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AIR FORCE WEATHER AGENCY**

**AIR FORCE WEATHER AGENCY
INSTRUCTION 15-2**



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Weather

***SPACE ENVIRONMENTAL OBSERVATIONS
SOLAR OPTICAL AND RADIO OBSERVING***

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This instruction implements Air Force Policy Directive (AFPD) 15-1, *Atmospheric and Space Environment Support*, and prescribes responsibilities and provides operational guidance for Solar Electro-Optical Network (SEON) detachments to observe, analyze, and report solar activity using the solar optical telescope (AN/FMQ-7) and radio telescope (AN/FRR-95). The acronym SEON collectively refers to the Solar Observing Optical Network (SOON) and Radio Solar Telescope Network (RSTN). This instruction is to be used in conjunction with Air Force Weather Agency Manual (AFWAMAN) 15-1, *Space Environmental Observations, Solar Optical Observing Techniques*; AFWAMAN 15-2, *Space Environmental Observations, Solar Radio Observing Techniques*; Air Force Manual (AFMAN) 15-124, *Meteorological Codes*; all applicable Technical Orders (TOs); and the SOON and RSTN Computer Operation Manuals (COMs). Send comments, suggested changes, or improvements through channels to Headquarters Air Force Weather Agency Scientific Services, Training, and Standards Division, AFWA/A3N, 101 Nelson Dr, Offutt AFB NE 68113-1023. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at <https://www.my.af.mil/gcss-af61a/afrims/afrims/rims>. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional's chain of command. This publication does not apply to the Air National Guard or Air Force Reserve commands. The reporting requirements in this publication are exempt from licensing in accordance with Air Force Instruction (AFI) 33-324, The Information Collections and Reports Management Program;

Controlling Internal, Public, and Interagency Air Force Information Collections, paragraph 2.11.12.

SUMMARY OF CHANGES

This interim change revises AFWAI 15-2 by (1) deleting Space Environment Sensor Suite (SESS) in paragraph 4.4.1., (2) rewording paragraph 4.4.2.2., (3) replacing (except SOON Operational Effectiveness) with (Total FRR-95 or FMQ-7), (4) replacing Attachment 7 with an updated Attachment 7, (5) deleting AFI 15-180 reference, and (6) updating the publication dates of AFWAMAN 15-1 and AFWAMAN 15-2 in the glossary of references and supporting information. A margin bar (l) indicates newly revised material.

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Chapter 1

SEON OPERATIONS/RESPONSIBILITIES

1.1. Introduction.

1.1.1. The Solar Electro-Optical Network (SEON) is a real-time solar optical and radio observing and analysis network.

1.1.1.1. The Solar Observing Optical Network (SOON) telescope gathers standardized solar photospheric, chromospheric, and coronal data in either computer assisted ("automatic") or non-computer ("semiautomatic") mode.

1.1.1.1.1. There are a total of 3 sites that operate SOON telescopes around the world:

1.1.1.1.2. San Vito, Italy (LISS), Holloman, New Mexico (KHMN), and Learmonth, Australia (APLM).

1.1.1.2. The Radio Solar Telescope Network (RSTN) telescopes gather standardized solar radio data in computer assisted ("automatic") mode. The RSTN system produces discrete frequency radio observations using Radio Interference Measuring Sets (RIMS), and wideband (spectral) radio observations using the Solar Radio Spectrograph (SRS).

1.1.1.2.1. There are a total of 4 sites that operate RSTN telescopes around the world:

1.1.1.2.2. San Vito, Italy (LISS), Kaena Point, Hawaii (PHFF), Learmonth, Australia (APLM), and Sagamore Hill, Massachusetts (K7OL).

1.1.2. The network provides timely, accurate solar alerts and analyses to the Space Weather Operations Center (SPACEWOC), 2d Weather Squadron at Offutt AFB, NE, and the National Oceanic and Atmospheric Administration (NOAA) Space Weather Prediction Center (SWPC) at Boulder, CO.

1.2. HQ AFWA Responsibilities.

1.2.1. SEON-related responsibilities of the offices at HQ Air Force Weather Agency (AFWA) that deal directly with the solar observatories are listed below.

1.2.1.1. 2d Weather Squadron (2 WS).

1.2.1.1.1. Specifies special SEON and geophysical data collection requirements and requests observational data such as all preliminary, final, and observatory messages.

1.2.1.1.2. Resolves, or makes the appropriate referrals for any problem (other than circuit related) that impacts an observatory's ability to perform its mission.

1.2.1.1.3. Reports on and provides guidance concerning trend information, system improvements, training problems, or other related issues.

1.2.1.1.4. Primary point of contact (POC) for recommendations or suggestions to improve data observing, analysis, or dissemination techniques or procedures. Benchmarks and cross-feeds innovative methods to accomplish the mission.

- 1.2.1.1.5. Manages the intersite Integrated Solar Radio Flux (IFLUX) Standardization Program and monitors quality control efforts and equipment up-time information.
- 1.2.1.1.6. Manages observatory operations and performs quality assurance of contractor performance.
- 1.2.1.1.7. Manages telescope maintenance contracts and monitors contractor performance.
- 1.2.1.2. Space Weather Operations Center (SPACEWOC).
 - 1.2.1.2.1. Shares space environmental data and coordinates space forecast products with the Department of Commerce's NOAA SWPC.
 - 1.2.1.2.2. Monitors, in real-time, the equipment/operational status of the solar and geophysical sensor networks, and the quality of the data they provide.
 - 1.2.1.2.3. Issues Alerts and Warnings to allow operators to mitigate space weather effects.
- 1.2.1.3. Operations Center (AFWA/A3O).
 - 1.2.1.3.1. Serves as the AFWA Commander's representative by providing 24-hour single point of contact. The AFWA Operations Center provides services for reporting, tracking, and resolving problems.
 - 1.2.1.3.2. Tracks daily ops status of production and communication systems for AFWA computer complex.
 - 1.2.1.3.3. Monitors status of data flow and products coming into and going out of AFWA. When an issue is reported, AFWA Operations Center will contact appropriate office of primary responsibility and assist in resolving problems with data flow (circuit-related problems) and products coming into and going out of AFWA.
- 1.2.1.4. Strategic Plans, Requirements, and Programs Directorate (AFWA/A5/8).
 - 1.2.1.4.1. Oversees configuration management of observing software and hardware, including inventories, via system program office (SMC/SLWA).
 - 1.2.1.4.2. Assists in the development and acquisition of new computer software and/or hardware systems, or observing techniques and software.
- 1.2.1.5. Operational Capabilities Requirements Division (AFWA/A5C) & Operations Requirements (AFWA/A3O).
 - 1.2.1.5.1. A5C collects and prioritizes validated requirements for new operational capabilities.
 - 1.2.1.5.2. AFWA/A3O Coordinates operational needs/requirements within existing capabilities.
- 1.2.1.6. Space Weather Communications (AFWA/A6O).
 - 1.2.1.6.1. Focal point for all external communication/computer systems-related issues. Responsibilities include the following:

1.2.1.6.1.1. Long-haul communications.

1.2.1.6.1.2. Certification and accreditation (C&A) issues for each site.

1.2.1.6.1.3. Technical solutions and support.

1.2.1.7. Scientific Services, Training, and Standards Division (AFWA/A3N).

1.2.1.7.1. Develops and publishes operational observing guidance based on supported unit requirements.

1.2.1.7.2. Acts as the primary office for science and technology related issues for space weather.

1.2.1.8. Space Weather Integration Team (16 WS/WXN).

1.2.1.8.1. Develops new techniques to exploit space weather data (to include integration into space weather models as well as situational awareness products).

