NIU

Navigation Interface Unit

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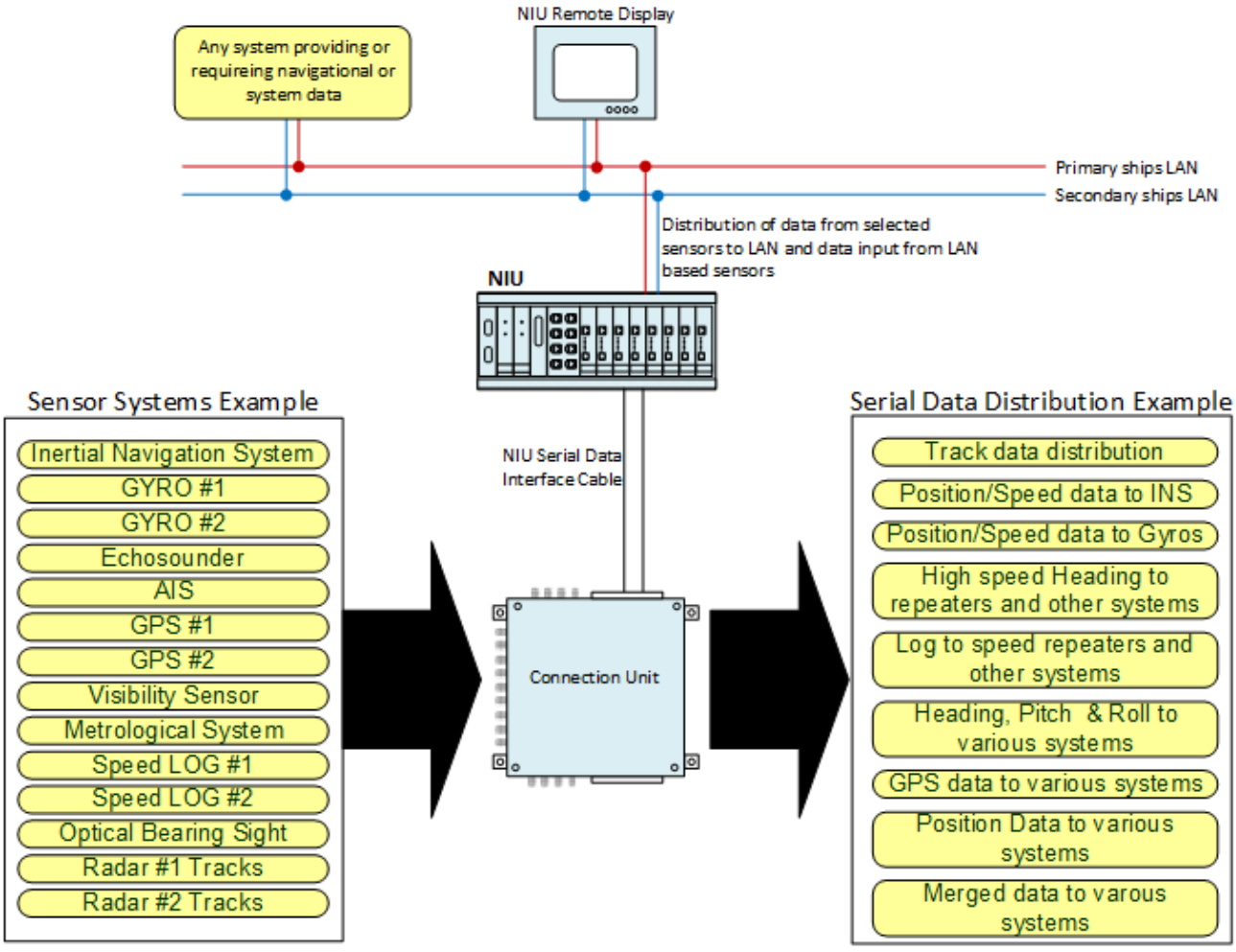
Introduction

The “Navigation Interface Unit” (NIU) is a data distributor, data translator and data monitor for ships using multiple navigational sensors (e.g. GPS, Gyro, INS, Log, AIS, Weather Stations, etc.) and having a large number of systems requiring data from these sensors.

This unit can act as a centralized gateway between navigational sensors and any equipment using the data transmitted from these sensors.

In addition to performing simple sensor data distribution/data buffering, the NIU can also adapt the sensor data (alter transmission speed, alter transmission frequency, message filtering, do protocol conversions and mix data from multiple interfaces) in a vast number ways to meet the requirements of each individual system using this data.



