

Our LAN Radar Data Distribution System (LRADDS) provides for distribution of radar video data over an open architecture LAN to Open Architecture Computer Environment (OACE) compliant display consoles and legacy consoles. It also allows for direct interface to standard Navy radars and IFF sensors and legacy analog consoles.

Analog Radar Interfaces

The system is designed using Radar Interface Modules (RIMs) in a 6U VMEbus form factor, which may be housed in existing VMEbus card cages (within existing equipment cabinets) or in independent enclosures (located in the radar equipment room).

RIMs convert analog radar signals to an open architecture Internet Protocol (IP) and deliver multicast packets over an Ethernet LAN. Each RIM accepts two (2) radar videos and a variety of azimuth format signals (ACP/ARP, Parallel SIN/COS, 5-Wire Synchro, 6-Wire SPY, and Resolver). However, other azimuth formats are easily adapted.

RIMs digitize radar video signals at a 40 MHz rate, with 8 bit samples. These 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 four 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.

The RIM design accommodates both azimuth sweeping and azimuth hopping radars, and RIM modules are hot-swappable.

Radar Video Scan Conversion

A software-based scan converter is installed on host Radar Scan Converter Processors (RSCP), which are Linux servers that off-load the scan conversion computations from the display console. This software processes the ship's radar video streams (as provided by the RIMs) for display on digital display consoles. 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.

System interfaces are identical to the Navy's existing AN/SPQ-14, ASDS, and AASDS systems with far fewer components and the replacement of copper cabling with light-weight fiber optic cabling.



Frontier Electronic Systems provides real-time, efficient, and cost effective digital radar distribution for a wide array of government and military applications, from small-scale radar distribution to large, system-wide programs.

Display Radar Interfaces

The LRADDS API allows the radar's application to generate LRADDS polar data directly, eliminating the need for analog signal digitization. This data is provided to a gigabit Ethernet interface and is directly compatible with the software scan converter.

Distribution Network

Distribution of LRADDS 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.

The multicast capabilities of the Ethernet switch replaces the specialized switch hardware traditionally required to distribute analog signals.

The COTS network switch provides the copper and fiber-optic Ethernet connectivity to networked equipment within the following parameters:

- Hybrid 1000Base-LX and 1000Base-T ports
- Managed Layer 2/3
- Multicast support IGMP snooping

Legacy Display Console Interfaces

LRADDS can provide distribution to legacy equipment. Display Interface Modules (DIM) provide the conversion from the IP protocol data (as provided by RIMs) back into analog signals for legacy consoles. This provides the same gigabit Ethernet distribution, but to legacy displays as well. And with LRADDS, your legacy equipment requires no modification for connection or operation.

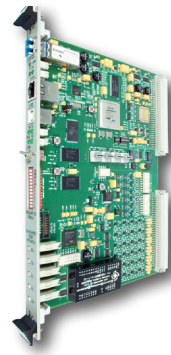
The DIM accepts gigabit Ethernet fiber optic data streams from the multicast switch, decodes the incoming messages, then converts the digitized video to analog format. DIMs are also designed around the 6U VMEbus technology and are hot-swappable.

IFF Interface

LRADDS also provides an interface with IFF systems. Our IFF Interface Modules (IIM) provide the translation of the IFF video and control interfaces from the AN/UPX-24 CP-1273 into standard LRADDS video data format, which (similar to radar video through a RIM) is available to the scan conversion servers for inclusion of IFF Video overlay with the synchronized radar video. This video is provided over a gigabit Ethernet fiber optic interface. As with all of our interface modules, IIMs utilize a 6U VMEbus form factor and are hot-swappable.

System Diagnostics

LRADDS includes powerful integrated system diagnostics tools, which allow you to quickly and accurately troubleshoot failures in monitored equipment components by means of Simple Network Management Protocol (SNMP). Use our graphical user interface to view overall system health or even view specific video channels for diagnostic purposes.



Radar Interface Module (RIM)

- 2-video (20 MHz bandwidth)
- TM and TE triggers
- True bearing indication
- Radar azimuth options:
 - 5-Wire Synchro
 - 6-Wire (UYA-4)
 - 3-Wire (UYQ-21)
 - ACP/ARP
 - Parallel SIN/COS
- Fiber optic gigabit Ethernet output



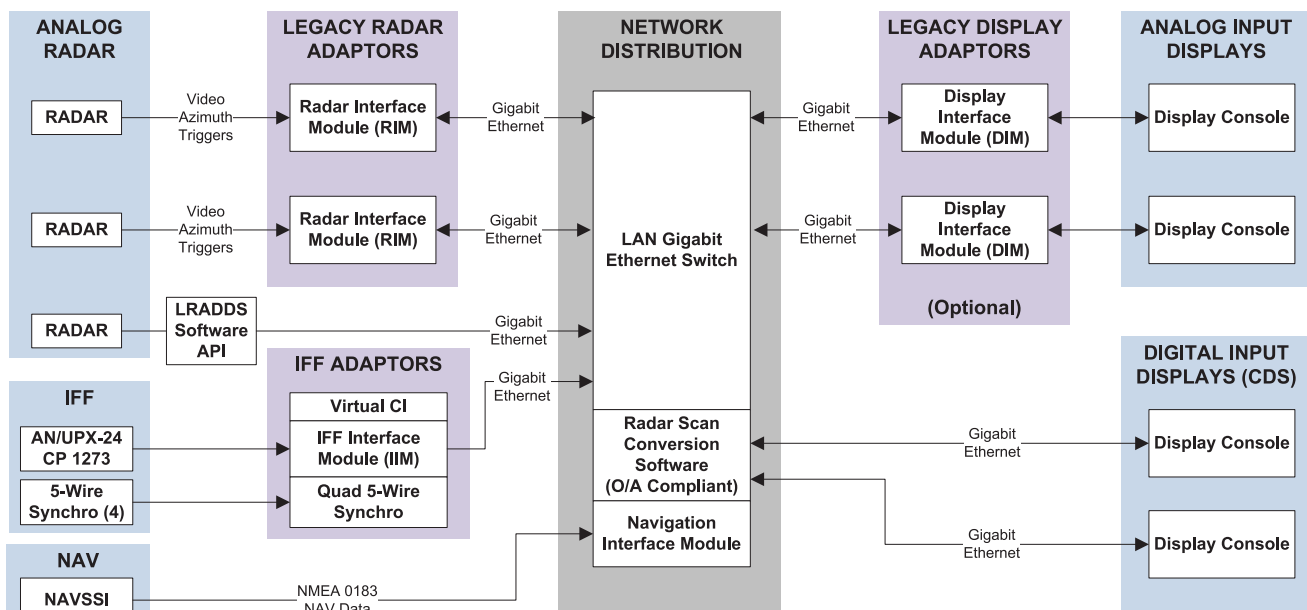
Display Interface Module (DIM)

- 2-video (20MHz bandwidth)
- TM and TE triggers
- True bearing indication
- Display azimuth interface options:
 - 5-Wire Synchro
 - 3-Wire (UYQ-21)
 - RADDS (MIL-STD-751B)
 - ACP/ARP
- Fiber optic gigabit Ethernet input



IFF Interface Module (IIM)

- Compatible with AN/UPX-29 system
- Handles two (2) video channels
- Fiber optic gigabit Ethernet I/O



LAN Radar Data Distribution System (LRADDS)



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