

ORDER

7110.14A

**THREE LEVEL WEATHER FOR ARTCC DISPLAYS
PROJECT IMPLEMENTATION PLAN**

RECEIVED



February 16, 1990

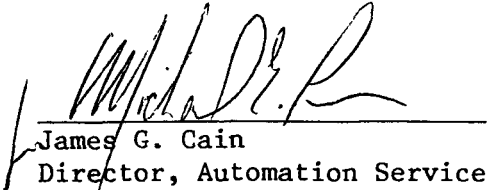
**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

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Initiated By: AAP-310

FOREWORD

This order directs affected organizations to take necessary action to implement the three-level weather (3LW) function for use on air route traffic control center (ARTCC) displays. It provides guidance on 3LW-related software and hardware implementation tasks, revised schedules, and project funding status. Management responsibility for this project has been assigned to the ATC Automation Division, AAP-300 and, in particular, the En Route Automation Branch, AAP-310. Support and cooperation from the groups listed within this order are essential for successful implementation of 3LW.



James G. Cain
Director, Automation Service

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CHAPTER 1. GENERAL

1. PURPOSE. This order transmits the Three Level Weather (3LW) for Air Route Traffic Control Center (ARTCC) Displays Project Implementation Plan to the field. It provides the revised activities, schedules, and responsibilities necessary for implementing the 3LW function into the National Airspace System (NAS).
2. DISTRIBUTION. This order is distributed to the division level in the Automation, the Air Traffic Operations, the Air Traffic Plans and Requirements, the Program Engineering, the Systems Maintenance, the NAS Transition, and the Flight Standards Services, the Office of System Engineering & Program Management, the Office of Personnel, and the Office of Training and Higher Education in the FAA's Washington, D.C. Headquarters. In the field the order is distributed to the division level in the regional Airway Facilities and Air Traffic organizations, and to the division level at the FAA Aeronautical Center and the FAA Technical Center. In addition, this order will be forwarded to the air traffic manager at each ARTCC.
3. CANCELLATION. Order 7110.14, dated September 30, 1988 is cancelled.
4. BACKGROUND. Two-level weather (lines and H's) already exists in delineating weather for air traffic controllers on the en route plan view displays. The addition of the third level of weather (delineated by M's) is a change to the en route display environment that will, once implemented, be available until data from weather radars is integrated into the sector suite displays in the mid-1990's. This order covers the software and hardware changes that will be made to implement the 3LW function in all ARTCCs.
5. DEFINITIONS. The following definitions are peculiar to 3LW for ARTCC Displays.
 - a. Any software component/3LW implies software modified to accommodate or process 3LW input or output. For example, A4e0.1/3LW is national operational software build A4e0.1 modified to process three levels of weather.
 - b. ARSR-3/3LW implies an ARSR-3 radar modified to output three levels of weather.
 - c. CD-2/RMM/3LW implies a common digitizer, model 2, modified for remote maintenance monitoring (RMM) and also modified to output three levels of weather.
6. AUTHORITY TO CHANGE THIS ORDER. The Director of Automation Service may issue changes to this order necessary to implement the project.

7. REQUESTS FOR INFORMATION. If further information or clarification is required, contact the Acting Program Manager, En Route Automation Program, AAP-310, FTS 267-8347. *Branch*

8.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS. The implementation of the third level of weather, along with changes to the existing radar signal thresholds at which each weather graphic is activated, is designed to aid controllers in assisting pilots to avoid hazardous weather areas. The levels will be represented by radial lines; by M's and by H's. Minimal changes will occur in the collection, processing, and display of en route weather as compared to the way such weather is provided today. Those changes that have been made or are in the process of being made include: modification of software in the central computer complex host (CCCH), the computer display channel (CDC) and the display channel complex (DCC), the direct access radar channel (DARC) and the en route automated radar tracking system (EARTS) to accept three levels of weather from the CD-2 and ARSR-3 systems. In addition, the common digitizer, model 2 (CD-2) and air route surveillance radar, model 3 (ARSR-3) systems will be modified to provide the capability of processing and transmitting three levels of weather to the ARTCCs.

- * The 3LW function is scheduled to be included in the en route operational software version A4e0.3, DARC operational software version RAK04, and EARTS software version A4.06. These versions are currently planned for release to the field in 1989 and 1990. Subsequent ARTCC implementation of 3LW will occur after the CD-2s and ARSR-3s that feed the centers are modified to output weather data in three levels.

This order covers the implementation of software changes to the central computer complex, version A4e0.3; the computer display channel, version DAIO4; the display channel complex, version EAK 01, DARC version RAK04, and EARTS version A4.06 to provide 3LW function. It also covers, in a general way, changes to the CD-2s and ARSR-3s to output three levels of weather. The useful life of the 3LW function is dependent upon the implementation of next generation weather radar (NEXRAD) data onto the ARTCC displays, currently scheduled to begin in 1995.

*

21. PURPOSE. The addition of the 3LW to the existing two levels of weather on air traffic controllers en route plan view displays (PVD) will aid in identifying those precipitation areas in the en route control environment that are potentially hazardous to National Airspace System users. Approximately 130 radar weather outputs will be affected by the change from two-level to three-level weather. The radars provide precipitation intensity data (weather) to ARTCCs in the form of narrowband (digital) information relayed through communication links to ARTCC data receiver groups (DRG). These weather data are then processed through the HOST or DARC computers and the display subsystems for subsequent presentation on controllers' displays along with aircraft data blocks and other control or aeronautical information. On the current displays, narrowband weather is presented as lines through precipitation areas of low intensity and H's surrounding areas of comparatively high intensity. The current method for presenting weather will be changed to provide better discrimination between potentially hazardous and non-hazardous

weather areas. The addition of a middle, or moderate, level of weather intensity, represented by M's, will provide controllers with an opportunity to monitor all three levels of weather intensity simultaneously, or any one or more levels as they choose. In order to reduce the clutter generated by the simultaneous presentation of lines, M's and H's, the precipitation intensity threshold for the activation of the H's will be different from that in use in the current system. The H's will appear at intensities near 3.5 on a weather severity scale of one to six.* The M's, or moderate intensities, will appear at 2.5 on the same one to six scale. The lines will identify those precipitation intensities below 2.5.

22. HISTORY. Not applicable (N/A).

23.-29. RESERVED.

*See Appendix 1 for NAS Configuration Control Decision and NAS Change Proposal 8102 "Weather Display Thresholds for Three-Level Weather," September 9, 1985.

CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION. Radar data are collected on aircraft and weather targets for the NAS en route system by approximately 120 long range radars (LRR) and 10 terminal radars (ASR) throughout the 50 states and overseas. All of those radars have attendant common digitizers (CD), with the exception of ARSR-3s which have their own internal digitizers, whose function it is to convert analog radar data into digital. Those data are then processed, packaged, and buffered at the radar sites prior to being forwarded to the ARTCC via land lines or microwave links.

Regardless of the type of radar, weather data are currently obtained on alternate radar antenna scans with the refresh cycle beginning once every 12 scans or up to two minutes. 3LW will change this update interval to once every 9 scans for a nominal refresh rate of every 1.5 minutes. This is done by changing the weather data gathering sequence within the radar processing subsystems.

The data link between nearly all radar sites and ARTCCs consists of 14.4k baud of multiplexed lines. However, weather messages from the radar sites are limited to 200 per radar scan or 32 messages per second. After individual radar site weather data have passed through the ARTCC DRG, they are separated from control data and forwarded to the host computer via the peripheral adapter modules and to the DARC computer via the DARC radar multiplexor. After the weather data are processed in the CCCH or DARC they are forwarded, on a priority basis, to the display subsystem - either the computer display channel or the display channel complex. In those systems the weather data are buffered until the next display channel refresh cycle calls for new data. Within either of those display subsystems, commands are generated to begin and end lines or H's on azimuth change pulses according to the messages received from the CCCH or DARC. 3LW will add M's to the lines and H's.

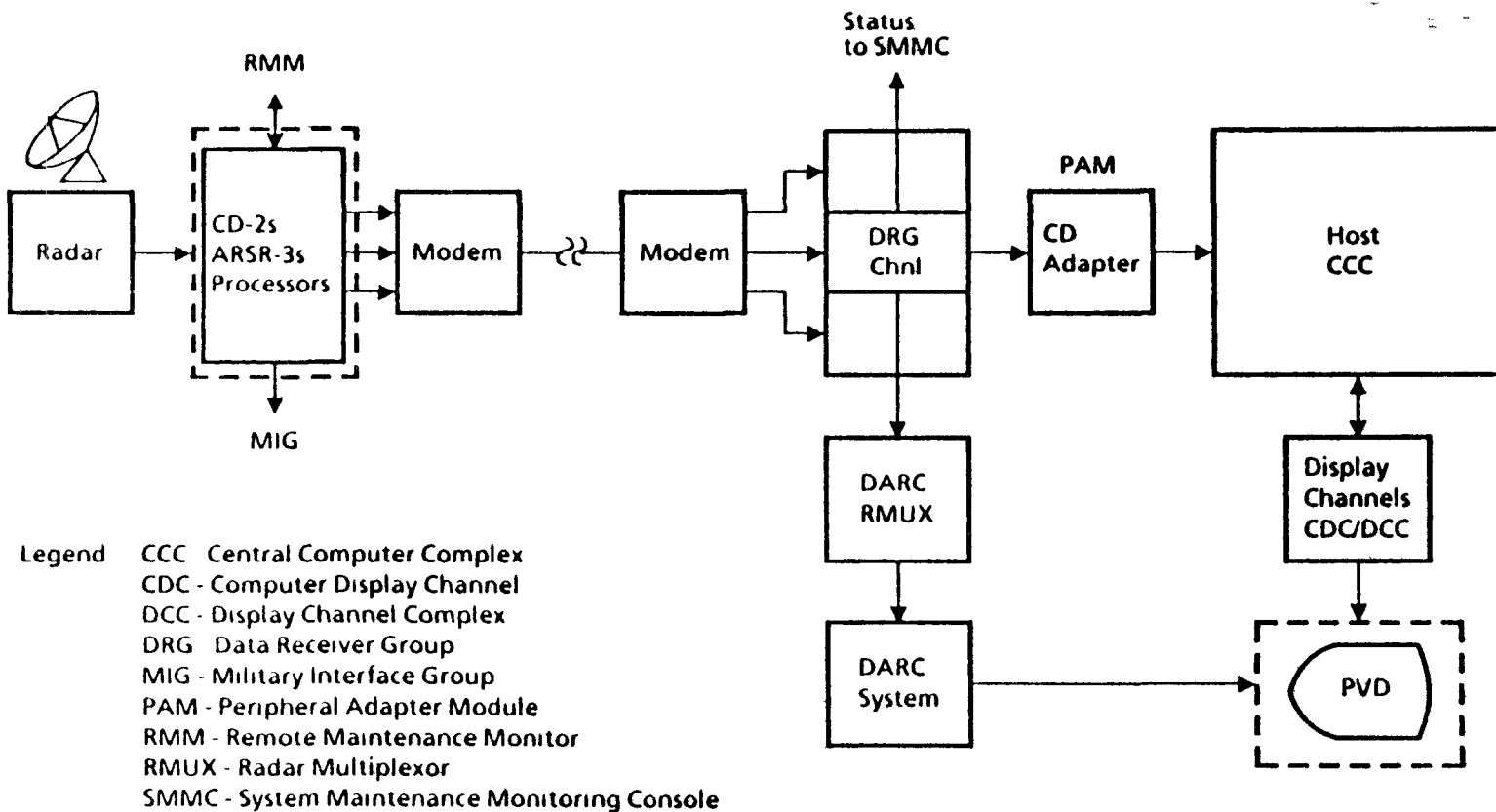
Outputs from the CDC/DCC are passed to a display generator, and weather scenarios appear and disappear on the controller's PVD in appropriate graphics as refresh commands dictate. In the upper middle-left or right-hand area of the controller's display console are 28 filter keys which are used to control some of the data that appear on the PVD.

