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## **Weather Surveillance Radar - 1988 Doppler**

**(WSR-88D)**

### **Integrated Logistics Support Plan**

WSR-88D Integrated Logistics Support Plan  
R400-IS301E  
6 November 2023

Prepared by: WSR-88D Radar Operations Center, Program Branch  
Submitted by: Terrance J. Clark, WSR-88D Integration Program Manager

Approved:

For the Department of Commerce:

MEHTA.AJAY.NATWAR.1365835825

Digitally signed by  
MEHTA.AJAY.NATWAR.1365835825  
Date: 2023.12.18 18:20:31 -05'00'

Ajay Mehta  
Director, Office of Observations  
National Weather Service

For the Department of Defense:

DREHER.JOHN.P.1093482766

Digitally signed by  
DREHER.JOHN.P.1093482766  
Date: 2023.12.18 12:03:29 -05'00'

Mr. John P. Dreher  
Materiel Leader, Weather Systems Branch  
Air Force Life Cycle Management Center

For the Department of Transportation:

MALCOLM ANDREWS

Digitally signed by MALCOLM ANDREWS  
Date: 2023.12.11 16:47:10 -05'00'

Malcolm Andrews  
AJM-3, Director, Enterprise Services,  
Federal Aviation Administration

For the WSR-88D Program:

COOLEY.KEVIN.CHRISTOPHER.120463826

Digitally signed by  
COOLEY.KEVIN.CHRISTOPHER.120463826  
Date: 2023.12.20 15:59:55 -05'00'

Kevin Cooley  
Director, Office of Planning and Programming for Service Delivery,  
National Weather Service Chair, WSR-88D Program Management Committee

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# **1. Introduction**

## **1.1 Overview**

The Weather Surveillance Radar - 1988 Doppler (WSR-88D) program is a joint effort of the Department of Commerce (DOC), the Department of Defense (DoD), and the Department of Transportation (DOT). The operational user agencies involved are the DOC's National Weather Service (NWS), the DoD's United States Air Force (USAF), and the DOT's Federal Aviation Administration (FAA). The program has deployed 159 operational and 10 non-operational (training, test, and repair) WSR-88D weather radar systems throughout the United States and at selected overseas locations.

For the design and acquisition phase of the WSR-88D system, the Joint System Program Office (JSPO) was assigned program management responsibility under the DOC, with coordination of the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM). The WSR-88D Responsibility Transfer Plan defined the criteria for orderly transfer of support management and program management from the JSPO to the joint WSR-88D Radar Operations Center (ROC) and the NWS Office of Observations, respectively. Support Management Responsibility Transfer (SMRT) and the WSR-88D Program Management Responsibility Transfer (PMRT) occurred in 1997. The WSR-88D system is in the operational phase. The Next Generation Weather Radar (NEXRAD) Service Life Extension Program (SLEP) and other sustaining engineering modification projects approved by the WSR-88D Program Management Committee (PMC) continue to provide state-of-the-art technology insertion to enhance radar capabilities and address component obsolescence. The PMC is described in section 2B of the [Memorandum of Agreement for the Interagency Operation of the WSR-88D](#).

### **1.1.1 Purpose**

This Integrated Logistics Support Plan (ILSP) identifies organizational relationships and responsibilities and describes the basis for agreements among various agencies for the management and technical support of the WSR-88D Program. The plan identifies support activities to be accomplished, and references how, when, and by whom they will be accomplished. This plan includes detailed information for site personnel such as recommended on-site spares, support equipment (SE), and consumables.

This document has been routinely updated and has evolved since WSR-88D network deployment to describe the logistics organizations and procedures in place for support of the WSR-88D system.

### **1.1.2 Program Summary**

The WSR-88D program provided a major upgrade of weather radar capabilities to detect, collect, and distribute vital weather data in order to identify weather events, to interpret vital weather data, and to issue warnings. It accomplishes this task by integrating advanced Doppler radar capabilities; real-time signal processing techniques; advanced meteorological/hydrological algorithms; and automated product processing and distribution technologies into the WSR-88D

system. To support this national effort, radar system hardware and software capabilities vital to severe weather warnings, flood warnings, and water resource management must be effectively maintained and enhanced as new requirements and technologies are identified.

## **1.2 Applicability**

### **1.2.1 Background**

The DOC, DoD, and DOT have similar agency goals and mission requirements concerning the location, development, and movement of hazardous weather activity detectable by radar. In response to these needs, the three agencies developed a common WSR-88D system with the WSR-88D JSPO assigned responsibility for system acquisition and deployment. The technical, operational, and integrated logistics support concepts developed during the WSR-88D Validation Phase indicated a need for continuation of a joint centralized, common support effort during the operational phase of the system life cycle. WSR-88D life cycle costs, system reliability, network integration, and future technological advancements were some considerations which formed the basis for agency agreements for operation and support of the system through a joint, tri-agency ROC. Consequently, actions were taken to define and establish the WSR-88D ROC as an organization of the NWS (W/OBS1) operating under the authority of the WSR-88D PMC. The PMC established the following priorities for the ROC: keep operational radar systems running, sustain baseline operational radar system capabilities, improve radar system reliability, integrate new capabilities into the radar system, and support the Product Improvement (PI) program.

Major responsibilities of the ROC to sustain operational life cycle operations for all WSR-88D systems belonging to the three departments are in the areas of:

- Centralized software/algorithm development and maintenance
- Field support
- Engineering management
- Configuration management
- Modification development and deployment
- Technical documentation
- On-site depot maintenance

Supply support management and centralized depot repair are the responsibility of the NWS Logistics Management Branch (LMB). The ROC is responsible for managing and engineering PI projects for changes that affect WSR-88D system architecture and that are approved by the PMC. Multi-agency and/or multi-organizational project teams may be formed to address both PI and sustaining engineering projects.

### **1.2.2 Scope**

This plan describes the integrated logistics support of the WSR-88D system during its operational life cycle. Included in the plan are the roles, responsibilities, and functional support task areas for the DOC, DoD, DOT, and the ROC to provide overall program management and oversight.

### **1.2.3 Program Management Responsibility**

The PMC was formally established January 14, 1993, upon signature approval of the original Terms of Reference by the members of the NEXRAD Program Council (NPC). The NPC formally retired on November 17, 1997, after granting the PMC overall authority for the NEXRAD program. The NPC can be recalled at any time to address issues that cannot be resolved by the NEXRAD Program Management Committee.

Oversight of the NEXRAD program budget, policy, resource commitment, and management guidance is provided by the PMC throughout the life cycle of the WSR-88D program to ensure that both common and unique agency requirements are addressed and resolved.

The day-to-day operations and management of the WSR-88D Program are directed from the tri-agency ROC with the ROC Director organizationally reporting to the Director of the NWS Office of Observations and serving the PMC as the Integration Program Manager (IPM). The Director, Office of Planning and Programming for Service Delivery serves as the Chair of the PMC.

## **1.3 References**

The following documents and changes thereto are applicable:

Engineering Handbook 1 (EHB-1), Weather Surveillance Radar 22-9, January 27, 2023

Engineering Handbook 6-501 (EHB 6-501), Illustrated Parts Breakdown R24, 1 October 2022

Federal Meteorological Handbook 11 (FMH-11), Doppler Meteorological Radar Observations, OFCM, [Part A](#) (July 2021), [Part B](#) (December 2005), [Part C](#) (October 2017), and [Part D](#) (February 2006)

ICD 2620062 ICD for the WSR-88D Generator Shelter – Rev A 21 July 2008

Management Process for WSR-88D Modifications, ROCPLN-PGM-02, Rev 1, October 15, 2001

MEMORANDUM OF AGREEMENT among Department of Commerce (DOC), Department of Transportation (DOT) and Department of Defense (DoD) for Allocation of Program Costs of Next Generation Weather Radar (NEXRAD) Program, 1 October 2019

[MEMORANDUM OF AGREEMENT among the Department of Commerce, Department of Defense, and Department of Transportation for Interagency Operation of the Weather Surveillance Radar-1998, Doppler \(WSR-88D\), Approved 24 March 2021](#)

NEXRAD Maintenance Concept, RG400-MC202, February 1984

Technical Data Management Plan ROCPLN PGM-04C, 01 March 2007

WSR-88D Configuration Management Plan, ROCPLN-PGM-03, 7 July 1996



[WSR-88D Configuration Control Board Charter, ROCPLN-PGM-06A April 12, 2000](#)

[WSR-88D Program Management Committee Charter, 9 June 2022](#)

WSR-88D System Specification, Document Number 2810000K, Code Identification 0WY55, 1 January 2018

WSR-88D Responsibility Transfer Plan, Version 3.4, 3 March 1993, and associated Transfer Agreements, 20 June 1994

## **1.4 Acronyms and Office Symbols**

### **1.4.1 Acronyms**

ACC	Air Combat Command
AETC	Air Education and Training Command
AF	Air Force
AFGSC	Air Force Global Strike Command
AFI	Air Force Instruction
AFLCMC	Air Force Life Cycle Management Center
AFMC	Air Force Material Command
AFNIC	Air Force Network Integration Center
AFPD	Air Force Policy Directive
AFSC	Air Force Sustainment Center
AFSOC	Air Force Special Operations Command
AJM-0	Program Management Organization, FAA
AJM-3	Enterprise Services, FAA
AJW-0	Technical Operations, FAA
AMC	Air Mobility Command
AJW-L	FAA Logistics Center
APWG	Adaptable Parameter Working Group
A <sub>i</sub>	Inherent Availability
A <sub>o</sub>	Operational Availability
A <sub>s</sub>	Service Availability
ASN	Agency Stock Number
ATE	Automated Test Equipment
AWIPS	Advanced Weather Interactive Processor System
CAGE Code	Commercial and Government Entity (CAGE) code See <a href="https://cage.dla.mil/">https://cage.dla.mil/</a> .
CCB	Configuration Control Board
CLS	Consolidated Logistics System
CM	Configuration Management
CSE	Common Support Equipment (Not WSR-88D unique. See PSE.)
CWSU	Center Weather Support Unit, NWS
DLA	Defense Logistics Agency
DOC	Department of Commerce
DoD	Department of Defense

DOT	Department of Transportation
ECP	Engineering Change Proposal
EHB	Engineering Handbook
ETIMS	Enhanced Technical Information Management System
FAA	Federal Aviation Administration
FEDSTRIP	Federal Standard Requisitioning and Issue Procedures
FMH	Federal Meteorological Handbook
HQ	Headquarters
ICD	Interface Control Document
ILSP	Integrated Logistics Support Plan
IPM	Integration Program Manager
ISEA	In-Service Engineering Activity
ITWS	Integrated Terminal Weather System
JSPO	Joint System Program Office
LMB	Logistics Management Branch
LRU	Line Replaceable Unit
LTE	Long Term Evolution
MDC	Maintenance Data Collection
MILSTRIP	Military Standard Requisitioning and Issue Procedures
MLOS	Microwave Line of Sight
MOA	Memorandum of Agreement
MSCF	Master System Control Function
MTBF	Mean Time Between Failure
MTTR	Mean Time to Repair
NEXRAD	Next Generation Weather Radar
NIST	National Institute of Standards and Technology
NLSC	National Logistics Support Center
NOAA	National Oceanic and Atmospheric Administration
NPC	NEXRAD Program Council
NRC	National Reconditioning Center
NSN	National Stock Number
NWS	National Weather Service
NWSTC	NWS Training Center
OCLO	Office of the Chief Learning Officer
OFCM	Office of the Federal Coordinator for Meteorological Services and Supporting Research
PACAF	Pacific Air Force
PCR	Publication Change Request
PHS&T	Packaging, Handling, Storage, and Transportation
PI	Product Improvement
PICA	Primary Inventory Control Activity
PIP	Private IP
PM	Preventive Maintenance
PMC	Program Management Committee

PMEL	Precision Measurement Equipment Laboratory
PMRT	Program Management Responsibility Transfer
POC	Point of Contact
PPD	Program Plans Division
PSE	Peculiar Support Equipment (WSR-88D unique. See CSE.)
RDA	Radar Data Acquisition
ROC	Radar Operations Center
RPG	Radar Product Generation
RPIE	Real Property Installed Equipment
SE	Support Equipment
SERD	Support Equipment Recommendation Data
SCMW	Supply Chain Management Wing
SICA	Secondary Inventory Control Activity
SMR	Source Maintenance and Recoverability
SMRT	Support Management Responsibility Transfer
SMT	Special Maintenance team
SREC	Software Recommendation and Evaluation Committee
SSE	Shared Support Equipment
TAC	Technical Advisory Committee
TCM	Total Time Corrective Maintenance
TDWR	Terminal Doppler Weather Radar
TMDE	Test, Measurement, and Diagnostic Equipment
TPS	Transition Power System
TPMS	Transition Power Maintenance System
USAF	United States Air Force
USSF	United States Space Force
VSAT	Very Small Aperture Terminals
WARP	Weather and Radar Processor
WDTD	Warning Decision Training Division
WFO	Weather Forecast Office
WSR-88D	Weather Surveillance Radar - 1988 Doppler

#### **1.4.2 National Weather Service (NWS) Office Symbols**

W/OBS	Office of Observations
W/OBS1	Radar Operations Center
W/OBS12	ROC Program Branch
W/OBS32	Services Branch
W/OBS34	Logistics Management Branch
W/OBS341	National Reconditioning Center
W/OBS342	National Logistics Support Center
W/CLO	Office of the Chief Learning Officer (OCLO)
W/CLO2	Warning Decision Training Division (WDTD)
W/CLO4	Electronics and Information Technology Division (E&IT)
W/OPPSD	Office of Planning and Programming for Service Delivery

## **1.5 WSR-88D System Description**

The WSR-88D system includes 159 operational Doppler radar sites consisting of a Radar Data Acquisition (RDA) function, a Radar Product Generation (RPG) function, and support which include communications, facilities, and integrated logistics functions addressed by this plan.

Multiple User Display Systems interconnect with the WSR-88D system, and have replaced the Principal User Processor (PUP). These systems include the NWS Advanced Weather Interactive Processor System (AWIPS), the FAA Weather and Radar Processor (WARP), and the DoD commercial display. All of these systems are external to the WSR-88D system and are the responsibility of the owning agencies.

All operational WSR-88D systems are employed as network sites, as defined in FMH-11 (Part A). The basic policies for the operation and support of the WSR-88D systems to meet the common needs of the WSR-88D agencies are stated in the Memorandum of Agreement (MOA) among DOC, DOT, and DoD for Interagency Operation of the WSR-88D.

### **1.5.1 Radar Data Acquisition**

The RDA includes the Doppler radar, tower, and radome which are located at the radar site. It includes hardware and software required for transmitting, receiving, signal processing, control, status monitoring, error detection, display, calibration, and archiving functions related to the radar's operation. To the extent required, it includes some display and data entry hardware and software to provide for human interaction in the control and status monitoring of the transmitter, receiver, and auxiliary site equipment.

### **1.5.2 Radar Product Generation**

The RPG includes data processing, data entry, and display capabilities located at either the radar or principal user site. It includes all hardware and software required for real-time generation, storage, and distribution of meteorological and hydrological products required for operational use. It also includes hardware and software required for control, status monitoring, error detection, and archiving. To the extent required, it includes some display and data entry hardware and software to provide for human interaction in the generation and distribution of products.

### **1.5.3 User Display Systems**

The User Display Systems are unique to each agency and are no longer part of the WSR-88D system.

### **1.5.4 Communications**

The communications function includes the hardware communications components and associated software for wideband and narrowband communication circuits. Wideband communication circuits extend between the RDA and the RPG and between the RPG and the Level II base data users. Depending on the configuration and location of the RDA and RPG, the

wideband communications between the RDA and the RPG can be hardwired, commercial, or private T1 circuit.

The NEXRAD Private IP (PIP) network is used to transmit weather data, Master System Control Function (MSCF) control and command data, radar products for AWIPS, and Level II data for further dissemination in the WFO. Radar products are transmitted to AWIPS. Level II data is sent from the WFO to the NWS Headquarters for further dissemination.

For NWS systems, a wireless backup communications solution exists for the WSR-88D commercial T1 circuits that support primary communications between geographically-separated RDA units to RPG units at the WFOs. This backup communications solution can be either wireless 4G Long Term Evolution (LTE) technology, or satellite Very Small Aperture Terminals (VSATs) at sites that cannot achieve adequate 4G LTE signal strength. For DoD and FAA sites, the communications is between the RPG unit at the site and the WFO.

### **1.5.5 Facilities**

The facilities function includes real estate, buildings, and provision and installation of Real Property Installed Equipment (RPIE) such as power generation, air conditioning equipment, uninterruptible power systems, and access roads, which are needed in support of the WSR-88D system. Each agency is responsible for its own facilities management in support of the WSR-88D Program.

## 2. Agency, Depot, and User Responsibilities

### 2.1 General

This section of the ILSP identifies the organizations of the participating agencies involved in WSR-88D operations and maintenance, delineates their organizational relationships, and specifies responsibilities for the management and support of the WSR-88D resources and functions throughout the system's operational life cycle. [Table 2.1](#) lists major responsibilities.

