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Operations, Planning, Command and Control

SPACE SURVEILLANCE OPERATIONS - BASIC OPERATIONS

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(U) This SD implements reference (a) and it provides procedures and guidance for worldwide Space Surveillance Operations. In addition, it is in compliance with the requirements as identified in the Joint Requirements Oversight Council (JROC) approved Capstone Requirements Document (CRD). It applies to United States Strategic Command (USSTRATCOM), particularly the Global Operations Directorate; the USSTRATCOM operational component commands, and all Space Surveillance Network (SSN) sites including Royal Air Force (RAF) Fylingdales and Globus II, located in Vardo, Norway. In addition, RAF Fylingdales follows guidance specified in reference (b).

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(U) The SSN uses a set of formatted messages to facilitate information flow. Messages identified by message number can be found on-line at the Integrated Weapon System Database (IWSD) managed by Electronic Systems Center/Command and Control Directorate (ESC/NDC) at Peterson Air Force Base (AFB), CO. The SSN must use specified message format or its Advanced Data Communications Control Procedures (ADCCP) equivalent. Free text message formats are described in the attachments to this SD. Detailed information on the message construction may be obtained by visiting the IWSD website. Contact ESC/NDC for access to the database (iwsd@cisf.af.mil, Defense Switched Network (DSN) 834-2467).

(U) This SD may be supplemented as necessary. If there is conflict between this SD and unit, contractor or component command publications, this SD takes precedence. Referenced directives, interface control documents, security classification guides, and other pertinent documents are in **Attachment 1**. The reporting requirements in this SD are exempt from Report Control Symbol licensing in accordance with reference (c), controlling internal, public, and interagency Air Force information collections. Submit recommended changes to the Space Enhancement Division (USSTRATCOM/OP50), 901 SAC Blvd., Ste 1E21, Offutt AFB, NE 68113-6000.

SUMMARY OF REVISIONS

(U) This SD has been revised in its entirety. The content has been reorganized into a more logical sequence, so all procedures for each particular type of event are discussed together, and in the chronological order in which they actually occur. The text has also been rewritten for clarity, and updated to reflect current organizations. Directions and explanatory information not pertaining to all sites and not needed for standardization among all units have been removed. (Supplements to this SD should contain further details appropriate to commands below the unified level.)

(U) In the interest of clarity, the Space Control Center (SCC) will refer to the Operations Center performing the space control command and control duties at that time. There is no delineation between the SCC and the Alternate SCC except in cases of CMOC/SCC specific functions that will be identified.

(U) Significant content changes include: The SD is divided into two volumes: Volume 1 – Basic Operations, Volume 2 – Event Processing. The addition of several new chapters: Continuity of Operations, Sensor Calibration, Breakup, Satellite Separations and Deorbits, Orbital Safety. Deletion of AKAC-222 encryption/decryption requirements.

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Chapter 1
INTRODUCTION (U)

1.1. (U) Space Surveillance Network (SSN) General Description. The SSN consists of a worldwide network of space surveillance sites (both terrestrial and on-orbit), a communications network, data processing, and command and control centers. Sites collect data from which position and velocity information can be directly measured or mathematically inferred, which they transmit in near real time to the data processing/command and control centers. These centers process the data to develop an accurate orbit description and status for man-made objects in earth orbit. This information is used by numerous operational and intelligence organizations, as well as by the civilian community.

1.2. (U) SSN Mission. The SSN mission is to detect, track, identify, and catalog man-made objects in space. Tracking, detection, and identification include the collection of radar, optical, and radio frequency (RF) data and the correlation of that data to known objects in orbit. Identifying objects and assessing their mission capability requires the collection of radar, optical, and RF data to determine a satellite's function and status. Such data, in terms of a satellite's elevation, azimuth, etc., in reference to the site, are commonly referred to as "metric observations." Future space-based observing systems being designed to contribute to the space surveillance mission will provide metric observations with orbiting sensors.

1.2.1. (U) Space Control Activities. Space control consists of surveillance, protection, negation, and prevention. SSN mission information is used primarily to support space situational awareness as part of the space surveillance sub-mission under space control. SSN mission information provides the following:

1.2.1.1. (U) Information needed by the Commander (CDR), USSTRATCOM to make timely and accurate space threat evaluations and decisions.

1.2.1.2. (U) Support USSTRATCOM's space control mission through satellite attack warning and verification, positional data for targeting, and payload battle damage assessment.

1.2.1.3. (U) Data needed for space intelligence assessments, particularly for the Satellite Reconnaissance Advance Notice (SATRAN) program and Naval Network and Space Operations Command's (NNSOC's) equivalent, Satellite Vulnerability (SATVUL).

1.2.1.4. (U) Conjunction analysis for space and missile launches, and orbiting satellites, to determine unobstructed windows for launches, laser testing, orbit maneuvering, and warning of possible collisions between space objects.

1.2.1.5. (U) Support to surveillance of space by detecting, tracking, characterizing, classifying, cataloging/monitoring, and disseminating/distributing information on man-made objects in earth orbit. This is accomplished via command and control of the SSN and data processing.

1.2.1.6. (U) Support to protection by detecting and reporting space events against all space systems of national interest in near real time.

1.2.2. (S) (b)(1) USSC
(b)(1) USSC
(b)(1) USSC

1.2.2.1. (U) SOI is the analysis of imagery and/or signatures from sites, to determine satellite characteristics (in terms of size, shape, and motion) and thereby determine their functions and operational status.

1.2.2.2. (S) (b)(1) USSC

(b)(1) USSC

1.2.2.3. (S) (b)(1) USSC

(b)(1) USSC

(b)(1) USSC

1.2.3. (U) Other Uses. SSN data is also provided to authorized agencies outside USSTRATCOM. This data supports the following:

1.2.3.1. (U) Scientific and technical intelligence analysis for long-term assessments of foreign space systems' capabilities.

1.2.3.2. (U) Confirmation of domestic satellite configuration and evaluation of satellite anomalies for domestic and cooperating launch agencies.

1.2.3.3. (U) Technical studies and research and development efforts on future space systems and capabilities. Supports U.S. and Allied military and commercial launches, maneuvers, deorbits, and reentry predictions.

1.3. (U) SSN Classifications. There are a variety of sites located around the world and in space that make up the SSN which are operated by the military services and civilian organizations. The sites are classified several ways: by primary mission supported, range, collector type, data type, and space intelligence mode. Also, some sites belong to specific program systems. See **Attachment 2** for a listing of all SSN sites and their basic characteristics.

1.3.1. (U) Site Categories. The SSN sites are separated into three categories. For more information about the SSN, refer to reference (d).

1.3.1.1. (U) Dedicated Sites. Sites subordinate to USSTRATCOM components with a primary mission of Space Surveillance. These sites include Ground-Based Electro-Optical Deep Space Surveillance (GEODSS), Moron Optical Surveillance System (MOSS), Midcourse Space Experiment Satellite/Space Base Vehicle (MSX/SBV), Eglin, GLOBUS II, and the Naval Space Command (NAVSPACECOM) Space Surveillance System (NSSS).

1.3.1.2. (U) Collateral Sites. Sites subordinate to USSTRATCOM components, but with a primary mission other than Space Surveillance, such as missile warning, intelligence collection or range support. These sites include Ballistic Missile Early Warning System (BMEWS), PAVE (Program acquisition name) Phased Array Warning System (PAVE PAWS), Perimeter Attack Radar Characterization System (PARCS), Kaena Point, and Ascension.

1.3.1.3. (U) Contributing Sites. Sites under contract or agreement to support the SSN, but not under the operational control of a USSTRATCOM component. These include both military and civilian sites with various primary missions (i.e., research and development). These include Lincoln Space Surveillance Complex (LSSC), Ronald Reagan Ballistic Missile Test Range (RTS), Passive Imaging Metric Sensor (PIMS), and the Maui Space Surveillance System (MSSS).

1.3.1.3.1. (U) LSSC. The LSSC is located in Westford, MA. The LSSC consists of three radars:

1.3.1.3.1.1. (U) Millstone Radar. Millstone Hill Radar contributes to the deep space component of the SSN. Primarily tasked by Headquarters (HQ) USSTRATCOM/OP50 and the SCC. Millstone is the primary communications node point for the MOSS and SBV sites.

1.3.1.3.1.2. (U) Haystack Radar. The Haystack Long-Range Imaging Radar (LRIR) is capable of imaging near earth and deep space satellites. HQ USSTRATCOM/OP23 (Production & Analysis Division) is the primary tasker.

1.3.1.3.1.3. (U) Haystack Auxiliary Radar. This is a near earth imaging radar with higher resolution than the LRIR. HQ USSTRATCOM/OP23 is the primary tasker.

1.3.1.3.2. (U) RTS. The RTS is located in the Marshall Islands. These radars are tracking stations for the Western Range (WR). Their primary mission is to support test and evaluation of developmental and operational Intercontinental Ballistic Missiles (ICBMs), space launch vehicles and aeronautical development programs.

1.3.1.3.2.1. (U) Advanced Research Projects Agency (ARPA) Lincoln C-Band Observables Radar (ALCOR) is a high-power, narrow beam, coherent, chirped, C-Band, monopulse tracking radar with a Narrowband (NB) and Wideband (WB) operating modes. ALCOR is the primary weather measurement radar with Target Resolution and Discrimination Experiment (TRADEX) designated as back up.

1.3.1.3.2.2. (U) ARPA Long Range Tracking and Instrumentation Radar (ALTAIR) was designed and developed to gather coherent data on reentry vehicles and satellites at Very High Frequencies (VHF) and Ultra High Frequencies (UHF). ALTAIR can track targets at Near Earth as small as 5 centimeters (cm) and at geocynchronous (GEO) ranges can track to 1 meter.

1.3.1.3.2.3. (U) The Millimeter Wave (MMW) radar is a dual frequency (Ka- and W-band) monopulse tracking radar. The MMW can track targets at Near Earth as small as 2.8 cm and at GEO ranges can track to 5 meters. The MMW radar is exceptionally well suited for two-dimensional imaging of satellites and reentry vehicles.

1.3.1.3.2.4. (U) TRADEX is a UHF tracker and L-band illuminator. Multi-Target Tracking (MTT) provides TRADEX the capability to simultaneously track up to 63 targets, send up to 10 track files to Kiernan Reentry Measurement System (KREMS) Control Center (KCC), and collect pulse-by-pulse data on up to six targets.

1.3.1.3.3. (S) (b)(1) USSC

(b)(1) USSC

(b)(1) USSC

(b)(1) USSC

1.3.1.3.4. (U) Maui Space Surveillance System (MSSS). The MSSS is located on Maui, Hawaii, and are contributing sensors providing Deep Space (DS) coverage. The MSSS consists of the following: Air Force Maui Optical Station (AMOS) 1.6 meter telescope, Maui Optical Tracking and Identification Facility (MOTIF) 1.2 meter telescope, 0.8 meter Beam Director/Tracker (BD/T), and the 3.67 meter Advanced Electro-Optical (E-O) System (AEOS). In addition, the Commercial off the Shelf (COTS)-based RAVEN is a small autonomous telescope the MSSS uses to perform most of its metric mission. These E-O sites on Maui are considered as one system with multiple telescopes and capabilities and are operated by Detachment 15, Air Force Research Lab.

1.3.2. (U) Range Type. Sites are separated by their range capability to collect data on near earth (NE) objects, DS objects, or both. A NE object has an orbital period less than 225 minutes, whereas a DS object has an orbital period equal to or greater than 225 minutes. An object with a 225-minute period, if in a circular orbit, would be at an approximate altitude of 5875 kilometers. **NOTE:** Near earth sites may track space objects with periods of greater than 225 minutes if eccentricity is greater than 0.1 and a portion of the trajectory falls within their collection capabilities.

1.3.3. (U) Collector Type. Sites collect data using one of the following phenomenologies: radar with frequencies between X-band and VHF, E-O, or passive RF. Passive sites can only detect and track emitting or active, satellites. The radar sites can be further differentiated into collection types, such as mechanical trackers, phased arrays, or continuous wave fence.

1.3.4. (U) Data Type. The sites may also be categorized as providing primarily Space Track (metric observations) or Space Intelligence (SOI data and imaging) data collection.

1.3.4.1. (U) Space Track. The observations are used to identify and update satellite orbital parameters. Metric observations describe the apparent position and/or velocity of a satellite relative to a site's location. For example, a particular radar site may provide observations containing measurements of time, elevation, azimuth, range, and range-rate (also called TEARR data). An example of optical site data would include the observation time, the right ascension and declination of a satellite's orbital position.

1.3.4.2. (U) Space Intelligence. Space Intelligence data is used to determine the status of space objects, assessing their mission, capabilities, size, shape, and motion. Data includes NB radar signatures, WB radar imagery, Long Wave Infrared (LWIR) signatures, S-Band signatures, photometric signatures, RF signatures, visible/infrared imagery, and hyperspectral signatures.

1.3.5. (U) Space Intelligence Mode. Sites may be categorized by the type of Space Intelligence data they provide. This includes NB or WB radar data (using coherent or non-coherent techniques), visible or Infrared (IR) data, photometry, signatures and imagery. The radar frequencies include UHF, VHF, C-Band, Ku-Band, L-Band, and X-Band. The E-O modes include LWIR, photometry (optical), and imagery.

1.3.6. (U) Specific Program Systems. Certain sites of like phenomenology belong to a specific program. They are as follows:

1.3.6.1. (U) Ground-based Electro-Optical Deep Space Surveillance (GEODSS). GEODSS are dedicated E-O sites providing DS coverage. Detachment 1 is located at Socorro, NM; Detachment 2 is located at Diego Garcia, British Indian Ocean Territory (BIOT); and Detachment 3 is located atop Mt. Haleakala, Maui, HI. Optical sites are limited to night time/twilight operations, by weather, and do not directly measure range, range rate, or Radar Cross Section (RCS). The optical system supports USSTRATCOM by providing metric observations of satellite orbits and SOI data.

1.3.6.2. (U) PAVE PAWS. PAVE PAWS' primary mission is to watch America's coasts for incoming Sea–Launched Ballistic Missile (SLBM) or ICBMs and provide appropriate warning. The PAVE PAWS sites have a secondary mission of space surveillance. The SLBM warning units are the 6th Space Warning Squadron (6 SWS), Cape Cod Air Station (AS), MA, and the 7th Space Warning Squadron (7 SWS), Beale AFB, CA. PAVE PAWS sensors are collateral two-faced phased array radars.

1.3.6.3. (U) Ballistic Missile Early Warning System (BMEWS). BMEWS consists of collateral sites with a primary Missile Warning (MW) mission monitor for ballistic missile attacks over the polar regions. The BMEWS sites have a secondary mission of space surveillance. BMEWS sites include 12th Space Warning Squadron (12 SWS), Thule, Greenland (Site I); 13th Space Warning Squadron (13 SWS), Clear, Alaska (Site II); and RAF Fylingdales, United Kingdom (UK) (Site III).

1.3.6.4. (U) Perimeter Attack Radar Characterization System (PARCS). PARCS is a very capable attack characterization site. 10th Space Warning Squadron (10 SWS) located at Cavalier Air Force Station (AFS), ND, provides detection of ICBMs over the North Pole and SLBMs out of the Hudson Bay.

