

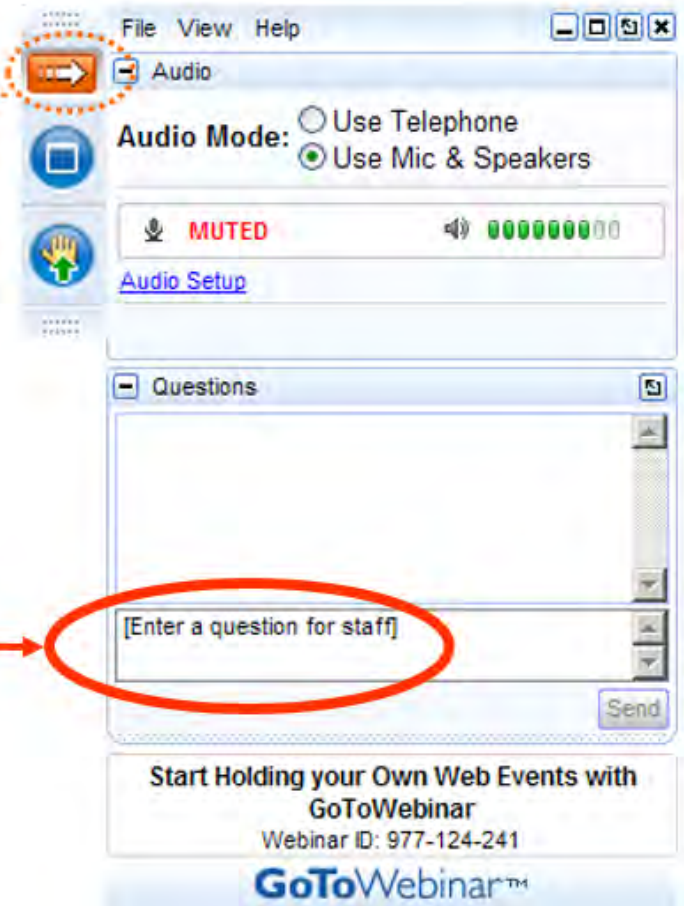
# NDB Systems for the Offshore Market



# Your questions please?

(if you don't see the control panel, click on the orange arrow icon to expand it)

Please enter your questions in the text box of the webinar control panel (remember to press send)





# Corporate History

- Design, manufacturing, sales and support of  
**Navigational products**  
**AM and FM broadcast transmitters**  
**Industrial RF & Communications products**  
**Sonar**
- Established in 1969 (**50<sup>th</sup> anniversary in 2019!**)
- Products installed in over 177 countries
- Exceptional field reputation for reliable products
- Dedicated, long-term staff
- Quality Management System audited by Bureau Veritas and registered/certified to **ISO 9001:2015**.

# Facilities



## **Nautel Limited**

Nova Scotia, Canada:

- Headquarters
- Design, Production
- + 70,000 sq. ft.



## **Nautel Maine, Inc.**

Maine, USA:

- Production
- + 36,000 sq. ft.



## **Nautel C-Tech**

Ontario, Canada:

- Sonar products
- Design, Production

Additional Parts Depots - Memphis, TN USA & Oakhanger, Hampshire, UK  
Customer Service Center – Quincy, IL USA