1.3. Solar Observatory Responsibilities.

1.3.1. All SOON and RSTN detachments.

1.3.1.1. Collects and analyzes solar optical and radio observations, and collects data related to the ionosphere IAW the duty priorities in Attachment 2 and IAW the timeliness criteria in Attachment 3. Contacts the SPACEWOC for guidance when an observing situation occurs where written guidance is inadequate.

1.3.1.2. Submits suggested new or improved data observing, analysis, or dissemination techniques or procedures to 2 WS/DO.

1.3.1.3. Identifies and reports SEON software problems and/or proposals for software changes or development to 2 WS/DO.

1.3.1.4. Will conduct position qualification of all personnel and other key training responsibilities. Reference AFI 36-2201, *Air Force Training Program* and AFI 15-127, *Air Force Weather Qualification Training* for specific responsibilities and key concepts and terminology.

1.3.1.5. Reports all equipment and communication outages to the servicing maintenance agency using guidance in Chapter 4. Coordinates scheduled downtime for maintenance or training with the 2 WS/DO, and reports actual outages to AFWA Operations Center, IAW Chapter 4.

1.3.1.6. Detachment leadership will:

1.3.1.6.1. Develop a Master Training Plan (MTP) to define qualification requirements for assigned personnel, contingency plans, wartime requirements, special operating instructions, or publications governing the duties. Leadership will divide and assign work center tasks to individual positions to ensure 100 percent task coverage.

1.3.1.6.2. Ensure seminars on solar theory and observing techniques for assigned analysts are conducted and documented in the Air Force Training Record (AFTR) IAW AFI 15-127, on a quarterly basis.

- 1.3.1.6.3. Report on the quality of formal training received at the SOON Operators course using the appropriate forms or methods prescribed by the lead trainer at the SOON Operators course. Leadership will forward a copy of the reports to Detachment 4 and 2WS/DO who will forward to AFWA/A3N if necessary.
- 1.3.1.6.4. Be position qualified within 180 days of arrival on station. Detachment Commanders will be qualified on either the RSTN or SOON system (if both systems are available, they will qualify on both). The Noncommissioned Officer in Charge (NCOIC) of Solar Observatory Operations (NSOO) will be position qualified on all solar analyst duties performed at their unit (both RSTN and SOON if available). To maintain position qualification, the commander and NSOO must work as many shifts as needed.
- 1.3.1.6.5. Use guidance provided in AFWAMAN 15-1, AFWAMAN 15-2, all applicable TOs, and COMs to develop local equipment and computer procedures to cover the following situations:
 - 1.3.1.6.5.1. Normal Power-Up and Shutdown (e.g., sunrise and sunset).
 - 1.3.1.6.5.2. Complete Power-Up and Complete Shutdown during the observing day (e.g., during severe weather such as lightning within 5 nautical miles; or when room environmental limits exceed safe/proper thresholds for computer or telescope equipment).
 - 1.3.1.6.5.3. Emergency Power-Up and Emergency Shutdown during the observing day (e.g., during severe weather and/or when hazardous conditions exist or are imminent such as flood, fire, electrocution, etc).
- 1.3.2. The Kaena Point Observatory.
 - 1.3.2.1. Maintains patrol coverage IAW paragraph 2.1.
 - 1.3.2.2. Monitors all IFLUX values from each site in the network.
 - 1.3.2.2.1. Will be considered the standard observatory for IFLUX values. Each site will compare its IFLUX values against the standard observatory, based on only unqualified IFLUX values. If a site's unqualified IFLUX values (on any frequency) differ by more than 10 percent from the standard observatory's values for more than 5-days, qualify the IFLUX value on that frequency.
 - 1.3.2.2.2. If Kaena Point finds their own values to be unreliable/unavailable, they will notify SPACEWOC and 2 WS/DO who will either determine an alternate temporary standard observatory or authorize temporary use of the network average.
 - 1.3.2.3. When requested, provides RSTN data to the Air Force Research Laboratory Battlespace Environment Division (AFRL/RVB).
 - 1.3.2.4. Performs Centralized Repair Activity actions IAW MOA between AFWA and Space and Missile Center, Weather Sustainment Division.
- 1.3.3. The Holloman Observatory.
 - 1.3.3.1. Maintains patrol coverage IAW paragraph 2.1.

1.3.3.2. Maintains and conducts the SOON Operator's and Maintainer's courses. Operations will take priority when the site is the only SOON site on patrol, especially when the manned space operations are in orbit, special data collection is in progress, or event-level activity is very likely. Routine operations, especially when another SOON site is on patrol, are secondary to the unit's hands-on training mission for SOON operators and SOON Consolidated Repair Activity (CRA) technicians.

1.3.4. The Learmonth Observatory.

1.3.4.1. Maintains patrol coverage IAW paragraph 2.1.

1.3.4.2. Provides support and data on a non-interference basis to the Australian IPS Radio and Space Services IAW existing inter-government support agreements. With 2 WS/DO coordination, the multiple site duty priority list in Attachment 2 may be modified locally to meet this requirement.

1.3.4.3. Coordinates with IPS Radio and Space Services Co-Manager for all equipment upgrades/modifications.

1.3.5. The San Vito Solar Observatory.

1.3.5.1. Maintains patrol coverage IAW paragraph 2.1.

1.3.5.2. For variances between AFWAI 15-2, AFWAMAN 15-1, AFWAMAN 15-2 and the contract Statement of Work requirements, the contract will take precedence pending final determination by Contracting Officer's Representative (COR).

1.3.6. Sagamore Hill Solar Observatory.

1.3.6.1. Maintains patrol coverage IAW paragraph 2.1.

1.3.6.2. Provides RSTN equipment access to maintenance technicians in Formal RSTN CRA training courses. Operations are primary when the site is the only RSTN site on patrol, especially when the manned space operations are in orbit, special data collection is in progress, or event-level activity is very likely. Routine operations, especially when another RSTN site is on patrol, are secondary to the unit's training mission for CRA technicians.

