

MILNET AWA

DATA BUS FOR NAVAL COMBAT SYSTEMS



DEFENCE SYSTEMS

Products/Service	HF Transmitters HF Receivers BAWRA Ionobuoy Software MIL Spec Data Bus
Systems	Communications Command & Control Avionics EW Magnetic Range Radar Air Traffic Control Networks
Turnkey Capability	System Design, Integration and Manufacture Logistic Support
Services	Quality Assurance Level A3821 Cleared Facility Status

TRANSMISSION SYSTEMS

Products	Small Capacity Analogue & Digital Radios Optical Fibre Terminals High Capacity Microwave Radio Systems High Capacity Optical Fibre Systems Multiplexers Optical Fibre Networks
Turnkey Systems	Design, Manufacture, Installation and Logistic Support

AIRWAYS SYSTEMS

Products	DME & DVOR Systems
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Defence and Transmission Division
NORTH RYDE TECHNOLOGY GROUP
Amalgamated Wireless (Australia) Limited
Incorporated in New South Wales

Cnr. Talavera & Lane Cove Road, North Ryde, NSW
PO Box 96, North Ryde 2110 NSW Australia
Telephone: (02) 887-7111
Int: (61) (0) 887-7111
Cable: "WIRELESS" Sydney
Telex: AAJ0623
FAX: 61-2-887-7333 (GIB/1 Auto Answer)



INTRODUCTION

Data Bus technology has now evolved as an integral part of distributed processing and control systems in modern Naval combatants.

The 1st Generation of Data Buses used in a Shipborne environment were developed to transport information such as low-speed synchro, voice-intercom, sonar-audio, processed data, control and status. The total capacity of these 1st Generation Buses can range up to 30 Mbps.

The 2nd Generation Data Buses now emerging are designed to provide all the features of 1st Generation, with the additional capability of transporting wide bandwidth digitized raw sonar, radar and video information. The total capacity of these 2nd Generation Buses can be in excess of 300 Mbps depending upon applications.

Building on the experience of AWA's 1st Generation commercial Data Bus product AWANET, AWA have developed their 2nd Generation product MILNET, targeted specifically towards the Naval environment.

MILNET is a general purpose, time division multiplex Data Bus, which employs state-of-the-art fibre optic technology, providing interference immunity, security and long-term capacity growth. Its high reliability triple redundant configuration and flexible Bus design, offers a modular, cost effective growth path from 30 Mbps to 480 Mbps to meet immediate and long-term needs.

MILNET

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AWA

MAIN FEATURES

MILNET provides the following capabilities to ship and combat system designers:

- Hierarchical network design provides communications compatibility, flexibility and security. The MILNET backbone interfaces to standard cluster networks such as V24, Ethernet, MIL-STD-1553, STANAG 4103 and STANAG 4186.
- Channel capacity and access protocols can be dynamically allocated to suit immediate subsystem priorities and requirements.
- Handles time-continuous and bursty data. Time-continuous information, such as raw or pre-processed sonar, video, radar, radio, and intercom can be allocated dedicated or circuit channels which are contention-free. Bursty information, such as processor, display, telemetry, control and navigation data are allocated access to one or more token-ring packet channels.
- MILNET can be configured as a single Data Bus or as a Data Network with up to three identical and physically separated Data Buses, offering increased survivability and transport capacity.
- Each Bus may be configured as a single or dual ring. Addition of secondary ring redundancy and passive bypass options makes MILNET ideal for Naval ships where both cable and equipment damage are possible.
- Useful single Bus capacity is expandable from 30 Mbps to 180 Mbps without the need for backbone re-cabling or major equipment changes.
- Communications between Data Bus nodes is in serial form over optical fibre cable. Short distance communication can alternatively be in parallel form over shielded multi-pair cable. The option of mixed transmission media allows the ship and system designers to optimize the Network in terms of performance, reliability and cost.

NETWORK STRUCTURE

A MILNET Data Network is composed of the following parts:

BACKBONE NETWORK

Up to 3 Data Buses, each consisting of counter-rotating primary and secondary rings, connecting distributed communications nodes.

CLUSTER INTERFACE UNIT (CIU)

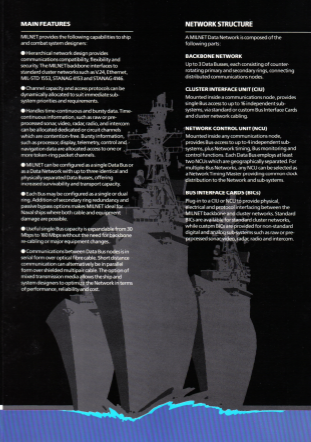
Mounted inside a communications node, provides single Bus access to up to 16 independent sub-systems, via standard or custom Bus Interface Cards and cluster network cabling.

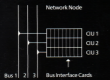
NETWORK CONTROL UNIT (NCU)

Mounted inside a communications node, provides Bus access to up to 4 independent sub-systems, plus Network timing, Bus monitoring and control functions. Each Data Bus employs at least two NCUs which are geographically separated. For multiple Bus Networks, any NCU can be selected as a Network Timing Master, providing common clock distribution to the Network and sub-systems.

BUS INTERFACE CARDS (BICs)

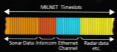
Plug-in to a CIU or NCU to provide physical, electrical and protocol interfacing between the MILNET backbone and cluster networks. Standard BICs are available for standard cluster networks, while custom BICs are provided for non-standard digital and analog sub-systems such as raw or pre-processed sonar, video, radar, radio and intercom.





FRAME STRUCTURE

The Time Division Multiplex structure of MILNET is split into a number of user definable service bands.



Each band is headed with band length, address etc. and tailed with a cyclic redundancy check bit. This approach has the data integrity approach of packetized transmission protocols with the no-congestion, fixed minimal delay advantages of circuit switching.

TECHNICAL CHARACTERISTICS

Topology	Triple-Bus (each bus, dual ring)
Transport Medium	Optical Fibre or Shielded Multipair cable.
Maximum distance between nodes	1000 metres Optical Fibre (850nm) 20 metres Multipair cable (95402)
Data Rate	Selectable 30 Mbit/s to 100 Mbit/s per bus.
Bit error rate	Better than 1 in 10 ⁹ .
Maximum no. of users	256 nodes x 16 users/node.
User Interfaces	Standard cluster network protocols - Ethernet - MIL-STD 1553 - V24 - STANAG 4186, 4153 Customs analog/digital interfaces for sonar, radar & intercoms, etc.

