CHANGE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Air Traffic Organization Policy

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CHG 1

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Effective Date:
11/10/2010

SUBJ: MAINTENANCE OF THE AUTOMATED RADAR TERMINAL SYSTEM EXPANSION (ARTS IIE)

1. Purpose of This Change. This change transmits revised pages to Federal Aviation Administration Order JO 6190.19A, Maintenance of the Automated Radar Terminal System Expansion (ARTS IIE). It provides updates as directed by Order 6000.15F, General Maintenance Handbook for NAS Facilities. Technical Performance Record (TPR) forms have been removed from the handbook and users are directed to the TPR website for the latest approved TRP forms. The certification requirements in Appendix 1 have been modified to include separate certifications for the TRACON Automation Display System (TADS) and the Radar Tower Automation Display Service (RTADS). Other editorial changes and corrections are indicated by a change bar in the margin.

2. Audience. This directive is distributed to selected Technical Operations Services (TOS) offices having the following facilities/equipment: ARTS IIE.

3. Where Can I Find This Change? This change is available on the MYFAA employee Web site at https://employees.faa.gov/tools_resources/orders_notices/ and on the air traffic publications Web site at http://www.faa.gov/air_traffic/publications.

An electronic version of this Order is available on the Intranet site located at **http://nasdoc.faa.gov/** under the System heading: ARTS; System A2E.

4. Explanation of Policy Change. See the Explanation of Changes attachment which has editorial corrections and changes submitted through normal procedures.

5. Distribution. This directive is distributed to selected offices and services within Washington headquarters, the William J. Hughes Technical Center, the Mike Monroney Aeronautical Center, regional Airway ok.Facilities divisions, and Airway Facilities Field Offices having the following facilities/equipment: ARTS IIE.

6. Disposition of Transmittal. Retain this transmittal until superseded by a new basic order.

7. Page Control Chart. See the page control chart attachment.

8. Risk. A Safety Risk Management (SRM) analysis meeting was conducted on September 22, 2010, and no risks to the National Airspace System (NAS) were noted for this Order.

Malcolm Andrews
Director, Terminal Program Operations
Air Traffic Organization

11/10/2010
Date Signed

DISTRIBUTION: Selected Technical Operations Field Offices INITIATED BY: AJT-1410

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Explanation of Changes

103. Certification

110. Instruction Book

303. Radar/ATCRBS/CENRAP ARTS IIE Interface

304. ARTS IIE/DEDS Interface

305. DDAS

306. SP Subsystem

310. DEDS

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403. Monthly

404. Quarterly

406. Annually

410. Semi Annually

411. Annually

412. As Required

501. Technical Performance Records Entries

513. Decoded Video Generation

516. AACU, DCI, and Echo Data

700. Glossary

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Appendix 1. Table A-2 ARTS

Appendix 1. Table A-3 RTADS

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CHAPTER 1. GENERAL INFORMATION AND REQUIREMENTS

100. OBJECTIVE.

This handbook provides the necessary guidance, to be used in conjunction with information available in instruction books and other handbooks, for the proper maintenance of the Automated Radar Terminal System (ARTS) IIE.

101. SAFETY.

Personnel should observe all pertinent safety precautions when working on the equipment. Refer to Order 6000.15 for guidance.

102. COORDINATION.

Maintenance activities at each facility shall be closely coordinated at all times through the appropriate Control Center with Air Traffic (AT) operations personnel in accordance with Order 6000.15.

103. CERTIFICATION.

Refer to Order 6000.15 for general guidance on the certification of systems, subsystems, and equipment. Refer to Appendix 1, Certification Requirements, of this handbook for the specific requirements of the Terminal Automated Radar Service (TARS), the ARTS, Radar Tower Automation Display Service (RTADS) and TRACON Automation Display System (TADS).

a. Certification Statement.

Upon completion of system evaluation and performance check, the certifying technician shall make the appropriate entry in the Facility Maintenance Log (FAA Form 6030-1) or the appropriate log in the Automated Logging System. See appendix 1 for the required statements. There can be exceptions to the certification statement if one subsystem, or a portion of the subsystem, is not usable but continued operation will not adversely affect the safe movement of aircraft. An example is ARTS IIE certified with exception of the Interfacility Data Subsystem (IFDS) or the Data Entry and Display Subsystem (DEDS) #2.

b. Levels of Certification.

There are three levels of periodic certification for the ARTS IIE. Listed from highest to lowest level they are: service level, system level, and subsystem level. In the event of a failure, equipment certification, in accordance with Order 6000.15 is required prior to restoring a single item back into operation.

(1) Service Level. Certification of the TARS service encompasses certification of Radar, Air Traffic Control Radar Beacon System (ATCRBS), and the ARTS system used by Air Traffic (AT) for the safe movement of aircraft within the service area. The terminal radar and beacon hardware are certified and maintained in accordance with the latest issue of the following orders:

(a) Order 6310.9, Maintenance of Airport Surveillance Radar (ASR-7 and ASR-8).

(b) Order 6310.10, Maintenance of Airport Surveillance Radar (ASR-4, -4B, -4D, -5, -5D, -6, -6D) Transmitter Site Equipment.

(c) Order 6360.1B, Maintenance of Air Traffic Control Beacon Interrogator (ATCBI) Equipment (except ATCBI-5).

(d) Order 6360.14, Maintenance of Air Traffic Control Beacon Interrogator (ATCBI-5) Equipment.

(e) Order 6310.19, Maintenance of Airport Surveillance Radar (ASR-9).

(f) Order 6170.10, Maintenance of Data Multiplexing Network Equipment.

(g) Order 6410.18, Maintenance of Digital Bright Radar Indicator Tower Equipment (DBRITE).

(h) Order 6365.3, Maintenance of the Mode Select (MODE-S) Beacon System.

(i) Order 6310.30, Maintenance of Airport Surveillance Radar (ASR-11).

(2) **Subsystem Level.** There are six subsystem levels normally associated with the ARTS IIE. They are as follows:

(a) The Decoding Data Acquisition Subsystem (DDAS) and associated control/processing lines.

(b) The System Processing (SP) Subsystem which does the data processing and consists of: a microprocessor, hard drives, a floppy drive, serial interfaces, and associated network connections.

(c) DEDS which consists of individual Radar Alphanumeric (A/N) Display Subsystem (RADS), DBRITE, and their associated equipment.

(d) The System Monitor Console (SMC) Subsystem consists of a personal computer (PC) workstation and associated peripherals.

(e) The Interface Processing (IP) Subsystem consists of: a Display and Network Interface Processor (DNIP), a DNIP Adapter (DA), a Device Controller Interface (DCI), and an Aural Alarm Control Unit (AACU).

(f) The Subsystem Interface (SSI) subsystem consists of an Institute of Electrical and Electronic Engineers (IEEE) 802.3 compliant Local Area Network (LAN), cables, and connectors for operational and maintenance use.

c. **Certification Requirements.** Certification shall be accomplished as follows:

(1) **Periodic.** In accordance with intervals as specified in appendix 1, tables A-1, A-2, A-3 and A-4.

(2) **Following Corrective Maintenance.** After corrective maintenance on an element of the ARTS IIE system that has affected certification, the element must be recertified in accordance with Order 6000.15. The entire subsystem may not need to be recertified; the certifying technician determines the necessary certification actions. Recertification is based on:

(a) Key subsystem parameters meeting the requirements detailed in chapter 3.

(b) The subsystem demonstrating proper operations based on diagnostic or operational tests.

(3) In any case, the corrective action performed should be logged.

104. CENTER RADAR ARTS PRESENTATION.

The Center Radar ARTS Presentation (CENRAP) is to be used in the event of extended outages for the terminal radar (planned or unplanned).

a. **CENRAP Description.**

(1) The function of CENRAP is to provide a backup for TARS service using a strategically located Long Range Radar (LRR) as a source of beacon radar information. The digitized beacon information will be provided to the ARTS subsystem through the existing IFDS National Airspace System (NAS) to ARTS interface. All of the functions of TARS will be provided by CENRAP with the exception of the following:

(a) Analog beacon/search radar video.

(b) Minimum Safe Altitude Warning (MSAW).

(c) Conflict Alert (CA).

(2) CENRAP has two modes of operation; one with a CENRAP Trigger Simulator (CTS) and one without. The determination as to when to use the CTS depends on the failure mode.

(a) If the normal source of Azimuth Change Pulse/Azimuth Reference Pulse (ACP/ARP), radar pretrigger, or beacon trigger was interrupted to the indicator site equipment, then the CTS would be used with CENRAP.

(b) If only the beacon video were interrupted to ARTS, the CTS would not be required with CENRAP. CENRAP would not be activated if only the search video were interrupted.

b. CENRAP Hardware.

The only additional hardware provided with the ARTS system is the CTS.

(1) CTS The CTS consists of a Printed Circuit Board (PCB) and a built–in power supply, which requires alternating current (ac) power. The unit will be mounted at a location that will allow a simple connection of the ACP/ARP, radar pretrigger, and beacon trigger signal path to the unit to allow selection of either the normal or backup ACP/ARP, radar pretrigger, and beacon trigger signals. Control of the unit can be either remote or local depending on site preference. An indicator light can be provided at the ASR control panel in the Terminal Radar Approach Control (TRACON) facility to provide ON/OFF status of the unit.

(2) Data Acquisition Subsystem (DAS). The ARTS IIE DDAS is disabled in the CENRAP mode.

(3) SP Subsystem. All functions of the SP are utilized during CENRAP mode except MSAW and CA.

(4) RADS. RADS A/N data is available during CENRAP mode. Beacon or Search radar video may not be available depending on operational status of the local radar.

(5) IFDS. All functions of the IFDS are utilized during the CENRAP mode.

c. CENRAP Software. NAS En Route. When the radar remoting function is enabled by supervisory input message, the output processor and its associated storage is loaded from disk and the desired airspace Radar Sort Boxes (RSB) is defined. Targets received from the preferred site in those RSBs are reformatted for use by the ARTS, stored in an available output buffer and output to the ARTS when the buffer is filled, or 1–second has elapsed, whichever comes first. A special zero azimuth, site adaptable range message is also input for "NORTH" reference. All beacon targets are altitude filtered when a valid Mode C exists, slant range corrected, and pressure altitude corrected below 18,000 feet.

105. AIRCRAFT ACCIDENT.

a. Basic aircraft accident/incident guidance on the required technical evaluations, reports, and other procedures is contained in the latest edition of Order 8020.16, Aircraft Accident and Incident Notification, Investigation, and Reporting. Use this in conjunction with locally developed procedures if notified of an aircraft accident/incident.

b. When aircraft accidents or incidents occur, Air Traffic Organization Technical Operations personnel are responsible, when requested by the Technical Operations Aircraft Accident Representative (AFAAR) through the appropriate control center, to evaluate and document the technical performance of the facilities which may have been involved (for some facilities, it may also be necessary to remove them from service, and to conduct flight inspections). This requires that facility operational data be obtained and recorded in the maintenance log and on technical performance records. These records are official documents, and may be used by an aircraft accident investigation board in the determination of facility operational status at the time of the accident. See the latest edition of Order 8020.16, "Air Traffic Organization Aircraft Accident and Incident Notification, Investigation, and Reporting," for detailed guidance on requirements and activities following an aircraft accident/incident.

c. All station records such as logs, meter reading forms, etc., are official documents and, as such, may be required in case of an investigation regarding a local aircraft accident and should be safeguarded.

d. It is imperative that all records be kept current, concise, and accurate. These checks shall be made carefully and completed rapidly. Additionally, these records will be used for investigating other situations when the operation of the facility is questioned.

106. FLIGHT INSPECTION.

The ARTS IIE display can be aligned and checked using range calibration marks, permanent echoes, and video data from an operational radar system with a sufficiently high degree of confidence that a flight inspection normally need not be performed at operational

changeover to automation capability. Flight inspection (see chapter 6) shall be performed if a correct display alignment cannot be established prior to transition to operational status, if the ASR system has been significantly altered by modification(s), or if the ASR system performance has deteriorated beyond established performance standards and tolerances which require flight inspections, as outlined in the applicable ASR and beacon technical handbooks or in OA P 8200.1, United States Standard Flight Inspection Manual are contained in the OA P 8200.1, sections 102, 104 through 110, 200, and 215. AT controllers will verify the ARTS IIE altitude readout capability using normal AT targets–of–opportunity. ARTS IIE engineers and electronic technicians who may participate in radar systems flight inspection activities should familiarize themselves with the information contained in OA P 8200.1 so that they may use flight inspection time to the best advantage and give the flight inspection group any necessary assistance.

107. TECHNICAL INSPECTION.

Formal inspections are among the more effective management controls for assuring the required quality level of maintenance work and of equipment and system performance. See Order 6000.15 and the latest edition of Order JO 6040.6, National Airspace System Technical Evaluation Program.

108. PERIODIC MAINTENANCE.

Chapter 4 established the task and schedules that are required for the periodic maintenance of the ARTS IIE. These tasks, as scheduled, are the minimum required for the ARTS IIE to meet.

109. TEST EQUIPMENT AND TOOLS FOR PERIODIC MAINTENANCE.

Test equipment and tools required for performing routine maintenance and troubleshooting of the ARTS IIE are shown in the latest editions of Order 6200.4, Test Equipment Management Handbook and Order 4630.2, Standard Allowance of Supplies and Working Equipment for National Airspace System Facilities, respectively.

110. INSTRUCTION BOOKS.

a. Hardware. The instruction books covering the hardware for the ARTS IIE system, subsystems, and equipment are listed below:

(1) Automated Radar Terminal System (ARTS IIE), TI 6190.11B.