Chapter 2

COMMON ACTIVITIES/TASKS

2.1. Patrol Coverage.

2.1.1. Make every effort to both maximize patrol coverage and allow time for analyst and maintenance training or repair activities (including urgent preventative maintenance). A special effort should be made to accommodate temporary duty personnel from CRA or Mobile Depot Maintenance (MDM) teams. Whenever possible, provide continuous patrol when:

2.1.1.1. Manned space flight is in orbit or a spacewalk is planned or in progress.

2.1.1.2. No other observatory of the same type (i.e., SOON or RSTN) will be on patrol during the period.

2.1.1.3. Special data collection (requested by the SPACEWOC or SWPC) is in progress.

2.1.1.4. Event-level activity is very likely.

2.1.2. Notify the SPACEWOC as soon as possible by telephone before sending coded patrol (STATS) message when the following situations occur, or normal service is restored:

2.1.2.1. A SOON or RSTN sensor outage results, or is expected to result in, a data loss of 30 minutes or more. **NOTE:** The type of outage reporting or coordination required here is different from the requirement to report patrol breaks exceeding 5 minutes by a STATS message. Report outage times of 30 minutes or more on the End of Day Summary (NWXX60). Use language understandable by non-analyst personnel (avoid jargon).

2.1.2.2. A communications outage that causes send or receive capability to be completely lost or has lasted, or is expected to last, 30 minutes or more. Ensure the SPACEWOC is aware of the problem and ask them to inform the other SEON observatories and the SWPC.

2.1.2.3. A geophysical sensor outage results, or is expected to result in a data loss of 90 minutes or more.

2.1.3. Request scheduled downtimes for maintenance activities or training from the 2 WS/DO before releasing equipment. Provide an estimate of the duration of the outage or training. Give advance notice in Section 3 of the End of Day Summary (NWXX60) message and the 3-hour plain language code (PLAIN) messages for SOON sites. The 2 WS/DO will make every effort to approve requests from the Holloman and Sagamore Hill Observatories to provide hands-on training for students in formal courses, subject to the criteria in paragraph 2.1.1.

2.1.4. If postponement of maintenance work could result in equipment damage, the detachment commander has final responsibility to decide on the downtime after considering all operational and equipment impacts.

2.2. Intersite Data Discrepancies.

2.2.1. Once intersite data discrepancy thresholds are observed or when “bad” or erroneous data collection is identified by either SPACEWOC or the observatory currently situated on the sun, initiate an intersite data discrepancy review for the following:

2.2.1.1. Flares that differ by one or more categories in either importance or brightness.

2.2.1.2. Event-level radio bursts that differ by more than 20 percent in peak intensity.

2.2.1.3. Significant Disappearing Solar Filaments (DSF's) that differ by more than 5 degrees in length.

2.2.1.4. Non-confirmation from another observatory (on-patrol) of a Type II or IV sweep, Loop Prominence System (LPS), an Eruptive Prominence on the Limb (EPL), Bright Surge on Limb (BSL) or a DSF. **NOTE:** A significant DSF is defined as 10 heliographic degrees.

2.2.2. Upon determination or suspected occurrence, the SPACEWOC will report intersite data discrepancies immediately to the applicable observatories in an attempt to resolve the differences. Analysts at the observatories will respond quickly and thoroughly to appropriate requests for data reviews.

2.2.3. Analysts will be aware of phenomena being reported by other observatories since analysts may be the first to detect an intersite discrepancy. Upon determination or suspected occurrence, analysts will initiate an intersite data discrepancy review themselves by notifying the SPACEWOC to notify other observatories involved.

2.2.4. Analysts should not adjust their data messages just to achieve agreement with another site's reports. Discrepancies should be resolved near real-time, so the SPACEWOC can transmit the proper products/data to their supported units.

2.2.5. Respond to notification of an intersite data discrepancy from the SPACEWOC by investigating the items listed below, as well as any other factors an analyst believes might be relevant to the discrepancy. Call the SPACEWOC and indicate the results of the investigation. Use the following procedure to check for intersite discrepancies with SPACEWOC acting as the final arbitrator:

2.2.5.1. Check site's messages and forms for accuracy.

2.2.5.2. Check to see if all equipment is configured and operating properly then check calibrations.

2.2.5.3. Check to see if the relevant software is operating properly.

2.2.5.4. Check recent equipment, computer, and communications performance outage logs to see if there is a reason to doubt the data.

2.2.5.5. Evaluate the analysis techniques used.

2.2.5.6. Consider solar elevation effects (e.g., close to sunrise, sunset).

2.2.5.7. Consider possible weather influences (e.g., high winds, clouds, etc).

2.2.5.8. Consult local maintenance technicians when appropriate.

2.3. Quality Assurance and Metrics.

2.3.1. General. The main objective of the Quality Assurance (QA) and Metrics programs are to ensure supported units consistently receive the highest quality products and services possible and to promote improvement of processes used to support operations.

2.3.1.1. Implement Quality Assurance principles and metrics IAW AFI 15-114, *Functional Resource and Weather Technical Performance Evaluation*.

2.3.1.2. Units may use AF Form 3811, *Quality Control Register*, or an automated program with similar utility to help manage a local quality assurance program.

2.3.1.3. Include Error-Free Rates (EFRs) for all event code (EVENT) (SXXX60 and SXXX61) header coded messages and all non-event level flares, bursts, and sweeps into the units QA program. QA will be conducted on 100 percent of all event messages.

2.3.1.4. QA program will be broken down into two categories: technical and administrative. Count technical errors (including timeliness errors) in the EFR, but omit administrative errors in end of month totals. For example, no initials on the data circuit hardcopy is an administrative error. Technical errors occur when the supported unit does not receive an accurate message within the required timeframe.

2.3.1.5. Count no more than one error for each message, no matter how many encoding errors are noted within the message. Therefore, no message will ever have more than one error, and thus, internal error total may differ from that reported.

2.3.2. Methods of Quality Assurance.

2.3.2.1. On-the-Spot (OTS) QA. OTS QA is the most important tool for detachment leaders to ensure supported units receive accurate and timely support. Detachment leaders will implement OTS QA processes for all support provided to units. Ideally, OTS QA should be performed on all products before they are issued. A successful OTS QA program will identify and correct support deficiencies before delivery to the user. Detachment leaders should place the most emphasis of the QA program on OTS QA.

2.3.2.2. After-the Fact (ATF) QA. Detachment leaders will use ATF QA to evaluate the quality of support provided to units to identify areas that might require additional training or better procedures. This may be done on a smaller scale than OTS QA. Detachment leaders will focus most ATF QA on the end products and support received by users, with less focus on the internal processes and tools used to develop the support.

2.3.2.3. Horizontal QA. Detachment leaders will use this method to check all products on a given day for basic horizontal consistency. Horizontal QA is the process of ensuring multiple products/information produced within the same operations center, valid for the same time period, are consistent when they are disseminated to the supported unit. Product consistency prevents supported units from receiving conflicting information. Consider developing checklists that evaluate the horizontal consistency of all support received by supported unit.

2.3.3. Metrics. Detachments will track specific metrics as assigned and forward to 2 WS electronically.

Chapter 3

DATA DISSEMINATION

3.1. Service Messages.

3.1.1. Transmit service messages only for the following purposes:

3.1.1.1. To resolve data receipt or other communications problems affecting current support operations and requiring immediate attention (e.g., interference verification, discrepancies, etc).