It will be through these keys that low, medium, and high weather intensity levels can be selected for display on the associated PVD. The location of the 3LW weather filter keys will be the same for DARC as they are for the NAS (prime channel) operation.

Brightness controls, range resolution controls, and weather data offsets remain as before. Descriptions of how the weather data are collected, processed, formatted, and transmitted from LRRs are contained in the CD-2, ARSR-3, and radar site modem specifications and instruction books. Figure 3-1 is a schematic of how weather data are obtained from the long-range radar sites, and are processed and forwarded to the ARTCC plan view displays. A similar type processing is used for Centers that employ EARTS software.

Figure 3-2 contains the concept of 3LW as seen on a plan view display.

FIGURE 3-1. NAS/DARC 3LW SYSTEM



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FIGURE 3-2. DEPICTION OF 3LW ON A PLAN VIEW DISPLAY

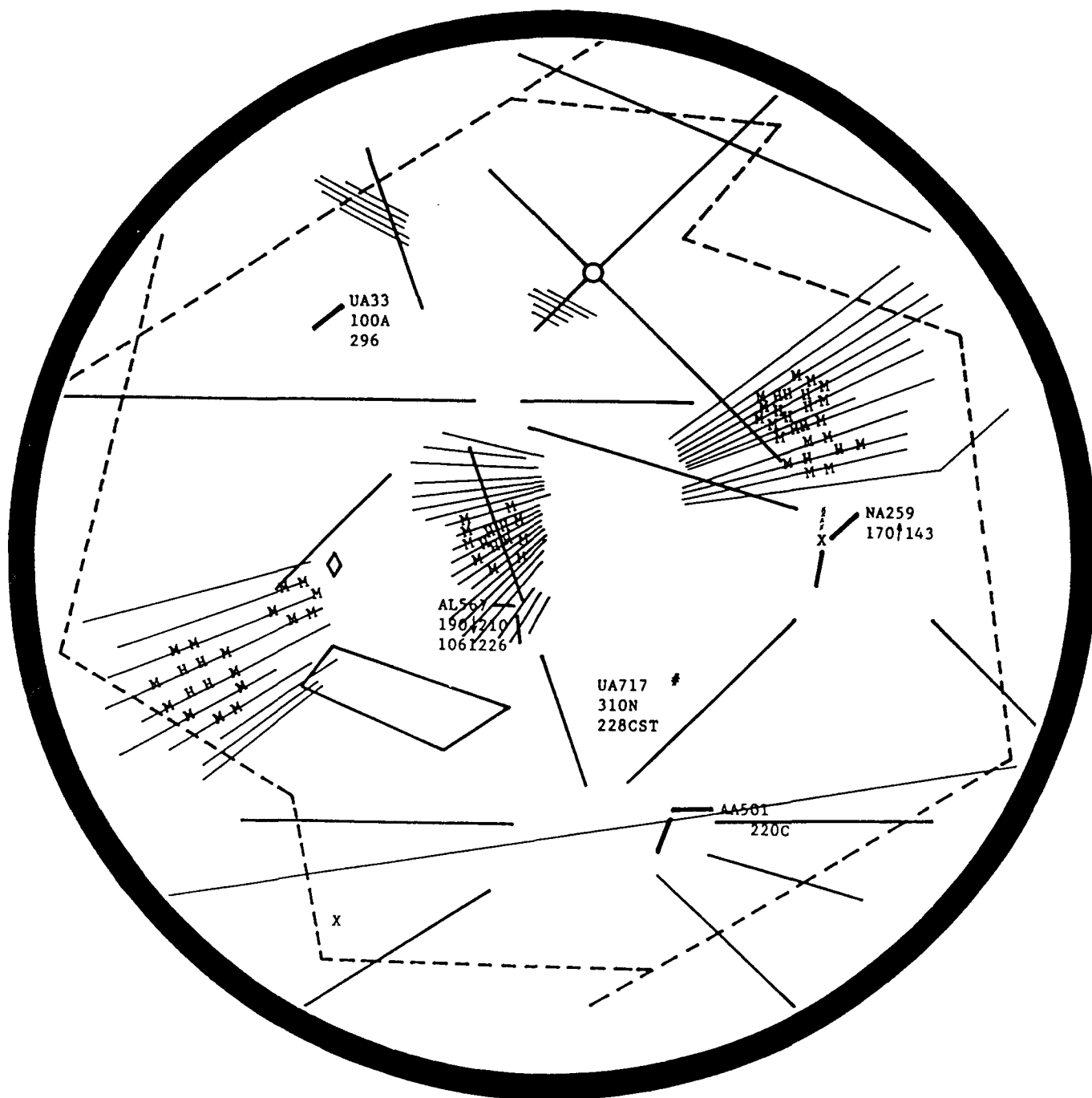


Figure 3-3 shows the recommended location of the third filter key for both NAS and DARC operation modes. The new alignment then becomes Weather I (lines); Weather II (M's), and Weather III (H's).

31. PHYSICAL DESCRIPTION. Using Figure 3-1 and moving from left to right, this section describes those NAS/DARC 3LW system physical components that are to be replaced or modified to implement the 3LW function.

- * a. Radars. The only radars being modified for 3LW are the ARSR-3's. The major changes to the ARSR-3's for 3LW follow.

(1) General. The weather collection and processing in the ARSR-3 provides any one of six selectable intensity levels of weather on any radar antenna scan or sequence of antenna scans. The weather intensity level and scanning sequence is currently on-site selectable from the weather map processor. The current two-level weather scan sequence is 101010202020 and then repeated. The one (1) represents low intensity weather and the two (2) represents high intensity weather. The zeros are scans on which there is no weather collected. The three-level weather scanning sequence will be 111222333 and then repeated. One (1) will be low intensity weather. Two (2) will be medium intensity weather and three (3) will be high intensity weather. Should a different sequence of scans or number of weather intensity levels be required after modification of the radar they can be made by selections from the weather map processor, initially on site and later by the RMM system. *

(2) ARSR-3 Component Changes. To accommodate the 3LW function, the ARSR-3's will have replaced or modified:

(a) The Intel bit slice processors in the target correlator and formatter by new micro-processors.

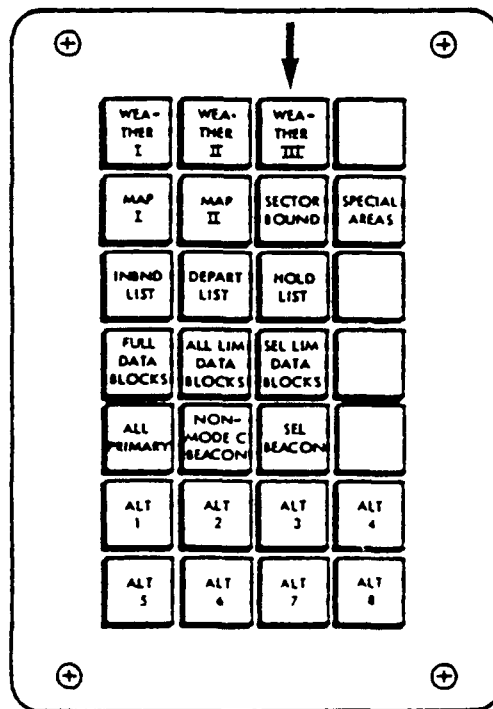
(b) Components within the radio frequency hardware system. There will be a receive-only channel for weather returns extracted from the low beam receive path. This requires installing a new coupler and anti-transmit receive/transmit tube in the radar wave guide. The preceding will allow the ARSR-3 to have an exclusive weather detection, processing, and reporting capability. The channel assigned to weather detection will permit application of a weather sensitivity timing curve, $1/R^2$ (one over R squared), to aid in improved normalization of close in weather returns.

(c) Receiver interface control cabinet.

(d) Digital target extractor cabinet.

(e) Receiver processor cabinet.

b. Radar Processors. The ARSR-3 microprocessors and cancellation filters are being replaced by state-of-the-art technology to reduce supply support costs and increased component reliability. The CD-2 processors will remain essentially the same, but the software and firmware will be changed.

FIGURE 3-3 RECOMMENDED 3LW FILTER KEY LOCATION

c. Modems. There are no planned changes for 3LW in the send or receive modems.

d. Data Receiver Channels. There are no planned changes for 3LW in the data receiver channels.

e. Peripheral Adaptor Module and DARC Radar Multiplexor. There are no planned changes for 3LW in these components.

f. Host/DARC/Display Channels. Current software for these processors will be modified to accommodate the 3LW function.

32. SYSTEM REQUIREMENTS. 3LW weather imposes no additional requirements for power, reliability, maintainability or interdependency on existing hardware or software that do not already exist.

33. INTERFACES. 3LW implementation requires no additional interfaces. There are no new interface control documents for 3LW.

34.-39. RESERVED.

CHAPTER 4. PROJECT SCHEDULES AND STATUS

40. PROJECT SCHEDULES AND GENERAL STATUS.

a. NAS Program Statusing and Baseline Schedule. This baseline schedule tracks the 3LW level 1 (AND-2) and level 2 (AAP-1) milestones by which the project reports to higher management. The 3LW schedule is reviewed monthly by the NAS Program Status Review Board (PSRB). It is updated as milestones are completed or as changes become apparent. Procedures for changing the baseline schedule are described in NAS Project Statusing and Baseline Schedule Change Control Procedures.

b. 3LW Project Schedule. This schedule concerns milestones that are of interest to the 3LW project manager and supplement those reported on to the PSRB. This schedule is updated as required.

c. 3LW Master Test Plan Activities Schedule. This schedule contains milestones relevant to 3LW tests and evaluations. It parallels the schedules in paragraphs (a) and (b) above and will be updated as required.

d. Implementation Schedules. The 3LW implementation schedule includes deployment schedules and operational testing for software and hardware, installation and site acceptance testing, logistics planning milestones and operational readiness dates (ORD). They are summarized below in Table 4-1.

