ORDER

6340.20

SOLID STATE RECEIVER/DIGITAL MOVING
TARGET INDICATOR (SSR/DMTI) MODIFICATION
KITS FOR VACUUM TUBE AIR ROUTE
SURVEILLANCE RADARS (VT ARSR)

PROJECT IMPLEMENTATION PLAN

JULY 6, 1988

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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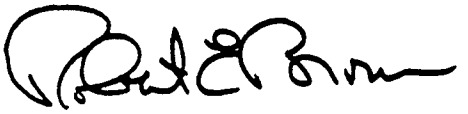
Initiated By: APS-310

FOREWORD

This order describes the management structure and direction for the implementation and integration of the Solid State Receiver/Digital Moving Target Indicator (SSR/DMTI) modification kit into the receiver subsystem of 64 vacuum tube air route surveillance radars (ARSR-1, ARSR-2 and FPS-20 series). It defines the role of project management in directing the field deployment of the SSR/DMTI modification and describes the supporting roles of the related organizations of the Federal Aviation Administration (FAA) in implementing the SSR/DMTI modification.

Chapters 1 and 2 summarize the SSR/DMTI modification project and describe the SSR/DMTI modification hardware. Chapters 3 through 6 address project requirements, management and deployment organization, responsibilities and communications. The remaining chapters and appendices support these chapters.



Robert E. Brown
Acting Director, Program Engineering
Service

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CHAPTER 1. GENERAL

1. PURPOSE. This order establishes a Solid State Receiver/Digital Moving Target Indicator (SSR/DMTI) project implementation plan which defines management direction and responsibilities for implementation and installation of the SSR/DMTI into the receiver subsystem of vacuum tube air route surveillance radars (ARSR-1, ARSR-2 and FPS-20 series).

This project will procure, install, and integrate into the National Airspace System (NAS), 60 SSR/DMTI modification kits. Elwood, N. J., FAA Academy and one each United States Air Force and United States Navy sites will also have modification kits installed. These four sites will not be integrated into NAS.

This SSR/DMTI modification will apply to the following vacuum tube technology ARSR en route radar systems:

a. ARSR-1, -2 series long range radars: 41 kits including one United States Air Force and one United States Navy equipment.

b. FPS-20 series family of long range radars: 23 kits.

2. DISTRIBUTION. This order is distributed to branch level in the Program Engineering Service and Systems Maintenance Service; to division level in the Offices of Flight Standards, Personnel and Technical Training, Airport Planning and Programming, and the Associate Administrator for Air Traffic in Washington headquarters; to branch level in the regional Airway Facilities, Air Traffic, Flight Standards, and Logistics divisions; to branch level in the FAA Academy and FAA Depot at the Mike Monroney Aeronautical Center; to branch level at the FAA Technical Center; and standard distribution to the general NAS sectors.

3. AUTHORITY TO CHANGE THIS ORDER. This order may be changed only by the SSR/DMTI MOdification Project Manager or his designated representative. Requests for changes to this document should be directed to SSR/DMTI Modification Project Manager, APS-310, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591, telephone (202) 267-8424.

4.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS.

a. Acquisition Concept. The acquisition of the SSR/DMTI modification kits is under a nationally managed FAA contract whereby the contractor will provide all services, materials and data necessary to design, develop, fabricate, test, deliver, install, interface, checkout and integrate into the National Airspace System (NAS) the SSR/DMTI modification kits on a turnkey basis.

b. Contract Award. The SSR/DMTI modification kits are being procured under a competitive fixed price contract. The winner of this competition was United Technologies, Norden Systems, Inc. of Melville, N.Y. The contract was awarded on August 15, 1985. The contractor is to provide a total of 64 SSR/DMTI modification kits representing three (3) different hardware configurations.

21. PURPOSE. This order establishes a SSR/DMTI modification implementation plan which defines management direction and responsibilities for implementation and installation of the SSR/DMTI into the receiver subsystem of vacuum tube air route surveillance radars (ARSR-1, ARSR-2 and FPS-20 series).

This project will procure, install, and interface 60 SSR/DMTI modification kits into the NAS. The four remaining modification kits are designated for installation at Elwood, N.J.; Point Mugu, CA; Vandenburg AFB, CA; and the FAA Academy.

This SSR/DMTI modification will apply to the following vacuum tube technology ARSR enroute radar systems:

a. ARSR-1, -2 series long range radars (41 kits)

b. FPS-20 series family of long range radars (23 kits)

22. HISTORY. The ARSR-1, -2 and FPS-20 series radars have served as enroute radar sensors since the late 1950s and are far beyond their designed service life.

Due to the large number, high cost, and operational priority of new systems entering the FAA/NAS inventory, the ARSR-1, -2 and FPS-20 series LRRs became candidates for life extending modifications and operational improvements. The selected life extension and operational improvements recommended for these systems, were the following:

a. Replace radar receiver front-end components in ARSR-1, -2

b. Replace vacuum tube technology receiver/processor with a SSR/DMTI unit

c. Refurbish the Radar Set Control at ARSR-1, -2 sites

d. Install primary power improvements, at selected facilities, to reduce equipment outages

e. Add limited remote control capability to the LRRs, at selected facilities, to reduce on site maintenance manning requirements

Only a, b, and c above are part of this modification. Regions should perform "c" prior to SSR/DMTI modification kit installation. FAA Headquarters is evaluating equipment to accomplish "d". Remote Control Interface Units (RCIU) have been installed to accomplish "e".

23. AUTHORIZATION. The development and acquisition of the SSR/DMTI modification kit follows the guidelines of FAA solicitation, offer and award DTFA01-84-R-27361 dated July 10, 1984 and FAA Specification FAA-E-2739, dated March 16, 1984. The SSR/DTMI modifications are not a major system acquisition as defined by FAA Order 1810.1 nor are they covered by a systems requirements statement. The authorization rationale for these modifications is supported by the NAS Plan, Project IV-15, Long Range Radar Program.

24. BENEFITS. Implementation of the SSR/DMTI modification project will replace the unstable, unreliable, maintenance intensive, analog vacuum tube receiver/processor subsystem with a solid state receiver and digital MTI subsystem. Radar performance in the presence of ground clutter and weather will be improved. Reliability and maintainability of the subsystem will be improved over the vacuum tube model. Logistics support costs will be reduced.

25. SYSTEM CONCEPT. The SSR/DMTI is specifically designed for incorporation into FAA vacuum tube enroute long range radars. Digital circuitry and solid state electronics are incorporated to produce a reliable, maintainable receiver/processor subsystem.

26-29. RESERVED.

CHAPTER 3. PROJECT DESCRIPTION

30. BASIC SYSTEM OPERATION. The SSR/DMTI modification kit will provide features that significantly enhance the characteristics of the following vacuum tube radar systems:

a. ARSR-1, -2 series long-range radars

b. FPS-20 series family of long-range radars consisting of the following models:

(1) Single Modulator Systems

(a) AN/FPS-20A
(b) AN/FPS-66A
(c) AN/FPS-67A
(d) AN/FPS-67B
(e) AN/FPS-87A
(f) AN/FPS-91A
(g) AN/FPS-93A
(h) ARSR-60

(2) Dual Modulator Systems

(a) AN/FPS-64
(b) AN/FPS-65
(c) AN/FPS-64A
(d) AN/FPS 65A

c. Improved system characteristics are as follows:

(1) System operational availability of 99.35%

(2) System maintainability:

(a) A reliable receiver/processor with a Mean Time Between Failure (MTBF) in excess of 3000 hours

(b) Receiver Mean Time To Repair (MTTR) receiver/processor is 0.5 hours with Mean Bench Repair Time (MBRT) of 4 hours (8 hours maximum)

(c) A stable receiver/processor that does not require constant adjustment to maintain peak performanance

d. Kit Configurations. The SSR/DMTI modification kit will be furnished in three configurations as required by the contract, DTFA01-85-C-00049 and FAA Specification, FAA-E-2739, para. 3.1.1 through 3.1.1.3. The equipment will be designed for maximum commonality of modules among the three configurations.

e. SSR/DMTI Type I Modification Kit. The Type I kit modifies the ARSR-1, -2 series long-range radars. It will consist of the following: (See Figure 3-1.)

(1) Receiver group (A&B channels) performing the following functions:

(a) Intermediate Frequency (IF) preamplifier
(b) Solid state log receiver/processor
(c) Solid state Digital Moving Target Indicator (DMTI) In-Phase and Quadrature (I&Q) processor
(d) Combiner Destagger Unit
(e) Synchronizer
(f) Sensitivity Time Control (STC) waveform generator
(g) Video and trigger distribution amplifiers
(h) Manual and auto Built-In Test Equipment (BITE)

(2) Solid state Coherent Oscillator (COHO) with phase locking circuitry

(3) Solid state Stable Local Oscillator (STALO)

(4) A new Channel Change Unit located in the channel A cabinet

(5) Modification documentation

(6) Installation material and cable

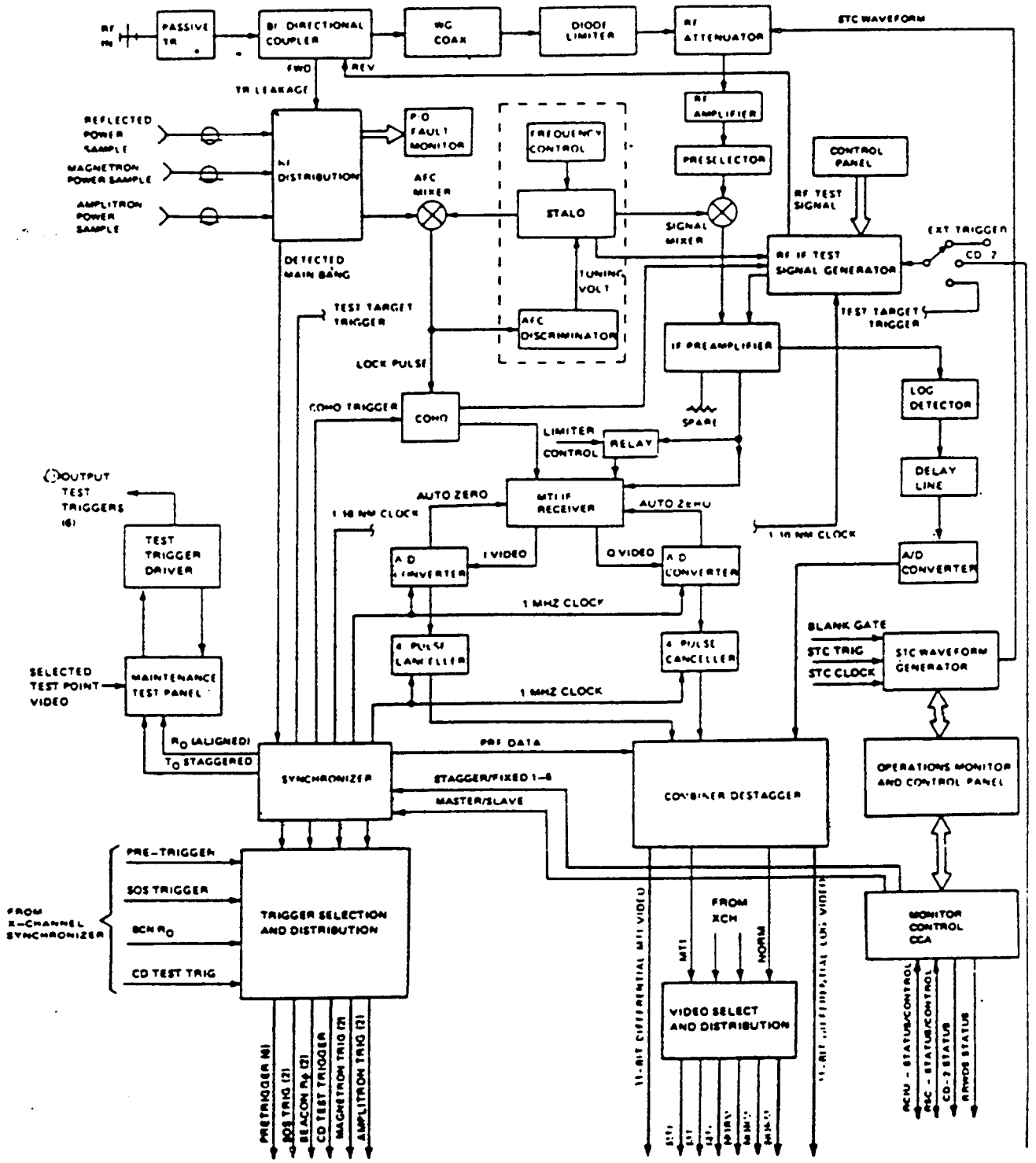
(7) Front-end modules in accordance with FAA-E-2739, paragraph 3.6.5 and its subparagraphs

f. SSR/DMTI Type II Modification Kit. The Type II kit modifies FPS-20 family of long-range search radars. It will consist of the following: (See Figure 3-2.)

(1) Receiver group (A&B channels) performing the following functions:

(a) IF preamplifier
(b) Solid state log receiver/processor
(c) Solid state MTI I&Q processor
(d) DMTI Combiner Destagger Unit
(e) Synchronizer
(f) STC waveform generator
(g) Video and trigger distribution amplifiers
(h) Manual and auto BITE

FIGURE 3-1. SSR/DMTI-KIT I



(2) Solid state COHO

(3) Solid state STALO

(4) Azimuth Change Pulse (ACP)/Azimuth Reference Pulse (ARP) processor

(5) Modification documentation

(6) Installation material and cable

g. SSR/DMTI Type III Modification Kit. The Type III kit modifies the ARSR-60 long-range search radar at Trevose, Pennsylvania. The Type III kit is identical to the Type II kit except that it operates with a three (instead of six) microsecond pulse width. It consists of the same modules, documentation, and installation materials as the Type II kits. (See Figure 3-2.)

31. PHYSICAL DESCRIPTION. The physical description of the SSR/DMTI Modification Kit is contained in the figures and tables listed below:

a. Figure 3-3, SSR/DMTI Cabinet

b. Figure 3-4, Rear View of SSR/DMTI Cabinet

c. Table 3-1, Weight Analysis of SSR/DMTI Cabinet and Components

d. Table 3-2, Floor Loading of SSR/DMTI Cabinet

e. Table 3-3, Power Disipation of Major SSR/DMTI Assemblies

32. PROJECT REQUIREMENTS. The SSR/DMTI modification will be designed to accept the required input signals and will meet the specified requirements to satisfactorily up-grade the current vacuum tube equipment.

33. INTERFACES.

a. Interface Items Unique to ARSR-1, -2.

(1) The SSR/DMTI provides triggers for the amplitron and magnetron transmitters. See Figure 3-5.

(2) A transmitter Radio Frequency (RF) power sample is taken from a waveguide and fed to each SSR/DMTI for detection and low power alarm. See Figure 3-5.

(3) The radar set control selects channel A or B, applies high voltage to selected channel and selects antenna polarization type (linear or circular polarization). See Figure 3-7.