(2) Acquisition Processing Cabinet (APC), TI 6190.12A.

(3) Radar Alphanumeric Display Set (RADS), TI 6190.13B.

b. Software. The instruction books covering software, system function and system description for the ARTS IIE system are listed below:

(1) ARTS IIE Computer Program Functional Specification (CPFS) System Description and Specified Series (NAS-MD-634).

(2) ARTS IIE Computer Program Functional Specification (CPFS) Keyboard (NAS-MD-638).

(3) ARTS IIE Computer Program Functional Specification (CPFS) Display Output Processing and Converging Runway Display Aid (CRDA) (NAS-MD-639).

(4) ARTS IIE Computer Program Functional Specification (CPFS) Error and Status Messages (NAS-MD-642).

(5) ARTS IIE Operational Program — Program Listing.

(6) ARTS IIE Computer Systems Operator's Manual/Software User's Manual (CSOM/SUM).

(7) ARTS IIE Common Arts System Monitor Console Personal Computer SMC PC User Interface Design Document (ATC 61506).

(8) ARTS IIE Diagnostic and Maintenance Program–Reference Manual, TI 6190.22A.

NOTE: Refer to table 1-1, paragraph 1.4.2 of CSOM/SUM, for the list of ARTS IIE COTS documentation and manuals.

111. - 199. RESERVED.

CHAPTER 2. TECHNICAL CHARACTERISTICS

200. SYSTEM INTRODUCTION.

a. The ARTS IIE is a microprocessor based common processing system and subsystem with a PC based peripheral which is used as a system monitor and workstation.

b. The ARTS IIE provides the first level of terminal automation to airports having low to medium levels of AT density. The system processes transponder replies received from the secondary radar system to determine the aircraft identity, range, altitude and speed. By combining the radar data with the operational program processed data, flight plans, and keyboard entries, a coherent synthetic A/N presentation, along with aural alarms, SMC PC System Monitor (SYSMON) window and Echo printer printouts, is provided for the ATC and for maintenance functions.

201. INTERFACE CAPABILITIES.

The FA-9020 has the following interface capabilities as illustrated in figure 2-1:

Primary Radars	ASR-3, 4, 5, 6, 7, 8, 9,11
Secondary Radars	ATCBI-3, 4, 5, 6 MODE-S
Radar Microwave	RML-1A, 2, 3, 4, 5, 6
Secondary Radar Performance Monitor	FAA-E-2261A
Secondary Radar Defruiter	FA-7281, MX-8757
Video Mapper	FA-5100/A, FA-5400/A, FA-5450/A, FA-8049, FA-8970, AN/GPA-30, AN/GPA-91, AN/GPA-131
Data Transmission Modem	2400 bit/sec. data sets
DBRITE	FA-10220

FIGURE 2-1. SUBSYSTEM INTERFACE

202. SYSTEM FUNCTIONAL OVERVIEW.

a. The primary radar video and trigger may be interfaced directly from the radar transmitter site via coaxial landline (uncompensated mode), through a Radar Microwave Link (RML), a fiber optics system, video compression system, or a line compensation unit (compensated mode). The video signals are amplified by one of two possible channels internal to the APC and distributed via a serial coaxial cable to the individual displays for presentation on a Cathode–Ray Tube (CRT).

b. The secondary radar video and trigger may be received in an identical manner as the primary video, but in addition to amplification, the DDAS performs certain hardware processing on each return before distribution to the individual displays. The incoming secondary information contains mode pulses P1 and P3 whose pulse spacing of 8–microseconds (µs) or 21 µs determines whether the aircraft reply is identity (Mode 3/A) or altitude (Mode C) respectively. Individual aircraft replies contain a starting bracket pulse F1 and an ending bracket pulse F2. Between the bracket pulses are a series of 0.45 µs–wide pulses, each separated by 1.45 µs which represent the assigned aircraft code or barometric altitude.

c. The digital information consists of four pulse groups of three pulses per group, for a possibility of 4096 discrete codes. Two additional pulse code positions are available: the X pulse located midpoint between the bracket pulses and the Special Position Indicator (SPI) pulse located 4.35 µs after F2. Also certain aircraft codes receive special treatment in the DDAS, and create a unique video presentation on all displays when detected. These codes are: 7700 for aircraft emergency, 7600 for aircraft radio failure, and 7500 for aircraft hijack.

d. Besides code detection and separate broadband video distribution to each display, the DDAS beacon video, quantized and decoded, is transmitted to the Data Acquisition Device Controller/Processor (DADCP) for further processing. The DADCP processes the replies into target report store messages and forwards them to the computer for additional processing. After processing by the computer, the beacon report is sent to the Display Device Controller/Processor (DDCP) for presentation on the RADS or DBRITE. By comparing the target information to the available data base, the SP generates a tag for every aircraft and makes the tag information available to individual displays upon request. The tag may be shown as a single symbol only or a single symbol, leader, and Limited Data Block (LDB) or Full Data Block (FDB). The LDB consists of two lines. The first line being Mode 3A beacon code and the second line being Mode C reported altitude. The FDB consists of three lines. Information which may be contained is: aircraft identity, altitude, altitude modifier (if assigned by controller), ground speed, special designator, and alert (CA, Low Altitude (LA) or both). The display A/N presentation also includes preview, TAB, and system display areas. The SP data base used to derive A/N information receives data from an ARTCC via interfacility communication, or keyboard entries from the AT controller.

e. When the ARTS IIE is using the Mode–S/Digital Radar Serial interface, the Sensor Interface Software (SIFS) surveillance processing function within the SP will collect beacon report messages, beacon Real–Time Quality Control (RTQC) messages, sector mark messages, and system status messages. The radar shall send messages on any one of up to three digital data links as a series of Common Digitizer (CD) 2 format message fields. These CD format messages are sent directly to the SP subsystem of the APC via the APC external connector panel through a VCOM-54, serial interface controller Circuit Card Assembly (CCA). The SIFS surveillance processing function will reformat the target data and transmit it to target report store for additional processing by track processing in the SP. The DDAS will provide backup processing of beacon input data in the event that the digital target data becomes unreliable.

203. – 299. RESERVED.

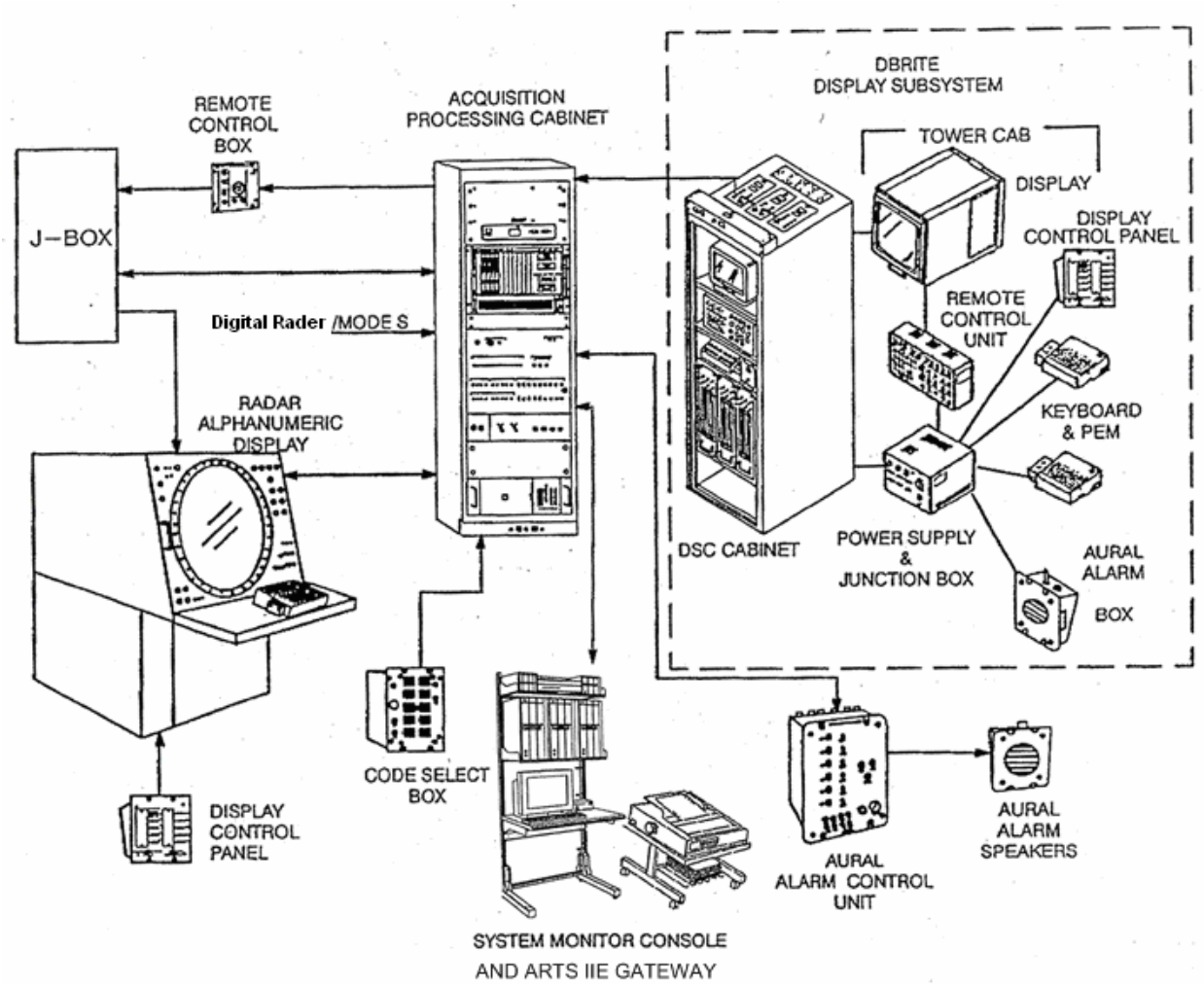

FIGURE 2-2. ARTS IIE EQUIPMENT

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CHAPTER 3. STANDARDS AND TOLERANCES

300. GENERAL

This chapter prescribes the standards and tolerances for the ARTS IIE and associated equipment, as defined in Order 6000.15. All key performance parameters and/or inspection elements are identified by an arrow (→) placed to the left of the applicable item.

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
301. ARTS IIE SYSTEM.				
a. Operational Program.	Par. 502	Successful no fault execution	Same as standard	Same as standard
b. MSAW/CA Scenario Checks.	Par. 515	Successful no fault execution	Same as standard	Same as standard
302. RADAR/ATCRBS/ARTS IIE OVERALL SYSTEM.				
a. ASR Analog Only				
(1) ATCRBS Overall Broadband System Sensitivity (OSS).	Par. 511	Commissioned value	Within 3 decibels (dB) of standard	Same as initial
(2) Overall Narrowband System Sensitivity (ONSS) through the DDAS.	Par. 507	Commissioned value	Within 6 dB of standard	Same as initial
(3) ASR Normal/Moving Target Indicator (MTI) Overall System Sensitivity.	Par. 510	Commissioned value	Within 3 dB of standard	Same as initial
b. MODE-S in Interim Beacon Interrogator (IBI) mode for ONSS.	Par. 507	Commissioned value	Within 3 dB of tangential	Same as initial
c. Digital Radar.	Par. 523			
303. RADAR/ATCRBS/CENRAP ARTS IIE INTERFACE.				
a. Uncompensated Input Video.	TI 6190.11B, table 4-2			
→ (1) Beacon Video.				

STANDARDS AND TOLERANCES

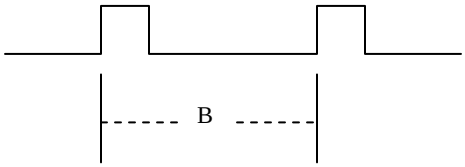
Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(a) Amplitude.		5.0 volts (V) peak	±3.0 V peak	Same as initial
(b) Noise Level		0.5 volts (V) Avg. Max.	Same as standard	Same as initial
→ (2) Beacon Pretrigger and Mode Pulses.				
(a) Amplitude.		A minimum of 1.75 times the Beacon Video Amplitude	Same as standard	Same as initial
(b) Pulse Width.		1.0 µs	±0.5 µs	Same as initial
(c) Mode 3A Pulse Spacing.		8.0 µs	±0.1 µs	Same as initial
(d) Mode C Pulse Spacing.		21.0 µs	±0.1 µs	Same as initial
→ (3) Mixed Normal Video and Pretrigger.				
(a) Video Amplitude.		4.5 V peak	±2.0 V	Same as initial
(b) Pretrigger Amplitude.		37.5 V peak	±23 V	Same as initial
→ (4) MTI Video Amplitude.		4.5 V peak	±2.0 V	Same as initial
b. Compensated Input Video.	TI 6190.11B, table 4-2			
→ (1) Beacon Video.				
(a) Amplitude.		3.0 V peak	±1.0 V	Same as initial
(b) Pulse Width.		0.45 µs	±0.15 µs	Same as initial
(c) Noise Level		0.5 volts (V) Avg. Max.	Same as standard	Same as initial
→ (2) Beacon Pretrigger and Mode Pulses.				