**Table 2.1**  
**Major Responsibilities Synopsis**

#### **Program Management**

Program Management Responsibility	Office of Observations
Interagency Management Coordination	Office of Observations
Interagency Technical Coordination	ROC
Tri-agency Budget Coordination	Office of Observations

#### **Configuration Management**

Agency PMC/Configuration Control Board (CCB) Coordination	ROC
Hardware/Software Configuration Management	ROC
Communications Configuration Management	Agencies/ROC
Engine/Generator/TPS Shelter(s) Configuration Management	Agencies/ROC

#### **Engineering/Technical Support**

Maintenance Data Collection	LMB
Maintenance Data Analysis	ROC/LMB
Software Maintenance/Enhancement	ROC
Adaptable Parameters	ROC
Technical/Engineering Documentation.	ROC
Modification/Retrofit Planning, Procurement, Deployment	ROC
Engineering, NEXRAD Product Improvement	ROC
Engineering, Sustaining	ROC
Integration Testing	ROC
Frequency Management	Agencies/ROC

#### **Field Support**

On-Site Depot Team Corrective/Preventive Maintenance	ROC
Hotline Field Support	ROC
Replenishment Supply/PICA	LMB
Depot Repair and/or Reconditioning	NRC
Quality Control of Depot Repairs	NRC
Quality Assurance of New Supply Spares	NRC
Organizational Level Corrective/Preventive Maintenance	Agencies/Site
System Calibration	Agencies/Site
Test Equipment Repair and Calibration	Agencies/Site/NRC

Formal Maintenance Training	NWSTC
Formal Operations Training	WDTD/AETC
Network Management	ROC
Tri-agency Operational Support	ROC
Communications Access Management	ROC
Operations	Agencies

Note 1: See Section 1.4 for acronyms.

Note 2: Agencies = NWS, FAA, and USAF

## 2.2 Program Management Committee (PMC)

**Background:** The PMC was formally established January 14, 1993, upon signature approval of the original Terms of Reference by the members of the NEXRAD Program Council (NPC). The NPC formally retired on November 17, 1997, after granting the PMC overall authority for the NEXRAD program. The NPC can be recalled at any time to address issues that cannot be resolved by the NEXRAD Program Management Committee.

**Authority:** The PMC is guided by the latest approved version of the WSR-88D PMC Charter. The PMC provides overall tri-agency policy, management guidance, budget, agreements, and decisions involving changes, modifications, new work, and resource commitments for the WSR-88D Program. The primary role of PMC members is to make higher authority decisions for each agency throughout the operational life of the WSR-88D equipment with focus on major product improvements and network performance.

Unresolved issues encountered at the PMC level can be elevated to the Agency Executive level (Director of NWS, Headquarters NWS; Director of Weather, Headquarters USAF; and FAA Director of Enterprise Services). The PMC Chair will invite the appropriate agency executives to a meeting to address and resolve such issues.

**Chair:** The PMC is chaired by the Director, Office of Programming and Planning for Service Delivery who, as a non-voting member, presides over all meetings of the PMC, arranges the presentation of issues to the PMC, and obtains all resolutions. The Chair receives plans, issues, interagency MOAs, and charters from the agencies and the ROC and receives Engineering Change Proposals (ECPs) from the NEXRAD CCB.

**Integration Program Manager (IPM):** The ROC Director serves as the IPM. The IPM shall:

- a. Provide non-voting PMC operational support representation.
- b. Provide technical support; advice regarding operations; and status information on approved changes to development and test activities at the ROC.
- c. Participate in the prioritization of new approved changes for development and testing.
- d. Prepare interagency MOAs, plans, and charters for signature.
- e. Monitor WSR-88D network performance and briefs performance statistics to the PMC.

**Product Improvement (PI) Manager:** PI projects typically use new technology that improves the WSR-88D system architecture and performance capabilities. Non-voting PI representation is provided by the ROC who is the WSR-88D PI Manager. The functional PI program management is conducted within the ROC. The PI Manager proposes project baselines in terms of cost, schedule, and scope defining the product and cost benefit as the advocate for PI. PI projects are defined as sustaining engineering (i.e., IT Refresh, refurbishment, etc.) projects that have an Independent Government Cost Estimate that is not manageable within the ROC Tri-agency Operations O&M budget. Once PMC approval for a PI project is received, the PI Program Manager manages the approved project within the PMC approved baseline cost, schedule, and scope and briefs the status of PI projects to the PMC.

**Executive Secretary:** The NWS Office of Observations Services Branch provides the non-voting Executive Secretary to the PMC. The Secretary is responsible for scheduling meetings, preparing the agenda and supporting data, assisting the Chair in the conduct of meetings, and preparing and distributing meeting minutes.

**Agency Representatives:** The voting members are:

- a. the Director, Office of Observations, NWS;
- b. the Chief, Weather Systems Branch, Air Force Life Cycle Management Center; and
- c. the Director, Enterprise Services, FAA.

The Agency Representatives are delegated full authority to act as Executive Agents for their respective agencies and shall present agency issues to the PMC. The Agency Representatives shall review the PMC agenda and be prepared to address and resolve each item on the agenda. The Agency Representatives shall ensure appropriate coordination occurs to obtain agency approval to commit resources for support responsibility.

## **2.3 Department of Commerce, National Weather Service (NWS)**

### **2.3.1 Office of Planning and Programming for Service Delivery**

The NWS Office of Planning and Programming for Service Delivery (OPPSD) provides the Agency Representative who is the NWS voting member of the PMC and who is delegated full authority to act as Executive Agent for DOC. The NWS OPPSD chairs the PMC. The NWS OPPSD plans WSR-88D system evolution consistent with the NWS information technology structure. The PMC analyzes requirements and solutions for cost benefit and operational feasibility.

### **2.3.2 Office of Observations (NWS/OBS)**

The NWS Office of Observations serves as the NWS voting member of the PMC and provides the non-voting PMC WSR-88D Integration Program Manager. The NWS Office of Observations operates and maintains all NWS-owned WSR-88D equipment. In addition, the NWS Office of Observations:

- a. Provides program management responsibility for WSR-88D operational support as detailed in the WSR-88D Responsibility Transfer Plan and the WSR-88D PMC Charter.
- b. Prepares program plans and documentation.



- c. Provides support for NWS WSR-88D site surveys, site modifications, and site acceptance of WSR-88D equipment.
- d. Provides a NWS representative to tri-agency working groups and teams.
- e. Plans, budgets, and provides staff to the ROC. Manages and operates the ROC by implementing coordinated tri-agency plans, policies, budget, and staffing. Plans, programs, and budgets costs for tri-agency and agency-unique integrated logistics support elements including the maintenance, spares, Peculiar Support Equipment (PSE), and repairs of the NWS portion of the WSR-88D systems at field sites (by special teams, contractors, or on-site personnel) and at the repair depot.
- f. Reviews the ILSP annually and determines if a major update with formal coordination is required. This review includes any changes in sparing/levels and substantive changes to office/agency roles and responsibilities. Administrative changes such as table entries, office symbols, etc., will be posted as required to the ROC web page with informal coordination with the agency focal points and do not require formal coordination/signature.
- g. Provides tri-agency WSR-88D hardware and software configuration management, hardware sustaining engineering design, software and algorithm maintenance, software release, sustaining engineering modification development/procurement/deployment, engineering/technical data development, and maintenance. The ROC is responsible for the security of the WSR-88D system. The ROC has implemented a risk management framework which leverages continuous monitoring to support on-going authorization and risk management to ensure the WSR-88D system's continued authority to operate. The ROC coordinates support requirements for fielded systems including field support and on-site depot level maintenance. The ROC manages near-term technical data transfer activities and long-term system improvement work. The ROC established and maintains a site configuration database. The ROC investigates radar coverage issues, resolves electromagnetic interference issues, analyzes proposed construction to ascertain potential degradation to radar performance, relocates radars, and procures additional radars as needed.
- h. For PI projects, the ROC performs the following activities:
  - a. Provide systems engineering for PI projects
  - b. Develop software for PI and sustaining engineering projects
  - c. Provide integration and testing of PI projects
  - d. Provide supply support planning and implementation for PI projects.
  - e. Provide supply equipment planning and implementation for PI projects.
  - f. Provide retrofit planning, modification kit procurement, and implementation for PI projects.
  - g. Provide safety planning and implementation for PI projects.
  - h. Provide field and depot maintenance support planning and implementation for PI projects.
  - i. Provide depot repair planning and implementation for PI projects.
  - j. Provide facilities planning and implementation for PI projects.
  - k. Provide configuration management planning and implementation for PI projects.
  - l. Provide operations and maintenance technical manual planning and implementation for PI projects.

- m. Provide engineering data including specifications and drawing planning and implementation for PI projects
  - n. Perform Independent Verification and Validation of PI projects
- i. Plans and budgets for operation, maintenance, and sustaining engineering modification improvements to the WSR-88D system.
- j. Procures and provides to NWS sites, via the LMB, all WSR-88D Common Support Equipment (CSE) requirements. Provides calibration for all NWS CSE and PSE.
- k. Provides direction to the NWS Regions and maintains liaison with other agencies in the effective maintenance of required meteorological and hydrological data collection, dissemination, and exchange.
- l. Serves, through the LMB, as the Primary Inventory Control Activity (PICA) to control and replenish spare parts inventory and provide supply support for all three agencies. Ensures that Line Replaceable Units (LRUs) are returned to the NRC in a timely manner, and coordinates and obtains approval from the LMB for requisitions for LRUs for which no unserviceable LRU return to the NRC is planned.
- m. Plans for and provides centralized depot-level repair support for all NWS, Air Force, and FAA equipment at the NRC in accordance with the procedures contained in [Appendix B](#) of this plan.
- n. Responds to requests for data and audits to help the ROC maintain network configuration control of WSR-88D and the individual site configuration database.

### **2.3.3 National Weather Service Training Center (NWSTC)**

The NWS Office of the Chief Learning Officer (OCLO) supports training of NEXRAD operators and electronics technicians at the National Weather Service Training Center (NWSTC).

The NWSTC in Kansas City, MO is responsible for development, implementation, conduct, and monitoring of formal technical training required to qualify NWS, FAA, and DoD maintenance personnel on WSR-88D equipment.

### **2.3.4 Warning Decision Training Division (WDTD)**

The Warning Decision Training Division (WDTD) in Norman, OK is responsible for development, implementation, conduct, and monitoring of formal operations training required to qualify NWS operations personnel on WSR-88D and AWIPS equipment. In addition they review WSR-88D Program documents, provide advice on radar and warning-related operational issues, and assist with testing new WSR-88D builds.

## **2.4 Department of Defense (DoD) – United States Air Force (USAF)**

DoD owns and maintains 25 WSR-88Ds. DoD operates 4 of the 25 WSR-88Ds (viz., Vandenberg AFB, Kadena AB, Camp Humphreys, and Kunsan AB); and NWS operates the remaining 21.

### **2.4.1 Air Force Materiel Command (AFMC)**

- a. Establishes a Secondary Inventory Control Activity (SICA) to interface with the PICA's logistics systems.
- b. Supports any USAF conducted Operational Test and Evaluation programs as necessary in accordance with Department of Air Force Test Center Instruction (AFTCI) 99-103.
- c. Provides calibration and Precision Measurement Equipment Laboratory (PMEL) support for Air Force WSR-88D systems and ensures that systems and equipment meet the metrology and calibration requirements in accordance with Department of Air Force Manual (AFMAN) 21-113 which establishes and directs the metrology and calibration program and Technical Order (T.O.) 00-20-14 which provides methodology and procedures to carry out the direction of AFMAN 21-113.
- d. Coordinates with the supporting agency to ensure the WSR-88D system is supported according to approved MOA and established WSR-88D support procedures of DoD, DOC, and DOT.
- e. Plans and performs site surveys for the Air Force portion of the WSR-88D system.

#### **2.4.1.1 Air Force Sustainment Center (AFSC) 448<sup>th</sup> Supply Chain Management Wing (SCMW)**

Performs SICA responsibilities for the Air Force.

- a. Plans, programs, budgets, and funds for spares and depot support of Air Force owned components as required by MOA with the supporting agency, NWS.
- b. Provides a representative to tri-agency working groups and teams where DoD logistics, maintenance, and configuration issues are discussed.
- c. Provides customer liaison and feedback to AFLCMC for DoD maintainers and supply points to ensure effective support of WSR-88D equipment.
- d. Assists the ROC in Technical Manual development by providing part numbers, documentation references, etc.

#### **2.4.1.2 Air Force Life Cycle Management Center (AFLCMC)**

AFLCMC provides the Agency Representative who is the DoD voting member of the PMC and who is delegated full authority to act as Executive Agent for DoD. AFLCMC provides DoD program management support based on program management responsibilities as identified in Air Force Instruction (AFI 63-101/20-101, Integrated Life Cycle Management), while ensuring the operation and maintenance of all DoD-owned WSR-88D equipment. In addition, AFLCMC:

- a. Plans, budgets, and provides staff to the ROC. Staffs the position of ROC Deputy Director. Executes Central Asset Management funds to support radar personnel, testing, equipment and research. Executes Air Force Centralized Asset Management (CAM) 3400 funds.
- b. Plans and provides communications for WSR-88D RPG sites utilizing DoD communications contracts.
- c. Provides a DoD representative to tri-agency working groups and teams.
- d. Plans, programs, and budgets costs for ROC-executed tri-agency and agency unique operation, modification improvements, and integrated logistics support elements including the maintenance, spares, and repairs of the DoD portion of the WSR-88D

systems at the site (by special teams, contractors, or on-site personnel) and at the repair depot. Funds provided are Air Force Procurement (3080) for modifications and Air Force CAM Weapon System Sustainment (WSS) for integrated logistics support activities.

- e. Ensures provision of all NEXRAD CSE requirements to DoD sites. Provides calibration and repair of all DoD site test equipment.
- f. Provides direction to the DoD Commands. Maintains liaison with other agencies in the effective maintenance of required meteorological and hydrological data collection, dissemination, and exchange.
- g. Responds to requests for data and audits to help the ROC maintain nationwide configuration control of WSR-88D and to keep the site configuration database current.
- h. Provides operations training requirements to the Air Education and Training Command (AETC).
- i. Ensures all customers are informed that with an ID and password they can view a read-only copy of stock availability and requisition status by going to <https://cls.nlsc.noaa.gov/>.
- j. Ensures NEXRAD technical documentation is loaded in a timely manner to ETIMS.

#### **2.4.2 Air Combat Command – Lead Command**

ACC/A5W is responsible for coordinating with AFLCMC and participating commands on inputs when tasked or required in accordance with Air Force Policy Directive (AFPD 10-9, Lead Command/Lead Agent Designation and Responsibilities for United States Air Force Weapon Systems, Non-Weapon Systems, and Activities). In addition, ACC/A5W:

- a. Assists in the policy and procedures for WSR-88D support.
- b. Arranges for a maintenance or logistics representative participation in tri-agency working groups and teams where DoD logistics and maintenance issues are discussed.

#### **2.4.3 Participating Commands**

The participating commands and services (ACC, AETC, AFMC, AFGSC, AMC, AFSOC, PACAF, and USSF) operate DoD/Air Force-owned WSR-88D equipment in accordance with AFPD 21-1, Maintenance of Military Materiel. In support of operations and maintenance the participating commands:

- a. Budget and fund command spares replenishment and CSE using MAJCOM or unit Operations and Maintenance funding (AF 3400 O&M) under Program Element (PE) 35111.
- b. Ensure that LRUs are returned to the NRC in a timely manner, and coordinate and obtain approval from OBS34 for requisitions for LRUs for which no unservicable LRU return to the NRC is planned.
- c. When tasked or required, support AFLCMC in coordinating policy and procedures.
- d. Upon request, provide inputs to various logistics documents (Maintenance Concept, ILSP, and others).
- e. Provide qualified personnel to support logistics and program activities (technical order verification, provisioning, audits, and others) upon request.
- f. Assist in support of site surveys, installation requirements, and the commissioning of systems at command sites.

- g. Provide maintenance training requirements to HQ AETC. HQ AETC then provides the requested number of class seats to NWS who conducts the training.
- h. Respond to requests for data and audits to help the ROC maintain nationwide configuration control of WSR-88D and to keep the site configuration database current.
- i. Provide timely and adequate maintenance information to assist the ROC with the correction of malfunctions and engineering design deficiencies.
- j. Provide all WSR-88D CSE requirements to DoD sites. Provides calibration and repair of all DoD site test equipment.

## **2.5 Department of Transportation (DOT)**

DOT/FAA owns and maintains 12 WSR-88Ds. NWS operates all 12 of FAA's WSR-88Ds. The NWS will operate the MSCF for all FAA WSR-88Ds except during maintenance operations. Operations of the MSCFs will be in a manner consistent with the mission priorities of the DOT.