FIGURE 3-2. SSR/DMTI-KIT II & III

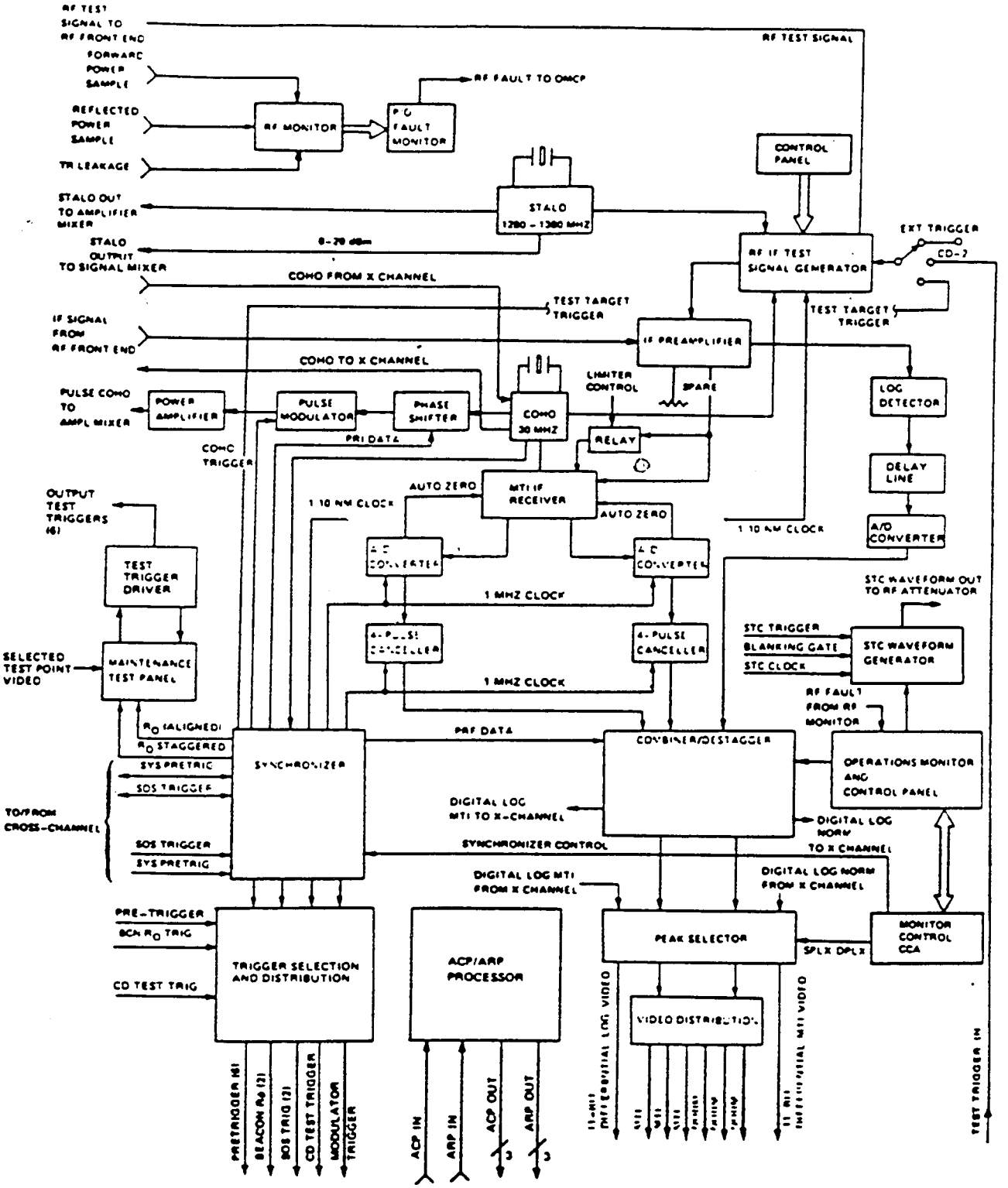


FIGURE 3-3. SSR/DMTI CABINET

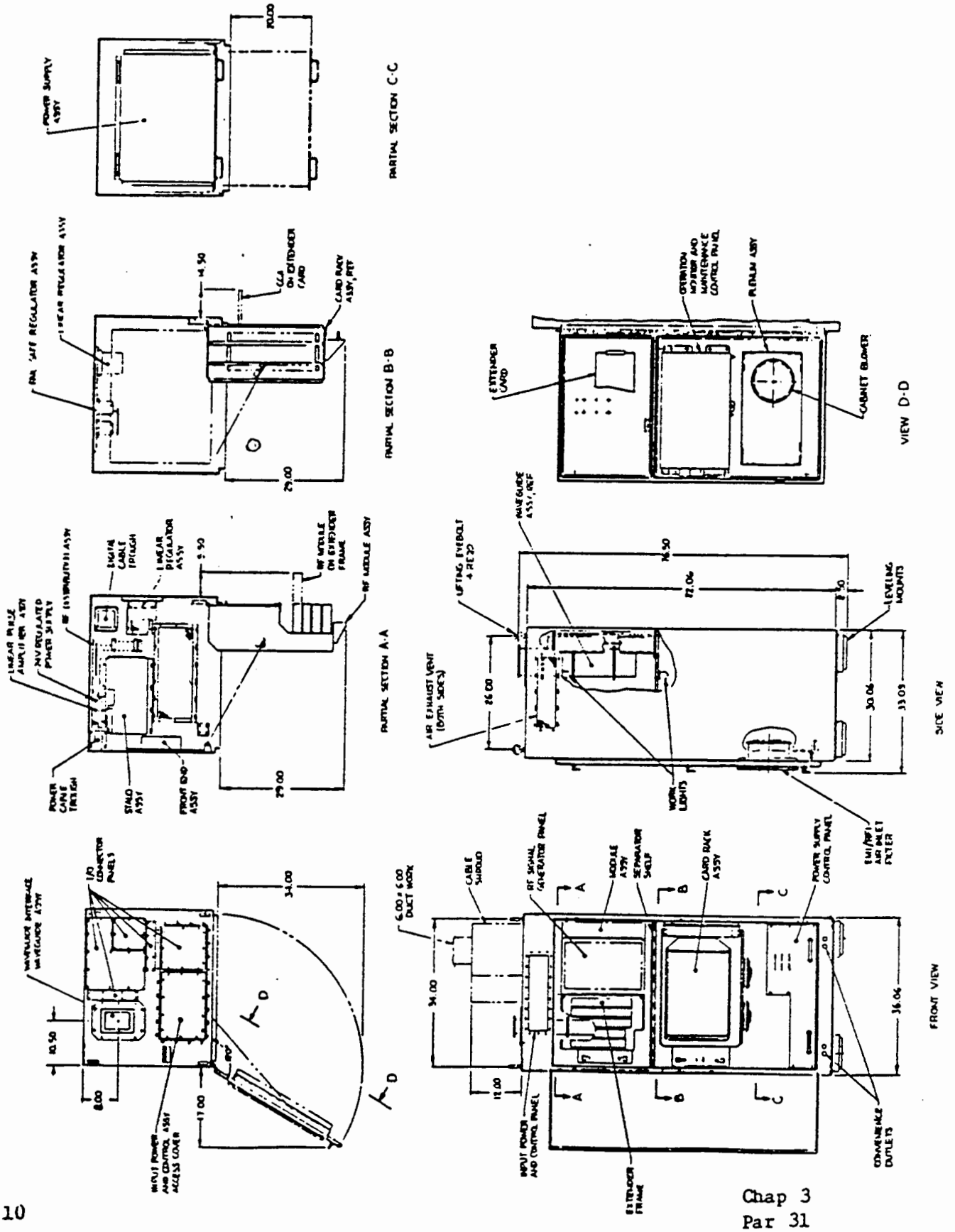


FIGURE 3-4. SSR/DMTI CABINET

Rear View

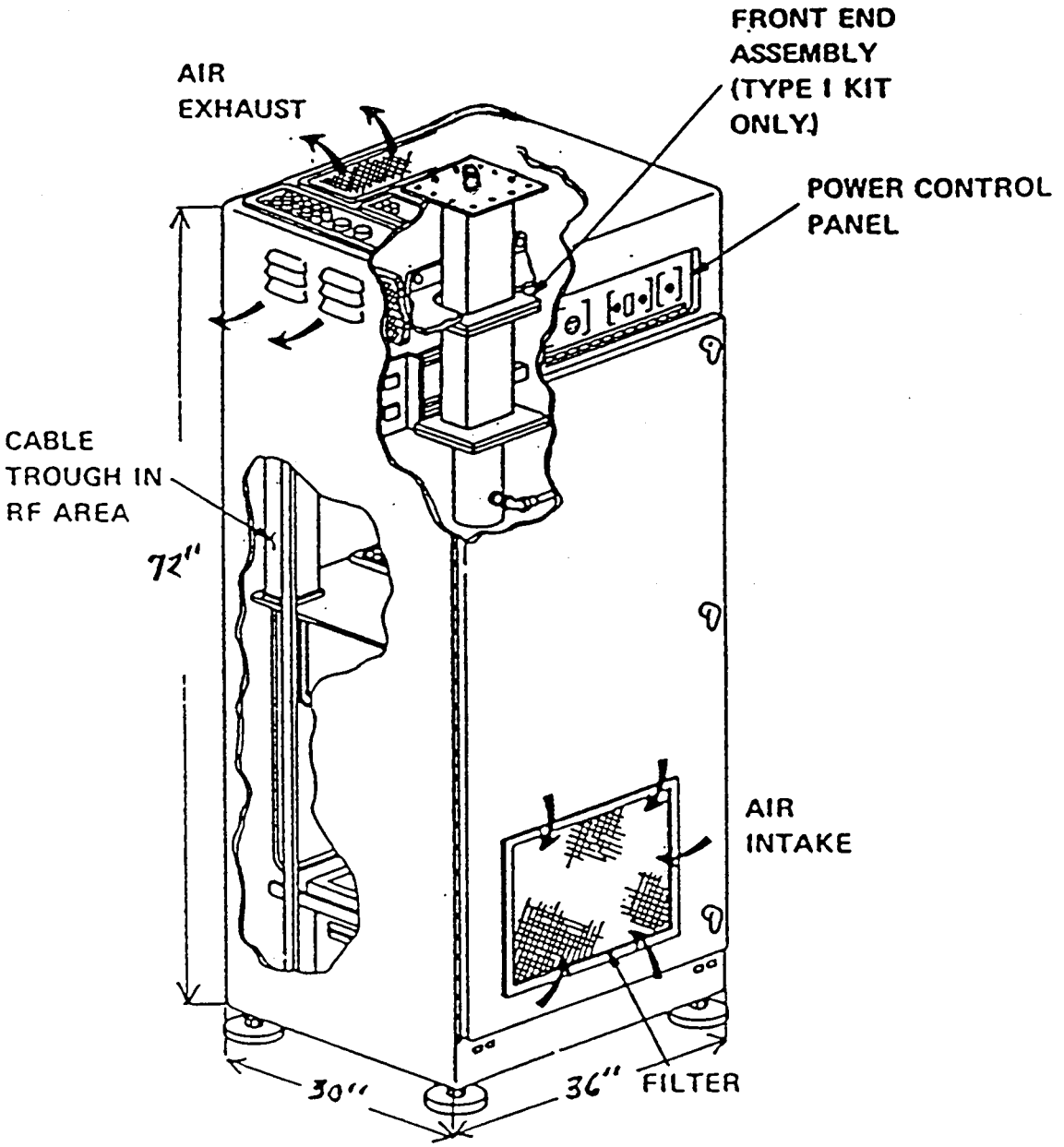


TABLE 3-1. WEIGHT ANALYSIS

Cabinet Plus Harnesses	543 Lbs
DMTI Rack	50
RF Module Rack	30
Power Supply	80
Regulators	12
Waveguide Assembly	15
RF Components	5
Control Panels	15
Total Cabinet Assembly	750 Lbs

TABLE 3-2. FLOOR LOADING

Cabinet Assembly Weight	750 Lbs
Distributed Floor Load	100 PSF
Concentrated Floor Load	600 PSF

TABLE 3-3. POWER DISSIPATION OF MAJOR ASSEMBLIES

DMTI Rack	300 W Max
RF Module and Components	100 W Max
Linear Regulator (RF)	100 W Max
Linear Regulator (Digital)	30 W Max
Power Supply Assembly	150 W Max
Cabinet Total	680 W Max

b. Interface Items Unique to FPS-20 Series.

(1) The RF front-end for the FPS-20 series equipment is located externally to the SSR/DMTI cabinet. This necessitates a variation of interfaces from the ARSR-1, -2 as follows:

(a) RF test stimuli
(b) STC voltages
(c) IF received signal
(d) STALO
(e) RF sample (RCVR)
(f) Pulsed COHO
(g) Range Zero (RO) trigger for Plan Position Indicator (PPI)

(2) The ACP/ARP pulses are generated from antenna analog synchro data and shaped by the SSR/DMTI.

(3) Channel-to-channel connections provide interconnections between channels A and B (see Figure 3-8).

c. Common Interfaces. The following interfaces apply to the ARSR-1, -2, the FPS-20 series. See Figure 3-9.

(1) Common Digitizer Interface (CD-2). The interface with the common digitizer provides channel selected triggers and video as follows (see Figure 3-10):

(a) Pre-trigger output
(b) Start of stagger sequence (SOS)
(c) MTI log video
(d) Log video
(e) Test trigger input
(f) ACP/ARP for Types II and III kits

(2) Radar Microwave Link Terminal (RMLT)/Remote Communication Link (RCL) Interface. Interface is made with the RMLT/RCL providing synchronization, MTI video, log video, and synchro data. Signals supplied to the RMLT are as follows:

(a) Pre-trigger output
(b) MTI log video
(c) Log video
(d) Analog antenna synchro data (ACP/ARP)

(3) Remote Radar Weather Display System (RRWDS) Interface. The RRWDS is interfaced with the DMTI video and trigger as follows (see Figure 3-11):

(a) Pre-trigger output
(b) MTI log video
(c) Log video
(d) Active radar channel
(e) STC (Off, 1 and 2)
(f) Circular Polarization (CP)/Linear Polarization (LP)

FIGURE 3-5. SIMPLIFIED INTERCONNECTION DIAGRAM TYPICAL ARSR-1, 2 SITE (KIT I)

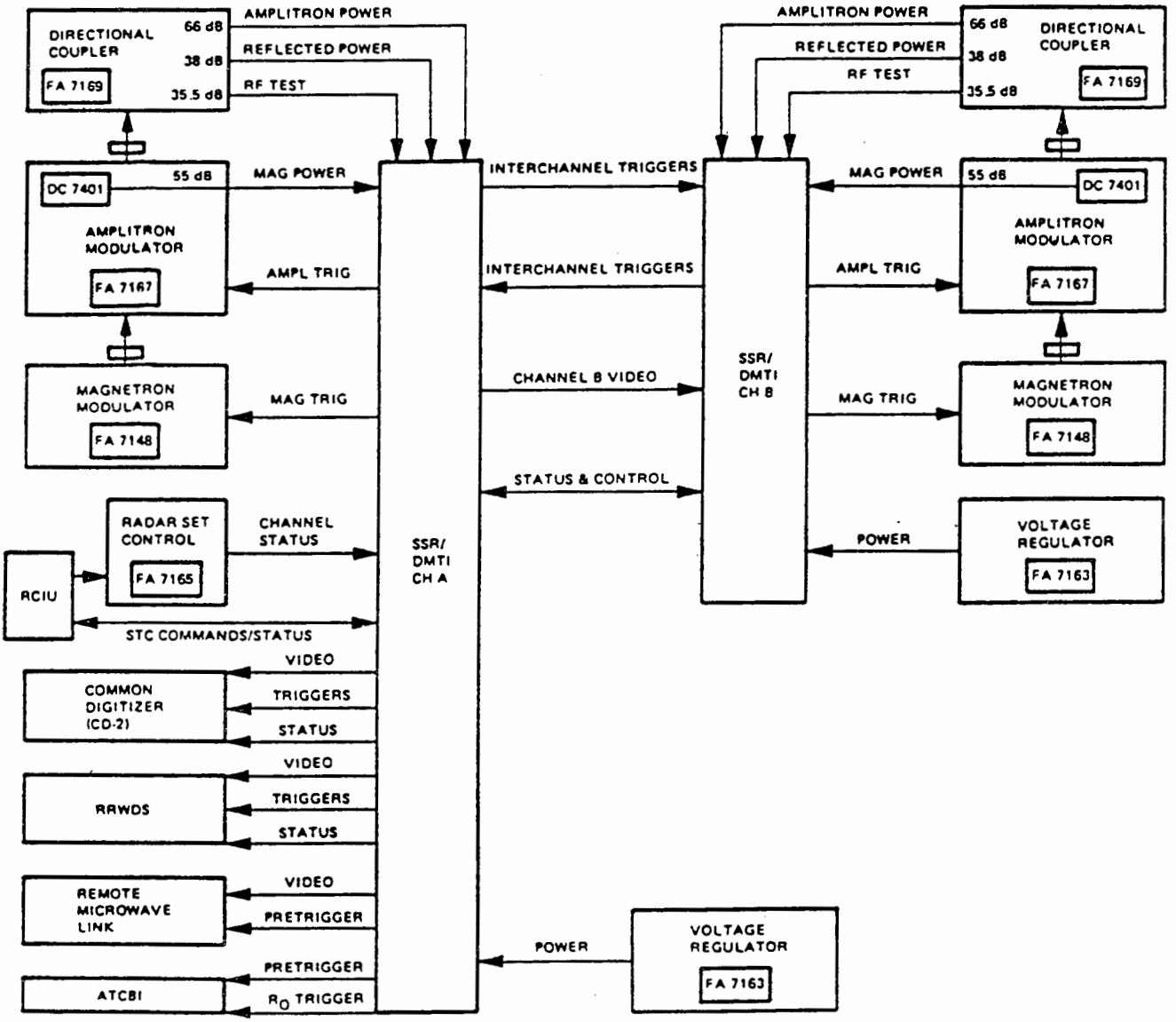


FIGURE 3-6. SIMPLIFIED INTERCONNECTION DIAGRAM

FPS-20 SITE (KITS II AND III)