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(a) Amplitude.		37.5 V peak	±25 V	Same as initial
(b) Pulse Width.		1.0 µs	±0.5 µs	Same as initial
(c) Mode 3A Pulse Spacing.		8.0 µs	±0.1 µs	Same as initial
(d) Mode C Pulse Spacing.		21.0 µs	±0.1 µs	Same as initial
→ (3) Radar Pretrigger.		40 V peak	±30 V	Same as initial
→ (4) Normal Video.		3.0 V peak	±1.0 V	Same as initial
→ (5) MTI Video.		3.0 V peak	±1.0 V	Same as initial
→ c. ACP.	Par. 512			
(1) Amplitude.		5.0 V peak	-1.0 V +2.2 V	-1.5 V +2.2 V
(2) Pulse Width.		23 µs	±3.0 µs	Same as initial
(3) ACP Number.		4096 per revolution	Same as standard	Same as standard
(4) Jitter.*		±10 % of normal spacing	Same as standard	Same as standard

*Jitter Max=[(60 sec/RPM)/4096]x.1
EXAMPLE
ASR ANTENNA = 15 RPM

60 sec/15 RPM = 4 sec per scan (360)
4 sec/4096 ACPs = 971 µs
971x.1 = 97.1 us max jitter



Jitter is equal to B ±10%

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
→ **d.** ARP.	Par. 512			
(1) Amplitude.		5.0 V peak	-1.0 V +2.2 V	-1.5 V +2.2 V
(2) ARP Number.		1 per revolution between adjacent ACP	Same as standard	Same as standard
(3) Pulse Width.		23.0 µs	±3.0 µs	Same as initial
e. CENRAP Trigger Simulator (CTS). (If Applicable)	TI 6190.28, par. 4.1.2.4 or manufacturer's instruction book			
(1) ACP.				
(a) Amplitude.		5.0 V peak	-1.0 V +2.2 V	-1.5 V +2.2 V
(b) Pulse Width.		23 µs	-3.0 µs +27.0 µs	Same as initial
(2) ARP.				
(a) Amplitude.		5.0 V peak	-1.0 V +2.2 V	-1.5 V +2.2 V
(b) Pulse Width.		23 µs	-3.0 µs +27.0 µs	Same as initial
(3) Pretrigger.				
(a) Amplitude.		25 V peak	+2.0 V	Same as initial
(b) Pulse Width.		1.0 µs	-0.5 µs +9.0 µs	Same as initial
(4) Beacon Pretrigger.				
(a) Amplitude.		25 V peak	+2.0 V	Same as initial
(b) Pulse Width.		1.0 µs	-0.5 µs +9.0 µs	Same as initial
f. Range and Azimuth Accuracy for CENRAP Operatations.	FAA Forms 6030-16/ 6030-17			

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(1) North Mark Reference.		North Mark target must align with north mark symbol on video map and range mark.	±1 °of Azimuth and ±3% range.	Same as initial
(2) Registration between analog video and CENRAP A/Ns.		Video and synthetic video shall register within 2 nautical miles (nmi) of range for all range scale settings.	Same as standard	Same as standard
304. ARTS IIE/DEDS INTERFACE.				
→ **a.** Compensated APC Output Video Levels.	TI 6190.12A, par. 6.4.2			
(1) Beacon (HTB2-7).	Par. 518			
(a) Amplitude.		4.0 V peak	±0.2 V	±0.5 V
(b) Pulse Width.		0.45 µs	±0.15 µs	Same as initial
(2) Normal (HTB1-17).	TI 6190.12A, par. 6.4.2	4.0 V peak	±0.2 V	±0.5 V
(3) MTI (HTB1-20).		4.0 V peak	±0.2 V	±0.5 V
b. DEDS Input Video (Measured at each RADS).	TI 6190.11B, table 4-3			
(1) Normal Video.		2.0 V minimum 4.0 V maximum	Same as standard	Same as standard
(a) Weather Video. (digital radar only)		WX Low Level 2.0V minimum 2.5V maximum	Same as standard	Same as standard
		WX High Level 3.0V minimum 4.0V maximum	Same as standard	Same as standard
(2) MTI Video.		2.0 V minimum 4.0 V maximum	Same as standard	Same as standard
(3) Map Video.		2.0 V minimum 4.0 V maximum	Same as standard	Same as standard
(4) Spare Video.		2.0 V minimum 4.0 V maximum	Same as standard	Same as standard
(5) Decoded Beacon Display Video.		2.0 V minimum 4.0 V maximum	Same as standard	Same as standard
(6) Radar Pretrigger.		3.0 V minimum 6.0 V maximum	Same as standard	Same as standard
c. DEDS Azimuth Data.	TI 6190.11B, table 4-3			

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(1) ACP.				
(a) Amplitude.		3.0 V minimum	Same as standard	Same as standard
(b) Pulse Width.		23 µs	±3.0 µs	Same as initial
(c) Number.		4096 per revolution	Same as standard	Same as standard
(2) ARP.				
(a) Amplitude.		3.0 V minimum	Same as standard	Same as standard
(b) Number.		1 per revolution	Same as standard	Same as standard
305. DDAS.				
a. APC Power Supply (1PS1).	TI 6190.12A, table 4-1			
(1) +5 V dc		+5.0 Volts direct current (V dc)	±0.02 V dc	±0.05 V dc
(a) Ripple		Must not exceed 50 millivolts (mV) peak–to–peak	Same as standard	Same as standard
(2) +15 V dc		+15.0 V dc	±0.05 V dc	±0.15 V dc
(a) Ripple		Must not exceed 150 mV peak–to–peak	Same as standard	Same as standard
(3) -15 V dc		-15.0 V dc	±0.05 V dc	±0.15 V dc
(a) Ripple		Must not exceed 150 mV peak–to–peak	Same as standard	Same as standard
(4) -5 V dc		-5.0 V dc	±0.02 V dc	±0.05 V dc
(a) Ripple		Must not exceed 100 mV peak–to–peak	Same as standard	Same as standard
b. APC Backup Channel Power Supply.	TI 6190.12A, table 4-1			
(1) +5.0 V dc (1G/PS1)		+5.0 V dc	±0.02 V dc	±0.05 V dc
(a) Ripple		Must not exceed 50 mV peak–to–peak	Same as standard	Same as standard
(2) +15.0 V dc(1G/PS2)		+15.0 V dc	±0.1 V dc	±0.25 V dc
(a) Ripple		Must not exceed 150 mV peak–to–peak	Same as standard	Same as standard
(3) -15.0 V dc (1G/PS2)		-15.0 V dc	±0.1 V dc	±0.25 V dc
(a) Ripple		Must not exceed 150 mV peak–to–peak	Same as standard	Same as standard

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
c. Code Select Box (CSB) Power Supply.	TI 6190.11B, par 6.2.1			
(1) +5 V dc (TB1-A1 to TB1-A3).		+5.0 V dc	±0.05 V dc	±0.10 V dc
d. Beacon Decoder.		Correct decoding and display of beacon data	Same as standard	Same as standard
→ **e.** Aural Alarm Control Unit (AACU) Power Supply.	TI 6190.11B, par. 6.2.2			
(1) +5 V dc		+5.0 V dc	±.1 V dc	±.1 V dc
(2) +15 V dc		+15.0 V dc	±.25 V dc	±.25 V dc
(3) -15 V dc		-15.0 V dc	±.25 V dc	±.25 V dc
(4) Audio Level.	Par. 517	1.0 Volt Peak–to–Peak (V PP)	±.1 V PP	±.1 V PP
f. DADCP Diagnostic.	TI 6190.22A, par. 4.4.3	Successful no fault execution	Same as standard	Same as standard
g. DDAS Confidence Test.	TI 6190.22A, par. 4.4.4	Successful no fault execution	Same as standard	Same as standard
h. DDCP Diagnostic.	TI 6190.22A, par. 4.4.6	Successful no fault execution	Same as standard	Same as standard
i. Keyboard Device Controller (KDC) Diagnostic.	TI 6190.22A, par. 4.4.5	Successful no fault execution	Same as standard	Same as standard
j. Display Test Pattern (DTP) Test.	TI 6190.22A, par. 4.4.7	Successful no fault execution	Same as standard	Same as standard
k. Interactive (DDAS) Diagnostic.	TI 6190.22A, par. 4.4.9	Successful no fault execution	Same as standard	Same as standard
306. SP SUBSYSTEM.				
a. Power–Up Tests.	TI 6190.22A, par. 4.2.4	Successful no fault execution	Same as standard	Same as standard
b. Extended Diagnostics.	TI 6190.22A, par. 4.2.5	Successful no fault execution	Same as standard	Same as standard
c. Disk Test.	TI 6190.22A, par. 4.3.1	Successful no fault execution	Same as standard	Same as standard
d. Serial Board Loopback Test.	TI 6190.22A, par. 4.3.3	Successful no fault execution	Same as standard	Same as standard
e. Diagnostic Test.	TI 6190.22A, par. 4.6	Successful no fault execution	Same as standard	Same as standard
f. SP Chassis Power Supply (1C/PS1).	TI 6190.12A, table 4-1			

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(1) +5.0 V dc		+5.0 V dc	±0.02 V dc	±0.05 V dc
(a) Ripple		Must not exceed 50 mV peak–to–peak	Same as standard	Same as standard
(2) +12.0 V dc		+12.0 V dc	±0.04 V dc	±0.12 V dc
(a) Ripple		Must not exceed 120 mV peak–to–peak	Same as standard	Same as standard
(3) -12.0 V dc		-12.0 V dc	±0.16 V dc	±0.24 V dc
(a) Ripple		Must not exceed 120 mV peak–to–peak	Same as standard	Same as standard
g. Uninterruptible Power Supply (UPS) Assembly (1J/PS1) Output	TI 6190.12A, table 4-1	120 V ac	Same as standard	±14.4 V ac
307. SMC SUBSYSTEM.				
a. SMC PC Power–On Diagnostic Tests.	TI 6190.22A, par. 4.7.1	Successful no fault execution	Same as standard	Same as standard
b. Echo Printer Diagnostic.	TI 6190.22A, par. 4.7.4	Successful no fault execution	Same as standard	Same as standard
308. IP SUBSYSTEM.				
a. DNIP Test.	TI 6190.22A, par. 4.4.1	Successful no fault execution	Same as standard	Same as standard
b. DCI Diagnostic.	TI 6190.22A, par. 4.4.2	Successful no fault execution	Same as standard	Same as standard
c. Aural Alarm Diagnostic.	TI 6190.22A, par. 4.4.8	Successful no fault execution	Same as standard	Same as standard
309. SSI SUBSYSTEM.				
a. LAN Test.	TI 6190.22A, par. 4.5	Successful no fault execution	Same as standard	Same as standard
310. DEDS.				

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
a. RADS.				
(1) DEDS Power Supply.	TI 6190.13B, par. 6.2.1 table 4-1			
(a) +5 V dc (TB1-4, -5, -6, -7; and the +5 V stud)		+5.0 V dc	±0.02 V dc	±0.05 V dc
(b) Ripple (+5 V dc)		150 mV peak–to–peak maximum	Same as standard	Same as standard
(c) +15 V dc (TB1-8 and 9)		+15.0 V dc	±0.05 V dc	±0.15 V dc
(d) Ripple (+15 V dc)		200 mV peak–to–peak maximum	Same as standard	Same as standard
(e) -15 V dc (TB2-1, -2, -3, and -4)		-15.0 V dc	±0.05 V dc	±0.15 V dc
(f) Ripple (-15 V dc)		200 mV peak–to–peak maximum	Same as standard	Same as standard
(g) -5 V dc (TB2-6 and -7)		-5.0 V dc	±0.02 V dc	±0.05 V dc
(h) Ripple (-5 V dc)		500 mV peak–to–peak maximum	Same as standard	Same as standard
(i) +6.3 V dc (TB2-8)		+6.3 V dc	±0.1 V dc	±0.32 V dc
(j) Ripple (+6.3 V dc)		500 mV peak–to–peak maximum	Same as standard	Same as standard
(k) +20 V dc (TB1-11 and 12)		+20.0 V dc	±0.05 V dc	±0.2 V dc
(l) Ripple (+20 V dc)		500 mV peak–to–peak maximum	Same as standard	Same as standard
(m) +50 V dc (TB1-13 and -14)		+50.0 V dc	±0.2 V dc	±0.5 V dc

STANDARDS AND TOLERANCES

Parameter	Reference Paragraph	Standard	Tolerance/Limit	
			Initial	*Operating*
(n) Ripple (+50 V dc)		500 mV peak–to–peak maximum	Same as standard	Same as standard
(2) DEDS +20 V dc Auxiliary Power Supply (TB1-1 to TB1-4).	TI 6190.13B, par. 6.2.2 table 4-1	+20 V dc	±0.05 V dc	±0.2 V dc
(a) Ripple		250 mV peak–to–peak maximum	Same as standard	Same as standard
→ (3) Radar permanent echoes.	Par. 504	Must be located at coordinates specified on commissioning data form	Same as standard	Same as standard
(a) Azimuth		Commissioned value	±1.0° of true azimuth	Same as initial
(b) Range		Commissioned value	Within 3% of true range	Same as initial
(4) A/N positioning.	Par. 519	Characters shall be positioned at the point designated by the X, Y display coordinates in the data message with an absolute accuracy of +1.0% of the display diameter	Same as standard	Same as standard
→ (5) Registration between search video and computer–generated data.	Par. 503 TI 6190.11B, par. 9.9.2 (bd-bj)	Video and digital data shall register within 1/8 nmi (0.232 kilometers (km)) or 0.2% of the usable diameter of the CRT faceplate, whichever is the largest, at any point of display including range scale and off–center positions	Same as standard	Same as standard
→ (6) Video map accuracy.	Par. 506			

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(a) Runway centerline.	Commissioned value	Maximum error left or right of runway edges shall not exceed 500 ft. (152.4 meters (m)) or 3% of distance from the antenna to the point at which the approach is discontinued, whichever is greater	Same as standard	Same as standard
(b) Navigational aids and fixes.	Commissioned value	An aircraft reported as being over a fix shall be within a circular area about the fix, the radius of which is 3% of the fix–to–station distance, or 500 ft./152.4 m (ATC Radar Beacon only sites 1,000 ft./304.8 m), whichever is greater	Same as standard	Same as standard
(7) MTI reflector operation.	Commissioned value	Not less than 16 targets for 20 consecutive antenna rotations	Same as standard	Same as standard
(8) DDAS RTQC accuracy.	Par. 505	RTQC Target location shall be at range of 59 1/16 nmi and azimuth of (2090-2107 ACPs)	Same as standard	Same as standard
b. DBRITE Display.				
(1) A/N registration (60 miles range selection).	Par. 503	A/N and radar video shall register within .033 inch	Same as standard	Same as standard
311. IFDS.				
a. Review SMC PC Echo printer or SYSMON printout for excessive IFDS status printouts.		Printouts indicate normal operation of ARTS-ARTCC link	Same as standard	Same as standard

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
b. Operational Program Handoffs.		Handoffs between ARTS and ARTCC handled correctly	Same as standard	Same as standard
312.-399. RESERVED				

CHAPTER 4. PERIODIC MAINTENANCE

400. GENERAL.

a. This chapter establishes all the maintenance activities that are required for the ARTS IIE on a periodic, recurring basis, and the schedules for their accomplishment. The chapter is divided into two sections. The first identifies the performance checks (i.e., tests, measurements, and observations) of normal operating controls and functions which are necessary to determine whether operation is within established tolerances/limits. The second section identifies other tasks that are necessary to prevent deterioration and/or ensure reliable operation.

b. The following tables of performance checks and maintenance tasks are not to be taken as the minimum work required for proper maintenance, rather as the maximum interval permitted between tasks. Staffing at a facility may require a reduction in the frequency of daily and weekly checks. Refer to Order 6000.15 for guidance.