3.1.1.2. To provide notification of actual or anticipated changes in operating hours (e.g., to report or coordinate equipment or circuit outages).

3.1.1.3. To transmit mission related products or information to a small number of supported units or agencies.

3.1.2. Keep service messages brief and professional.

3.1.3. Manual Operations (MANOP) Headings. These alphanumeric designators identify message types based on their data content, source of origin, and transmission or file time (e.g., "AXXX61 APLM DDGGgg").

3.1.3.1. Use SXXX60 headers for all EVENT code reports. SXXX61 headers flag urgent, event-level data reports, also for all preliminary event-level coded data reports (e.g., solar flare code (FLARE), solar disk and limb activity summary code (DALAS), discrete solar radio burst (BURST), and spectral solar radio burst code (SWEEP) transmitted in 15 minutes or less after meeting event criteria or event maximum.

3.1.3.2. Use routine reporting headers (AXXX61 – optical and AXXX71 - radio) for all non-event activity reports, final event level reports, and for event-level activity reports transmitted more than 15 minutes after meeting event criteria or event.

3.1.3.3. The Amendment (AMD) modifier is appended to MANOP headers to flag reports which may require special attention. This modifier ensures the messages won't be rejected as duplicate messages by weather communication computers.

3.1.4. Corrected Messages.

3.1.4.1. Add the modifier "AMD" to the MANOP heading (along with the original transmission time or fixed file time) to flag a corrected message. **EXAMPLE:** AXXX61 APLM DDGGgg AMD. Add a remark at the end of the message listing the corrected time (i.e. Correction to a Previously Disseminated Report (COR) 1445). For successive corrections of the same message do not number the AMD modifier (i.e. AMD02, AMD03, etc.). Use the "AMD" modifier to flag messages containing the following erroneous data:

3.1.4.1.1. A message retransmitted because the comeback copy was either garbled or not received by the transmitting site.

3.1.4.1.2. A final or previously corrected message retransmitted to change or correct data in the message.

3.1.4.1.3. If information in the first two lines of a message (i.e., MANOP header and code type) is to be corrected, the analyst need only retransmit the message with the correct information and a "COR" modifier. If data in the body of the message (Line 3, 4, etc.) is to be corrected, the analyst should also use the report status code (S = 3) for corrected data, unless the code type in question doesn't have this option (e.g., PLAIN and EVENT).

Table 3.1. Message Key Fields.

Code Type	Iiii	YMMDD	JJ or JJJ	FF or FFFFF	GGgg	EE	NNNN	TT	EE, FF, or HH
BURST	X	X	X	X					
SWEEP	X	X	X						
IFLUX	X	X		X	X				
FLARE	X	X	X						
DALAS	X	X	X			X			
SPOTS	X	X	X				NOTE 3		
PLAIN	NOTE 1	NOTE 2			NOTE 2				
EVENT	X	NOTE 2			NOTE 2				
STATS	X	X			X			X	NOTE 4

LEGEND: Iiii = World Meteorological Organization (WMO) block and station number

YMMDD = Year/Month/Day

JJ/JJJ = Local sunspot group number (for SPOTS), or local activity serial (or sequence) number (for other codes)

FF/FFFF = Frequency (FF for BURST, FFFFF for IFLUX)

GGgg = Time (hours and minutes)

EE = Type of DALAS activity

NNNN = SWPC region number

TT = STATS type of sensor system (optical, radio, or geophysical)

EE/FF/HH = STATS system, frequency, or equipment indicator

NOTES:

1. Since the PLAIN code doesn't contain an Iiii group, the decoders use the station identifier (e.g., APLM, KHMN, etc.) in the MANOP header as a key field.
2. Since the PLAIN and EVENT codes don't contain either the YMMDD or GGgg groups in the body of the message, the decoders use the date/time groups (DDGGgg) in the MANOP header as key fields.
3. A change in the SWPC region number, to include a change from //// to a number (or vice versa), requires a deletion of the old data line.
4. To change EE, FF, or HH, the analyst adjusts the item's status/frequency effective at the same time it was originally mistakenly reported.

3.2. Data Archival.

3.2.1. Dispose of SOON, RSTN, and geophysical data records IAW the AFWA/National Environmental Satellite, Data, and Information Service (NESDIS)/National Geophysical Data Center (NGDC) Support Agreement and AFMAN 33-363, *Management of Records*.

3.2.2. Use Standard Form 135, *Records Transmittal and Receipt* when physical products are shipped to NGDC. If data normally archived is not available detail on the records transmittal form what data is missing or lost and explain the reasons.

3.2.3. Forward the following products and worksheets to the NGDC not later than 30 days following the last day of the record month. **EXCEPTION:** Through an agreement with the Australian IPS Space and Radio Services, the Learmonth Solar Observatory will provide all observatory data to Australian Radio and Space Services first. Following archival at Sydney, Australia, Australian Radio and Space Services will then provide the data to NGDC. NGDC prefers transmittal of archive data via ftp directly to their server. Each unit will develop local procedures to transmit this data to NGDC.

3.2.3.1. AFWA Form 17, *Solar Optical Worksheet*; AFWA Form 18, *RSTN Daily Activity Log*; and AFWA Form 21, *Sunspot Analysis Worksheet*. The logs are used in conjunction with archived data to help identify periods of significant activity.

3.2.3.2. RIMS archive data. Archive RIMS data monthly from each RSTN site which will be sent to NOAA/NESDIS/NGDC.

3.2.3.3. SRS archive data. Archive SRS data monthly from each RSTN site. Data will be sent to NOAA/NESDIS/NGDC monthly utilizing either read only compact discs, or via ftp.

3.2.4. Use the following address for NGDC:

Electronic: ftp://incoming.ngdc.noaa.gov/pub/incoming/site-specific_location

Mail: NOAA/NGDC/STP

(E/GC2) Attn: Solar Group

325 Broadway

Boulder, CO 80305-3328

3.2.5. Save event-level Type II and Type IV hard or electronic copies for in-house training.

3.2.6. Contractor operated sites will forward the following items monthly to the contract COR, who will forward selected items to NGDC.

3.2.6.1. Complete AFWA Forms 17, 18, 20, and 21 for all periods of operations.

3.2.6.2. Time vs. flux hardcopy plots for any period of discrete frequency burst activity. These plots should not exceed 120 minutes, should include all burst peaks, and cover all eight discrete frequencies.

Chapter 4

CONTINUITY OF OPERATIONS

4.1. General. Each unit must develop local procedures for documenting and reporting SEON observing/support equipment outages, and communications equipment/circuit outages. Also consult AFI 21-103, *Equipment Inventory, Status, and Utilization Reporting*, for more guidance. Report all outages and mission impacts to the appropriate servicing maintenance agency and Fielded System Support Center IAW locally developed guidance. Notify the above maintenance agency again when equipment is restored to service.

4.2. Outage Procedures.

4.2.1. Mission Impact Statements. A mission impact statement reports the impact an outage has on mission capability of either an AFWA unit or an agency supported by AFWA. Determine mission impacts for SEON equipment using Attachment 4. Contact the Detachment Commander when in doubt as to an outage's impact.