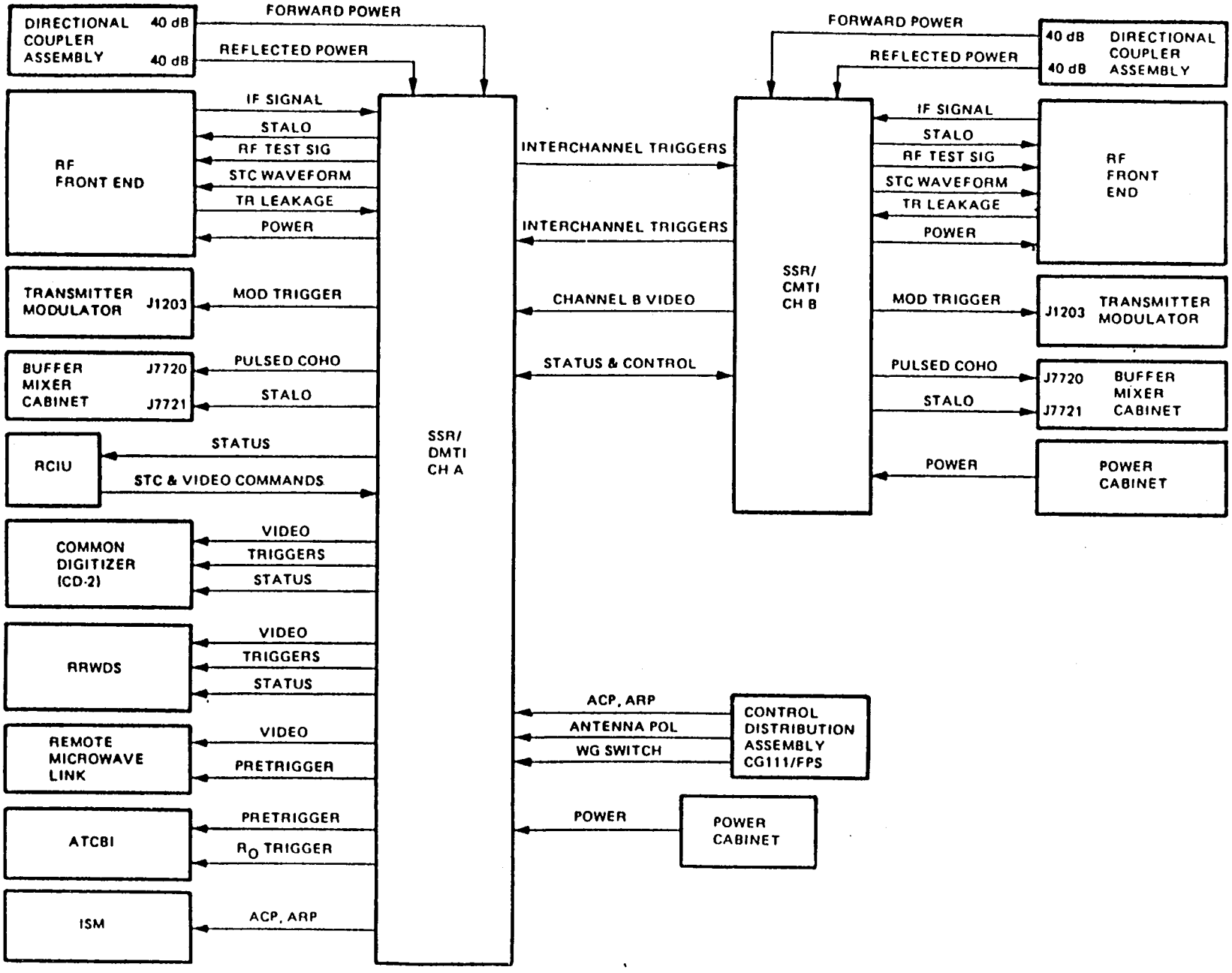


FIGURE 3-7. RADAR SET CONTROL INTERFACE- KIT I

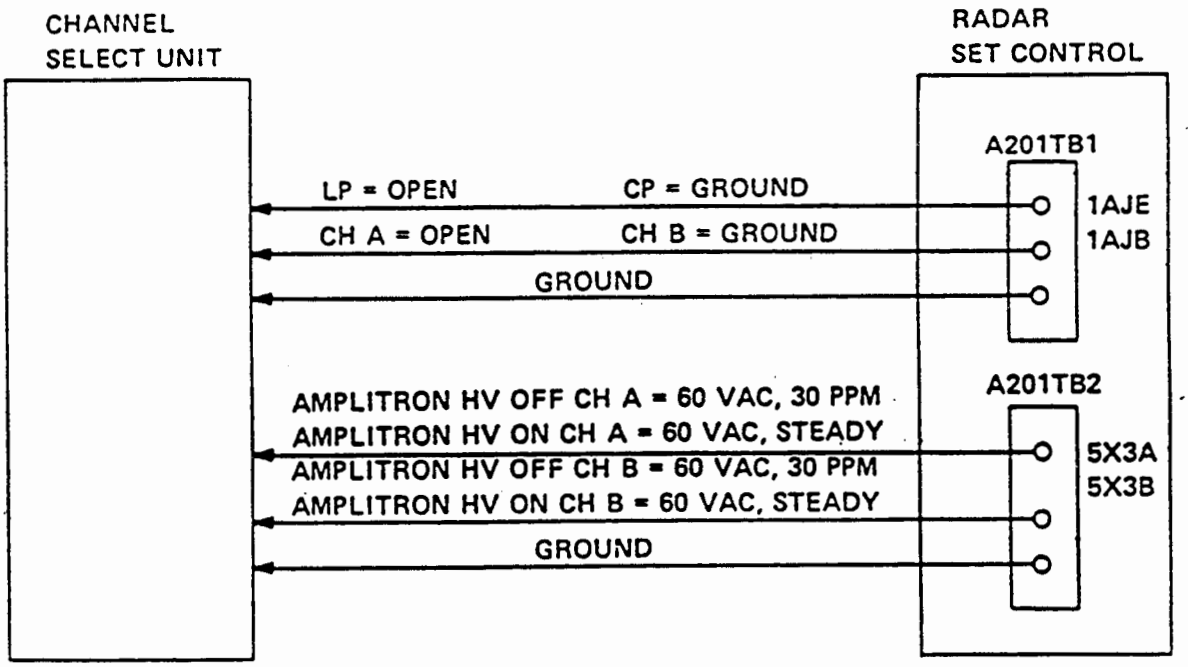


FIGURE 3-8. INTERFACES UNIQUE TO KIT II AND III

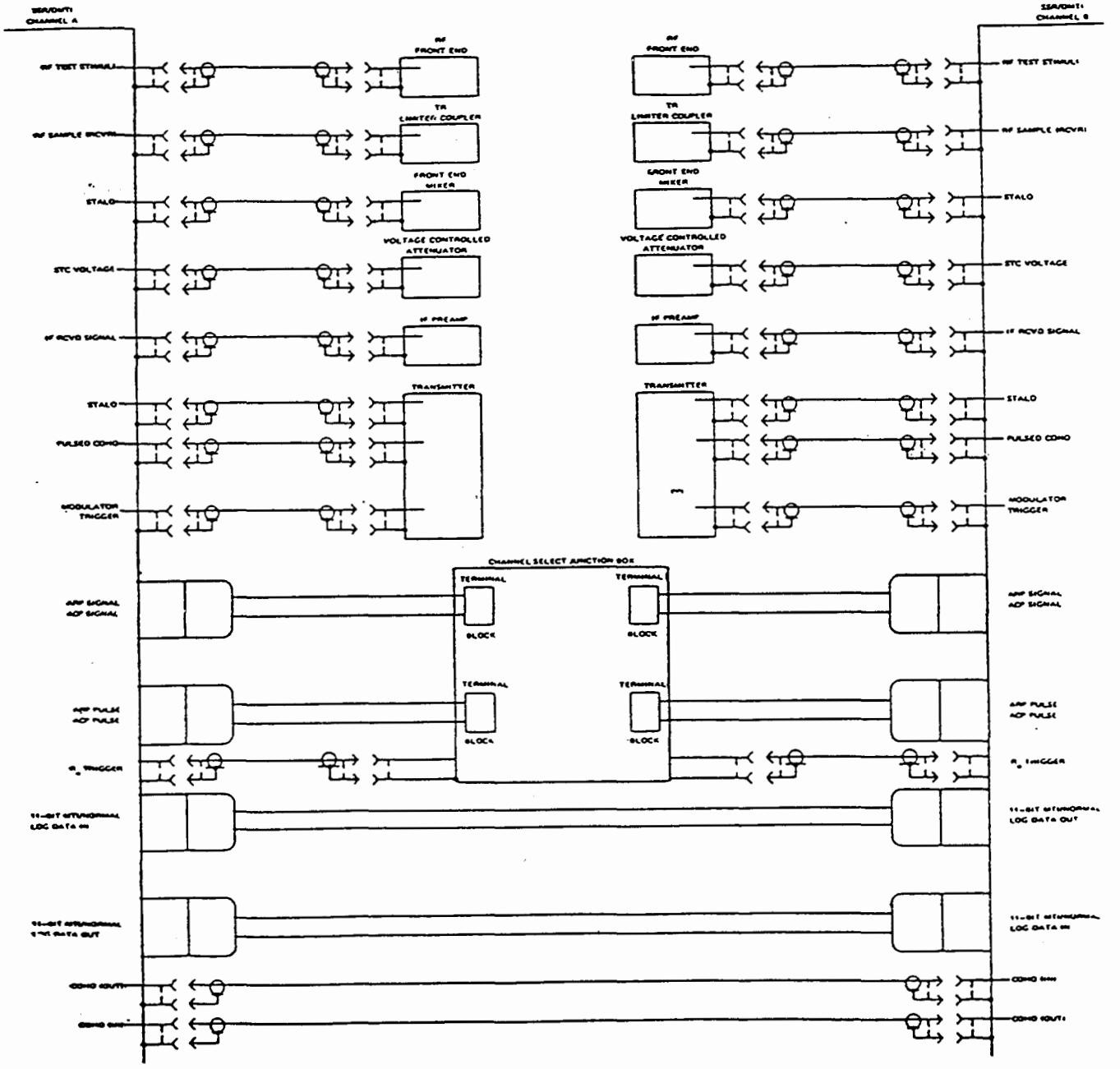


FIGURE 3-9. INTERFACE COMMON TO ALL KIT CONFIGURATIONS

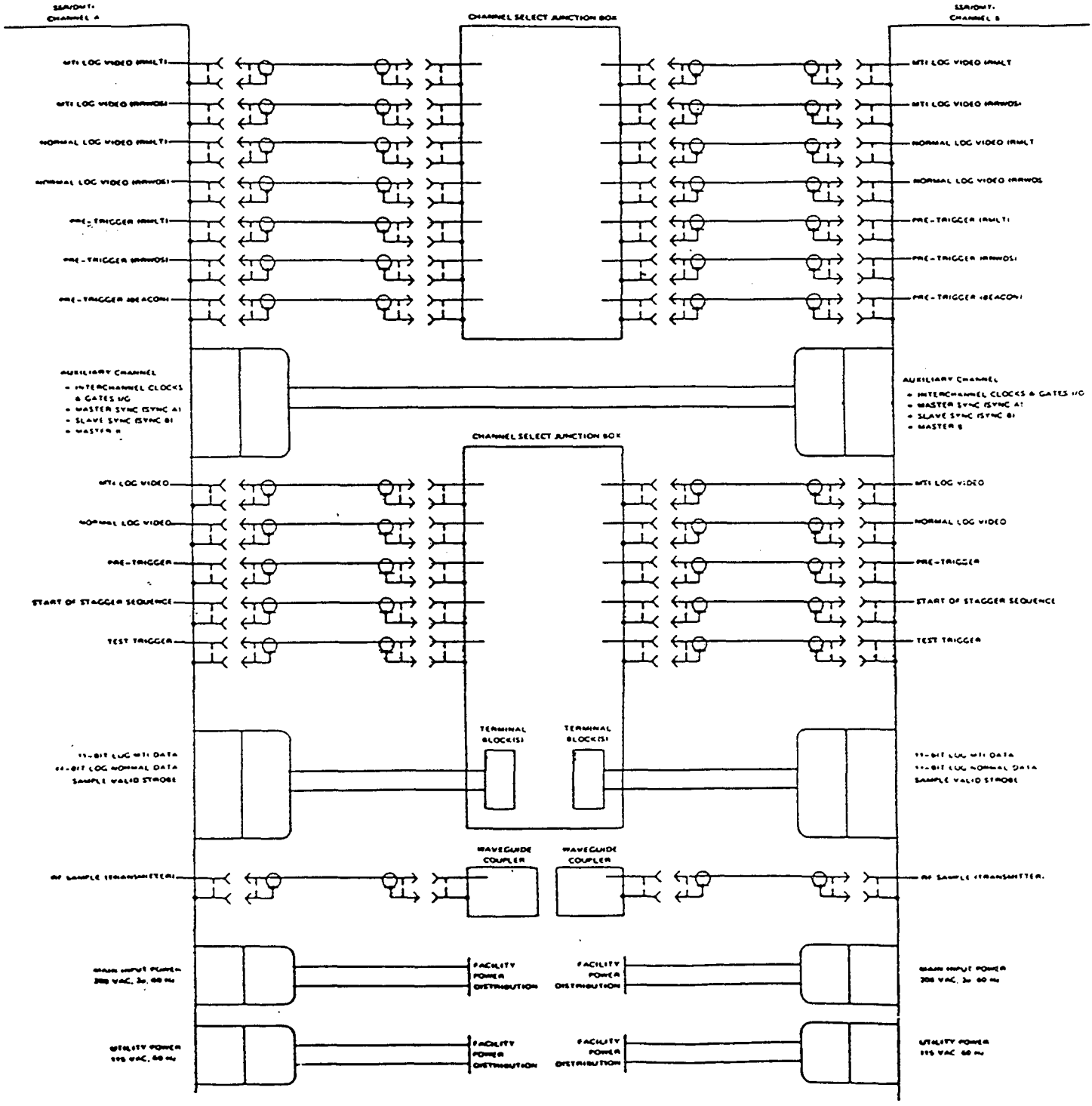


FIGURE 3-10. CD-2 INTERFACE

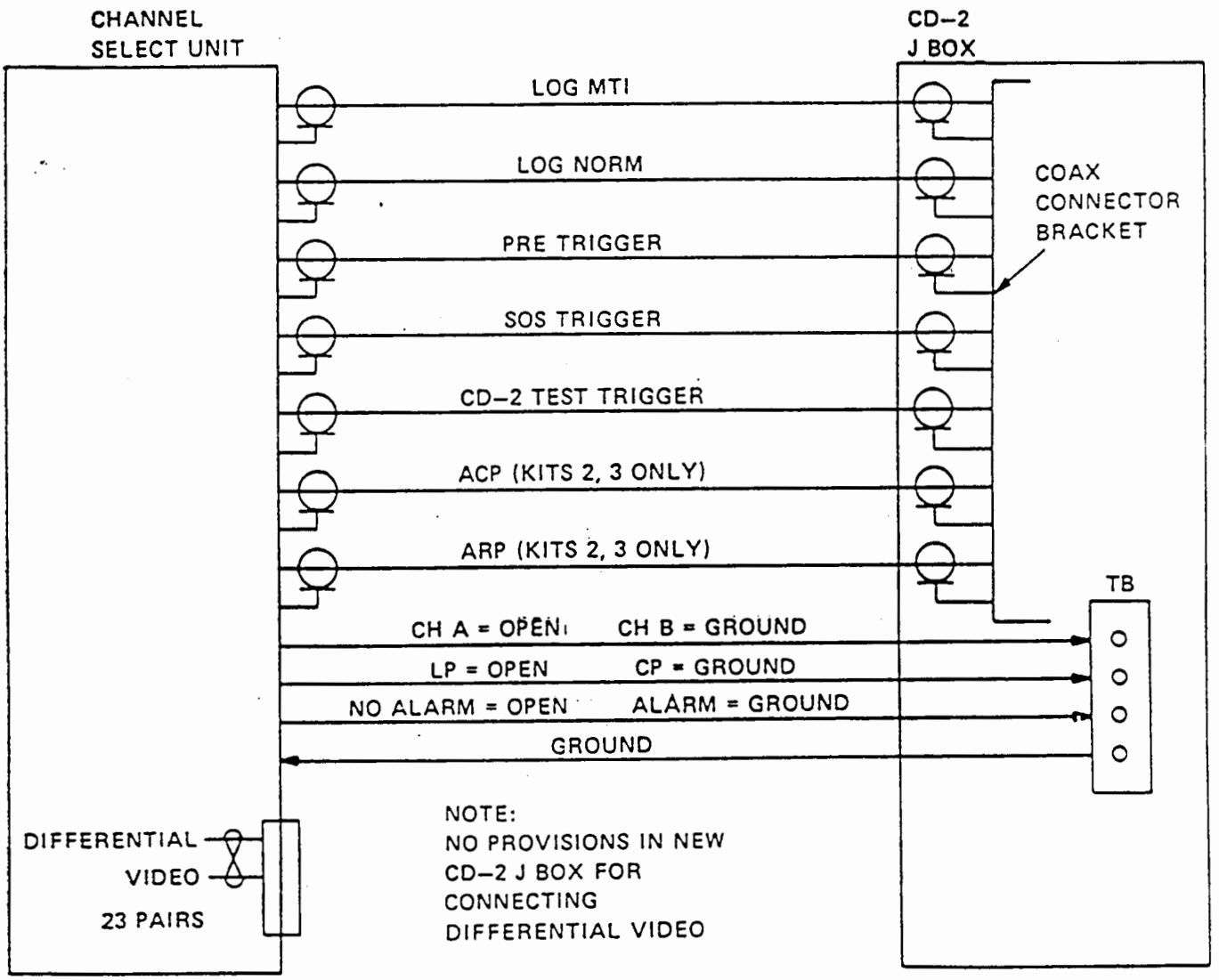
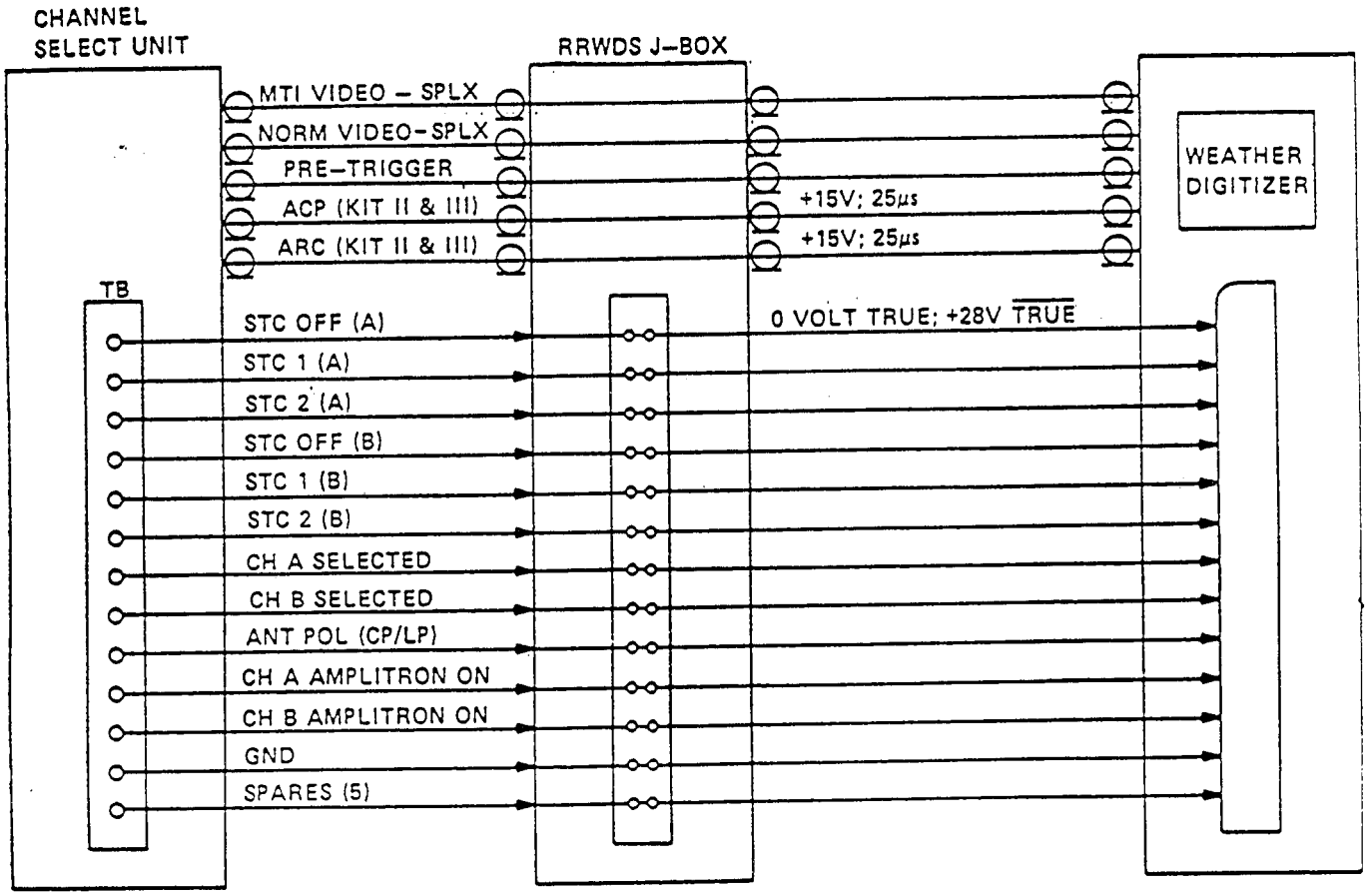


FIGURE 3-11. RRWDS INTERFACE



(g) Amplitron ON (type I kit only)
(h) ACP/ARP

(4) Air Traffic Control Radar Beacon (ATCRB) Interface. For beacon synchronization as follows:

(a) Pre-trigger
(b) RO trigger

(5) Integral System Monitor (ISM).

(a) ACP/ARP (type II and III kits only) see Figure 3-14.

(6) Remote Control Interface Unit (RCIU) Interface. Type I kit as follows (see Figure 3-12):

(a) High Voltage, ON/OFF 1 and 2 (control channel A and B)
(b) STC OFF, 1 and 2 (status channel A and B)
(c) STC OFF, 1 and 2 (control channel A and B)
(d) CP/LP select (control)
(e) +28 VDC 1 amp voltage source
(f) +48 VDC 1 amp voltage source
(g) Channel Select (control channel A and B)

(7) Remote Control Interface Unit (RCIU) Interface. Type II and III kits as follows (see Figure 3-13):

(a) Video select channel A and B
(b) CP/LP select
(c) STC OFF, 1 and 2 (control) channel A and B
(d) STC OFF, 1 and 2 (status) channel A and B