### **2.5.1 Federal Aviation Administration (FAA)**

FAA AJM-3, Enterprise Services Directorate provides the Agency Representative who is the FAA voting member of the PMC and who is delegated full authority to act as Executive Agent for DOT. The FAA maintains all FAA-owned WSR-88D equipment. In addition, the FAA:

- a. Assists in the preparation of program plans and documentation.
- b. Provides local support for FAA site surveys and modifications and for acceptance of WSR-88D equipment.
- c. Provides an FAA representative to tri-agency working groups and teams.
- d. Plans, budgets, and provides staff to the ROC.
- e. Plans and budgets for operation, maintenance, and modification improvements to the WSR-88D system.
- f. Procures and provides to FAA sites all required WSR-88D CSE. Provides calibration and repair of all FAA site test equipment.
- g. Plans, programs, and budgets costs for tri-agency and agency-unique integrated logistics support elements including the maintenance, spares, and repairs of the NWS portion of the WSR-88D systems at the site (by special teams, contractors, or on-site personnel) and at the repair depot. Ensures that LRUs are returned to the NRC in a timely manner, and coordinates and obtains approval from the NWS Logistics Management Branch for requisitions for LRUs for which no unserviceable LRU return to the NRC is planned.
- h. Provides guidance and authorizing documentation to local offices, FAA Service Areas, and Technical Support offices for the operation and effective maintenance of the WSR-88D. Works with other agencies for collection, dissemination, and exchange of required meteorological and hydrological data.
- i. Responds to requests for data and audits to help the ROC maintain nationwide configuration control of WSR-88D and to keep the site configuration database current.
- j. Provides operations and maintenance training requirements to the NWS Office of the Chief Learning Officer.
- k. Performs SICA responsibilities for the FAA.
- l. Provides customer liaison and feedback to the FAA maintainers and supply points to ensure effective support of WSR-88D equipment
- m. Provides configuration management of the Engine/Generator/TPS shelter for FAA sites.

### 3. Tasks and Plans

This section of the ILSP identifies the tasks and plans whereby the three agencies support the field (to include spare parts and support equipment), maintain technical and engineering data, train the field, test and evaluate system changes, provide hardware and software maintenance, enforce configuration management, publish technical manuals, and field modification retrofits. [Table 3.1](#) provides a list of functional area responsibilities and organizational Points of Contact.

#### 3.1 Maintenance Planning

##### 3.1.1 Maintenance Concept

The three agencies approved the NEXRAD Maintenance Concept, RG400-MC202, in February 1984. It provides policy for the life cycle maintenance planning and maintenance of the WSR-88D system hardware. In summary, organizational and field maintenance are the responsibility of each agency. The policy provides for removal and replacement of LRUs at the organizational level and repair of LRUs at a centralized depot maintenance facility. The maintenance policy further provides for specialized, on-site depot level maintenance support provided by a centralized team for a select number of large, low failure or highly complex items.

##### 3.1.2 Availability Definitions and Requirements

The WSR-88D program defines several availabilities, three of which are discussed here.

- a. Operational Availability ( $A_o$ ) is the true availability. It is the percentage of the time the radar is operational over a given time period. If we let
  - TT be the total hours  $A_o$  is calculated over (typically over 1 year = 8760 hours),
  - TPM be the hours spent doing preventive maintenance during TT,
  - TCM be the hours spent doing corrective maintenance, during TT
  - ADT be the hours of administrative down time during TT (e.g., hours waiting for ETs to come on duty and hours driving to the site), and
  - LDT be the logistics down time during TT (e.g., time waiting for parts)then

$$A_o = \frac{TT - TPM - TCM - ADT - LDT}{TT}$$

As a stated requirement of the tri-agencies, the DOC and AFLCMC WSR-88Ds shall have an  $A_o$  of at least 0.960, and the DOT WSR-88Ds shall have an  $A_o$  of at least 0.989.

- b. The three agencies use Service Availability ( $A_s$ ) to monitor WSR-88D availability.  $A_s$  is defined as

$$A_s = \frac{TT - TCM - ADT - LDT}{TT}$$

Notice that  $A_s$  is the same as  $A_o$  with TPM removed. It follows that preventive maintenance time does not count against  $A_s$ .

As a stated requirement of the tri-agencies, the DOC redundant WSR-88Ds shall have an

$A_s$  of .96836, the DOC and DoD single thread WSR-88Ds shall have an  $A_s$  of .96651, and the DOT WSR-88Ds shall have an  $A_s$  of .99672.

- c. Contracts for major system upgrades should specify Inherent Availability ( $A_i$ ) rather than  $A_s$  because  $A_s$  includes corrective maintenance downtime administrative delays, and logistics delays associated with corrective maintenance, which are beyond the contractor's control.  $A_i$  is defined as

$$A_i = \frac{TT - \frac{TT * MTTR}{MTBF}}{TT} = 1 - \frac{MTTR}{MTBF}$$

where MTTR is mean time to repair and MTBF is mean time between failures.  $A_i$  includes TCM and TPM but excludes ADT and LDT.

As a stated requirement of the tri-agencies, the DOC redundant WSR-88Ds shall have an  $A_i$  of .98345, the DOC and DoD single thread WSR-88Ds shall have an  $A_i$  of .98250, and the DOT WSR-88Ds shall have an  $A_i$  of .99885.

Contractors should contact the Program Branch for further details. Also see [WSR-88D System Specification, Document Number 2810000J, Code Identification 0WY55, 24 December 2014](#), Section 3.2.5.

### 3.1.3 Field Support at the ROC

The ROC supports all three agencies, primarily by telephone through the WSR-88D Hotline in the resolution of field level hardware and software problems. The ROC keeps appropriate POCs informed of difficult or ongoing problems. (See [Table 3.1](#) , below.)

The ROC will provide depot level support to each site by arranging for appropriate contract or Government services. [Table 3.2](#) lists the depot team corrective maintenance items which the ROC provides. Depot team support may be requested by calling the WSR-88D Hotline.

### 3.1.4 Maintenance Data Collection

The agencies use maintenance data collection (MDC) to identify reliability, maintainability, and availability trends, problems, and deficiencies. The agencies forward site  $A_s$  to ROC/Program Branch as it becomes available. ROC/Program Branch compiles monthly statistics and provides reports to the PMC members and others as required.

As required, NRC uses maintenance data to calculate MTBF and repair cost for individual LRUs.

## 3.2 Workforce and Personnel

The WSR-88D system is maintained by personnel of the three agencies. While the skill level of agency maintenance personnel varies, all WSR-88D systems are maintained only by task-qualified technicians.

### 3.3 Supply Support

The LMB provides PICA supply support for WSR-88D systems and resolution of tri-agency supply problems. The process in place for supply support is provided as [Appendix A](#) of this plan.

As the PICA, the LMB has established and maintains an electronic requisition and status link Federal Standard Requisitioning and Issue Procedures (FEDSTRIP). DLA has established and maintains the Military Standard Requisitioning and Issue Procedures (MILSTRIP) to accommodate current DoD and FAA requisitioning procedures and routing processes. Field personnel experiencing supply support problems contact their normal Inventory Management Specialist; the SICA in turn contacts the LMB. NWS warehouse operations, under the supervision of the LMB, are located at the National Logistics Support Center (NLSC), Grandview, Missouri. Requirements for stock item replenishment are determined by the LMB and executed through the procurement office of the NOAA Region Acquisition Division. The tri-agency funding required to operate the warehouse is acquired through the stock item unit price surcharge included on the funded FEDSTRIP/MILSTRIP consumable and repairable requisitions or Consolidated Logistics System (CLS) requisitions submitted by the field users. The LMB provides the FAA and DoD with "read only" access to CLS for status monitoring of requisitions.

The agencies will ensure that all WSR-88D LRUs or other items which are coded as repairable are returned to NRC in accordance with the WSR-88D Supply Support Plan ([Appendix A](#)) and the WSR-88D Depot Repair Support Plan ([Appendix B](#)). The agency/site will be charged full replacement cost for any LRU requisitioned. Credit will be issued when repairable items are returned to the NRC. If credit items are not returned within thirty (30) days from the day of issue to the customer, credit will not be provided. In the event of a unique circumstance, special arrangements can be made by the agencies with the LMB to extend the return time.

#### 3.3.1 Site Recommended Spares and Consumables

Site recommended spare parts were provided to each site based on each agency's assessment of its need to meet availability requirements after the time of system acceptance by the Government. As modifications are made to the WSR-88D system, it is the responsibility of each assigned project team to assess impact to the recommended on-site spares list and coordinate additions, changes, and deletions with the LMB and the agencies. It is each site's responsibility to replace items used from their on-site spares during corrective maintenance. By signature on this ILSP, each agency agrees to the on-site spares list as defined herein. Additional stock ordered beyond these on-site spares as a result of leveling or unilateral sparing by the agency will not be authorized without previous agreement by the LMB. Changes to the on-site spares list must be proposed by the agency at the annual review of this agreement, or as agency needs change, and codified into this document. The recommended site spares for the WSR-88D system are provided in [Table 3.3A](#) for repairable on-site spares and [Table 3.3B](#) for consumable on-site spares. Peculiar support equipment is listed in Table 3.4. EHB 6-500 Table 1-23 "Consumables/Expendables Matrix" lists all other consumables. EHB 6-500 is available at <https://www.roc.noaa.gov/WSR88D/Program/MaintenanceManuals.aspx> and may be more current than the ILSP.



### **3.3.2 NWS Supply**

NWS field personnel follow the policies and procedures contained in NWS Engineering Handbook 1, Instrumental Equipment Catalog (Part R), for obtaining needed WSR-88D replacement supply items (e.g., LRUs, piece parts, and consumables). EHB-1 R is available at <https://obs3.nws.noaa.gov/> in the Engineering Handbooks section.

### **3.3.3 Air Force Supply**

The Air Force field personnel use the procedures contained in [Appendix A](#) of this plan for parts requisitioning. Any item (LRU, piece part, etc.) required to make repairs to the equipment is requisitioned through the host supply activity using established procedures set by Air Force directives and base supply (e.g., telephone, appropriate forms, and computer terminals). Base supply processes a MILSTRIP requisition and makes available the required part based on the requisition priority. The requisitions for repairable items are automatically routed to the PICA through the 415th SCMS/GUMBC, the Air Force's SICA for WSR-88D. Requisitions for consumables are routed directly to NWS or DLA.

### **3.3.4 FAA Supply**

The FAA Logistics Center, as the SICA, is the centralized supply point for the FAA. The FAA Logistics Center processes MILSTRIP requisitions to the PICA who will make available the required part based on the requisition priority. FAA field personnel utilize existing FAA ordering procedures for ordering replacement items.

### **3.3.5 Obtaining Stock Availability and Requisition Status**

NWS, Air Force, and FAA Logistics Center customers with an ID and password can view a read-only copy of stock availability and requisition status by going to <https://cls.nlsc.noaa.gov/>.

## **3.4 Support Equipment**

### **3.4.1 Purchase and Distribution**

WSR-88D Peculiar Support Equipment (PSE) is documented and approved by the three agencies through the Support Equipment Requisition Data (SERD) prepared by the ROC Program Branch. Approved PSE is procured by the ROC and distributed to WSR-88D sites through NLSC. Repairable PSE which fails is returned to the NRC for repair, and its replacement is requisitioned from the WSR-88D PICA using normal supply procedures. PSE approved for use on the WSR-88D is provided in Table 3.4. More current PSE data may be available in EHB 6-500 Tables 1-22. EHB 6-500 is available at: <https://www.roc.noaa.gov/WSR88D/Program/MaintenanceManuals.aspx>

WSR-88D Common Support Equipment (CSE) is documented and approved by the three agencies through a SERD prepared by the ROC Program Branch. The SERD recommends CSE. The decision as to which items are required by each agency (due to current agency inventories), the funding, procurement, and distribution of CSE will be the responsibility of each agency. Replacement and repair of failed CSE is the responsibility of each agency. CSE documented by approved SERD for use on the WSR-88D is provided in [Table 3.5](#). More current CSE data may

be available in EHB 6-500 Table 1-22 EHB 6-500 is available at:  
<https://www.roc.noaa.gov/WSR88D/Program/MaintenanceManuals.aspx>

Certain items of Support Equipment due to frequency of use and/or high cost are shared by the agencies from limited quantities available at the NLSC. WSR-88D Shared Support Equipment (SSE) is documented and approved by the three agencies through a SERD prepared by ROC/Program Branch. Approved SSE is procured by the ROC and stored at the NLSC. When a user site requires this support equipment, it is requisitioned as any other stock item, used by the site, and then returned to the NRC for checkout prior to being returned to the NLSC stock shelf. SSE approved for use on the WSR-88D is provided in [Table 3.6](#). More current SSE data may be available in EHB 6-500 Tables 1-21 and 1-22. EHB 6-500 is available at <https://www.roc.noaa.gov/WSR88D/Program/MaintenanceManuals.aspx>.

[Table 3.7](#) lists the parts in the Recommended WSR-88D Transition Power Maintenance System (TPMS) On-Site Spares Kit and their quantity. This kit is considered an on-site spare for all DoD sites and a regional spare for the NWS. The FAA is not part of the TPMS Program.

### **3.4.2 SE Maintenance and Calibration**

Maintenance and calibration of on-site PSE and CSE is handled differently within each agency. A brief summary of each agency's procedures is given below.

- a. **NWS.** Calibration and repair of NWS WSR-88D on-site SE is handled by the NWS Surface and Upper Air Division's Services Branch who contracts with a mobile calibration contractor to calibrate equipment at each NWS office annually. If an office needs to use equipment that has lost its calibration before the mobile contractor is scheduled to arrive, they can order new equipment out of stock. Test equipment calibration is traceable to NIST standards and is done at the manufacturer's recommended interval.
- b. **Air Force/Space Force.** The accuracies associated with the WSR-88D radar system and supporting TMDE must be traceable to NIST or a DoD-approved source.

The AF Metrology Calibration Detachment 1, Heath, OH, is assigned the responsibility of calibration support planning for systems entering the Air Force inventory. This planning action is accomplished through reviews of contractor prepared documents, such as SERD submittal, support equipment plans, etc.

The calibration and maintenance support of the WSR-88D TMDE designated in Technical Order 33K-1-100 as PMEL responsibility is performed by the closest geographically located PMEL. The owning activity normally is responsible for PSE. If resources are not available to the owning activity, the PMEL identifies an alternative source at a lower organizational level or provide the required support. When necessary, PMELs equipped with a Transportable Field Calibration Unit will provide support to remote or off-base locations requiring on-site calibration or repair of TMDE.

- c. **FAA.** The policy for each article of test equipment is established by FAA Headquarters. It is the responsibility of the Airway Facilities Sector or Division to see that each site's test equipment is maintained and calibrated in accordance with this policy. Although the FAA's depot in Oklahoma City is available for engineering and repair maintenance and calibration, the Region may contract with a private contractor or with a local Air Force PMEL, depending on the test equipment to be repaired or calibrated.

### **3.5 Responsibilities and Parts Tables**

The following tables will be updated as needed and will be posted to the ILSP on the ROC website (<http://www.roc.noaa.gov/WSR88D/PublicDocs/ILSP.pdf>) without re-coordination of this document.

**Table 3.1**  
**Functional Area Responsibility/Points of Contact**

	<b>Tri-Agency Coordination</b>	<b>DOC POC</b>	<b>DoD POC</b>	<b>DOT POC</b>	<b>Tri-Agency Committees &amp; Groups</b>
<b>Plans</b>	ROC DIR	ROC DIR	AFLCMC	AJW-0	PMC/TAC
<b>Budget</b>		ROC DIR	AFLCMC	AJW-0	PMC
<b>System CM Site CM</b>	ROC CM	ROC CM	AFLCMC AFLCMC	AJW-0 AJW-0	PMC/WSR-88D CCB/TRC
<b>SW Maint/Sustaining ENG SW Develop/PI ENG</b>	ROC ENG ROC ENG	ROC ENG ROC ENG	AFLCMC AFLCMC	AJW-0 AJW-0	SREC/APWG SREC/APWG
<b>H/W Sustaining Eng H/W Develop/PI Eng</b>	ROC ENG ROC ENG	ROC ENG ROC ENG	AFLCMC AFLCMC	AJW-0 AJW-0	
<b>Documentation</b>	ROC PGM	ROC PGM	AFLCMC	AJW-0	
<b>Field Maint Depot Maint</b>	ROC OPS NRC	ROC OPS NRC	HQ ACC/A3 AFLCMC	AJW-L AJW-L	
<b>Facilities</b>	W/OBS1	W/OBS1	UNITS/ MAJCOMS	AJM-0	
<b>Operations Trng Maint Trng</b>	ROC OPS ROC OPS	WDTD NWSTC	KEESLER AFB NWSTC	WDTD* NWSTC	
<b>Modifications</b>	ROC PGM	ROC PGM	AFLCMC	AJW-0	
<b>Peculiar SE Common SE Shared SE Depot SE</b>	ROC PGM ROC PGM ROC PGM NRC	ROC PGM ROC PGM ROC PGM	AFLCMC AFLCMC AFLCMC	REGION/SITE REGION/SITE REGION/SITE	
<b>Safety</b>	ROC PGM	ROC PGM	AFLCMC	AJW-0	
*WDTD teaches NWS Center Weather Support Unit (CWSU) employees working for the FAA.					