TABLE 4-1 3LW IMPLEMENTATION SCHEDULES SUMMARY

• 3LW Master Test Plan Schedule (6-16)	Figure 4-1
• 3LW Deployment Summary	Table 7-1
• Combined ARSR-3/3LW Modification Kit and CD-2/RMM/3LW EEM Kit Radar Site Delivery Schedules and 3LW ORD Schedule	Appendix 3
• 3LW Logistics Planning Schedule	Table 9-1

*

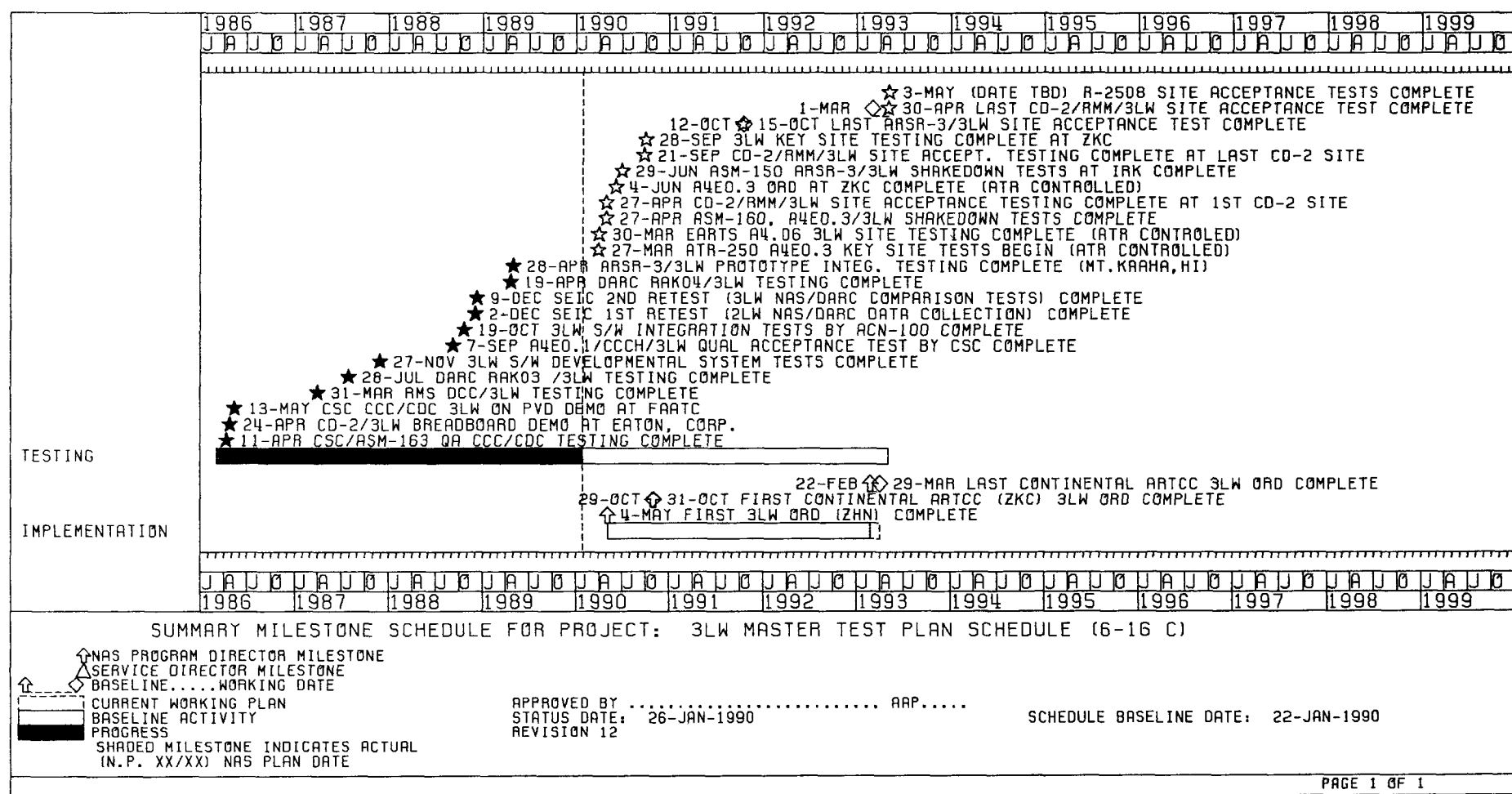
41. PSRB MILESTONE SCHEDULE SUMMARY. These data are provided in Appendix 2.

42. INTERDEPENDENCIES AND SEQUENCE. The implementation of 3LW as presented in this order requires that certain other NAS software and systems be operational prior to the start of 3LW implementation.

- * a. A4e0.3 Software. Initially, A4e0.3 software, with the 3LW function, will be used to evaluate the weather outputs from ARSR-3/3LW and prototype CD-2/RMM/3LW equipment. It is then required for 3LW/Key Site testing at the Kansas City ARTCC (ZKC) and subsequent ORD's beginning with ZKC in October 1990. A4e0.3 is currently scheduled for national release in March 1990.
- b. DARC/RAK04/3LW Software. This software with the 3LW function is currently being implemented. In June 1990 and beyond, it will be essential for ARSR-3/3LW output evaluation and 3LW Key Site testing and ORD's.
- c. EARTS/A4.06/3LW Software. This software containing the 3LW processing has been deployed. It is required to evaluate outputs from the Kenai, AK, and Pico del Este, PR radars. It is also essential for ORD's at the Honolulu, Anchorage, and San Juan ARTCC's.
- d. ARSR-3/3LW Hardware. ARSR-3/3LW hardware outputs are required to test the 3LW function in A4e0.3 and DARC/RAK04/3LW.
- e. CD-2/RMM/3LW Hardware. 3LW outputs from both versions CD-2A/C and CD-2D are required to evaluate 3LW software changes and upgrades. CD-2/3LW outputs from the FAA Technical Center laboratory CD-2 equipment were used in the testing of A4e0.1/3LW, A4e0.3/3LW, DARC/RAK/3LW, and EARTS/3LW. CD-2/RMM/3LW production kit outputs must be available for the 3LW Key Site tests and all subsequent 3LW ORD's.
- f. A brief summary of major test events for operational implementation of 3LW are presented in Figure 4-1. A more complete description of 3LW testing is contained in the 3LW Master Test Plan.
43. 3LW KEY SITE. The Kansas City, MO ARTCC has been selected by the Air Traffic Operations Service as the 3LW Key Site. Testing is currently scheduled to begin on or about 28 September 1990.
44. FIRST CONUS 3LW ORD. The Kansas City ARTCC is also the site of the first CONUS 3LW ORD and currently scheduled to begin 26 October, 1990. The remainder of the 3LW ORDs are provided by ARTCC in Appendix 3 at the end of ARSR-3/3LW and CD-2/RMM/3LW modification kit delivery data. 3LW ORDs are scheduled to be completed by the last Monday of the months listed.
- 45.-49. RESERVED.

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FIGURE 4-1. 3LW IMPLEMENTATION TEST ACTIVITIES SCHEDULE



CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. The technical management of the 3LW project is the responsibility of the Air Traffic Control Automation Division, AAP-300 and, in particular, the En Route Automation Branch, AAP-310. This organization manages the 3LW project within the guidelines provided by FAA policies, directives, and established procedures. The Branch Manager, AAP-310, is the 3LW Program Manager and is the focal point for all program activities. The Project Manager is responsible for overall day-to-day management of 3LW. This position is currently vacant.

51. PROJECT CONTACTS. The personnel directly involved with the 3LW project at FAA Headquarters are listed below. Additional personnel, involved with 3LW are listed in Appendix 4.

* Name	Function	Organization	
Delois Smith	Acting Manager	En Route Automation Branch, AAP-310	
Jack Neuberger	Project Manager	EARTS Enhancements, AAP-310	
Jim Reed	Project Manager ARSR-3/3LW	Radar Program, APS-310	
Ted Weyrauch	Project Manager CD-2/RMM/3LW	Radar Program, APS-310	
Ardy Williams	3LW Coordinator	Terminal-Enroute Branch, ATR-123.3	
Harold Chasin	3LW Coordinator	Control Systems Branch, ATR-210	
Amado Colberg	3LW Coordinator	En Route Procedures Branch, ATO-336	
Rich Acosta	Manager	ATC Training Requirements and Certification, AAT-14	
Frank Coons	Acting Project Manager and 3LW Project Support	ATC En Route Automation Systems, SEI Contractor	*

52. PROJECT COORDINATION. The following 3LW elements and NAS operating areas require coordination for implementation purposes.

a. Host Computer Software. AAP-310 has provided a tested and approved version of A4e0.1/3LW to ATR-250 for subsequent integration testing and deployment to the field in A4e0.3.

ACN-100 (Automation Division) has tested the CCCH/3LW in the A4e0.1 version along with DARC/3LW and associated CDC/3LW and DCC/3LW display subsystems. Both A4e0.3/3LW and DARC/RAK04 will contain the patch described in paragraph 102. Integration Testing was accomplished at the FAA Technical Center with output from the CD-2/RMM/3LW prototype modification.

b. DARC Computer Software. The National Automation Engineering Field Support Division, ASM-400, is responsible for deployment and implementation of DARC/RAK04/3LW. ASM-400 has coordinated with ATR-250 on the appropriate delivery and release dates to ZKC and the remainder of the ARTCCs.

c. CDC Software. ASM-400 is responsible for the deployment and implementation of DAI 0400/3LW and will coordinate as in b above.

d. DCC Software. ASM-400 is also responsible for the deployment and implementation of EAK 01D1/3LW and will coordinate as in b above.

* e. EARTS/A4.06/3LW. AAP-310 has been responsible for the development and testing of EARTS/4.05I/3LW at the Honolulu ARTCC. ATR-200 is responsible for the deployment of the latest operating revision A4.06/3LW. Key site testing of that revision is scheduled for February/March 1990 at the Anchorage ARTCC. ORD's of A4.06 are still being planned for those remaining ARTCC's that utilize EARTS software and are the responsibility of the EARTS Project Manager.

f. ARSR-3/3LW. APS-310, through ACE-400 (lead Region concept), is responsible for the deployment, testing, and implementation of the ARSR-3/3LW modifications. AAP-310 will coordinate with APS-310, ACE-400, and ASM-630, on relevant 3LW Project elements. ASM-630 (Radar Systems Engineering Branch) is responsible for the ARSR-3/3LW modification kit Shakedown Test Plan and initial Shakedown test of the first CONUS ARSR-3/3LW modification at Kirksville, MO. FAA respective regional/sec or Airways Facilities personnel will conduct the remaining ARSR-3/3LW modification shakedown testing using the plan provided by ASM-630. *

g. CD-2/RMM/3LW. APS-310 is responsible for the testing, deployment, and implementation of CD-2/RMM/3LW EEM kits. AAP-310 will coordinate with APS-310 who in turn will coordinate with ASM-400 and the CD-2 Contractor on the project elements. ASM-400 is responsible for shakedown testing of CD-2/RMM/3LW EEM kits prior to full field deployment of and will coordinate with APS-310 on the test plans and schedules.

53. PROJECT RESPONSIBILITY MATRIX.

*	a. <u>SOFTWARE</u>	<u>MAJOR ACTIONS</u>	<u>ATO-300</u>	<u>ASM-400</u>	<u>CONTR</u>
			<u>ATR-200</u>		
	• <u>EARTS/A4.06/3LW</u>	Deployed	Maintains		
	• <u>A4e0.3/3LW</u>	Integration Testing	X		Assists
		Shakedown Testing		X	
		Documentation		X	X
		Deployment & Maintenance	X		
	• <u>DARC RAK04/3LW</u>	Shakedown Testing		X	
		Documentation		X	X
		Deployment & Maintenance		X	
	• <u>CDC & DCC/3LW</u>	Deployed		X-Maintains	
	b. <u>HARDWARE</u>	<u>MAJOR ACTIONS</u>	<u>APS-300</u> <u>ACE-400</u>	<u>ASM-630 (1)</u> <u>ASM-400 (2)</u>	<u>FAA</u> <u>REGIONS</u>
	• <u>ARSR-3/3LW</u>	Mod Kit Deployment	X		
	Install, Checkout, Document, Spares & Training Materials		X	INSTALL- ONLY	X
		Shakedown Tests		X(1)	X
	• <u>CD-2/RMM/3LW</u>	EEM Kit Deployment	X- Contractor		FAA Depot
	Install, Checkout, Document, Spares & Training Materials		X- Contractor	INSTALL- ONLY	X
		Shakedown Tests		X(2)	X
	c. <u>ATC TRAINING MATERIALS/3LW</u>		<u>ATO-300</u>		<u>OTHER</u>
		Provides	X		AAT-14
		Accomplishes	FAA Academy & Regions		
	d. <u>ASE-220</u>	Provides Configuration Management for all 3LW project components.			

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54. PROJECT MANAGERIAL COMMUNICATIONS.