NIU Features:

Data processing

- Simple buffering of serial data (one input to one or many serial outputs)
- Data format conversion (e.g. Proprietary to standard NMEA format)
- Transmission speed conversion (Data rate, Baudrate conversion)
- Combining data from different sensors into a single output interface
- Data filtering (only allow distribution of specific data messages, e.g. only distribute NMEA GGA, ZDA, VTG messages from a GPS unit)
- Data message manipulation (e.g.. add time stamp data, change data source indicator etc. to a data message before redistribution)
- Distribution of data from (Auto Selection) the best/prioritized data source (e.g. Auto selects best position data from GPS#1, GPS#2 or INS. Only the best source is distributed to user systems. Criteria may be a combination of: Highest priority sensor, data quality and data validity)
- Act as a low latency media converter: Serial Data -> LAN, LAN -> Serial Data
- Automatically links up to 4 serial input/output pairs for each DDM module when powered off (providing data from sources to critical systems even when NIU is off or DDM failure has occurred)

Setup and configuration

- Fully user configurable data interfaces and data distribution functionality via standard computer software
- Add physical interfaces by installing additional data processing modules
- New or existing interfaces is configured using a configuration software tool
- Modular hardware design allows custom equipped unit (Each NIU is mounted with only the number of interfaces required by the customer)

Customization and options

- Custom adaptations and proprietary interface protocols can be implemented on request
- All physical cable connections for serial data are located in one single easily accessible connection unit
- Operator display unit for data distribution control, system health overview, sensor health overview and other customized features

Other features

- Hot swappable data processing modules (DDM)
- All DDM units are the same and can be put in any slot position in NIU (automatically configured according to position in NIU)
- Each processing board has a USB connection for maintenance purposes (detailed unit status and data interface status overview)
- Prepared for 19” rack mount (4U height) and telescopic rails
- Dual internal power supply option (24VDC and/or 115-220VAC)

NIU Modules

Data Distribution Module (DDM)

- Primary data processing and routing module
- 8 individual RS422 inputs and output interfaces per module
- Up to 8 DDM modules per NIU
- Ethernet and CAN bus interfaces
- High speed dedicated DSP type processor for data handling
- Each module has Independent operation
- Can operate in single or redundant mode (DDM module pair)

Serial data Buffer Module (SBC):

- Independent multi-input (2 or 3) RS422 buffer unit
- Up to 8 modules per NIU
- On-Card Setup options: 1 to 8 and 1 to 4 buffer or
  3 separate 1 to 4 buffers

HDLC Module:

- Independent Synchronous HDLC format conversion module
- Customizable data formats, timing (clock) and data rates
- Interfaces: Two UART based RS422 data inputs, 1 HDLC input and 1 HDLC output (3 buffered HDLC outputs).
- Converts data from UART serial data to HDLC (Data + Clock)
- Converts data from HDLC to UART serial data (RS422)
- Fixed or Evaluation of best of multiple data inputs:
  HDLC input and/or UART inputs
- Internal or external HDLC clock

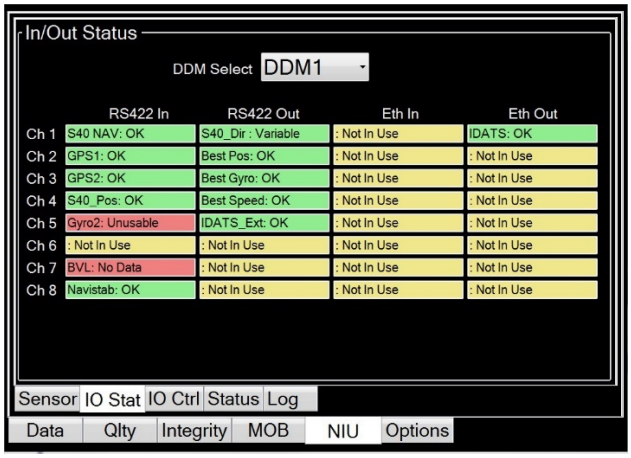
Custom made modules:

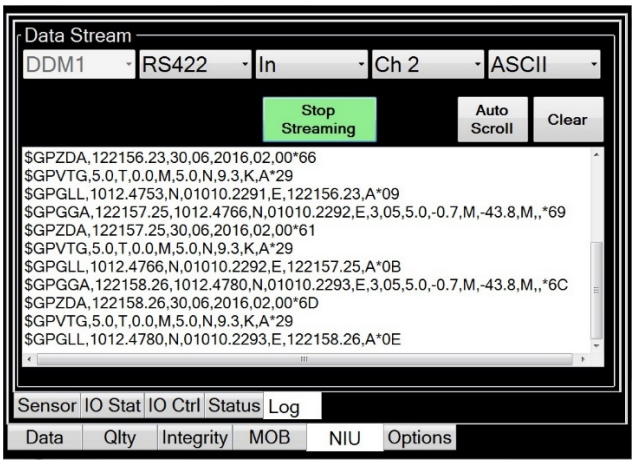
- Custom made modules to fit in NIU housing
- Typical solutions:
  - Synchro to digital
  - Analog to digital