1.3.6.5. (U) The Fence (formerly NSSS or NAVSPASUR). The Fence is a continuous wave fence located along a great circle inclined 33.57 degrees to the equator in a fan-shaped pattern. There are three transmitter sites located at Gila River, AZ; Lake Kickapoo, TX; and Jordan Lake, AL, and six receiver sites located in San Diego, CA; Elephant Butte, NM; Red River, AR; Silver Lake, MS; Hawkinsville, GA; and Tattnall, GA. The prime Space Control Center has Operational Control (OPCON) over the ASCC. If inoperative, then USSTRATCOM Global Operations Center (GOC) has OPCON per reference (e)

1.3.6.6. (U) Future Space-Based Surveillance Systems. Future satellite surveillance systems are planned and will comply with this SD. These systems will provide space-based observations to support space surveillance, (i.e., Space Based Surveillance System (SBSS).)

1.3.7. (U) Site Responsibilities. Sites fulfill the following general requirements in support of the space surveillance mission as defined by the current approved CRD for Space Control (multi-mission sites fulfill these requirements within mission priorities).

1.3.7.1. (U) Data Collection. Respond to tasking, and collect metric and SOI data as prescribed in this SD.

1.3.7.2. (U) Data Transmission. Send all collected data to the appropriate addressees within the time constraints specified in this SD.

1.3.7.3. (U) Data Maintenance. Maintain files and records per references (f) and (g) or service equivalents.

1.3.7.4. (U) Availability Reporting. Report site outages and availability to the SCC and/or JIC as described in this SD. Space-based systems will report on the availability of each sensor of each satellite used for space surveillance.

1.3.8. (U) Non-SSN Assets. Other systems that can track satellites may be called upon as needed to provide space track data to the SCC. These include the following:

1.3.8.1. (S) (b)(1) USSC

(b)(1) USSC

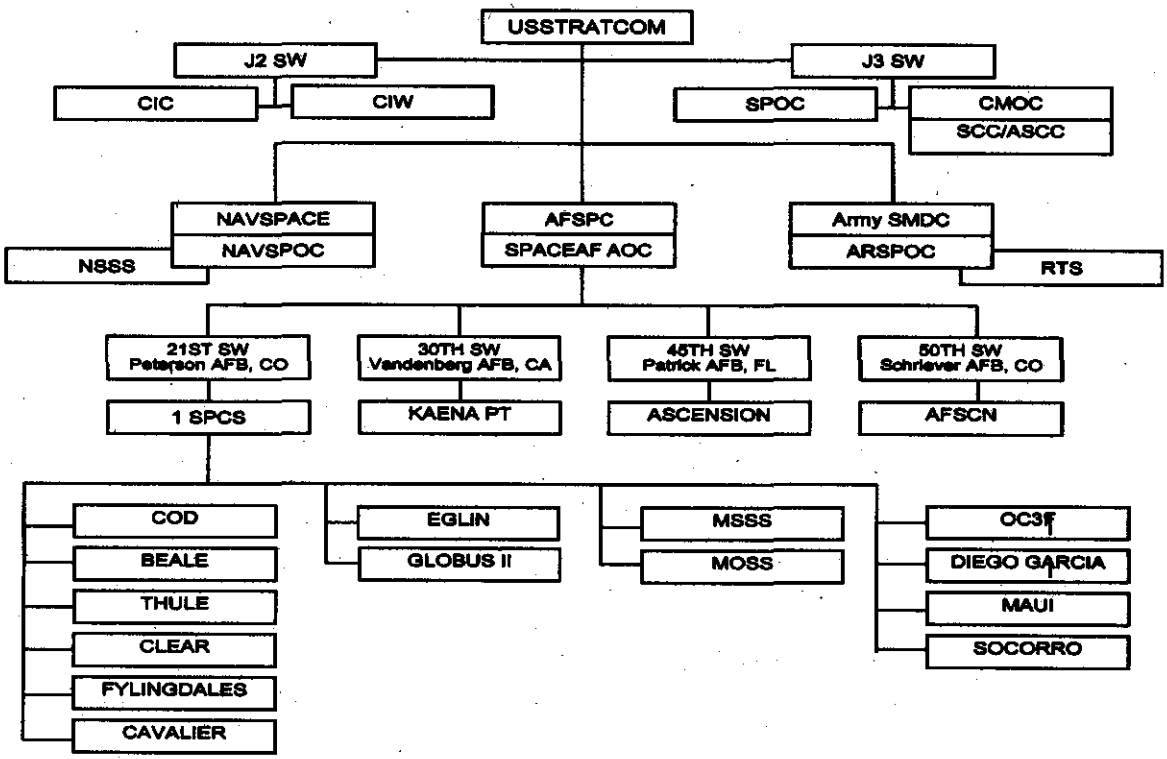
(b)(1) USSC

1.3.8.2. (U) Air Force Satellite Control Network (AFSCN). The AFSCN is operated and controlled by the 50th Space Wing (50 SW) located at Schriever AFB, CO. The 50 SW is responsible for the tracking and commanding of Department of Defense (DoD) and limited civil satellite systems. It consists of various Command and Control (C2) facilities and a network of ground stations. The 50 SW will provide high-precision radiometric track data to the SCC when requested.

1.3.8.3. (U) Research and Development (R&D)/Civilian Sites. R&D and civilian sites may be used as contributing sites as required, pending coordination with the USSTRATCOM Global Assessment Center (GAC) and SCC.

1.4. (U) Organizational Relationships. (See **Figure 1.1.**)

Figure 1.1. (U) Organizational Relationships. (U)



1.4.1. (U) USSTRATCOM. Headquartered at Offutt AFB, NE, USSTRATCOM is a Combatant Command responsible for synchronizing and integrating U.S. military space components and executing assigned missions. The assigned missions are outlined for each unified command in the reference (a). For USSTRATCOM, these include conducting space operations (force enhancement, space control, space support including spacelift and on-orbit operations, and force application), including the support of ballistic missile defense for the U.S. The CDR, USSTRATCOM, is the military commander responsible for execution of the space control mission, including space surveillance. USSTRATCOM exercises Combatant Command (COCOM) of all dedicated and collateral SSN assets. CDR, USSTRATCOM interfaces with the President and the Secretary of Defense, the Joint Staff, outside commands, and civilian and foreign entities, and provides overall direction and authority for operations involving the SSN to component commanders.

1.4.2. (U) USSTRATCOM/OP. The USSTRATCOM Director of Global Operations (USSTRATCOM/OP) is responsible to CDR, USSTRATCOM for providing guidance and policy on space surveillance operations to the components. USSTRATCOM/OP has delegated authority form the CDR, USSTRATCOM for directing USSTRATCOM operations. The heart of this C2 structure is centralized planning of all space forces at USSTRATCOM with decentralized execution through Component Commands.

1.4.2.1. (U) Director of Combat Operations (USSTRATCOM/OPA). USSTRATCOM/OPA is the commander of the GOC and oversees operational staff elements.

1.4.2.2. (U) USSTRATCOM/OP50 is the office of primary responsibility (OPR) for this SD, as well as other operational documents and agreements relating to space surveillance.

1.4.3. (U) USSTRATCOM GOC. The GOC represents the CDR, USSTRATCOM 24/7 and is overseen by the Senior Controller (SrC), an O6. The Space and Warning Operations Officer (SWOO), is the SrC's space point of contact. The mission of the GOC is to provide a single C2 center responsible for maintaining situational awareness, tracking that status of forces, information fusion, mission tasking, and providing space-based military capabilities to military and government organizations requiring support. One function of the GOC is to fully integrate space into U.S. military operations by providing focused operational support to Unified and Joint Task Force (JTF) commanders. USSTRATCOM, with its components and national agencies, ensures the space capabilities provided to the warfighting Commanders are timely, accurate, and relevant.

1.4.4. (U) Director of Intelligence, USSTRATCOM/OPB, the Joint Intelligence Center's (JIC), Global Intelligence Division (Intelligence Watch and Global Assessment Center) and Space Analysis Division (OP24), contribute to CDR, USSTRATCOM's space situational awareness.

1.4.4.1. (S) (b)(1) USSC

(b)(1) USSC

(b)(1) USSC

1.4.5. (U) Combined Intelligence Watch (CIW). The CIW is the 24-hour intelligence watch center for NORAD and USNORTHCOM. Located inside CMOC, the CIW primarily focuses its support to the NORAD mission. As such, it provides current, all-source intelligence support to the CMOC Commander, CMOC Command Directors, and remaining CMOC operation centers; component Commanders; and a host of theater-, U.S. Command-, and national-level intelligence agencies. As a member of the Defense Indications and Warning System, the CIW is also responsible for indications and warning (I&W) for worldwide ballistic missile and space system launches, and strategic aviation threats.

1.4.6. (U) Cheyenne Mountain Operations Center (CMOC) Commander (CMOC/CC). The CMOC/CC is responsible to CDR, USSTRATCOM for oversight of SCC operations. The CMOC Director of Operations (CMOC/J3) is responsible for the overall readiness of the operations functions and reports to the CMOC/CC. CMOC/J3S analysts also perform pre-event coordination and special processing.

1.4.7. (U) Space Control Center (SCC).

1.4.7.1. (U) The SCC is the central processing facility and command, control, and communications interface for the SSN. 1st Space Control Squadron (1 SPCS) located within CMOC executes the SCC mission. Air Force Space Command (AFSPC) is responsible for the performance of the SCC crew and for routine administration of SSN operations.

1.4.7.2. (U) Alternate Space Control Center (ASCC). The ASCC is the alternate processing center, command, control, and communications interface for the SSN. The ASCC is located within the Naval Space Operations Center (NAVSPOC) at Naval Network and Space Command (NNSOC), Dahlgren, VA. The ASCC performs the same functions as the SCC when required, and is operationally responsible to USSTRATCOM. The ASCC maintains a complete current database of all space objects and "hot shadows" SCC actions at all times, so it can assume control of the SSN immediately when necessary. See **Chapter 2** for details of how and when SCC functions are transferred to the ASCC.

1.4.7.3. (U) Continuity of Operations. USSTRATCOM/OP50 is the staff element responsible for continuity of space control operations. Operations will conform to this SD or as directed by the CMOC Command Director (CD)/Mission Director (MD). USSTRATCOM components will ensure continuous 24-hour space control operations in peacetime and through all levels of conflict. SCC and ASCC will regularly exercise backup operations and the transfer of responsibility for assigned space control functions.

1.4.8. (U) SCC Responsibilities. In its space surveillance role, the SCC crew processes high-priority and/or analysis-intensive objects and space events. In particular, the SCC crew is responsible for the following:

1.4.8.1. (U) Space Control Operations Support. Processing and analyzing potentially harmful or hostile events effecting space (such as satellite proximity events or the launch of anti-satellite weapons against U.S. satellites, directed energy directed against space elements, electronic warfare directed against the space system communications link or data processing support, space nuclear detonations, and ground attacks/sabotage against space system ground elements).

1.4.8.2. (U) Space Event Processing. Processing all space events (domestic and foreign) such as launches, maneuvers, deorbits, separations, conjunction analysis, reentry assessments, break-ups, and decays and reporting to national authorities as required.

1.4.8.3. (S) (b)(1) USSC
(b)(1) USSC
(b)(1) USSC

1.4.8.4. (U) Outside User Support. Providing information to authorized users in support of treaty obligations and event analysis.

1.4.8.5. (U) 1 SPCS Space Analysis Center (1 SPCS/SAC) analysts under the 1 SPCS Operations Division (1 SPCS/DO) also perform extensive analysis of breakups, lost space objects and objects which have not yet been correlated to a particular launch. In particular, 1 SPCS/SAC is responsible for the following:

1.4.8.5.1. (U) SSN. Monitoring SSN site performance and processing routine space object observations.

1.4.8.5.2. (U) Metric Tasking. Determining and transmitting all tasking for metric observations to SSN sites, at least once per day.

1.4.8.5.3. (U) Site Status Monitoring. Maintaining situational awareness of the operational status of all sites in the SSN and coordinating approval for dedicated sites to perform preventive maintenance.

1.4.8.5.4. (U) Routine Satellite Catalog Maintenance. Maintaining accurate, current element sets for man-made space objects in earth orbit not monitored by the SCC crew.

1.4.8.5.5. (U) Normal Decay and Breakup Processing. Processing decays of all small space objects into the earth's atmosphere and analyzing and cataloging the pieces from satellite breakups.

1.4.8.5.6. (U) Outside User Support. Provides information to authorized users in support of treaty obligations and event analysis.

Chapter 2

CONTINUITY OF OPERATIONS (U)

2.1. (U) General. Command and control of the SSN is performed by two centers, the SCC and the ASCC. One operates as the primary control center while the other operates in hot shadow. Hot shadow is the state of operational readiness required to immediately assume operations. Normal and hot shadow operations ensure unity of command at the operational LEVEL. Only one space control center will be primary at any given time. Responsibility for performing certain space control tasks may be delegated by the primary space control center.

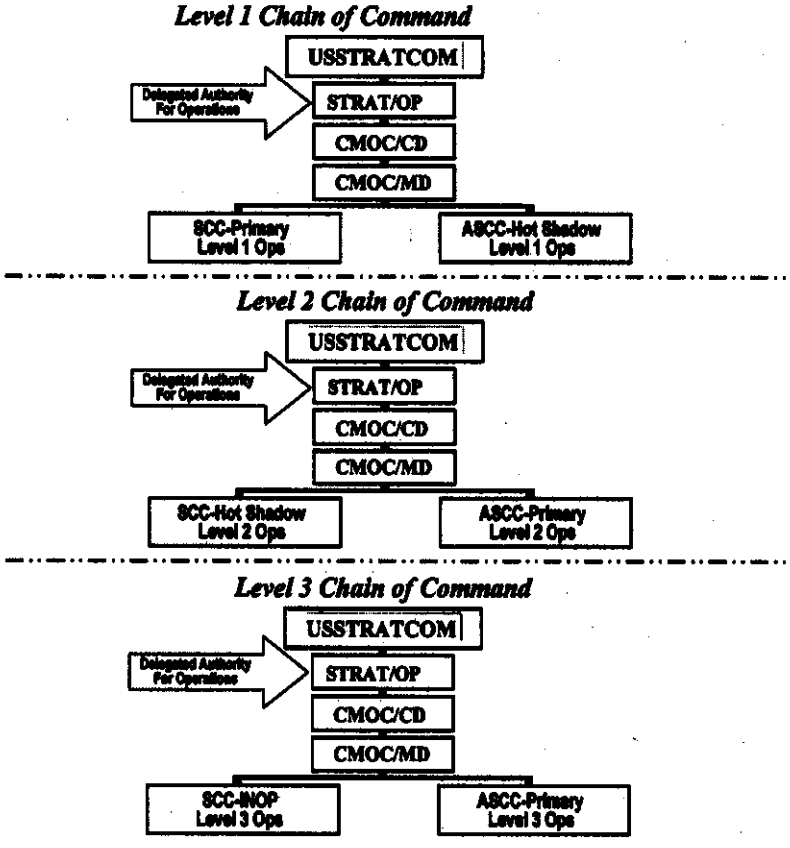
2.2. (U) Operational Chain of Command. See **Figure 2.1**.

2.2.1. (U) LEVEL 1 Operations. Operational Chain of Command flows from the GOC SrC to the MD, then to the SCC Commander.

2.2.2. (U) LEVEL 2 and 3 Operations. Operational Chain of Command flows from the GOC SrC to the MD, then to the Alternate Space Control Center Commander (ASCC).