**Table 3.2**  
**Depot Team Corrective Maintenance Items List**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	SMR
*		C0814-817	SPAR ASSEMBLY, 2A2WG2		PAFZZ
11*		MICROFLECT	STEEL TOWER	29189	PDFDD
R400-12		8531-1	RADOME	15175	PDFDD
12MP10*		8531-4	ZENITH HATCH ASSEMBLY	15175	PAFDD
12MP11*		B1529-12-AZ	PANEL, AZIMUTH	15175	PAFZZ
12MP2*		B1529-11-B1	PANEL, B1	15175	PAFZZ
12MP3*		B1529-11-B2	PANEL, B2	15175	PAFZZ
12MP4*		B1529-13-B1X	PANEL, B1X	15175	PAFZZ
12MP5*		B1529-13-B2X	PANEL, B2X	15175	PAFZZ
12MP9*		B1529-11-A	PANEL, A	15175	PAFZZ
R400-12MS4		705-174-5	LIGHTNING ROD FOR 5 ROD ARRAY	15175	PAFZZ
R400-12MS6		8552-74-1	LIGHTNING ROD SHAFT ASSEMBLY, 88"	15175	PAFZZ
2*		1214777	ANTENNA/PEDESTAL (LPP)	56232	PDFDD
2*		1219667	ANTENNA/PEDESTAL (FSP)	56232	AD
2A1*		2300109-302	PEDESTAL ASSEMBLY, REDUNDANT FSP	26795	PBFDD
R400-2A1	5985-01-629-9603	2300109-301	PEDESTAL ASSEMBLY, FSP	26795	PBFDD
2A1*		2300107-301	PEDESTAL ASSEMBLY, LPP	26795	PBFDD
2A1A1*		54636-1202-101	ELEVATION ASSEMBLY, LPP	26795	PBFDD
2A1A1*		40505-1202-101	ELEVATION ASSEMBLY, FSP/REDUNDANT	26795	PBFDD
R400-2A1A1A3A1 OR R400-2A1A3A3A1	3010-01-436-0701	14636-5003-3	GEARBOX, DIFFERENTIAL, PLANETARY	1M813	PAFLD
R400-2A1A1A5 OR R400-2A1A1A5-FSP	3120-01-388-2111	14636-5001-101 or 1222R2	BEARING, RADIAL CONTACT, ELEVATION FSP	1M813	PAFLD
R400-2A1A1A6 OR R400-2A1A1A6-FSP	3110-01-414-1805	14636-5001-103 or 1222A11	BEARING, 4PT ANGULAR CONTACT, BULL GEAR, ELEV FSP	1M813	PAFZZ
R400-2A1A1A5-LPP	3110-01-667-3208	18405001	BEARING, RADIAL CONTACT, ELEV, BULL GEAR BEARING LPP	32828	PADDD
R400-2A1A1A6-LPP	3110-01-629-3247	2200312-201	BEARING ASSY, 4 PT ANGULAR CONTACT, ELEVATION LPP BULL GEAR	0WY55	PAFLD
R400-2A1A1MS1	5330-01-380-9549	NS67400-0022	SEAL FLANGE	15566	PAFZZ
R400-2A1A1SR	5331-01-381-2557	5-069N674-70	PACKING, O-RING	02697	PCFZZ
2A1A3*		40505-1201-101	AZIMUTH ASSEMBLY, FSP/REDUNDANT	26795	PBFDD

**Table 3.2**  
**Depot Team Corrective Maintenance Items List**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	SMR
R400-2A1A3A5	3120-01-388-6395	14636-5001-102 or 1222A10	BEARING, 4PT ANGULAR CONTACT, AZ LPP &FSP	1M813 OR 0HRJ8	PAFLD
R400-2A2	5985-01-414-9266	2300105-301	ANTENNA ASSEMBLY, FSP, DUAL POL	35844	PBFDD
R400-2A2A2	5985-01-593-5653	C0814-835	PRIME FOCUS FEED ASSEMBLY	1KR45	PADDD
*No R400- designator in ASN column and no value in NSN column because not stocked at NLSC					
R400-2A2A1MP1 - R400-2A2A1MP18	5985-01-417-6540	171740X	REFLECTOR SKIN PANEL	35844	PAFZZ
R400-2A2A1MS3	5985-01-413-9062	171789X	SKIN PANEL PACK	35844	PBFDD
R400-3A1	5895-01-387-5785	1D20992G01	CONTROL PANEL	97942	PAFDD
R400-W10-302	5995-01-362-0500	1213464-302	CABLE ASSEMBLY, RDA, EXTERNAL, 10M TOWER, LPP	56232	PAFZZ
R400-W10-303	5995-01-362-0499	1213464-303	CABLE ASSEMBLY, RDA, EXTERNAL, 15M TOWER, LPP	56232	PAFZZ
R400-W10-304	5995-01-362-0501	1213464-304	CABLE ASSEMBLY, RDA, EXTERNAL, 20M TOWER, LPP	56232	PAFZZ
R400-W10-305	5995-01-362-0502	1213464-305	CABLE ASSEMBLY, RDA, EXTERNAL, 25M TOWER, KOUN and LPP	56232	PAFZZ
R400-W10-306	5995-01-362-0503	1213464-306	CABLE ASSEMBLY, RDA, EXTERNAL, 30 M TOWER, LPP	56232	PAFZZ
R400-W10-307	5995-01-387-3787	1213464-307	CABLE ASSEMBLY,RDA, EXTERNAL, 10 M, FSP	56232	PAFZZ
R400-W10-308	5995-01-387-3808	1213464-308	CABLE ASSEMBLY, RDA EXTERNAL, 15 M TOWER, FSP	56232	PAFZZ
R400-W10-309	5995-01-387-3809	1213464-309	CABLE ASSEMBLY, RDA EXTERNAL, 20 M TOWER, FSP	56232	PAFZZ
R400-W10-310	5995-01-387-3177	1213464-310	CABLE ASSEMBLY, RDA EXTERNAL, 25 M TOWER, FSP	56232	PAFZZ
R400-W10-311	5995-01-387-3810	1213464-311	CABLE ASSEMBLY, RDA EXTERNAL, 0 M TOWER, FSP	56232	PAFZZ
R400-W10-314	5995-01-469-5861	1213464-314	CABLE ASSEMBLY, 5 M TOWER, REDUNDANT	56232	PAFZZ
R400-W10-317	5995-01-469-5885	1213464-317	CABLE ASSEMBLY, 20 M TOWER, REDUNDANT	56232	PAFZZ
R400-W10-318	5995-01-469-5888	1213464-318	CABLE ASSEMBLY, 25 M TOWER, REDUNDANT	56232	PAFZZ
R400-W10-319	5995-01-469-5892	1213464-319	CABLE ASSEMBLY, 30 M TOWER, REDUNDANT	56232	PAFZZ
R400-W131-310	5995-01-467-8525	2320188-307	CABLE ASSEMBLY, W131, 467" LENGTH	0WY55	PAFZZ
R400-W131-313	5995-01-469-5895	2320188-310	CABLE ASSEMBLY, W131, 850" LENGTH	0WY55	PAFZZ

**Table 3.2**  
**Depot Team Corrective Maintenance Items List**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	SMR
R400-W31-301 OR R400-W31	5995-01-360-9755	2320188-301	CABLE ASSEMBLY, W31, 720" LENGTH	0WY55	PAFZZ
R400-W31-303	5995-01-360-9756	2320188-302	CABLE ASSEMBLY, W31, 1296" LENGTH	0WY55	PAFZZ
R400-W31-314	5995-01-469-5898	2320188-311	CABLE ASSEMBLY, W31, 980" LENGTH	0WY55	PAFZZ
R400-W31-317	5995-01-469-5904	2320188-314	CABLE ASSEMBLY, W31, 900" LENGTH	0WY55	PAFZZ
R400-W3-301	6150-01-360-9803	2320175-301	CABLE ASSEMBLY, W3, 730" LENGTH	0WY55	PAFZZ
R400-W3-302	6150-01-360-9804	2320175-302	CABLE ASSEMBLY, W3, 927" LENGTH	0WY55	PAFZZ
R400-W3-303	6150-01-360-9805	2320175-303	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-304	6150-01-360-9806	2320175-304	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-305	6150-01-360-9807	2320175-305	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-306	6150-01-360-9808	2320175-306	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-307	6150-01-388-7609	2320175-307	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-308	6150-01-388-7613	2320175-308	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-309	6150-01-388-7614	2320175-309	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-310	6150-01-388-7612	2320175-310	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-311	6150-01-388-7611	2320175-311	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W3-312	6150-01-387-6854	2320175-312	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-301	5995-01-362-0498	2320179-301	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-302	5995-01-362-0494	2320179-302	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-303	5995-01-368-4586	2320179-303	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-304	5995-01-362-0495	2320179-304	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-305	5995-01-362-0496	2320179-305	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-306	5995-01-362-0497	2320179-306	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-307	5995-01-387-6396	2320179-307	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-308	5995-01-387-3631	2320179-308	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-309	5995-01-387-3632	2320179-309	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-310	5995-01-387-3639	2320179-310	CABLE ASSEMBLY	0WY55	PAFZZ
R400-W4-311	5995-01-388-3804	2320179-311	CABLE ASSEMBLY, W4, 1754" LENGTH,	0WY55	PAFZZ
R400-W4-312	5995-01-469-5840	2320179-312	CABLE ASSEMBLY, W4, 156" LENGTH	0WY55	PAFZZ
R400-W53-302	5995-01-360-9767	1213591-302	CABLE ASSEMBLY, 946" LENGTH, NWSTC, CH2, LPP	56232	PAFZZ
R400-W53-304	5995-01-360-9758	1213591-304	CABLE ASSEMBLY, 1320" LENGTH, KOUN, LPP	56232	PAFZZ

**Table 3.2**  
**Depot Team Corrective Maintenance Items List**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	SMR
R400-W54-308	5995-01-360-9761	1213591-308	CABLE ASSEMBLY, 946" LENGTH, NWSTC, CH2, LPP	56232	PAFZZ
R400-W54-310	5995-01-360-9762	1213591-310	CABLE ASSEMBLY, KOUN, LPP	0WY55	PAFZZ



**Table 3.3A**  
**WSR-88D System Recommended On-Site Repairable Spares List**

ASN	NSN	PART NUMBER	ITEM NAME	FAA QTY	DoD QTY	NWS QTY
R400-2A1A1A2A1 or R400-2A1A3A2A1	7050-01-388-0992	14636-5017-1	ENCODER (Currently not authorizing on-site spares because of critically low stock)	0	0	0
R400-90/190A1	5840-01-654-0575	239064	SPIP	0	1*	0
R400-2A1A1B1 or R400-2A1A3B1	6105-01-394-5305	14636-5018-1, 9001BA, or 2200220-201	DC SERVO MOTOR	1	1	1
R400-3A10	6110-01-315-9249	1D20990G01	CHARGING SWITCH	1	1	1
R400-3A4	5963-01-316-0781	645A794A02	RF DRIVER MODULE	0	1	0
R400-3A5	6625-01-316-0780	1A20768A01	PULSE SHAPER MODULE	1	1	1
R400-3A8	6110-01-471-6084	2500004-301	POST CHARGE REG, MODIFIED	0	1	0
R400-4A26	5895-01-368-4590	1213625-201, 70069, 466B-1	RF POWER MONITOR	1	1	1

\* One SPIP spare is authorized as forward supply to support the 4 PACAF NEXRADs

**Table 3.3B**  
**WSR-88D System Recommended On-Site Consumable Spares List**

ASN	NSN	PART NUMBER	ITEM NAME	FAA QTY	DoD QTY	NWS QTY
R400-3A7C01	9160-01-142-5748	55822AV, SHELL DIALA AX, or TS-3487	OIL, DIELECTRIC, 5 GAL.	1	1	1
R400-3A7HP1-1	4320-00-590-9245	2500039-301	OIL PUMP	0	1	0
R400-3A13F1 R400-3A13F2 R400-3A13F3	5920-00-284-6787	F02A250V5A	FUSE, 5 AMP, 250V	1	1	1
R400-3PS1A1F1 or 017-F-3-11	5920-00-296-0679	F03A250V5A or MS90079-3	FUSE, CARTRIDGE, 5AMP 250V	1	1	1
R400-3PS3F101	5920-00-243-3787	F03A250V10A	FUSE, 10 AMP, 250 V	1	1	1
R400-3SP4F101 R400-3PS5F101 R400-3PS7F101	5920-01-023-5878	F03B250V2A	FUSE, SLOW BLOW, 2A, 250V	1	1	1
R400-3PS6F101	5920-00-189-6900	F03B125V5A	FUSE, SLOW BLOW, 5A, 125V	1	1	1
R400-3S7	5930-01-390-3455	159C632G01	KIT, SENSOR, PRESSURE	1	1	1
R400-3S8	5930-01-322-0288	2390017-301	SENSOR, PRESSURE	1	1	1
R400-3S10	5998-01-589-6741	2370005-301	CCA, AIR FLOW SENSOR, TRANSMITTER ( 3S10 )	1	1	1
R400-3B4	4140-01-312-6960	646A048H01 or 141LS-282	FAN, TUBE AXIAL	1	1	1
R400-70/170B1	4140-01-105-2015	1213829-201 or 028254	FAN	1	0	1
R400-90/190A22F1-R400-90/190A22F5; R400-70/170A22F1-R400-70/170A22F5; or 017-F-40-45	5920-01-123-5836	SC15, WF1814/01-005, or 24-071F00M00R00	FUSE, 15 AMP 300 V	1	1	1
R400-014-O-20	9150-01-418-8738	SCHSHC 75W, Alt PN SHVC 624	OIL, LUBRICATING, 5 GAL., PEDESTAL GEARBOX	1	1	1
R400-014-O-22	9150-01-389-2196	TRIBOLUBE-L3-5	OIL, LUBRICATING, LOW TEMP, 5 GAL., PEDESTAL GEARBOX	*	*	*
014-G-14	9150-00-935-4018	AEROSHELL GREASE 17 or MIL-G-21164	GREASE, CARTRIDGE	1	1	1

\*Recommended for sites with low temperature environments

**Table 3.4**  
**WSR-88D Peculiar Support Equipment**

ASN	NSN	PART NUMBER	ITEM NAME	SERD	RDA	RPG	SMR
R400-SE1	4320-01-388-2118	1219694-301	OIL TRANSFER PUMP KIT	2	X		PAOZZ
R400-SE1-1	4320-01-486-4476	1P579 or 1219684-201	DIELECTRIC OIL TRANSFER PUMP ONLY	2	X		PAOZZ
R400-SE12	4720-01-389-1475	3F6132 or 1219680-201	DRAIN HOSE PEDESTAL OIL W/ 15 FT HOSE	28	X		PAODD
R400-SE22	4920-01-417-2706	M709	TOOL, KLYSTRON ADJUSTMENT	61	*		PAOZZ
R400-SE25	3950-01-354-2517	4214-2262	CRANE, CURVED OUTRIGGER	66	X		PAODD
R400-SE34	5120-01-407-8166	R400-SE34	SWITCH SLEEVE SPANNER WRENCH	74	X		PAOZZ
R400-SE35	5975-01-412-0666	161C755G01	TOOL, BYPASS	N/A	X		PAOZZ
R400-SE41	5315-01-433-8106	2100001-101	PIN, ENGAGEMENT	89	X		PAOZZ
R400-SE5	3950-01-393-3802	SH-10	CHAIN HOIST	5	X		PAODD
R400-SE51	5925-01-392-7701	PSL-CB	CIRCUIT BREAKER LOCKOUT DEVICE	107	X		PAOZZ
R400-SE52	3950-01-567-4434	2200637-201	ELECTRIC DAVIT CRANE	110	X		PAODD
R400-SE6	3940-01-391-2615	WSP4415	SLING, KLYSTRON TUBE AND FOCUS COIL	1	X		PAODD
R400-SE7	3920-01-390-2989	86D064	SERVICE DOLLY, KLYSTRON	3	X		PAODD
R400-SE8	4910-01-197-4887	1213760-201, 2300148-301, or SD1984 REV B	MANUAL DAVIT CRANE, RDA TOWER	6	*		PAODD
R400-SE60	4720-01-589-6710	2310033-301	HOSE ASSEMBLY	116	X		PEOZZ
R400-SE59	5120-01-587-3233	2100068-101	GEAR TOOL (DATA PACKAGE)	117	X		PEOZZ
<b>LEGEND:</b>	* Item delivered as part of site installation						