FIGURE 3-12. RCIU INTERFACE - KIT 1

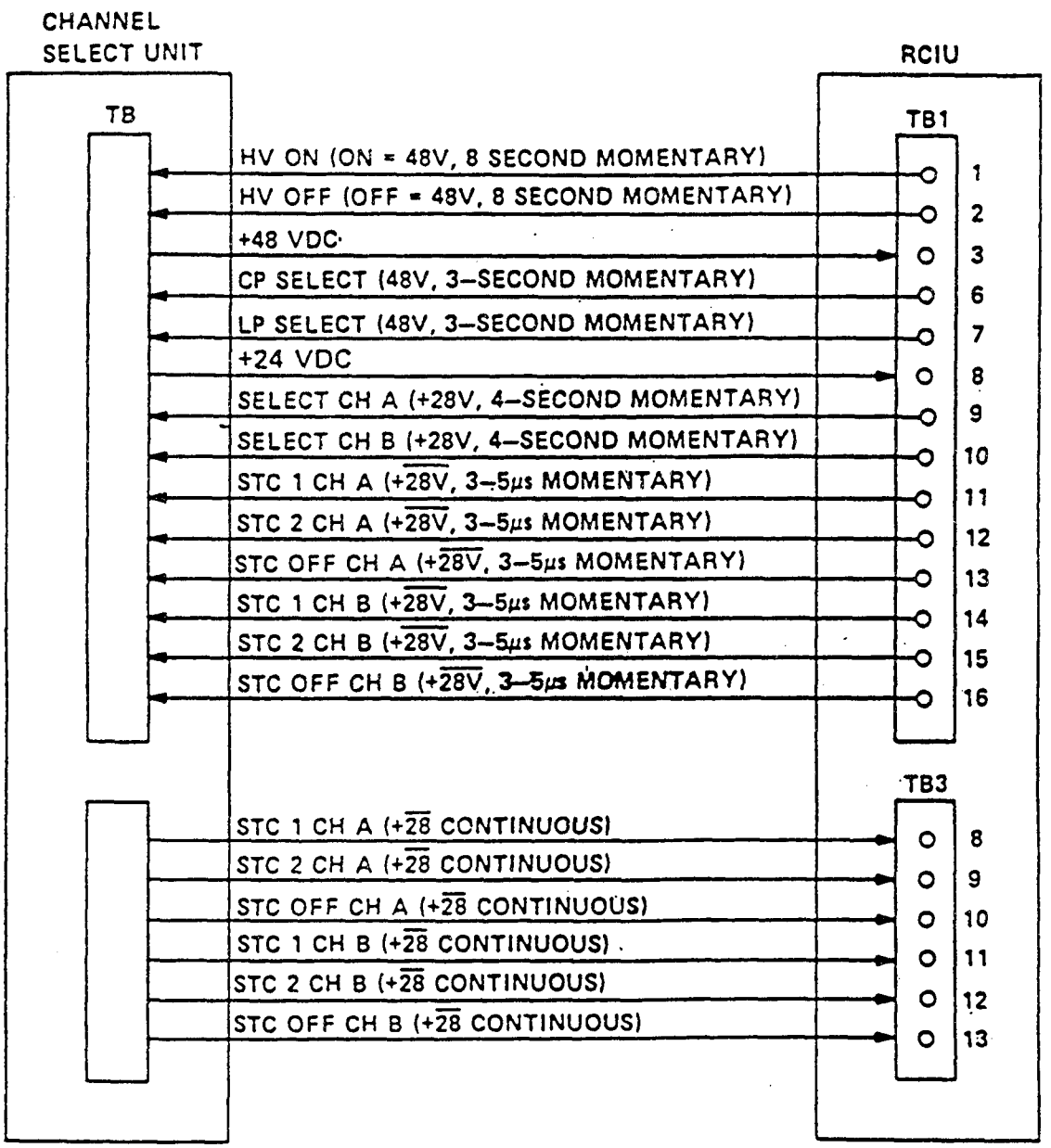


FIGURE 3-13. RCIU INTERFACE - KIT II AND III

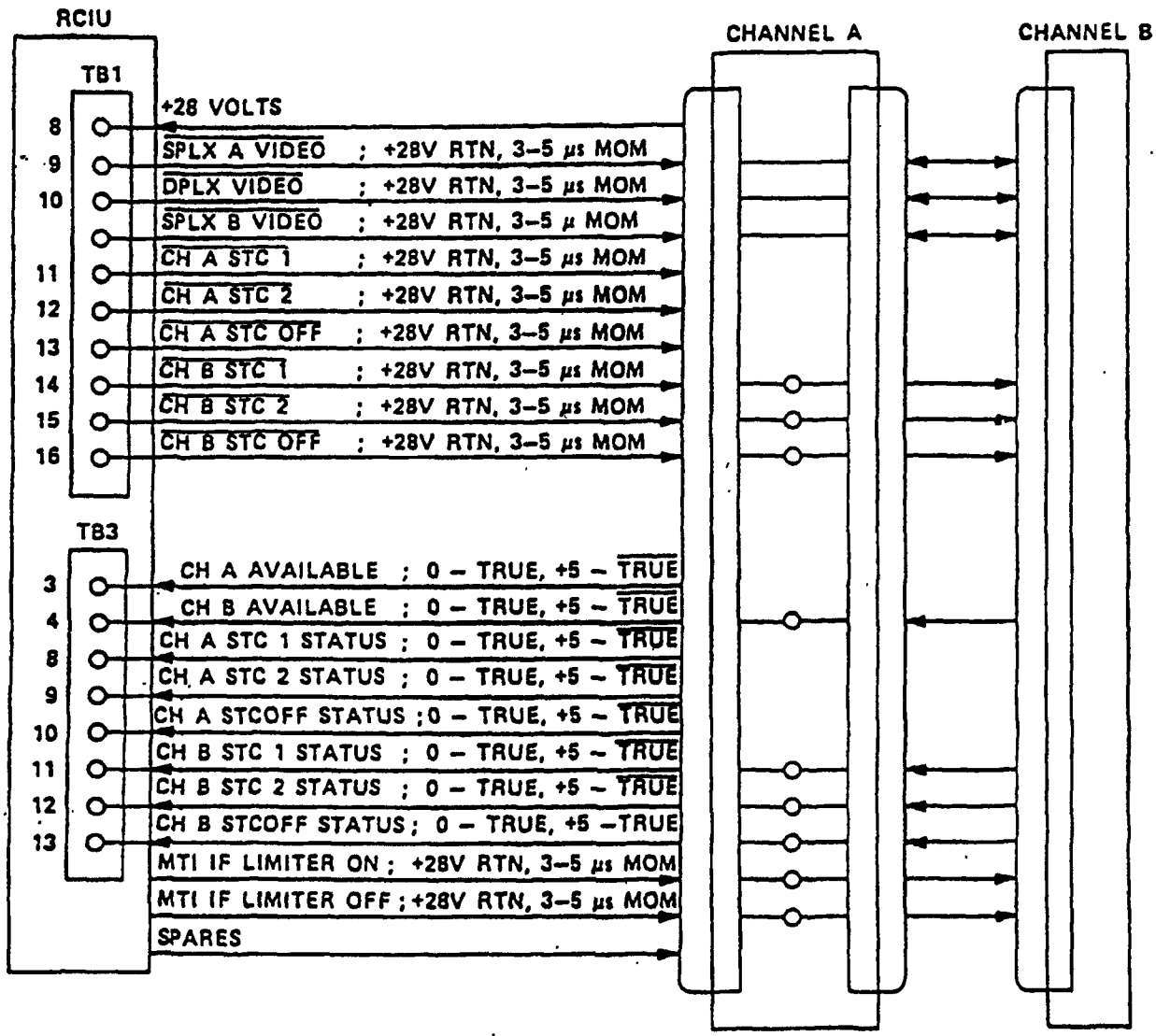
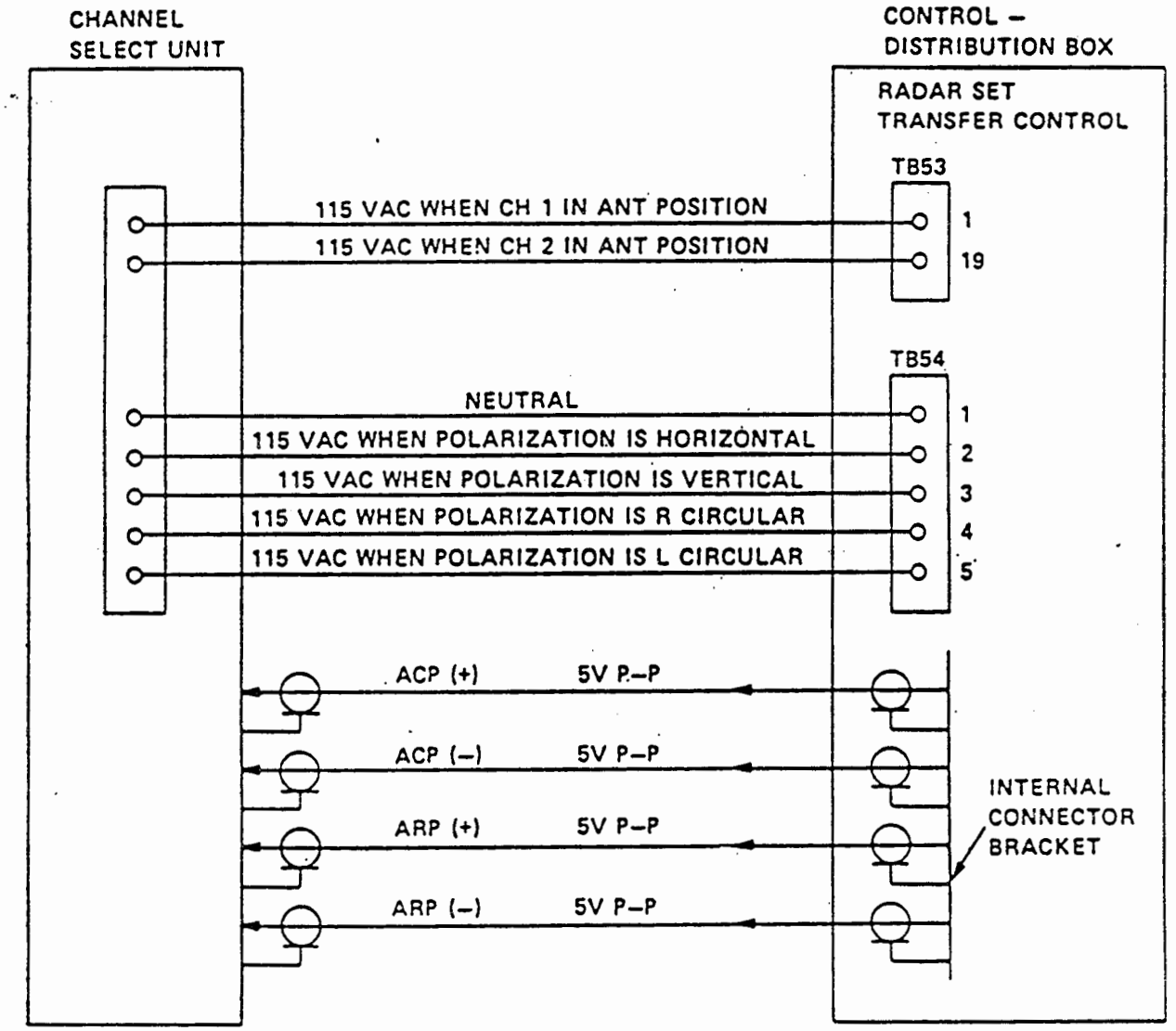


FIGURE 3-14. CONTROL DISTRIBUTION BOX INTERFACE - KIT II AND III



Note - In Duplex Mode both channels are on.

34. EQUIPMENT LAYOUT. The "before" and "after" equipment layout at typical Type I and Type II SSR/DMTI Modificatio sites is covered in the below listed figures.

a. Figure 3-15 ARSR Site Equipment Layout before SSR/DMTI Modification

b. Figure 3-16 ARSR Site Equipment Removed as a result of SSR/DMTI Modification

c. Figure 3-17 ARSR Site Equipment Layout after SSR/DMTI Modification

d. Figure 3-18 FPS-20 Series Site Equipment before SSR/DMTI Modificaiton

e. Figure 3-19 FPS-20 Series Site Equipment removed as a result of SSR/DMTI Modification

f. Figure 3-20 FPS-20 Series Site Equipment Layout after SSR/DMTI Modification

35.-39. RESERVED

FIGURE 3-15. TYPICAL ARSR SITE EQUIPMENT LAYOUT

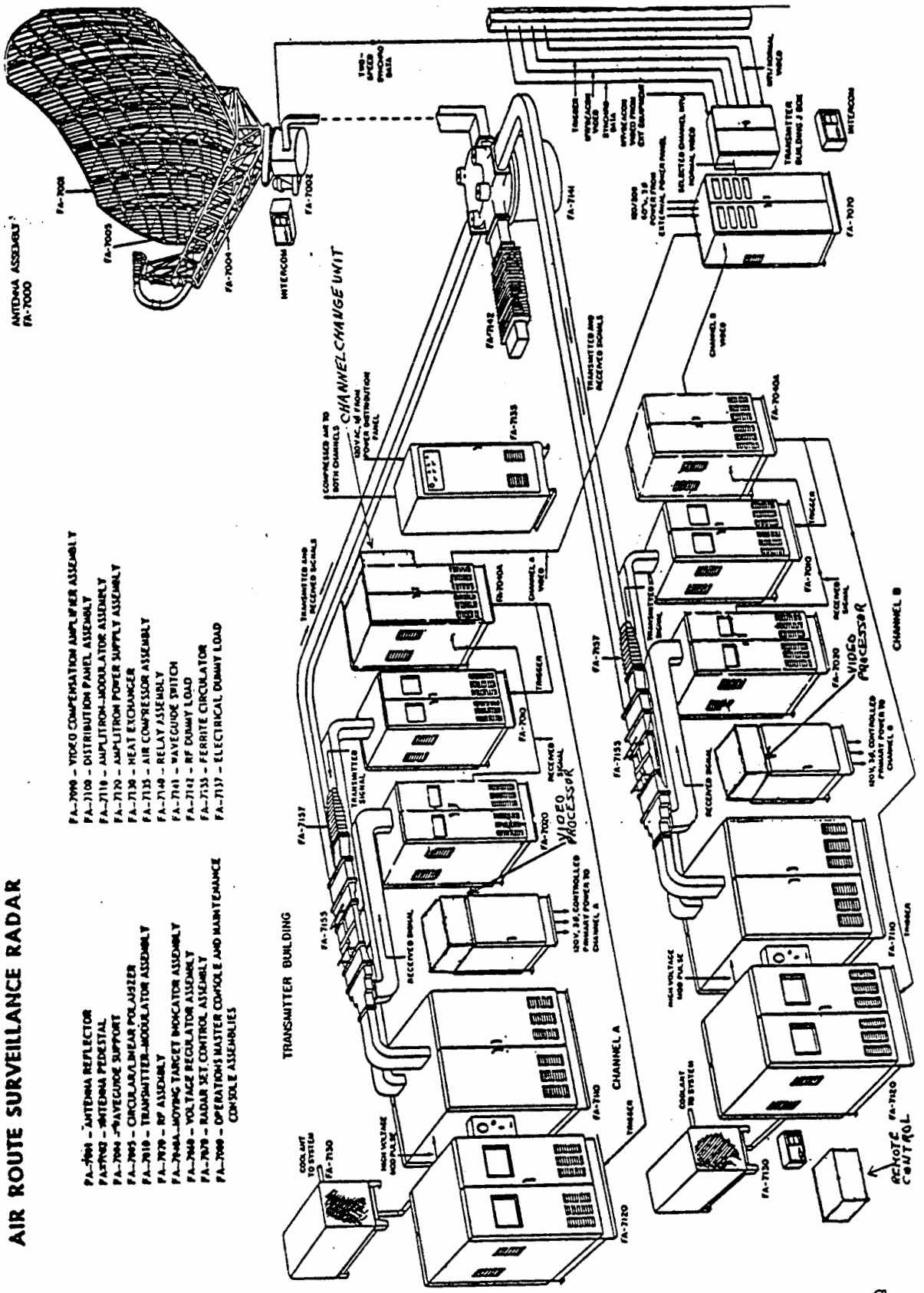


FIGURE 3-16. TYPICAL ARSR SITE EQUIPMENT LAYOUT

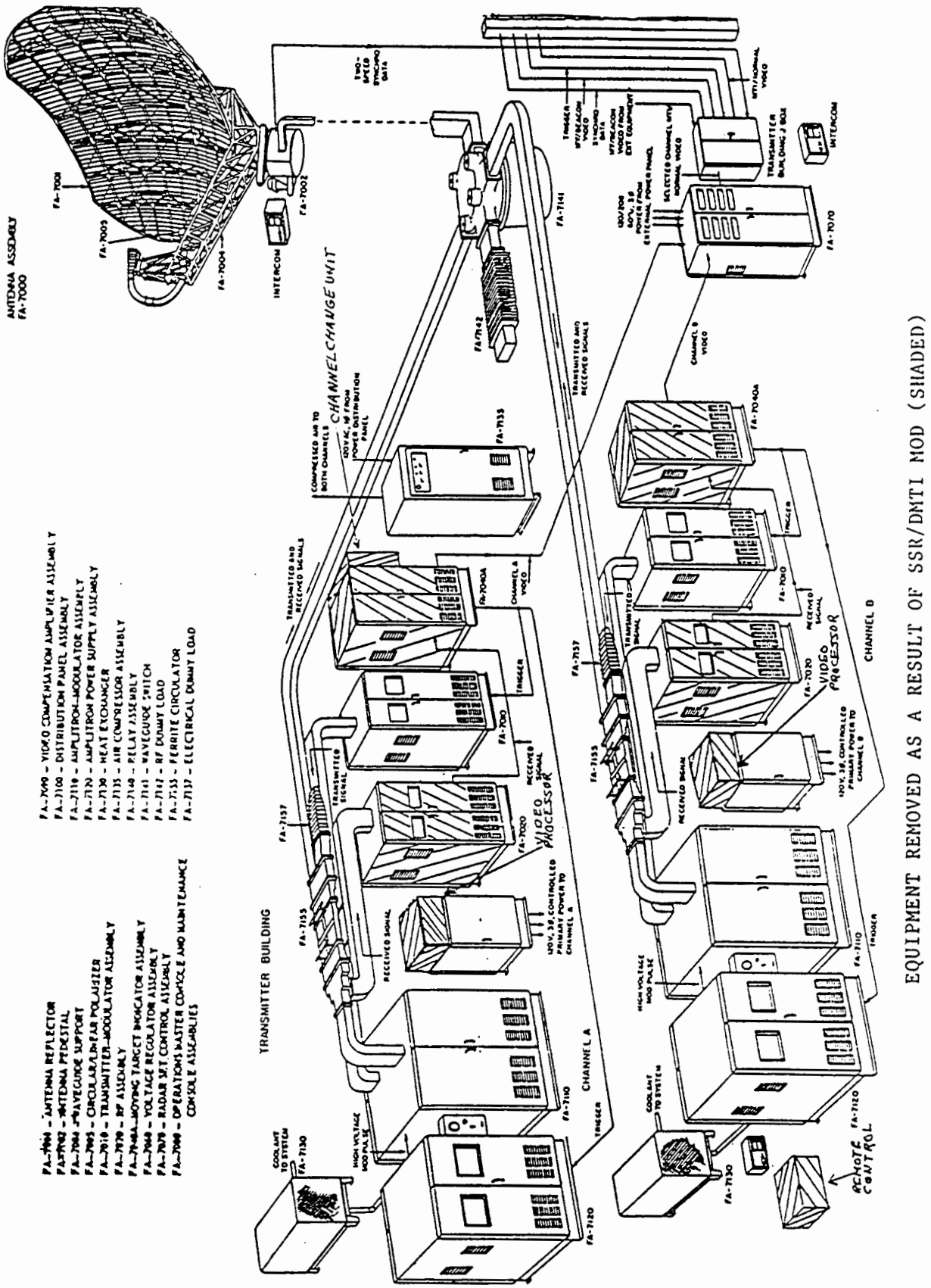
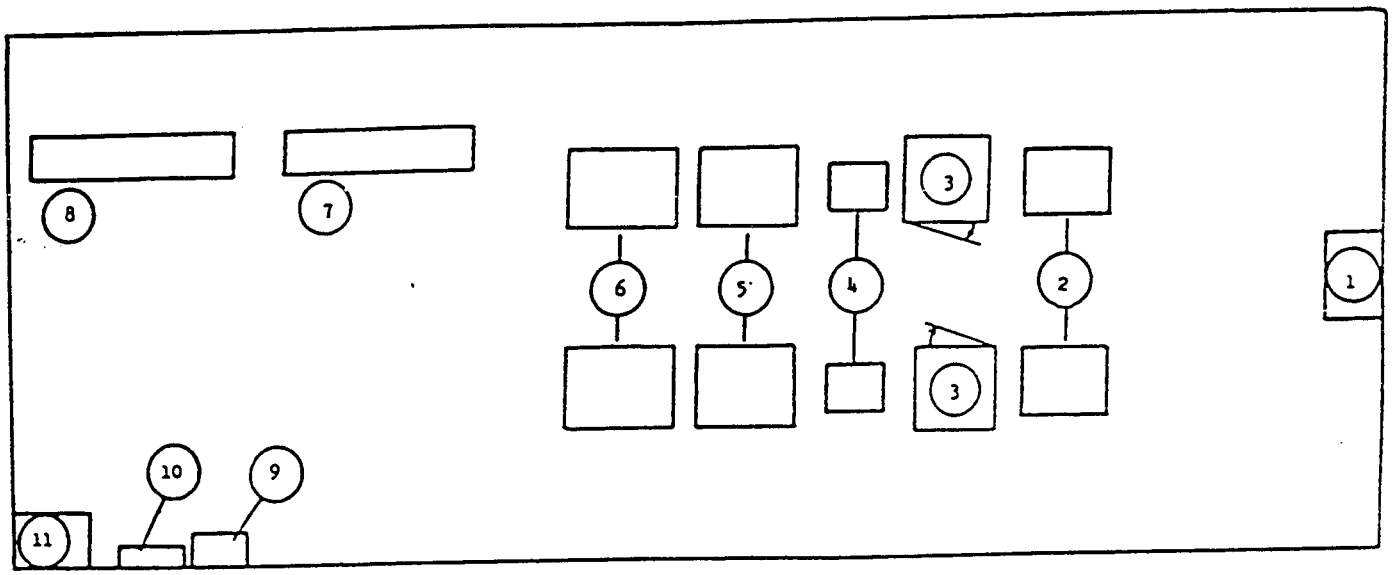
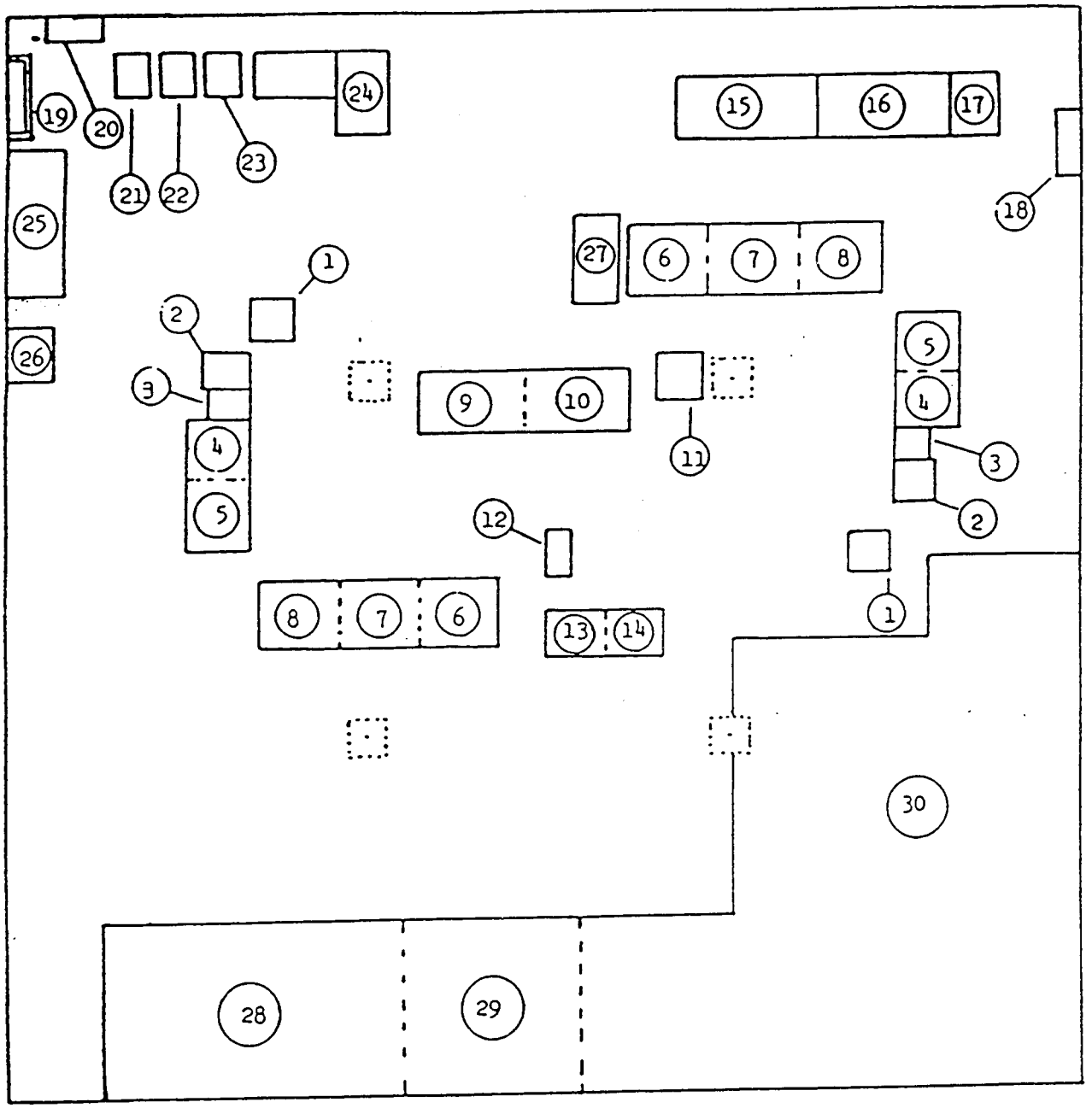