4.2.1.1. A Minimum (MIN) outage is a reduction or limitation of equipment or circuit capability, but not to the degree that the equipment or circuit is operationally unusable.

4.2.1.2. A Significant (SIG) outage is a reduction or limitation of equipment or circuit capability to the point where the equipment or circuit is operationally unusable.

4.2.2. Outage Logs. Log SEON, Automated Data Process Equipment (ADPE) and communications equipment or circuit outages on AFWA Form 20 using the instructions below.

4.2.2.1. A unit may either use a separate AFWA Form 20 for each piece of equipment or communications circuit, or may combine items on a single form. Copies of AFWA Form 20 for SEON equipment and circuit outages must be sent monthly to the 2 WS/DOZ. At contractor-operated sites, all AFWA Form 20s must be sent monthly to Contracting Officer's Representative (COR).

4.2.2.2. The AFWA Form 20 will be cut off at the end of the Greenwich Mean Time (GMT) month. If an item is still out-of-service, close the outage on the old AFWA Form 20, and indicate in the Remarks column that the outage was carried forward to a new month's AFWA Form 20. At the same time, reopen the outage on the new month's AFWA Form 20, and record in the remarks column the original Month/Date Time Group (DTG) that the problem occurred.

4.2.2.3. All times on the AFWA Form 20 are to be GMT (GMT or Universal Time Coordinated (UTC)). For any AFWA Form 20 that includes ADPE outages, indicate the GMT to Local time conversion, and whether it changed during the month. **NOTE:** Use local times only on AF Form 597 ADPE Maintenance.

4.2.2.4. Use the remarks column of the AFWA Form 20 to describe the reason for the outage, if known. It can also be used to log Job Control Numbers (JCN), follow-up actions, or other clarifying remarks.

4.2.2.5. If the mission impact statement changes, record the date/time of the change in the remarks column.

4.2.2.6. Compute the "TOTAL OUTAGE TIME" by subtracting the "DTG PROBLEM OCCURRED" from the "DTG REPAIR COMPLETED." However, do not count as outage time any period when the observatory was closed (except for geophysical sensors, which operate 24 hours per day). In other words, total outage time is the time the equipment or system was out-of-service, but could have been used if it were functional. **NOTE:** To compute the total outage date/time for AF Form 597, subtract the time from when maintenance is called from the date/time the repair was completed.

4.2.2.6.1. For SEON and communications equipment/circuits, these times are normally from sunrise to sunset.

4.2.2.6.2. For geophysical sensors (ionosondes, etc.), and (if applicable) their communications equipment/circuits, these times are normally based on a 24-hour observing day.

4.2.2.7. For Preventative Maintenance Inspections (PMI), the "DTG PROBLEM OCCURRED" and "DTG MAINTENANCE NOTIFIED" may not apply. For such cases, use the "DTG MAINTENANCE ARRIVED" to compute "TOTAL OUTAGE TIME."

4.2.2.8. Actual out-of-service time ("DTG PROBLEM OCCURRED") is relevant to operations. Use the actual out-of-service time when preparing STATS messages and the End of Day Summary (NWXX60) message. Use the "TOTAL OUTAGE TIME" when preparing the Monthly Outage Report.

4.2.2.9. If equipment is repaired, but it is being monitored to ensure the repair corrected the problem, the item should normally be logged back in service or, at most, continued as a minimum outage.

4.2.2.10. Use of an AFWA Form 20 is not limited to equipment/circuit malfunctions. It may also be used to document downtime for any reason (e.g., weather, power outage, or Radio Frequency Interference (RFI)).

4.2.2.11. Archive AFWA Forms 20 IAW AFMAN 33-363, *Management of Records*.

4.2.3. STATS Messages.

4.2.3.1. Detailed guidance on optical and radio patrol-related STATS messages is contained in AFWAMAN 15-1, AFWAMAN 15-2, and AFMAN 15-124.

4.2.3.2. Once an item is reported as being in or out of service, it is not necessary to repeat the item in subsequent STATS messages if its status remains unchanged.

4.2.3.3. Only STATS messages that affect on/off patrol, and type of patrol (automatic vs. semi-automatic), need to be logged on the AFWA Forms 17 and 18. If desired, a site may locally decide to log all STATS messages, including dedicated communication line, phones, etc.

4.2.3.4. The GGggM group contains the actual time the item became inoperative (or operable), not the time the change was discovered or reported to maintenance, nor the time the STATS message was transmitted.

4.2.3.5. Going on/off patrol due to clouds, high winds, or other types of weather will not normally affect a site's computer (except for thunderstorms), dedicated communication line, Defense Switched Network (DSN), commercial, or VOIP phones. Also, high winds

don't affect SRS low band antenna patrol. As a result, the "/" option ("all systems/equipment") has limited usefulness.

4.2.3.6. A STATS reportable commercial phone, DSN, VOIP, or dedicated communication line outage is intended to reflect a site-wide outage in send, receive, or both. The fact that a single phone instrument, phone line, or data circuit printer is out of service is not reportable by STATS. The SPACEWOC and SWPC are only interested when the ability to communicate with the site, in one or both directions, is lost. (For example: At a dual site, if RSTN has no dedicated communication line capability, but SOON does, do not report the outage via a STATS message.)

4.2.3.7. At a dual SOON/RSTN site, the SOON and RSTN analysts should not both report a site-wide commercial phone, DSN, or dedicated communication line outage. The same isn't true for computers: treat the SOON and RSTN computers separately. For this reason, a computer outage that affects both SOON and RSTN must be reported in both a SOON and a RSTN STATS message. **NOTE:** Although commercial phone, DSN, VOIP, and dedicated communication line outages must be reported in a SOON STATS message at dual sites, the RSTN analyst can send that message if the site prefers to assign this duty to the RSTN analyst.

4.2.4. SEON Communications Outage.

4.2.4.1. The SPACEWOC requires rapid reporting of event level solar activity. When normal communications methods are inoperative, use the following procedures to report the outage:

4.2.4.1.1. The solar analyst will call SPACEWOC DSN 312-271-4317(analyst) / 312-272-8087 (forecaster) or Commercial 402-294-4317 / 402-232-8087 to inform them of the communications outage and expected duration. The SPACEWOC will provide guidance on special support requirements, either in the form of telephone support or special message support.

4.2.4.1.2. The solar analyst will call the AFWA Operations Center (DSN 312-271-2586 or Commercial (402-294-2586) and open a ticket.

4.2.4.2. During the outage:

4.2.4.2.1. SPACEWOC requests all significant events be called in as soon as possible. Significant radio events are any radio burst greater than 5,000 solar flux units (SFUs), Type II or Type IV sweeps. Significant optical events are any flare, or any DALAS.

4.2.4.2.2. If possible, use Air Force Weather WEB Services (AFW - WEBS) or Weather Subscription Service (WSS) to transmit all messages.