**Table 3.5**  
**WSR-88D Common Support Equipment**

ASN	NSN	PART NUMBER	ITEM NAME	SERD	RDA	RPG	SMR
041-B-5	NWS0-43-500-0001	335-1000	CANVAS HOIST BAG	111	X		PAOZZ
041-L-4	5210-00-223-9607	98-12	LEVEL, MECHANICS IMPROVED PRECISION	90	X		PAOZZ
041-A-3 or R400-SE42	5120-01-449-7588	NWS-6000-SP1	TOOL KIT, EXTRACTION/INSERTION	95	X	X	PAOZZ
R400-SE43	5935-01-458-6310	234	PANEL PUNCH, ELECTRONIC CONNECTOR	96		X	PAOZZ
R400-SE45	7910-01-467-2748	2200064-20 or SC3683A	VACUUM CLEANER, CANNISTER, HEPA	98	X		PAOZZ
R400-SE46	6625-01-492-3940	2244/20 or EQUIVALENT	RADIATION HAZARD METER, EMR-20	99	X		PEOLD
R400-SE49	5210-00-293-3511	GGG-R-791 TY3CL1ST3 or X46	RULE, MULTIPLE FOLD	91	X		PAOZZ
R400-SE56	5995-01-538-9626	EVNSL91-0006	CABLE ASSEMBLY, CATEGORY 5E, STRAIGHT	113	X		PAOZZ
R400-SE57	5995-01-538-8742	UTP-1200-10R	CAT5E CROSSOVER 10' TEST CABLE	114		X	PAOZZ
R400-SE58	5995-01-538-8752	UTP-1400-10B	CAT5E STRAIGHT TEST CABLE 10'	115		X	PAOZZ
T158	6625-01-275-6268	HP 5350B OPT 001	MICROWAVE FREQUENCY COUNTER	47	X		PAODD
T229A	6625-01-391-5354	HP 8648C OPT 1E5-1E6	RF SIGNAL GENERATOR	49	*		PAODD
T229	6625-01-324-6462	600/.01-8-OPT 03	GENERATOR, SIGNAL, AUDIO FREQUENCY	67	X		PAODD
T313-1	6625-00-354-9762	HP 8481A	POWER SENSOR, -30 TO +20 dBm	43	X		PAODD
T313-2 or T331-9	6625-01-028-2882	HP8484A, 8484A, or HP8481D	POWER SENSOR -70 TO -20 dBm	10	X		PAODD
T330	6625-00-411-9643	HP 4328A	MILLIOHMETER/HIGH RESIST METER	58	*		PAODD
T330A	6625-01-373-2278	HP4338A or E4980A	MILLIOHMETER, DIGITAL	58	*		PAODD
T331	6625-01-033-5050	HP 436A	POWER METER, DIGITAL	9	X		PAODD
T331-10	5985-01-305-3003	3324-4	POWER SPLITTER (4-WAY)	36	X		PAOZZ
T331-2	6625-01-297-2594	HP 8481H	POWER SENSOR -10 TO +34.7 dBm	27	X		PAODD
T332	6625-01-336-6150	DT-5U-3-1434R04, 420X400, or 400X180	TEST SET TRANSMISSION, BREAKOUT BOX, RS232	19		X	PAOZZ
<b>LEGEND:</b>	* Alternate Items for same SERD						
	** NWS Only						

**Table 3.5**  
**WSR-88D Common Support Equipment**

ASN	NSN	PART NUMBER	ITEM NAME	SERD	RDA	RPG	SMR
T333	6625-01-312-2930	87V or 87-5	MULTIMETER, HAND HELD	12, 65	X		PAOZZ
T335	6625-01-304-4945	AM-48	TRANSMISSION LINE TEST SET	15		X	PAODD
T372-1	6625-01-040-4423	P6015A or P6015	HIGH VOLTAGE PROBE	48	X		PAOZZ
T374	6625-93-000-0040	TDS 420	OSCILLOSCOPE, DIGITAL	**11	*		PAODD
T411	6625-01-487-0700	78-110 or NS-468B	NETWORK CABLE TESTER	100			PAOZZ
T434A	6625-01-455-2312	OC60D&TC/DE	OIL TEST SET, PORTABLE, TESTER, AUTOMATIC LIQUID DIELECTRIC,	51	*		PAODD
T542	5985-00-813-9111	HP 908A	COAXIAL TERMINATION 50 OHM	37	X		PAOZZ
T543	6625-01-327-5153	HP 423B OPT 003 or 423B-003	COAXIAL DETECTOR, POSITIVE OUTPUT, DIODE DETECTOR BNC/TYPEN	18	X		PAOZZ
T600	6625-00-484-6354	HP 11581A	COAXIAL ATTENUATOR	38	X		PAODD
T600-5	5985-01-272-0914	8491A-030-890	ATTENUATOR, FIXED, COAXIAL, TYPE N 30 dB	38A	X		PAOZZ
T600-6	5985-94-000-0001	23-6-34	ATTENUATOR, FIXED, COAXIAL, 6 DB, 10 WATTS, DC TO 18 GHZ, TYPE N CONNECTORS	**82	*		PAOZZ
T605	5985-01-138-3578	HP 8494A OPT 001-UK6	ATTENUATOR, STEP 0 - 11 dB	44	X		PAODD
T606	5985-01-249-6037	HP 8496A OPT 001-UK6	ATTENUATOR, STEP 0 - 110 dB	45	X		PAODD
T606-1	5985-01-107-7801	HP 11716A	INTERCONNECTION KIT	46	X		PAOZZ
T616 or R400-SE36	5985-01-029-4624	HP S281A	ADAPTER, WAVEGUIDE TO COAX	57	X		PEOZZ
T800	6625-01-326-8976	HP 8563A	SPECTRUM ANALYZER	16	X		PAODD
T900	6635-01-239-6812	GD-30	DYNAMOMETER, GRAM FORCE	80	X		PAOZZ
Not in CLS	Not in CLS	923718		50			
			DIP CLIP, 28 PIN		X	X	
<b>LEGEND:</b>	* Alternate Items for same SERD						
	** NWS Only						

**Table 3.6**  
**WSR-88D RDA Shared Support Equipment**

ASN	NSN	PART NUMBER	ITEM NAME	SERD	RDA	SMR
R400-SE14	5905-01-390-0244	1219695-301	RESIST/ADAPT, FILAMENT POWER	31*	X	PAODD
R400-SE26	8145-01-388-1190	2D08935G01	TRANSPORT CART, KLYSTRON	4	X	PAODD
R400-SE37	5985-01-445-4605	54418A-284 or C284CNSG	ADAPTER, WAVEGUIDE, RECTANGULAR FLANGE	92	X	PEODD
R400-SE9	6625-01-389-1375	RF/TABEL	AMMETER	17*	X	PAODD
R400-SE9-1	6625-01-707-8290	2300154-301	CURRENT PROBE	N/A	X	PAOLD
R400-SE61	5895-01-645-8227	2340094-301 or NS346D-CS4	KIT, NOISE SRC CAL	N/A	X	PAODD
<b>LEGEND:</b>	* Issued to all DoD sites and Shared by DOC and DOT sites					

**Table 3.7**  
**Recommended WSR-88D TPMS On-Site Spares Kit**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	QTY
R400-62W3F1	5920-01-028-5727	128102005 or MDL-3 or MDX3 or F02B250V3A	FUSE, SLO-BLO, 3.0A/250V	31795	2
R400-62A12F1	5920-00-174-5793	128103155-002 or MDL-2/10	FUSE, TIME DELAY, 0.2A	31795	1
R400-62A1F16, R400- 62A1F17, R400-62A1F18	5920-01-332-1033	128304123 or A60X70-4T1	FUSE, 70A	31795	1
R400-62A2F1, R400- 62A2F2, R400-62A2F3, R400-62A2F4, R400- 62A2F5, R400-62A2F6, R400-62A2F7, R400- 62A2F8, R400-62A2F9, R400-62A2F10	5920-01-491-5105	128304038-053 or KLKD 10	FUSE, 10A, TYPE K	31795	2
R400-62A2F13, R400- 62A2F14, R400-62A2F15	5920-01-257-3545	128304038-045 or KLKD 1 or ATM 1	FUSE, 1A, TYPE K	31795	2
R400-62A3A1	5998-01-491-4744	101073070-001	PCB, STATIC SWITCH BYPASS	31795	1
R400-62A3A1MP1	5999-01-491-5457	132208006 or LCBS-8-19	SPACER, PCB	31795	2
R400-62A3E1	5920-01-044-4158	141923173 or 9L15ECC001	SURGE ARRESTOR, 650 V	31795	1
R400-62A9R21, R400- 62A9R22, R400-62A9R23, R400-62A9R24, R400- 62A9R25, R400-62A9R26, R400-62A3R61, R400- 62A3R62, R400-62A3R63	5905-01-309-8531	141713001 or NHL-20 or 7-32- 20-NON	RESISTOR, 20 OHM, 20 WATT	31795	1
R400-62A4A1	5998-01-491-4766	101073074-001	PCB, RECTIFIER, CONTROL	31795	1
R400-62A4A2	5998-01-491-4756	101073072-001	PCB, INVERTER CONTROL	31795	1
R400-62A4A1MP1, R400- 62A4A2MP1	5970-01-491-5458	132208047-001 or 275-160210- 04 or RLCBSR1-4-01	STANDOFF, PCB, NYLON	31795	2
R400-62A5A1	5998-01-491-4752	101073071-001	PCB, MONITOR	31795	1
R400-62A5A2DS1	6240-01-491-5473	139305015-001 or LFOM2840	LAMP, CCFT, LCd	31795	1
R400-62A5A3	5998-01-491-5559	163901048-001	PCB, LCD INVERTER	31795	1
R400-62A6S5	5925-01-491-5057	122130089-001 or PR29-27567- 1	SWITCH, PUSHBUTTON, 2P, 20A	31795	1
R400-62A7B1, R400- 62A7B2, R400-62A7B3, R400-62A7B4	4140-01-491-5544	031512-JQ24K0X or FD1751B24W7-3P-61	FAN, 24 VDC, 283 CFM	31795	2

**Table 3.7**  
**Recommended WSR-88D TPMS On-Site Spares Kit**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	QTY
R400-62A8A1C41, R400-62A8A2C42, R400-62A8A2C43, R400-62A6C3A, R400-62A6C3B, R400-62A6C3C	5910-01-436-5774	120519018-001 or EPS 20	CAPACITOR, 3.3UF, 1050V	31795	1
R400-62A8A1F41, R400-62A8A1F42, R400-62A8A1F43, R400-62A8A1F44, R400-62A8A1F45, R400-62A8A1F46	5920-01-491-5164	128307025-001 or 170M3415 or 6.6URD30TTF0200	FUSE, 200A, 700VAC	31795	4
R400-62A8A1MP1, R400-62A8A2MP1, R400-62A8A3MP1	5999-01-439-7896	129101001-002 or AP-425-244	PAD, THERMAL INTERFACE	31795	4
R400-62A8A1Q41/Q42, R400-62A8A2Q43/Q44, R400-62A8A3Q45/Q46	5961-01-491-5523	143224023-001 or CM300HA-24H	IGBT, 300A, 1200V	31795	4
R400-62A9C21, R400-62A9C22, R400-62A9C23, R400-62A9C24, R400-62A9C25, R400-62A9C26	5910-01-491-5048	120515017-001 or 4MP-12698K	CAPACITOR, 0.20UF, 660VAC	31795	1
R400-62A9PB21, R400-62A9PB22, R400-62A9PB23, R400-62A3PB61, R400-62A3PB62, R400-62A3PB63	5961-01-440-8946	143318022 or CD631615 or TT142N16KOF	SCR MODULE, DUAL	31795	3
R400-62A9PB21MP1, R400-62A9PB22MP1, R400-62A9PB23MP1	5999-01-491-5442	129101002-002 or AP370-134	PAD, THERMAL INTERFACE	31795	4
R400-62C5	5910-01-496-7647	120104103-001 or CGS154T035WSL3PH or 3186FH154T040AP	CAPACITOR, ALUMINUM ELECTROLYTIC, 0.15 MILLIFARAD, 35V	31795	1
R400-62E6MP1, R400-62E7MP1, R400-62E8MP1	5970-00-142-1840	132204002 or 2165-1A	STANDOFF, 1/4-20	31795	2
R400-62F61	5920-00-033-4339	128304128-003 or AJT80 or LPJ-80SP	FUSE, 80A, TIME DELAY	31795	1
R400-62K2	6110-01-496-9032	123209032-001 or EH145C2P-Y	CONTACTOR, 2 POLE, 24VDC COIL, 200A, 600VDC	31795	1



**Table 3.7**  
**Recommended WSR-88D TPMS On-Site Spares Kit**

ASN	NSN	PART NUMBER	ITEM NAME	CAGE CODE	QTY
R400-62PS1, R400-62PS2, R400-62PS3	5998-01-491-4760	101073073-001	PWB, DC POWER SUPPLY	31795	1
R400-64A1F1	5920-01-256-5830	128208001-012 or FNQ 1-1/2 or ATQ 1-1/2	FUSE, 1.5A, 500VAC	31795	1
R400-64A1F2	5920-00-370-2479	128208001-029 or ATQ 10 or FNQ 10	FUSE, 10A, 500VAC	31795	1

### **3.6 Technical Data**

Technical data includes all levels of engineering data, technical manuals, and any other data necessary to operate and support a system over its life cycle. All technical data is managed and maintained by the ROC. This includes the drawing repository (vault), the drafting work, updating of original text, etc. Engineering data includes specifications, drawings, schematics, manufacturing standards, test criteria, calibration information, and full design disclosure. Engineering data are used to support WSR-88D repair, quality assurance, modification, provisioning, replenishment procurement of spares, and contractor logistics support. The ROC provides electronic access and retrieval of WSR-88D engineering data through the AGILE™ configuration and data management software tool.

The complete suite of technical manuals including operator manuals, maintenance manuals, commercial manuals, parts listings, etc. is developed, updated, managed, and distributed by the ROC. A more complete discussion of Technical Manuals is found in paragraph 3.14.

### **3.7 Training and Training Support**

#### **3.7.1 Operations Training**

Each agency is responsible for its own training. WDTD provides operations training for NWS. DoD provides operations training at Keesler AFB Technical Training Center.

#### **3.7.2 Maintenance Training**

Maintenance training is the responsibility of each agency and is carried out for DOC, DOT, and DoD at the NWSTC.

#### **3.7.3 Training Equipment**

DOC training equipment is located at the NWSTC in Kansas City, Missouri, and in Norman, Oklahoma. This equipment is configuration controlled, managed, and modified in accordance with procedures applicable to operational systems.

### **3.8 Facilities**

The Facilities functional area includes construction, maintenance, and modification of shelters and other RPIE. Facilities are operated and maintained by each agency according to agency instructions.

### **3.9 Packaging, Handling, Storage, and Transportation (PHS&T)**

PHS&T of WSR-88D components is in accordance with best commercial practices to ensure protection of items during shipment and handling. NLSC is responsible for PHS&T of outbound shipments. The NRC monitors PHS&T of supplies received, and initiates requests, as required, for assistance from the NLSC, and the ROC to correct problems in this area should problems arise during the operational life cycle phase of the program. Unit shipping containers shall be of sufficient strength and offer adequate protection against damage from handling by a commercial carrier (i.e., Federal Express, United States Postal Service, etc). These unit shipping containers

shall be packaged into exterior shipping packages in accordance with MIL-STD-648D. The broken carcass should be returned to NRC in the reusable container that the new item was received, along with the H-14 required to receive carcass credit. Packaging instruction (SPI) applies to all items with Expendability-Reliability-Repairability Codes (ERRC) C, S, and T. Commercial packaging container criteria, as outlined in Appendix E of MIL-STD-2073-1, may be employed to meet SPI requirements. Items identified as Electrostatic Discharge Sensitive (ESDS) per DoD-STD-1686 should be returned in original containers. Shipping costs from the NWS supply warehouse are covered by the surcharge paid by the FAA and DoD. Shipping costs from the site to the NWS supply warehouse are the responsibility of the site and will not be paid by the NRC or NLSC.

### **3.10 Test and Evaluation**

Test and Evaluation associated with the deployment of hardware or software modifications to the WSR-88D system is the responsibility of the ROC. The ROC maintains the WSR-88D test equipment located in Norman, OK.

#### **3.10.1 Test Program Objectives**

Thorough testing of a complex system like the WSR-88D requires the expenditure of a considerable amount of time and resources. Such expenditure should not be done without a clear understanding of the objectives of the test program. These objectives are:

- a. Provide confidence to the WSR-88D agencies that the modified system will meet their operational requirements;
- b. Ensure that overall system reliability, usability, stability, and performance does not deteriorate as a result of modifying the system;
- c. Find and correct as many errors in the modified system as possible, as early as possible in the test cycle and prior to releasing the modification to the field; and,
- d. Prevent software defects by promoting the adoption of proven defect prevention methods, such as inspections and walk-throughs, throughout the development process.

#### **3.10.2 Levels of Testing**

The WSR-88D Program has adopted a five-level test cycle in order to ensure modifications are thoroughly tested. These levels are Component Testing, Integration Testing, System Testing, and Acceptance Testing (which is divided into Operations Testing and Beta Testing). Component and Integration Testing are informal and will be done by the software and hardware developers. All formal testing is managed by an independent test group trained in industry-standard test processes. Software and hardware under formal test is controlled by the Configuration Management Team.

#### **3.10.3 Focus of Testing**

Testing focuses on three major system attributes: functionality, stability, and performance.

### **3.10.4 Management of Testing**

The ROC's Operations Branch Radar Test Team is independent of the Engineering function and conducts all WSR-88D formal testing. The Test Program Manager appoints Test Directors for each formal level of testing. The Radar Test Team provides test plans and test reports to the Test Program Manager for review.

### **3.11 Commissioning and Decommissioning Plans**

Commissioning Plans and Decommissioning Plans for each site are the responsibility of each agency.

### **3.12 Software Maintenance**

WSR-88D system software maintenance is accomplished by the ROC based on tri-agency CCB approved change requirements to the operating system, the applications software, support software, background maps, adaptable parameters, and diagnostics. These responsibilities include development or modification of source code, correction and testing of software, documentation of changes, technical documentation development, configuration management, duplication/copy, and distribution to WSR-88D field sites. Software maintenance at the field level is restricted to changing some adaptable parameters. Field sites load software upgrades provided by the ROC to the WSR-88D system in accordance with ROC provided installation instructions.