401. EQUIPMENT CONFIGURATIONS.

The ARTS IIE instruction book includes system hardware and software tests for the ARTS IIE and associated DBRITE displays. The periodic performance checks schedules for the DBRITE displays are covered under Order 6410.18.

SECTION 1. PERFORMANCE CHECKS

SUBSECTION 1. ARTS IIE PERFORMANCE CHECKS

TABLE 4-1. ARTS IIE PERFORMANCE CHECKS

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
402. WEEKLY.		
a. DEDS. (FAA Form 6190-7 Item).		
(1) RADS.		
(a) Verify permanent echo positional accuracy.	Par. 310a(3)	Par. 504
(b) Verify A/N to video registration.	Par. 310a(5)	Par. 503
(c) Verify video map accuracy.	Par. 310a(6)	Par. 506
(d) Visual and operational check.	Par. 301(a)	Par. 502
(2) DBRITE.		
(a) Verify A/N to video registration.	Par. 310b	Par. 503
b. ATCRBS/ARTS IIE Interface.		
(1) Check ACP amplitude, pulse width, and jitter. (FAA Form 6190-7 Item).	Par. 303c	Par. 512
(2) Check ARP amplitude and pulse width. (FAA Form 6190-7 Item).	Par. 303d	Par. 512
(3) Check the beacon uncompensated video input amplitude, and noise level. (FAA Form 6190-7 Item). If applicable.	Par. 303a(1)	TI 6190.11B, table 4-2
(4) Check the beacon compensated video input amplitude, pulse width, and noise level (FAA Form 6190-7 Item). If applicable.	Par. 303b(1)	TI 6190.11B, table 4-2
(5) Check the Mode 3/A and Mode C trigger amplitude and pulse width. (FAA Form 6190-7 Item).	Par. 303a(2) or 303b(2)	TI 6190.11B, table 4-2
(6) Check ASR normal, MTI video and pretrigger input amplitude. (FAA Form 6190-7 Item).	Par. 303a(3,4) or 303b(3,4,5)	TI 6190.11B, table 4-2
c. System Cold Start – Reset All Chassis from SMC.	Par. 301a	CSOM/SUM Par. 4.2.1

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
403. MONTHLY.		
a. MSAW/CA Functional Test.	Par.301b	Par. 515
(1) Perform scenario checks.		
b. Aural Alarm Functional Test.	Visual and operational check	TI 6190.11B par. 6.2.3
(1) Press test button on AACU for each display position and verify speaker operation at appropriate display position.		
c. Radar Beacon Data Path Check.		
(1) Verify serial path 0 and 1, if applicable.		Par. 514
(2) Verify DNIP path.		Par. 514
d. SP Subsystem Checks.		
(1) Run Power–Up Tests.	Par. 306a	TI 6190.22A, par. 4.2.4
(2) Run Internal Disk Diagnostic Test, for Hard Disk 0 & 1.	Par. 306c	TI 6190.22A, par. 4.3.1
e. IP Subsystem.		
(1) Run the DNIP Test. (Power-up and Extended tests)	Par. 308a	TI 6190.22A, par. 4.4.1.2.3
(2) Run the DCI Diagnostic.	Par. 308b	TI 6190.22A, par. 4.4.2
f. ARTS IIE System Checks.		
(1) Perform overall ATCRBS/ARTS IIE Minimum Discernible Signal (MDS) check (FAA Form 6190-8 Item). (ASR-3, 4, 5, 6, 7, 8 only).	Par. 302a(1), 302a(3)	Par. 510 and 511
(2) Perform ONSS check (FAA Form 6190-8 Item). (Analog ATCBI and IBI systems only).	Par. 302a(2), 302b	Par. 507
(3) Verify that the MTI reflector performance is within tolerance.	Par. 310a(7)	Par. 508
(4) Check decoded video generation and each emergency code.	Par. 305d	Par. 513
(5) APC UPS Check. If applicable.	Visual and operational status checks.	Par. 522

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	Maintenance Procedures
g. ARTS IIE DEDS Interface. (FAA Form 6190-8 Item).		
(1) Normal Video. If applicable.	Par. 304a(2)	TI 6190.12A, par. 6.4.2.1
(2) MTI Video. If applicable.	Par. 304a(3)	TI 6190.12A, par. 6.4.2.1
h. DDAS. (FAA Form 6190-8 Item).		
(1) Check display backup triggers and videos.	Function Check	TI 6190.12A, par. 3.6.1
i. CENRAP.		
(1) Registration between broadband video and computer generated targets (without CENRAP trigger simulator).	Par. 303f(1) and 303f(2)	Par. 524b
(2) Registration between video map/range ring and computer generated targets (with CENRAP trigger simulator). If available.	Par. 303f(1)	Par. 524c
(3) CTS Only. Check output signals. If applicable.		
(a) Pretrigger, beacon pretrigger, ACP, and ARP amplitudes.	Par. 303e(1) thru 303e(4)	Par. 524d
(b) Pretrigger and beacon pretrigger pulse widths.	Par. 303e(3)(b) and 303e(4)(b)	Par. 524d
(c) ACP, ARP pulse width.	Par. 303e	Par. 524d
(4) Registration between North Mark map symbol, associated range ring and North Mark target.	Par. 303f(1)	Par. 524c
404. QUARTERLY.		
a. ARTS IIE DEDS Interface. (FAA Form 6190-8 Item).		
(1) Beacon Video (Amplitude and Pulse Width).	Par. 304a(1)	Par. 518
(2) Synthetic Analog beacon.	Par. 304b(5)	Par. 525

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
b. DEDS. (FAA Form 6190-8 Item).		
(1) RADS/DBRITE.		
(a) Run the DDCP diagnostic program.	Par. 305h	TI 6190.22A, par. 4.4.6
(b) Run the KDC diagnostic program.	Par. 305i	TI 6190.22A, par. 4.4.5
(c) Run the DTP diagnostic program (Use full align pattern).	Par. 305j	TI 6190.22A, par. 4.4.7
c. ARTS IIE System Checks.		
(1) Perform the APC UPS check.	Functional check	Par. 509
(2) Check the UPS power supply. Correct as necessary	Visual check	TI 6190.12A, table 3-5
d. SP Subsystem Check.		
(1) Run Diagnostic Test Component Test.	Par. 306e	TI 6190.22A, par. 4.6
e. SSI Subsystem.		
(1) LAN Test	Par. 309	TI 6190.22A, par. 4.5
405. SEMIANNUALLY.		
a. SMC PC Subsystem Checks.		
(1) Run SMC PC Power–On Test.	Par. 307a	TI 6190.22A, par. 4.7.1
b. Perform Interactive DAS Test (INTDAS).	Par. 305k	TI 6190.22A, par. 4.4.9
406. ANNUALLY.		
a. Check Aural Alarm Control Unit (AACU).	Par. 305e	TI 6190.11B Par.6.2.2 and Par. 517
407. AS REQUIRED.		
a. ARTS IIE System Checks. Perform the following checks:		
(1) Ensure proper cycling of the operational program.	Par. 301	Par. 502
(2) Check the SMC-PC SYSMON Window and/or SMC Echo Printer for normal messages and printouts.	Visual and operational check	

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
b. IFDS.	Visual check	
(1) Check the SMC-PC SYSMON Window and/or Echo printer for normal printouts.	Visual check	
c. SP Subsystem Checks.		
(1) For digital systems with serial interface, run the Serial Board Loopback Test.	Par. 306d	TI 6190.22A, par. 4.3.3
(2) For the Interfacility Data Set perform Serial Loopback Test.	Par. 306d	TI 6190.22A, par. 4.3.3
(3) Run BROPM.	Visual and functional check	ATC 61552, par. 6.4.1
(4) Run Factory Tests.	Successful no fault execution	TI 6190.22A, par. 4.2.6
(5) Perform Function Select Position “d”.	Successful no fault execution	CSOM/SUM, par. 2.1.1.3
(6) Run Extended Diagnostics.	Par. 306b	TI 6190.22A, par. 4.2.5
d. Run the Printer Test.	Par. 307b	TI 6190.22A, par. 4.7.4

SUBSECTION 2. OTHER MAINTENANCE TASKS

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
408. MONTHLY.		
a. DDAS of APC.		
(1) Check, clean, and/or replace air filters as necessary.	Visual Check	TI 6190.12A, par. 6.3.1.4
(2) Check, clean, and/or replace fans as necessary.	Visual and functional check	TI 6190.12A, par. 6.3.1.3 par. 6.3.1.4
b. SP Subsystem. (VME Chassis).		
(1) Check, clean and/or replace fans and fan tray assembly as necessary.	Visual and functional check	TI 6190.12A, par. 6.3.1.2
c. DEDS.		
(1) RADS.		
(a) Check, clean and/or replace as necessary all the RADS fans.	Visual and functional check	Par. 521
(b) Check and clean or replace as necessary the air filters located at the rear of the RADS cabinet.	Cleaning and functional check	TI 6190.13B, par. 6.3.1.2
409. QUARTERLY.		
a. DEDS.		
(1) RADS/DBRITE.		
(a) Check and clean as necessary the CRT and inspect the CRT for degradation of performance.	Visual and operational check	TI 6190.13B, par. 6.3.1.1
(b) Check the alignment of the RADS and correct as necessary.	Operational check	TI 6190.13B, par. 6.4.1
(c) Visually check RADS and DBRITE lamps and keyboards and correct or replace as necessary.	Visual and operational check	Par. 520

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
410. SEMIANNUALLY.		
a. DDAS of APC.		
(1) Measure the APC power supply voltage amplitude and ripple. Correct as necessary.	Par. 305a	TI 6190.12A, table 5-1 par. 6.2.1.4
(2) Measure the APC backup channel power supply voltage amplitude and ripple. Correct as necessary.	Par. 305b	TI 6190.12A, table 5-1 par. 6.2.1.2
(3) Check the Acquisition Signal Conditioner (ASC) and Beacon Video Conditioner (BVC) alignment. Correct as necessary.	Functional Check	TI 6190.12A, par. 6.4.2.1 par. 6.4.2.2
b. SP Subsystem. (VME Chassis).		
(1) Measure the SP chassis power supply (1C/PS1) voltage amplitude and ripple. Correct as necessary.	Par. 306f	TI 6190.12A, table 5-1 par. 6.2.1.1 par. 6.4.1.1
c. ARTS IIE System.		
(1) Check the operation of all lamps, Light Emitting Diode (LED) indicators, switches and controls. Correct as necessary.	Visual and functional check	TI 6190.12A, par. 3.2
(2) DDAS – check monitor lamps for proper operation.	Visual check	TI 6190.11B, table 3-3
d. DEDS.		
(1) RADS.		
a. Measure the DEDS power supply voltage amplitude and ripple. Correct as necessary.	Par. 310a(1)	TI 6190.13B, par. 6.2.1
b. Measure the +20 V auxiliary power supply voltage amplitude and ripple. Correct as necessary.	Par. 310a(2)	TI 6190.13B, par. 6.2.2
e. SMC PC Subsystem.		
(1) Clean and inspect SMC PC. Correct as necessary.	Visual and functional check	TI 6190.11B, par. 6.3.1.1
(2) Clean and inspect the Echo Printer. Correct as necessary.	Visual and functional check	TI 6190.11B, par. 6.3.1.1.6

ARTS IIE Performance Checks	*Reference*	
	Standards & Tolerances	*Maintenance Procedures*
411. ANNUALLY.		
a. DDAS.		
(1) Measure the CSB voltage amplitude. Correct as necessary.	Par. 305c	TI 6190.11B, par. 6.2.1
412. AS REQUIRED.		
a. DEDS.		
(1) Clean surfaces of RADS cabinet and equipment.	Visual check and cleaning	TI 6190.13B, par. 6.3.1.1
b. AACU.		
(1) Clean and inspect. Correct as necessary.	Clean and functional check	TI 6190.11B, par. 6.3.1.3
c. DDAS.		
(1) Clean the DDAS.	Visual and cleaning check	TI 6190.12A, par. 6.3.1.1
(2) Check ACP and ARP generation.	Par. 304c	Par. 512
d. SP Subsystem.		
(1) Clean the surfaces of the APC.	Visual check and cleaning	TI 6190.12A, par. 6.3.1.1
(2) Clean the surfaces of the SP.	Visual check and cleaning	
(3) Clean and inspect the UPS.	Visual check and cleaning	
413.-499. RESERVED.		