4.2.4.2.3. If unable to transmit the messages via AFW - WEBS, send finals, NWXX60, and closing STATS message via e-mail or fax to the SPACEWOC at close of business. The e-mail address is spaceweather@offutt.af.mil, and the fax number is DSN 312-272-7770, Comm (402) 232-7770.

4.2.4.3. After the outage:

4.2.4.3.1. Notify the SPACEWOC and AFWA Operations Center when the outage is over.

4.2.4.3.2. Transmit all significant messages. Attach a PLAIN message at the end of the bulletin stating "TRANSMITTING TO UPDATE DATABASE ONLY." Messages are stored in AFW - WEBS database for reference.

4.2.4.4. Procedures for Requesting Support During Extended Communications Outages.

4.2.4.4.1. An extended total communications outage could degrade SEON operations. If fax line or e-mail is available, ask the SPACEWOC to send pertinent bulletins as they become available. Suggested bulletins are:

AXXX01 KWNP (JOINT USAF/NOAA SOLAR & GEOPHYSICAL ACTIVITY SUMMARY) AXXX02 KWNP (JOINT USAF/ NOAA SOLAR REGION SUMMARY)
 AXXX05 KWNP (JOINT USAF/NOAA DATA ACQUISITION REPORT OR SVC MSG)
 NWXX52 KGWC (6HR SOLAR FLARE SUMMARY)
 SXXX56 KGWC (FIXED-FREQUENCY SOLAR RADIO BURST SUMMARY)
 SXXX55 KGWC (SOLAR RADIO FLUX SUMMARY)
 SXXX57 KGWC (SWEEP-FREQUENCY SOLAR RADIO BURST SUMMARY)
 SXXX51 KGWC (SOLAR DISK & LIMB ACTIVITY SUMMARY)
 FXXX01 KWNP (REPORT OF SOLAR AND GEOPHYSICAL ACTIVITY)
 TXXX51 KGWC (GOES X-RAY EVENT SUMMARY)
 Other observatory bulletins, as required (e.g. BOXOUT, SPOTS)

4.3. End of Day Summary Messages.

4.3.1. Send a plain language End of Day Summary (NWXX60) message, using the format in Attachment 5, at the end of each observing day no earlier than 30 minutes before sunset. Whenever practical, first coordinate the message with maintenance to verify its accuracy. Avoid site-specific jargon and remember to plainly outline impacts to patrol. Use NWXX60 for optical sites and radio sites. Multisensor sites (SOON, RSTN, ionosonde, etc.) will combine all Space Environment Sensor Suite (SESS) sensors into one NWXX60 message.

4.3.2. Section 1. Include all SEON, geophysical, and communication (both equipment and circuit) outages with a cumulative daily outage time of 30 minutes or more, or still out at the end of the day. **EXAMPLE:** Include the data circuit if it was logged out three times during the observing day for 10 minutes each time.

4.3.2.1. Specify inoperative equipment or circuits. Use the SEON Equipment Breakdown table in Attachment 6, or consult local maintenance personnel, to identify equipment items. Include outages due to PMIs, power or air conditioning, high winds, etc.

4.3.2.2. Mission impact. Use Attachment 4 for guidance.

4.3.2.3. Date/time of equipment outage in GMT. Use actual out-of service time, which may differ from the time that maintenance was notified.

4.3.2.4. Estimated Time In Commission (ETIC), if not operational by the end of the observing day. Only an ETIC date (not time) is required. Avoid, when possible, the use of "UNKNOWN" for an ETIC, instead give best estimate. Continually review and update this estimate until the equipment is back in service.

4.3.2.5. Date/time equipment was back in operation, in GMT.

4.3.3. Section 2. Include:

4.3.3.1. A detailed account of each outage.

4.3.3.1.1. The cause of the outage.

4.3.3.1.2. Its impact on patrol. **EXAMPLES:** Caused semiautomatic patrol, no effect on patrol, frequency usable, but data qualified.

4.3.3.1.3. Repairs or efforts taken to correct the problem.

4.3.3.2. Any noise tube value change; include the new value, date changed, and reason for the change.

4.3.3.3. Use of "No Change in Status" to describe an outage is only acceptable when a communications problem makes it difficult to transmit a long message. Due to long-term outages or lost messages, recipients can lose track of what status this phrase is referring to.

4.3.3.4. Section 3. Include a 3-day patrol outlook based on weather, equipment, or other circumstances, which might significantly, impact patrol. SPACEWOC will use this information to evaluate the networks status. **EXAMPLES:** Planned major equipment downtime, scheduled communications outages, or anticipated periods of extended semiautomatic operations. All maintenance must be forecast three days in advance and noted on the NWXX60 message. When maintenance forecasts a change or requirements arise less than three days from implementation, plainly describe the reasons in the message or call the SPACEWOC directly to explain the change. It is necessary to include date/time of these anticipated impacts on operations. However, it is not necessary to include a weather outlook if no significant weather (e.g., wind storm, thunderstorms, hurricane, etc) is expected.

4.4. Monthly Outage Report.

4.4.1. Transmit the Monthly Outage or Effectiveness/Outage Report using applicable format in Attachment 7 to 2 WS/DOZ for non-contract and contract sites via e-mail no later than 5 working days after the end of the month. Include a courtesy copy to 2 WS/DO. Use the Equipment Breakdown table in Attachment 6 as an aid in preparing the report. Base outages reported on the GMT month. Name the file with the detachment number, month, year and out.doc (i.e. Det4Mar12out.doc).

4.4.2. Report.

4.4.2.1. Total monthly patrol hours possible for both SOON and RSTN operations (as applicable). **SUGGESTION:** Use local sunrise/sunset tables, or ephemeris program data. **NOTE:** The difference in definitions for optical and radio sunrise/sunset will typically cause RSTN patrol to be about 20 minutes shorter per day than potential SOON patrol, or about 10 hours less per month.

4.4.2.2. Monthly uptime percentage for all SEON, geophysical, and communications equipment outages that occurred during the month.

4.4.2.3. Monthly operational effectiveness percentages for all sensor and communications systems at the site.

4.4.2.4. Explain all percentages (Total FRR-95 or FMQ-7) that are less than 100%.

4.4.2.5. Changes to noise tube values required during the month, to include the new value, date changed, and reason for the change.

4.5. Operational Reports (OPREP). Refer to AFWAI 10-3, *Operational Reporting*, (and applicable supplements) for guidance on Operational Reports. When in doubt an incident may be OPREP reportable, call the AFWA Operations Center IAW AFWAI 10-3.