### **3.13 Depot Repair**

Carcasses of repairable parts must be returned to the NRC within 30 days of the requisition for the new part in order to receive the repair credit. Shipping costs to return the carcass to NRC are the responsibility of the site and will not be paid by NRC or NLSC. Centralized depot LRU repairs are performed by the NRC in Grandview, Missouri. The NRC uses the most cost-effective method available (either organic or contract) so that the repair process is transparent to the user. The user is responsible for returning repairable items to the NRC. The NRC repairs the LRU, performs quality control functions, and returns the LRU to the NLSC as serviceable, or condemns it as non-repairable.

The NRC also collects component failure data from information returned with a LRU from a field site as well as information collected during the NRC repair process. The NRC enters the data into a computer network for further analysis by the ROC and user agencies. Contractor repair information is collected when available.

See [Appendix B](#) of this plan for a copy of the Depot Repair Support Plan.

#### **3.13.1 Depot Test Equipment**

The NRC maintains all the hardware and software associated with WSR-88D Automated Test Equipment (ATE) and bench test equipment. When required, the NRC replenishes its test equipment.

### **3.14 Configuration Management**

Overall management of the hardware and software configuration baselines of the WSR-88D systems is the responsibility of the ROC. The processes and agency responsibilities are prescribed by the tri-agency approved WSR-88D Configuration Management Plan and the WSR-88D Configuration Control Board Charter. For the 12 FAA NEXRAD sites, the Generator/TPS Shelter facilities are under FAA CM control, provided FAA adheres to ICD 2620062 “ICD for the WSR-88D Generator Shelter.” The ROC retains CM responsibility for the DoD and DOC Generator/TPS Shelter facilities.

### **3.15 Technical Manuals**

The ROC develops, revises, prints, and distributes Technical Manuals in accordance with the requirements of the Technical Data Management Plan. Source, Maintenance, and Recoverability (SMR) codes will appear in the Illustrated Parts Breakdown Manual to inform the technician of the source of repair, the maintenance action required, and the disposition of the failed item. Documentation associated with the Generator/TPS Shelter facilities for the 12 FAA NEXRAD sites shall be maintained by FAA, provided FAA adheres to ICD 2620062 “ICD for the WSR-88D Generator Shelter.”

See <http://www.roc.noaa.gov/WSR88D/Program/TechManPubSect1c.aspx> for a listing of current Technical Manuals. See <https://www.roc.noaa.gov/WSR88D/Program/TechManPubsect2b.aspx> for a listing of current and inactive Modification Documents.

#### **3.15.1 Technical Manual Changes**

The agencies identify suggested changes and submit them using their developed procedures. The Air Force submits changes on Air Force Technical Order (AFTO) Form 22. The FAA submits changes as Case Files. The NWS submits Publication Change Requests (PCRs). (Note: For the following discussion, the term PCR is used generically to refer to each agency’s publication change request.) These changes are then submitted to the ROC. When received, the ROC Documentation Team enters the PCR into a database which assigns a local control number. The PCR is then reviewed by the ROC to determine validity and clarify any procedures/changes. If approved, the PCR is filed until the next technical manual change; and the PCR database is updated. If disapproved, the PCR is filed, and the database is updated. All PCR status is obtainable on the ROC website, which is updated nightly.

Technical manual changes are incorporated according to the PCR priority as follows:

- a. EMERGENCY: Change developed and published within 10 calendar days
- b. URGENT: Change developed and published within 45 calendar days.
- c. ROUTINE: Published in the next change/revision of the document.

A listing of current Publications Change Requests (PCRs) can be found at <https://www.roc.noaa.gov/WSR88D/Program/PCRS/Default.aspx>.

### **3.15.2 Technical Manual Ordering**

**USAF:** The Air Force uses Enhanced Technical Information Management System (ETIMS), AFTO System of Record.

**NWS:** The ROC sends the printed manuals to the sites using the CLS System. Electronic copies of all manuals are available on the ROC website.

**FAA:** The ROC sends the printed manuals to the sites using the CLS System based on input provided by FAA. Electronic copies of all manuals are available on the ROC website.

### **3.16 Modification/Retrofit**

The ROC is assigned the lead design and engineering responsibility for sustaining engineering modifications and retrofit of the WSR-88D system and for Product Improvement projects and retrofit of the WSR-88D system. For CCB approved engineering changes, the ROC provides systems engineering and integration for modification and retrofit including the following: development, prototype, planning, documentation, procurement, testing, kit deployment, and status reporting. These responsibilities are carried out in accordance with the requirements of the Management Process for WSR-88D Modifications. For Sustaining Engineering projects, retrofit kits for all agencies affected by a change are requisitioned by the ROC for shipment directly (“pushed”) to the affected site maintenance personnel. The ROC maintains records for site completion of retrofits at <https://www.roc.noaa.gov/WSR88D/Program/RetrofitMgmt.aspx>.

APPENDIX A: SUPPLY SUPPORT PLAN

APPENDIX A

TO

WSR-88D INTEGRATED LOGISTICS SUPPORT PLAN

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## **1. Purpose**

The purpose of this supplementing plan is to identify the organizational relationships and responsibilities among the supply support organizations that support the fielded Weather Surveillance Radar-88D (WSR-88D) systems and equipment. This plan identifies activities to be accomplished and references how, when, and by whom they will be accomplished. This plan addresses the action to be taken by the National Weather Service (NWS) Office of Observations, Department of Defense (DoD), and Department of Transportation, Federal Aviation Administration (FAA) and includes their subordinate organizations in the establishment and maintenance of the WSR-88D supply support system. The supply support provided to agencies external to the NWS is through interagency supply support agreements.

The participating agencies agree to the terms, procedures, and conditions set forth herein. All changes to this plan must be approved by the participating agencies.

## **2. Scope**

This plan is used during the operational phase and includes the improvements and upgrades to fielded systems and equipment that comprises the WSR-88D.

NWS provides supply related logistics support for the WSR-88D to all participating agencies in the capacity of a Primary Inventory Control Activity (PICA). Stock item initial provisioning, follow-on provisioning, replenishment, and supply coordination on behalf of WSR-88D users is accomplished at NWS Headquarters in Silver Spring, Maryland by the NWS Logistics Management Branch.

## **3. Background**

In November 1992, the supply support function for the WSR-88D transitioned from the interim support contract with Lockheed Martin to full Government support by the NWS through LRU and repair parts stocked at the National Oceanic and Atmospheric Administration's National Logistics Support Center (NLSC) warehouse. The transition commenced with the delivery of provisioned stock items to NLSC in early FY 1992 and was completed with the termination of the contractor interim support contract line items.

Initial Operational Capability (IOC) for the United States Air Force (USAF) supply support was achieved October 1, 1993 by implementation of Military Standard Requisitioning and Issue Procedures (MILSTRIP) requisitioning for all USAF sites. The Federal Aviation Administration achieved IOC October 1, 1995 by implementation of full Federal Standard Requisitioning and Issue Procedures (FEDSTRIP) and MILSTRIP requisitioning for their WSR-88D sites. Billing for NWS supplied material to external customers has been operational since 1993 for the USAF and since 1995 for the FAA.

Warehousing of stock items including storage, requisition processing, packing, shipping, receiving, and physical inventory control are accomplished at the NLSC as directed and funded

by NWS Logistics Management Branch. DoD and FAA contribute their share of these costs through the surcharge applied during purchase of consumable or repairable parts.

#### **4. References**

The following documents and changes thereto are applicable:

[DAFI23-101, Department of the Air Force Guidance Memorandum to the Department of Air Force Instruction \(DAFI\) 23-101, \*Materiel Management\*](#)

Defense Integrated Material Management Manual for Consumable Items, DoD 4140.26M, May 16, 1997

[DoD Manual 4140.68 Integrated Materiel Management of Nonconsumable Items, 5 March 2020](#)

Engineering Handbook 1 (EHB-1), Instrumental Equipment Catalog

[Engineering Handbook 6-501 \(EHB 6-501\), Illustrated Parts Breakdown, 18 May 2015](#)

Federal Logistics Information System (FLIS) Manual DoD 4100.39M, April, 2010

[Joint Regulation Governing the Use and Application of Uniform Source Maintenance and Recoverability Codes, AR 700-82, SECNAVINST 4410.23; AFM 21-106, 29 August 2020](#)

MEMORANDUM OF AGREEMENT among Department of Commerce (DOC), Department of Transportation (DOT) and Department of Defense (DoD) for Allocation of Program Costs of Next Generation Weather Radar (NEXRAD) Program, October 1, 2019

[MIL-HDBK-502A, Department of Defense Handbook Product Support Analysis, Superseding MIL-HDBK-502 27 Dec 2022](#)

[Military Standard Billing System \(MILSBILLS\) Manual, DoD 4000.25-7-M, dated 11 April 2012](#)

Military Standard Requisitioning and Issue Procedures (MILSTRIP) Manual, DoD 4000.25-1, dated June 16, 2015

MIL-STD-1686C, Department of Defense Standard Practice, Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices), 25 October 1995

[MIL-STD-2073-1E, Department of Defense Standard Practice for Military Packaging, 22 April 2019](#)

## **5. Acronyms**

BAS	Business Applications Solution
BM	Rather than being an acronym, “BM” is the passing action status code assigned when being passed from FGZ to G13.
CAMS	Commerce Administrative Management System
CLS	Consolidated Logistics System
CMD	Catalog Management Data
CONUS	Continental, Conterminous, Contiguous United States
DAAS	Defense Automated Addressing System
DCN	Design Change Notice
DESEX	Defense Emergency Supply Expert System
DLA	Defense Logistics Agency
DLIS	Defense Logistics Information Services
DoD	Department of Defense
DODAAC	Department of Defense Activity Address Code
DSN	Defense Switched Network (Military phone system)
ECP	Engineering Change Proposal
EHB	Engineering Handbook
EOQ	Economic Order Quantity
ERRC	Expendability-Recoverability-Repairability Codes
ESDS	Electrostatic Discharge Sensitive
FAA	Federal Aviation Administration
FEDSTRIP	Federal Standard Requisitioning and Issue Procedures
GSA	General Services Administration
ILS	Integrated Logistics Support
ILS-S	Integrated Logistics System - Supply
ILSP	Integrated Logistics Support Plan
IMM	Integrated Material Management
IPB	Illustrated Parts Breakdown
JSPO	Joint System Program Office
LMB	Logistics Management Branch (NWS)
LOA	Level of Authority
LRU	Line Replaceable Unit
LSA	Logistics Support Analysis
LSAR	Logistics Support Analysis Record
MAJCOM	Major Command
MICAP	Mission Capability
MILSBILLS	Military Standard Billing System
MILSTRIP	Military Standard Requisitioning and Issue Procedures
MOE Rule	Major Organizational Entity Rule

MOU	Memorandum of Understanding
NIMSC	Non-consumable Item Material Support Code
NLSC	National Logistics Support Center
NOAA	National Oceanic and Atmospheric Administration
NRC	National Reconditioning Center
NSN	National Stock Number
NWS	National Weather Service
OPAC	Online Payment and Accounting
PCA	Physical Configuration Audit
PICA	Primary Inventory Control Activity
POC	Point of Contact
PTD	Provisioning Technical Documentation
RDA	Radar Data Acquisition
ROC	Radar Operations Center
RPG	Radar Product Generator
SCR	System Change Request
SE	Support Equipment
SERD	Support Equipment Recommendation Data
SICA	Secondary Inventory Control Activity
SMR	Source, Maintenance, and Recoverability Code
SPTD	Supplementary Provisioning Technical Documentation
SSR	Supply Support Request
Sybac	Simplified Billing and Collections
TIR	Total Item Record
UJC	Unit Justification Code
USAF	United States Air Force
W/OBS34	Logistics Management Branch
W/OBS341	National Reconditioning Center
W/OBS342	National Logistics Support Center
WSR-88D	Weather Surveillance Radar - 1988 Doppler

## **6. Organizational Responsibilities for WSR-88D Operational Supply Support**

During the initial Integrated Logistics Support (ILS) planning for the WSR-88D, an integrated tri-agency team approach was used to develop the WSR-88D supply support. To accomplish this, one provisioning specialist and one equipment specialist or inventory manager from each agency was designated to coordinate the unique supply requirements for their agency to the overall supply support system. This team management approach has been extended to the management of each agency's operational phase supply support. Outlined below are the various responsibilities of the tri-agency team participants.

## **6.1 NWS Responsibilities - Primary Inventory Control Activity (PICA)**

The NWS Logistics Management Branch (LMB) is the PICA for the WSR-88D. As an Integrated Material Manager, the LMB is responsible for and provides the following functions for WSR-88D supply support:

- a. Budgets and funds for PICA repair and sustainment re-procurement contracts.
- b. Performs cataloging activities for NWS managed items.
- c. Contracts for re-procurement of repair parts and repairable end items.
- d. Provides customer service activities for customers external to the NWS.
- e. Makes disposal decisions for items no longer required by the WSR-88D supply system.
- f. Provides provisioning for new items being introduced into the WSR-88D system.
- g. Provides requisitioning processing for tri-agency requisitions.

The NEXRAD Inventory Manager responsibility resides within the LMB and is responsible for monitoring the stock on a regular basis, taking action to address stock level issues (i.e. abuse of orders, unauthorized sites placing orders, etc), planning and budgeting for stock replenishment, procuring replenishment/sustainment stock, and providing customer service to the tri-agencies on stock-related inquiries.

## **6.2 Department of Defense**

The Department of Defense is responsible for and provides the following functions for WSR-88D supply support:

- a. Provides coordination and management of DoD supply support requirements, funding, and lead service planning.
- b. Ensures that the proper supply representatives attend all meetings and program activities where supply support issues are discussed.
- c. Provides SICA FEDSTRIP support for USAF owned WSR-88D equipment.
- d. Management activities include Engineering Change Proposal (ECP) evaluation coordination and coordination of the activities of subordinate USAF commands who are involved in or provide supply support.

## **6.3 Federal Aviation Administration, Mike Monroney Aeronautical Center**

Mike Monroney Aeronautical Center is responsible for and provides the following functions for WSR-88D supply support:

- a. Provides coordination and management of supply support requirements, funding, and agency planning.
- b. Ensures that the proper supply representatives attend all meetings and program activities where supply support issues are discussed.
- c. Provides SICA FEDSTRIP support for FAA owned WSR-88D equipment.
- d. Management activities include ECP evaluation coordination and coordination of the activities of field units who are involved in or provide supply support.

## 7. Operational Supply Support

NLSC provides supply support and replenishment for WSR-88D operational sites. This support process involves a number of definite steps and involves a number of different organizational activities. This section summarizes the major activities that comprise the supply support systems.

### 7.1 Requisitioning Process

Requisitions from all the WSR-88D using agencies are submitted and accepted in accordance with the policies of Military Standard Requisitioning and Issue Procedures (MILSTRIP) Manual, DoD 4000.25-7-M and/or DAFI 23-101, Chapter 5. Both electronic and manual requisitions prescribed by the MILSTRIP Manual may be used, however the use of manual requisitions is restricted to emergency situations where the normal electronic transmission system has failed.

NWS activities order directly from the NLSC using standard NWS operating procedure.

FAA sites order through the FAA Mike Monroney Aeronautical Center using standard FAA operating procedure. FAA then submits all WSR-88D orders to the DoD logistics system for processing.

DoD sites order through their respective SICAs. The process begins with the user calling his local supply POC. By the end of the process one or more of the following activities will be involved:

a. **G13, National Weather Service (NWS)**

The local supply POC submits all G13 requisitions through the Integrated Logistics System – Supply (ILS-S). This includes Mission Capability (MICAP) requisitions. G13's system is completely automated, and they will not accept requisitions over the phone. All customers can view a read-only copy of stock availability and requisition status by going to <https://cls.nlsc.noaa.gov/>. If no status is available after 24 hours, contact 439 SCOS Non-Airborne MICAP Flight.

b. **FGZ, Ogden Air Logistics Center (415th SCMS/GUMBC))**

Due to funding, FGZ must act as the Air Force Inventory Control Point even though they do not stock any assets. Requisitions must flow through FGZ in order to be funded. Once FGZ receives your requisition and allocates funds, they pass the requisition to G13, using “BM” for the status code.

c. **DLA, Defense Logistics Agency (SMS)**

All DLA requisitions can be done through the ILS-S. Contact DESEX (877-352-2255, 877-DLA-CALL) to retrieve status.

Requisitions are transmitted by customers external to the NWS via the Defense Automated Addressing System (DAAS). Data received by DAAS from a WSR-88D user

is immediately downgraded 2 levels in priority and transmitted to the NWS Department of Defense Activity Address Code (DODAAC), 136418, Source of Supply G13. Electronic requisitions are received by the NWS from DAAS at Headquarters NWS, Logistics Management Branch, Silver Spring, Maryland. After initial requisition validation and stock availability verification, the requisition is transmitted to the NWS Consolidated Logistics System (CLS) computer in Grandview, Missouri. Transmission of the validated requisition is over a dedicated T-1 line. After the stock validation process is completed, requisition status is transmitted from the NWS back to the requisitioner via DAAS. The requisition status either states that the item is available and gives the estimated shipping date or it states that the item is not available and that it has been placed on back order. Incoming requisitions are forwarded to the NLSC for processing once an hour, 24 hours a day, 7 days a week.