FIGURE 3-17. FINAL ARSR SITE EQUIPMENT LAYOUT



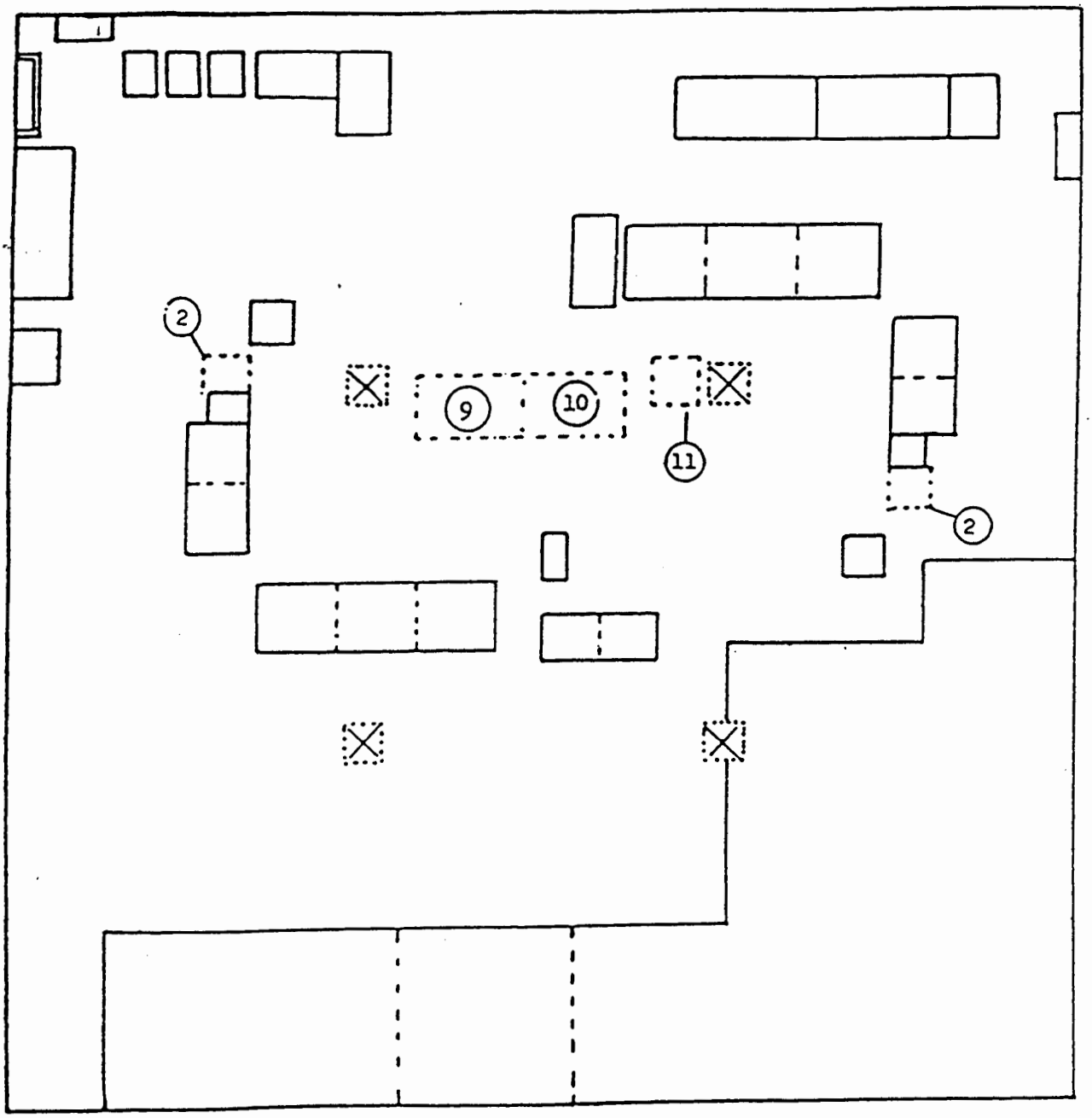
1. RSC
2. XMTR/MODULATOR ASSY
3. SSR/DMTI
4. VOLTAGE REGULATOR
5. AMPLITRON/MODULATOR
6. AMPLITRON PWR SUPPLY
7. BCN/ISM
8. RML
9. RCIU
10. CD-2A J-Box
11. CD-2A

FIGURE 3-18. FPS-20 SITE BEFORE MODIFICATION



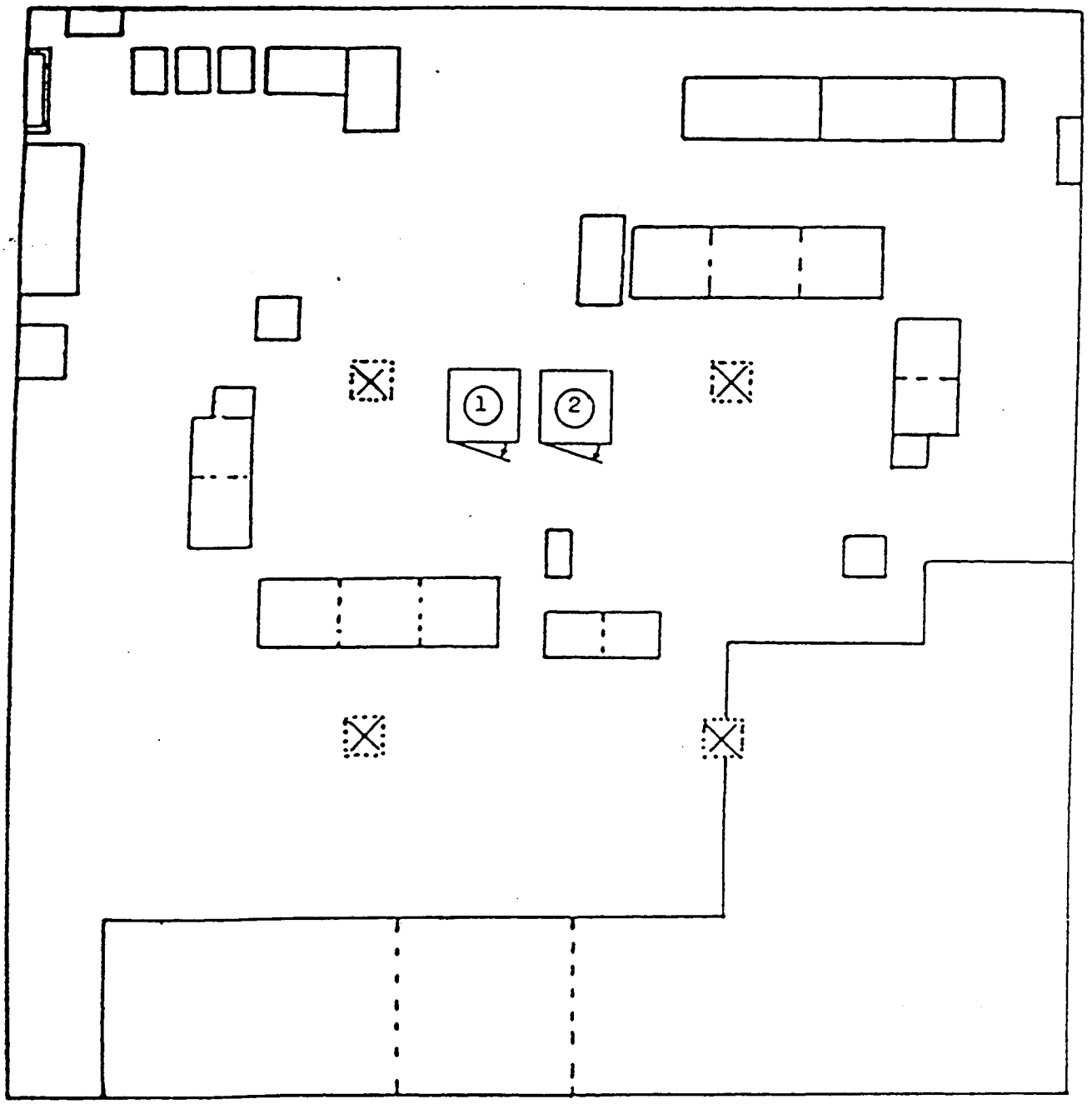
1.	RSC	11.	NAS INTERFACE	21.	PARADYNE
2.	MONITOR ASC. GROUP	12.	CONT. DIST. BOX	22.	WFMU
3.	AMPLIFIER MIXER	13.	BCN	23.	RRWDS
4.	RF AMPLIFIER	14.	ISM	24.	RCU/MONITOR
5.	RF AMPLIFIER	15.	RML-4 EQUIP.	25.	CD-2A
6.	PWR DIST. PNL	16.	VOICE DATA MUX	26.	CARD TESTER
7.	H. V. PWR SUPPLY	17.	TERACOM	27.	PPI
8.	RADAR MODULATOR	18.	RCJB	28.	STAIR WELL
9.	RCVR/MTI GROUP	19.	CD-2A J-BOX	29.	ELEVATOR
10.	RCVR/MTI GROUP	20.	RCIU	30.	OFFICES

FIGURE 3-19. EQUIPMENT REMOVED BY MODIFICATION



2. MONITOR OSC. GROUP
9. RCVR/MTI
10. RCVR/MTI
11. NAS INTERFACE

FIGURE 3-20. EQUIPMENT LAYOUT AFTER MODIFICATION



1. SSR/DMTI CAB. A
2. SSR/DMTI CAB. B

CHAPTER 4. PROJECT SCHEDULE AND STATUS

40. PROJECT SCHEDULE AND STATUS. SSR/DMTI installations are shown in paragraph 41 below by region and in the order of each region's internal priorities. The schedule is also arranged to install sites with extreme winter conditions during milder portions of the year.

41. MILESTONE SCHEDULE SUMMARY. Installation sites by region are shown in Table 4-1. A detailed installation schedule summary, by delivery sequence, is shown in Appendix 2.

TABLE 4-1. SSR/DMTI SITE INFORMATION BY REGION

REGION & SITE	REGION DELIVERY SEQUENCE	PRIMARY RADAR
CENTRAL REGION		
Oskaloosa, KS*	1	ARSR-2
St. Louis, MO	2	ARSR-1E
Omaha, NE	3	FPS-66
North Platte, NE	4	ARSR-2
Hutchinson, KS	5	FPS-66
Garden City, KS	6	ARSR-2
EASTERN REGION		
Elwood, NJ	1	ARSR-2
Oakdale, PA	2	FPS-67
Benton, PA	3	FPS-67
Trevose, PA	4	ARSR-60
GREAT LAKES REGION		
Indianapolis, IN	1	ARSR-1E
TBD	2	TBD
Tyler, MN	3	ARSR-2
Minneapolis, MN	4	ARSR-1E
Horicon, WI	5	ARSR-2
La Grange, IN	6	ARSR-1E
London, OH	7	ARSR-1E
Detroit, MI	8	ARSR-1E
Cleveland, OH	9	ARSR-1E
Gettysburg, SD	10	FPS-67B

* Kit Proof, Type I.

TABLE 4-1. SSR/DMTI SITE INFORMATION BY REGION (CONTINUED)

REGION & SITE	REGION DELIVERY SEQUENCE	PRIMARY RADAR
NEW ENGLAND REGION		
St. Albans, VT	1	FPS-67B
Cummington, MA	2	FPS-67B
NORTHWEST MOUNTAIN REGION		
Seattle, WA	1	ARSR-1
Boise, ID	2	ARSR-2
Cedar City, UT	3	ARSR-2
Francis Peak, UT (Salt Lake City)	4	ARSR-1E
Ashton, ID	5	ARSR-2
Lovell, WY	6	ARSR-2
Rock Springs, WY	7	ARSR-2
Lusk, WY	8	ARSR-2
Denver, CO (Parker)	9	ARSR-1E
Grand Junction, CO	10	ARSR-2
Trinidad, CO	11	ARSR-2
SOUTHERN REGION		
Memphis, TN	1	ARSR-1E
Nashville, TN	2	ARSR-1E
Lynch, KY	3	ARSR-2
Benson, NC	4	ARSR-1E
Charlotte, NC	5	ARSR-1E
Marietta, GA	6	ARSR-1E
Ashburn, GA	7	ARSR-1E
Haleyville, AL	8	FPS-67B
Montgomery, AL	9	ARSR-1E
Pico Del Este, PR	10	FPS-67A
Citronelle, AL	11	ARSR-2
SOUTHWEST REGION		
Gallup, NM	1	ARSR-2
Mesa Rica, NM	2	ARSR-1E
West Mesa, NM	3	FPS-66A
Amarillo, TX	4	FPS-67
Lackland, TX (San Antonio)	5	FPS-66A
Rogers, TX	6	ARSR-1E
Ft. Worth, TX	7	ARSR-1E
Alexandria, LA	8	FPS-20A
Texarkana, AR	9	FPS-67
Russellville, AR	10	FPS-64A
Oklahoma City, OK	11	FPS-67B

TABLE 4-1. SSR/DMTI SITE INFORMATION BY REGION (CONTINUED)

REGION & SITE	REGION DELIVERY SEQUENCE	PRIMARY RADAR
WESTERN PACIFIC REGION		
Boron, CA**	1	FPS-67B
Point Mugu, CA	2	ARSR-1E
Vandenberg AFB, CA	3	ARSR-1E
Sacramento, CA	4	FPS-91A
Red Bluff, CA	5	FPS-65B
Battle Mountain, NV	6	ARSR-2
Fallon, NV	7	FPS-66A
Las Vegas, NV	8	FPS-20A
FAA Academy, OK		ARSR-2

** Kit Proof, Type II.

42. INTERDEPENDENCIES AND SEQUENCE. Installation schedule reflects region's preference and is adjusted for climatic conditions. The following dependencies apply:

a. Common Digitizer, CD-2, should have been delivered, installed, checked-out and integrated into NAS prior to SSR/DMTI modification. If CD-2 is not certified, contractor will connect to CD-1.

b. Receiver front-end modifications have been installed, checked out and accepted in affected FPS-20 series radars.

c. Radar Set Control (RSC) for affected ARSR-1/2 systems should have been refurbished prior to SSR/DMTI modification. If RSC has not been refurbished, contractor will connect to existing unit.

43-49. RESERVED.

CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT. The SSR/DMTI Modification Project is under the auspices of APS-310, Radar Branch. The Project Manager and designated staff members are responsible for procurement and implementation of the SSR/DMTI modifications from contract award through installation, checkout, and integration into the NAS. Matrix management will be used by the project Manager to monitor specific areas such as contractor performance and project implementation. The Project Manager will utilize personnel from various FAA organizations to support program requirements. While there will be distinct lines of authority with regard to achieving project goals, informal communication and support is encouraged among project responsible personnel.

a. Key Individuals. Key individuals are as follows:

(1) Project Manager. The Division Manager (APS-300) has designated APS-310, Radar Branch, to serve as Project Manager for the SSR/DMTI modification contract.

(2) Technical Officer. The Project Manager has designated a member of the APS-310 En Route Radar Section as Technical Officer (TO) for the SSR/DMTI modification contract. This TO will be responsible for all aspects of design, production, testing, delivery and management of the SSR/DMTI turnkey installations. The TO is also responsible for all aspects of field implementation and will maintain close liaison with Regional Technical Officer's Representative (TOR) and contractor's installation teams in the regions.

(3) Quality Reliability Officer (QRO). A QRO is appointed by Acquisition and Materiel Service (ALG-300) to administer the contract at the contractor's factory and ensure the adequacy of the quality control programs and inspection system.

(4) Technical Officer's Representative (TOR). The TOR, is designated by the Regional AF Division as being accountable for ensuring that items required in support of the installation of the SSR/DMTI modifications are accomplished in an orderly manner. The TOR is responsible for communication, coordination, and reaction to the responsibilities of the TO. The TOR will submit periodic technical reports describing progress at each site within the region to the TO.

(5) Airway Facilities Site Representative (AFSR). The AFSR is assigned by the Sector Manager with primary responsibilities to work closely with the TOR and with the contractor during the installation, testing, and acceptance phases at each SSR/DMTI modification site. Additional responsibilities are described in Chapter 7 of this plan.

b. Project Responsibilities.

(1) Headquarters Responsibilities.

(a) Program Engineering and Maintenance Service (APS-310)

1. Provide project guidance to all Offices, Services, FAA Aeronautical Centers and Regions.

2. Ensure the timely implementation of the SSR/DMTI modification into the operational environment in a way that minimizes costs and optimizes systems performance.

3. Identify APS requirements and staff offices of services necessary to support the installation and test effort of the SSR/DMTI modifications.

4. Prepare, analyze, and distribute scheduling information to Regions, FAA Aeronautical Center, FAA Depot, etc.

5. Ensure the baseline configuration for the SSR/DMTI modification and provide suitable documentation to appropriate offices upon transition to operational status.

6. Provide planning and guidance information to all activities which interface with the SSR/DMTI modification to aid in the timely implementation of support activity.

7. Provide site preparation requirements to the Regions, and FAA Aeronautical Center (AAC), for monitoring the accomplishment of site activities leading toward the completion and acceptance of the site modification.

8. Be responsible, for factory and field acceptance testing.

9. Provide technical surveillance of the contractor in the design, development, production, testing, installation, integration and documentation of hardware and software for the SSR/DMTI modification.

10. Develop the SSR/DMTI modification maintenance concept. This entails providing for maintenance for the SSR/DMTI by the appropriate in-house system and developing the concept in coordination with ASM-100.

11. Coordinate with the Region(s) in scheduling and monitoring installation, dismantling or disposal of equipment in accordance with FAA Order 4800.2, Utilization and Disposal of Excess and Surplus Property.

12. Provide all software and hardware interfaces required for SSR/DMTI modification. The following tasks should be completed prior to the SSR/DMTI modification:

a. Common Digitizer, CD-2, should have been delivered, installed, checked-out and integrated into NAS prior to SSR/DMTI modification.

b. Receiver front-end modifications have been installed, checked out and accepted in affected FPS-20 series radars.

c. Radar Set Control (RSC) for affected ARSR-1/2 systems should have been refurbished prior to SSR/DMTI modification.

13. Ensure that logistic support requirements, in coordination with the Aeronautical Center, are planned, funded, and delivered in time to permit effective operational use of the SSR/DMTI modification.

14. Provide input and assistance to the Office of Personnel and Training (APT) for training of maintenance personnel.

15. Develop performance, maintenance, and calibration standards, and procedures for the SSR/DMTI modification.

16. Assist in and ensure the development of system operations change-over plans with AAT and the Regions.

17. Provide Configuration Management for the SSR/DMTI modification.

18. Resolve all issues emanating from installation, checkout, and integration into the NAS of the SSR/DMTI modification.

19. The TO will schedule a meeting at FAA headquarters, for all TORs to provide a briefing on TOR responsibility and authority.

(b) Office of the Associate Administrator for Air Traffic (AAT).

1. Identify and document any additional operational requirements for SSR/DMTI modification and update FAA Order 7110.65E to include air traffic procedures for integration of the SSR/DMTI into the NAS.

2. Ensure that all operational aspects of system implementation are satisfactorily resolved by the Regions prior to operational changeover.

(c) Acquisition and Materiel Service (ALG) (ALG-300/400.

1. Provide procurement actions necessary to award and administer contract(s) for the acquisition of the SSR/DMTI modification and related items to include spares and calibration equipment.

2. Provide FAA headquarters and in-plant contract administration. The headquarters contract officer has been designated as ALG-340.

3. Provide in-plant Quality Reliability Officer(s) (QRO) to ensure the adequacy of the quality programs and inspection systems and to administer the contract at the contractors' factories.

4. Provide surveillance of program management and contract administration.

5. Provide policy and procedural guidance to regional divisions and the FAA Technical Center for appropriate SSR/DMTI property controls and records maintenance prior to operational use.