# Production Capabilities



***Computerised Fabrication Shop***



***PWB Assembly***



***Light Assembly***



***Final Assembly***



***Final Production Test***



***Packing and Shipment***



# Product Families

AM



J1000



NX3



NX5



NX10



NX15



NX25



NX50



NX100 to 2 MW

FM



VS Series



NVLT Series



GV Series

Navigation



Vector Series NDB/DGPS/Navtex



NDB/DGPS/Navtex Antenna Tuning Units



NL Series Next Generation Loran



LF Antennas



Industrial RF



HF Amplifier



LF/VLF Comms



NG Series  
Weather Radio Transmitters

SONAR



NS Series  
LF High Power Amplifier

# Product Families

## Offshore NDB Applications

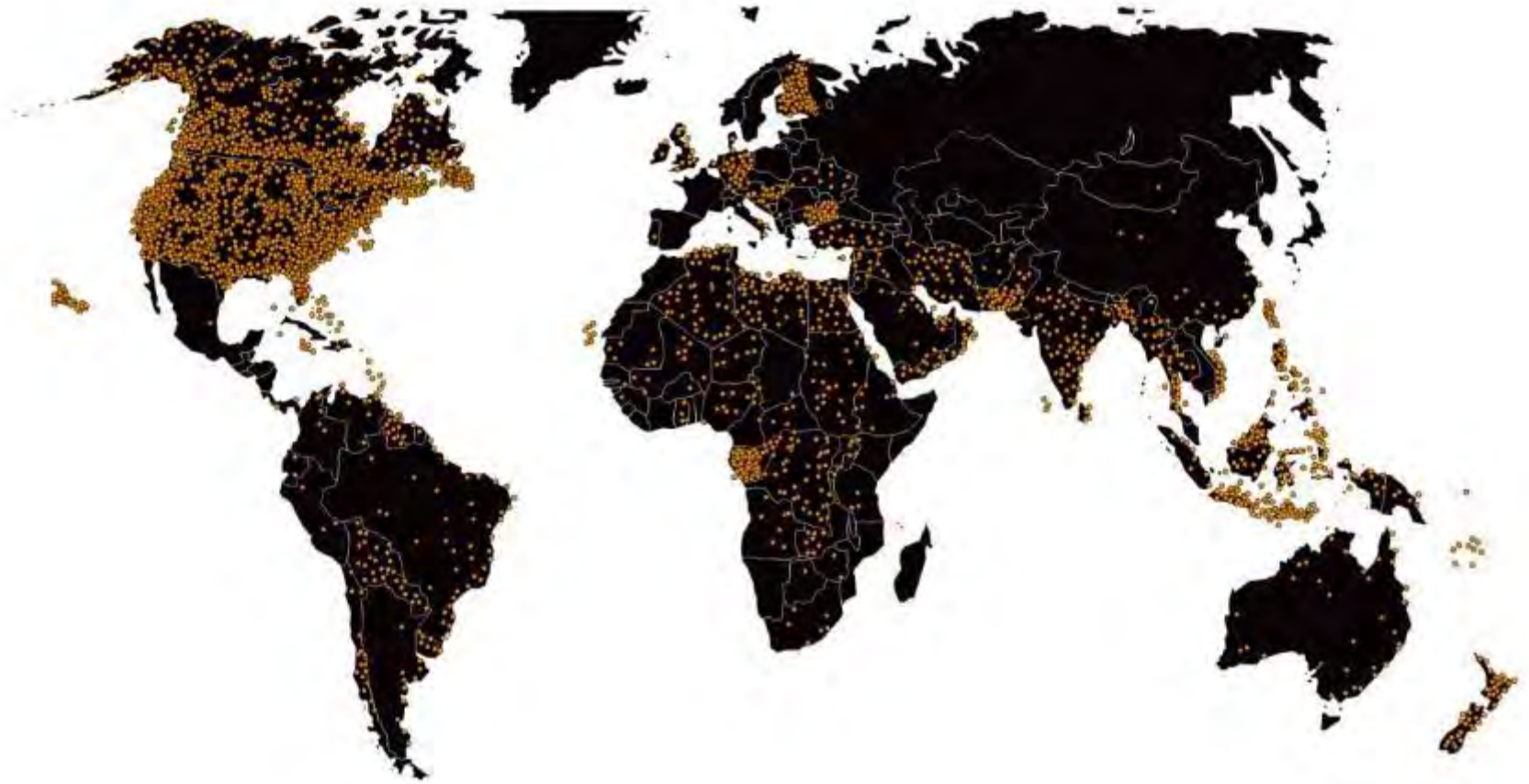


Oil/Gas Rigs/Platforms, FPSO's  
and support vessels



Wind farms

# Worldwide Navigation Customers





# NDB Overview

## Non-Directional Radiobeacon (NDB):

- Used to guide helicopters to offshore platforms and vessels
- Operate in the Low and Medium Wave frequency band at 190-1250 kHz and 1600-1800 kHz
- AM transmission of platform/vessel identification via keyed Morse code
- Operate into physically short antenna (Helideck long-wire or whip)
- Need to be highly reliable and require minimal maintenance
- Radiated signal from the NDB antenna is omni-directional