2.2.3. (U) Space Threat Assessment. Chain of Command flows from CDR, USSTRATCOM to USSTRATCOM/OP to the Combined Command Center (CCC) MD, then to SCC or ASCC.

Figure 2.1. (U) Chain of Command at Different Levels. (U)



2.3. (U) Levels. Three LEVELs define the operational relationships between the SCC and ASCC (each LEVEL is defined in subsequent paragraphs). See **Figure 2.2.** for the LEVEL Change Matrix.

Figure 2.2. (U) Level Change Matrix (U)

LEVEL	C2	TASKING	COMPUTATION	HOT SHADOW	SITUATION
1	SCC	SCC	SCC	ASCC	Normal Operations
2	ASCC	ASCC	ASCC	SCC	ASCC proficiency operations or SCC unable to perform C2 of mission
3	ASCC	ASCC	ASCC	N/A	SCC unable to perform mission

2.3.1. (U) LEVEL 1 (Normal Operations).

2.3.1.1. (U) During normal operations, the SCC is primary for C2 of the SSN. The ASCC hot shadows the SCC surveillance and protection mission, monitoring and performing parallel operations. Under certain circumstances, such as during high-tempo wartime operations, planned or unplanned outages, or exercises, the SCC may delegate some space surveillance tasks to the ASCC, while maintaining LEVEL 1 operations. During LEVEL 1 operations, the Naval Space Operations Center (NAVSOC) is manned by orbital analysts and C2 crews remaining on call.

2.3.1.2. (U) Responsibilities.

2.3.1.2.1. (U) Command and Control. At LEVEL 1, the SCC has full command and control of the space control mission and will keep the GOC fully informed on its actions.

2.3.1.2.2. (U) Tasking. The SCC directs the SSN at LEVEL 1. The ASCC monitors tasking based on the SCC Tasking Summary and Catalog.

2.3.1.2.3. (U) Computation. The SCC performs all analysis and computations and sends all required messages. During LEVEL 1 operations ASCC analysts are always in hot shadow mode.

2.3.1.2.4. (U) Data Transmission. Sites dual-route metric observations to the SCC and ASCC via the most expedient means possible.

2.3.1.3. (U) ASCC Support. At any time, the SCC may delegate specific processing tasks to the ASCC, while maintaining overall LEVEL 1 operations. In such cases, the SCC may authorize the ASCC to task sites, to liaison directly with the sites, and to generate all Element Sets (ELSETs) and messages related to those specific tasks. In such cases, the ASCC will keep the SCC informed of its actions and the SCC will ensure it maintains awareness of the status of ASCC processing.

2.3.2. (U) LEVEL 2 (ASCC Primary with SCC Hot Shadow). There are two cases for LEVEL 2 operations. The first case is unscheduled, where the SCC has operational capabilities but cannot perform the entire mission and the other case is scheduled for ASCC proficiency training.

2.3.2.1. (U) LEVEL 2 - Unscheduled.

2.3.2.1.1. (U) During LEVEL 2 operations, the ASCC is primary for all space control functions. The SCC hot shadows the ASCC, monitoring and performing parallel operations.

2.3.2.1.2. (U) Responsibilities.

2.3.2.1.2.1. (U) Command and Control. At LEVEL 2, the ASCC has full command and control of the SSN, as well as responsibility for performing space control functions not specifically retained by the SCC. The SCC hot shadows ASCC actions. The ASCC keeps the GOC and the SCC fully informed of its actions.

2.3.2.1.2.2. (U) Tasking. The ASCC directs and tasks the SSN.

2.3.2.1.2.3. (U) Computation. The ASCC performs all analysis and computations and sends all required messages. The SCC performs parallel computations to the maximum extent possible in order to keep its internal databases current, but will not release any data or messages outside the SCC. The ASCC may task the SCC to provide back-up support, if able.

2.3.2.2. (U) LEVEL 2 - Scheduled (i.e., ASCC Proficiency).

2.3.2.2.1. (U) All actions are in accordance with LEVEL 2 - Unscheduled responsibilities.

2.3.2.2.2. (U) Weekly. Components will develop procedures to ensure ASCC proficiency activations are conducted.

2.3.2.2.3. (U) 72-Hour Activations. To exercise the ASCC in extended operations and exercise the process of providing augmentation, 72-hour proficiency activations are to be conducted at least once per year. SCC will send augmentation personnel.

2.3.3. (U) LEVEL 3 (ASCC Primary for Operations).

2.3.3.1. (U) During LEVEL 3 operations, the ASCC has full tasking and computational responsibilities, and assumes command and control of SSN operations. The SCC is unable to provide C2 of the SSN and is unable to hot shadow the ASCC.

2.3.3.2. (U) Operations Security. LEVEL 3 indicates severe degradation of operations. The fact the SSN is at LEVEL 3 is classified Secret until return to LEVEL 2 or LEVEL 1.

2.3.3.3. (U) Responsibilities.

2.3.3.3.1. (U) Command and Control. At LEVEL 3, the SCC is incapable of performing C2 of the SSN. The ASCC is delegated responsibility for SSN C2 and keeps the MD informed of its actions.

2.3.3.3.2. (U) Tasking. The ASCC tasks the SSN.

2.3.3.3.3. (U) Computation. The ASCC performs all computations and sends all required messages.

2.4. (U) Authority. The SCC Commander normally implements all operational LEVEL changes with approval from the MD. The ASCC Commander may independently initiate LEVEL 3 operations if unable to contact the SCC or CCC for more than 2 hours and if the current environmental/world situation dictates the possible need for alternate operations.

2.5. (U) Considerations. The SCC Commander, in coordination with the SrC, will decide on the appropriate LEVEL based on the current and anticipated situation, and on the estimated length of the outage. When choosing the appropriate LEVEL of operations, consider each center's capability to provide command and control of the space surveillance network and its capability to perform computations on the data received from the SSN. Command and control and tasking capabilities are primarily dependent on the status of voice and message communications links; computational capability is dependent on both communications and on internal computer and data handling systems. The SCC Commander considers a LEVEL change when one of the following conditions exist: loss of computational capabilities, inability to access vital databases, loss of power and/or air conditioning, loss of data communications, loss of internal or external voice communications, ASCC proficiency activation, or situations in which crew evacuation is required (i.e., fire, bomb threat, etc.). In the SCC, as long as voice and message communications capabilities remain intact, a LEVEL change is not necessarily mandated. The SCC could retain operational command and control and tasking of the SSN and direct the ASCC to provide computational support as appropriate. Future space-based systems may substitute automated voice reports to be repeated until acknowledged by the SCC or ACC at the receiving end. These automated voice reports are capable of activating an audible and/or visible (such as flashing light) alert signal at the receiving site until acknowledgement. Site personnel will manually initiate follow-up voice calls when automated calls are not acknowledged for more than 5 minutes. The SCC Commander will keep the SrC fully informed of his/her actions.

2.6. (U) Outages or High Operations (OPS) Tempo. If the SCC's capability to provide command and control is degraded or if operations tempo is very high, support may be required from the ASCC.

2.6.1. (U) Determination. The SCC Commander, after identifying the problem and its expected duration, determines whether to delegate tasks and remain at LEVEL 1 or whether a LEVEL change is needed. If the SCC Commander determines a LEVEL change is needed, he will request MD approval for the recommended LEVEL change. When approved, the SCC Commander implements the change and support required.

2.6.2. (U) Support. Support may consist of limited or full computational duties, complete transfer of responsibilities, or any combination necessary to support the space control mission. A complete transfer should be accomplished only if the SCC cannot maintain effective command and control of the SSN.

2.6.3. (U) Assumption of Command and Control. Two hours after initial indications of communication outage the ASCC will automatically assume command and control of the space control mission until directed otherwise by USSTRATCOM or a designated representative. Before assuming command and control, the ASCC will attempt to contact the MD.

2.7. (U) ASCC Augmentation.

2.7.1. (U) The ASCC is designed to sustain LEVEL 2 or LEVEL 3 Space Control operations for up to 72 hours without augmentation of personnel. Augmentation is the act of sending crew-qualified personnel from the SCC to the ASCC to support extended operations. The decision to request augmentation is left to the discretion of the Commander, NNSOC (COMNNSOC), ensuring the SrC is informed.

2.7.2. (U) The SCC will provide augmentation support to ASCC when required per component procedures. For details on CMOC support, refer to ASCC Augmentation Concept of Operations (CONOPs). Augmentation personnel are operationally responsible to the NNSOC operations officer and administratively responsible to the CMOC/J3S (Space Combat Analysis Branch). They will perform duties as directed by the NNSOC/N3 (Director of Operations).

2.8. (S) (b)(1) USSC

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2.9. (U) Implementation Actions.

2.9.1. (U) Implementation of LEVEL 2 Actions.

2.9.1.1. (U) SCC actions at LEVEL 2.

2.9.1.1.1. (U) The SCC transmits a message to all SSN sites and to satellite owner/operators notifying them of the implementation of LEVEL 2 (see **Attachment 3** for message format). The message is sent with "IMMEDIATE" precedence no later than 24 hours prior to the scheduled activation time. The messages state the date and time of the activation and also the time of return to LEVEL 1.

2.9.1.1.2. (U) Last-minute changes to the schedule, including extensions caused by unscheduled real-world activity are sent by the primary command and control center via FLASH precedence message.

2.9.1.1.3. (U) Prior to activation, the SCC coordinates with the ASCC to determine readiness of ASCC to assume operations. The SCC provides a turnover briefing to the ASCC 45 minutes prior to a planned LEVEL change.

2.9.1.1.4. (U) CMOC/MD approves initiation of LEVEL 2 operations.

2.9.1.1.5. (U) ASCC briefs LEVEL change via the Operations Loop.

2.9.1.2. (U) Site Actions at LEVEL 2.

2.9.1.2.1. (U) Sites must contact the SCC by telephone or message to acknowledge receipt of the message and the date and time of transition to and from LEVEL 2 operations. Sites do not need to call the SCC or ASCC upon the actual activation.

2.9.1.2.2. (U) Report operational status changes to both the ASCC and SCC.

2.9.1.2.3. (U) Respond to ASCC tasking and pass all voice reports to ASCC.

2.9.1.2.4. (U) Data Transmission. Sites dual-route metric observations to the SCC and ASCC in accordance with required timelines.

2.9.2. (U) Implementation of LEVEL 3 Actions.

2.9.2.1. (U) If going directly from LEVEL 1 to LEVEL 3, implementation procedures are the same as for LEVEL 2. If possible, this will be done while the SCC is still capable of communicating and giving a thorough turnover to the ASCC. If not, the MD will give as much of a status briefing to the ASCC as possible.

2.9.2.2. (U) If LEVEL 2 is already in effect, the MD may direct LEVEL 3 operations. The ASCC will transmit a message to the SSN sites and to satellite owner/operators (see **Attachment 3** for message format).

2.9.2.3. (U) ASCC briefs LEVEL change via the Operations Loop.

2.9.2.4. (U) Site Actions at LEVEL 3.

2.9.2.4.1. (U) Acknowledge receipt of the LEVEL 3 message to the ASCC via secure voice or message.

2.9.2.4.2. (U) Report operational status changes to the ASCC only.

2.9.2.4.3. (U) Respond to tasking from the ASCC and make voice reports to the ASCC.

2.9.2.4.4. (U) Data Transmission. Sites route metric observations to the ASCC. If communications at CMOC is operational, dual route data to SCC in accordance with current timelines. If the Communications System Segment (CSS) is not operational, send data to the ASCC via the most appropriate communications method available.

2.10. (U) Return to Normal Operations Actions.

2.10.1. (U) Return To LEVEL 1 Operations.

2.10.1.1. (U) Unscheduled.

2.10.1.1.1. (U) Return to LEVEL 1 immediately if the ASCC Space Operational Capability (OPSCAP) becomes RED or YELLOW and the estimated time of return to operation (ETRO) is unknown or greater than 3 hours.

2.10.1.1.2. (U) With the approval of the MD, the SCC may resume LEVEL 1 operations anytime circumstances so dictate.

2.10.1.2. (U) Scheduled.

2.10.1.2.1. (U) Return to LEVEL 1 is done at the time stated in the original LEVEL 2 message sent to the sites. If a change in time is necessary, a revised message will be sent stating the new time.

2.10.1.2.2. (U) The ASCC coordinates with the SCC to ensure the SCC is ready to resume LEVEL 1 operations. The SCC Commander informs the MD of the SCC status, and obtains approval for return to LEVEL 1.

2.10.1.2.2.1. (U) The ASCC provides a turnover briefing to the SCC.

2.10.1.2.2.2. (U) SCC briefs LEVEL change via the Operations Loop.

2.10.2. (U) Recovery from Level 3 Operations. The SCC initiates recovery from LEVEL 3 when it is capable of resuming command and control and primary computational support (for LEVEL 1) or able to provide hot shadow computational support of the SSN (for LEVEL 2). The actual requirements necessary for reconstitution of the SCC may vary based on the situation.

2.10.2.1. (U) SCC and ASCC confer on the situation, required actions, and LEVEL 1/2 implementation time. The SCC Commander obtains approval from the MD for the recommended LEVEL change.

2.10.2.2. (U) The ASCC provides a turnover briefing to the SCC.

2.10.2.3. (U) The SCC transmits a message to the SSN and to satellite owner/operators notifying them of the return to LEVEL 1 or LEVEL 2 (see **Attachment 3** for message format).

2.10.2.4. (U) The SCC briefs the LEVEL change via the Operations Loop. Sites acknowledge message receipt by telephone or message and the time of return to LEVEL 1 or LEVEL 2 operations.

2.11. (U) Operational Status Reporting Procedures.

2.11.1. (U) Operational Status Reporting. The ASCC reports all equipment outages to the CCC as described in Status Report contents below.

2.11.2. (U) LEVELs 1 and 2. The SCC and ASCC immediately report to each other any equipment outage that could cause an operational status change. Include an ETRO and recommended LEVEL change, as appropriate. Report actual status when it is determined.

2.11.3. (U) LEVEL 3. Immediately report any equipment outage that could cause an ASCC status change to the MD including an ETRO. Report actual status when it is determined.

2.11.4. (U) Status Report Contents.

2.11.4.1. (U) Outage Report. When initially reporting a status change or equipment outage, report the following:

2.11.4.1.1. (U) Equipment involved.

2.11.4.1.2. (U) Reason for outage, and status.

2.11.4.1.3. (U) Time of the outage.

2.11.4.1.4. (U) ETRO.

2.11.4.2. (U) Recovery Report. Upon return to normal operations, report the following:

2.11.4.2.1. (U) Equipment status.

2.11.4.2.2. (U) How problem was resolved.

2.11.4.2.3. (U) Actual time of return to operations.

Chapter 3

SENSOR STATUS, MAINTENANCE PLANNING AND RECALL (U)

3.1. (U) General. The GOC, SCC and GAC must be aware at all times of the operational status of each SSN sensor in order to effectively perform their missions. This chapter provides standard procedures for status reporting, planning of preventive maintenance, and recall from maintenance.

3.2. (U) Space Operational Capability (OPSCAP). OPSCAP is an assessment of a site's capability to perform its SSN mission. A site's OPSCAP is the worst case of equipment status, environmental status, personnel availability, and communications status. Specific guidelines for determining RED and YELLOW status are site dependent and are promulgated in applicable site instructions.