* a. Headquarters Project Management. In accordance with the October 1988 AAP-300/APS-300 "Three Level Weather for ARTCC Displays (3LW) Project Management Memorandum of Understanding", "AAP-300 has been assigned overall management responsibility for the development, testing, and implementation of the 3LW software. APS-300 has been assigned management responsibility for the modification of the ARSR-3's and CD-2's to output 3LW." APS-300 will have overall management responsibility of 3LW "upon completion of the first ORD in CONUS." Physical transfer of software to the field will be by site program bulletins. The implementation of 3LW modifications into the ARSR-3's will be through a letter agreement between APS-300 and the FAA Central Region. The implementation of CD-2/RMM/3LW EEM kits in the field will be by contract between the FAA and the CD-2 contractor and through APS-300 agreement with the FAA Regions. *

b. Regional Project Management. The FAA regions have each designated a 3LW Regional Project Coordinator (RPC). The RPC is responsible for coordinating 3LW-related software and hardware deployment as well as implementation schedules with regional ARTCCs, individual radar sites, and the FAA Depot. The RPC will arrange for appointment of a 3LW technical representative at each ARTCC.

c. ARTCC Project Management. An ARTCC 3LW technical representative (TR) will be appointed by the center manager, and will have overall responsibility for management of the 3LW implementation within the ARTCC. This will require coordination of local training on 3LW interpretation and reporting of any problems encountered with 3LW implementation to the RPC and 3LW-related software problems to ATR-250 and ASM-400.

d. FAA Technical Center Project Management. The FAA Technical Center has played a major role in testing of the software for 3LW and will assist in the testing of CD-2s in shakedown and key site testing in the field. A test Director/Coordinator will be designated from ASM-400 to serve as the lead for shakedown testing. Each organization's test representative will coordinate test activities at the FAA Technical Center to meet responsibilities and schedules provided in the 3LW Master Test Plan, Revision 2.

e. FAA Aeronautical Center Management. A representative from the National Engineering Field Support Division (ASM-600) will be appointed as contact for coordination of ARSR-3/3LW technical interchange meetings and shakedown testing. This representative will coordinate his activities with the AAP-310, the APS-310 ARSR-3 Project Manager, the Central Region Establishment Engineering Branch (ACE-450), and the ARSR-3/3LW Project Engineer (ACE-454).

55. IMPLEMENTATION STAFFING. No additional ARTCC staffing has been identified during the 3LW transition period.

56. PLANS AND REPORTS. The 3LW Master Test Plan provides supporting data on the implementation of 3LW. No new or additional reports are required to implement 3LW.

57. APPLICABLE DOCUMENTS. The following is a listing of 3LW project-related documents. They provide information, policy, and directives applicable to 3LW implementation. Any conflicts between these and other regional guidance should be referred to the 3LW Project Manager for resolution.

* a. FAA Specification.

FAA-E-2483b Air Route Surveillance Radar - Model 3

FAA-E-2679a Common Digitizer-2 (CD), and Amend-1,
Specification change -2

b. FAA Standards.

FAA-STD-019a Lightning Protection Grounding, Bonding
and Shielding Requirements for Facilities

FAA-STD-024a Preparation of Test and Evaluation
Documentation

FAA-STD-036 Preparation of Project Implementation Plans

c. FAA Orders.

FAA Order 1320.1C FAA Directives System

FAA Order 1810.4A FAA NAS Test and Evaluation Program

FAA Order 1800.58 National Airspace Integrated Logistics
Support Policy

FAA Order 4800.2A Utilization and Disposal of Excess Surplus
Personal Property

FAA Order 7350.5 Location Identification (LOCIDS)

d. FAA Technical Instruction Books.

TI 6340.22 ARSR-3/3LW Instruction Book (available May
1990)

TI 6340.8 ARSR-3 System, Type FA-9200

TI 6340.13A ARSR-3 Standards and Tolerances

TI 6350.18 CD-2 Instruction Book

TRACS Transportable Radar Analysis Computer
System Instruction Book

e. Other Applicable Documents.

*	SM-88-001	National Airspace System Training Plan	
		NAILS Implementation Guide, February 1989	
		NAILS Master Plan, March 1978	
	AAP-310 3LW Master Test Plan, Revision No. 2	Three Level Weather for ARTCC Displays (3LW), October 1989	
	SEIC	Test Report for the 3LW Integration Retest, January 1989	
	AAP-300 MOU	Three Level Weather for ARTCC Displays (3LW) Project Management Memorandum of Understanding, October 1988	*

58.-59. RESERVED.

CHAPTER 6. PROJECT FUNDING

60. PROJECT FUNDING STATUS. The 3LW project is funded primarily with FAA Facilities and Equipment appropriations. Funds have been allocated to the FAA Technical Center, the FAA Central Region, and selected contractors through fiscal year 1989. Fiscal year funding in 1990 and beyond has been requested to complete hardware implementation. Project Authorizations for fiscal year 1990 for ARSR-3 related tasks are scheduled to be released by April 30, 1990. A list of active 3LW related contracts and their contract technical officers is provided in Appendix 5.

61.-69. RESERVED.

CHAPTER 7. DEPLOYMENT

- * 70. GENERAL DEPLOYMENT ASPECTS. There are two areas of deployment to be addressed in the following paragraphs of this chapter. The 3LW-related software changes are scheduled to be part of the NAS and DARC operational software that will be in use by 1990 and thereafter. The 3LW-related hardware changes are being integrated with remote maintenance monitoring (RMM) changes in the CD-2 A, B, C, and D models. In the CD-2, 3LW and RMM will be deployed together within the same printed-circuit boards and associated electronic components, software programs, and CD-2 firmware. In the ARSR-3s, 3LW and RMM are being developed, tested, and deployed separately. The 3LW Deployment Readiness (DRR) process has been initiated on ARSR-3/3LW. Milestones for DRR activities will be added to the 3LW PSRB Summary Milestone Schedule as deployment schedules become firm. The CD-2/RMM/3LW DRR process has not yet started. *

a. 3LW SOFTWARE DEPLOYMENT.

(1) General Software Deployment. Air Traffic Plans and Requirements Service, Automation Software Division, ATR-200, manages the testing and deployment of national software builds. The 3LW function is scheduled to be contained in changes to the CCCH software which is A4e0.3. Changes to subsystems computer software for CDC, DCC, and DARC are managed and issued as they are adopted by ASM-400 in cooperation with ATR-250. Deployment of NAS and DARC national builds will be by site technical bulletin. EARTS deployment will be by site technical bulletin released by ATR-245.

(2) 3LW in CCCH. 3LW was initially tested in 9020 version A3d2.14 and retested in A4e0.1. It has been included in A4e0.3 for testing of 3LW software with outputs from ARSR-3's and CD-2's modified for 3LW. Deployment of A4e0.3/3LW is currently schedule for March 1990.

(3) 3LW in DARC. 3LW will be contained in the DARC software version RAK04 which is scheduled to be available for operational use in parallel with A4e0.3. Version RAK04 is currently being implemented nationwide.

(4) 3LW in CDC. 3LW was tested in CDC software version DAH 0.29 and will be available in version DAI 0400 for deployment after retesting with CCCH.

(5) 3LW in DCC. 3LW was tested in DCC version EAI 03 and will be available for deployment in version EAK 01D1 after retesting with CCCH.

(6) 3LW in EARTS. 3LW was tested in build A4.05I and is scheduled for deployment to ZAN and subsequent sites in version A4.06.

(7) 3LW Software Deployment Schedules. The release of national software versions containing the 3LW function is controlled by ATR-250 and ASM-400. The exact release dates of new and changed functions within each 3LW software package are still being coordinated. Those ARTCC's affected (all) will be notified by Air Traffic Service sufficiently far enough in advance to permit necessary preparations.

b. 3LW HARDWARE DEPLOYMENT. Deployment of ARSR-3/3LW modifications will be by FAA Central Region and support installation and check-out teams. Deployment of CD-2/RMM/3LW EEM kits will be by the contractor. Installation and checkout of CD-2/RMM/3LW EEM kits will be by FAA Regional Airway Facilities personnel and the contractor.

(1) ARSR-3/3LW. There are 23 standard ARSR-3 facilities and 4 mobile enroute radar facilities (ARSR-3 MERF) that require modification (FAA Academy system included).

- * ARSR-3/3LW modification kits will be deployed by the FAA Central Region for CONUS radar sites beginning in April 1990. Operational checkout (site acceptance testing) of the first CONUS site (Kirksville, MO) is scheduled to be completed by July 1990. Modifications and checkouts are scheduled to be made by ACE-400 trained teams which are currently to be composed of FAA Airway Facilities personnel. Delivery schedules for both ARSR-3/3LW and CD-2/RMM/3LW modification kits are provided in Appendix 3. Completion of all ARSR-3/3LW modifications is currently scheduled for September 1991.

(2) CD-2/RMM/3LW. The current plan is for direct delivery of EEM kits from the contractor's facility to the FAA Depot for subsequent deployment to radar sites. There are 127 CD-2's to be modified. FAA personnel will install the delivered EEM kits on commissioned CD-2's. Contractor personnel will install the EEM kits on non-commissioned CD-2's. Initial deployment is scheduled for April 1990 to one of the non-commissioned six radar sites that provide data to ZKC. Completion of all CD-2/RMM/3LW modifications is currently scheduled for March 1993.

*

71. SITE PREPARATION.

a. 3LW Software. There are no special site preparations required to implement the 3LW software.

b. 3LW Hardware.

(1) ARSR-3/3LW. Prior to the arrival of the retrofit team, relevant premodification activities must be completed. Premodification of the standard ARSR-3 facilities will consist of compliance with FAA Standard 019a on equipment grounding and operational checkout and performance verification (for example see TI 6340.13A, ARSR-3 Standard and Tolerances). Performance verification must be conducted by site and servicing Airway Facilities personnel, and out-of-tolerance and marginal performance problems must be corrected. Results of verification and corrective measures taken, if any, will be made available to the ARSR-3 modification team prior to commencing retrofit activities.

(2) CD-2/RMM/3LW. The same process as described in 71.b.(1) above is required at commissioned sites for the CD-2 retrofits. At non-commissioned CD-2 sites, the contractor is responsible for premodification verification of CD-2 equipment status and correction of performance problems.

72. DELIVERY.

a. 3LW Software. 3LW software will be delivered by site technical bulletins. Additional 3LW software delivery data are provided in paragraph 70.a.(1) through (7).

b. 3LW Hardware. The planned delivery dates of the ARSR-3/3LW modification kits and CD-2/RMM/3LW EEM kits, with spares, are provided in Appendix 3. It contains the site name, LOCIDS, type of radar, type of CD-2 kit (A, C, and D only) and the FAA region that controls the radar site.

73. INSTALLATION PLAN.

a. ARSR-3/3LW. Two teams will complete the ARSR-3/3LW modification kit installations. An estimated three weeks on site are required at each radar facility. The ARSR-3 schedule sequence was selected to proceed with respect to ARTCC geographical coverage where possible. Additional consideration was given to seasonal installations to circumvent logistics problems and inordinate delays that will arise if northern site retrofits are attempted during the winter season.

During the 3-week on-site period, simplex-only radar service will be available. One radar channel will receive the retrofit installation and operational checkout during the first 7 days on site. The retrofit includes wire changes to the receiver processor and digital target extractor bucket backplanes; installation of new/modified circuit cards; and the installation of new RF wave guide components, associated cabling, and hardware. Testing of the retrofit will be accomplished using the transportable radar analysis computer system (TRACS). Subsequent to the simplex channel performance verification, the other channel will be modified. Once both channels have been modified and duplex performance has been verified, FAA site and ARTCC personnel must re-certify the ARSR-3 radar data acquisition subsystem for use in NAS. A several week staggering of the site installations is necessary to accommodate the transit time for the TRACS and analysis personnel.