# NDB Overview

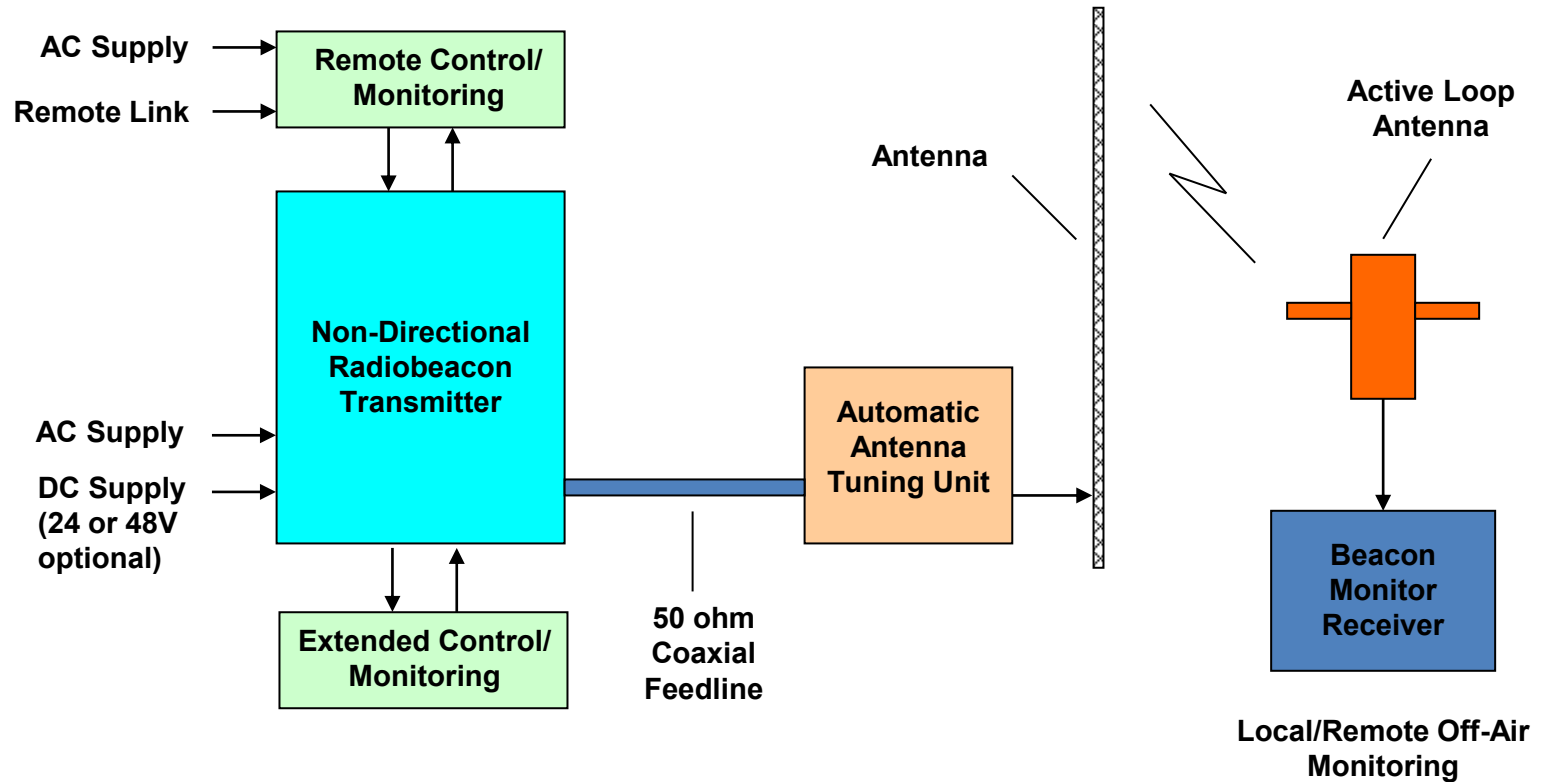
## ADF Receiver (located in helicopter):