3.2.1. (U) OPSCAP Criteria. Report to the SCC using the following criteria:

3.2.1.1. (U) GREEN. No degradation to SSN mission accomplishment.

3.2.1.2. (U) YELLOW.

3.2.1.2.1. (U) Partial degradation to SSN mission accomplishment (includes partial degradation to communications links).

3.2.1.2.2. (U) All data lines are down to the C2 agency **OR** all means of voice communications are non-operational to the C2 agency.

3.2.1.3. (U) RED.

3.2.1.3.1. (U) Not able to detect, track, or unable to transmit data in accordance with (IAW) either the observation transmission requirements or SOI transmission requirements. (See reference (h) for transmission requirements.)

3.2.1.3.2. (U) All data lines are down to the C2 agency **AND** all means of voice communications are non-operational to the C2 agency.

3.2.2. (U) OPSCAP Classification.

3.2.2.1. (U) Outages. Ongoing sensor outages (RED and YELLOW OPSCAPS) are generally considered Secret since they denote a lack of capability within a U.S. military system. See site Security Classification Guides (SCGs) (references (i) and (j)) for guidance on classification for specific types of outages. Outages after the fact are generally UNCLASSIFIED. For sites having SCGs due to another mission, use the most stringent guidelines for outages relating to both missions. The OPSCAP tables without actual status are Unclassified.

3.2.2.2. (U) Exception. Contributing sensors with scheduled, in-progress, or requested system downtimes which result in a site RED or YELLOW OPSCAP for space surveillance are considered Unclassified. Unscheduled maintenance should be RED if the SSN mission is degraded per the on-site OPSCAP Charts.

3.2.3. (U) OPSCAP Reporting. If a site is primary for space surveillance and a space outage also affects the site's missile warning capability, crews must also report OPSCAP to the primary missile warning C2 agency following notification of space OPSCAP change to the SCC. This requirement is IAW the 14th Air Force (14AF) supplement to reference (k).

3.2.3.1. (U) When a space outage (OPSCAP change) occurs which exceeds or is expected to exceed 2 minutes, site personnel will immediately report the outage, cause, and ETRO to the SCC. Crews will contact the SCC to report an OPSCAP impacting outage no later than 120 seconds from indication of the fault. Outages not expected to exceed 2 minutes are not reported.

3.2.3.2. (U) Information about any on-going outage lasting longer than 2 minutes in duration is classified and must be reported by secure means. Upon termination, an outage becomes unclassified.

3.2.3.3. (U) Space-based observation systems outages occur only when their ground-based processing or communications outages prevent communications with the SCC for longer than 2 minutes. Normally, a partial or complete outage of a single satellite in an observing constellation will not require declaration of a space outage.

3.3. (U) Maintenance Planning. Sites will schedule outages to perform essential preventive maintenance (PM) on a regular basis, but at the same time the SSN as a whole must continue to perform the space surveillance mission. To accomplish this, PM will be scheduled in advance and centrally coordinated, so the SSN can maintain the maximum possible sensor coverage and availability. This guidance is not applicable to space-based observation systems.

3.3.1. (U) Monthly Maintenance Schedule (MMS).

3.3.1.1. (U) 21st Space Wing (21 SW) is responsible for coordinating the MMS for all dedicated and collateral sensors. 21 SW also tracks monthly downtime for each contributing sensor.

3.3.1.2. (U) Changes to the MMS. After the MMS has been published, all dedicated and collateral sites must send any changes to planned outage times, requests for additional downtimes, or requests to deconflict outages to the 21SW/Wing Operations Center Branch (DOCX). Contributing sensors will provide notification of any changes to planned outage times, requests for additional downtimes, or requests to deconflict outages to the 21 SW/DOCX.

3.3.2. (U) Downtime Approval.

3.3.2.1. (U) Dedicated sites. Prior to **ALL** scheduled maintenance, sites will obtain approval from the SCC before actually performing any maintenance degrading the sites' space OPSCAP. Site personnel will contact the SCC for approval 30 minutes and 5 minutes prior to maintenance start time. The SCC will approve initiation of the scheduled maintenance, or direct its postponement or cancellation based on anticipated launch activity and other real-world situations and requirements. The SCC Commander will coordinate with the MD to obtain approval before denying or postponing a scheduled site outage. If scheduled maintenance is disapproved, the site will reschedule as soon as possible.

3.3.2.2. (U) Collateral Sites. Before performing scheduled maintenance, the site will obtain approval from the sensor manager (14AF Air Operations Center (AOC) or 21 SW Wing Operations Center (WOC). If approval is given, site personnel will then call the SCC and report they will be going down for scheduled maintenance. The SCC monitors the MMS for collateral site outages, and will coordinate with the 14AF AOC, as required. The SCC Commander will coordinate with the MD to obtain CD approval before denying or postponing a scheduled site outage.

3.3.2.3. (U) Contributing Sites. Contributing sensors will provide downtime information and conduct maintenance IAW signed Memoranda of Agreement (MOAs).

3.3.3. (U) Site Recall. If a high-priority event, such as a New Foreign Launch (NFL), occurs during a site outage, the site may be directed to return to operations as soon as possible, subject to pre-coordinated recall times. For these high priority events, sites may be recalled from scheduled maintenance, operations training, site stand down, testing, and some corrective maintenance.

3.3.3.1. (U) Recall Approval.

3.3.3.1.1. (U) Dedicated Sites. The SCC will coordinate with the MD prior to recalling any dedicated sensor.

3.3.3.1.2. (U) Collateral Sites. The SCC will coordinate with the MD and obtain CD approval for site recall. Once approval is obtained, the SCC will notify the 14AF AOC about the site's recall.

3.3.3.1.3. (U) Contributing Sites. The SCC will obtain MD approval to recall contributing sites.

3.3.3.1.4. (U) Recall for ANCHOR FLASH. CD/MD approval for ANCHOR FLASH gives blanket approval to recall all sites. If a site is down for any reason and receives an ANCHOR FLASH message, consider the site recalled and resume operations as soon as possible (ASAP). If recall is not authorized for one or more sites, that will be noted in the message text.

3.3.3.2. (U) Site Notification. For any type of site, once recall approval is granted, the SCC contacts the site directing it to return to operations.

3.3.3.3. (U) Special Requirements for Site Recall.

3.3.3.3.1. (U) ALTAIR (or TRADEX as backup to ALTAIR). The SCC Commander will coordinate with the MD to obtain CD approval before recalling ALTAIR from scheduled maintenance or non-duty hours for a Category (CAT) 1 event at any time (7 days a week, 24 hours a day). If a NFL occurs, recall is not necessary; ALTAIR will recall itself automatically upon receipt of an ANCHOR alert. Do not recall ALTAIR for a reason other than CAT 1 tracking during its designated prime shift unless absolutely necessary.

3.3.3.3.2. (U) Ascension and Kaena Point. The SCC Commander will coordinate with the MD to obtain CD approval to recall these sites from scheduled maintenance as needed. If dedicated to supporting a domestic launch from the Eastern or Western Range, recall for coverage of that launch is not necessary, the radars will track and will send observations on the launch to the SCC on a non-interference basis with their range support mission.

3.3.3.3.3. (U) Millstone. The SCC Commander will coordinate with the MD to obtain CD approval before recalling Millstone from scheduled maintenance or during non-duty hours to track a deep space NFL or other high-interest event. The SCC must inform Millstone of a recall or anticipated recall as early as possible, if outside normal duty hours, as the radar requires up to 2 hours to return to operations. Do not recall Millstone during non-duty hours unless absolutely necessary.

3.3.3.3.4. (U) Haystack, Haystack Auxiliary Radar (HAX) and ALCOR. These imaging sites may be recalled by the GAC for events of extraordinary importance or opportunity. The GAC must inform the SCC when recalling either Haystack or HAX. Likewise, the SCC Commander will coordinate with the MD to obtain CD approval before recalling Haystack or HAX from scheduled maintenance. Inform the GAC ASAP after decision to recall imaging sites.

Chapter 4

SENSOR CALIBRATION (U)

4.1. (U) General. This chapter provides guidance for space surveillance sensors and centralized processing centers in the execution of calibrating the SSN. Calibration is a critical surveillance function to ensure the quality of space object positional data meets operational performance requirements. The space catalog of orbital descriptions is maintained at the standard general perturbations theory level of accuracy, analytic theory, and at a significantly more precise level for use with special perturbations (SP), numerical theory. In order for the **SP Space Catalog** to be as accurate as possible, the whole SSN must be deliberately and routinely calibrated to achieve optimum performance. This chapter outlines the calibration process and the calibration functions that must be performed to improve the effectiveness and efficiency of the SSN.

4.2. (U) Process. SSN calibration is an end to end process that must be performed at the sensors and the centralized processing nodes. It also requires the support/priority at the components' higher headquarters (HHQ) to ensure units have the proper calibration tools, procedures, and manpower to effectively carry out the functions as outlined in this chapter.

4.2.1. (U) Calibration Requirement. All space surveillance sensors (dedicated, collateral, and contributing) must routinely calibrate their respective systems to achieve accurate space surveillance calibration. This effort must include both metric and atmospheric (including ionospheric/tropospheric) calibration.

4.2.2. (U) Calibration Process Defined. 1 SPCS/SAC will task the sensors to track calibration satellites in order to measure the quality of sensor observations. The observations are compared with precision reference orbits (derived from the best available position and velocity data). The result is a set of values for each sensor (e.g., sigma and bias for elevation, azimuth, range, and range rate). The resulting values will be shared with the respective sensors and, if significant errors exist, sensors will correct systematic errors (biases). SCC must also accommodate sensor biases in the orbit determination process and assign weights to sensor observation data used in the appropriate mission processing system. Since a single satellite's observation sigma and bias will depend on its position in orbit as well as its sensing capabilities, special procedures will be used to calibrate space-based observing systems. The SCC may request space-based observing systems to use more than one satellite in their constellation for simultaneous or near simultaneous multiple observations, when necessary to achieve greater than usual orbit accuracy.

4.3. (U) SSN Calibration Responsibilities.

4.3.1. (U) 1 SPCS/SAC Calibration Responsibilities. 1 SPCS/SAC is responsible for managing calibration of the SSN. This includes the following specific functions:

4.3.1.1. (U) Assign a Calibration Officer to manage and conduct the calibration functions as well as provide direct liaison with sensors.

4.3.1.2. (U) Ensure the SSN is tasked to track calibration satellites.

4.3.1.3. (U) Compare the sensor observation data with precise reference orbits.

4.3.1.4. (U) Monitor, analyze, and report on results of this comparison. Sigmas and biases will be shared with the sensor sites.

4.3.1.5. (U) Identify significant degradations in sensor metric quality and provide quick feedback to the respective sensor. Work with the sensor to resolve the cause of degradation and required correction.

4.3.1.6. (U) Monitor and update weight and biases used in the mission processing system and appropriate system files. Also ensure accurate sensor geodetic position data is maintained in the SSN.

4.3.1.7. (U) Distribute routine calibration results on 1 SPCS web page via Calibration Report (see **Attachment 4** for message format). Distribute routine calibration reports/messages to sensor sites and HHQ.

4.3.1.8. (U) Maintain precision reference orbits at all orbit ranges and routinely distribute Predicted Ephemerides results on SCC web page (see **Attachment 4** for an example of a Predicted Ephemerides Report.).

4.3.1.9. (U) Identify to HHQ when additional resources are required to conduct SSN calibration.

4.3.1.10. (U) Maintain historical archives of sensor calibration data.

4.3.2. (U) Sensor Site Calibration Responsibilities. Each sensor site will be responsible for conducting routine calibration of their systems to achieve optimum metric observations performance (goal is to meet sensor's design/theoretical limits). The includes the following specific function:

4.3.2.1. (U) Assign a Calibration point of contact to manage and administer calibration requirements as well as provide direct liaison with 1 SPCS Calibration Officer.

4.3.2.2. (U) Conduct atmospheric calibration routinely (ideally both tropospheric and ionospheric) to determine atmospheric effects on space tracking.

4.3.2.3. (U) Correct observed biases routinely and notify 1 SPCS immediately.

4.3.2.4. (U) Track calibration satellites routinely as tasked in the Sensor Tasking (SU66 or ADCCP equivalent) message or as directed by 1 SPCS.

4.3.2.5. (U) Identify to HHQ when site geodetic surveys are required (geodetic surveys should be conducted every 5-8 years or when significant changes are made to site hardware).

4.3.2.6. (U) Notify 1 SPCS in writing when changes occur that could significantly affect sensor data quality.

4.3.2.7. (U) Notify 1 SPCS in writing on specific satellites used for site specific internal calibration. This tasking will not be reflected in the site's Sensor Tasking (SU66 or ADCCP equivalent) message.

4.3.2.8. (U) Monitor the 1 SPCS web page for observed degradation in observation data (e.g., elevation, azimuth, range, and range rate).

4.3.2.9. (U) Identify to HHQ when additional resources are required to conduct site calibration for the SSN mission.

4.3.3. (U) HHQ Calibration Responsibilities. Component HHQ will ensure operations units have sufficient resources to conduct SSN calibration. This includes the following specific function:

4.3.3.1. (U) Review and validate unit procedures for conducting SSN calibration.

4.3.3.2. (U) Ensure operational units have adequate SSN calibration tools, models, and data to conduct calibration (star catalogs, Total Electron Content (TEC) map, etc.).

4.3.3.3. (U) Ensure operational units have adequate manpower to conduct routine SSN calibration.

4.3.3.4. (U) Ensure geodetic surveys are current for all sensor sites.

4.3.3.5. (U) Develop, validate, and maintain calibration requirements for each unit/site or space-based observing system.

Chapter 5

SITE ROUTINE MESSAGES, RECORDS, AND LOGS (U)

5.1. (U) General. This chapter describes messages sent by the SSN to the SCC and JIC and various documents that must be maintained by sites. These documents help in analyzing space events and allow for improvements to current standard procedures. These are minimum requirements necessary for standardization. Adhere to component and local instructions if they are more stringent.

5.2. (U) Metric Observation Messages.

5.2.1. (U) Routine Metric Observations. Sites report observations on all detected space objects to the SCC and ASCC, using the metric observation formats for their appropriate site types as detailed in the appropriate Interface Control Documents (ICDs). Send observations within the time requirements established in reference (d). Send observations on CAT 1 objects at IMMEDIATE precedence; for CAT 2 use PRIORITY; for CATs 3, 4 and 5 use ROUTINE.

5.2.2. (U) Site Metric Availability Reports. Each SSN site will provide the Sensor Metric Availability Report (Site Free Text or ADCCP equivalent) message (see **Attachment 4** for message format) its availability to collect metric data to 1 SPCS on a weekly basis. This report will cover a 7-day period, from 0001Z Monday to 2359Z Sunday. This report must be sent to 1 SPCS by 2359Z Tuesday of each week (i.e., a report covering 01/0001Z - 07/2359Z Jan 01 is due to 1 SPCS by 09/2359Z), so the data can be included in the Weekly Sensor Tasking Response (Site Free Text or ADCCP equivalent) message (see **Attachment 4** for message format).

5.3. (U) General Message Considerations.