6. Provide procedures for the disposal or utilization of surplus material.

(d) Office of Personnel and Training (APT). Act as alternate Contracting Officer's Technical Representative for training items only (APT-300, FAA Headquarters).

(e) Systems Engineering Service (ASM-400). Set the policy on how to control the changes in the configuration of the SSR/DMTI and monitor the SSR/DMTI configuration. Additionally, changes will be evaluated and controlled by the Configuration Control Board.

(2) System Engineering and Integration Contractor (SEIC) Responsibilities.

(a) Monitor the SSR/DMTI modification project and provide technical, and implementation and integration planning support to the SSR/DMTI Project Manager.

(b) Monitor/analyze the contractor's technical and schedule performance.

(c) Monitor the progress of the integration of the SSR/DMTI modification into the NAS.

(d) Identify and assist in resolving integration issues.

(e) Assist in in-plant quality review program as requested.

(3) Region Responsibilities. The regions will assist the TO with SSR/DMTI project coordination, and monitoring and approving contractor installation and checkout efforts for the SSR/DMTI modification field implementation. Regional AF Division Managers are the responsible individuals

for this implementation. To assist in this effort, each AF division manager will designate a Technical Officer's Representative (TOR), and an Airway Facilities Sector Representative(s). Responsibilities of these positions are delineated in Chapter 7, Field Deployment.

(4) SSR/DMTI Contractor Responsibilities. The SSR/DMTI contractor is responsible for providing turnkey SSR/DMTI modification installation. This includes design, development, testing, production, and installation of the system and providing spares, unique test equipment, training and all required documentation.

(5) Other FAA Support Organizations Responsibilities.

(a) Aeronautical Center (AAC). The Aeronautical Center will provide maintenance material, maintenance training support and inputs to the maintenance concept in coordination with the FAA Academy, Depot and APS-310. The Aeronautical Center will be provided with one SSR/DMTI modification . It will be used by the Academy for training. Responsible activity for each task listed below is in parentheses following task description.

1. Provide maintenance support for SSR/DMTI to include tools and test equipment, support equipment and facilities, technical data, transportation and handling. In-house maintenance has been selected. (AAC-400).

2. Act as Contracting Officer's Technical Representative for training items only. This task is assigned to Supervisor, Surveillance Radar Unit, AAC-944C, FAA Academy. (AAC-944).

3. Analyze training requirements; approve training program/materials; assign training responsibility; review and approve all associated SSR/DMTI modification training schedules, assignments, and programs. (AAC-940).

4. Establish a contractor conducted training program for maintenance personnel. (AAC-940).

5. Instruct and advise Regions on training programs, schedules, and personnel assignments using FAA Order 1380.40 for guidance with manning standards established by ASM-230. (AAC-940).

6. Provide for technical supervision of on-site activities performed under the contract(s) at the FAA Academy. (AAC-440).

7. Accept items delivered to the FAA Academy under the SSR/DMTI contract (AAC-52).

8. Conduct provisioning conferences for the SSR/DMTI Project. (AAC-400).

9. Develop, in conjunction with ALG and APS, logistics policies and plans for support of the system. (AAC-400).

10. Participate, as requested by APS, in the review of instruction books developed by the contractors. (AAC-940).

11. Assure timely selections of necessary maintenance instructors to meet AAC training and staffing requirements. (AAC-940).

12. Participate in planning activities for the transition of the SSR/DMTI into the logistics inventory. (AAC-400).

13. Provide facilities for contractor training of FAA personnel. (AAC-940).

14. Establish facilities and item management control and accountability for all agency property received at AAC. (AAC-80).

51. PROJECT CONTACTS. Key members of the regional and Headquarters staff have been identified and are shown in Table 5-1.

TABLE 5-1. SSR/DMTI FOCAL POINTS

Headquarters

Project Area	Office	Individual	Telephone
Project manager	APS-310	Don Johnson	202-267-8573
Contract Administrator	ALG-340	Ann Clogan	202-267-3654
Technical Officer	APS-310	Bill Lowe	202-267-8424

Regional Technical Officer's Representatives

Region	Office	Individual	Telephone
Central	ACE-433	Richard Marcus	FTS-758-7124
		Commercial	816-374-3937
Eastern	AEA-432	Charles Gruner	FTS-667-1198
		Commercial	718-917-1190
Great Lakes	AGL-451	Richard Brammer	FTS-384-7654
		Commercial	312-694-7654
New England	ANE-422	William Tretter	FTS-836-7211
		Commercial	617-273-7211
Northwest Mountain	ANM-455.C	Lee Slaughter	FTS-446-2357
		Commercial	206-431-2355
Southern	ASO-433.2	Gary Vizzini	FTS-246-7638
		Commercial	404-763-7638
Southwest	ASW-432.6	William Robertson	FTS-734-5373
		Commercial	817-877-2283
Western Pacific	AWP-463.13	Mickey Finn	FTS-984-1717
		Commercial	213-297-1717
Aeronautical Center	ACC-944A	Phil Stanley	FTS-749-4496
		Commercial	405-686-2788

52. COORDINATION RESPONSIBILITIES OF THE REGIONS.

a. Technical Officer's Representative (TOR). The TORs serve as focal points in the respective regions for SSR/DMTI implementation activities. As the Project Manager's regional representatives, they work closely with the project manager and the Headquarters Technical Officer. They are designated by the Regional/AF Division Manager and are accountable for ensuring that the SSR/DMTI modification is implemented in an orderly manner. The TORs are responsible for supporting the Project Manager. Tasks include, but are not limited to:

(1) Coordinate/manage regional deployment activities.

(2) Provide guidance and direction to the FAA Site Personnel.

(3) Provide inputs and periodic technical reports describing the deployment progress at each site to the TO.

(4) Coordinate with Air Route Traffic Control Centers, as required, for test activities associated with the system.

(5) Conduct the Joint Acceptance Inspection (JAI) and integration of the SSR/DMTI modification into NAS and ensure the airways/facilities sector manager or representative is present.

(6) Review and approve Contractor's Site Engineering Report (CSER).

(7) Confirm radar operating frequencies, of each site to be modified, to the Technical Officer. Frequency assignments will be forwarded to the SSR/DMTI contractor.

(8) Arrange for contractor site access.

(9) Complete FAA Form 256 for SSR/DMTI modifiction acceptance and submit the completed form to the TO.

(10) Maintain Installation Log and submit weekly installation status report, based on log entries, to the TO.

b. Site Representative. The FAA Site Representative will be assigned by the AF Sector Manager. This position is the interface between the contractor and the TOR. Tasks include, but are not limited to:

(1) Assist the contractor during site surveys.

(2) Provide input to TOR and logistics planning activities as they relate to site requirements.

(3) Record the Form 198 Performance Data prior to beginning the installation.

(4) Provide assistance to the TOR in direction and guidance to the SSR/DMTI contractor to efficiently and timely accomplish site preparation, installation, testing, and evaluation of the SSR/DMTI.

(5) Witness the site preparation and modification installation.

(6) Participate in modification testing and integration into NAS.

(7) Witness the completion of FAA Form 256 for SSR/DMTI modification acceptance.

(8) Assist in system field testing in accordance with the requirements of the test plans for the SSR/DMTI modification, and witness the JAI.

(9) Participate in the Joint Acceptance Inspection (JAI).

53. PROJECT RESPONSIBILITY MATRIX. Table 5-1 summarizes the various functions of the SSR/DMTI project and the primary and support responsibilities.

TABLE 5-1. SSR/DMTI MODIFICATION RESPONSIBILITIES SUMMARY

Function/Event	Primary	Support
Project Management and Control	SSR/DMTI Project Manager	All
NAS Implementation off SSR/DMTI	APS-310 Regions Contractor	HQ FAA SEIC
Financial Management	APS-310	Regions
Record Form 198 Data	Site Representative	TOR APS-310
Site Preparation	Contractor	Regions APS-310
Installation of SSR/DMTI	Contractor	APS-310 Regions SEIC
Acceptance Tests/Joint Acceptance Inspection (JAI)	Contractor TOR Site Representative	APS-310

TABLE 5-1. SSR/DMTI MODIFICATION RESPONSIBILITIES SUMMARY (CONTINUED)

Function/Event	Primary	Support
System Integration	TOR Site Representative ARTCC Personnel Contractor	APS-310 AAT
Shakedown Test	ASM-150	Regions
Maintenance Staffing	ASM-230	APS-310 Regions
Maintenance Training	AAC-944A	APT APS-310 Regions
Configuration Management	AES-400 APS-310 ASM-150	AAT SEIC
Contract Administration	ALG-300	APS-310 Regions AAT
Technical Support	ASM-150	
Technical (Field)	Regions ASM-150 AAC ASM-150	APS-310
Logistic Support	ALG-300 APS-310	ASM-100 AAC-440

54. PROJECT MANAGERIAL COMMUNICATIONS. To maintain effective and responsive control of overall progress, reviews, conferences, and working sessions will be held among the TO, TORs and the contractor. Participation in these conference and working groups by various other FAA offices may be requested at the discretion of the TO. In addition, routine status reports will be required.

a. Project Reviews. Periodically, the Project Manager will brief higher management on the status of project schedules and current topics. These reviews provide for top-level management control of the project. In preparation, the Project Manager may request the support of functional or contractor organizations in providing status and information on specific project topics.

b. Implementation Working Group. This group will meet periodically at the headquarters in Washington or other location to address both project issues and specific functional activities. Membership consists of the Project Manager, Headquarters Technical Officer and the SEIC. Other offices will be asked to participate as required. Action items generated at these meetings will be resolved by the SSR/DMTI Project Office or representatives from functional areas. Minutes of each meeting will be distributed to attendees and include a summation of the topics discussed and description of all action item resolutions.

c. Technical Officer's Representatives Conferences. These conferences will be scheduled as necessary. These meetings are attended by TORs from each Region, the Technical Officer, and representatives from headquarters organizations. They provide a forum to discuss and resolve project issues of special interest to the Regions. Action items generated at these conferences focus on regional concerns and are resolved by the TO and designated TORs or representatives from functional areas.

d. Design Reviews. Design reviews between APS-310 and the SRR/DMTI contractor will be held at scheduled times. These reviews include a Preliminary Design Review, and a Critical Design Review which have been completed. Other project reviews addressing specific SSR/DMTI activities will be convened on an as-required basis and participating SSR/DMTI organizations will be notified in advance of the date, time, and location so they can attend. APS-310 will be represented by the Technical Officer.

e. Regional Status Reporting. Weekly status reports regarding technical progress will be submitted to the TO by each TOR. Routine reporting as well as responses to specific requests will be covered in these reports.

f. Quality and Reliability. The Plant QRO will make weekly reports to the APS-310 Technical Officer. Format, content and schedule of these inputs are as directed by the APS-310 Technical Officer.

g. Installation Phase Documentation. The basic documentation required is the Installation Log and Weekly Installation Status Report. These are described below:

(1) Installation Log. The FAA Site Representative will maintain a project log and make entries documenting the installation status, activities, and events for each SSR/DMTI site. Entries will be made for every visit to the job site and for telephone conversations with the contractor's on-site representative that have an impact on the contract. Items of consequence not adequately covered by written documents shall be included in the log, such as unusual physical conditions encountered, oral protests, design deficiencies noted and actions taken, and the cause and extent of delays. Complete and factual entries will be made at time of occurrence. Appendix 3 itemizes a typical listing of entries for the installation log. Upon completion of the contract work, the Site Representative will forward the log to the TO.

(2) Weekly Installation Status Report. This report is designed to ensure that the Contracting Officer, regional division, and the Project Manager are abreast of the progress and problems that take place each week at each location. The weekly status report will be prepared and mailed every Friday by the TOR. The completed weekly status report will be furnished to the Site Representative with copies to the Regional AF Division and AF Sector Managers. A typical listing of entries to be made in the Weekly Installation Status Report is contained in Appendix 3.

55. IMPLEMENTATION STAFFING. The following personnel are responsible for the implementation of the SSR/DMTI modification at 64 en route long range radar sites.

a. Project Manager. The Division Manager (APS-300) has designated APS-310, Radar Branch, to serve as Project Manager for the SSR/DMTI modification contract.

b. Technical Officer. The Project Manager has designated a member of the APS-310 En Route Radar Section as Technical Officer (TO) for the SSR/DMTI modifications contract. The TO will be responsible for all aspects of design, production, testing, delivery, installation, NAS Integration and management of the SSR/DMTI turnkey contract. The TO is also responsible for all aspects of field implementation and will maintain close liaison with Regional TORs and contractor's installation teams in the Regions.

c. Quality Reliability Officer (QRO). A QRO is appointed by Acquisition and Materiel Service (ALG-300) to administer the contract at the contractor's factory and ensure the adequacy of the quality control programs and inspection system.

d. Technical Officer's Representative (TOR). The TOR, is designated by the Regional AF Division as being accountable for ensuring that items required in support of the installation of the SSR/DMTI modifications are accomplished in an orderly manner. The TOR is responsible for communication, coordination, and reaction to the responsibilities of the Technical Officer. The TOR will submit to the Technical Officer weekly technical reports describing progress in each site within the region.

56. APPLICABLE DOCUMENTS.

FAA Documents

FAA-C-2454	Facility Site Preparation
FAA-G-1210	Provisioning Technical Documentation
FAA-G-1375B	Spare Parts Peculiar
NAS-DD-1000	Level I Design Document
FAA-STD-019	Lightning Protection for Facilities
DTFA01-85-C-00049	Award/Contract for SSR/DMTI Modification Kits
FAA-E-2739	Specification for SSR/DMTI Modification Kits
6200.4C	Test Equipment Management Handbook
6340.8A	Maintenance of AN/FPS-20 Family of Radars
6340.8	Maintenance of Air route Surveillance Radar (ARSR) Facilities
7110.65D	Air Traffic Control
OAP 8200.1	Flight Inspection Manual

FAA Orders

1050.1D	Policies and Procedures for Considering Environmental Impacts
1050.10A	Prevention, Control and Abatement of Environmental Pollution of FAA Facilities
1380.40B	Airway Facilities Sector Level Staffing Standard System
4250.9A	Field Inventory Management and Replenishment Handbook
4402.55A	FAA Procurement Manual - Real Property
4620.3C	Initial Support for New or Modified Equipment Installation
46.50.7	Management of project Material

FAA Orders cont'd

4800.2	Utilization and Disposal of Excess and Surplus Property
6020.2	Joint Acceptance Inspections for FAA Facilities

57.-59. RESERVED.

CHAPTER 6. PROJECT FUNDING

60. FINANCIAL ASPECTS.

a. Scope. FAA offices, services, and regions must use the budgeting process to obtain funding for staffing, training, equipment and associated development.

b. Financial Allocation. APS-310 is the sole source of funding, to the Regions, for the SSR/DMTI Modification Project.

61. REGIONAL CONTRACT AUTHORITY. None. ALG-300 is the sole contract authority for this project.

62.-69. RESERVED.

CHAPTER 7. FIELD DEPLOYMENT

70. GENERAL. The SSR/DMTI modification project is a turnkey contract whereby the SSR/DMTI contractor is responsible for the design, manufacturing, testing, and delivery of SSR/DMTI modifications to the field. The contractor is also responsible for conducting site surveys, installation and testing of each SSR/DMTI modified system including conduct of acceptance inspection and interfacing into the NAS. This will include resolution of all exception items noted during acceptance and integration into the NAS. Any exception items that cannot be resolved between the TOR and the SSR/DMTI contractor will be forwarded to the SSR/DMTI Technical Officer for resolution.

71. IMPLEMENTATION STRATEGY.

a. General. The planned population of SSR/DMTI modified sites is 64 systems. These will be dispersed throughout the FAA Air Route Surveillance Network. The contractor will establish two or more installation teams which will be responsible for all site activities associated with the SRR/DMTI modification installation.

b. SSR/DMTI Modification Locations. Appendix 2 lists all qualifying SSR/DMTI Modification locations at which the SSR/DMTI contractor will be responsible for installing SSR/DMTI modified systems. It is envisioned that the contractor will request an FAA approved installation schedule that will reduce the impact of winter weather on field work.

c. Installation Concept. In order to make maximum use of the contractor's resources and to minimize project implementation costs, installation efforts will be accomplished in "clusters" of 5 to 10 systems within the same geographical area. The proposed SSR/DMTI modification schedule is shown in Appendix 2. Selected sites and schedules are shown in tabular form by equipment delivery sequence. No adjacent sites will be modified at the same time.

d. Operational Constraints Affecting Contractor. At commissioned operational sites, all contractor performed installation, checkout and acceptance testing must be completed on one channel before starting work on the other channel. Site operation has priority over modification. Oscaloosa, Kansas, FAA Academy and Elwood, New Jersey sites are exceptions to this requirement.

72. KEY SSR/DMTI FOCAL POINTS. Key members of the regional and Headquarters staff have been identified and are shown in Table 7-1.

TABLE 7-1. SSR/DMTI FOCAL POINTS

Headquarters

Project Area	Office	Individual	Telephone
Project Manager	APS-310	Don Johnson	202-267-8573
Contract Administrator	ALG-340	Allen Kann	202-267-3645
Technical Officer	APS-310	Bill Lowe	202-267-8424

Regional Technical Officer's Representatives

Region	Office	Individual	Telephone
Central	ACE-453.1	Marvin Timm	816-374-3937
Eastern	AEA-432	Charles Gruner	718-667-1198
Great Lakes	AGL-451	Richard Brammer	312-384-7654
New England	ANE-422	William Tretter	617-273-7211
Northwest Mountain	ANM-455.C	Lee Slaughter	206-446-2357
Southern	ASO-432.2	Max Shelnut	404-246-7638
Southwest	ASW-432.6	William Robinson	817-734-2283
Western Pacific	AWP-430	Mickey Finn	213-297-1717
Aeronautical Center	AAC-445B	Cassis Brookshire	405-686-2788

73. DEPLOYMENT RESPONSIBILITIES OF THE REGIONS.

a. Regional Technical Officer's Representative (TOR). The TOR serve as focal points in the respective regions for SSR/DMTI implementation activities. As the Project Manager's regional representatives, they work closely with the Project Manager and the Headquarters Technical Officer. They are designated by the Regional AF Division and are accountable for ensuring that the SSR/DMTI modification is implemented in an orderly manner. The TOR is responsible for communication, coordination and supporting the Technical Officer. Tasks include, but are not limited to:

(1) Coordinate/manage regional deployment activities.

(2) Provide guidance and direction to the FAA site personnel.

(3) Provide inputs and periodic technical reports describing the deployment progress at each site to the TO.

(4) Coordinate with Air Route Traffic Control Centers, if required, for flight advisory of test activities associated with the system.

(5) Conduct the Joint Acceptance Inspection (JAI) and the integration of the SSR/DMTI modification into the NAS and ensure the AF Sector Manager or representative is present.

(6) Review and approve Contractor's Site Preparation Report (CSPR) and standard drawings for APS-310.

(7) Confirm radar operating frequencies and pulse repetition frequencies (PRFs), of each site to be modified, to the Headquarters Technical Officer. Frequency assignments will be forwarded to the SSR/DMTI contractor.

(8) Arrange for contractor site access.

(9) Complete FAA Form 256 for SSR/DMTI modification acceptance and submit the completed FAA Form 256 to the TO.

(10) Maintain the Installation Log and submit the Weekly Installation Status Report based on log entries to the TO.

b. Site Representative. The FAA Site Representative will be assigned by the AF Sector Manager. This position is the interface between the contractor and the TOR. Tasks include, but are not limited to:

(1) Assist the contractor during site surveys.

(2) Provide input to logistics planning activities as they relate to site requirements.

(3) Record the Form 198 data prior to start of installation.

(4) Provide assistance to the TOR in direction and guidance to the SSR/DMTI contractor to efficiently and timely accomplish site preparation, installation, testing, integration into NAS, and evaluation of the SSR/DMTI.

(5) Assist in system field testing in accordance with the requirements of the test plans for the SSR/DMTI modification, and conduct the JAI with the TOR.

74. GOVERNMENT FURNISHED INFORMATION FOR SSR/DMTI DEPLOYMENT.

a. APM-310 Furnished Information. APS-310 will identify locations where SSR/DMTI modifications will be installed (Appendix 2). APS-310 has provided to the SSR/DMTI contractor the FAA Region-provided radar operating frequencies, PRFs, and equipment Interface Control Drawings for each selected SSR/DMTI modification site.

b. Region Furnished Information.

(1) Radar Operating Frequency. Regions have provided a listing of operating frequencies and PRFs for all selected SSR/DMTI modification sites within their respective areas.