LOUIS V. ZUCCARELLO, Colonel, USAF
Commander

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 15-1, *Atmospheric and Space Environment Support*, 8 January 2001

AFI 15-114, *Functional Resource and Weather Technical Performance Evaluation*, 7 December 2001

AFI 15-127, *Air Force Weather Qualification Training*, 14 March 2012

AFI 15-128, *Air Force Weather Roles and Responsibilities*, 07 February 2011

AFI 21-103, *Equipment Inventory, Status, and Utilization Reporting*, 26 January 2012

AFI 33-324, *Air Force Information Collections and Reports Management System*, 06 Mar 2013

AFI 36-2201, *Air Force Training Program*, 15 September 2010

AFMAN 15-124, *Meteorological Codes*, 28 October 2009

AFMAN 33-363, *Management of Records*, 1 March 2008

AFWAI 10-3, *Operational Reporting*, 1 May 2008

AFWAMAN 15-1, *Space Environmental Observations, Solar Optical Observing Techniques*, 5 Dec 2013

AFWAMAN 15-2, *Space Environmental Observations, Solar Radio Observing Techniques*, 13 Nov 2013

CFETP15W, *Career Field Education and Training Plan*, 15 March 2012

CFETP1W0XX, *Career Field Education and Training Plan*, 01 December 2011

Prescribed Forms

AFWA IMT 17, *Solar Optical Worksheet*

AFWA IMT 18, *RSTN Daily Activity Log*

AFWA IMT 20, *Equipment/Communications Outage Log*

AFWA IMT 21, *Sunspot Analysis Worksheet*

Adopted Forms

SF Form 135, *Records Transmittal and Receipt*

AF Form 847, *Recommendation for Change of Publication*

AF IMT 597, *ADPE Maintenance Record*

AF IMT 3811, *Quality Control Register*

Abbreviations and Acronyms

ADPE—Automated Data Process Equipment

AFI—Air Force Instruction

AFMAN—Air Force Manual
AFPD—Air Force Policy Directive
AFRL—Air Force Research Laboratory
AFWA—Headquarters Air Force Weather Agency
AFWA/CC—Headquarters Air Force Weather Agency Commander
AFWAMAN—Air Force Weather Agency Manual
AFW—WEBS—Air Force Weather - WEB Services
AFTR—Air Force Training Record
AMD—Amendment
AN/FMQ—7—Solar Optical Telescope
AN/FRR—95—Radio Telescope
ATF—After the Fact
BSL—Bright Surge on Limb
BURST—Discrete Solar Radio Burst
CFETP—Career Field Education and Training Plan
COM—Computer Operations Manual
COR—Correction to a Previously Disseminated Report
COR—Contracting Officer’s Representative
CPC—Compliance Performance Checklists
CRA—Centralized Repair Activity
DALAS—Solar Disk and Limb Activity Summary Code
DEC—Declination
DSF—Disappearing Solar Filament
DSN—Defense Switched Network
DTG—Date Time Group
EFR—Error-Free Rate
EPL—Eruptive Prominence on Limb
ETIC—Estimated Time In Commission
EVENT—Event Code
FLARE—Solar Flare Code
GMT—Greenwich Mean Time
GPS—Global Positioning System

IAW—In Accordance With

IFLUX—Integrated Solar Radio Flux

IMT—Information Management Tool

JCN—Job Control Number

LPS—Loop Prominence System

MANOP—Manual Operations

MDM—Mobile Depot Maintenance

MIN—Minimum

MOA—Memorandum of Agreement

MTP—Master Training Plan

NCOIC—Non Commissioned Officer in Charge

NESDIS—National Environmental Satellite, Data, and Information Service

NGDC—National Geophysical Data Center

NOAA—National Oceanic and Atmospheric Administration

NSM—Noise Storm

NSOO—Non Commissioned Officer in Charge of Solar Observatory Operations

OPR—Office of Primary Responsibility

OPREP—Operational Reports

OTS—On the Spot

PLAIN—Plain Language Code

PMI—Preventative Maintenance Inspection

POC—Point of Contact

QA—Quality Assurance

RA—Right Ascension

RDS—Records Disposition Schedule

RF—Radio Frequency

RFI—Radio Frequency Interference

RIMS—Radio Interference Measuring Sets

RSTN—Radio Solar Telescope Network

SEON—Solar Electro-Optical Network

SESS—Space Environment Sensor Suite

SFU—Solar Flux Units (1 sfu = 10^{-22} Watts per meter squared per Hertz [W/m²/Hz])

SIG—Significant

SOON—Solar Observing Optical Network

SOSS—SEON Operations Secure Server

SPACEWOC—Space Weather Operations Center, 2d WS/WXZ

SPOTS—Sunspot Code

SRS—Solar Radio Spectrograph

STATS—Patrol Status Code

SWEEP—Spectral Solar Radio Burst Code

SWPC—Space Weather Prediction Center

TO—Technical Order

UPS—Uninterruptible Power Supply

UTC—Universal Time Coordinated

VOIP—Voice-over Internet Protocol

WINDS—Weather Information Network Distribution System

WMO—World Meteorological Organization

WSS—Weather Subscription Service

Attachment 2
DUTY PRIORITIES

SOON-only Site Duty Priorities:

1. Analyze and report *event-level* flares and DALAS activity, in that order.
2. Respond to SPACEWOC and SWPC special data requests.
3. Analyze and report *routine* flare and DALAS activity, in that order.
4. Analyze and report photospheric (white light) activity.
5. Transmit other routine messages.
6. Load and update images as required by the AXXX05 KWNP.
7. Archive and store data.
8. Support technical applications studies.
9. Perform routine station and additional duties.

RSTN-only Site Duty Priorities:

1. Analyze and report *event-level* discrete frequency bursts and SRS activity, in that order.
2. Respond to SPACEWOC and SWPC special data requests.
3. Analyze and report *routine* discrete frequency bursts and SRS activity, in that order.
4. Transmit other routine messages.
5. Archive and store data.
6. Support technical applications studies.
7. Perform routine station and additional duties.

Multiple Sensor Site Duty Priorities. Multiple sensor (SOON, RSTN, ionosonde) sites will use the following priorities:

1. Analyze and report *event-level* discrete frequency bursts, flare, SRS activity, and DALAS activity, in that order.

2. Report optical and radio events to Australian IPS Radio and Space Weather Services (Learmonth only).
3. Analyze and report *routine* discrete frequency bursts, flares, SRS activity, and DALAS activity, in that order.
4. Relay ionosonde data to SWPC.
5. Analyze and report photospheric (white light) activity.
6. Transmit other routine messages.
7. Load and update images as required by the AXXX05 KWNP.
8. Report to Australian Radio and Space Weather Services: (Learmonth only)
 - Routine discrete frequency and SRS activity.
 - Routine flare and DALAS activity.
 - Other routine messages, in that order.
9. Archive and store data.
10. Support technical applications studies.
11. Perform routine station and additional duties.

Attachment 3

TIMELINESS CRITERIA

1. Automatic Operations: (Transmit as soon as possible, but not to exceed these limits.).

CODE TYPE	EVENT LEVEL	NON-EVENT LEVEL
EVENT	2 min after event start or notification	Not Applicable
FLARE		
-Preliminary	2 min after meeting, or increasing to a higher (area or brightness), event threshold	Optional
-Final	10 min after end	15 min after end
DALAS		
-Preliminary	10 min after event identification	Optional
-Final	20 min after end	NLT end of day (AXXX72) message
BURST		
-Preliminary	2 min after meeting event threshold 2 min after crossing reportable threshold 5 min after peak on each frequency (may be combined for near simultaneous peaks)	Optional (30 min after start for an NSM)
-Final	10 min after end	15 min after end (45 min for an NSM)
SWEEP		
-Preliminary	2 min after type identification	Optional. (EXCEPTION: 30 min after type identification for a Type 6, 7, or 8)
-Final	30 min after end data availability	45 min after end data availability

NOTE: NSM = Noise Storm**2. Semiautomatic Operations:** (Transmit as soon as possible, but not to exceed these limits.).

