

LOCKHEED MARTIN



NEXRAD WSR-98D Doppler Weather Radar



Design innovation the world over



A modern weather service is critical to any nation's infrastructure development. A computer-based Doppler Weather radar should be a key element of that modernization program to save lives, protect resources, promote growth and achieve economic benefits. The radar system selected should be affordable; encompass proven technology; detect a broad range of meteorological, atmospheric and even biological targets, in clear air and precipitation, over a large geographic area, and provide real-time distribution of information to multiple users. NEXRAD WSR-98D will meet these needs well into the 21st century.

In 1996, Lockheed Martin, with the China Meteorological Administration, formed a joint venture to produce an affordable, state-of-the-art, full-coherence Doppler Weather radar. The radar would integrate the technology from Lockheed Martin's WSR-88D performance with advanced technology. The first NEXRAD WSR-98D radar will be installed

in China in 1999.

NEXRAD as an S-band radar, provides fully coherent data over its entire operational range. Its high resolution, accurate reflectivity, radial velocity and velocity spectrum width data, when processed by the advanced meteorological algorithms used in the WSR-88D enables generation of over 70 weather products, designed to meet the meteorologist's operational and research requirements.

NEXRAD WSR-98D will enable the meteorologist to select from either the manual mode of operation used by most current radars, or the Volume Coverage Pattern mode employed so successfully by the WSR-88D. It employs off-the-shelf signal processing technology which allows users to accurately locate and precisely measure radial motions within a storm. This precision, coupled with the system's ability to automatically generate alerts when predetermined thresholds are met, make NEXRAD unique.

NEXRAD consists of three main functional units: The Radar Data Acquisition (RDA) unit, the Radar

Product Generator (RPG) and the advanced Principal User Processor (PUP) workstation. These components are supported by reliable communication links.

The RDA unit consists of the radome, antenna, pedestal, tower, waveguide, transmitter, receiver, signal processor, monitor and control processor, and communication and maintenance facilities that process the radar information and communicate with the Radar Product Generator.

The RPG is a high power computer running a variety of algorithms and software that generate over 70 weather products available to users. It also provides facilities for on-line mass storage and archiving of data.

The PUP workstation is a dual-screen multi-window graphics workstation that used RPG data to create high-quality color displays. A variety of network and communication options allow any PUP workstation to access weather products across the entire network of local and remote radars.

NEXRAD WSR-98D

Specifications

Radar Data Acquisition (RDA) Unit

Radar Range

Reflectivity: 460 km (248 nm)

Velocity: 230 km (124 nm)

Antenna

Type: S-band, center-feed, parabolic dish

Size (dia.): 9m (28 ft.)

Beam-width: 0.99°

Gain: 45.0 dB

Polarization: Linear horizontal

Side Lobes (with radome): -27 dB

Boresight Accuracy: 0.33°

Pedestal Type: Elevation over azimuth

Pointing Accuracy: ± 0.2°

Readout Precision: ± 0.1

Acceleration: ± 17°/sec²

Azimuth Rate (max): +34.5°/sec (6 rpm)

Elevation Rate (max) ± 34.5°/sec

Transmitter

Frequency Range: 2.7 to 3.0 GHz

Peak Power Output: 750 kw

Average Power Output: 1.56 kw

Pulse Widths: 1.6, 4.5-5.0 μ sec

Range Sample: 250m (0.13 nm)

Pulse Repetition Frequency:

Long: 318 to 452 pulses/sec

Short: 318 to 1304 pulses/sec

Receiver/Signal Processor

Temperature Stability: 0.0005% over temp. range

Receiver Channels: Linear output/Log output

Dynamic Range: 95 dB

Signal Processor: Programmable

Clutter Canceller: Map controlled digital filters, up to 50 dB suppression

Radar Product Generator (RPG)

Processor: Pentium II based real-time workstation

Archive device: Read/write optical disk

Unit Control Position: Application console, system console with optional printer

Communications

Wideband: One T1/E1 standard port (1.544/2048 Mb/sec radar base data)

Narrowband: 1 PVC, 128 Kbps, dedicated or dial-up lines; LAN.

Advanced Principal User Processor (PUP) Workstation

Processor: Pentium II-based graphics workstation



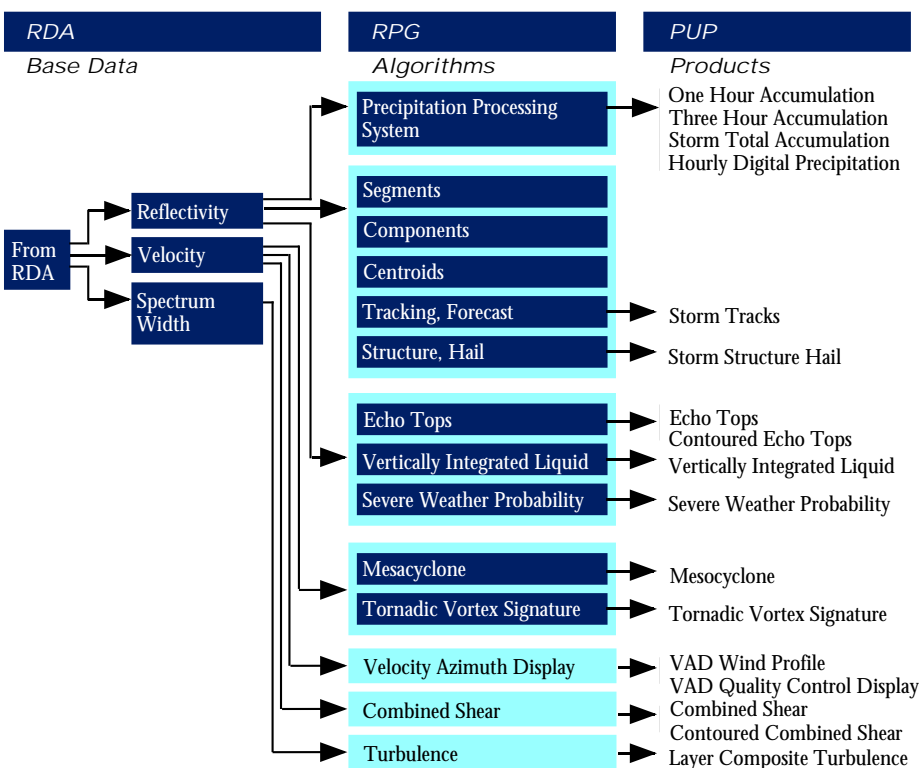
Video: Adaptable 16-million color palette look-up tables, multi-window, zoom and time lapse functions

Display: Dual 19-inch CRT high-resolution color monitors

Hardcopy Device: Color, dual-mode printer

Archive Device: Read/write optical disk

Algorithm Processing/Products



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