5.3.1. (U) Standard Message Set. The Standard Message Set incorporates a set of messages for data exchange between the SSN and the SCC/ASCC/JIC. This subset of the standard list is identified in **Attachment 4** and is the minimum operationally required message set. These messages represent data exchanges deemed essential for efficient SSN operations and for effective site employment against space events. The remainder of the messages are considered to be desirable as mission-enhancements. The messages include tasking, alerts and directions to the sites to coordinate data collection as well as messages for transferring site data and information to the command and control nodes. The attachment includes information on the currently available Common User and ADCCP formats for each message and may be used for developing communications requirements for SSN acquisitions and upgrades.

5.3.2. (U) Classification Guidance. See references (i), (j) or SCG or appropriate site/system SCGs for guidance. If uncertain about the classification of a topic, send a classified message or call by secure voice to discuss it. Do not add amplifying comments to a pre-formatted Unclassified message unless necessary, because their association could classify the message.

5.3.3. (U) Releasability Guidance. Classified messages sent to a foreign government must be consistent with current foreign disclosure policy and must contain an appropriate releasability statement.

5.3.3.1. (U) Formatted Messages. All messages directed by this SD and formatted accordingly are releasable to Canada, the UK, and Norway. However, if amplifying data is included in the message text indicating source information or intelligence capabilities outside those identified in this SD, consider the message not releasable until approval is obtained from the Foreign Disclosure Policy Officer (FDPO) (HQ AFSPC/XPIF).

5.3.3.2. (U) Free-text Messages. Free-text messages generated by the SCC or JIC of an informational nature, in addition to site responses to these messages, need to be reviewed on a case-by-case basis for releasability by the appropriate FDPO.

5.4. (U) Communications Standards. General. All communications systems between the SCC, sites, intermediate processing centers, and satellite owner/operators must incorporate the established communications interoperability standards, such as the following:

5.4.1. (U) Bit Error Rate. Connectivity between SSN elements must consist of point-to-point circuits with a bit error rate no greater than 1 x 10-5 (no more errors than one in every 100,000 bits). This is approximately one character error in every 12,500 characters received or one error in every three full pages received.

5.4.2. (U) Circuit Speed. Circuit speed between sites and processing centers must be such that no message queuing will occur when the site is generating observational data, advisory, warning, attack assessment, or targeting messages at its maximum sustained rate.

5.4.3. (U) Transmission Time. Circuits must be designed to meet the transmission time criteria specified in reference (d).

5.4.4. (U) Other. All circuits must implement data link protocol allowing automatic error and channel controls.

5.4.5. (U) Standards Review and Waivers. CMOC/J6 (Command and Control Directorate) will periodically review the performance of communication system elements to ensure compliance with these requirements. Requests for waivers from these requirements must be submitted to CMOC/J6 for decision.

5.5. (U) Classification and Maintenance of Records.

5.5.1. (U) Data Classification Requirements. Classify SSN reports and data following references (i) and (j). Also handle all classified reports, records, data, and information per reference (l), DoD and appropriate local security directives.

5.5.2. (U) Event Logs. Maintain the following information in some form (logbook, computer entries, event worksheets, etc.) as determined on-site.

5.5.2.1. (U) ANCHOR Alerts. Start and stop times and results.

5.5.2.2. (U) NFLs. Acquisition times, results of each scheduled pass before ELSET 1 and times observations were sent to the SCC.

5.5.2.3. (U) Special Taskings. Notification and acquisition times on Maneuvers, Reentry Assessments (RAs), etc., and results of each pass.

5.5.2.4. (U) OPSCAP Changes. Start and stop times of outages (to include PM), reason, and time of return to operations.

5.5.2.5. (U) Other. Brief descriptions of all significant telephone calls or notifications from/to the SCC (include time and initials).

5.5.3. (U) Disposition of Data. Sites dispose of locally-held data when no longer required, as follows:

5.5.3.1. (U) Radar Data. Destroy data after 30 days or when no longer needed.

5.5.3.2. (U) Optical Data. Destroy after 30 days or when no longer needed.

5.5.3.3. (U) Orbital Element Sets. Replace with updated element set transmitted from SCC. Delete element sets permanently after the object has decayed.

5.5.3.4. (U) Reentry Assessment Data. Reentry Assessment record, final decay message, computer printouts of satellite positional data to include spiral decay vectors, final element set and related data of specialized interest. Permanently retire special interest items immediately after object decays. Other than special interest items, destroy data 2 years after object decay.

5.5.3.5. (U) Logbooks. Event Logs. Retain at least 1 year after last entry in the log.

Chapter 6

SCC/1 SPCS/JIC PRODUCTS AND MESSAGES (U)

6.1. (U) General. This chapter describes the products produced and messages sent by the SCC, 1 SPCS, and JIC. For further information about products prepared for outside distribution, see reference (m).

6.2. (U) Boxscore (SU77). A Boxscore contains a list of satellites launched by each country or launching agency to include payloads, rocket bodies, platforms, and debris. A Boxscore also contains total objects in orbit, total space probes, and total objects decayed. This can be sent as a message or is located on the 1 SPCS Webpage.

6.3. (U) Daily Quality Control Report. The JIC provides feedback to sensors on the quality and responsiveness of SOI data via this message. Additionally, the JIC may provide sensor feedback on a case-by-case basis.

6.4. (U) Current Element Set Request. If a site does not have the current ELSET on an object, ask the SCC for retransmittal. To request 25 or fewer current ELSETs, make the request by voice. For a one-time transmittal of more than 25 ELSETs, send the New Field Element Set Request (SA30 Message or ADCCP equivalent) message not to exceed 150 ELSETs per message request.

6.5. (U) Daily Feedback Message (MU30). This message lists satellites which have not been tracked for several days and therefore warrant special attention by the SSN. The first part of the message, 2 to 4 days old objects, is NEVER populated. The second part, 5 or more days old objects, is known as the "lost list". The "lost list" message is generated during the 1 SPCS tasking job.

6.5.1. (U) Production. 1 SPCS produces this message and sends it to sites once per day during tasking.

6.5.2. (U) Site Action. Sites use the lists in this message to resolve CAT 3 conflicts and to identify objects requiring additional attention. When time allows search early and late for these objects with best possible sensor search. Provide feedback to the SCC when asked.

6.6. (U) Decay Prediction. Decays predictions are posted every Wednesday on the 1 SPCS webpage. The Satellite Decay Prediction is a list of satellites RA Decays are all payloads, rocket bodies, platforms and debris with radar cross-sections greater than 1 square meter. Normal Decays are objects with radar cross-sections less than 1 square meter) with their expected Julian date of decay 60 days into the future. The long-term decay predictions are calculated using General Perturbations theory.

6.7. (U) Double Precision Position and Velocity Vectors (MU46). A Double Precision Position and Velocity Vector message contains position and velocity information for a satellite using Special Perturbations theory. This information may be transmitted via MU46 or as per request.

6.8. (U) Historical Data. Historical data is maintained in the 1 SPCS Computer Analysis Verification of Ephemerides Network (CAVENET) and can be accessed upon request. The historical data includes all element sets, observations, composite tasking data, solar flux data, and time constants.

6.9. (U) Predictive Avoidance. Predictive Avoidance contains a list of time periods (windows) during which any number of specified secondary satellites and/or the earth will pass near a line of sight between a sensor and a designated primary satellite. This information is passed using the Directed Energy (DE) Site Clearinghouse Report (SU15) message. The sensor may be located at a fixed station on the earth's surface, on a vessel (ship or aircraft), on a missile or satellite. The target may be a satellite, missile, vessel, fixed station, or a fixed point in inertial space (star). This information is primarily used for the Laser Clearinghouse Program run by the USSTRATCOM Space Vault.

6.10. (U) Radar Cross Section (RCS) Catalog. A catalog, produced monthly by 1 SPCS, of the RCS values for all space objects in the Satellite Catalog (SATCAT). Eglin provides UHF RCS information by the fifth day of the month to be included in the catalog.

6.11. (U) Resident Space Object Catalog (RSO Catalog). A compilation of the most recent element sets and/or special perturbations vectors on all man-made orbiting objects.

6.12. (U) Satellite Catalog (SATCAT). A reference of general information on all cataloged objects (IAW United Nations (UN) treaty) distributed weekly by 1 SPCS via Web Site or floppy disk (upon request with an approved USSTRATCOM Form 1, Orbital Data Request. The SATCAT includes data on objects that have decayed and some planetary probes, as well as objects currently in earth orbit. SATCAT contents includes:

6.12.1. (U) International Designator. This consists of the year of launch, the number of the launch since the beginning of the year, and an alphabetical suffix. (Suffixes are assigned in the order of payloads first, then rocket bodies, then other major objects and debris.)

6.12.2. (U) SCC number. A five-digit number between 00001 and 69999 assigned sequentially by the SCC to each object cataloged.

6.12.3. (U) Common name. The payload name as assigned by the launch agency (determined from media announcements for NFLs). Rocket bodies and platforms are designated by the booster type, such as "SL-06 R/B." For unknown objects, the common name is "unknown."

6.12.4. (U) Country, site, and date. The country owning the satellite, the launch site, and the date of launch.

6.12.5. (U) Decay date. If no longer in orbit, the decay date.

6.12.6. (U) Basic orbital parameters (period, inclination, apogee, and perigee) if parameters are available.

6.13. (U) Satellite Element Inventory (MU49 or ADCCP equivalents) Message. This message lists the current element set number for each satellite tasked to each particular site. This message is automatically generated by the Space Control Center, Space Defense Operations Center (SCC SPADOC) computer system's Element Set Inventory (ESI) function and transmitted to each sensor site daily at approximately 2325Z.

6.13.1. (U) Upon receipt, site personnel (or software) should compare the current element set number of each satellite number in the message to the element set number for the corresponding satellites in their site databases. Request an update if the element set number in the message differs from that of the site's database:

6.13.2. (U) Three or more for phased arrays sites.

6.13.3. (U) One or more off for other sensors.

6.14. (U) Special Perturbations Ephemeris (SU85). This message contains ephemris points in the Earth Fixed Geocentric (EFG) coordinate system consisting of position and velocity vectors and the unique elements of the radial (U), in-track (V), and cross-track (W) position covariance matrix, based on inertial velocity.

6.15. (U) State Vectors. A State Vector contains position and velocity information for a satellite using SP theory. This product is associated with a requirement for better accuracies associated with special projects and tasks such as RA, selected Computation of Miss Between Orbits (COMBO) tasks, and similar tasks.

6.16. (U) Two-Line Element Set (MU15 or ADCCP Equivalents). A Two-Line Element Set (TLE) contains position and velocity information for a satellite using General Perturbations (GP) theory. The mean motion parameter has been modified to be astrodynamically compatible with Simplified General Perturbations (SGP) model. For users wanting to use SGP4/DP4 (Deep Space Portion), a very slight modification is required to revert the mean motion back to its original form.

6.17. (U) Uncataloged Objects List. A list of objects for which element sets are developed, but which are not cataloged because they cannot be associated to a particular launch. These element sets are maintained as 8XXXX (analyst satellite) numbers. Various SCC computer programs, such as Conjunction Assessment, require a complete catalog including all such earth-orbiting objects.

6.18. (U) Weekly Near Earth Positive/Negative (Pos/Neg) Object Report. This message, produced on SCC Friday mid shift, lists objects that require Pos/Neg voice reports per reference (h).

6.19. (U) Weekly Sensor Tasking Response. 1 SPCS will make available via web site, a weekly report to each sensor giving an overview of its performance during the previous week (see **Attachment 3** for message format). Sites may request to receive this report from 1 SPCS. It is broken into two parts, one is based on objects acquired and the other on tracks. Both parts show the same type of information:

6.19.1. (U) Number of objects/tracks tasked to the sensor.

6.19.2. (U) Number of objects/tracks acquired.

6.19.3. (U) Percentage of tasked objects/tracks acquired.

6.19.4. (U) This information is broken down by category and day and also by cataloged objects and analyst satellites. A partial example is shown in **Attachment 3**.

6.20. (U) Other Space Support Data Products. Space support data products not listed above will be considered on a case-by-case basis via USSTRATCOM Form 1 (i.e., Position Situation Report and Volume Penetration Report).

(b)(6) USSC Maj, USAF
Command Secretariat

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION (U)

References

(a) Unified Command Plan.

(b) AFI 10-201, Status of Resources and Training System, 8 January 2002

(c) AFI 37-124, The Information Collections and Reports Program, 1 October 1994

(d) SD 505-1 Vol II, Space Surveillance Operations – Event Processing, 13 February 2004

(e) JP 3-14, Joint Doctrine for Space Operations, 9 August 2002

(f) AFMAN 37-123, Management of Records, 31 August 1994

(g) AFMAN 37-139, Records Disposition Schedule, 1 March 1996

(h) UI 10-30, (S) Theater Event System (TES) Architecture and Operations (U), 1 March 1999

(i) Space Surveillance Network (SSN) Security Classification Guide

(j) Space Defense Operations Center (SPADOC) 4 Security Classification Guide

(k) UI 10-23, (S) Integrated Tactical Warning and Attack Assessment (ITW/AA) Procedures and System Description (Missile and NUDET Warning Only) (U), 1 June 2000

(l) DoD 5200.1R, Information Security Program, January 1997

(m) UI 10-5, DoD, Commercial, Civil, and Foreign Space Support, 1 April 2002

Abbreviations and Acronyms

1 SPCS—1st Space Control Squadron

1 SPCS/SAC—1st Space Control Squadron/Space Analysis Center

14AF—14th Air Force

21 SW—21st Space Wing

ACC—Alternate Space Control Center Commander

ADCCP—Advanced Data Communications Control Procedures

AEOS—Advanced E-O System

AFB—Air Force Base

AFSCN—Air Force Satellite Control Network

AFSPC—Air Force Space Command

ALC—ALCOR, Kwajalein

ALCOR—ARPA Lincoln C-Band Observables Radar

ALT—ALTAIR, Kwajalein

ALTAIR—ARPA Long Range Tracking and Instrumentation Radar

AMOS—Air Force Maui Optical Station

AOC—Air Operations Center

ARPA—Advanced Research Projects Agency

ASAP—as soon as possible

ASC—Ascension Island (Eastern Range supporting sensor.)

ASCC—Alternate Space Control Center (located in the NAVSPOC at NNSOC, VA)

BD/T—Beam Director/Tracker

BIOT—British Indian Ocean Territory

BLE—Beale AFB, California

BMEWS—Ballistic Missile Early Warning System

C2—Command and Control

CAT—Category

CAV—Cavalier, North Dakota

CCC—Combined Command Center of NORAD and USSTRATCOM, inside Cheyenne Mountain.

CD—Command Director (The senior NORAD crew member in the CCC.)

CIS—Commonwealth of Independent States

CIW—Combined Intelligence Watch

CLR—Clear Alaska

Cm—centimeter

CMOC—Cheyenne Mountain Operations Center (CMAFS), Colorado

CMOC/J3—Cheyenne Mountain Operations Center/Director of Operations

COCOM—Combatant Command

COD—Cape Cod AFB, Massachusetts

CDR—Commander

CRD—Capstone Requirements Document

CU—Common User

DGC—Diego Garcia GEODSS Site

DoD—Department of Defense

DS—Deep Space

DSN—Defense Switched Network

EGL—Eglin AFB, Florida

ELSET—Element Set

E-O—Electro-Optical

ETRO—Estimated Time of Return to Operation

FDPO—Foreign Disclosure Policy Officer

FYL—Fylingdales, United Kingdom

GAC—Global Assessment Center

GEO—Geosynchronous

GEODSS—Ground-Based Electro-Optical Deep Space Surveillance.