* b. CD-2/RMM/3LW. The site installation plan for commissioned and non-commissioned CD-2 sites is being developed by APS-310 and will be available after the award of a 30 CD-2/RMM/3LW EEM kit production contract which is scheduled for February 1990. The EEM kit delivery schedule provided in Appendix 3 after February 1990 is predicated on award of a 100 EEM kit production contract by September 1990. CD-2/RMM/3LW EEM kits will nominally arrive at the radar sites 60 days prior to ORD at the primary control ARTCC. *

74. DEPLOYMENT SUMMARY. A summary of major deployment activities is contained in Table 7-1.

Table 7-1 3LW Deployment Summary

*	<u>Software</u>	<u>Deployment Date</u>
	A4e0.3/3LW	March 1990
	DARC/RAK04/3LW	Deployed
	CDC-DAI	Deployed
	DCC-EAI	Deployed
	EARTS-A4.06/3LW	Deployed and being tested
	<u>Hardware</u>	
	ARSR-3/3LW	April 1990 - September 1991
	CD-2/RMM/3LW	April 1990 - December 1990
		March 1992 - March 1993

75.-79. RESERVED.

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CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION.

* a. 3LW Software. Contractor and FAA developed software for 3LW was or is being tested by ACN-100, ASM-400, and ATR-250 at the FAA Technical Center prior to field deployment. These tests include individual software component tests for CCCH/3LW in A4e0.3, DARC/RAK04/3LW, along with supporting operational CDC/3LW and DCC/3LW software. Integration testing of all the above 3LW-related software components with 3LW output from the FAA Technical Center Elwood radar fitted with the prototype CD-2A/C/RMM/3LW EEM kit is also underway.

b. 3LW Hardware.

(1) ARSR-3/3LW. The FAA Central Region, acting in the contractor equivalent role, will perform production test and evaluations on ARSR-3/3LW modification kits prior to their release for shipment to sites listed in Appendix 3. Test procedures for the above will be approved by APS-310 and available by April 1990.

(2) CD-2/RMM/3LW. Factory testing of CD-2/RMM/3LW EEM kits prior to shipment to radar sites or the FAA Depot will be as defined in Phase III of the CD-2/RMM/3LW production kit contract modification with Telephonics Instruments Company, Inc. The contractor's factory test plan and procedures for production test and evaluations will be available in March 1990.

81. CHECKOUT.

a. ARSR-3/3LW radar site testing of the modification kits will be conducted using TRACS. Testing plans and procedures will be available as in 80.b.(1) above.

b. CD-2/RMM/3LW radar site checkout plans and procedures will be provided by CD-2 Contractor for approval of APS-310 and ASM-400 by April 1990.

82. CONTRACTOR INTEGRATION TESTING. The roll of the CD-2/RMM/3LW EEM kit contractor in integration testing at the radar sites will be as defined in the Phase III CD-2/RMM/3LW EEM 30 production kit contract modification.

83. CONTRACTOR ACCEPTANCE INSPECTION (CAI). For the CD-2/RMM/3LW EEM kits, a FAA Quality and Reliability Officer (QRO) is located at the contractor's plant (production, testing, and shipping facility). The QRO will provide the FAA required inspection and acceptance approval for EEM kits prior to shipment.

84. FAA INTEGRATION TESTING.

a. 3LW Software. ATR-250 will perform Integration Testing on 3LW software prior to release to the field.

*

- * b. 3LW Hardware. The ARSR-3/3LW modification kit (retrofit) integration testing was performed by ACE-400 at the prototype facility (Kansas City MERF site). The first production facility modification kit will be tested on the Kirksville, MO ARSR-3. The remaining integration testing will be conducted by the installation teams and regional/sector personnel.

85. SHAKEDOWN AND CHANGEOVER.

a. Software (A4e0.3). Shakedown testing will be performed by ATR-250 with contractor support at the FAA Technical Center.

b. DARC/RAK04. Shakedown testing of the version of DARC/RAK04 containing the two-level and three-level weather processing functions has been performed by ASM-400 in cooperation with ATR-250.

c. EARTS/A4.05. Shakedown testing of version "H" was performed by ATR-245 with UNISYS contractor support in the FAA technical Center. Version A4.06 will undergo shakedown testing at Anchorage, AK ARTCC.

d. Hardware.

(1) ARSR-3/3LW. Shakedown testing will be performed by ASM-630.

(2) CD-2/RMM/3LW. Shakedown testing will be performed by ASM-400.

86. JOINT ACCEPTANCE INSPECTION (JAI). The requirements for a JAI in accordance with FAA Order 6020.2A and FAA Order 6030.45 are under evaluation and a decision on chair applicability will be made by April 1990.

87.-89. RESERVED.

CHAPTER 9. INTEGRATION LOGISTICS SUPPORT

90. MAINTENANCE CONCEPT.

a. ARSR-3/3LW. The 3LW enhancement to ARSR-3 provides the processes performed by certain components within the system, however; maintenance functions will remain virtually unchanged. From a July 1988 national airspace integrated logistics support management team (NAILSMT) meeting it was established by APS-310 that there would be little or no increase in the maintenance workload when the ARSR-3s are modified for 3LW. The technology incorporated by the enhancement will be in consonance with the existing maintenance concept and will adhere to current maintenance policies which require troubleshooting system problems and isolating failures to the defective component level. Repair of defective components will be accomplished from parts stocked on-site. Parts used to repair defective components from on-site stores will be reordered from the FAA Depot. Line replaceable units for on-site maintenance will be established by the ARSR-3/3LW NAILSMT. The exchange and repair concept will be used on defined line replaceable units. Contract support is not envisioned for on-site repair work. The FAA Depot is currently managing the ARSR-3 component repair contract and that function is expected to continue concerning the 3LW function. The definitive FAA Depot role in ARSR-3/3LW logistic support is being developed by the NAILSMT.

Supply support provisioning data will be provided by ACE-400 to the FAA Depot on ARSR-3/3LW modification kit components. All 3LW modification kit components will meet existing Military (MIL) and FAA Specifications or will be acquired from a quality preferred list request submitted to APS-310 for approval. Operational down-times will be consistent with those already being used in maintaining the ARSR-3 and detailed in specification FAA-E-2679a.

b. CD-2/RMM/3LW. The RMM/3LW modification to the CD-2 provides improved weather contouring and reporting processes as well as the capability for future remoting of various CD-2 maintenance functions. The software and hardware components incorporated by the changes will be in compliance with the existing CD-2 maintenance concept. Troubleshooting system problems and isolating failures will be to the defective circuit card assembly for firmware failures. Fault isolation will be to the defective programmable read-only memory (PROM) integrated circuit chip. In most instances restoration to service will be by PROM or card replacement. Card repair will be made by the FAA Depot or its designated contractor. Replacement components to restock site stores will be ordered from the FAA Depot. Line replaceable units used for on-site repairs and maintenance will be from the listing established by the CD-2/RMM/3LW NAILSMT.

The FAA Depot is currently managing the CD-2 repair contract and is expected to continue in that function. The role of the FAA Depot in continued CD-2/RMM/3LW logistic support is being developed by the NAILSMT.

c. 3LW Software. Maintenance of 3LW software during the implementation process will be provided by the Enroute Software Development and Support contractor for the A4e0.3/3LW and ASM-400 for DARC RAK04/3LW; CDC/3LW and DCC/3LW. Maintenance of 3LW software after field acceptance (ORD) is by Air Traffic Service for A4e0.3 and ASM-400 for the other 3LW software components.

91. TRAINING.

* a. ARTCC Controller Training. APT-300, in cooperation with AAT-14, will develop a controller training packet which is scheduled to be delivered to the FAA Academy, AAC-930, in June 1990 and the 3LW Key Site (ZKC) by August 1990. Upon verification of packet content in key site testing, other ARTCC's will receive their training materials 30 days prior to scheduled ORDs (see Appendix 3 for ORD dates). FAA Order 7110.65 will be updated by ATO-320 and ATO-330 to reflect changes to accommodate 3LW.

b. ARSR-3/3LW. The Central Region will train the installation teams making the 3LW modifications. In addition, the ARSR-3 FAA Academy training program will be updated by May 1990 to reflect changes made by adding the 3LW function. Central Region will provide all engineering materials, schematics, and theory of operation to AAC-940 for updating Academy training and, upon request, will assist during the update process.

c. CD-2/RMM/3LW. The RMM/3LW modification will change a considerable amount of the current circuitry and incorporate additional circuitry to consummate the function; therefore, the Academy training program will be updated to reflect the changes. APS-310 will provide all engineering change notices, schematics and instruction book change pages (including theory of operation) to AAC-940 for their use in updating Academy training. A decision will be sought at the next NAILSMT (February 27, 1990) meeting as to what additional training will be necessary for those who have already completed Academy CD-2 training.

*

92. SUPPORT TOOLS AND TEST EQUIPMENT.

a. ARSR-3/3LW. Since the 3LW enhancement will be achieved by teams, special tools and test equipment required for installation and post test will follow along with the installation team. After the installation is completed, the Schedule B tool and test equipment will be adequate for regular system maintenance.

b. CD-2/RMM/3LW. APS-310, via contractor, will provide updated Auttek diagnostic test programs, and associated documentation and interface hardware for the CD-2 assemblies that are affected by the RMM/3LW modification. There will be no changes to existing CD-2 Schedule A (tools) or Schedule B (test equipment) as a result of these modifications.

93. SUPPLY SUPPORT.

a. ARSR-3/3LW. The Central Region will purchase and provide 10 percent spare parts to the FAA Depot. Most of the parts incorporated by the 3LW

- * modification are currently in the logistics inventory for the ARSR-3 system. All peculiar commercially manufactured parts that are not currently in the logistics inventory for ARSR-3 will be identified. Prefabrication drawings will be provided for application-specific apparatus. A Provisioning Conference will be scheduled by March 1990 by ACE-450 and its findings will be reviewed by the NAILSMT.

During installation and subsequent testing, the ARSR-3/3LW installation teams will provide necessary spares. *

b. CD-2/RMM/3LW. APS-310 will purchase and provide updated provisioning data and spare circuit card assemblies for delivery to the FAA Depot. Most of the parts incorporated by the RMM/3LW modification are currently in the logistics inventory for the CD-2 system. A provisioning conference will be scheduled, as required.

During installation and checkout of non-commissioned CD-2 sites, spares will be provided or updated to the RMM/3LW revision level as part of the EEM kit.

94. VENDOR DATA AND TECHNICAL MANUALS.

a. ARSR-3/3LW. The Central Region will provide technical documentation for the 3LW design in consonance with FAA Specification FAA-D-2494b. The technical documentation will be provided to site personnel at the time of installation. ASM-630 will issue electronic equipment modification change pages for the ARSR-3 technical instructions (TI) update. Site as-built drawings should be updated by regional personnel subsequent to the installation. Policy documents such as FAA Handbook 6340.13A and FAA TI 6340.8 will be updated by ASM-630. A draft of recommended changes will be provided to ASM-630 by ACE-400.

Until handbook 6340.13A and TI 6340.8 are updated, the ARSR-3/3LW Instruction Book 6340.22 will be in effect.

b. CD-2/RMM/3LW. ASM-400, via APS-310, will provide technical documentation for the CD-2 RMM/3LW. The technical documentation will consist of an EEM (with TI 6350.18 instruction book change pages) and change pages for the CD-2 software document, TI 6350.23. The EEM will be provided to field CD-2 site personnel with the modification kit for installation. Site as-built drawings should be updated by regional personnel subsequent to the installation. Policy documents such as FAA Handbook 6350.21 will be updated by ASM-400 during periodic major revisions.

95. EQUIPMENT REMOVAL. Site personnel should remove salvageable parts and hardware from obsolete circuit card assemblies as directed in the EEM and in accordance with FAA Order 4800.2A "Utilization and Disposal of Excess Surplus Personal Property."

96. FACILITIES.

* a. ARTCCs. The first ARSR-3/3LW performance verification will use EARTS A4.05 software in the checkout process at the Honolulu ARTCC. Subsequent performance verifications for both ARSR-3/3LW and CD-2/RMM/3LW equipment will employ DARC/RAK04/3LW software.

b. Radar Sites.