(2) Interface Control/Drawings. The cognizant Region has furnished site equipment interface control drawings for contractor use.

75. EVENTS/EQUIPMENT/SERVICES FOR SSR/DMTI INSTALLATIONS.

a. Contractor Supplied Services. The SSR/DMTI contractor will provide all equipment, materials, services, and documentation required for the full turnkey operation of the SSR/DMTI modification. The contractor will provide full time supervision of his personnel for all site activities.

b. Order of Work Events at Each Site. Figure 7-1 depicts the expected order of site installation/acceptance events. These events are further described as follows:

(1) Pre-Survey Conference. Prior to the start of the site survey and evaluation, the SSR/DMTI contractor will request a pre-survey conference with sector authorities and the Site Representative. The purpose of this conference is to ensure all requirements relating to the specific site are identified and included in the Contractor's Site Preparation Report (CSPR). Any siting peculiarities should be identified at this conference.

(2) Site Survey and Evaluation by the Contractor. The SSR/DMTI contractor performs the site survey and evaluation to determine equipment locations for the SSR/DMTI. During this site evaluation, the contractor will determine the routing of power/control cables and placement/routing of associated SSR/DMTI equipment.

(3) Contractor's Site Preparation Reports. The contractor will submit a site preparation report for each site receiving a SSR/DMTI modification kit. Where the requirements of the installation are identical, a single report may apply to multiple sites. The CSPR will be used by the Government to prepare the site for installation of the contractor's equipment and to perform necessary servcies not required of the contractor. Therefore, all requirements to prepare the site for installation of the equipment shall be included. The report shall include, but not be limited to the following:

a. Typical floor plan layouts of SSR/DMTI cabinet(s) and equipment.

b. List of the SSR/DMTI equipment and tools to be delivered to the site by the contractor.

c. Tabulation of the mechanical and electrical characteristics of each piece of equipment. Included shall be the definition of power requirements, circuit breaker panels, heat load in BTU per hour, starting surge current data, circuit breaker requirements, and power factors. The overall dimensions and weights (crated and uncrated) and any other informtion needed for the Government to prepare for the equipment installation shall be provided.

d. Definition of cable and connector requirements for the complete installation, including typical cable access points and routing.

e. Definition of any office equipment and space required by the contractor during the installation and checkout period.

f. Identification of requirements for Government services.

g. List of temporary test equipment, which will be supplied by the contractor.

h. A tabulation of typical or estimated work schedules, requirements, and plans.

i. List of cabinets and modules to be removed.

(4) Review of the Contractor's Site Preparation Report. The CSPR, for each site, will be submitted to the cognizant Regional TOR. The TOR will review each CSPR submitted and provide comments within 30 days. The contractor will not commence any site activities until the CSPR is approved by the TOR.

(5) Pre-modification Conference. Upon arrival at the site installation the SSR/DMTI Contractor Installation Team Leader will hold a pre-modification conference to discuss the activities planned and how the work will be accomplished. The conference should be attended by the TOR and the Site Representative. If the TOR is satisfied with the contractor methodology, the TOR will approve the site for installation of the SSR/DMTI modification. The TOR will notify the Region and the TO with a record of the results of the conference.

(6) Form 198 Data. The Site Representative will record this pre-installation baseline data.

(7) Site Installation. After approval to proceed by the TOR, the SSR/DMTI contractor will perform all work necessary for installation of the SSR/DMTI modification.

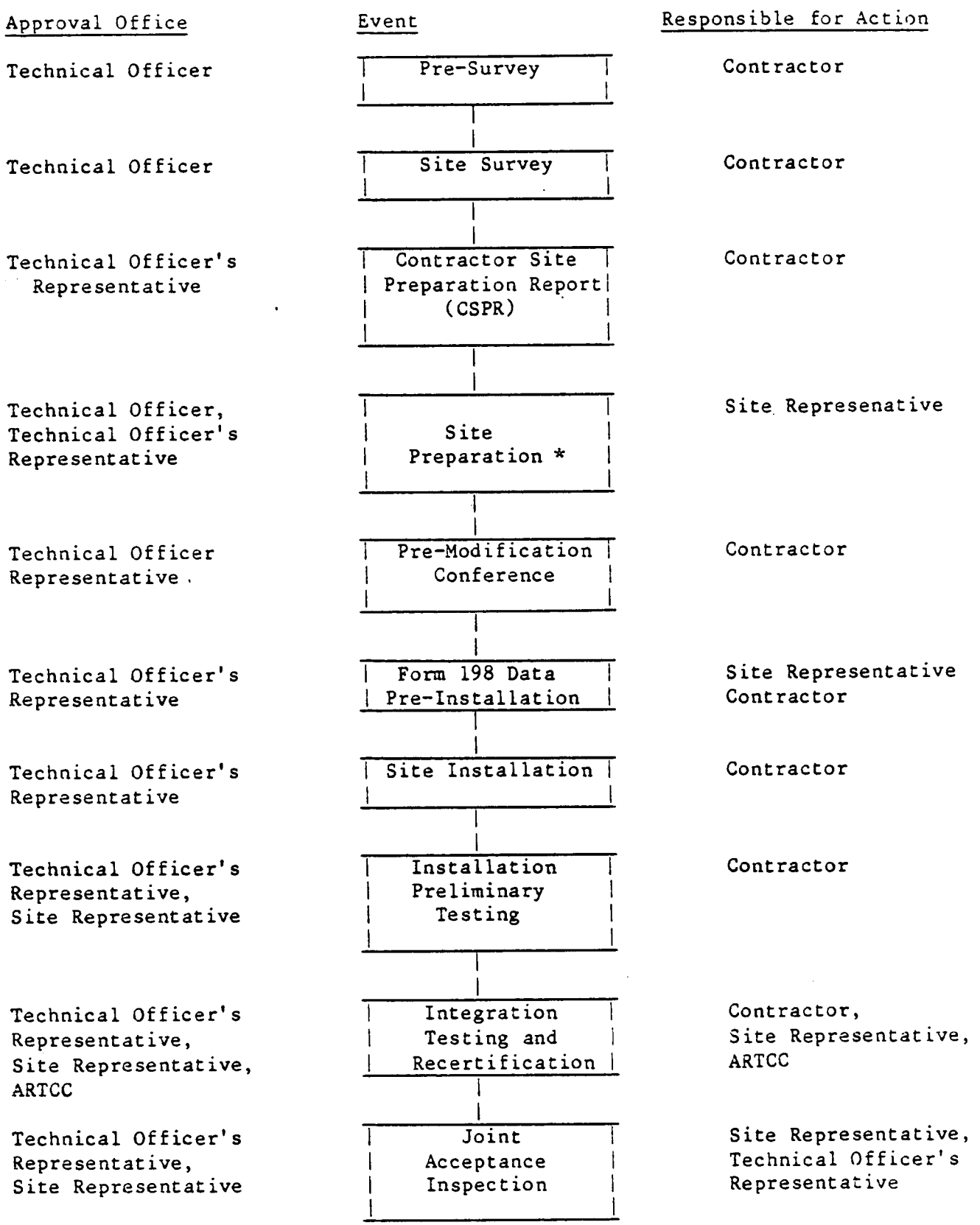
(8) Calibration and Preliminary Testing. After the installation of SSR/DMTI modification, the contractor will calibrate and perform preliminary testing of the system. Upon successful results of testing, the contractor will notify the TOR to witness the field test.

(9) Acceptance Test. After both channels are completed, a 24 hour acceptance test is required to demonstrate that the SSR/DMTI modified site is operationally ready for acceptance. The acceptance test will be performed by the SSR/DMTI contractor and witnessed by the Site Representative and the TOR. Certification testing will be performed by ARTCC and site personnel after the site acceptance test.

(10) Joint Acceptance Inspection (JAI). After the conclusion of a successful test and NAS integration test at each site, the TOR will conduct the JAI. The results of the JAI documented on Forms 198 and 256 must be forwarded to the AF Sector Manager and the TO. After successful completion of site acceptance and system certification test, the SRR/DMTI modified site will be operationally recertified.

76.-79. RESERVED.

FIGURE 7-1. SITE INSTALLATION/ACCEPTANCE EVENTS



* If Required

CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION AND TESTING. The verification and testing of the SSR/DMTI modifications are described in the following paragraphs:

a. Contractors Factory Preliminary Tests. These preliminary tests are made by the contractor to demonstrate readiness for inspection prior to notifying the Government of formal witnessed testing.

b. Design Qualification Tests. The contractor shall perform the following design qualification tests as a minimum:

(1) General Characteristics Tests. These tests are designed to demonstrate that the SSR/DMTI modifications meets every requirement of the specification through inspection, analysis and/or actual testing.

(2) Performance Test. This test will establish that the SSR/DMTI modification equipment (Types I, II, and III) fully satisfies all requirements of the specification. The test will be conducted in accordance with a Government approved test plan and procedures and will verify the following functions:

(a) Pulse Repetition Frequency (PRF) and stagger operation
(b) Receiver performance
(c) IF bandwidth
(d) Overall bandwidth and pulse response
(e) Receiver sensitivity
(f) Noise figure
(g) STC performance (Log and MTI)
(h) DMTI performance
(i) Power supply performance
(j) Operation of switching functions
(k) Master/slave operation
(l) All meter readings
(m) Comparison of waveform at all ac or pulse test points (with standard wave form photos)
(n) Measurement of voltage at all DC test points

(3) Reliability Test and Demonstration. The reliability test and demonstration will be conducted by the contractor in accordance with a Government approved test plan. Reliability development testing will be performed in accordance with the specification requirements. A reliability demonstration will be conducted on specified equipment units to demonstrate compliance with the specified MTBF and availability requirements.

(4) Maintainability Test. A maintainability demonstration will be conducted by the contractor in accordance with a Government approved test plan. The test will be conducted under simulated operational conditions, and will establish whether or not the SSR/DMTI modification meets the MTTR maintainability requirements of the specification. Corrective maintenance tasks will be generated by fault simulation, and specific corrective maintenance tasks to be demonstrated will be selected by the Government. All preventive maintenance tasks prescribed for normal operational deployment will be tested. The appropriate maintenance procedures described in the SSR/DMTI Instruction Book will be followed, as needed, during performance of each corrective or preventative maintenance task.

c. Type Tests. Type tests will be performed by the contractor to demonstrate that the SSR/DMTI modification functions correctly under the service conditions specified. The following type tests are applicable:

(a) Barometric pressure cycling (equipment operating)
(b) Temperature and humidity cycling (equipment operating)
(c) Temperature, humidity and altitude extremes (equipment non-operating)
(d) Free fall shock tests

d. Production Tests. System production tests will be performed on both A&B channel and ancillary units of each complete SSR/DMTI equipment delivered. Government approved tests and procedures will be used to verify that the delivered equipment complies with specification requirements. Spare CCAs and assemblies supplied as spares with the system are to be substituted, for like items, and tested during the production test. The production test will include a complete calibration and alignment in accordance with the SSR/DMTI Instruction Book procedures. After completion of the production performance test, the equipment will be operated continuously for 70 hours to demonstrate satisfactory performance in accordance with the specification. The production test will also include inspection of preservation, packaging, packing and marking for shipment.

e. Availability Calculation. The contractor will establish the availability of the operational SSR/DMTI equipment. Data obtained from the reliability test and demonstration, the maintainability test and the burn-in portion of the production tests will be used to make this calculation. The availability figure obtained is to be equal to or better than the required specification value.

81. PREINSTALLATION TEST. The Government will provide to the contractor, an operational system that meets or exceeds the specified operating parameters for the ARSR-1, -2 radar system for the Type I kits and an FPS-20 family radar system for the Type II/Type III kits. The Site Representative will perform and record the results of a preinstallation test in accordance with the Form 198 tests.

82. INSTALLATION, CHECKOUT CALIBRATION AND PRELIMINARY TESTING. After the installation of SSR/DMTI modification, the contractor will calibrate and perform preliminary testing of the system. Upon successful results of testing, the contractor will notify the TOR to witness the field test.

a. Post-Installation Tests. The Government will not allow the contractor to proceed with the modification of the second channel of the radar system until the first channel is modified, tested, and meets the requirements of the applicable FAA Order 6340.6A, Maintenance of Air Route Surveillance Radar (ARSR) Facilities, and the SSR/DMTI specification. The post-installation test will include both general and operational tests which will include as minimum:

General Tests

(1) Operation of all control circuits and indicators
(2) Measurement of test point data
(3) Power supply performance
(4) Video levels and quality
(5) Adjustment range of new and affected controls
(6) Meter readings
(7) Appearance of installation
(8) Video timing requirements
(9) Test trigger requirements
(10) Automatic switching upon loss of transmitter power
(11) Video timing and delays
(12) Video addition tests
(13) Power supply tests
(14) Log receiver MDS
(15) MTI receiver MDS
(16) MTI improvement factor
(17) MTI SCV

b. NAS Integration Test Procedures. The contractor will prepare and conduct detailed integration test procedures which provide assurance that the installed operational SSR/DMTI equipment is correctly interfaced with its data transmission equipment and ARTCC end users. The tests will verify the timing, alignment, and other internal SSR/DMTI adjustments required to adapt the SSR/DMTI to its external interfacing equipment. The accuracy of the SSR/DMTI data output, and its correct functioning with the using facility's automation equipment will be demonstrated. These integration tests will use the equipment and operational procedures, in current FAA use, to the maximum extent possible. Once approved by the Government, these integration test procedures will be used to validate and recertify the NAS interfaces.

83. CONTRACTOR ACCEPTANCE INSPECTION. The contractor will perform an on-site acceptance test in accordance with Government approved test plans and procedures. The test will consist of the following:

a. On-site test will be performed on each radar channel when installation is complete on each channel, and then system tests will be performed when both channels are complete.

b. The system must operate under test conditions for a least 24 hours after the tests on the individual channels are completed.

c. Test data will be recorded at least every 6 hours during the test. All observations of malfunction or instability will be recorded in the test log.

d. The Government representative(s) will be permitted to make any number of entries into the log even if not concurred in by the contractor's representative.

e. In the event of failure in the radar system unrelated to the contractor's modification, the test time will be extended by a time equal to the outage. All specification requirements will be met during the 24 hour tests without readjustment of any controls. The radar channel/system will operate for the entire test period without relevant failure, due to any portion of the system modified or installed by the contractor.

84. NAS INTEGRATION AND TESTING. NAS integration and testing is performed by the contractor (see 82b) and witnessed by the TOR and Site Representative. The FAA will assist the contractor as required in integration and testing. Targets of opportunity will be used in lieu of a flight check aircraft to recertify the radar system.

85. SHAKEDOWN AND CHANGEOVER. Prior to the JAI the TOR will verify the following:

1. ASM-150 will develop Shakedown Test Plan and Procedures.

2. All required SSR/DMTI technical documentation is available at the site.

3. Spares are available at the site, in the required range and depth, to support the site's required operational schedule.

4. All required site shift maintenance personnel have completed the SSR/DMTI Training Course and have demonstrated proficiency on the modified equipment.

86. JOINT ACCEPTANCE INSPECTION (JAI). After the conclusion of a successful acceptance test, the TOR and AF maintenance representative will conduct the JAI. A copy of the results of the JAI must be forwarded to the TO for submission to the Project Manager. The JAI documentation is comprised of FAA Forms 198 and 256. The radar system will be designated as operationally recertified upon satisfactory completion of the JAI demonstration.

87.-89. RESERVED.

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. LOGISTICS SUPPORT REQUIREMENTS. Logistics support is a continuing phase of operations beginning with development of the maintenance/support concept for the SSR/DMTI modification. Starting with the preparation of a Procurement Request (PR) which includes a requirement for the contractor to provide certain provisioning documentation, it is essentially completed when the initial provisioning requirements, documentation, and material have been delivered and stored. The individual item quantity requirements are to be predicated on a maintenance/support concept based on operational considerations, equipment redundancy, and reliability factors derived from the approved system design and approved by the FAA Depot. Storage space is to be provided for supply stock and is to be planned by the regional office responsible and coordinated with FAA Depot and ALG during the logistics support phase for each facility to be modified.

91. MAINTENANCE CONCEPT. There will be no change in the current maintenance concept as a result of the SSR/DMTI modification. Operational site maintenance of the SSR/DMTI modification will consist of preventive maintenance, test, alignment, troubleshooting, and removal/replacement of defective circuit cards and RF/IF assemblies. All analog/digital circuit cards and RF/IF assemblies will be sent to the FAA Depot, in Oklahoma City, Oklahoma, for repair. Remote Maintenance Monitoring equipment is not an integral part of the SSR/DMTI modification. FAA has installed (by separate contract) a Remote Control Interface Unit, (RCIU) that replaced the previous Remote Control Unit. The SRR/DMTI modification will connect existing control cabling and modification related control cabling with the RCIU.

92. TRAINING.

a. The contractor is contractually required to develop, prepare, and validate a maintenance training course that provides all required documentation and materials for the SSR/DMTI modifications. The contractor will present 10 sessions of this maintenance training course.

(1) Student Requisites. Students entering the SSR/DMTI training will be skilled radar maintenance technicians that have completed FAA courses 44415, Microprocessors, and 44416, Digital Techniques.

(2) Scheduling. It is anticipated that the SSR/DMTI training will require five training days for each class. Table 9-1 lists the proposed scheduling of the SSR/DMTI training.

(3) Leadtime. Regions should ensure that technician training for SSR/DMTI maintenance is completed in sufficient time to support the operational requirements of each SSR/DMTI modified site. All SSR/DMTI training assignments are to be coordinated with the responsible training activity at the FAA Academy.

TABLE 9-1. SSR/DMTI TRAINING SCHEDULE

Class No.	Location	Maximum No. of Students	Estimated Start
1	Oskaloosa, KS	8	1/10/88
2	FAA Academy, OK	8	4/12/88
3	FAA Academy, OK	8	4/22/88
4	FAA Academy, OK	12	5/03/88
5	FAA Academy, OK	12	5/13/88
6	FAA Academy, OK	12	5/24/88
7	FAA Academy, OK	12	6/03/88
8	FAA Academy, OK	12	6/14/88
9	FAA Academy, OK	12	6/23/88
10	FAA Academy, OK	12	7/06/88

(4) Training Program Management. All aspects of SSR/DMTI training are the responsibility of the Contracting Officer's Technical Representative (COTR), Supervisor, Surveillance Radar Unit AAC-944A, FAA Academy, Oklahoma City, Oklahoma.

93. SUPPORT TOOLS AND TEST EQUIPMENT. All special tools and test equipment necessary for the installation, repair, adjustment, test and maintenance of the SSR/DMTI modifications, not readily available on the open market, are to be supplied by the contractor with the equipment.

a. Schedule A Items. The contractor is to submit a list of recommended Schedule A supplies and working equipment to the FAA in sufficient time to allow headquarters review. Procurement actions for items readily available on the open market (or through Government procurement sources; i.e., Defense Logistics Service Center (DLSC)) are to be initiated as soon as possible so that those items are available prior to the installation and checkout phase.

b. Standard Test Equipment. In accordance with FAA Order 6200.4, Test Equipment Management Handbook, the contractor is to provide a list of standard test equipment which is required to maintain the system. The TO will obtain FAA review of lists furnished by the contractor.

94. SUPPLY SUPPORT. Plans for initial spare parts provisioning and follow-on supply support are to be based on the maintenance concept.

a. Long-Leadtime Items List. In order to obtain timely delivery of items having a long procurement leadtime, the FAA Depot is to utilize a long-leadtime items list (LLTIL) furnished by the contractor. The FAA Depot is to use the list to identify those long-leadtime items that should be placed on order prior to receipt of the provisioning parts list (PPL).

b. Provisioning Parts List. A tabulation of all replaceable parts and assemblies used in the end article subject to electrical or mechanical failure is to be furnished by the contractor in accordance with FAA-G-1210, Provisioning Technical Documentation.

(1) Provisioning Conference. A provisioning conference chaired by the contracting officer, as requested by the FAA Depot, is to be held approximately 30 days after receipt of the PPL.

(2) Initial Stock Requirements. Approximately 60 days after the provisioning conference, the FAA Depot is to determine initial stock requirements for both the FAA Depot and user points and initiate appropriate acquisition action.

(3) On-Site Spares. The contractor will furnish one set of on-site spares, as established in the provisioning process, to be delivered concurrently with each SSR/DMTI modification kit.