GOC—Global Operations Center

HAX—Haystack Auxiliary Radar (co-located with Millstone Radar, MA)

HHQ—Higher Headquarters

HQ—Headquarters

HUMINT—Human Intelligence

IAW—in accordance with

ICBM—Intercontinental Ballistic Missiles

IMINT—Imagery Intelligence

JIC—Joint Intelligence Center

KAE or KPT—Kaena Point, Hawaii. (Western Range supporting sensor.)

LRIR—Long-Range Imaging Radar

LSSC—Lincoln Space Surveillance Complex

LWIR—Long Wave Infrared

MAJCOM—Major Command

MAU—Maui GEODSS, Maui, Hawaii

MD—Mission Director (The senior USSTRATCOM crew member in the CCC.)

MIL—Millstone Massachusetts

MMS—Monthly Maintenance Schedule

MMW—Millimeter Wave

MOSS—Moron Optical Surveillance System

MOTIF—Maui Optical Tracking and Infrared Facility

MPA—Mission/Payload Assessment

MSSS—Maui Space Surveillance System

MW—Missile Warning

NAV—NAVSPACECOM continuous radar wave Fence.

NAVGOC—Naval Space Operations Center

NAVNETWARCOM—Naval Network Warfare Command

NAVSOC—Naval Space Operations Center

NB—Narrowband

NE—Near Earth

NFL—New Foreign Launch

NNSOC—Naval Network and Space Operations Command (formed from NAVSPACECOM)

NORAD—North American Aerospace Defense Command

NSSS—NAVSPACECOM Space Surveillance System

OPS—Operations

OPSCAP—Operational Capability

OSINT—Open Source Intelligence

PARCS—Perimeter Attack Radar Characterization System

PAVE PAWS—PAVE (Program acquisition name) Phased Array Warning System

PIMS—Passive Imaging Metric Sensor

PM—Preventive Maintenance

R&D—Research and Development

RA—Reentry Assessment

RAF—Royal Air Force

RCS—Radar Cross Section

RF—Radio Frequency

RTS—Ronald Reagan Ballistic Missile Test Range

SATCAT—Satellite Catalog

SATRAN—Satellite Reconnaissance Advance Notice

SBV—Space Based Vehicle

SCC—Space Control Center

SCG—Security Classification Guides

SD—Strategic Command Directive

SHY—Eareckson AFS, Alaska (Former name for Shemya Island; still used as site nomenclature.)

SIGINT—Signals Intelligence

SLBM—Sea–Launched Ballistic Missile

SOB—Space Order of Battle

SOC—Socorro GEODSS site, Socorro New Mexico

SOI—Space Object Identification

SP—Special Perturbations

SPACEAF—Space Air Forces

SPACEAF AOC—SPACEAF Air Operations Center

SrC—USSTRATCOM/GOC Senior Controller

SSN—Space Surveillance Network

THL—Thule, Greenland

TIP—Tracking and Impact Prediction

TRADEX—Target Resolution and Discrimination Experiment

TRX—TRADEX

U—Radial Vector

U.S.—United States

UHF—Ultra High Frequency

UK—United Kingdom

USSTRATCOM—United States Strategic Command

USSTRATCOM/OP—USSTRATCOM Director Global Operations

USSTRATCOM/OP20—USSTRATCOM Joint Intelligence Center

USSTRATCOM/OP23—Production & Analysis Division

USSTRATCOM/OP50—USSTRATCOM Space Enhancement Division

V—In-Track Vector

VHF—Very High Frequencies

W—Cross-Track Vector

WB—Wideband

Terms —All terms are unclassified unless marked otherwise.

1st Space Control Squadron (1 SPCS)—Subordinate to 14AF and 21SW; executes USSTRATCOM'S space control mission, provides operational command and control of the SSN; operates the SCC and the SAC.

14th Air Force (14AF)—SPACEAF. Air Force functional component of AFSPC.

21st Space Wing (21 SW)—Subordinate to SPACEAF; provides operational guidance, support, policy and maintenance scheduling directly to the Air Force elements of the SSN.

50th Space Wing (50 SW)—Subordinate to SPACEAF; operates and controls the AFSCN.

Air Force Satellite Control Network (AFSCN)—Commands most U.S. military satellites; reports positional data on those satellites, through 50SW, to the SCC when requested.

ANCHOR Alert—An immediate notification (in most cases verbally) from the SCC to sensors that a new foreign space or missile launch has actually occurred. There are four different ANCHOR alert options, each of which identifies a specific type of launch event.

Breakup—The unintentional breaking of a single on-orbit space object into two or more pieces.

Breakup Processing—The special procedures taken to analyze and catalog the pieces of a satellite breakup. It begins when a breakup is confirmed, and ends when the SCC determines those pieces which have not yet been identified, cataloged, or decayed are best processed through normal UCT processing and not through special breakup procedures.

Collateral Sensor—A sensor subordinates to USSTRATCOM but with a primary mission other than Space Surveillance support.

Combatant Command (COCOM)—Title 10, US Code, Section 164 assigns to the Commander, USSTRATCOM COCOM over forces in support of Unified Commanders.

Computer Analysis and Verification of Ephemeris Network (CAVNET)—The 1 SPCS offline mission support system.

Contributing Sensor—A non-USSTRATCOM sensor under contract or agreement to support the SSN.

Cooperative Launch—A pre-planned launch originating outside the US and involving the explicit cooperation of one or more US agencies.

Deep Space (DS)—Orbit with a period of 225 minutes or greater.

Dedicated Sensor—An USSTRATCOM-subordinate command sensor with a primary mission of Space Surveillance support.

Defense Intelligence Space Order of Battle (DISOB)—For Russian satellites.

Deorbit—The intentional reentry of a satellite into the earth's atmosphere.

Domestic Launch—A missile or space launch originating in the U.S. or from a U.S. platform.

Eastern Range (ER)—U.S. launch site at Cape Canaveral, Florida.

Element Set (ELSET)—A mathematical representation of a satellite's orbit, in terms of period, inclination, etc.

ELSET 1—The first element set (orbital period, inclination, international designator, etc.) generated by the SCC on a newly launched space object. ELSET 1 criteria is established in the Historic Launch Chapter. The first element set generated by the SCC on a newly launched space object.

Errant Liftoff ("Launch Agency Errant")—When a domestic launch vehicle does not achieve its planned liftoff parameters, cannot be confirmed destroyed, and its predicted impact point can reasonably be assumed to be outside range destruct lines.

Former Soviet Union (FSU)—The FSU consisted of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

High Interest Tasking (HIT)—An object having an increased interest requiring additional tasking from SSN.

Historic Launch—A launch which follows a specific historic profile for which a launch folder is available to SSN.

Historic Launch Folder—A specific combination of launch site, booster, orbital inclination, and period for new foreign launches that have been observed in the past. Launch folders are maintained and updated by CMOC/J3.

Initial Launch Alert Message (ILAM)—A message sent by CMOC/J3 to SSN sensors, based on data from the R-15, about an upcoming pre-planned launch. It details the predicted launch date and windows, nominal ELSET numbers, predicted schedule of events, object descriptions, tasking requirements and cataloging instructions.

Metric Observations—Sensor data showing the position of a space object.

Mission and Payload Assessment (MPA)—The use of SOI and metric data along with other intelligence sources; SIGINT, IMINT, HUMINT, and OSINT, to determine payload mission(s), physical configuration, and status (active, inactive or mission ended).

Near Earth (NE)—An orbit with a period of less than 225 minutes.

New Foreign Launch (NFL)—A booster launched from a foreign country or agency that has not been announced or coordinated with USSTRATCOM.

Nominal ELSETs—Element sets, derived from information in the R-15, describing each orbit segment in a pre-planned launch scenario. These are assigned five-digit numbers in the range from 70000 to 74999 (as shown in **Attachment 5**). Each nominal ELSET is in the format 7XXYY, where XX indicates a particular pre-planned launch, and YY denotes a particular element set for that launch. (The number "7XX00" refers to a particular launch in general.)

Non-Historic Launch—A launch that does not follow a known profile in terms of period and inclination of a satellite launched from a particular site.

Normal Decay Object—Debris with an RCS of less than one square meter, not expected to survive reentry through the atmosphere and impact the earth.

Normal Decay Prediction—A decay prediction based on a general perturbations correction applied to an element set of a satellite.

Observation (Ob)—A single detection of a space object by a sensor, in terms of azimuth, elevation, etc., relative to that sensor.

Operator—The agency which maintains the satellite while in orbit.

Owner—The agency or command which ultimately purchased and owns the system.

Owner/Operator—The Space Control term for the owner and/or operator--the designated control center or agency that is the focal point for operational control of a satellite payload, and/or vehicle, and/or ground site. The owner/operator interfaces with SCC and is generally the location where the SCC Owner/ Operator Communications System (SOCS) terminal is located for a given space system.

R-15—A message sent to 1 SPCS/SAC by a launching agency, normally 15 days before launch, giving all the coordination information needed by the SSN to plan for a domestic or cooperative launch.

RA Object—Any payload, rocket body, or platform, or a piece of debris with a RCS of one square meter or greater or has a greater than five percent probability of surviving reentry.

Separation—The intentional separation of one or more parts or contents of a satellite from the main body. Separations are confirmed by intelligence sources.

Space Asset—Any element of a space system, including the space surveillance network, the command and control communications links or any facility supporting a space system.

Space Event—A non-routine event involving a space object, such as launch, maneuver, breakup, etc.

~~(S)~~ (b)(1) USSC

(b)(1) USSC

Space Object Identification (SOI)—The analysis of narrow-band radar data; wide-band radar, photometric and visible/infrared imagery data; and passive radio frequency (RF) sensor data to determine the characteristics of Earth satellites (in terms of size, shape, and motion).

Space Surveillance Network (SSN)—Worldwide network o f space surveillance sensors , communications, and data processing/command and control centers.

Space System—The combination of ground sensor(s), satellite(s), communication link(s), tracking site(s), launch site(s), control station(s) and supporting assets of a major space resource, constellation or network.

Space Track—The collection of radar, optical, and passive radio-frequency data to determine a satellite's position.

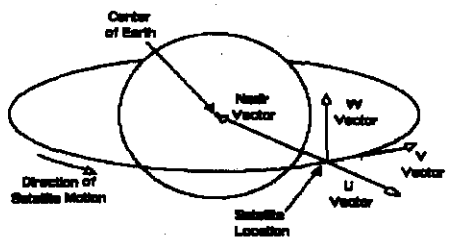
Time, Elevation, Azimuth, Range, Range Rate (TEARR)—Typical metric observable data provided by radars.

Tracking and Impact Prediction (TIP)—Current term for TIP is Reentry Assessment (RA) but message software has not kept pace with the change.

UVW Coordinate System—See Figure A1.1. for explanation of the UVW Coordinate System.

Figure A1.1. (U) UVW Coordinate System. (U)

UVW Coordinate System--



Satellite-Centered UVW Coordinate System

--U--Radial vector. A vector in the orbit plane, pointing from the satellite away from the center of the Earth. Positive is in the direction opposite the Earth (opposite nadir). It may be considered as the opposite of a nadir vector that is defined as a vector pointing from the satellite toward the center of the Earth.

--V--In-Track vector. A vector in the orbit plane, perpendicular to the U vector and positive in the direction of satellite motion. Defined by the W vector crossed into the U vector. Note that this vector is close to, but not identical to, the velocity vector.

--W--Cross-Track vector. A vector perpendicular to the orbital plane, parallel to the orbit angular momentum vector. Defined by the U vector crossed into the satellite instantaneous velocity vector. Thus, it is positive to the left of satellite line of travel.

Attachment 2

SSN SENSOR/SITE DESCRIPTIONS (U)

A2.1. (U) SSN Sensor/Site Descriptions. The following tables list the SSN Sensor/Site Descriptions.

Table A2.1. (U) Dedicated Sensors. (U)

No.	Abbrev.	Name	Location	Type	Range	Intel-Use	Intel-Mode	Intel-Response
210	SOC	Socorro	NM	Optical (AN/FSQ-114)	DS	Primary	Photometry	60 mins
211		Sensor 1		(GEODSS Site 1)				
212		Sensor 2						
213		Sensor 3						
230	MAU	Maui	HI	Optical (AN/FSQ-114)	DS	Primary	Photometry	60 mins
231		Sensor 1		(GEODSS Site 3)				
232		Sensor 2						
233		Sensor 3						
235								
240	DGC	Diego Garcia	BIOT	Optical (AN/FSQ-114)	DS	Primary	Photometry	60 mins
241		Sensor 1		(GEODSS Site 2)				
242		Sensor 2						
243		Sensor 3						
245								
260	MOSS	MOSS	Spain	Optical	DS	Secondary	Photometry	60 mins
375	GB2	GLOBUS II	Norway	Tracker (AN/FPS-129)	DU/DS	Primary	WB/X-Band	2 hrs
398	EGL	Eglin AFB	FL	PA (AN/FPS-85)	DU/DS	Primary	NB/NC/ UHF	30 mins
399	EGL	Eglin AFB	FL	PA (AN/FPS-85)	DU/ NE	Primary	NB/NC/ UHF	
504	SBV	Space-Based Visual	Space	Visible Wavelength				
741	NAV	San Diego	CA	CW Fence Receiver	DU/ NE			
742	NAV	Elephant Butte	NM	CW Fence Receiver	DU/ NE			
743	NAV	Silver Lake	MS	CW Fence Receiver	DU/ NE			
744	NAV	Tattnall	GA	CW Fence Receiver	DU/ NE			
745	NAV	Kickapoo	TX	CW Fence Transmitter	DU/ NE			

746	NAV	Red River	AR	CW Fence Receiver	DU/ NE			
747	NAV	Hawkinsville	GA	CW Fence Receiver	DU/ NE			
748	NAV	Gila River	AZ	CW Fence Transmitter	DU/ NE			
749	NAV	Jordan Lake	AL	CW Fence Transmitter	DU/ NE			

DS - Deep Space C - Coherent
DU - Dual (Near earth & deep space CW - Continuous Wave
DU/DS - Dual (Primarily deep space) PC - Pulse Compression
DU/NE - Dual (Primarily near earth) NB - Narrowband
FOV - Field of View BD/T - Beam Director Tracker
NE - Near Earth NC - Non-coherent
PA - Phased Array WB - Wideband
* SOI-qualified personnel on site.
** Provides voice and message (text) reports but no SOI signatures.

