FRONTIER FES
ELECTRONIC SYSTEMS

A Woman-Owned, Native-American Small Business

SPQ-15(V)
DATA DISTRIBUTION SYSTEM

The AN/SPQ-15(V) DDS provides for distribution of radar video data over an open architecture LAN to Open Architecture Computer Environment (OACE) compliant display consoles and legacy consoles. The DDS architecture, illustrated below, allows for direct interface to standard Navy radars and IFF sensors. Radar Interface Modules (RIM) provide conversion from analog radar signals to an open architecture Internet Protocol (IP) delivered over an Ethernet LAN.

A publish/subscribe scenario, using the multicast capabilities of the Ethernet switch, provides the switching functionality, replacing the specialized switch hardware traditionally required to distribute analog radar signals. The DDS also provides software-based scan conversion of the radar video to facilitate interfacing to open architecture compliant display consoles implemented on Commercial Off the Shelf (COTS) computer hardware. An Application Program Interface (API) provides the ability for the software on the display console to be modified to take advantage of the DDS scan conversion.

Display Interface Modules (DIM) provide the conversion from the IP protocol data back into analog signals for legacy consoles. Legacy equipment requires zero modification for connection or operation. System interfaces are identical to existing systems with far fewer components and the replacement of copper cabling with light-weight fiber optic cabling.

Key Features

- Dwell by dwell distribution of radar video so that no information is lost
- Direct Interface to existing radars and display consoles
- Direct interface to OACE compliant display consoles
- Software-based radar scan conversion implemented in OA Linux servers
- Modular, scalable architecture to accommodate the number of radars and display consoles
- Hot-swappable VMEbus modules
- Designed for shipboard environment
- Multicast—allows any radar to any display via scan converter server

Radar Data Scan Converter

The DDS provides software-based Radar Video Scan Conversion to provide raster-based image data to OACE compliant display consoles. The scan conversion is implemented on OA COTS Linux servers that off-load the scan conversion computations from the display console. The scan conversion provides real-time image updating for PPI, A-Scan, and B-Scan format displays.

The scan-converted video is used to create a bitmap layer that may be displayed alone or combined with tactical information overlay and map data underlay graphics. An API provides the application software engineers with function calls to select the desired radar to be viewed, size of window, coverage area, fading options, etc.

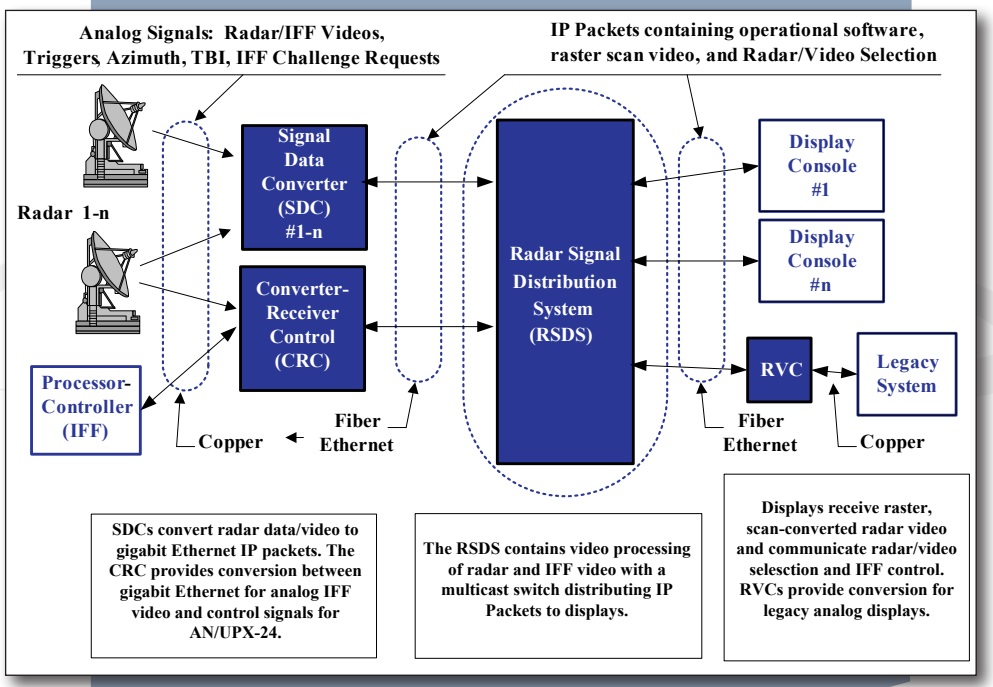
Distribution Network

Distribution of radar data is accomplished in a publish/subscribe scenario using the multicast capabilities of a gigabit Ethernet LAN Switch. The number of ports on the switch is dependent on the compliment of radars and display consoles to be supported. The capacity of the gigabit Ethernet LAN switch may be tailored to specific installation requirements.

