14.1   USE OF THE RADAR PRODUCT CENTRAL COLLECTION/DISTRIBUTION
SERVICE TO COLLECT ALL WSR-88D ARCHIVE PRODUCTS

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1. BACKGROUND

The National Weather Service (NWS) implemented the Radar Product Central Collection/Distribution Service (RPCCDS) in January 2001 to improve the way users receive Weather Surveillance Radar-Doppler 1988 (WSR-88D) products issued from NWS, Department of Defense (DOD), and Department of Transportation (DOT) radars. The RPCCDS replaced the NEXRAD Information Dissemination Service (NIDS), which had been providing these products through telecommunications links from various radars to as many as four NIDS providers.

The NWS has a legal requirement to permanently archive a prescribed set of WSR-88D products for research purposes and for accident investigations. This requirement is defined in the NWS Operations Manual and Federal Meteorological Handbook Number 11. The permanent archive is maintained at the National Climatic Data Center's (NCDC) Hierarchical Data Storage System (HDSS).

When first implemented, RPCCDS collected 30 WSR-88D products, but these did not include the entire set of prescribed archive products. The routine products set (RPS) list, which controls what products are transmitted from WSR-88D radar sites, was not large enough at the time to support both the operational needs of the radar sites and all the archive requirements. Thus, the NWS radar sites had to continue recording all archive products on Write Once Read Many (WORM) or JAZ media and then transmit the products via disk to the NCDC for archival. This process was not only inefficient but also costly, especially in terms of the amount of storage media required. The NWS

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therefore decided to use the RPCCDS to collect all products and transmit them to NCDC, a process that was more reliable, more timely, and more cost-efficient.

2. ARCHIVED PRODUCTS

The NWS is required to archive 25 WSR-88D products (see Table 1) from all NWS WSR-88D radars during precipitation mode operation. A fewer number of products are archived during clear air mode operation. At this time, there is no requirement to archive products from DOT and DOD radars.

Table 1. WSR-88D Archive Products

Product Identifier	Product Description
2/GSM	General Status Message
19/R	Base Reflectivity - 124 nmi Range
20/R	Base Reflectivity - 248 nmi Range
25/V	Base Radial Velocity - 32 nmi Range
27/V	Base Radial Velocity - 124 nmi Range
28/SW	Base Spectrum Width - 32 nmi Range
30/SW	Base Spectrum Width - 124 nmi Range
34/CFC	Clutter Filter Control
36/CR	Composite Reflectivity - 8 Levels
38/CR	Composite Reflectivity - 16 Levels
41/ET	Echo Tops
47/SWP	Severe Weather Probability
48/VWP	Velocity Azimuth Display Wind Profile
56/SRM	Storm Relative Mean Radial Velocity
57/VIL	Vertical Integrated Liquid
58/STI	Storm Tracking Information
59/HI	Hail Index
60/M	Mesocyclone
61/TVS	Tornadic Vortex Signature
62/SS	Storm Structure
74/RCM	Radar Coded Message
78/OHP	Rainfall Accumulation - One Hour
80/STP	Rainfall Accumulation - Storm Total
81/DPA	Digital Precipitation Array
82/SPD	Supplemental Precipitation Data

3. CURRENT PROCESS

A prescribed set of WSR-88D products is generated by each NWS radar site's Open Radar Products Generator (ORPG). The entire product set is transmitted with every volume scan via the Advanced Weather Interactive Processing System (AWIPS) wide area network (WAN) to the NWS Network Control Facility (NCF) located in Silver Spring, Maryland. The NCF then transmits these products by dual-socket 1.5 mbps connections to two NWS multicast servers: a primary server and a backup server. The backup server is a "hot" backup, which means that it receives the same products as the primary server. Should the primary server fail, the backup server automatically becomes active and begins broadcasting products to the NCDC.

The multicast servers use "push" technology to broadcast the WSR-88D products to the NCDC and the user community, which includes other Government agencies as well as several private sector companies. All registered users, including NCDC, must have a dedicated T1 Line connected to the multicast server to receive the broadcast. After receiving the products, NCDC stores them in the HDSS archive, where they are then available to any user upon request. Figure 1 provides a graphical depiction of this process.
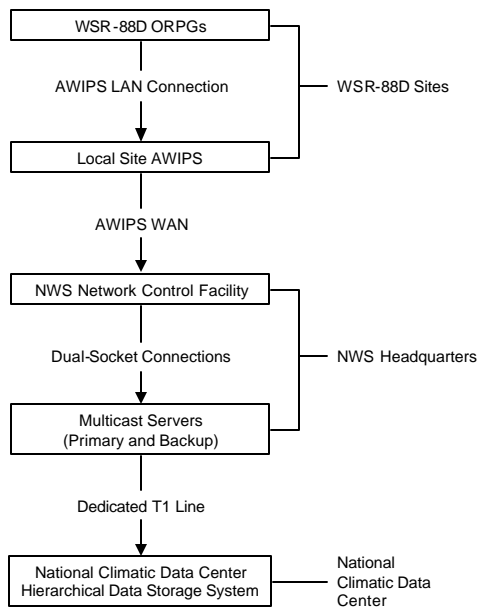

Figure 1. Transmission of WSR-88D Products to NCDC Using the RPCCDS

4. TRANSITION

The implementation of the ORPGs and ORPG software Build 1.2 along with AWIPS Build 5.2.1 and Maintenance Release 5.2.1.1 allowed the RPS list to be increased and the RPCCDS to collect the entire archiveI products set. With these software builds in place, the local AWIPS sites activated a methodology allowing the additional products to be sent to the local site AWIPS. The PRODLIST.TXT file could then be updated to transmit the products through the AWIPS WAN to the NWS Network Control Facility and the RPCCDS multicast server. At NWS Headquarters, the PRODLIST.TXT files are updated in groups of 6 or 12 sites at a time. This allows the system to be tested with a gradual increase in the product load on the telecommunication network rather than having to undergo a load increase all at once.

5. RESULTS

Using the RPCCDS to collect all WSR-88D archive products and multicast them to NCDC has proven successful. As of the time this paper was prepared (September 2002), the reliability of the RPCCDS was 98 to 99 percent, and the transmission time from the radar to NCDC was 47 to 48 seconds. At that time, the RPCCDC was receiving and transmitting to NCDC an average of 900,000 products a day. It is projected that when all NWS radars sites are transmitting the complete archive products set through the RPCCDS, the average reliability will be about 96 percent, the transmission time will be about 51 to 52 seconds, and the average number of products will be about 1 million per day.

The NWS has seen a significant improvement in reliability and timeliness in transmitting all archive products to NCDC when compared to using the WORM or JAZ media. Using the RPCCDS has eliminated the need to send disks to NCDC, resulting in both a more efficient and more cost-effective operation.