(1) ARSR-3/3LW Modifications. On-site radar modification, acceptance testing and performance verification will be conducted over a period of three weeks beginning on or about the dates listed in Appendix 3.

(2) CD-2/RMM/3LW. The installation and checkout of each EEM kit at non-commissioned CD-2 sites will take up to 14 days. The installation and checkout of EEM kits for commissioned CD-2 sites is estimated to require 80 manhours to be accomplished over a 7-day period. Radar site modification, acceptance testing and performance verification is scheduled to begin on the dates listed in Appendix 3.

97. INTEGRATED LOGISTICS SUMMARY. 3LW hardware logistics support areas are summarized in Table 9-1.

TABLE 9-1 3LW LOGISTICS PLANNING SCHEDULE

<u>Task</u>	<u>ARSR-3</u>	<u>CD-2</u>
NAIIS Management Team Meeting (initial)	July 6, 1988	Aug 30, 1988
Integrated Logistic Support Plan Completed	Mar 1990	Mar 1990
Training Materials Developed and Delivered to FAA Academy	Mar 1990	Apr 1990
Training Courses Begin at Academy	Jun 1990	Jul 1990
Technical Data Package Delivered to ASM-630/ASM-400	Feb 1990	Oct 1989
Site Spares Delivered (See Appendix 3)	With installation	With installation or by FAA Depot

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98.-99. RESERVED.

CHAPTER 10. TRANSITION

100. GENERAL. Because of NAS radar networking throughout the enroute surveillance system, operational and weather data from the same radar site are often shared by adjacent ARTCCs. This presents 3LW implementation problems which are addressed below.

101. TWO-LEVEL AND THREE-LEVEL WEATHER MIXING. Each LRR will transmit either two-level or 3LW information. As the 3LW sites are added one by one, or in groups of several, their 3LW outputs will be essentially transparent to the ARTCC operating on two-level weather. To accomplish this during the ARTCC by ARTCC implementation period, the middle level (M) output from the 3LW sites will be made to appear as H's and to be consistent with the 2LW high level (H's) output from unmodified two-level radar sites. The A4e0.3/3LW and DARC RAK04/3LW software has been modified to permit this interim mode. When all the radar sites feeding any one ARTCC are upgraded to output 3LW, the 3LW software will be switched to the 3LW mode and low, medium, and high levels of weather will be transmitted and processed thereafter.

102. 3LW SOFTWARE, ARSR-3/3LW AND CD-2/3LW IN TRANSITION.

a. Software. Components of 3LW software, NAS, DARC, and display subsystems are all designed and tested to accept two-level and three-level weather. Those components process either as received. However, for the transition period, at each ARTCC, the A4e0.3/3LW and the DARC RAK04/3LW software is delivered with a patch to process weather data as described in paragraph 101 above. At cutover from a modified 3LW processing mode to a full or routine 3LW processing mode, the patch will be disabled at each ARTCC. Each ARTCC will reconfigure the display console filter keys to: Weather I (lines); Weather II (M's), and Weather III (H's) in time to meet Center ORD begin dates (see Appendix 3).

b. Hardware. Both ARSR-3/3LW and CD-2/3LW systems require command inputs to switch from 2LW to 3LW and for setting of three-level thresholds (as recommended in CCD 8102). This will be done either at the radar site or from the ARTCC maintenance processor system through the interim maintenance and control software for those centers so equipped.

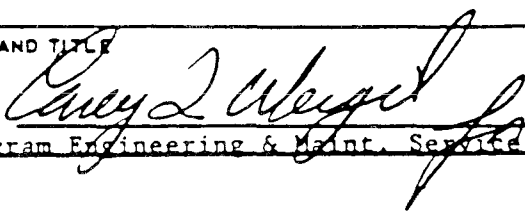
103.-109. RESERVED.

2/16/90

7110.14A
Appendix 1

APPENDIX 1. NAS CCD N8102 AND ATTENDANT NCP

2/16/90

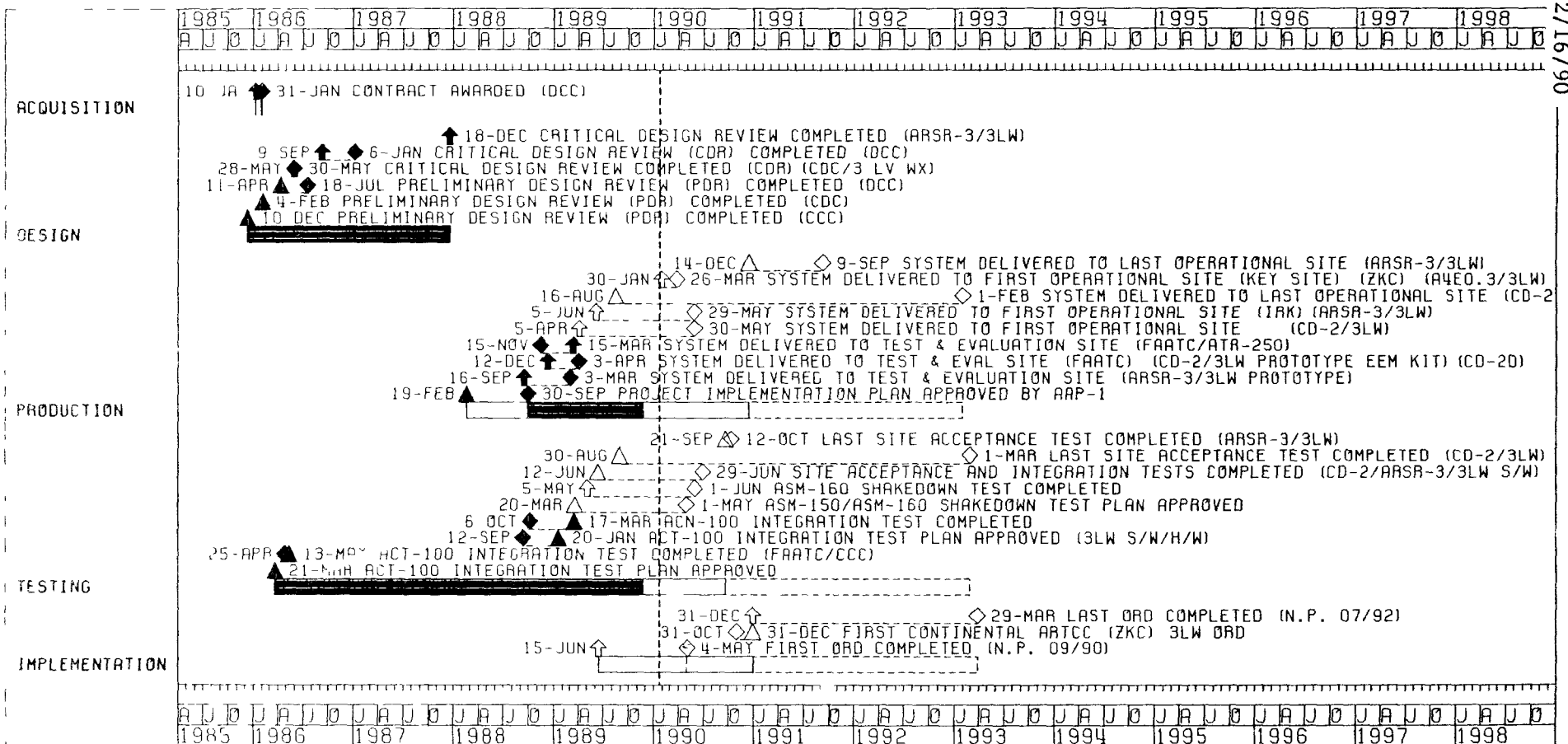
NAS CONFIGURATION CONTROL DECISION		
1. TO: (NCP/CCD WEEKLY PACKAGE DISTRIBUTION)		
2. NCP TITLE 8102 - Weather Display Thresholds for Three - Level Weather		3. CCD No. N 8102
4. CASE FILE NUMBER PM310-ARSR-011	5. SITE LOCATION All ARSR-3 and CD-2 sites	6. END ITEM NUMBER 2.1.1.5c/2.7.12.1/ 2.7.12.3/2.7.12.4
7. ACTION DIRECTED (In accordance with 1100.2, Change 123)		
<p>Accomplish the actions in the NCP dated 3/20/85.</p> <p><u>ACTION:</u> APM-310 - Provide guidance to APM-150 for appropriate revision of ARSR-3 instruction books and Order 6340.13, Maintenance of Air Route Surveillance Radar ARSR-3 Facilities.</p> <ul style="list-style-type: none"> - Provide guidance to APM-160 for appropriate revision of the CD-2 maintenance handbook, now in preparation. - Provide appropriate guidance to the CD-2 contractor for revision of the CD-2 instruction book. <p>APM-150 - Revise Order 6340.13 and issue an EEM to revise ARSR-3 instruction books in accordance with the guidance provided by APM-310.</p> <p>APM-160 - Revise the CD-2 maintenance handbook draft in accordance with the guidance provided by APM-310.</p>		
8. REMARKS		
<p>a. The 12, 24 and 33 dB thresholds identified in the NCP are site adaptable parameters. Each site will establish its specific standard threshold settings using procedures in the applicable maintenance handbooks, integration procedures and, if appropriate, equipment instruction books.</p> <p>b. CCD N7683 was superseded (i.e., rescinded) by CCD N7683D, dated May 20, 1985.</p>		
9. DECISION <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved	10. DATE 9/9/85	11. SIGNATURE AND TITLE  Dir., Program Engineering & Maint. Service, APM-1

2/16/90

7110.14A
Appendix 1

NAS CHANGE PROPOSAL (Instructions on Reverse Side)		FOR CM USE	Date Received 3/20/85	NCP Number 8102
1. Change Number PM 310-LRR-011 PM 310 ARSR-011	2. End Item Number 2.1.1.5c/2.7.12.1, 2.7.12.3, 2.7.12.4	3. Scope of Change <input type="checkbox"/> Local <input checked="" type="checkbox"/> National <input type="checkbox"/> Test	4. Prescreening Office <input checked="" type="checkbox"/> APH-150 <input type="checkbox"/> ATR-100 <input checked="" type="checkbox"/> APH-160	
5. Program Element <input checked="" type="checkbox"/> En Route <input type="checkbox"/> Flight Service <input type="checkbox"/> Interfacility Comm <input type="checkbox"/> Terminal <input type="checkbox"/> Ground-to-Air <input type="checkbox"/> Maint & Ops Support	6. Employee Suggestion Number N/A	7. Priority <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Urgent (Explain in Block 17)		
8. Originator T. Weyrauch	9. Originator's Organization APH-310	10. Telephone Number 426-8573	11. Date Initiated 02/22/85	
12. Facility/Identifier (FACID)	13. Facility Code	14. FA Type Number/Serial No.	15. Baseline Documents Affected	
16. Title (if applicable, include location and runway number) Weather Display Thresholds for Three-Level Weather				
17. Description: (a) problem, (b) proposed change, (c) impact (operational, R&M, resources, etc.), (d) cost, (e) savings (a) Of the three NAS Change Proposals: 7271 "ARSR-3 Three-Level Weather Reporting," July 1983; 7683 "CD-2 Three-Level Weather Reporting," February 1984 and 7840 "Weather Display Format for Three-Level WFMU," November 1984, none address the precipitation reflectivity strengths (dB values) that are to be represented by each of the three graphics (lines, Ms or Hs) to be provided on the plan view displays (PVDs). (b) The following three thresholds and precipitation return signal strength ranges are recommended in implementing three-level weather on the PVDs. The lines represent weather intensities from 12dB and above. The Ms represent weather intensities from 24dB and above. The Hs represent weather intensities from 33 dB and above. A Comparative NWS-FAA Reflectivity Intensities table is included below for reference purposes. Previous procedures for maintaining display graphic threshold calibrations for lines and Hs should remain in effect. (c) The impact of the recommended changes are to: standardize weather reporting intensities throughout the En Route ATC system; provide improved discrimination between intensities in the more hazardous range of intensities; and to reduce graphic presentation clutter by spreading out the thresholds in the most frequently observed weather intensity ranges. (d) Any costs involved are already reflected in planned modifications to the CD-2 and ARSR-3 equipment to provide three levels of weather on the PVD. (e) The implementation of three-level weather will permit removal of broadband (RBDE) equipment and five Telco leased Radar Microwave Links at a savings of 5 million dollars per year beginning in 1988.				
COMPARATIVE NWS-FAA REFLECTIVITY INTENSITIES AND POTENTIAL WEATHER ENCOUNTERS				
Reflectivity in dBz	FAA LRR (ARSR-2) Reflectivity Equivalent (dB)	Recommended Symbol Levels	NWS Code Level	Large Aircraft Hazard Related Comments
57 and above	42	↑	6	Frequent encounters of severe turbulence and damaging hail
50-56	36	and above	5	55 dBz
46-49	33	—H—H—H—H—H—H—	4	Encounters vary widely as does turbulence intensity and frequency
41-45	24	—M—M—M—M—M—	3	
30-40	12	—	2	40 dBz
0-29		Lines	1	Almost no encounters of severe turbulence
*The CD-2 Maintenance Handbook, when issued, will be an End Item (2.7.12.X).				
(attach additional sheets if necessary)				
18. Title of Originating Office Supervisor Manager, Primary Radar Program		Signature <i>Donald E. Johnson</i> Donald E. Johnson		

