOS
-----	-----	-------	-----	-----

AK2 S7 69630 04/1220 04/1226

USMCC REASON: No PDS solutions

EMS REPORTED CAUSE: EMS found no problems with LUT

AK1 Took S12 13680 04/1223 04/1236

AK2 S10 32835 04/1334 04/1347

USMCC REASON: No PDS solutions

EMS REPORTED CAUSE: EMS found no problems with LUT

AK1 Took S10 32835 04/1334 04/1347

AK2 S10 32839 04/2013 04/2025

USMCC REASON: No PDS ONLY solutions

EMS REPORTED CAUSE: EMS found no problems with LUT

AK1 Took S10 32839 04/2013 04/2024

4. **COMMUNICATIONS LINES STATUS** - UP.

5. **SAR INCIDENTS** - NONE

6. **406 BEACON SITES CLOSED**

LOCATED: USA 4, UNKNOWN 1

UNLOCATED: USA 12

REGISTERED USA BEACONS: 81% (13)

7. **TOTAL BEACON SITES CLOSED**

FIRST ALERTS	COMPOSITES	FREQUENCY
17	2	406 MHz

8. **406 MHz BEACON ACTIVATION SUMMARY**

(UNASSIGNED)	2
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FALSE ALERT - BEACON MISHANDLING: TESTING/MAINTENANCE	3
FALSE ALERT - BEACON MISHANDLING: USAGE	3
FALSE ALERT - BEACON MOUNTING: BRACKET FAILURE	1
FALSE ALERT - REASONS UNKNOWN	2
UNKNOWN / INCONCLUSIVE	6

9. U.S. MILITARY BEACONS ACTIVATED - 6

10. PROBLEMS - NONE.

11. CONTROLLER NOTES.

04/0406 - AUMCC will provide backup while ASMCC is down from 4 Oct 0500 until 5 Oct 0900 for scheduled maintenance.

04/1412 - JAMCC reported KOMCC's LEOLUT Incheon (4403) and satellite S9 combination not meeting QMS availability criteria.

04/1416 - USMCC reported LEOLUT California 2 (3668) and satellite S8 and S10 combinations have returned to normal for QMS availability criteria.

04/2056 - AUMCC reported LEOLUT Albany (5033) and satellite S11 combination have returned to normal for accuracy and availability criteria.

04/2209 - ARMCC reported that their FTP link is down.

12. RGDB NOTES - NONE.

13. 406 DATA BASE SUMMARY

BEACON REGISTRATIONS IN DATABASE 322 224

BEACON REGISTRATIONS RECEIVED BY MAIL OR FAX 22

BEACON REGISTRATIONS ENTERED - Decals mailed (online) 81 (62)

BEACON REGISTRATIONS TO BE ENTERED 3

CONFIRMATION UPDATES - Decals mailed (online) 339 (314)

UPDATES FROM UNSOLICITED CHANGES 195 (145)

TOTAL BEACON REGISTRATIONS UPDATED 534 (459)

Appendix D - Sample Weekly Saves Report

SARSAT Weekly Rescues Report for the US Search and Rescue Region

November 10 – November 16, 2017.

National Oceanic and Atmospheric Administration (NOAA) Search and Rescue Satellite Aided Tracking System (SARSAT) rescues: 1

Beacon ID - 2DCE47F7C4FFBFF **Home Port** - Barrow, AK

DISTRESS. On 12 November 2017 at 0521 UTC the COSPAS-SARSAT system detected a 406 MHz PLB at 70 31.3N 157 18.4W, 4 miles northwest of Atqasuk, AK. The PLB was activated when the operator of a snowmobile became lost in a blizzard. The Alaska Rescue Coordination Center received the SARSAT alert and contacted North Slope Borough Search and Rescue (NSBSAR). NSBSAR dispatched a helicopter and ground team to the SARSAT position, located the individual in distress, and transported them to Anaktuvuk Pass, AK. **1 SARSAT RESCUE**

Total number of rescues for CY 17: 241

Total number of rescues for FY 18: 22

Significance: The SARSAT system protects life and property in support of the nation's commerce and transportation systems. (Ops Officer, 301-817-4552)

<https://www.nesdis.noaa.gov/sarsat-satellite-aided-tracking-search-rescue>