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CHAPTER 5. MAINTENANCE PROCEDURES

500. GENERAL.

This chapter establishes the procedure for accomplishing the various essential maintenance activities required for the ARTS IIE, on either a periodic or incidental basis. The chapter is divided into two sections. The first describes the procedures to be used in making the performance checks listed in chapter 4, section 1. The second section describes the procedures for doing the tasks listed in chapter 4, section 2. The procedures contained herein are those that cannot be found in the equipment instruction books.

501. TECHNICAL PERFORMANCE RECORDS ENTRIES.

Order 6000.15 contains guidance and detailed instructions for field utilization of Technical Performance Record forms, as applicable to the ARTS IIE. Entries shall be made in accordance with the instructions published in Order 6000.15 (except as otherwise instructed in the subparagraphs to follow).

a. The ARTS IIE system performance shall be recorded on FAA Forms 6190-7 and 6190-8 as shown in figures 5-1 and 5-2.

b. Items currently required to verify normal broadband terminal radar performance shall be recorded as specified in the latest edition of Order 6310.9, Order 6310.10, Order 6310.19, Order 6310.30, Order 6360.1B, Order 6360.14, and Order 6365.3.

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(FAA FORM 6190-7)

Refer to http://tpr.faa.gov

FIGURE 5-1. TECHNICAL PERFORMANCE RECORD (WEEKLY)

(FAA FORM 6190-8)

Refer to http://tpr.faa.gov

FIGURE 5-2. TECHNICAL PERFORMANCE RECORD (MONTHLY, QUARTERLY)

SECTION 1. PERFORMANCE CHECK PROCEDURES

502. OPERATIONAL PROGRAM FUNCTIONAL CHECK.

a. Object. To determine that the ARTS IIE computer, peripherals and software are operating properly.

b. Discussion. This procedure will provide a functional check of the operating capabilities for the ARTS IIE system.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed during scheduled maintenance time or during operational time after coordinating with AT service. The technician will be familiar with the current version of the operational program, equipment configuration, and operating instructions of the facility. The test must be fully coordinated with AT.

e. Detailed Procedures.

(1) If operational program is not cycling, execute a program load, system initialization, and startup.

(2) Determine that the system data area is updating and current.

(3) Observe the untracked single symbols at each display. Verify symbols are correct using the code select and code readout capabilities.

(4) Enter a manual flight plan using the beacon code of an untracked target. Verify the auto–acquisition and track functions.

(5) Initiate a handoff to another position. Verify that the handoff and accept functions are correct. Continue the handoff/accept routine to all displays.

503. VIDEO-A/N REGISTRATION CHECK.

a. Object. To ensure correct placement of A/N target characters for the primary radar video.

b. Discussion. This test will verify correct A/N target placement with the search radar return. Some parameters that will affect target placement are external to the ARTS, such as weak beacon returns. A random check of several targets–of–opportunity should be made to verify proper placement.

c. Test Equipment Required. None.

d. Conditions. This check must be conducted while the operational program is being executed. Full coordination with AT is necessary. When operating with the CTS, use the procedure in paragraph 524c. When operating in CENRAP, without CTS, use the procedures in paragraph 524b.

e. Detailed Procedures. Use radar targets–of–opportunity which have an associated beacon; verify the A/N target character is being placed within specified tolerance of primary target. Alignment gauge 2670-5772 is applicable for the RADS.

504. PERMANENT ECHOES REGISTRATION CHECKS.

a. Object. To verify correct registration of the permanent echoes with the video map.

b. Discussion. This procedure is a functional check to ensure that each RADS/DBRITE display and video map properly register.

c. Test Equipment Required. None.

d. Conditions. This test may be conducted while the operational program is being executed. This test must be coordinated with AT. When operating with the CTS, use the procedure in paragraph 524c.

e. Detailed Procedures. Bring up the background maps on each display. Verify that the permanent echoes are over the appropriate map symbols and are within standards found in commissioning data. Digital radars should verify that at least one certified return such as an MTI reflector, Parrot, permanent echo or other permanent target is over the appropriate map symbol and is within standards found in commissioning data.

505. DEDS (RADS AND DBRITE) VISUAL CHECKS.

a. Object. To visually check the operation of the displays.

b. Discussion. This is a functional check of each operational display.

c. Test Equipment Required. None.

d. Conditions. This procedure may be used during scheduled Airway Facilities (AF) system time. These checks must be made while the operational program is being executed. The test must be fully coordinated with AT.

e. Detailed Procedures.

(1) Verify map alignment and positioning on permanent echo. When operating with the CTS, use the procedure in paragraph 524c.

(2) Verify correct information in system data area (clock incrementing normally).

(3) Verify correct operation of intensity, range, and off–center controls.

(4) Verify ability to select controller tracks via quick–look switches.

(5) Verify correct location of DDAS RTQC test target.

(6) Check the legibility and quality of the alphanumerics.

506. VIDEO MAP ACCURACY CHECK.

a. Object. To ensure proper alignment of the map video with radar returns.

b. Discussion. This test shall verify correct map alignment with the radar returns. The test may be conducted with known fixes or targets–of–opportunity to verify runway centerline alignment and navigational aid alignment.

c. Test Equipment Required. None.

d. Conditions. The test can be performed during scheduled maintenance time or during operational time after coordinating with AT service. When operating with the CTS, use the procedure in paragraph 524c.

e. Detailed Procedures. Use either radar Permanent Echo targets that have been flight checked or surveyed, or targets–of–opportunity or digitally generated targets to verify map positioning.

507. ONSS THROUGH THE DDAS.

a. Object. This check determines the ONSS of the beacon and ARTS systems. This check is not required when operating with the CTS.

b. Discussion. This check is used to generate a simulated beacon target suitable for computer processing. The simulated targets are routed through the beacon and ARTS which provide a measure of ONSS.

c. Test Equipment Required. Beacon test set FA-7270 or equivalent.

d. Conditions. These checks must be made while the operational program is being executed. The test can be performed during scheduled maintenance time or during operational time after coordinating with the AT service. For sites equipped with the MODE-S system, this test must be performed with the MODE-S system operating in the IBI mode.

e. Detailed Procedures. Two procedures are provided for this check; either procedure is acceptable for performing MDS. The first setup must be used if a range/azimuth gated test set is unavailable.

(1) Nongated Test Set.

(a) At the indicator site, connect the narrowband sensitivity trigger (NBST), located in the ARTS IIE junction box, to a spare landline that connects to the beacon transmitter site.

(b) At the beacon transmitter site, terminate the spare landline with 75 ohms and connect the landline to the beacon radio frequency (RF) test set, FA-7270, or equivalent.

(c) Turn OFF system stagger.

(d) Connect the RF signal output of the beacon test set to the beacon receiver directional coupler.

(e) Set the test set to the discrete code 6664 (coordinate the discrete code with ATC/Data System Specialist (DSS) personnel) and set the delay to the same range used with making a decoder sensitivity check. The altitude readout will be 53,600 feet.

(f) Adjust the output of beacon test set for one strong target (5-10 dB above tangential sensitivity).

(g) At the indictor site, start a FDB on the test set simulated target.

(h) Decrease the beacon test set output in increments of one dB per scan until CST is displayed in the FDB.

(i) Increase the beacon test set output one dB per scan until the CST is no longer displayed. This reading is a data block MDS.

(j) The data block MDS shall be within six dbs of tangential sensitivity as recorded during commissioning of ATCBI, and 3 dB for MODE-S.

(2) Gated Test Set.

(a) At the beacon transmitter site, set up the beacon test set to provide a single target whose azimuth is equal to 23 transmitter interrogations. The test set ACP setting can be calculated as follows:

$$ACP = 23 \times (4096 \div SR) \times (1 \div PRF)$$

where:

SR = Scan rate of antenna in seconds
PRF = Non staggered interrogation rate of beacon in Hertz (Hz)

(b) Position the beacon test set for a convenient target delay.

(c) Use the beacon pretrigger to trigger test set.

(d) Connect the rf signal output of the beacon test set to the beacon receiver directional coupler.

(e) Position the test set code to 6664. The displayed altitude shall be 53,600 feet.

(f) Adjust the output of the beacon test set for a strong target (5-10 dB above tangential sensitivity).

(g) At the indicator site, start a FDB on test set target.

(h) Decrease the beacon test set output amplitude in increments of one dB per scan until CST is displayed in the FDB.

(i) Increase the beacon test set output one dB per scan until CST is no longer displayed. This reading is the ONSS.

(j) The ONSS shall be within six dB of tangential sensitivity as recorded during commissioning of ATCBI, and 3 dB for MODE-S.

508. MTI REFLECTOR OPERATION.

a. Object. This check determines the usability of the reflector as a reference MTI target in calibration and alignment of the displays. This check is not required when operating with the CTS.

b. Discussion. This check is used to ensure that the target/scan ratio of the MTI reflector is within tolerance.

c. Test Equipment Required. None.

d. Conditions. This procedure can be conducted on the maintenance indicator or an operational display if coordinated with ATC personnel.

e. Detailed Procedures.

(1) Observe a minimum of 20 antenna scans on the display and count the number of scans that a particular reflector presents as a usable target.

(2) Record the usable target/scan ratio as:

$$\frac{\text{Number of scans reflector identified}}{\text{Number of scans observed}}$$

(3) The decimal fraction of step (2) above should be 0.8 or greater.

509. ARTS IIE APC UPS CHECK.

a. Object. To verify that the ARTS IIE will continue to run during a power outage until the engine generator takes over the load.

b. Discussion. None.

c. Test Equipment Required. None.

d. Conditions. This procedure may be performed during scheduled maintenance time or during operational time after coordinating with Air Traffic personnel.

e. Detailed Procedures. To perform the APC UPS check, perform the following steps:

(1) Ensure the ARTS system is fully operational (normal target processing on the RADS).

(2) Remove power from the ARTS APC by putting the appropriate circuit breaker(s) in the power panel on the wall to the off position.

(3) Wait for 5 minutes. During this time, observe that the ARTS system continues processing data normally.

(4) Return power to the ARTS APC by putting the circuit breaker(s) from (2) above to the on position.

(5) Observe normal ARTS system processing, and normal indications on the APC UPS front panel.

510. OVERALL RADAR/ARTS IIE SYSTEM SENSITIVITY CHECK.

a. Object. To determine that the overall system sensitivity, from the respective radar receiver to the operational displays, is within the established operating limits. This check is not required when operating with the CTS.

b. Discussion. This check is intended to verify operation of the MTI and normal video channels and not every type video signal. Operation of individual subsystems such as the video enhancer is checked on an individual basis at the transmitter site. The receiver sensitivity measurement indicates the condition of the transmitter site equipment up to the input of the remoting equipment. This measurement extends that check to cover the ARTS IIE display subsystems. Thus, it becomes a joint effort at the ASR and ARTS IIE sites.

c. Test Equipment Required. S–band test set.

d. Conditions.

(1) The initial overall system sensitivity measurements should be made when all equipment, including the radar receiver, remoting equipment, and display equipment are known to be operating at a peak performance. The system sensitivity upon which commissioning is based shall be recorded in dBm on the commissioning data forms and shall be used as the standard value for the system.

(2) Since this check will present a test signal on all displays, considerable coordination is required between ATC personnel, technicians at the radar site, and the technician taking readings on the display.

(3) Display losses and human factors may contribute to degradation of the system measurement. Therefore, the check should be made by a technician (observer) who is experienced with the display where the check is being made.

e. Detailed Procedures.

(1) Ensure that receiver functions are set for maximum sensitivity.

(2) Have the radar site technician connect the S–band test set to the incident coupler and adjust the delay control for a test signal at a convenient range outside the ground clutter area.

(3) The radar site technician should identify the test signal for the display observer by decreasing the test set attenuation and giving the approximate range.

(4) Prevent integration of the signal on the display, by varying the test target range slightly (approximately 2 miles–3.7 km) on successive antenna rotations.

(5) Increase the test set attenuation in small increments until the display observer can just discern the test signal on the display while observing normal video.

(6) Change the test signal delay and have the observer verify the signal by reporting its range.

(7) Adjust MTI gate to view MTI on the display and repeat steps (3) through (6) of this paragraph.

(8) If the checks are within established limits, disconnect test equipment and terminate the check.

511. OVERALL ATCRBS/ARTS IIE SYSTEM SENSITIVITY CHECK OSS.

a. Object. To determine that the OSS of the ATCBI equipment, with Sensitivity Time Constant (STC) on, is within tolerance. This check is not required when operating with the CTS.

b. Discussion.

(1) The initial OSS measurement shall be made when the performance of components for the system meet or exceed their commissioned performance values. These individual components, including transmitter–receiver, defruiter, remoting equipment, decoders, and display equipment must be operating at peak performance. This OSS, expressed in dBm, is recorded and used as the standard value for the system.

(2) Gain of the ATCBI receiver is reduced as a function of range by STC action. After optimum values for STC and OSS have been established, these values must be maintained for optimum system performance.

(3) The commissioned value of STC attenuation at the range of the test target shall be used when measuring OSS with STC on.