(4) Depot Spares. The contractor will furnish quantities of peculiar parts as depot-level spares as established in the provisioning process. The quantities provided shall be as required by FAA-G-1375.

c. Requisitioning Initial Supply Support Items. The latest edition of Order 4620.3, Initial Support for New or Modified Equipment Installation, assigns responsibility to the FAA Depot to establish Initial Site Support Allowance Charts (ISSAC) and maintain adequate stock to support new or modified equipment installations.

d. Submission of FAA Form 4500-2. Regions are to submit FAA Form 4500-2 to the FAA Depot, in accordance with Order 4640.7, Management of Project Materiel, paragraph 71, to obtain FAA Depot mechanical preparation of ISSAC items. The FAA Form 4500-2 for each facility should identify the number and type of equipment to be supported. The form should be forwarded to the FAA Depot no later than 3 months prior to the scheduled date of final acceptance at the site and FAA assumption of supply support responsibility.

e. FAA Depot Procedures. The FAA Depot is to use procedures in Order 4250.9, Field Inventory Management and Replenishment Handbook, paragraph 33, to furnish stock items and the associated requisitioning forms. ISSAC items must be received on site before the scheduled date of the modification acceptance test and NAS integration test.

95. CONTRACTOR DATA AND INSTRUCTION MANUALS. APS-300 will be responsible for supplying other agency elements with technical information on the SSR/DMTI modification project necessary to develop support plans, training programs, publications and other uses as required. Technical data includes, but is not limited to, engineering drawings, test results, vendor data, technical publications, equipment specifications, etc. Technical data will be disseminated by the contractor throughout the life of the contract.

a. Equipment Instruction Books. The contractor will develop the SSR/DMTI Modification Kit equipment instruction books. The contractor's Manuscript Plan, Manuscript Validation Plan, Draft Instruction Book Manuscript will be reviewed by the FAA and approved by APS-310. The contractor will prepare Preliminary Instruction Books identical to the approved Draft Instruction Book Manuscript.

a. Equipment Instruction Books. The contractor will develop the SSR/DMTI Modification Kit equipment instruction books. The contractor's Manuscript Olan, Manuscript Validation Plan, Draft Instruction Book Manuscript will be reviewed by the FAA and approved by APS-310. The contractor will prepare Preliminary Instruction Books identical to the approved Draft Instruction Book Manuscript.

(1) Delivery of Preliminary Instruction Books. The Preliminary Instruction Book will be delivered to SSR/DMTI Modification Kit Proofing Sites, delivery sequence 1 and 2, 60 calendar days after Government approval of Draft Instruction Book Manuscript. Delivery to sites 3 through 63 will be concurrent with modification kit equipment delivery.

(2) Final SSR/DMTI Instruction Books. The Government will print and distribute Final Instruction Books from the camera ready copy Instruction Book delivered by the contractor 60 calendar days after approval of Draft Instruction Book Manuscript. Distribution requirements are as follows:

(a)	Each modified radar site	2 copies
(b)	Each region	Standard Distribution
(c)	Aeronautical Center	36 copies
(d)	Technical Center	4 copies
(d)	FAA Headquarters	Standard Distribution
(f)	ASM-150	4 copies

96. EQUIPMENT REMOVAL AND DISPOSITION. APS-300 will provide affected regions with disposal plans for equipment removed and/or replaced during the SSR/DMTI modification project. Disposition is to be accomplished in accordance with the latest edition of Order 4800.2, Utilization and Disposal of Excess and Surplus Property.

97. STAFFING.

a. Maintenance Staffing Levels. AF maintenance staffing for air route surveillance radars with SSR/DMTI modifications will be commensurate with workload requirements. It will be in compliance with directives provided in the latest edition of Order 6380.40, Airway Facilities Sector-Level Staffing, Standard System. It is presumed that the incorporation of the SSR/DMTI modifications at ARSR sites will not require any additional maintenance staffing. Training will be provided for site maintenance personnel by the contractor at times and places specified in Table 9-1, SSR/DMTI Training Schedule. It is the responsibility of the regions, in coordination with Supervisor, Surveillance Radar Unit, AAC-944, FAA Academy, to arrange for training assignments for affected maintenance technicians prior to operational implementation of the SSR/DMTI modified equipment at the site.

b. Academy Instructor Requirements. It is presumed that no additional instructor staffing will be required at the FAA Academy. Instructors presently involved in providing training on air route surveillance radars will be cross trained on the SSR/DMTI modifications in class No. 2 presented by the contractor. This class will follow the installation, checkout, and integration of the 2nd delivery sequence modification kit in the ARSR located at the FAA Academy. SSR/DMTI training data/material will be incorporated into existing ARSR training classes.

98. ENGINEERING SERVICES. Engineering services will be provided per Order 1320.48B. In addition the contractor will be available with assistance on the existing service line item in the contract.

99. RESERVED.

CHAPTER 10. ENVIRONMENT AND ENERGY

100. GENERAL. No environmental objections to the SSR/DMTI modifications are anticipated. The modifications are installed in ARSR-1/2 and FPS-20 series radars, located in existing FAA facilities.

101. ENVIRONMENTAL IMPACT ASSESSMENT. None required. Finding of No Significant Impact (FONSI) not required.

102. LAND ACQUISITION. None required.

103. ELECTRONIC EMISSIONS. Any electronic signals generated in the SSR/DMTI equipment will be low level. Coupling to other site equipment will be prevented by EMI filtering and shielding in the contractors design. This will also prevent internally coupled signals within the SSR/DMTI equipment.

104.-109. RESERVED.

APPENDIX 1. ACRONYMS

ABBREVIATION	EXPLANATION
A/D	Analog to Digital
AI	Acceptance Inspection
AC	Alternating Current
AF	Airways Facilities
ACP	Azimuth Change Pulse
AFC	Automatic Frequency Control
AFSOMR	Airway Facilities Section Office Manager Representative
ARP	Azimuth Reference Pulse
ARSR	Air Route Surveillance Radar
ATCRB	Air Traffic Control Radar Beacon
ATCRBS	Air Traffic Control Radar Beacon System
BITE	Built-In Test Equipment
CCA	Circuit Card Assembly
CD-2	Common Digitizer-2
CLK	Clock
COHO	Coherent Oscillator
COTR	Contracting Officer's Technical Representative
CP	Circular Polarization
CRF	Computer Rate Function
CS	Chip Select
CSPR	Contractor's Site Preparation Report
D/A	Digital to Analog
DC	Direct Current
DMTI	Digital Moving Target Indicator
EMI	Electromagnetic Interference
FAA	Federal Aviation Administration
I	In Phase
I/O	Input/Output
IAU	Interface Adapter Unit
IC	Integrated Circuit
ICD	Interface Control Drawing
IF	Intermediate Frequency
ISM	Integral System Monitor
I&Q	In-Phase and Quadrature Phase
ISSAC	Initial Site Support Allowance Charts
Lbs	Pounds
LLTIL	Initial Site Support Allowance Charts
LRU	Lowest Replaceable Unit
LP	Linear Polarization
MBRT	Mean Bench Repair Time
MDS	Minimum Discernible Signal
MSI	Medium Scale Integration
MTBF	Mean Time Between Failures
MTI	Moving Target Indicator
MTP	Maintenance Test Panel
MTTR	Mean Time To Repair

ABBREVIATIONS (Continued)

ABBREVIATION	EXPLANATION
NAS	National Airspace System
OMCP	Operation Monitor and Control Panel
PARADYNE	Communication MODEM
PPI	Plan Position Indicator
PPL	Provisioning Parts List
PR	Procurement Request
PRI	Pulse Repetition Interval
PRF	Pulse Repetition Frequency
PROM	Programmable Read Only Memory
PSF	Pounds Per Square Foot
Q	Quadrature
QA	Quality Assurance
QRO	Quality Reliability Office (QRO)
R/A/M	Reliability/Availability/Maintainability
RCIU	Remote Control Interface Unit
RAM	Random Access Memory
RF	Radio Frequency
RTQC	Real Time Quality Control
RMLT	Radar Microwave Link Terminal RMS Root Mean Square
RCVR	Receiver
RO	Range Zero (Master Timing Trigger)
ROM	Read Only Memory
RSC	Radar Set Control
RRWDS	Remote Radar Weather Display System
SCV	Sub-Clutter Visibility
SGP	Signal Generator Panel
SEIC	Systems Engineering Integration Contractor
SSR/DMTI	Solid State Receiver/Digital Moving Target Indicator
STALO	Stable Local Oscillator
STBY	Standby
STC	Sensitivity Time Control
TERACOM	Microwave Equipment
TO	Technical Officer
TOR	Technical Officer's Representative
W	Watts
WFMU	Weather Fixed Mapping Unit

APPENDIX 2. FAA SRR/DMTI INSTALLATION SCHEDULE

Delivery Sequence	Site Location	Mod Kit Type	Start * Date	FAA Acceptance Date
1	Oscaloosa, KS	I	COMPLETED	
2	FAA Academy, OK	I	IN PROGRESS	
3	PT Mugu, CA	I	7/11/88	7/25/88
4	Elwood, NY	I	7/11/87	7/25/88
5	Olathe, KS	II	8/10/88	9/09/88
6	Denver, CO	I	9/09/99	9/23/88
7	Tyler, MN	I	9/09/88	10/07/88
8	Trinidad, CO	I	9/23/88	10/07/88
9	Minneapolis, MN	I	9/23/88	10/07/88
10	Mesa Rica, NM	I	10/07/88	10/21/88
11	St. Louis, MO	I	10/07/88	10/21/88
12	Gallup, NM	I	10/21/88	11/04/88
13	Memphis, TN	I	10/21/88	11/04/88
14	Vandenburg AFB, CA	I	11/04/88	11/18/88
15	Citronelle, AL	I	10/07/88	11/18/88
16	Seattle, WA	I	11/18/88	12/02/88
17	Montgomery, AL	I	11/18/88	12/02/88
18	Boise, ID	I	12/02/88	12/16/88
19	Marietta, GA	I	12/02/88	12/16/88
20	Battle Mount, NV	I	1/04/89	01/18/89
22	Ashton, ID	I	1/18/89	2/01/89
23	Detroit, MI	I	1/18/89	2/01/89
24	Las Vegas, NV	II	2/01/89	2/15/89
25	Indianapolis, IN	I	2/01/89	2/15/89
26	Cedar City, UT	I	2/15/89	3/01/89
27	Horicon, WI	I	2/15/89	3/01/89
28	Francis, Park, UT	I	3/01/89	3/15/89
29	Gettysburg, SD	II	3/01/89	3/15/89
30	Lovell, WY	I	3/1/5/89	3/29/89
31	Omaha, NE	II	3/15/89	3/29/89
32	Rock Springs, WY	I	3/29/89	4/12/89
33	Russelville, AR	II	3/29/89	4/12/89
34	Grand Junction, CO	I	4/12/89	4/26/89
35	Alexandria, LA	II	4/12/89	4/26/89
36	West Mesa, NM	II	4/26/89	5/10/89
37	Haleyville, AL	II	4/26/89	5/10/89
38	Lusk, WY	I	5/10/89	5/24/89
39	Pico del Este	II	5/10/89	5/24/89

* Firm installation dates are not established. First modification kit delivery will be in the first calendar quarter of 1987. Kits will then be delivered and installed at the rate of four (4) per month.

APPENDIX 2. FAA SRR/DMTI INSTALLATION SCHEDULE (CONTINUED)

Delivery Sequence	Site Location	Mod Kit Type	Start * Date	FAA Acceptance Date
40	North Platte, NE	I	5/24/89	6/07/89
41	Nashville, TN	I	5/24/89	6/07/89
42	Garden City, KS	I	6/07/89	6/21/89
43	LA Grange, IN	I	6/07/89	6/21/89
44	Hutchinson, KS	II	6/21/89	7/05/89
45	London, OH	I	6/21/89	7/05/89
46	Oklahoma City, OK	II	7/05/89	7/19/89
47	Lynch, KY	I	7/05/89	7/19/89
48	Texarkana, AR	II	7/19/89	8/02/89
49	Ashburn, GA	I	7/19/89	8/02/89
50	Fort Worth, TX	I	8/02/89	8/16/89
51	Charlotte, NC	I	8/02/89	8/16/89
52	Rogers, TX	I	8/16/89	8/30/89
53	Benson, NC	I	8/16/89	8/30/89
54	Lackland, TX	II	8/30/89	9/13/89
55	Cummington, MA	II	8/30/89	9/13/89
56	Amarillo, TX	II	9/13/89	9/27/89
57	Oakdale, PA	II	9/13/89	9/27/89
58	Red Bluff, CA	II	9/27/89	10/11/89
59	St. Albans, VT	II	9/27/89	10/11/89
60	Fallon, NV	II	10/11/89	10/25/89
61	Trevose, PA	III	10/11/89	10/25/89
62	Sacramento, CA	II	10/25/89	11/08/89
63	Benton, PA	II	10/26/89	11/08/89
64	Boron, CA	II	11/08/89	11/22/89

APPENDIX 3, INSTALLATION LOG AND WEEKLY INSTALLATION STATUS REPORT

1. INSTALLATION LOG. Entries to be made in the Installation Log should typically include, but not be limited to the following format:

a. Description of specific location of the work, such as building site, etc.

b. Contractor employees on job, by name and title.

c. description of work being done, its progress, and status of work on which operations have been suspended.

d. Weather and ground conditions, and their effect on the work.

e. Description and condition of equipment delivered to site, including GFE.

f. Deviations from contract plans and specifications and corrective or other action taken. Description of conditions differing in any respect from those contained in the contract, or allegations from contractor concerning such conditions.

g. Description of any damage to underground utilities, including cause and circumstances, precautions taken by contractor, extent of damage, and how repairs were accomplished.

h. Description of any acts of the contractor or subcontractors which damage Government property or the property of others, and confirmation of oral notification of such damage when reported.

i. Description of any components or subsystems rejected and the reasons.

j. Summary of telephone conversations referencing the SSR/DMTI modification.

k. A complete labor and material record in connection with any item of extra work or any other work for which there is any reason to believe a claim may be made.

l. Summary of any union problems, employee grievances, etc.

m. Summary of accidents and personnel injuries.

n. Change orders as issued.

2. WEEKLY INSTALLATION STATUS REPORT. Entries to be made in the Weekly Installation Status Report should typically include, but not be limited to the following format:

a. Part A, Weekly Progress. Describe the work accomplished during the week.

b. Part B.

(10) Change Orders. Describe change orders issued during the week.

(2) Progress. Describe on-site preparation/installation, deviations from the plan and other items adversely affecting implementation.

c. Part C, Problem Areas. Describe current and possible problems that might affect the completion of the contract work.

APPENDIX 4. DEFINITIONS AND ABBREVIATIONS FOR SSR/DMTI

Applicable definitions and abbreviations. The following definitions apply to the terms and abbreviations used within this implementation plan.

ACP	Azimuth Change Pulse. A series of pulses used to measure the rotation of a radar antenna with respect to a particular reference point. There are 4.096 pulses per revolution of the antenna. The current ACP equates to approximately 0.088 degrees. Unless otherwise noted, ACP will equal 0.088 degrees.
A/D	Analog-to-digital.
Analog	Pertaining to data in the form of continuously variable physical quantities. The term also refers to the equipment which uses analog signals in much of its internal circuitry.
ARP	Azimuth Reference Pulse. A pulse which occurs once per antenna revolution to identify a specific point of reference from which azimuth is measured. Normally, the pulse occurs at or near true North; accordingly, the ARP is sometimes called the North Mark.
ARTCC	Air Route Traffic Control Central. The ARTCC is the central air traffic control facility for a specific portion of the national en route airspace. Thus, the en route radar data is provided to one or, on occasion, more than one ARTCC.
ATCRBS (Beacon Radar)	Air Traffic Control Radar Beacon System (ATCRBS) in which an active airborne transponder generates a particular coded reply in response to a coded request for interrogation. The terms "beacon" and "secondary" are used to refer to the ATCRBS and its radar equipment.
Byte	A digital word which is eight bits in length.
CCA	Circuit Card Assembly. A moderately complex assembly of discrete parts consisting of active and passive electron components, their interconnecting wire or printed circuit wiring conductors, connectors, mounting hardware and similar pieces which are operated and maintained as a unit. In this specification, CCAs include both wired-in and plug-in assembles which use either printed wiring techniques or point-to-point wiring. They generally consist of a flat nonconducting baseboard on which the electronic components are mounted and which series as a major structural element. Thus, a power supply with large

	transformers, heat sinks, and regulators on a metal chassis is not a CCA, even if it is a plug-in assembly. Digital logic boards as well as those incorporating linear of discrete semiconductor components are CCAs regardless of the method used to interconnect the components. Backplanes and mother boards into which plug0in assemblies are inserted are not CCA if they contain only resistors, capacitors, and interconnecting cable and wiring.
CD-2	Common Digitizer-2. This is a second generation common digitizer. Unless otherwise noted in the particular context, or unless obviously not applicable, the term "CD-2" shall apply to the two CD-2 configurations defined below.
CD-2A	The long-range, FAA version of the CD-2 which provides search, beacon, and weather data to FAA users.
CD-2C	The long-range, Joint-use (common) version of the CD-2 which provides search, beacon, and weather data to FAA users, and search, beacon, AIMS, and height finder data to Air Defense Command users.
Clutter	The echoes or returns from a search radar which do not represent the desired information. For aircraft detection purposes, ground, sea, and weather returns qualify as clutter.
CP	Circular Polarization. A technique used by search radars to eliminate or separate weather returns from target returns.
Digital	Pertaining to data in the form of digits, as in a series of pulses. The term also refers to the equipment which uses digital signals to a great extent in its internal circuitry.
DMTI	Digital Moving Target Indicator.
Equipment	An electronic apparatus which is capable of performing its assigned functions with minimal support from other units. In this plan, the SSR/DMTI, the associated radar sets and similar units are defined as equipments.
Fall Time	The time required for a digital signal to decline from its active state to its inactive state. It is measured from the time the signal amplitude reaches 90 percent of its steady state active value to the time it reaches 10 percent of the value. For a positive pulse in a positive logic system, the fall time is measured on the downward slopping edge of the pulse.

MTBF	Mean Time Between Failure. For a particular interval, the functioning life of a population of an item divided by the total number of equipment and functional failures within the population during the measurement interval.
MTBO	Mean Time Between Outages. The average time that a particular equipment or system, including any redundant elements, will continue to provide correct, reliable operation or data to a defined user.
MTTR	Mean Time To Restore. The mean time required to restore a failed function to an operational condition. The function may be restorable by corrective maintenance repair, substitution of modules, board replacement, or the activation of a redundant element.
MBRT	Mean Bench Repair Time. The mean time required to repair failed item which has been removed from the system.
Pulse Width	The duration of a pulse as measured at the 50 percent amplitude points.
RAM	Random Access Memory. A RAM is a semiconductor memory chip, or a memory composed of such chips, which can be written into and read out of in a randomly addressable pattern under control of a processing element. It is used as a temporary storage for data which must be available within a very short access time. It may be either dynamic (refreshed) or static; both are volatile in that the data is lost when power is removed.
RTQC	Real Time Quality Control. A term used to donate the on-line automatic test data used by the NAS computer to continuously verify the correct operation of the search radar and other equipment in the NAS.
ROM	Read Only Memory intergrated circuit chip. A ROM is a semiconductor memory chip which is programmed only once (during chip manufacture) and then serves strictly as a source of data in response to specific requests. It is not alterable and its data content is permanent.
Scan	The time it takes for the radar antenna to complete one full revolution of 360 degrees. It is also called "scan time."

Search Radar	This term is used to refer to the aircraft surveillance radar which transmits radio frequency energy and receives echoes (skin paints) from objects in its path. No active participation of the target is required. The search radar is often called the "primary" radar because of this nonactive target mode of operation.
SNR	Signal-to Noise Ratio. The ratio of a signal to whatever noise may exist in the absence of that signal. The SNR of a video is defined as the ratio of the absolute peak voltage of the signal in the presence of noise to the root-mean-square value of the video noise voltage.
Stagger	A repeating sequence of variable interpulse periods.
Sweep	The time associated with the interpulse period of a radar. It is also known as the listening time. It begins at radar range zero time and ends at the beginning of the next radar pulse.
Test Target	A test target resulting from test signals injected anywhere in the radar receiver digitizer chain. It can be a search, beacon, or weather target.
us	In this plan, "us" is used as an abbreviation for "microseconds."
Voltage	All signal and SSR/DMTI power supply output voltages are specified with respect to the SSR/DMTI signal ground.
Word	A group of pulses or the bits of information they represent which are acted upon, treated, and processed as a group. Normally, the term applies to the internal manipulation and organization of information in a digital computer.