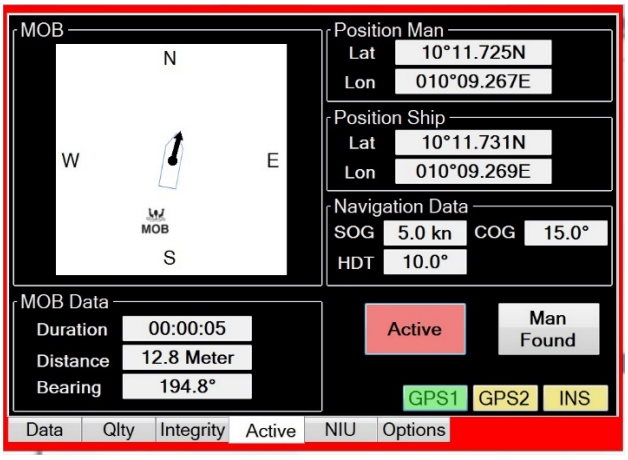
NIU Peripherals

Remote Display

- Panel PC based NIU Remote Control and Status unit
- Multiple display sizes available
- Ethernet interface to NIU
- Provides NIU status information
- View various data and status information from sensors connected to NIU
- Allows selecting sensors to be the sources for official ships navigational data (Manual or Auto selection)
- Deviation alarms for different sensor types
- Data distribution status overview
- View raw data streaming from NIU input and output interfaces
- Control (enable/disable) each individual NIU serial input or output interface
- Custom features can be implemented

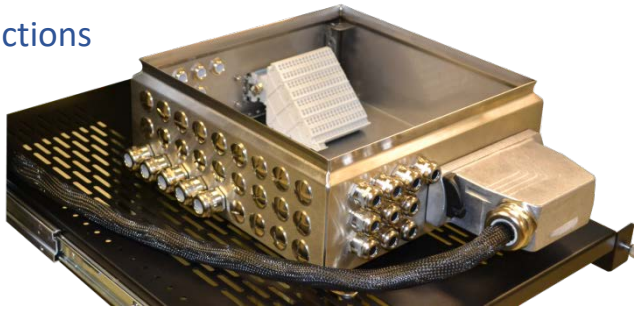






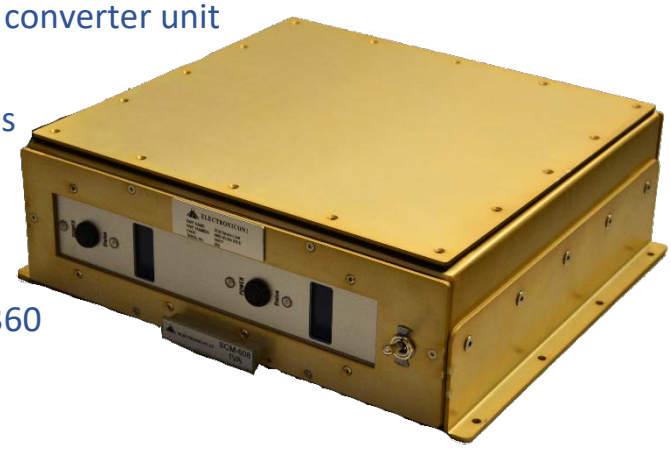
Interface Cable Connector Box

- Separate unit for termination of all serial data interface cables
- Allows flexibility regarding physical location of NIU unit and interface cabling
- Easy connection to the main NIU unit
- Easy access to all physical interface connections
- Easy connection of new interfaces or modification of exiting interfaces
- Optional 19” rack mount with telescopic rails



Synchro Module

- Standalone serial data to Synchro format converter unit
- Dual synchro output (1VA each)
- Fine + Coarse or two independent outputs
- 90V L-L (115V ref) or 11,8 V L-L (26V ref)
- Selectable formats
    - Heading, Roll, Pitch or custom
    - Ratio 1:1, 1:2, 1:4, 1:36, 1:45 or 1:360
- Two RS422 serial data input interfaces
- Status display for each synchro output
- Customizable serial data input formats



Technical Data

Parameter: / Unit:	NIU	Remote Contr. (12.1" version)	Connection Box (19",64 I/O version)	Synchro Module
Dim (HxWxD) mm	177x482x378	272x70.9x314	150x403x482	103x300x315
Weight kg	12.8	4.9	5.2	5.4
Power input	24VDC and/or 115-220VAC	24VDC and/or 115-220VAC	NA	18-36VDC
Enclosure Material	Aluminium	Aluminium	Aluminium	Aluminium
Data Interfaces	Up to: -64x RS422 Rx -64x RS422 Tx -3x Ethernet -3x HDLC Tx -1x HDLC Rx	-1x RS422 Tx/Rx -1x RS232 Tx/Rx -2x Ethernet USB etc.	128 individual connection points	-2x RS422 Rx -2x Synchro Tx
Operating Temp.	0˚ to 55˚C	-15˚ to 55˚C	NA	0˚ to 55˚C
Storage Temp.	-40˚ to 70˚C	-20˚ to 60˚C	NA	-40˚ to 70˚C
Relative Humidity	0% – 95% Non-Condensing	0% – 95% Non-Condensing	NA	0% – 95% Non-Condensing
Shock	10G, 10ms, half sine x, y, z axis		NA	10G, 10ms, half sine x, y, z axis
EMI/EMC	MIL-STD-461G Table V (A marked) RS103 limited to 1Ghz.	IEC 60945	NA	
ESD	EN61000-4-2	IEC 60945	NA	