(4) ASR Facility Broadband OSS Check. The OSS check tests a large portion of the wide–band systems including interrogator receiver, defruiter, remoting equipment, and decoding and display equipment. Close attention should be given to the noise level and defruiter threshold since these parameters greatly affect the OSS.

c. Test Equipment Required. Oscilloscope and beacon test set.

d. Conditions. Place the ATCBI channel online with STC ON and stagger OFF. Coordination with indicator site personnel is required for this check.

e. Detailed Procedures. ASR Facility Broadband Check.

(1) Calibrate the RF test set for 1090 Megahertz (MHz) pulsed operation. Refer to the test set instruction book. Using a calibrated 50 ohms RF cable (RG-58/U or equivalent), connect the test set RF output to the coupler, on the selected channel. Adjust the test set delay and azimuth gating, if available, so that the test pulse results in minimum interference with ATC operations.

(2) The range of the test signal is determined by measuring the time interval between the P3 pulse and the test pulse (first pulse of a code train).

(3) On the video test set, adjust 0.45 μs–wide pulses and select code 0000 or a test code required by the decoding equipment.

(4) To measure OSS, adjust the test set attenuator until the indicator site personnel observe a test signal on the operational display that is displayed approximately 50 percent of the time (50 percent breakup). Operational displays should be alternated each time this check is made. The OSS (expressed in dBm) is the sum of the test set attenuator setting, RF cable attenuation, coupler attenuation, and the STC attenuation at the selected range.

512. AZIMUTH PULSES.

a. Object. To ensure that the Azimuth Pulse Generator (APG) or Azimuth Data Converter (ADC) is providing proper signals for system operation.

b. Discussion. Azimuth data is generated by either an APG or synchronous generator located in the antenna pedestal. In the case of an APG, the signal consists of digital pulses called ACPs and ARP. One ARP is transmitted every antenna rotation between ACP 4096 and ACP 1. The synchronous generator provides only analog waveforms whose relative phase is correlated to the antenna position by a 60 Hz reference voltage. These signals are transmitted to the indicator site via RML, fiber optics, or landlines. At the site, the synchro data is converted to digital by the ADC card before distribution through the ASC card. The digital data is distributed directly from the ASC. This procedure provides measurement techniques for both cases.

c. Test Equipment Required. Oscilloscope and digital counter.

d. Conditions. The antenna must be rotating to complete these checks.

e. Detailed Procedures.

(1) Connect the oscilloscope to view ARP and ACP signals at the ARTS IIE demarcation box. Check the amplitude and pulse width of ARP and ACP signals.

(2) Verify the ARP is generated once for each antenna rotation and falls between two adjacent ACPs.

(3) Connect the digital counter to the ACP signal and ascertain that 4096 pulses are generated for each antenna rotation. Connect the oscilloscope to the same point and measure the time variation of the ACP interval.

513. DECODED VIDEO GENERATION.

a. Object. To verify correct decoding and decoded video generation by the DDAS. This procedure is not required when operating with CENRAP.

b. Discussion. This procedure is used to generate a simulated beacon target for DDAS decoding. The simulated target is routed through the beacon system and the DDAS to provide decoded video to the RADS and DBRITE.

c. Test Equipment Required. Beacon test set FA-7270 or equivalent.

d. Conditions. These checks must be made with the DDAS in the online mode to ensure live video processing by the DDAS.

e. Detailed Procedures. Two methods of providing the simulated beacon target are described. The first method must be used if an azimuth gated test set is unavailable. It is suggested that the display at which the test is to be conducted be selected on a rotating basis to more thoroughly check the system.

(1) Nongated Test Set.

(a) At the indicator site, connect the NBST, located in the ARTS IIE junction box, to a spare landline that connects to the beacon transmitter site.

(b) At the beacon transmitter site, terminate the spare landline with 75 ohms and connect the landline to the beacon RF test set, FA-7270, or equivalent.

(c) Turn OFF system stagger.

(d) Connect the RF signal output of the beacon test set to the beacon receiver directional coupler.

(e) Adjust the output of beacon test set for one strong target. (5-10 dB above tangential sensitivity-F1 and F2 pulses selected).

(f) Verify that the simulated beacon target appears on the RADS/DBRITE.

(g) Set the test set to each of the 10 site selected code families (AB code digits) as set into the code select box thumbwheel switches.

(h) Verify correct pattern video generation on RADS/DBRITE for each of the 10 code families.

(2) Gated Test Set.

(a) At the beacon transmitter site, set up the beacon test set to provide a single target whose azimuth is equal to 23 transmitter interrogations. The test set ACP setting can be calculated as follows:

ACP = 23 x (4096÷SR) X (1÷PRF)

where:

SR = Scan rate of antenna in seconds
PRF = Non staggered interrogation rate of beacon in Hz

(b) Set the beacon test set for a convenient target delay.

(c) Use the beacon pretrigger to trigger test set.

(d) Connect the RF signal output of the beacon test set to the beacon receiver directional coupler.

(e) Adjust the output of beacon test set for one strong target. (5-10 dB above tangential sensitivity -F1 and F2 pulses selected).

(f) Verify that the simulated beacon target appears on the RADS/DBRITE.

(g) Set the test set to each of the 10 site selected code families (AB code digits) as set into the code select box thumbwheel switches.

(h) Verify correct pattern video generation on RADS/DBRITE for each of the 10 code families.

(3) **Decoded Video Verification.** Verify the results specified in TI 6190.11B, par 9.9.2 (as–ax) are obtained when each site selected code family is entered into the beacon test set.

(4) **Emergency Decoding.** Verify the results specified in TI 6190.11B, par 9.9.2 (au–bc) are obtained when the test set code is set for the 7500, 7600, and 7700 emergency codes.

514. RADAR BEACON DATA PATH CHECK.

a. Object. To ensure the proper operation of the radar beacon data paths.

b. Discussion. This test will verify proper operation of the radar beacon data paths. This procedure uses the SMC-PC system configuration program group to execute the tests. The number of paths to be tested is dependent upon the type of radar at each site.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed during scheduled maintenance time or during operational time after coordinating with AT service. The technician will be familiar with the current version of the operational program, equipment configuration, and operating instructions of the facility. The test must be fully coordinated with AT.

e. Detailed Procedures. Perform the sensor configuration function contained in the system configuration program group on the SMC-PC.

(1) When the sensor configuration screen comes up, disable auto switching by left clicking on the green "E" in the auto switch column and left clicking on the "apply" button on the right side of the sensor configuration window.

(2) In the "Lock On" column, left-click on the "arrow" button to show what paths are available. Digital radar sites will have paths 0, 1, and 2. ASR-8 and below sites could have paths 0, or 0 and 1, depending upon whether there is a TDX 200 and BVR or AIU2.

(3) Lock the sensor on each available path by left clicking on the "apply" button.

(4) Ensure that each path has a normal display presentation on the RADS.

(5) When completed, set the path to "0" and enable auto switching; then left-click on the "OK" button on the right side of the sensor configuration window.

(6) For additional assistance, see the sensor configuration manager paragraph in the CSOM/SUM.

515. MSAW/CA FUNCTIONAL TEST.

a. Object. To ensure proper operation of MSAW/CA Alarm.

b. Discussion. This test will verify proper operation of the MSAW/CA alarms while under program control. This procedure uses the Training Test Target Generator (TTG) and uses test targets from a training scenario. The scenario as delivered to each facility by the Operational Support Facility (OSF) is specifically adapted for each ARTS IIE facility. It will verify that the current operational program can detect LA and CA conditions, activate the MSAW/CA software and hardware functions, display the appropriate visual warning on the display(s), sound the aural alarm(s), and provide the CDRS file. It will test designated locations within the ARTS IIE boundaries.

c. Test Equipment Required. None.

d. Conditions. The test must be coordinated with ATC, and performed during scheduled maintenance time. The technician will be familiar with equipment configuration, current version of the operational program, the scenario compatible with the operational program, operating instructions, and documentation included with the scenario and any applicable ARTS IIE documentation.

e. Detailed Procedures. The technician will perform this test in accordance with procedures that accompanied the scenario provided to the facility. Successful no fault execution will be determined by monitoring for correct scenario replay, display indications, and aural alarms as described in the scenario instructions, and documentation. Tests should be performed by utilizing a different display each time to ensure alarm sounds at correct display.

f. Return the Display and/or System to Normal Operation.

516. AACU, DCI, AND ECHO DATA.

a. Object. To ensure proper communication between the DCI and the AACU.

b. Discussion. This test will check the data from the AADC on the DCI board to the AACU, and echo data from the AACU to the AADC on the DCI board.

c. Test Equipment Required. Oscilloscope.

d. Conditions. This procedure may be used during scheduled AF system time. These checks must be made with the system off–line and the AACU diagnostic running.

e. Detailed Procedures.

(1) Execute the Aural ALARM ON OFF ECHO DATA TEST Diagnostic per TI 6190.22A, paragraph 4.4.8.1.3.

(2) Connect an oscilloscope to the DAT and GRD test points on the AACU front panel.

(3) Verify that the waveform is similar to the BOX DATA waveform in TI 6190.11B, figure 2-19.

(4) Connect an oscilloscope to the ECH and GRD test points on the AACU front panel.

(5) Verify that the waveform is similar to the ECHO DATA AT CONT waveform in TI 6190.11B, figure 2-19. (This waveform will have the VALID EOM AT CONT.BOX waveform in figure 2-19 added to the end.)

(6) Disconnect oscilloscope, terminate AACU diagnostic, and return system to normal operation.

517. AACU MINIMUM VOLUME ADJUSTMENT.

a. Object. To set the minimum volume level of the aural alarm.

b. Discussion. This procedure will adjust the aural alarm volume level with the volume level at minimum.

c. Test Equipment Required. Oscilloscope.

d. Conditions. The test must be fully coordinated with AT.

e. Detailed Procedures.

(1) Determine the Aural Alarm Speaker (AAS) with the longest cable length.

(2) Remove the four screws securing the AAS faceplate to the AAS and remove the faceplate. Lay the faceplate down so the back of the speaker is accessible.

(3) Using an oscilloscope, attach the ground lead to the black wire from the speaker, and attach the probe to the white wire at the terminal board TB1.

(4) Fully turn the volume control on the AACU front panel counterclockwise.

(5) Open the AACU (front panel swings out); press the appropriate test button and adjust R3 on the AACU controller board so that a 1–volt peak–to–peak signal is obtained on the oscilloscope. (The AACU controller board is mounted on the rear of the front panel.)

(6) When the reading from the peak–to–peak signal is obtained, disconnect the oscilloscope from the speaker and remount the faceplate; close the AACU front panel.

518. BEACON VIDEO OUTPUT CHECKS.

a. Object. To check the characteristics of the beacon video.

b. Discussion. This test provides a single performance check for compensated or uncompensated beacon inputs.

c. Test Equipment Required. Beacon test set FA-7270 or equivalent and oscilloscope.

d. Conditions. The test can be performed during scheduled maintenance time or during operational time after coordinating with AT and indicator site personnel. The ATCBI online channel STC is switched OFF for the test.

e. Detailed Procedures.

(1) Calibrate the beacon test set RF output for 1090 MHz pulsed operation. Refer to the test set instruction book. Using a calibrated 50 ohm RF cable (RG — 58/U or equivalent), connect the test set RF output to the coupler on the selected channel. Adjust the test set range delay so that the test pulse results in minimum interference with ATC operation. Adjust the beacon test set video output for .45 μsec wide pulse with a select code of 7777 and a total RF attenuation (test set attenuation, cable, and RF coupler) of 63 dBm at the receiver input. Ensure the ATCBI online channel STC is OFF.

(2) At the APC, measure the video signal characteristics of amplitude and pulse width at HTB2-7 in the DDAS with ASC-1 selected. Select ASC-2 and repeat the measurements.

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SECTION 2. OTHER MAINTENANCE TASK PROCEDURES

519. A/N POSITIONING CHECK.

a. Object. To ascertain correct placement of A/N characters from input data messages.

b. Discussion. This check is intended to verify correct placement of A/N characters over the expected physical position on the DEDS. The placement will be determined indirectly by observing the display test pattern and alignment overlay for RADS and the range rings for the DBRITE.

c. Test Equipment Required. None.

d. Conditions. This check must be fully coordinated with AT since it requires the use of the DTP.

e. Detailed Procedures. Either the operational program display test pattern or maintenance diagnostic test pattern may be used. For the RADS, use alignment overlay and verify correct placement (x,y) of '+' symbol for the alignment range.

520. DEDS (RADS AND DBRITE) LAMPS AND KEYBOARD CHECKS.

a. Object. To verify that all ARTS IIE DEDS (RADS and DBRITE) lights and keyboards are error free.

b. Discussion. This procedure is a functional check of the DEDS keyboard and the PEM operation and provides a visual check of all DEDS lights.

c. Test Equipment Required. None.

d. Conditions. This procedure may be run during the execution of the operational program provided care is exercised not to interfere with the ATC. This test must be coordinated with AT.

e. Detailed Procedures.

(1) Check keyboard and PEM operation by making several entries using the keyboard and PEM (i.e., repositioning the system data area). Observe normal operation and no parity error printouts in the preview area.

(2) Check keyboard lights by varying the intensity control. Check to ensure that all lights are properly lit.

521. RADS FAN CLEANING AND CHECKS.

a. Object. To clean and verify proper operation of fans in the RADS cabinet.

b. Discussion. None.

c. Test Equipment Required. None.

d. Conditions. The RADS CRT chassis and card rack assembly must be in the maintenance position. This procedure may be performed while the operational program is running with proper coordination with air traffic personnel.

e. Detailed Procedures.