When the requisition is received by the NLSC in the CLS computer, it is placed in the processing queue that operates on a first-in first-out basis. Emergency requisitions receive priority over the processing of routine requisitions. During normal duty hours emergency requisitions are processed on a priority basis. Emergency requisitions received after normal duty hours and weekends are given priority processing through the NLSC after-hours on-call process. Personnel designated for after-hours support are notified via the CLS computers synthesized voice function to come in and fill an emergency requisition. Only requisitions that are coded priority 02 or 03 with a unit justification code (UJC) receive after-hours processing.

### **7.1.1 Modification Kits**

Modification kits are stocked at the NLSC. A limited number of these are procured for a particular modification. Modification kits are requisitioned by the Radar Operations Center's (ROC) Program Branch for free issue and direct shipment to all affected field units. After rescission of the authorizing document and deletion of kits from the supply system, funding for the kit material is the responsibility of the specific organization.

### **7.1.2 Modification Kit Warranty Periods**

The Modification Kit process should also include consideration for applicable warranty periods. An assessment of whether an extended warranty or an additional procurement of WSR-88D stock listed items should be conducted in order to ensure that stock levels are not impacted based on necessity for extended repairs or long procurement lead times.

### **7.1.3 Depot-Only (ROC) Items**

Repair parts designated only for use by depot level repair activities performed by the Radar Operations Center will be issued only to authorized depot level repair organizations. Examples of such items include radomes or antenna panels.

## **7.2 Replenishment Process**

All of the WSR-88D stock listed items resulting from the provisioning process that are managed by the NWS are stocked, stored, issued, and replenished by the LMB. Replenishment is based on demands and is computed using Economic Order Quantity (EOQ) methodology. Requests for procurement are initiated by LMB inventory managers when stock falls below the minimum EOQ. Contracting for replenishment procurements is performed through the Eastern Region Acquisition Division Procurement Office as requested by the LMB on a weekly EOQ computational output cycle. Re-procurements are competitive, except for those stock items which are identified as proprietary. Non-competitive procurements are supported by sole source justifications.

## **7.3 Repair/Supply Support Interface**

Unserviceable repairable stock items (condition codes E and F) are returned to G14, the National Reconditioning Center (NRC) in Grandview, Missouri. Condemned (condition code H) stock depot disposable items are also returned to NRC. All failed, warranted stock items should be returned to NRC, regardless of condition. Warranty management is accomplished/coordinated through the NRC.

CLS provides return credit (less repair cost) for unserviceable stock items (condition codes E and F only) which are received with MILSTRIP Automatic Return, Document Identifier FTA and project code 3AL indicating a requisition for a replacement item. If credit items are not returned within 30 days from the day of issue to the customer, credit will not be provided. All other returned stock items will receive no return credit.

## **7.4 NLSC Warehouse Operation**

The NLSC warehouse is located at 14200 Merritt Rd, Grandview, Missouri 64030. The warehouse's normal hours of business are 6:30 AM to 3:30 PM Central Time, Monday through Friday. Emergency service for priority requisitions is provided 24 hours per day, 7 days per week.

### **7.4.1 Summary of the Warehouse Functions**

Receiving and receipting stock items;

- a. Warehousing stock items;
- b. Requisition processing and issuing stock items;
- c. Packaging and preservation of stock items;
- d. Shipping of stock items;
- e. Physical inventory of stock items;
- f. Control of accountable, inactive, excess, hazardous material content, shelf-life, and serialized stock items; and
- g. Operation of CLS.



## **7.4.2 Requisitions Processing and Turnaround Time Goals**

- a. **Non-duty-hour priority** - delivered to carrier within 4 hours of requisition receipt. Historically average time for delivery to a CONUS site from the time of requisition receipt at NLSC is 18 to 24 hours.
- b. **Duty-hour priority** - delivered to carrier same day as requisition receipt. Historically average time for delivery to a CONUS site from the time of requisition receipt at NLSC is 18 to 24 hours.
- c. **Duty-hour routine** – delivered to carrier 2 working days after requisition receipt. Historically average time for delivery to the site from the time of requisition receipt at NLSC is 3 days.  
NLSC selects the most expedient mode of transportation based on the site shipped to, the time of day, the availability of carriers, etc.

## **7.5 Prices, Billing, and Credits**

Each WSR-88D stock item stocked at the NLSC has a standard unit price. This is derived from the current market or production cost of the item at the time the price is established. Standard prices will be subject to, but not limited to, annual review. Revisions to standard prices will be issued in accordance with DoD FMR 7000.14R Volume 11. The WSR-88D users requisition stock items from the NWS using funded requisitions for both consumable and non-consumable items in accordance with MILSTRIP/FEDSTRIP procedures. Requisitions must contain appropriate fund and signal codes for subsequent billing/crediting action on both initial stocking requirements and replenishment requisitions. For DoD and FAA orders (consumable and repairable), a surcharge of 25% will be added to the current sell cost to cover shipping from NLSC to the site, packaging materials, and warehouse support.

Billing is based on monthly electronic transfer from the LMB to the Business Applications Solution (BAS). Billing and credits for DoD activities is via GSA/Interfund Transfers to DoD treasury appropriation accounts. On September 15, 1989 the NOAA NWS was approved to participate in the MILSBILLS Interfund System through the General Services Administration's Sybac system. This billing/paying process was implemented in November 1993. The approval limits the NWS's seller functions to DoD activities and to those items for which the NWS is designated as the integrated DoD material manager. Civilian agency customers are billed through the Online Payment and Accounting (OPAC) process. Accounting information from BAS is billed or credited through the NOAA Office of Finance and Administration to the appropriate agency paying office on a quarterly basis.

## **7.6 Re-procurement Data Management**

To the extent that re-procurement data was made available as Supplementary Provisioning Technical Documentation (SPTD) or as engineering drawings from

acquisition phase, files of these data are maintained by the NWS ROC Configuration Management Team. This re-procurement data is updated as WSR-88D design changes occur and is used for competitive replenishment of stock items. When re-procurement data is proprietary the data is used to support sole-source contracts.

## **7.7 Design Change/Modification Implementation**

Development and deployment costs for ECPs are allocated in accordance with the Cost Share MOU. The supply support product baselines were established as a result of the WSR-88D Physical Configuration Audits (PCA).

Design changes incorporated into the WSR-88D system by ECP approval by the three agencies include costs associated with the modification of spares, and are funded by the WSR-88D Program.

For each Engineering Change Proposal approved by the Configuration Control Board that affects any repairable or consumable stock item, a New Stock Item (NEWSIC) or Stock Item Change (SIC) is submitted to the LMB. NEWSICs will be used for the addition of items not currently stocked in the Consolidated Logistics System (CLS) while SICs will identify changes to existing stock listings. The requirement assures that the supply system will provide the correct parts for operation and maintenance of the WSR-88D.

## **7.8 Cataloging**

Cataloging is the assignment of National Stock Numbers (NSN) to items that are stocked in the supply system. All requisitions use the NSN to identify what is being requisitioned. To establish the NWS as a PICA for cataloging purposes, System Change Request (SCR) number OF-2712 [ZF-885701] was submitted to Defense Logistics Information Services (DLIS) on February 5, 1988. Corrections were made, and the SCR was formally referred to the DoD Integrated Material Management Committee for approval in March 1988. After review by all agencies, the SCR was approved on August 16, 1988 and implemented by DLIS on November 6, 1989. Full implementation of the software changes required by this SCR was completed by DLIS in 1994. This action provided the NWS Major Organizational Entity (MOE) rules to identify the NWS as both PICA and SICA and provided Level of Authority (LOA) for both PICA and SICA activities.

A MOE rule is a short hand used by the supply system to identify an operational relationship of buyer/seller, or wholesale/retail activity within the federal supply system. Each stock item sent to DLIS for cataloging receives a MOE rule as part of the NSN assignment process. Activities other than the cataloging requestor that want to be able to requisition that item also add their MOE rule after the NSN is assigned. The MOE rules then identify the activities that have registered for support from the PICA for that item. MOE rules and LOA assignments for WSR-88D items managed by the NWS are in accordance with SCR OF-2712 (ZF-885701).

All WSR-88D items are assigned NSNs. This is accomplished by the LMB in two steps. During the provisioning process all part numbers are screened against the DLIS data base to identify parts which already have an assigned NSN. If a match is found the NSN is added to the NWS data base, if no NSN is found a cataloging action is initiated to obtain a NSN. This was done for all WSR-88D repairable and consumable items. This is a continuous process that is used any time a new item is introduced into the WSR-88D supply system.

Action by an agency to add its MOE rules to an item with an existing NSN is called collaboration. Collaboration is used for Federal Supply Classes which are assigned to specific agencies for Defense Integrated Material Management (IMM). This has been accomplished by the LMB for WSR-88D items. In cases where the IMM is other than the NWS, action was taken to add all the WSR-88D using agencies' SICA MOE rules by applying the appropriate designations.

Cataloging actions to stock-list are submitted to DLIS by the LMB in accordance with the requirements of DoD FMR 7000.14R and also include Catalog Management Data (CMD). The submission of SICA(s) peculiar CMD is the responsibility of each respective agency. SICA proposed changes to item data, other than SICA CMD, are submitted to the PICA for processing to DLIS. All non-consumables for the WSR-88D for which NSN assignment is requested are Non-consumable Item Material Support Coded (NIMSC) into the Total Item Record (TIR) at DLIS in accordance with AFLCR 400-21, Wholesale Inventory Management and Logistics Support of Multiservice Used Non-consumables. All items are assigned NIMSC 5: Depot Repairable Component (Phase II). This code identifies SICA managed depot repairable components assigned to a PICA in another service. This action permits an organization to submit their supply requirements to the PICA on requisitions, which are funded by a designated point within the SICA. The SICA will also provide item/program data to the PICA to meet to register as a user of the item. This is accomplished by submitting Supply Support Requests (SSR). The IMM, as the item PICA, is required to add this information to the DLIS TIR for the stock-listed items and to assume supply support responsibility for the requestor. DLIS processes add/change/delete actions applicable to the DLIS TIR only when received from a PICA, except for Segment H, CMD, SICA.

## **7.9 Provisioning**

Provisioning is the process of determining the range and quantity of items (i.e., spares, repair parts, special tools, test equipment, and support items) required to support and maintain an end item of material for an initial period of service and during subsequent life cycle phases. The selection of items for supply support was a collaborative effort of the WSR-88D provisioning team. The quantities of each end item required for initial stock were calculated by the LMB and procured through the Provisioned Item Order option on the WSR-88D contract. In the case of Integrated Material Managed items already in the Federal Supply System, SSRs were initiated by NWS to the IMM in accordance with Chapter 4, DoD Manual 4140.26, Volume 1. Each WSR-88D non-consumable stock item which is PICA managed by agencies other than NWS will be

individually assessed during the provisioning process to determine if transfer of management to NWS management is desirable or appropriate from the currently assigned IMM. The provisioning process should also include consideration for applicable warranty periods. An assessment of whether an extended warranty or an additional procurement of WSR-88D stock listed items should be conducted in order to ensure that stock levels are not impacted based on necessity for extended repairs, long procurement lead times, and or future budget concerns.

### **7.9.1 Provisioning Organization**

Provisioning contact points have been established in each WSR-88D using agency as follows:

- a. PICA NWS, Logistics Management Branch
- b. SICA FAA, AJW-L
- c. SICA AF, 415th SCMS/GUMBC
- d. DLA, Battle Creek, MI

### **7.9.2 Source, Maintenance, and Recoverability (SMR) Coding**

SMR codes are used to communicate supply instructions to the various logistics support levels and to users. These codes are part of the Illustrated Parts Breakdown (IPB) of maintenance technical manuals, The NWS Engineering Handbook 1, Federal Cataloging Data and various provisioning and supply support documents. A single SMR code is assigned to each item and is based on the logistics support plans and maintenance concept of the end item, in this case the WSR-88D. The SMR codes provide a "mini" maintenance plan for each item which, when all elements of the SMR code are considered together, implements the WSR-88D maintenance concept. The SMR code assigned to each stock item is also a record of technical support decisions that reflect consideration of design, manufacture, application, repair cost, maintenance, and supply practices and capabilities for each stock item and the operational mission of the WSR-88D.

SMR coding for WSR-88D components began with contractor recommendations and were included as part of the Provisioning Technical Documentation (PTD). Assignments of SMR code are in accordance with the Joint Regulation Governing the Use and Application of Uniform Source, Maintenance, and Recoverability Codes, AFMAN21-106 (T0 00-25-195). Uniform SMR codes used on the WSR-88D consist of three parts: a two-position source code, a two-position maintenance code, and a one-position recoverability code. A further explanation of the codes is as follows:

- a. Source codes (positions 1 and 2) denote the means by which the stock item is acquired for replenishment purposes, i.e., procured and stocked at NLSC or elsewhere in the Government, locally manufactured, assembled, etc. For the WSR-88D, it was and is mandatory that the source code be constant for all users and applications of a single stock item.
- b. Maintenance codes (positions 3 and 4) denote the level(s) and extent of maintenance performed on an item. Position 3 of the SMR code is referred to

as the maintenance code. It indicates the lowest level of maintenance authorized to remove, replace, and use an item. The codes that apply to the WSR-88D stock items in position 3 are:

- "O" for organizational or field level removal and replacement or
- "D" for depot level removal and replacement.

Assignment of maintenance codes implies that the related logistics support areas such as maintenance training, tools, test equipment, technical documentation, etc., are inclusive of all stock items for a given level of maintenance.

The fourth position of the SMR code is often referred to as the repair code. This position identifies whether an item is repairable or consumable. If it is repairable, this position of the SMR identifies the lowest maintenance level with the capability to perform repair, i.e., all authorized maintenance actions required to restore the item to serviceable condition. As with position 3, the selection of a repair code implies that all related logistics support areas have been planned and provided to carry out the intent of the SMR code. The codes used in the fourth position of the SMR code for the WSR-88D stock items are:

- "Z" for no repair authorized or not repairable (consumable),
- "O" for organizational or field level repair,
- "D" for limited field repair, depot overhaul, and
- "L" for specialized repair teams.

Teams from the ROC will provide depot repair support for maintenance actions that are beyond the capability of field units.

Positions 3 and 4 of the SMR coding for the WSR-88D stock items will remain constant for all users to simplify management of each stock item.

- c. The fifth position of the SMR denotes which maintenance level is authorized to dispose of an item and is referred to as the recoverability code.

Recoverability codes for the WSR-88D items are:

- "Z" for non-repairable or throw away items. (Disposal is done by level of

- maintenance indicated in position 3 of the SMR code.),
- "O" for organizational or field level,
- "D" for depot level, and
- "A" which denotes that the item requires special handling, contains hazardous materials, or precious metals and that specific procedures must be followed in its disposal.

Some assumptions were used for the WSR-88D coding: Major WSR-88D end items such as Radar Product Generator (RPG), Radar Data Acquisition (RDA), etc., that will not be stocked, stored, issued or returned to depot for repair, will be source coded "PD" in positions 1 and 2, i.e., procured for initial issue or outfitting and restocked only for subsequent or additional initial

issues or outfittings. These items are not subject to automatic replenishment. These items are assigned NSNs for the purpose of property tracking and possible movement of systems during the operational life cycle. There is limited use of source code "XB," i.e., item is not procured or stocked, if not available through salvage requisition. Letter "D" in the third, fourth, or fifth position of the SMR code always denotes the NRC in Grandview, Missouri, regardless of the final repair destination or final disposition destination. Letter "O" in the third, fourth or fifth position of the SMR code applies to any organizational activity and/or its geographically associated sites.

### **7.9.3 Support Equipment**

The determination of the WSR-88D Support Equipment (SE) requirements was done through the Support Equipment Recommendation Data (SERD) process. The contractor submitted a SERD for each item considered necessary for the support of the WSR-88D. The SERD items were classified as being either peculiar (WSR-88D unique) or common. The Joint System Program Office (JSPO) along with input from the user agencies reviewed, modified, and approved or disapproved each item as appropriate. The equipment selected through the SERD process was then procured. Peculiar SE spare parts support was provisioned by NWS for support of tri-agency used support equipment. Support of Common SE is the responsibility of each agency. New items of support equipment are introduced into the supply support system through the SERD process.

### **7.9.4 Consumable Material**

An initial supply of consumable items, such as lamps, fuses, filters, oil, and belts, was made into a kit form and shipped from the NLSC in time to coincide with system delivery at the site. The kits contained an estimated one year supply of consumable items. Replenishment of consumable items at the site is accomplished by requisitioning these supplies from the NLSC.

### **7.9.5 Design Change Requirements**

As the WSR-88D system evolves and modifications are made to the system, each change will be provisioned to provide the necessary supply support for the new hardware; and new items will be procured as stock items. The method of parts selection will be via a Logistics Support Analysis (LSA) 036 Report, a provisioning parts list. The media and format for Provisioning Technical Documentation (PTD) and selected data elements shall be those available in MIL-HDBK-502 and as designated in Part II, Logistics Support Analysis Record (LSAR) Data Selection Sheet, of the contract DD Form 1949-1. SMR coding will be in accordance with the SMR coding used in the initial provisioning process.