Analog Radar Interfaces

The system is designed utilizing RIMs in a 6U VMEbus form factor. The RIMs are housed within an independent Signal Data Converter (SDC) located in the radar equipment room. SDCs provide conversion for as many as four radars. The RIM design accommodates multiple radar azimuth data interfaces, such as 5-Wire Synchro, Parallel Sin/Cos, ACP/ARP, and 6-Wire (UYA-4). However, other azimuth formats are easily adapted. The RIM design accommodates both azimuth sweeping and azimuth hopping radars. RIM modules are hot-swappable.

Each RIM digitizes two radar video signals at a 40 MHz rate, with 8 bit samples. The 40 MHz samples are combined to minimize the data rate while ensuring the range cell of the radar is accommodated. The 8 bit range of each video sample is used to normalize to a 4 bit sample with respect to a maximum input voltage. The digitized video is combined with the appropriate azimuth, trigger, and True Bearing Indicator (TBI) signals in IP packets and output via a gigabit Ethernet fiber optic interface.

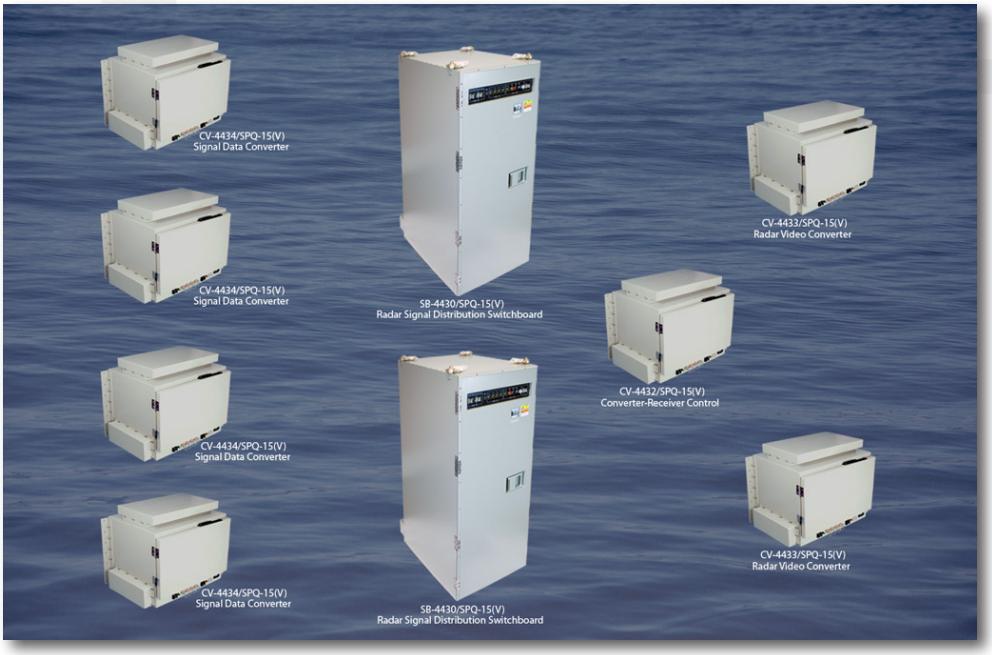


Display Radar Interfaces

The LRADDS API allows the radar to output polar data directly, eliminating the need for analog signal digitization provided by the SDC. This data is provided to a gigabit Ethernet interface and is directly compatible with the software-based scan converter.

Legacy Display Console Interface

DIMs are also designed around 6U VMEbus technology. They are housed in the Radar Video Converter (RVC). The DIM accepts gigabit Ethernet fiber optic data stream from the multicast switch, decodes the incoming messages, then converts the digitized video to analog format. DIM modules are hot-swappable.



IFF Interface

IFF Interface Modules (IIM) are also designed around 6U VMEbus technology. They are housed in the Converter-Receiver Control (CRC). This unit provides the translation of the IFF video and control interfaces from the AN/UPX-24 CP-1273 into a standard video data format, which is available to the scan conversion servers to allow the overlay of the IFF Video with the synchronized radar video. This video is provided over a gigabit Ethernet fiber optic interface.

Frontier Electronic Systems Corp.,
4500 W. 6th Avenue
Stillwater, OK 74074

1-800-677-1769
www.fescorp.com
info@fescorp.com