(1) With the RADS power switched OFF, remove, inspect, and clean the fan tray on the bottom of the card rack assembly. Use a soft, lint free cloth to remove any dust from the fan blades and ensure the blades rotate freely. Reinstall fan tray.

(2) Inspect and clean the two fans on the lower rear of the RADS cabinet. Ensure the blades rotate freely.

(3) Inspect and clean the fan on the deflection amplifier assembly. Ensure the blades rotate freely.

(4) Turn the RADS power switch ON. Observe that all fans rotate and listen for unusual noise. Replace if necessary.

522. UPS CHECK.

a. Object. To verify that the output of the UPS power supply 1J/PS1 provides (120 V ac nominal). The main purpose of this check determines the proper functional condition of the UPS battery and to light the Replace Battery LED when the battery condition is below normal.

b. Discussion. This check verifies that the UPS is operating correctly and, during this

test, ac line voltage is produced by the UPS circuitry using the battery as its source of power. This ac voltage is momentarily switched to the UPS load circuit. If the battery test result indicates that the battery condition is low, the Replace Battery LED is lit. When the indicator is lit, it may not be noticed unless specific action is taken to check its operating state.

c. Test Equipment Required. None.

d. Detailed Procedures.

(1) Ensure that the APC power is ON.

NOTE: Refer to manual TI 6190.12A, table 3-1 and figure 3-1 for APC Control panel switches and table 3-5 and figure 3-5 for the UPS controls and indicators.

(2) Press and hold UPS TEST (power ON) pushbutton until UPS beeps (about 2–seconds) and then release. This action initiates the UPS self–test. Note the status of the UPS panel indicators. The online indicator should START BLINKING. While the indicator is blinking, the on–battery indicator should light and go out, and the replace battery and overload indicators should remain OFF.

(3) Observe that the SP voltage indicators, (LEDS), are lit green (normal).

(4) Plug in the spare UPS to any convenient electrical outlet and charge the battery for 4 hours.

523. DIGITAL RADAR OVERALL/ARTS IIE SYSTEM SENSITIVITY CHECKS.

The current MDS sensitivity checks are no longer applicable at ARTS IIE sites which interface with a digital radar.

524. MAINTENANCE PROCEDURES FOR CENRAP.

This section establishes the procedures for accomplishing the unique maintenance activities required for the operation of CENRAP. The procedures contained herein are those which cannot be found in the equipment instruction books.

a. Technical Performance Record Entries. Monthly entries are required on FAA Form 6000-8. Records of certification shall be made on FAA Form 6030–1, Facility Maintenance Log and appropriate log in the Automated Logging System.

b. Registration Between Video and Computer Generated Data With ASR APG/Triggers Video.

(1) **Object.** To determine that the difference in range/azimuth between the ATCBI broadband beacon video and the digital beacon video provided by the CENRAP is within a maximum range value of 2 nmi for all range settings.

(2) **Discussion.** The digital target position on the ARTS display in the CENRAP mode could appear to lag the analog (broadband) target position by up to 2 nmi because of the antenna scan range difference between the ASR and the Air Route Surveillance Radar (ARSR). This apparent difference is accommodated by the ATC procedures.

(3) **Test Equipment Required.** None.

(4) **Conditions.** This test must be conducted while the operational program is executing. Full coordination with local and center AT personnel is required.

(5) **Detailed Procedures.** After verification of the maintenance and performance procedures, the ARTS technician should perform the following steps:

(a) Request the SE to turn ON CENRAP at the ARTCC.

(b) Turn ON the CENRAP by executing the appropriate supervisory message.

(c) Verify the digital target position provided by CENRAP does not appear to be displaced from analog target positions in excess of 2 nmi for any range scale. Targets of opportunity may be used for this procedure.

(d) Verify the north mark target is aligned with the north mark map symbol, and the appropriate range mark, per paragraph 303f(1).

c. **Registration Between Map/Range Marks and Computer Generated Data with CTS.**

(1) **Object.** To determine that the range/azimuth of CENRAP, with the CTS, is within operating tolerances.

(2) **Discussion.** In the absence of broadband video, the CENRAP north mark target is used to verify display accuracy.

(3) **Test Equipment Required.** None.

(4) **Conditions.** This test must be conducted while the operational program is executing. Full coordination with local and center AT personnel is required.

(5) **Detailed Procedures.** After verification of the maintenance and performance procedures, the ARTS technician should perform the following steps:

(a) Request the SE to turn ON CENRAP at the ARTCC.

(b) Coordinate with ATC personnel and place the CTS in simulated mode.

(c) Turn ON the CENRAP by executing the appropriate supervisory message.

(d) Verify the North Mark target is aligned with the North Mark map symbol and the appropriate range mark, per paragraph 303f(1).

d. **CTS Checks.**

(1) **Object.** To verify the operating parameters of the ACP/ARP/radar pretrigger and the beacon trigger provided by the CTS.

(2) **Discussion.** None.

(3) **Test Equipment Required.** Oscilloscope.

(4) **Conditions.** The CTS should be in the nonsimulated mode. This test can be conducted while the operational program is executing.

(5) **Detailed Procedures.** Refer to the TI 6190.28, paragraph 4.1.2.4.

525. DDCP ALIGNMENT CHECK.

a. **Object.** To measure the synthetic beacon signal amplitude which is generated by the DDCP.

b. **Discussion.** This check measures the amplitude of the synthetic beacon signal which is generated on the DDCP. If the signal is out of tolerance, alignment references are provided.

c. **Test Equipment Required.** Oscilloscope.

d. **Conditions.** This test must be fully coordinated with AT, since the display under test must be removed from service.

e. **Detailed Procedures.**

(1) Use a coaxial tee connector and connect an oscilloscope to the synthetic beacon input coaxial connector at the rear of the RADS or at the top of the DBRITE cabinet. Be careful to maintain proper cable termination during this measurement.

(2) Measure the signal amplitude for compliance with the standards and tolerances.

(3) If an alignment is required, refer to TI 6190.12A paragraphs 6.4.2.3A or 6.4.2.3B.

526. EXTENDED DIAGNOSTICS – FLOPPY DRIVE.

a. **Object.** To ensure the proper operation of the floppy drive.

b. **Discussion.** This portion of the extended diagnostic test will verify proper operation of the floppy drive during the execution of the extended diagnostics when a DOS-formatted 3.5-inch floppy is inserted into the floppy drive prior to the extended diagnostic test execution.

c. **Test Equipment Required.** None.

d. **Conditions.** This test will be executed as a subtest of the extended diagnostics, assuming a formatted 3.5-inch floppy was inserted into the floppy drive prior to the extended diagnostic test execution.

e. **Detailed Procedures.**

(1) As stated, to ensure that this test is executed, a DOS-formatted 3.5-inch floppy is inserted into the floppy drive prior to the extended diagnostic test execution.

(2) If the floppy disk used for this test has been used previously and an error occurs, restart the test with a new DOS-formatted floppy in the floppy drive.

(3) If the test fails again with the new floppy, consider that the floppy drive may be defective.

527.-599. RESERVED.

CHAPTER 6. FLIGHT INSPECTION

600. GENERAL.

a. A flight inspection is required:

(1) Before an ASR and/or ATCBI/MODE-S facility commissioning or following a major modification to the ASR/ATCBI/MODE-S system.

(2) Periodically as specified in OA P 8200.1.

(3) After an antenna change, antenna pattern tilt change, or when it is suspected that there has been a change in the antenna pattern.

(4) After an aircraft accident in which the radar facility may have been a contributing factor.

(5) When the electronics technician or engineer deems it necessary to verify the operational capabilities of the equipment because of modifications or other circumstances affecting system performance.

(6) Whenever the sensitivity–time control/gain time control curve of the ATCBI receiver is adjusted to provide a greater gain reduction than the value flight–checked previously.

(7) Whenever directional output power of the ATCBI transmitter is reduced below the minimum output power level flight–checked previously.

(8) After installation of video map plate (or map overlay) to be used for ATC purposes; when navigational aides or fixes on the new map plate differ from those on map plates previously approved.

b. The instructions for inspections of the ASR and ATCBI systems are contained in section 215 of OA P 8200.1. Maintenance personnel should be fully aware of the material contained in other sections of OA P 8200.1 before participating in a flight inspection. Maintenance personnel are expected to cooperate fully with the flight inspection specialist and to provide necessary data for the discharge of the flight inspection responsibilities.

601. PREFLIGHT INSPECTION PREPARATION.

A thorough and complete understanding between ground personnel and the flight inspection crew is essential for a successful flight inspection. It is especially important that the entire flight check of the ATCBI facility be conducted using a side–lobe–suppression–equipped transponder that has been calibrated for –69 dBm sensitivity. The flight inspector should thoroughly brief the ground personnel of intended actions before the flight inspection. Maintenance personnel should prepare for a flight inspection in accordance with section 215.21 of OA P 8200.1. Such preparation should include the following actions by personnel responsible for the ground phase of the flight inspections.

a. Before a commissioning flight inspection, ascertain that all possible ground calibration and checking of equipment have been accomplished in accordance with applicable directives and instruction books.

b. Have qualified personnel available to change to standby power as required.

602. FLIGHT INSPECTION PARTICIPATION.

Maintenance personnel should familiarize themselves thoroughly with section 215.3 of OA P 8200.1. During flight inspection, maintenance personnel shall actively participate in the flight inspection in coordination with operations and flight inspection personnel. The flight inspection specialist shall be advised of any system deterioration during the progress of the flight inspection.

603. POSTFLIGHT INSPECTION ACTIONS.

Upon completion of the flight inspection, maintenance personnel shall accomplish the following actions:

a. If any adjustments or corrections were made, or if equipment was changed during the flight inspection, record meter readings or other data affected by the adjustment, correction, or equipment change.

b. Make available to the flight inspector all pertinent system parameters needed to complete the flight inspection report, such as, transmitter power, receiver sensitivity, etc.

c. Discuss with the flight inspector any problems encountered during the flight inspection

604.-699. RESERVED.

CHAPTER 7. GLOSSARY OF ACRONYMS AND TERMS

700. GLOSSARY.

A glossary of acronyms, terms, and signals is provided in the following paragraphs.

List of Acronyms. The acronyms used in this manual are listed below:

AACU	Aural Alarm Control Unit
AADC	Aural Alarm Device Controller
AAS	Aural Alarm Speaker
ac	Alternating current
ACID	Aircraft Identification
ACP	Azimuth Change Pulse
ADC	Azimuth Data Converter
AF	Airway Facilities
A/N	Alphanumeric
ANP	Alphanumeric Control Panel
APC	Acquisition Processing Cabinet
APG	Azimuth Pulse Generator
APS	Acquisition and Processing Set
ARP	Azimuth Reference Pulse
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
ARTS IIE	Automated Radar Terminal System (for use at airports with low to medium traffic)
ASC	Acquisition Signal Conditioner
ASR	Airport Surveillance Radar
AT	Air Traffic
ATC	Air Traffic Control
ATCBI	Air Traffic Control Beacon Interrogator
ATCRBS	Air Traffic Control Radar Beacon System
ATO	Air Traffic Operations
AUT	Autoload ROM Verification Test
BCD	Binary Coded Decimal
BPM	Beacon Performance Monitor
BRG	Beacon Reply Group
BTI	Beacon Trigger Interrupt
BUF	Device Controller/Buffer
BVC	Beacon Video Conditioner
CA	Conflict Alert
CBC	Computer Buffer Controller
CCA	Circuit Card Assembly
CD	Common Digitizer
CDRS	Continuous Data Recording Subsystem
CENRAP	Center Radar ARTS Presentaton
CFAD	Composite Flight Data Processing
CPFS	Computer Program Functional Specification
CRAD	Composite Radar Data Processing
CRC	Cyclical Redundant Checks
CRDA	Converging Runway Display Aid
CRT	Cathode–Ray Tube
CSB	Code Select Box
CSOM	Computer System Operator's Manual
CST	Coast
CTS	CENRAP Trigger Simulator
DA	DNIP Adapter
DADCP	Data Acquisition Device Controller/Processor
DAS	Data Acquisition Subsystem
db	Decibel
DBRITE	Digital Bright Radar Indicator Tower Equipment
dbm	Decibels above one milliwatt
dc	Direct current
DCI	Device Controller Interface
DCP	Display Control Panel
DDAS	Decoding Data Acquisition Subsystem
DDCP	Display Device Controller/ Processor

DEDS	Data Entry and Display Subsystem
DNIP	Display and Network Interface Processor
DP	Data Processor
DPS	Data Processing Subsystem
DSS	Data System Specialist
DTM	Digital Terrain Map
DTMG	Digital Terrain Map Generator
DTP	Display Test Pattern
DVG	Display Video Generator
DVM	Display Voltmeter
ETG	Enhanced Target Generator
FAA	Federal Aviation Administration
FDB	Full Data Block
FMU	Fixed Map Unit
ft	Foot/ Feet
HD	Horizontal Drive
Hz	Hertz
IBI	Interim Beacon Interrogator
IEEE	Institute of Electrical and Electronic Engineers
IFACT	Interfacility Test Program
IFDC	Interfacility Device Controller
IFDS	Interfacility Data Subsystem
IFR	Instrument Flight Rules
INTDAS	Interactive DAS Test
I/O	Input/Output
IP	Interface Processing
KBD	Keyboard
KDC	Keyboard Device Controller
KHz	Kilohertz
kHz	Kilohertz
km	Kilometer
LA/CA	Low Altitude/Conflict Alert
LAN	Local Area Network
LDB	Limited Data Block
LED	Light Emitting Diode
LRC	Longitudinal Redundancy Check
LRR	Long Range Radar
LSB	Least Significant Bit
m	Meter
MAIP	Mode S/Digital Radar Interface Processing
MDS	Minimum Discernible Signal
MHz	Megahertz
MM	Memory Module
MMU	Memory Management Unit
MODE-S	Mode Select
MOS	Metal Oxide Semiconductor
µs	Microsecond
MSAW	Minimum Safe Altitude Warning
MSB	Most Significant Bit
MTI	Moving Target Indicator
mV	Millivolt
NAS	National Airspace System
NAS-MD	NAS Configuration Management Document
NB	No Beacon
NBST	Narrowband Sensitivity Trigger
NCP	National Change Proposal
nmi	Nautical mile
PC	Personal Computer
PCB	Printed Circuit Board
PEM	Position Entry Module
PF	Power Failure
PPI	Plan Position Indicator
PRF	Pulse Repetition Frequency
QL	Quick Look
RADS	Radar Alphanumeric Display Subsystem
RAM	Random Access Memory
RAZ	Range Azimuth
RCB	Remote Control Box
RCVR	Receiver
RF	Radio Frequency
RML	Radar Microwave Link
ROM	Read–Only Memory
RSB	Radar Sort Boxes
RTC	Real–Time Clock