Table A2.2. (U) Collateral Sensors. (U)

No.	Abbrev	Name	Location	Type	Range	Intel-Use	Intel-Mode	Intel-Response
344	FYL	Fylingdales (Face A)	England	PA (AN/FPS-126)	NE	Secondary	NB/NC/UHF	30 mins
345	FYL	Fylingdales (Face B)	England	PA (AN/FPS-126)	NE	Secondary	NB/NC/UHF	30 mins
346	FYL	Fylingdales (Face C)	England	PA (AN/FPS-126)	NE	Secondary	NB/NC/UHF	30 mins
382	CLR	Clear (Face A)	Alaska	PA (AN/FPS-15)	NE	Primary	NB/NC/UHF	30 mins
383	CLR	Clear (Face B)	Alaska	PA (AN/FPS-15)	NE	Primary	NB/NC/UHF	30 mins
394	THL	Thule (SE face)	Greenland	PA (AN/FPS-15)	NE	Primary	NB/NC/UHF	30 mins
395	THL	Thule (N face)	Greenland	PA (AN/FPS-15)	NE	Primary	NB/NC/UHF	30 mins
396	CAV	Cavalier	ND	PA (AN/FPQ-16)	NE	Primary	NB/NC/UHF	30 mins
354	ASC	Ascension	Atlantic	Tracker (AN/FPQ-15)	NE	Primary *	NB/NC/ C-band	30 mins
355	ASC	Ascension	Atlantic	Tracker (AN/FPQ-18)	NE	Primary *	NB/NC/ C-band	30 mins
386	COD	Cape Cod (NE face)	MA	PA (AN/FPS-123)	NE	Primary	NB/NC/UHF	30 mins
387	COD	Cape Cod (SE face)	MA	PA (AN/FPS-123)	NE	Primary	NB/NC/UHF	30 mins
388	BLE	Beale (S face)	CA	PA (AN/FPS-123)	NE	Primary	NB/NC/UHF	30 mins
389	BLE	Beale (NW face)	CA	PA (AN/FPS-123)	NE	Primary	NB/NC/UHF	30 mins
932	KAE	Kaena Point	HI	Tracker (AN/FPQ-14)	NE	Primary *	NB/NC/ C-Band	30 mins

Table A2.3. (U) Contributing Sensors. (U)

No.	Abbrev	Name	Location	Type	Range	Intel-Use	Intel-Mode	Intel-Response
333	ALC	ALCOR	Kwajalein	WB Imaging Radar	NE	Primary	WB/C/C-Band	2 hrs
334	ALT	ALTAIR	Kwajalein	Tracker	DU	Secondary	NB/Dual/ UHF/VHF	15 mins
335	TRX	TRADEX	Kwajalein	Tracker	DU	Secondary	NB/C/L-, S-Bands	15 mins
925	MMW	Millimeter Wave	Kwajalein	WB Imaging Radar	NE	Primary	WB/ C.Ka-Band	2 hrs
369	MIL	Millstone	MA	Tracker	DU/ DS	Secondary **	NB/C/L-Band	Minutes
370	MIL	Millstone	MA	UHF Radar	DU/ DS			
372	HAY	Haystack	MA	Long Range Imaging Radar	DU	Secondary	WB/C/X-Band	2 hrs
373	HAX	Haystack Auxiliary	MA	Imaging	DU	Primary		2 hrs
393	SHY	Eareckson AFB	Alaska	PA (AN/FPS-108)	NE	Primary		
950	MSSS	BD/T WFOV (Metrics)	HI	0.8m (BD/T)	DU	Primary	BD/T WFOV (Metrics)	30 min - 3 hrs
951	MSSS	CMP-Photometric	HI	1.2m (MOTIF)	DU	Primary	CMP-Photometric	30 min - 3 hrs
952	MSSS	CIS-Imagery NFOV	HI	1.6m (AMOS)	NE	Primary	CIS-Imagery NFOV	1 - 3 hrs
953	MSSS	MIRS-LWIR	HI	1.2m (MOTIF)	DU	Primary	MIRS-LWIR	30 min - 3 hrs
954	MSSS	MAIS-Imagery NFOV	HI	1.2m (MOTIF)	NE	Primary	MAIS-Imagery NFOV	1 - 3 hrs
955	MSSS	MAIS-Imagery WFOV	HI	1.2m (MOTIF)	NE	Primary	MAIS-Imagery WFOV	1 - 3 hrs
956	MSSS	PHIAT-Imagery	HI	1.6m (AMOS)	NE	Primary	PHIAT-Imagery	1 - 3 hrs
957	MSSS	CIS-Imagery WFOV	HI	1.6m (AMOS)	NE	Primary	CIS-Imagery WFOV	1 - 3 hrs
958	MSSS	BDT NFOV (Metrics)	HI	0.8m (BD/T)	DU	Primary	BDT NFOV (Metrics)	30 min - 3 hrs
959	MSSS	Other sensors	HI	1.6m (AMOS)	NE	Primary	Other sensors	30 min - 3 hrs
962	MSSS	ADONIS-Imagery	HI	1.6m (AMOS)	NE	Primary	ADONIS-Imagery	1 - 3 hrs
963	MSSS	ELSI Imagery	HI	1.6m (AMOS)	NE	Primary	ELSI Imagery	1 - 3 hrs

964	MSSS	ELSI Signatures	HI	1.6m (AMOS)	NE	Primary	ELSI Signatures	30 min - 3 hrs
966	MSSS	LWIR Imagery	HI	3.7m (AEOS)	NE	Primary	LWIR Imagery	1 - 3 hrs
967	MSSS	Radiometric Signatures	HI	3.7m (AEOS)	NE	Primary	Radiometric Signatures	30 min - 3 hrs
970	MSSS	Metrics	HI	RAVEN	DU	Primary	Radiometric Signatures	30 min - 3 hrs

Attachment 3

LEVEL CHANGE FORMATS (U)

(U) NOTE: This attachment is UNCLASSIFIED in its entirety. The message becomes SECRET when filled in.

1. (U) Applicability/Purpose. This message format is designed for information exchange between SCC/ ASCC and addressees informing them of a Level change.

2. (U) Format:

CLASSIFICATION LINE

SUBJECT: SPACE INFORMATION MESSAGE

PRECEDENCE: IMMEDIATE DESTINATION:

ACTION: R 5060 5006 0AIZ 0AI8 0MMB

0WSR 0COM 0SAF

PREPARATION DATE/TIME (YY DDD HHMM):

TEXT: (See following message formats below)

Format 1 – LEVEL TWO Activation

Format 2 – Scheduled LEVEL THREE Activation

Format 3 – Unscheduled LEVEL THREE Termination

Format 4 – Termination of ASCC Activation

XX DECLASSIFICATION INSTRUCTIONS IF APPLICABLE.

1. (U) TEXT: THE NAVAL SPACE CONTROL CENTER IS CONDUCTING A SCHEDULED PROFICIENCY ACTIVATION

FROM Z (DDHHMM)(MMMYY)

TO Z (DDHHMM)(MMMYY)

PLEASE ENSURE ALL TRAFFIC IS DUAL ROUTED. ACKNOWLEDGE RECEIPT OF THIS MESSAGE TO ASCC AT DSN: 249-6500 (COMMERCIAL 540/653-6500) OR VIA MESSAGE.

2. (S) TEXT: THE NAVAL SPACE CONTROL CENTER IS CONDUCTING A SCHEDULED LEVEL THREE ACTIVATION

FROM Z (DDHHMM)(MMMYY)

TO Z (DDHHMM)(MMMYY)

PLEASE ENSURE ALL TRAFFIC IS DUAL ROUTED. ACKNOWLEDGE RECEIPT OF

THIS MESSAGE TO ASCC AT DSN: 249-6500 (COMMERCIAL 540/653-6500) OR VIA MESSAGE.

3. (S) TEXT: ASPADOC/ASCC LEVEL THREE OPERATIONS (U)

(S) EFFECTIVE DDHHMMZ MMM YY, LEVEL 3 OPERATIONS ARE DIRECTED. THIS IS A PRIMARY ACTIVATION FOR THE ASCC WITH NO SCC BACKUP.

(U) SENSORS REFERENCE UI 10-40(S) (U).

(U) DURING THE ACTIVATION, SENSORS WILL CALL IN VOICE REPORTS AND OPSCAP TO THE SCC AND ASCC UNLESS OTHERWISE DIRECTED.

(U) ACTION ADDRESSEES ACKNOWLEDGE RECEIPT TO THE SCC AND ASCC

(SCC – VIA MESSAGE (RUWRCAH) OR VIA DSN: 268-4409/COMM (719) 474-4409.

ASCC – VIA DSN: 249-6500/COMM: (540) 653-6500.)

(U) THIS MESSAGE IS RELEASABLE TO CANADA.

4. (U) TEXT: THE NAVAL SPACE CONTROL CENTER ACTIVATION IS TERMINATED.

ALL MESSAGE TRAFFIC SHOULD BE DUAL ROUTED TO SCC/ASCC. ACKNOWLEDGE RECEIPT OF THIS MESSAGE TO SCC AT DSN: 268-4409/COMM (719) 474-4409 OR VIA MESSAGE.

Attachment 4

MESSAGE AND REPORT FORMATS (U)

A4.1. (U) Calibration Report. Description. Weekly report available on 1 SPCS web page detailing the results of calibration for each site.

Table A4.1. (U) Sample Of Calibration Report Format. (U)

CALIBRATION SUMMARY INFORMATION FOR SENSOR ### (SENSOR NAME)
MESSAGE GENERATION TIME 00 228 16 33 124.108
CALIBRATION START TIME 00 208 00 00 00.000
CALIBRATION STOP TIME 00 222 00 00 00.000
TOTAL OBSERVATIONS: 1028

OBS		MEAN	STDDEV	RMS	USED
AZ/RA	(DEG):	0.0084	0.0362	0.0368	1028
EL/DEC	(DEG):	0.0408	0.0387	0.0562	1028
RANGE	(KM):	0.0115	0.0377	0.0394	1028
RANGE RATE	(M/SEC):	0.3373	2.4748	2.4965	1028

OBSERVABLES/RESIDUALS

SATNO	YY DDD HH MM SS SSS	AZIM/RA (DEG)	EL/DEC (DEG)	RANGE (KM)	RANGE RATE (KM/SEC)
16908	00 208 01 19 58.458	222.4553 -0.0034	4.3097 0.0182	4142.7210 0.0716	1.8497 -0.0062
16908	00 208 01 20 20.062	220.5822 0.0102	3.8651 -0.0030	4184.4370 0.0764	2.0022 -0.0024
16908	00 208 01 20 30.538	219.6646 -0.0072	3.6700 0.0168	4205.7900 0.0599	2.0750 0.0002
16908	00 208 01 20 42.198	218.6855 0.0039	3.4086 0.0014	4230.4250 0.0541	2.1536 0.0022
16908	00 208 01 20 53.002	217.7927 0.0177	3.1293 -0.0437	4254.0450 0.0532	2.2217 0.0008
1328	00 208 01 28 19 458	216.8437 0.0790	46.5430 0.0354	1224.5190 0.0215	-0.8266 -0.0049
1328	00 208 01 28 29 609	211.9592 0.0620	46.9838 0.0634	1218.0080 0.0174	-0.4595 -0.0002

A4.2. (U) Predicted Ephemerides. Description. Weekly report for each calibration satellite available on 1 SPCS web page containing special perturbations vector predictions for a 2-week period.

Table A4.2. (U) Sample Report of Predicted Ephemerides. (U)

20026 CALIBRATION PREDICTED EPHEMERIS			
TIME OF LAST MODIFICATION TO FILE: EPHEMERIS FILE START TIME: EPHEMERIS FILE STOP TIME:	00 228 18 41 40.000 00 224 00 00 00.000 00 238 00 00 00.000		
EARTH MODEL: EGM-96 COORDINATE SYSTEM: EARTH CENTERED ROTATING (ECR)			
YYDDDHHMMSS.SSS	X(KM) XDOT(KM/SEC)	Y(KM) YDOT(KM/SEC)	Z(KM) ZDOT(KM/SEC)
00224000000.000	-4376.166543 -1.589805	17471.087192 1.894706	18054.683968 -2.223543
00224000500.000	-4836.923517 -1.481713	18034.826115 1.862235	17368.337360 -2.351279
00224001000.000	-5265.103645 -1.372714	18587.637369 1.821859	16644.423574 -2.473946
00224001500.000	-5660.514113 -1.263336	19127.154499 1.773617	15884.503458 -2.591278
00224002000.000	-6023.120243 -1.154106	19651.028139 1.717584	15090.216192 -2.703019
00224002500.000	-6353.044608 -1.045544	20156.936899 1.653872	14263.275789 -2.808926
00224003000.000	-6650.565395 -0.938167	20642.598160 1.582628	13405.467419 -2.908768
00224003500.000	-6916.114044 -0.832480	21105.778710 1.504034	12518.643590 -3.002327
00224004000.000	-7150.272167 -0.728978	21544.305190 1.418307	11604.720163 -3.089399
00224004500.000	-7353.767758 -0.628142	21956.074296 1.325696	10665.672237 -3.169793
00224005000.000	-7527.470727 -0.530437	22339.062671 1.226485	9703.529888 -3.243333
00224005500.000	-7672.387751 -0.436309	22691.336466 1.120987	8720.373790 -3.309859
00224010000.000	-7789.656499 -0.346184	23011.060509 1.009546	7718.330719 -3.369223

A4.3. (U) Weekly Sensor Tasking Reponse. Description. This message is used to provide feedback to sites on their metric observation collection, comparing what was tasked to what was actually collected.

Table A4.3. (U) Transmission. (U)

Precedence: ROUTINE Classification: UNCLAS From: 1 SPCS To: Each individual SSN site.

Table A4.4. (U) Sample Format. (U)

Sensor 382 (CLR) Report for the week of: 07 Jan 2002

Track Summary for Cataloged Satellites

		Mon 07 Jan	Tue 08 Jan	Wed 09 Jan	Thu 10 Jan	Fri 11 Jan	Sat 12 Jan	Sun 13 Jan	Week Totals
Cat 1	Tracks Tasked	0	4	5	5	7	8	8	37
	Tracks Acquired	0	2	3	5	6	6	5	27
	Rate	0.0%	50.0%	60.0%	100.0 %	85.7%	75.0%	62.5%	73.0%
Cat 2	Tracks Tasked	968	1097	1091	1067	815	1093	1078	7209
	Tracks Acquired	792	861	834	840	632	855	869	5683
	Rate	81.8%	78.5%	76.4%	78.7%	77.5%	78.2%	80.6%	78.8%
Cat 3	Tracks Tasked	488	508	534	539	364	494	529	3456
	Tracks Acquired	381	387	401	436	263	375	384	2627
	Rate	78.1%	76.2%	75.1%	80.9%	72.3%	75.9%	72.6%	76.0%
Cat 4	Tracks Tasked	98	100	87	122	82	97	85	671
	Tracks Acquired	57	62	59	84	54	66	57	439
	Rate	58.2%	62.0%	67.8%	68.9%	65.9%	68.0%	67.1%	65.4%
Cat 5	Tracks Tasked	375	374	380	388	374	368	359	2618
	Tracks Acquired	325	319	324	342	283	321	324	2238
	Rate	86.7%	85.3%	85.3%	88.1%	75.7%	87.2%	90.3%	85.5%
Total	Tracks Tasked	1929	2083	2097	2121	1642	2060	2059	13991
	Tracks Acquired	1555	1631	1621	1707	1238	1623	1639	11014
	Rate	80.6%	78.3%	77.3%	80.5%	75.4%	78.8%	79.6%	78.7%

A4.4. (U) Sensor Metric Availability Report. Description. A required weekly input to 1 SPCS, used to identify problems and refine metric tasking for the overall SSN.

Table A4.5. (U) Transmission. (U)

Precedence: ROUTINE Classification: UNCLAS From: Each individual SSN site. To: 1 SPCS

Table A4.6. (U) Sample Format. (U)

SUBJ: SENSOR METRIC AVAILABLE/UNAVAILABLE STATUS PART I: SENSOR AVAILABLE METRIC TIME IN MINUTES							
	96001	96002	96003	96004	96005	96006	96007
ACTUAL METRIC AVAILABLE	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PLANNED METRIC AVAILABLE	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PERCENT AVAILABLE METRIC	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PART II: REASON UNAVAILABLE FOR METRIC TRACKING IN MINUTES							
A. NON-ROUTINE TASKING	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
B. WEATHER	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
C. SOI	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
D. R&D	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
E. CALIBRATION	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
F. EQUIPMENT/SOFTWARE	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
G. NFL	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
H. OTHER	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PART III: NARRATIVE INFORMATION NOT PROVIDED IN PART II							

NOTES:

(U) Part I. The actual minutes spent performing metric tracking for each 24-hour period.