#### **7.9.6 Provisioned Item Orders**

As required, the NWS provides Provisioned Item Order(s) to the designated acquisition agent designated for each change.

#### **7.9.7 Preservation, Packaging, and Packing Requirements**

The LMB is responsible for the requirements for ensuring preservation, packaging, and packing of spare and repair parts for WSR-88D and WSR-88D support equipment are considered during the provisioning process. Unit shipping containers shall be of sufficient strength and offer adequate protection against damage from handling by a commercial carrier (i.e., Federal Express, United States Postal Service, etc). These unit shipping containers shall be packaged into exterior shipping packages in accordance with MIL-STD-648D. The broken carcass should be returned to NRC in the reusable container that the new item was received, along with the H-14 required to receive carcass credit. Special Packaging Instruction (SPI) applies to all items with Expendability-Reliability-Repairability Codes (ERRC) C, S, and T. Commercial packaging container criteria, as outlined in Appendix E of MIL-STD-2073-1, may be employed to meet SPI requirements. Items identified as Electrostatic Discharge Sensitive (ESDS) per DoD-STD-1686 should be returned in original containers. Shipping costs from the NWS supply warehouse are covered by the surcharge paid by the FAA and DoD. Shipping costs from the site to the NWS supply warehouse are the responsibility of the site and will not be paid by the NRC or NLSC.

Usually packaging data is submitted for approval actions as soon as possible after requirements have been identified. This will ensure completion of data approval and allow sufficient packaging lead time prior to the required delivery dates of the items themselves. In no case are items shipped without approved packaging data, unless prior approval has been granted by the PICA.

#### **7.10 Operational Supply Support on a Continuing Resolution**

NRC and LMB will identify the critical items to sustain the WSR-88D while under a continuing resolution and will reassess the FY spend plan priorities upon the remaining allocation provided.

### **8. Depot Support**

The Integrated Logistics Support Plan (ILSP) designates the LMB as PICA for the WSR-88D radar system. As a part of this responsibility, the NRC has been designated as the primary Government repair depot for WSR-88D LRUs designated depot repairable. The ROC has been designated to provide on-site support for maintenance actions that are beyond the capability of field units. This encompasses maintenance actions that require special skills, knowledge, or

more manpower than are available to field sites. Examples include recovery from lighting strikes, system outages caused by catastrophic failures, and radome repair and maintenance.

### **8.1 Tower and Radome Repair and Maintenance**

Tower and radome repair and maintenance are agency specific and typically handled under separate contracts by prime contractors who accomplish in-depth inspections and write detailed reports. The ROC provides project management of the tower and radome repairs and maintenance for both the NWS and DoD radars. The FAA has their own program. The ROC Project Manager reviews the NWS and DoD inspection reports and then authorizes a level of maintenance to correct any discrepancies listed in the reports. The inspection reports will detail all supplies and materials required to correct the discrepancies. (The materials involved in the maintenance of these entities are not stock listed.) Once authorized, the contractors will purchase those supplies and materials, deliver them to the individual radar site, and install them.

### **8.2 Supply Support for Depot-Only Items**

Items that are SMR coded for depot, with a “D” in position 3, are only issued to activities authorized to use or release those items. At present only the LMB, the NRC, and the ROC have this authorization. There are two kinds of depot-level maintenance: 1) Depot and 2) On-site. NRC performs depot maintenance on LRUs which sites return to them. When sites need on-site, depot-level maintenance, they call the ROC Hotline. After the part arrives, a ROC Depot Maintenance Team travels to the site and performs the on-site, depot-level maintenance.



APPENDIX B: DEPOT REPAIR SUPPORT PLAN

APPENDIX B

TO

WSR-88D INTEGRATED LOGISTICS SUPPORT PLAN

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## **1. Purpose**

This document establishes a tri-agency support agreement for depot level support of the Weather Surveillance Radar - 1988 Doppler (WSR-88D) and ancillary test equipment. This agreement is established among the Department of Commerce (DOC) National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS), the Department of Transportation (DOT) Federal Aviation Administration (FAA), and the Department of Defense (DoD). This document establishes the NWS's National Reconditioning Center (NRC) as the primary activity for depot level maintenance, reconditioning, and quality control of the WSR-88D parts. The participating agencies agree to this by the terms, procedures, and conditions set forth herein. All changes to this plan must be approved by the participating agencies.

## **2. Acronyms**

ATE	Automated Test Equipment
BER	Beyond Economical Repair
CLS	Consolidated Logistics System
CM	Configuration Management
COR	Contracting Officer's Representative
DOC	Department of Commerce
DoD	Department of Defense
DOT	Department of Transportation
FAA	Federal Aviation Administration
H-14	NWS Form H-14 "Equipment Return Tag"
ILSP	Integrated Logistics Support Plan
JCN	Job Control Number
LMB	Logistics Management Branch (NWS)
LRU	Line Replaceable Unit
NIST	National Institute of Standards and Technology
NLSC	National Logistics Support Center
NOAA	National Oceanic and Atmospheric Administration
NRC	National Reconditioning Center (NWS)
NWS	National Weather Service
ORG	Organization Code
PICA	Primary Inventory Control Activity
ROC	Radar Operations Center
SE	Support Equipment
SMR	Source, Maintenance, and Recoverability
WSR-88D	Weather Surveillance Radar - 1988 Doppler

## **3. Background**

The Integrated Logistics Support Plan (ILSP) designates the LMB as Primary Inventory Control Activity (PICA) for the WSR-88D radar system. As a part of this responsibility, the NRC has been designated as the primary Government-wide repair depot for WSR-88D Line Replaceable Units (LRUs) determined to be depot repairable.

## **4. NRC Responsibilities**

The NRC provides depot level maintenance, reconditioning, and quality control services for all WSR-88D LRUs designated as depot repairable according to the Source, Maintenance, and Recoverability (SMR) code. In addition, the NRC maintains depot test equipment and provides program data to the Radar Operations Center (ROC).

### **4.1 Repair**

The NRC performs depot level repair and maintenance of all appropriate WSR-88D LRUs either in-house or by contract or a combination of both. Repairs will be performed in accordance with industry standards or better. All repairs will conform to the WSR-88D Technical Requirements. Defective LRUs will be returned to their original operating condition unless an official ROC change notice authorizes a modification. The NRC notifies the ROC if any unauthorized changes are made in the field to an LRU.

#### **4.1.1 Depot Repairable LRUs**

The CLS identifies the WSR-88D LRUs specified as depot repairable. All LRUs to be repaired or quality controlled by the NRC must be sent to the NRC for the work to be performed. The NRC will not provide on-site repair or troubleshooting except in special cases approved by the site, the ROC, and user agencies. These services are provided by the ROC's on-site depot corrective maintenance team and the WSR-88D Hotline.

#### **4.1.2 Performance Specifications**

Each NRC repaired LRU shall be determined to conform to one of two repair classifications. The vast majority of NRC repairs will be Class 1. Class 1 repairs will be repaired in accordance with the LMB performance specifications. Quality and workmanship will conform to industry standards and will equal or exceed the original manufacturer's specifications. Occasionally, due to high demand and/or low supply, LRUs that cannot be returned to Class 1 condition will be repaired and classified as Class 2 LRUs. Class 2 repairs will match all function, form, and fit requirements, but because of physical damage cannot be made to appear new. All Class 2 repairs will be so marked. The NRC will consult the ROC before any Class 2 repairs are accomplished.

#### **4.1.3 Repair Source Determination**

The NRC determines the feasibility of in-house versus contract repair for all depot-repairable LRUs based on repair costs, manpower availability, turnaround times, and program requirements. The NRC shall be responsible for repairing and reconditioning all depot-repairable WSR-88D LRUs using the most economical means available while meeting the quality, quantity, and timeliness criteria.

#### **4.1.3.1 Contract Repaired Items**

For LRUs to be repaired by contract, the NRC is responsible for preparing requests for quote and serving as the Contracting Officer's Representative (COR). Preparation of requests for quotation for contract repairs will be performed using NWS performance specifications and turnaround time requirements. The NRC personnel serve as COR for all repair contracts associated with depot repair of WSR-88D LRUs.

#### **4.1.3.2 In-House Repaired LRUs**

The NRC is responsible for developing test procedures and techniques for in-house repairs. This includes developing bench test procedures, designing and building specialized test fixtures, and modifying automated test equipment (ATE) hardware and software as appropriate.

After initial deployment of new LRUs, NRC and/or LMB is responsible for budgeting, procuring, and monitoring stock levels of bench stock necessary to repair these NEXRAD items.

#### **4.1.4 Beyond Economical Repair (BER) LRUs**

Beyond economical repair (BER) is a situation where the cost of repairing an item or asset exceeds its economic value or the cost of acquiring a replacement. Repairing the item is not financially viable or cost-effective.

Based on inspection and troubleshooting of an LRU, the NRC may designate an LRU as BER. The designation will be based on the cost of a new item against the cost of repairing the defective LRU as well as the availability of new replacement items.

#### **4.1.5 Parts Substitution**

The NRC coordinates any part substitutions with the ROC. Substitute parts may be needed to replace hard-to-find parts or to replace an expensive part with a less expensive but functionally identical part. All part substitutions will be coordinated with the ROC prior to implementation.

#### **4.1.6 Equipment Modifications**

Although most modifications entail kits installed by agency field personnel, authorized equipment modifications may be performed at the NRC during the repair process (attrition retrofit) or as a special project. NRC is responsible for incorporation of all modifications into their WSR-88D systems and any affected spare parts in stock at the National Logistics Support Center (NLSC). NRC costs associated with modifications will be recouped through modification program funding. The ROC Program Branch will be responsible for providing the necessary modification kits to the NRC for implementation. If, in the course of repair, NRC personnel identify a modification to the equipment that would benefit

the WSR-88D Program either through decreased maintenance costs or improved system performance, a suggestion for implementation will be submitted directly to the ROC, as a Configuration Change Request, for consideration by the WSR-88D Configuration Control Board.

## **4.2 Quality Control**

NRC Quality Control Test Procedures vary according to the item classification. Repaired LRUs are 100% inspected. New LRUs are normally sampled but may be 100% inspected based on item type, history, or quantity. Non-repairable items will be sampled. Sample quantities are determined by type of test required and type of item. For example, destructively tested items will have an extremely small sample. Repaired LRUs found to be out of specification will be referred to the repair source (in-house or vendor) for rework or final disposition. New items found defective will be referred to the procurement activity for supplier return for correction, replacement, or other disposition. Individually tested and accepted items will receive a quality control tag. Items that are sample tested will be given Quality Control acceptance by lot. The NRC will notify the ROC of non-routine problems with quality of new or repaired stock items. NRC Quality Control will ensure that all new and repaired WSR-88D LRUs meet original manufacturer's specifications and also meet the following criteria:

- a. New, repaired, and/or reconditioned items will perform their designed function when installed in field equipment.
- b. Reconditioned LRUs will be in like new condition or marked as Class 2 repair.
- c. New, repaired, and/or reconditioned items will contain all authorized modifications and all unauthorized modifications will be removed.
- d. New, repaired, and/or reconditioned items will be clean and have no damaged parts.

### **4.2.1 New Stock**

All new stock to be warehoused at NLSC is quality control inspected by the NRC in accordance with acceptable standards and practices. This includes repairable as well as disposable items.

### **4.2.2 Repaired or Reconditioned Stock**

All stock items repaired or reconditioned by the NRC either by contract or in-house are quality control inspected by the NRC prior to transferring the item to the NLSC inventory. In addition, all contractor-repaired items that qualify as Class 2 will be so marked by the NRC.

### **4.2.3 Received Defective**

Items returned to the depot as received-defective are examined to determine the cause of the failure. If the problem lies outside the depot, the ROC is notified for corrective action. The NRC documents each occurrence of received-defective that is found not to be defective and coordinates with the ROC for possible investigation (e.g., a diagnostic may be marginal or not operating as intended). Returned-defective LRUs will be credited at the issue cost.

#### **4.2.4 Inventory Rejected by NRC QC**

Inventory procured for stocking at the NWS Warehouse will be inspected by the NRC QC Inspection Unit upon arrival from the vendor and/or as requested through the SIC or NEWSIC process by sample or 100% inspections. Upon any rejection, NRC QC immediately notifies the procurement source of the reason for the rejection. Once notified, the procurement source will have no more than 30 days to either provide a waiver, an adjustment (if allowed), or return the item(s) for vendor resolution.

### **4.3 NRC Logistics**

The NRC receives and processes all defective WSR-88D LRUs and NWS owned ancillary test equipment.

#### **4.3.1 Return Form (H-14)**

Tri-agency users use the pre-printed H-14 paper form shipped with the requisitioned part to return an LRU for depot repair. Items received at the NRC will be checked against the H-14. For proper tracking and application of the repair credits, it is critical the DoD and FAA return the H-14 with the carcass. Failure to return the H-14, or information in section 4.3.2, may result in no repair credit to the agency.

#### **4.3.2 Defective WSR-88D LRU Accompanying Documentation**

For the DoD and DOT participants, the pre-printed H-14 form is the preferable form to return with each repairable item. If the H-14 is not available, each defective WSR-88D LRU sent to the NRC for repair by any participating agency shall be accompanied by appropriate documentation containing, as a minimum, the following information:

- a. DODAAC (DoD) or FAA identifier of the site where the failure occurred
- b. Task Code (USAF Job Control Number (JCN))
- c. NWS Part Number (NWS Sites Only)
- d. National Stock Number
- e. Serial Number
- f. Document Number
- g. Technician's assessment of the LRUs failure

#### **4.3.3 Data Entry**

The NRC records all necessary information on items received for repair into the CLS database. The NRC makes inquiries to sites to clarify apparent information discrepancies.

#### **4.3.4 NRC Repair Cost**

Before historical repair cost data was available on WSR-88D LRUs, all depot repairs were charged at 35 percent of acquisition cost. Now that in-house and contract repair costs have been established, depot repairs for non-vendor repaired items are charged at 27 percent of the acquisition cost. Vendor repaired items are charged at the actual vendor repair costs including shipping to and from the vendor plus any government furnished part costs. This costing method provides for the repair and maintenance of the NRC WSR-88D capital equipment. NRC computes actual repair costs and repair lead-times which are then automatically fed to the CLS product record in an overnight transfer. For DoD and FAA sites, a surcharge of 25% will be added to the current sell cost for the ordered part (consumable or repairable).

#### **4.4 Program Data**

The NRC provides the ROC with information on repair costs, repair turnaround times, number of repairs performed, received-defective rate, actual failure and repair data, and cost avoidance. The ROC may disseminate this information to user agencies. Restrictions may apply to the dissemination of repair cost information when it is deemed procurement sensitive.

#### **4.5 Test Equipment Calibration**

The NRC is responsible for and will maintain the calibration of all test equipment used in the course of depot repair of any WSR-88D LRU. Calibration will be performed at regular intervals and will be in accordance with the National Institute of Standards and Technology (NIST). As a routine part of the NRC repair process for field test equipment, that equipment will also be calibrated to NIST standards. However, user agencies and their field offices are responsible for the calibration of all such equipment in their inventory in accordance with those policies put in place by the individual agencies.

#### **4.6 Automated Test Equipment (ATE) Maintenance**

The NRC is responsible for maintaining the ATE equipment used in the depot repair of any WSR-88D LRU. This includes hardware and software maintenance and updates as necessary. The ROC is responsible for providing assistance in the implementation of new or modified hardware and software in the event of a new or modified LRU being introduced into the WSR-88D system.

##### **4.6.1 Hardware**

ATE hardware is maintained by the NRC either in-house or by contract.

##### **4.6.2 Software**

NRC personnel are responsible for implementing all software changes to the ATE, either through in-house efforts or through contract.



#### **4.6.3 ATE Configuration Management (CM)**

The NRC is responsible for maintaining CM on WSR-88D depot ATE.

#### **4.7 Repair Turnaround Times**

The NRC is responsible for repairing items in a timely manner in accordance with LMB and ROC Engineering guidance. The goal of the NRC is to quickly repair and quality control LRUs in order to minimize back orders.

#### **4.8 Shipping Costs**

Shipping costs from the NWS supply warehouse are covered by the surcharge paid by the FAA and DoD. Shipping costs from the site to the NWS supply warehouse are the responsibility of the site and will not be paid by the NRC or NLSC.

### **5. Site Responsibilities**

The WSR-88D site personnel are responsible for returning defective LRUs to the NRC within thirty (30) days and for calibration of support equipment (SE) at their sites.

#### **5.1 Return of Defective Items**

The site will ensure that the NRC receives a defective LRU within 30 days of the receipt of a replacement item. All defective items will be accompanied by documentation as described in paragraph 4.3.2. The NRC will issue overdue notices to each site for sites that have not returned their LRUs within the 30 day window. If credit items (carcasses) are not returned within 30 days from the day of issue to the customer, credit will not be provided. For extenuating circumstances, special arrangements can be made by the agencies with the LMB to extend the return time.

#### **5.2 Test Equipment Calibration**

The NRC ensures only calibrated test equipment is returned to NLSC for stocking. However, the individual agencies are responsible for assuring on-site calibration of all field test equipment drawn from stock.