CODE TYPE	EVENT LEVEL	NON-EVENT LEVEL
EVENT	5 min after event start or notification	Not Applicable
FLARE		
-Preliminary	15 min after meeting, or increasing to a higher (area or brightness), event threshold	Optional
-Final	20 min after end	30 min after end
DALAS		
-Preliminary	Same as automatic operations	Same as automatic operations
-Final	Same as automatic operations	Same as automatic operations

Attachment 4**EQUIPMENT OUTAGE IMPACTS****EQUIPMENT****MISSION IMPACT**

Radio (RIMS):	An outage is SIG if data cannot be gathered or analyzed on: <ul style="list-style-type: none">- 245 MHz- 410 MHz- 2695 MHz- 8800 MHz- Two or More Adjacent Frequencies- Three or More Frequencies
Radio (SRS):	An outage is SIG if the sweep type cannot be determined.
Optical (SOON):	An outage is SIG if you cannot accurately locate and analyze a flare.
SOON Rehost	An outage is SIG if SOON client cannot perform DSF or FLARE analysis.
SEON Computer System:	An outage is SIG if SOON or RSTN operations cannot be done in automatic mode.
Communications:	A data circuit outage is SIG if both send and receive capability are down. A DSN or commercial outage is SIG if these circuits are down while the data circuit is also down, leaving no functioning means of communications.

NOTES:

1. All other outages not specified above are **MIN**, unless declared **SIG** by the Detachment Commander, AFWA/CC/CV, or their designated representative.
2. An outage is normally **MIN** if data is degraded due to minor equipment problems, but can still be collected and analyzed.

Attachment 5

END OF DAY SUMMARY MESSAGE EXAMPLES

EXAMPLE 1:

NWXX60 APLM 061200
PLAIN

1. OUTAGES	IMPACT	OUT	IN/ETIC
A. 4995 MHZ	MIN	09APR/0145Z	10MAY/0000Z
B. FMQ-7	SIG	06MAY/0908Z	07MAY/0000Z

2. COMMENTS:

A. 4995 MHZ IS INOP DUE TO BAD NOISE TUBE. MAINTENANCE IS AWAITING PARTS.

B. THE DECLINATION MOTOR WILL NOT OPERATE PROPERLY AND IS UNABLE TO TRACK THE SUN. MAINTENANCE IS TROUBLESHOOTING.

3. THREE-DAY OUTLOOK (07 MAY - 09 MAY):

DATE/TIME	EQUIPMENT	IMPACT/REMARKS
07	ALL	NONE
08/0100-0400Z	15.4MHZ	SIG/LINCALS
08/0500-0800Z	8800MHZ	SIG/LINCALS
09	ALL	NONE

99999

EXAMPLE 2:

NWXX60 APLM 261200
PLAIN

NO REPORTABLE OUTAGES TODAY. NO SIGNIFICANT IMPACTS/PROBLEMS EXPECTED NEXT THREE DAYS.

99999

Attachment 6**EQUIPMENT BREAKDOWN****SRS**

Data Acquisition Computer
 Data Processing Computer
 Low band semi-bicone antenna
 High band tracking antenna
 Spectrum analyzer
 Antenna control unit
 Switch view
 Printer

RIMS

28 foot Antenna
 8 foot Antenna
 3 foot Antenna
 Antenna control unit
 Compressor-Dehydrator
 Time-code generator
 8 channel amplifier
 Calibration switch
 Lock-in amplifier (Master or Slave)
 RF Section
 RF Input switch
 IF Section
 RIMS Analysis Computer

Embedded Controller

PXI Chassis
 Circuit Boards
 A/D Converter
 D/A Converter

*Primary and backup

SOON

Telescope tube assembly
 Guider assembly (with control module)
 Power distribution assembly
 Manual switcher(s)
 RA or DEC drives (with servos)
 Video amplifier(s)
 Objective lens heater
 Uninterruptible Power System (UPS)
 Vacuum pump

Optical relay bench
 TV camera (with its filter wheel)
 9 or 23-inch TV monitors
 Collimator
 Slit assembly
 Eyepiece assembly
 Spectrograph assembly
 Central Processing Unit
 GPS time server
 Pre-filter
 1/4 Wave assembly (with drive, cables, servo, computer interchange)
 Polaroid Stack (AGC 1, 1/2, 1/4 Angstroms, or birefringent filter)

Communications

Commercial phone (equipment or circuit)
 DSN phone (equipment or circuit)
 SEON Operations Secure Server (SOSS)*
 Voice Over Internet Protocol (VOIP) phones
 SOON REHOST client computer*
 SEON WINDS Server*
 Solar Observing Optical Network (SOON) server*

Attachment 7

DET X, 2 WS

**RSTN/SOON EFFECTIVENESS/OUTAGE REPORT
Feb 2014**

Date

1. RSTN Total monthly patrol hours possible: 355 hours and 41 minutes.
2. SOON Total monthly patrol hours possible: 365 hours and 17 minutes.
3. RSTN Operational Effectiveness:
 - a. TOTAL FRR-95 (PERCENT UP): 89.54%
 - b. PMI's (PERCENT DOWN): 0.09%
 - c. WEATHER (PERCENT DOWN): 0.72%
 - d. EQUIPMENT (PERCENT DOWN): 9.65%
 - e. REMARKS: As necessary. Explain reason for outages less than 100% from paragraph (d) above. i.e. extended PMI, significant weather, equipment outages. Also, changes to noise tube values required during the month.
4. SOON Operational Effectiveness:
 - a. TOTAL FMQ-7 (PERCENT UP): 82.30%
 - b. PMI's (PERCENT DOWN): 0.22%
 - c. WEATHER (PERCENT DOWN): 12.16%
 - d. EQUIPMENT (PERCENT DOWN): 5.32%
 - e. REMARKS: As necessary. Explain reason for outages less than 100% from paragraph (d) above. i.e. extended PMI, equipment outages.
5. Communication Outages:
 - a. REMARKS: As necessary. Explain reason for outages to data circuit, DSN phone, VOIP, and commercial phones.

NOTE:

To calculate the percent up for "RSTN Operational Effectiveness or SOON Operational Effectiveness," find the total time available for each system and subtract all Equipment downtime (e.g. outages, RFI), Weather downtime (e.g., storm-stow, clouds), and PMIs.

"Total Percent Up" plus all down-percentages must equal exactly "100.0" percent. Do not include daily system calibration downtimes, or minimum outages during which data could be collected and analyzed, even if data may be degraded.

//SIGNED//

AIRMAN R. SHIPMATE, TSgt, USAF
NCOIC, Observatory Operations