**APPENDIX 2 SUMMARY MILESTONE SCHEDULE FOR PROJECT 3-LEVEL
WEATHER FOR ARTCC DISPLAYS (6-16)**



SUMMARY MILESTONE SCHEDULE FOR PROJECT: 3-LEVEL WEATHER FOR ARTCC DISPLAY (6-16)

▲ NAS PROGRAM DIRECTOR MILESTONE
 ◆ SERVICE DIRECTOR MILESTONE
 ◇ BASELINE.....PROMISE
 ■ SHADED MILESTONE INDICATES ACTUAL
 ■ PROGRESS
 ■ BASELINE ACTIVITY
 ■ CURRENT WORKING PLAN
 (N.P. XX/XX) NAS PLAN DATE

APPROVED BYAAP
 STATUS DATE, 23-JAN-1990
 REVISION 51

CLUSTER APPROVAL
 SCHEDULE BASELINE DATE, 6-JUL-1987

PAGE 1 OF 1

APPENDIX 3. COMBINED ARSR-3/3LW MODIFICATION KIT AND CD-2/RMM/3LW
EEM KIT RADAR SITE DELIVERY SCHEDULES AND 3LW ORD SCHEDULE

ARTCC	RADAR SITE, LOCID; RADAR TYPE	TYPE KIT/ FAA REGION	DELIVERY DATE W SPARES
* 1. ZKC	Hutchinson, KS (HTI), FPS-66A Garden City, KS (GCK), ARSR-2 Kirksville, MO (IRK), ARSR-3 St. Louis, MO (STL), ARSR-1E Oklahoma City, OK (OKC), FPS-67B Hanna City, IL (QUZ), FPS-67B Oskaloosa, KS (QBZ), ARSR-2 ORD 10/90	CD-2A/ACE CD-2A/ACE Mod/ACE CD-2A/ACE CD-2A/ASW CD-2A/AGL CD-2A/ACE	Apr 27, 1990 May 25, 1990 May 28, 1990 Jun 22, 1990 Jul 27, 1990 Aug 17, 1990 Aug 31, 1990
2. ZAU	Joliet, IL (JOT), ARSR-3 Hanna City, IL (QUZ), FPS-67B Horicon, WI (QHZ), ARSR-2 LaGrange, IN (QTZ), ARSR-1E Arlington, IA (QJO), ARSR-3 Indianapolis, IN (IND), ARSR-1E Coopersville, MI (QS7), FPS-66A ORD 01/91	Mod/AGL CD-2A/AGL CD-2A/AGL CD-2A/AGL Mod/AGL CD-2A/AGL CD-2A/AGL	Apr 02, 1990 Aug 17, 1990 Aug 31, 1990 Sep 14, 1990 Oct 19, 1990 Nov 16, 1990 Dec 14, 1990
3. ZMP	Empire, MI (QJA), ARSR-3 Nashwalk, MN (QJD), ARSR-3 Horicon, WI (QHZ), ARSR-2 Finley, ND (QFI), ARSR-3 Omaha, NE (QHO), FPS-66A Tyler, MN (QJC), ARSR-2 Gettysburg, SD (QJB), FPS-67B Watford City, ND (QWA), FPS-67B Minneapolis, MN (QJE), ARSR-1E ORD 05/92	Mod/AGL Mod/AGL CD-2A/AGL Mod/AGL CD-2A/ACE CD-2A/AGL CD-2A/AGL CD-2C/AGL CD-2A/AGL	Jul 09, 1990 Jul 23, 1990 Aug 31, 1990 Sep 05, 1990 Mar 1992 Mar 1992 Mar 1992 Mar 1992 Mar 1992
4. ZLC	Lakeside, MT (QLS), ARSR-3 Watford City, ND (QWA), FPS-67B Rock Springs, WY (RKS), ARSR-2 Lovell, WY (QSI), FPS-65A Ashton, ID (QVA), ARSR-1E Salt Lake City, UT (SLC), ARSR-1E Great Falls, MT (GFAA), FPS-65A Boise, ID (QCK), ARSR-2 Battle Mt, NV (BAM), ARSR-2 Cedar City, UT (CDC), ARSR-2 Grand Junction, CO (GJT), ARSR-2 ORD 06/92	Mod/ANM CD-2C/AGL CD-2A/ANM CD-2A/ANM CD-2A/ANM CD-2A/ANM CD-2C/ANM CD-2A/ANM CD-2A/ANM CD-2A/ANM CD-2A/ANM	Aug 05, 1991 Mar 1992 Mar 1992 Mar 1992 Mar 1992 Mar 1992 Apr 1992 Apr 1992 Apr 1992 Apr 1992 Apr 1992

ARTCC	RADAR SITE, LOCID; RADAR TYPE	TYPE KIT/ FAA REGION	DELIVERY DATE W SPARES
5. ZDV	Garden City, KS (GCK), ARSR-2 Gettysburg, SD (QJB), FPS-67B Rock Springs, WY (RKS), ARSR-2 Lovell, WY (QSI), FPS-65A Grand Junction, CO (GJT), ARSR-2 Gallup, NM (GUP), ARSR-2 Trinidad, CO (TAD), ARSR-2 Lusk, WY (LSK), ARSR-2 No. Platte, NE (LBF), ARSR-2 Denver/Parker, CO (QPK), ARSR-1E ORD 07/92	CD-2A/ACE CD-2A/AGL CD-2A/ANM CD-2A/ANM CD-2A/ANM CD-2A/ASW CD-2A/ANM CD-2A/ANM CD-2A/ACE CD-2A/ANM	May 25, 1990 Mar 1992 Mar 1992 Mar 1992 Apr 1992 May 1992 May 1992 May 1992 May 1992 May 1992
6. ZSE	Fossil, OR (QVN), ARSR-3 Seattle, WA (SEA), ARSR-1E Salem, OR (SLE), ARSR-1E Monroe, OR (QMO), FPS-66A Klamath Falls, OR (LMT), FPS-67B Spokane, OR (QMI), FPS-67B Crescent City, CA (CEC), FPS-66A ORD 07/92	Mod/ANM CD-2A/ANM CD-2C/ANM CD-2A/ANM CD-2A/ANM CD-2C/ANM CD-2C/ANM	Jul 08, 1991 May 1992 May 1992 May 1992 May 1992 May 1992 May 1992
7. ZOA	Battle MT, NV (BAM), ARSR-2 Crescent City, CA (CEC), FPS-66A Paso Robles, CA (PRB), ARSR-1E Mill Valley, CA (QMV), FPS-66A Red Bluff, CA (RBL), FPS-67B Sacramento, CA (SAC), FPS-91A Fallon, NV (FLX), FPS-66A ORD 08/92	CD-2A/AWP CD-2C/AWP CD-2C/AWP CD-2C/AWP CD-2A/AWP CD-2A/AWP CD-2A/AWP	Apr 1992 May 1992 Jun 1992 Jun 1992 Jun 1992 Jun 1992 Jun 1992
8. ZLA	Mt. Laguna, CA (QRW), ARSR-3 Seligman, AZ (QXP), ARSR-3 Cedar City, UT (CDC), ARSR-2 Las Vegas, NV (LAS), FPS-20A Boron, CA (QSR), FPS-67B San Pedro, CA (QLA), ARSR-1E Paso Robles CA (PRB), ARSR-1E ORD 08/92	Mod/AWP Mod/AWP CD-2A/ANM CD-2A/AWP CD-2A/AWP CD-2C/AWP CD-2C/AWP	Mar 04, 1991 Apr 15, 1991 Apr 1992 Jun 1992 Jun 1992 Jun 1992 Jun 1992

ARTCC	RADAR SITE, LOCID; RADAR TYPE	TYPE KIT/ FAA REGION	DELIVERY DATE W SPARES
9. ZAB	Seligman, AZ (QXP), ARSR-3	Mod/AWP	Apr 15, 1991
	Gallup, NM (GUP), ARSR-2	CD-2A/ASW	May 1992
	Trinidad, CO (TAD), ARSR-2	CD-2A/ANM	May 1992
	Odessa, TX (QXS), ARSR-1E	CD-2C/ASW	Jul 1992
	Albuquerque, NM (QSA), FPS-66A	CD-2A/ASW	Jul 1992
	Mesa Rica, NM (QWC), ARSR-1E	CD-2A/ASW	Jul 1992
	Amarillo, TX (AMAA), FPS-67B	CD-2A/ASW	Jul 1992
	El Paso, TX (ELP), ARSR-1E	CD-2A/ASW	Jul 1992
	Silver City, NM (SVC), ARSR-2	CD-2C/ASW	Jul 1992
	ORD 09/92		
10. ZFW	Oklahoma City, OK (ZKC), FPS-67B	CD-2A/ASW	Aug 17, 1990
	Sonora, TX (SOA), ARSR-3	Mod/ASW	Jan 07, 1991
	Rogers, TX (QYS), ARSR-1E	CD-2A/ASW	Jul 1992
	Alexandria, LA (AEX), FPS-20	CD-2A/ASW	Jul 1992
	Odessa, TX (QXS), ARSR-1E	CD-2C/ASW	Jul 1992
	Amarillo, TX (AMAA), FPS-67B	CD-2A/ASW	Jul 1992
	Texarkana, AR (TXX), FPS-67	CD-2A/ASW	Jul 1992
	ORD 09/92		
11. ZHU	Sonora, TX (SOA), ARSR-3	Mod/ASW	Jan 07, 1991
	Alexandria, LA (AEX), FPS-20	CD-2A/ASW	Jul 1992
	Rogers, TX (QYS), ARSR-1E	CD-2A/ASW	Jul 1992
	Odessa, TX (QXS), ARSR-1E	CD-2A/ASW	Jul 1992
	Citronelle, AL (QRB), ARSR-2	CD-2C/ASO	Aug 1992
	Houston, TX (HOU), ARSR-1E	CD-2C/ASW	Aug 1992
	New Orleans, LA (MSY), ARSR-1E	CD-2C/ASW	Aug 1992
	San Antonio, TX (SAT), FPS-66A	CD-2A/ASW	Aug 1992
	Oilton, TX (QZA), FPS-67B	CD-2A/ASW	Aug 1992
	ORD 10/92		
12. ZME	Newport, MS (QNM), ARSR-3	Mod/ASO	Jan 21, 1991
	Texarkana, AR (TXX), FPS-67	CD-2A/ASW	Jul 1992
	Citronelle, AL (QRB), ARSR-2	CD-2C/ASO	Aug 1992
	Nashville, TN (QOJ), ARSR-1E	CD-2A/ASO	Aug 1992
	Haleyville, AL (QPC), FPS-67B	CD-2A/ASO	Aug 1992
	Russelville, AR (QXR), FPS-64A	CD-2A/ASW	Aug 1992
	Memphis, TN (QYB), ARSR-1E	CD-2A/ASO	Aug 1992
	ORD 10/92		
13. ZID	Joliet, IL (JOT), ARSR-3	Mod/AGL	Apr 02, 1990
	Indianapolis, IN (IND), ARSR-1E	CD-2A/AGL	Oct 19, 1990
	Nashville, TN (QOJ), ARSR-1E	CD-2A/ASO	Aug 1992
	Lynch, KY (QRI), ARSR-2	CD-2A/ASO	Sep 1992
	Pittsburgh, PA (PITA), FPS-67B	CD-2A/AEA	Sep 1992
	London, OH (QWO), ARSR-1E	CD-2A/AGL	Sep 1992
	ORD 11/92		