(U) Actual metric time available in minutes

(U) Planned metric time availability in minutes (this takes into account down time for scheduled maintenance, as per the monthly maintenance schedule), and

(U) Percentage of time available for metric tracking.

(U) Part II. The time in minutes the sensor was prevented from performing routine metric tracking, and the reason (using the following codes):

A = Non-routine tasking (not from consolidated or update tasking message)

B = Weather

C = Space Object Identification (SOI)

D = Research and Development (R&D)

E = Calibration

F = Equipment/Software

G = New Foreign Launch (NFL)A3.19.2.2.8. (U) H = Other (provide narrative explanation in Part III).

(U) Part III. Any additional information not listed in Part II, and details of any "H" (other) time reported in Part II.

A4.5. (U) Operationally Required Site Message Set. Description. The following messages represent the data exchanges between sites and SCC/ASCC for efficient SSN operations and for effective sensor employment against space events. Messages to/from satellite Owner/Operators, AFSCN, data product users (NASA, DMSP, etc.), and Missile Warning are not included. ASCC to SCC unique coordination messages and Cheyenne Mountain Complex (CMC) internal messages also are omitted. The messages flagged "OPS REQ'D" are considered to be mission essential (needed for effective employment of sensors against space events) for any site (dedicated, collateral or contributing). The remaining messages are recommended for mission enhancement.

Table A4.7. (U) Message Sets. (U)

PROCESS	MESSAGE TITLE (generic)*	OPSRE Q'D	TO / FMSIT E	SSN CU Format	SSN ADCCPFormat
LAUNCH	Possible Foreign Launch	YES	TO	SU69	AN20, ND06
	Anchor Alerting Initiation	YES	TO	SU79	
	Anchor Alerting Termination	YES	TO	SU80	
	ELSET One Publication		TO	SU73	
	Initial Launch Alert Message (ILAM)		TO	SU51	
	Initial Launch Alert Addendum		TO	SU53	
	Pre-Planned Launch T-3 Notification		TO	MU17	
	Pre-Planned Liftoff Notification		TO	MU19	
	Pre-Planned Launch Failure		TO	MU21	
	Pre-Planned Launch Scrub		TO	MU22	
MANEUVER	Possible Maneuver	YES	TO	MU61	AN21, GN09, ND10
	Maneuver Verification	YES	TO	MU62	GN10, ND11
	Possible Maneuver Cancellation	YES	TO	MU63	ND12, GN11
BREAKUP	Possible Breakup	YES	TO	SU83	ND05
DECAY	Satellite Decay	YES	TO	MU59	
	Payload Debris (in orbit after decay)	YES	TO	MU64	
	TIP Tasking Message	YES	TO	MU26	ND03
	TIP Alert Message		TO	MU14	ND02
	TIP 60-Day Decay Message		TO	SU59	
	TIP 10-Day Message		TO	SU60	
	TIP 2-Hour MW Ephemeris Message		TO	SU61	
SEARCH	Sensor Search Message	YES	TO	SU57	
	Sensor Search Termination	YES	TO	SU58	
GENERAL PURPOSE	Metric Observation	YES	FM	AA07	AL13, BM22, CD03, FP11, GE04, PP04
	SOI Signature	YES	FM	AA23	AL15, BM25, CD08, GE06, PP06
	Miss Report	YES	FM	SA19	CD07, FP13 GE07, PP07
SSN MANAGEMENT	Level Change Alerting	YES	TO	SU65	ND15

	Satellite Element Inventory	YES	TO	MU49	AN25, DC03, ~~EG12~~, GN03, MB03, ND08 PN03
	New Field Element Set Request	YES	FM	SA30	SP01
	Satellite Element Set	YES	TO	MU15	AN22, DC02, EG11, GN02, MB02, ND21 PN02
	SPADATS Element Set (used for Flash ELSET)	YES	FM	AA06	AL11, BM23, CD04, DN08, FP10, GE05 PP05
	Sensor Tasking	YES	TO	SU66	AN23, DC01, EG10, GN01, MB01, ND04 PN01
	Sensor Tasking Update	YES	TO	SU67	AN24, DC04, EG13, GN06, MB04, ND20 PN06
	Supplemental Tasking	YES	TO	SU56	
	SOI Tasking	YES	TO	SU68	
	Free Text	YES	TO	MU99	GN04
	Free Text	YES	FM	SA32	GE01
	Daily Feedback Message (old/lost list)		TO	MU30	
	TUO Correlation		TO	MU48	
	HANSA Discrepancy Advisory		TO	MU84	ND18
	Analyst Satellite Catalog Action		TO	MU91	
	Satellite Catalog		TO	SU54	
	RCS Catalog Report (RCS data)		FM	SA33	
	Sensor Analysis Report (tasking response)		TO	SU52	
	Sensor Calibration Daily Data		TO	SU81	
	Sensor Calibration Average Data		TO	MU82	
	Sensor Location, Weights, & Biases		TO	MU43	
	DEFCON Change Message		TO	SU07	

* Generic name is used since each individual sensor ADCCP version may have a slight variation in the message name. For example: GEODSS Element Set, SPADATS Element Set, etc.

Attachment 5
DISTRIBUTION LIST (U)

A5.1. (U) Table A5.1. Table A5.1. shows the distribution requirements for this SD.

Table A5.1. Table A5.1.(U) Distribution List. (U)

CMOC/J3S, 1 NORAD RD, Suite 9101, Cheyenne Mountain AS CO 80914-605	20
CMOC/J3S, 1 NORAD RD, Suite 9101, Cheyenne Mountain AS CO 80914-605	20
CMOC/J3T, 1 NORAD RD, Suite 215C, Cheyenne Mountain AS CO 80914-6101	2
CMOC/CVS, 1 NORAD RD, Suite 7-55, Cheyenne Mountain AS CO 80914-605	1
CMOC/J2W, 1 NORAD RD, Suite 9302, Cheyenne Mountain AS CO 80914-6072	1
USSTRATCOM/ANS SW (Rm 105), 250 S Peterson Blvd, Suite 116, Peterson AFB CO 80914-3180	1
USSTRATCOM/J2F SW, 570 Suffolk St, Peterson AFB CO 80914-1680	2
USSTRATCOM/DEFSMAC Exchange Officer, 250 S Peterson Blvd, Peterson AFB CO 80914-3030	1
USASSDC/CSSD-OP-S, P.O. Box 15280, Arlington VA 22215-0280	2
HQ USARSPACE/MOSC-OP-S, 1670 N. Newport Rd, Colorado Springs CO 80916-2757	2
USAKA/CSSD-KA-RI, P.O. Box 26, APO AP 96555-2526	2
USSTRATCOM/OP34, 250 S Peterson Blvd, Suite 116, Peterson AFB CO 80914-3090	30
USSTRATCOM/J35 SW, 250 S Peterson Blvd, Suite 116, Peterson AFB CO 80914-315	1
USSTRATCOM/J5B SW (Rm 122), 250 S Peterson Blvd, Suite 116, Peterson AFB CO 80914-3170	1
USSTRATCOM/J5R SW (Rm 224), 250 S Peterson Blvd, Suite 116 Peterson AFB CO 80914-3080	1
USSTRATCOM/J67 SW, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-4530	1
USSTRATCOM/J6 SW (Rm 219), 250 S Peterson Blvd, Suite 116, Peterson AFB CO 80914-3110	1
USSTRATCOM/HO SW (Rm 426), 250 S Peterson Blvd, Suite 116, Peterson AFB CO 80914-3160	1
HQ AFSPC/DOCP, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-4190	1
HQ AFSPC/DOO, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-450	2
HQ AFSPC/DOY, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-425	2

HQ AFSPC/DRCS, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-4580	1
HQ AFSPC/IG, 125 E Ent Ave, Peterson AFB CO 80914-1281	1
HQ AFSPC/SCN, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-4730	1
HQ AFSPC/XPX, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-4610	1
13 SWS/DO, 50 AST, Stop 40013, Clear AFS AK 99704-5000	3
7 SWS/DO, 7400 Spencer Paul Rd, Beale AFB CA 95903-1906	1
14 AF/A33/DOX/OV, 747 Nebraska Ave, Suite 22, Vandenberg AFB CA 93437-6268	2
18 SPSS/DO, 12 Laboratory Rd, Edwards AFB CA 93524-8390	3
21 SOPS/DOR, Onizuka AFS, 1080 Lockheed Way, Box 046, Sunnyvale CA 94089-1235	2
30 RANS/DMI, 826 13th St, Bldg. 7011, Rm 101, Vandenberg AFB CA 93437-5212	1
533 TRS/DO, 680 11th Street, Suite 126, Vandenberg AFB, CA 93437-555	30
D Space D 2-2, Directorate of Space Development, National Defence Headquarters, MGen George R. Pearkes Bldg, Ottawa, Ontario, Canada K1AOK2	2
Canadian Forces Joint Headquarters, J5 Space Policy, Kinston, Ontario, Canada	1
DCOS SP OPS, AIR COMMAND HQ, Westwin, Manitoba, Canada R3J 0T0	1
1 SPCS/DO, 1 NORAD Rd, Suite 7205, Cheyenne Mountain AFS CO 80914-6009	20
21 OSS/OSOG/OSOX, 775 Loring Ave, Suite 115, Peterson AFB CO 80914-1297	2
21 OSS/OSXP, 775 Loring Ave, Suite 103, Peterson AFB CO 80914-1297	2
21 SW/DOC, 775 Loring Ave, Suite 235, Peterson AFB CO 80914-1295	2
50 LSS/SCUR, 300 O'Malley Ave, Suite 146, Schriever AFB CO 80912-3030	1
544 IG/DP, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-4130	1
Det 1, 533 TRS/DOS, National Test Facility, M/S N900 CMTS, 730 Irwin Ave, Schriever AFB CO 80912-7300	5
Det 4 AFOTEC/CM, 4146 E Bijou ST, Colorado Springs CO 80909-6899	1
17 TS/CC, 730 Irwin Ave, STE 83, Schriever AFB CO 80912-7383	2
MITRE Corp, 1150 Academy Park Loop, Suite 212, Colorado Springs CO 80910	1
NRO Operations Squadron (NOPS), 401 Discoverer Ave, STE 32, Schriever AFB CO 80912	1
Raytheon Support Service Co, 1330 Inverness Drive, Suite 400, Colorado Springs CO 80910-3754	2

ESC/NDC, 160 Patrick St, Peterson AFB CO 80914-2530	1
USARSPACE, 150 Vandenberg St, Suite 1105, Peterson AFB CO 80914-425	1
5 SPSS/DO, 57 W. D Ave, Suite 125, Eglin AFB FL 32542-6848	7
45 RANS (CCAS), 10400 Phillips Parkway, Patrick AFB FL 32925-2618	5
45 RANS/DS (CCAS), 1645 Phillips Parkway, Patrick AFB FL 32925-5522	1
DET 8, SMC/CWP, 1046 S. Patrick Dr, Bldg. 981, Rm 102, Patrick AFB FL 32925	1
ITT Federal Services Corp, Kaena Point Tracking Site, PO Box 977 (RS480), Waianae HI 96792-0977	2
Det 3, 18 SPSS, 535 Lipoa Parkway, Suite 50, Kihei, Maui HI 96753-6999	1
National Security Agency/DEFSMAC/PIW4, Fort George G. Meade MD 5755-6000	1
6 SWS/DO, Cape Cod AfS, PO Box 428, Sagamore MA 02561-0428	3
HQ ESC/TNB/TNI/TNG, 5 Eglin ST, Hanscom AFB MA 01731-2121	3
HQ ESC/SRD/SRE, 50 Griffiss St, Hanscom AFB MA 01731-1622	4
MIT Lincoln Lab, Millstone Radar, 244 Wood ST, Lexington MA 02173-9108	1
MIT Lincoln Lab, Surveillance Tech Group, 244 Wood St, Lexington MA 02173-9108	1
MIT Lincoln Lab, Field System Group, 244 Wood St, Lexington MA 02173-9108	1
MITRE Corp, Attn: R. McGaffign-D130, 52 Burlington Rd, Bedford MA 01730-145	3
Raytheon Co. Equipment Div, 430 Boston Post Rd, Wayland MA 01778-5000	3
HQ AFOTEC/TSR, 8500 Gibson Blvd SE, Kirtland AFB NM 87117-5558	1
HQ AFSC/SEWE, 9700 Ave G SE, Kirtland AFB NM 87117-5670	1
Det 1, 18 SPSS, PO Box W, Socorro NM 87801-5000	3
MIT/Lincoln Lab GEODSS Field Site, PO Box 1707, Socorro NM 87801-1707	1
4 SPSS/IM, 1424 Sabre Rd, Holloman AFB NM 88330-7842	3
Lockheed Martin, PO Box 4840, Syracuse NY 13221-4840	1
10 SWS/DO, HCR 3, BOX 260, Cavalier AFS ND 5825-9314	3
NAIC/DXDR/DXDL, 4115 Hebble Creek Rd, Suite 6, Wright-Patterson AFB OH 45433-5610	2
NAIC/TASC, 4115 Hebble Creek Rd, Suite 6, Wright-Patterson AFB OH 45433-6508	1

Armed Forces Staff College/JCEWS-C3D, 7800 Hampton Blvd, Norfolk VA 23511-6097	1
Naval Space Command /N32, 5280 Fourth St, Dahlgren VA 22448-5300	3
National Reconnaissance Office/NROC/Office of Policy, 14675 Lee Road, Chantilly VA 20151-1715	4
Joint Staff/J33 (NMCC Surveillance Officer), Pentagon Rm 2B894, Washington DC 5318-3000	1
Joint Staff/J38/DSOD, Pentagon Rm 3C860, Washington DC 5318-3000	1
SAF/SXP, 1640 Air Force, Pentagon, Washington DC 5330-1640	1
5 SPSS/IM, Unit 5060, Box 260, APO AE 09461-0260	3
12 SWS/DO, PSC 1501, Box 1072, APO AE 09704-5000	3
21 OG/USAFLO, PSC 52, Unit 8170, APO AE 09496-8170	4
Lockheed Martin, Attn: Maintenance Management, PSC 725, APO AE 09824-725	1
AFELM/PEP High Wycombe, PSC 821 Box 10, FPO AE 09421	3
Det 4, 18 SPSS/DO, Unit 6585, Bldg. 1301, Rm 101, APO AE 09643-6585	2
3 SPSS/IM, Unit 5197, APO AP 96319-5197	3
Commander, US Kwajalein Missile Range, PO Box 26, APO AP 96555-2526	8
Det 2, 18 SPSS/DC, PSC 466, Box 51, FPO AP 96595-0051	1
MIT Lincoln Lab/Attn: Document Control, Box 58, APO AP 96555-2526	4
45 RANS (1), Range Technical Services, Account 1 (Security)	1
Range Technical Services, Account 7 (Operations Control Reference Library)	1
Range Technical Services, Account 50 (Ascension)	1
Total:	283

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