RTADS	Radar Tower Automation Display Service
RTDS	Remote Tower Display System
RTQC	Real–Time Quality Control
SCIP	Surveillance and Communication Interface Processor
SE	Systems Engineer
SECRA	Secondary Radar
SIFS	Sensor Interface Software
SMC	System Monitor Console
SMO	Systems Management Office
SP	System Processing
SPI	Special Position Indicator
SSI	Subsystem Interface
STC	Sensitivity Time Constant
SUM	Software User's Manual
SYSMON	System Monitor
TADS	TRACON Automation Display System
TARS	Terminal Automated Radar Service
TI	Technical Issuance
TRACAB	Terminal Radar Approach Control (Tower Cab)
TRACON	Terminal Radar Approach Control (IFR) Room
TTG	Test Target Generator
TTL	Transistor–Transistor Logic
TV	Television
UPS	Uninterruptible Power Supply
V	Volt
V ac	Volts Alternating Current
Vcc	Collector Supply Voltage (dc)
VD	Vertical Drive
V dc	Volts Direct Current
VF	Voice Frequency
VME	Versa Module Eurocard
V PP	Volts Peak–to–Peak
VR	Voltage Return
VRC	Vertical Redundancy Checks
V rms	Volts root–mean–square
NSN	National Stock Number
ONSS	Overall Narrowband System Sensitivity
OSS	Overall Broadband System Sensitivity
WS	Wire Strap
xtmr	Transmitter

701. LIST OF TERMS.

The unique terms used in this manual are listed below:

Beacon pretrigger	A sync pulse that precedes beacon zero range by a fixed time interval.
Beacon video	The target return received in response to a beacon radar interrogation.
Bracket pulses	A pair of pulses nominally spaced 20.3 μs apart, which frame a reply code.
Compensated Beacon Video	Beacon video signals that do not contain triggers.
Dead Time	The time between maximum system range and zero range.
Discrete Code	A 12-bit code expressed as four octal digits whose last 2 digits are not zero.
Garble	A condition that exists when 2 beacon replies are received within 40 μs and the leading edges of the pulses are overlapped.
Mode 3/A	Transponder responses for identification and tracking.
Mode C	Transponder response for automatic pressure altitude transmission.
Nondiscrete code	A 6-bit code expressed as 4 octal digits whose last 2 digits are zeros.
Scan	One antenna rotational period.
Special code	Certain nondiscrete codes designated as special because of unique actions required when detected. These codes are 7500, 7600, and 7700.
SPI	A special pulse used for identification purposes that occurs 4.35 μs after the last beacon bracket pulse.
Terminal Radar Approach Control Tower Cab (TRACAB) facility	The sum of all the equipment used to provide terminal radar service from a tower cab.
TRACON facility-Instrument Flight Rules room	The sum of all the equipment used to provide terminal radar service primarily from an Instrument Flight Rules (IFR) room.

702.-705. RESERVED.

APPENDIX 1. CERTIFICATION REQUIREMENTS

TABLE A-1. TERMINAL AUTOMATED RADAR SERVICE (TARS)

Service	*Certification Parameter*	*Ref. Par. Stds & Tol/Limits*
TARS providing automated terminal radar/beacon data processing, display and entry capability concurrent with analog radar and analog beacon display to the air traffic controllers. OR TARS providing automated terminal radar/beacon data processing, display and entry capability with: analog radar display; without: analog beacon, MSAW, and CA to the AT controller. OR TARS providing automated terminal radar/beacon data processing display and entry capability; with CENRAP	Error–free data processing, display, entry and interfacility communication capability as evidenced by current radar, beacon, or CENRAP (if applicable), and ARTS certification. AND Verification that the TARS is performing its intended function as evidenced by: — Echo Printer or SYSMON printouts indicating normal overall operation (if printouts available) and — Proper information being presented correctly on the control room/display(s) (This check must be made while the current version of the operational program is being executed). AT personnel shall be advised immediately of any certification actions that would impact AT operations.	The latest editions of Orders 6310.2, 6310.9, 6310.10, 6310.19, 6310.30, 6360.1, 6360.14, 6365.3, 6410.18, and this handbook.

NORMAL CERTIFICATION INTERVAL: Weekly

PERSONS RESPONSIBLE FOR CERTIFICATION: ATSS with certification authority

CERTIFICATION ENTRY IN FACILITY MAINTENANCE LOG: TARS Certified

TABLE A-2. ARTS IIE TERMINAL ATC AUTOMATION SYSTEM (ARTS) [1]

Service	*Certification Parameter*	*Ref. Par. Stds & Tol/Limits*
Sensor Interface Capability. Provides beacon video data to the ARTS and radar/beacon video to the displays.[1]	Radar/Beacon video levels within required tolerance levels as evidenced by:	303
	— current certification of radar/beacon systems, DBRITE and,	Appropriate Maintenance Handbook
	— error free display of data on the DEDS and,	
	— normal printouts on the Echo printer or SYSMON operational program printouts (if printouts available)	301
	Accurate conversion of analog beacon data into digital target reports as evidenced by:	
	— registration of alphanumeric beacon and analog beacon symbols and,	
AND	— ground based beacon transponder target registration on DEDS (if available) and,	
	— normal DAS printouts on the Echo printer or SYSMON. (if printouts available), and	
	— normal DAS operation as observed on front panel indicator lights, and correct decoded video generation.	305d
Track Processing Capability. Performs the data processing prior to display.	Error free processing of beacon data into display format as evidenced by:	
	— error free cycling of the operational program and,	301
	— proper operation of controls and status indicators and,	
AND	— normal printouts on the Echo printer or SYSMON printouts (if printouts available)	
	— proper operation of MSAW/CA alarm	515

TABLE A-2. ARTS IIE TERMINAL ATC AUTOMATION SYSTEM (ARTS) [1] (Continued)

Service	*Certification Parameter*	*Ref. Par. Stds & Tol/Limits*
IFDS Capability. Provides 2400 bits/second interfacility data communication capability.	Appropriate operation of the ARTS-ARTCC data link as evidenced by: — operational program handoffs to ARTCC and, — normal operation of controls and status indicators and, — normal Echo printer or SYSMON printout (if printout available)	311
AND **Mode–S/Digital Radar Serial Interface Capability.** If applicable provides interface processing of beacon data into a format acceptable for further processing by the SP when using either digital radar or Mode–S inputs	Accurate reformatting of target data into target reports as evidenced by: — Registration of A/N beacon symbols — Ground based beacon transponder target registration on DEDS (if available) and, — Normal printouts on Echo printer or SYSMON printout (if printouts available)	301

NORMAL CERTIFICATION INTERVAL: Event Based

PERSONS RESPONSIBLE FOR CERTIFICATION: ATSS with certification authority

CERTIFICATION ENTRY IN FACILITY MAINTENANCE LOG: ARTS IIE Certified

NOTE: 1 When using the terminal primary radar with CENRAP beacon, analog beacon is not required for ARTS IIE certification. When using the CTS, primary radar and analog beacon are not required for ARTS IIE certification.

TABLE A-3. RADAR TOWER AUTOMATION DISPLAY SERVICE (RTADS)

Service	*Certification Parameter*	*Ref. Par. Stds & Tol/Limits*
RTADS Provide terminal processing to Radar Tower Air Traffic Controllers	Knowledge that the Automated Radar Terminal System (ARTS) is certified.	Table A-2
	Knowledge that the constituent FAA Radar and Interrogator systems are currently certified.	Appropriate Maintenance Handbooks
	Knowledge that the RTDS or DBRITE is certified.	
	For DBRITE Displays – The target A/N registration to specified tolerance.[1]	310b
	MSAW/CA alarm.	Multifunction, 2, Alarm, M or C or Targets of opportunity

NORMAL CERTIFICATION INTERVAL: Weekly

PERSONS RESPONSIBLE FOR CERTIFICATION: ATSS with certification authority

CERTIFICATION ENTRY IN FACILITY MAINTENANCE LOG: RTADS Certified

NOTE: [1] When using the CTS, use par 303f(1) as the standard for display accuracy.

TABLE A-4. TRACON AUTOMATION DISPLAY SYSTEM (TADS)

Service	*Certification Parameter*	*Ref. Par. Stds & Tol/Limits*
TADS Provide Data Entry and Display Capability to Air Traffic Controllers. Provides analog radar, analog and A/N beacon capability to the controller, with related control and entry functions.[1]	For ARTS IIE RADS Displays (FA-9030)- Display of analog radar, analog and alphanumeric beacon, maps, and tabular information to the controller, with related control and data entry functions within specified tolerance and limits for range, azimuth, target/map registration and target/A/N registration.[2]	310a
	Knowledge that the Automated Radar Terminal System (ARTS) is certified.	Table A-2
	Knowledge that the constituent FAA Radar and Interrogator systems are currently certified.	Appropriate Maintenance handbooks

NORMAL CERTIFICATION INTERVAL: Event Based

PERSONS RESPONSIBLE FOR CERTIFICATION: ATSS with certification authority

CERTIFICATION ENTRY IN FACILITY MAINTENANCE LOG: TADS Certified

NOTE:[1] When using the terminal primary radar with CENRAP beacon; analog beacon is not required for DEDS certification. When using the CTS, primary radar and analog beacon are not required for DEDS certification.

NOTE: [2] When using the CTS, use par 303f(1) as the standard for display accuracy.

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APPENDIX 2. FAA FORM 1800-2 NAS CHANGE PROPOSAL

CASE FILE/NAS CHANGE PROPOSAL (Please type or print neatly)	**FOR CM USE**	Case File Received Date	NCP Issuance Date	NCP Number	Page 1 of____

1. Case File Number	2. Prescreening Office ☐ ASE-500 ☐ ☐ ANS-200 ☐ AFE-100 ☐_____ APM-100
3. Scope of Change ☐ Local ☐ National ☐ Test ☐ CIP	4. Program Element ☐ Air Traffic Control ☐ Interfacility Comm ☐ _____ ☐ Ground-to-Air ☐ Maint & Opns Support
5. Life-Cycle Baseline Acquisition: ☐ Requirements Determination ☐ Functional ☐ Design ☐ Allocated ☐ Product ☐ Operational	6. Priority ☐ Normal ☐ Time-Critical ☐ Urgent
7. Supplemental Change Form ☐ ECR/ECP ☐ TES ☐ _____ 7a. Supplemental Change No_____ 7b. Supplemental Change Initiation Date _____	

8. Case File Originator	9. Originator's Organization	10. Telephone Number	11. Case File Initiation Date

12. Baseline Document Type ☐ CPFS ☐ SPEC ☐ MTBK ☐ _____ ☐ TI ☐ DWG ☐ IRD/ICT	13. Baseline Document Number(s)
14. CI Subsystem Designator 15. FA Type	16. CI Component Designator

17. Facility Identifier (FACID)	18. Facility Code (FACCODE)	19. Cost Center Code	20. Software System Version

21. Title (as descriptive as possible including location and runway number is applicable)

22. Description: (a) Identification of problem, (b) proposed change, (c) interface impact, (d) cost, (e) benefits, (f) schedule, (g) justification of time-critical/urgent status

Blocks 1 through 22 are to be completed by originator and/or the NCP coordinator. If a block is not applicable, write N/A. Attach additional sheets if necessary. See current revision of NAS-MD-001 for detailed completion instructions.

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Case File Number	NCP Number	Page 2 of____

23. Name and Title of Originator's Immediate Supervisor (Type//Print Clearly)	Signature	Date

24. Facility/Sector Review (AT/AF)

Name	Routing Symbol	Date	Concur	Non-Concur

Routing Symbol	Signature
Date	
Routing Symbol	Signature
Date	

24a. Comments

(Attach additional sheets if necessary)

25. Regional Review (AT/AF/FS/AS)

Name	Routing Symbol	Date	Concur	Non-Concur

☐ Recommend Approval (Enter into CM/STAT. Forward to Prescreening) ☐ Disapprove (Return of Originator)

Routing Symbol	Signature
Date	
Routing Symbol	Signature
Date	
Routing Symbol	Signature/Configuration Mgr/NCP Coordinator/ Reg Exec Sec
Date	

25a. Comments

(Attach additional sheets if necessary)

26. Prescreening Review Organization Comment

(Attach additional sheets if necessary)

Reviewers	Routing Symbol	Date	Concur	Non-Concur
Recommended Must Evaluators				

☐ Recommend Approval ☐ Recommend Disapproval

(Return original to originating office through the Regional NCP Coordinator)

Routing Symbol	Signature
Date	

27. Configuration Management Use Only