ARTCC	RADAR SITE, LOCID; RADAR TYPE	TYPE KIT/ FAA REGION	DELIVERY DATE W SPARES
14. ZOB	Clearfield, PA (QCF), ARSR-3	Mod/AEA	Aug 20, 1990
	LaGrange, IN (QTZ), ARSR-1E	CD-2A/AGL	Sep 14, 1990
	Cleveland, OH (CLE), ARSR-1E	CD-2A/AGL	Sep 1992
	Detroit, MI (QTD), ARSR-1E	CD-2A/AGL	Sep 1992
	London, OH (QWO), ARSR-1E	CD-2A/AGL	Sep 1992
	Pittsburgh, PA (PITA), FPS-67B	CD-2A/AEA	Sep 1992
	Dansville, NY (DSV), ARSR-1E	CD-2C/AEA	Sep 1992
	Utica, NY (QXV), ARSR-60	CD-2C/AEA	Sep 1992
	ORD 11/92		
15. ZBW	Dansville, NY (DSV), ARSR-1E	CD-2C/AEA	Sep 1991
	No. Truro, MA (QEA), FPS-91A	CD-2C/ANE	Sep 1992
	Cummington, MA (QHA), FPS-67B	CD-2A/ANE	Sep 1992
	Utica, NY (QXV), ARSR-60	CD-2C/AEA	Sep 1992
	St. Albans, VT (QHB), FPS-67B	CD-2A/ANE	Sep 1992
	Buck Harbor, ME (QYA), FPS-66A	CD-2C/ANE	Sep 1992
	ORD 12/92		
16. ZNY	Riverhead, NY (QVH), ARSR-3	Mod/AEA	Sep 09, 1991
	Trevoise, PA (QDP), ARSR-60	CD-2A/AEA	Sep 1992
	No. Truro, MA (QEA), FPS-91A	CD-2C/ANE	Sep 1992
	Cummington, MA (QHA), FPS-67B	CD-2A/ANE	Sep 1992
	Benton, PA (QRC), FPS-67A	CD-2A/AEA	Sep 1992
	ORD 01/93		
17. ZDC	Bedford/Roanoke, VA (QBE), ARSR-3	Mod/AEA	Feb 18, 1991
	Binns Hall, VA (QBN), ARSR-3	Mod/AEA	May 27, 1991
	The Plains, VA (QPL), ARSR-3	Mod/AEA	Aug 19, 1991
	Trevoise, PA (QDP), ARSR-60	CD-2A/AEA	Sep 1992
	Pittsburgh, PA (PITA), FPS-67B	CD-2A/AEA	Sep 1992
	Raleigh, NC (QRL), ARSR-1E	CD-2A/ASO	Oct 1992
	ORD 01/93		
18. ZTL	Bedford, VA (QBE), ARSR-3	Mod/AEA	Feb 18, 1991
	Lincolnton, GA (QNK), ARSR-3	Mod/ASO	May 13, 1991
	Citronelle, AL (QRB), ARSR-2	CD-2C/ASO	Aug 1992
	Haleyville, AL (QPC), FPS-67B	CD-2A/ASO	Aug 1992
	Nashville, TN (QOJ), ARSR-1E	CD-2A/ASO	Aug 1992
	Lynch, KY (QRI), ARSR-2	CD-2A/ASO	Sep 1992
	Montgomery, AL (MGM), ARSR-1E	CD-2A/ASO	Oct 1992
	Ashburn, GA (QHN), ARSR-1E	CD-2A/ASO	Oct 1992
	Raleigh, NC (QRL), ARSR-1E	CD-2A/ASO	Oct 1992
	Atlanta, GA (ATLA), ARSR-1E	CD-2A/ASO	Oct 1992
	Charlotte, NC (CLT), ARSR-1E	CD-2A/ASO	Oct 1992
	ORD 02/93		

ARTCC	RADAR SITE, LOCID; RADAR TYPE	TYPE KIT/ FAA REGION	DELIVERY DATE W SPARES
19. ZJX	Cross City, FL (CTY), ARSR-3	Mod/ASO	Oct 15, 1990
	Ft. Lonesome, FL (QJT), ARSR-3	Mod/ASO	Apr 1, 1991
	Citronelle, AL (QRB), ARSR-2	CD-2C/ASO	Aug 1992
	Ashburn, GA (QHN), ARSR-1E	CD-2A/ASO	Oct 1992
	Montgomery, AL (MGM), ARSR-1E	CD-2A/ASO	Oct 1992
	Raleigh, NC (QRL), ARSR-1E	CD-2A/ASO	Oct 1992
	Tyndall, FL (PAM), FPS-66A	CD-2C/ASO	Nov 1992
	Jacksonville, FL (NEN), ARSR-60M	CD-2C/ASO	Nov 1992
	Patrick, FL (COF), FPS-64A	CD-2C/ASO	Nov 1992
	Jedburg/Charleston, SC (CHS), 66A	CD-2C/ASO	Nov 1992
	ORD 02/93		
20. ZMA	Ft. Lonesome, FL (QJT), ARSR-3	Mod/ASO	Oct 15, 1990
	Cross City, FL (CTY), ARSR-3	Mod/ASO	Apr 01, 1991
	Patrick, FL (COF), FPS-64A	CD-2C/ASO	Nov 1992
	Miami, FL (MIA), ARSR-1E	CD-2C/ASO	Dec 1992
	Key West, FL (NQX), FPS-67B	CD-2C/ASO	Dec 1992
	ORD 03/93		

OTHER CD-2/RMM/3LW EEM KIT DELIVERIES

FAA Technical Center	Elwood, NJ/ARSR-1	CD-2C	TBS
	Laboratory	CD-2C	TBS
	Laboratory	CD-2D	Installed
FAA Depot Testbed	at Elwood, NJ	CD-2C	Installed
FAA Academy	ARSR-1E	CD-2A/C,C	TBS
San Juan, PR (ZSU)	San Juan, PR/ASR-8	CD-2D/ASO	TBS
	St. Thomas, VI/ASR-6	CD-2D/ASO	TBS
	Pico del Este, PR/FPS-20	CD-2A/ASO	TBS
Honolulu, HI (ZHN)	Kahului, HI/ASR-7	CD-2D/AWP	TBS
Edwards AFB, CA R 2508	Edwards AFB, CA/ASR-5	CD-2D/AWP	TBS
	Fremont Valley, CA/ASR-8	CD-2D/AWP	TBS
	Indian Wells, CA/ASR-8	CD-2D/AWP	TBS
	Owens Valley, CA/ASR-8	CD-2D/AWP	TBS
	Panamint Valley, CA/ASR-8	CD-2D/AWP	TBS
	Searles Valley, CA/ASR-8	CD-2D/AWP	TBS
	Velvet Peak, CA/ASR-8	CD-2D/AWP	TBS
Unisys, Inc.	Paoli, PA	CD-2A/APS	
TBS: To be Scheduled			

OTHER ARSR-3/3LW MODIFICATION KIT DELIVERIES

Anchorage, AK (ZAN)	Kenai, AK ARSR-3	Mod/AAL	Jul 1991
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APPENDIX 4. 3LW PROJECT CONTACTS

<u>NAME</u>	<u>ORGANIZATION</u>	<u>ROLE</u>	<u>FTS TELEPHONE NO.</u>
* Frank Coons	AAP-310	3LW Project Manager	267-8337
Delois Smith	AAP-310	Manager En Route Automation Branch	267-8347
Al Beard	AAP-312	Manager En Route Software Development and Support	267-8342
Jack Neuberger	AAP-310	EARTS Enhancements Manager	267-8338
Jim Reed	APS-310	Project Manager, ARSR-3/3LW	267-3434
Ted Weyrauch	APS-310	Project Manager CD-2/RMM/3LW	267-8426
Ardy Williams	ATR-120.3	Air Traffic Requirements	267-9186
Meinard Simmons	ATR-245	EARTS Section	482-6017
Wayne Wolfe	ATR-252	En Route Production Section, A4e0.3 Development	482-6013
Wes Rutherford	ASM-410	3LW Shakedown Testing	482-4234
Sam Levine	ASM-430	Manager, DARC S/W Support	482-6048
John Dietrich	ASM-630	ARSR-3/3LW Shakedown Testing	747-5175
Harry Boler	ACE-454	ARSR-3/3LW Project Engineer, Central Region	(816)587-2706
Rich Acosta	AAT-14	Air Traffic Training Requirements	267-9208
Stan Grubaugh	AAC-485	FAA Depot, NAS Project Provisioning	747-5630
Kirk Miller	AAC-445B	FAA Depot, Radar Automation Engineering Unit	747-2788
Dan Jones	AAC-944A	En Route Radar Unit Airway Facilities Branch	747-5267 *

	<u>NAME</u>	<u>ORGANIZATION</u>	<u>ROLE</u>	<u>FTS TELEPHONE NO.</u>	
*	J. Cline	AAL-454C	Regional Coordinator	(907)271-5199	
	C. Gruner	AEA-432	Regional Coordinator	667-1200	
	R. Aquilar	ACE-453	Regional Coordinator	867-3262	
	R. Brammer	AGL-451A	Regional Coordinator	384-7654	
	W. Tretter	ANE-422T	Regional Coordinator	836-7211	
	L. Slaughter	ANM-455C	Regional Coordinator	446-2357	
	S. Braddy	ASO-452.10	Regional Coordinator	246-7638	
	R. Lenz	ASW-421.2	Regional Coordinator	734-5426	
	D. Nadani	AWP-422.3	Regional Coordinator	984-1077	*

2/16/90

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Appendix 5

APPENDIX 5. 3LW RELATED ACTIVE CONTRACTS AND CONTRACT TECHNICAL OFFICERS

<u>TASK</u>	<u>CONTRACT</u>	<u>CONTRACT T.O.</u>	<u>COMMENTS</u>
En Route Software Support. 3LW upgrade into A4e0.3.	NAS En Route Operational Program Development and Support with Computer Science Corp.	Al Beard AAP-310	
CD-2/3LW EEM Kit Production Phase III	Modification to existing contract with Telephonics Systems Company, Inc. (formerly Eaton Corp.) Farmingdale, New York.	Ted Weyrauch, APS-310	To be awarded by September 1990
ARSR-3/3LW Modification Kit Components	Kit Preparation, Testing, Packing and Shipment. Potential contract support for kit installation and checkout.	Harry Boler, ACE-454	Several On-going Contracts