- Consists of a simple, frequency selectable receiver and indicator
- Acts as a field strength meter, with a direction-finding needle
- Needle points towards the strongest source of the selected carrier frequency
- As the helicopter approaches the platform, the signal strength from the NDB antenna increases, and the needle points towards the direction of the platform or vessel



# NDB Overview

## TYPICAL NDB SYSTEM



# Offshore NDB System Components

**VR125**



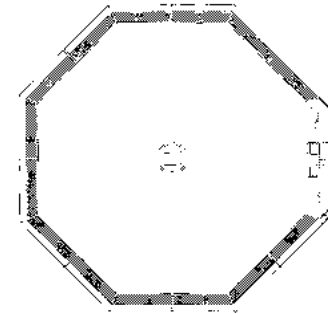
*125 W NDB Transmitter*

**ATU500SROS**



*Antenna Tuning Unit*

**CL-HD**



*Helideck Antenna*

**VR-Link2 with ECMP3**



*Remote Control/Monitor with  
Extended Control/Monitor Panel*

**NRB4**



*Beacon Monitor Receiver*

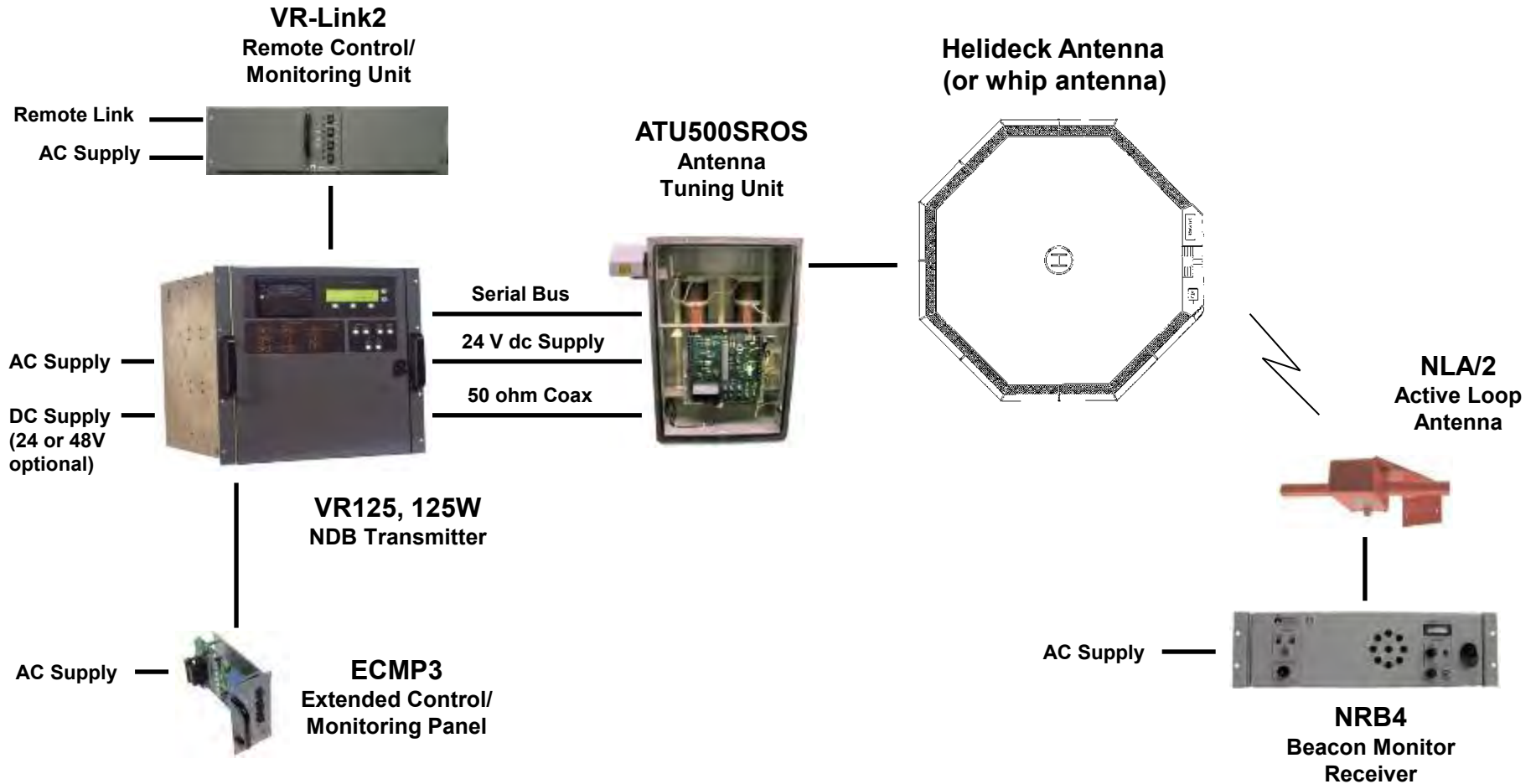
**NLA/2**



*Active Receiving Loop Antenna*

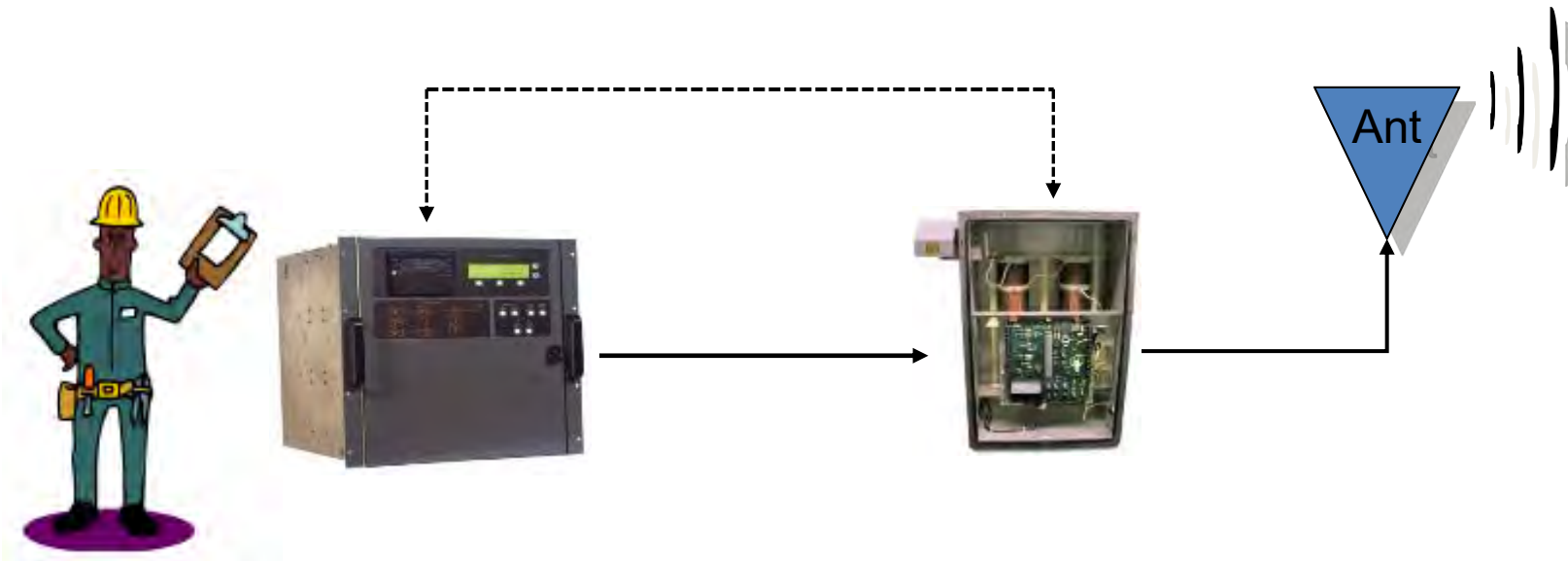


# VR125, 125 Watt Offshore NDB System



# VR125, 125 Watt Offshore NDB System

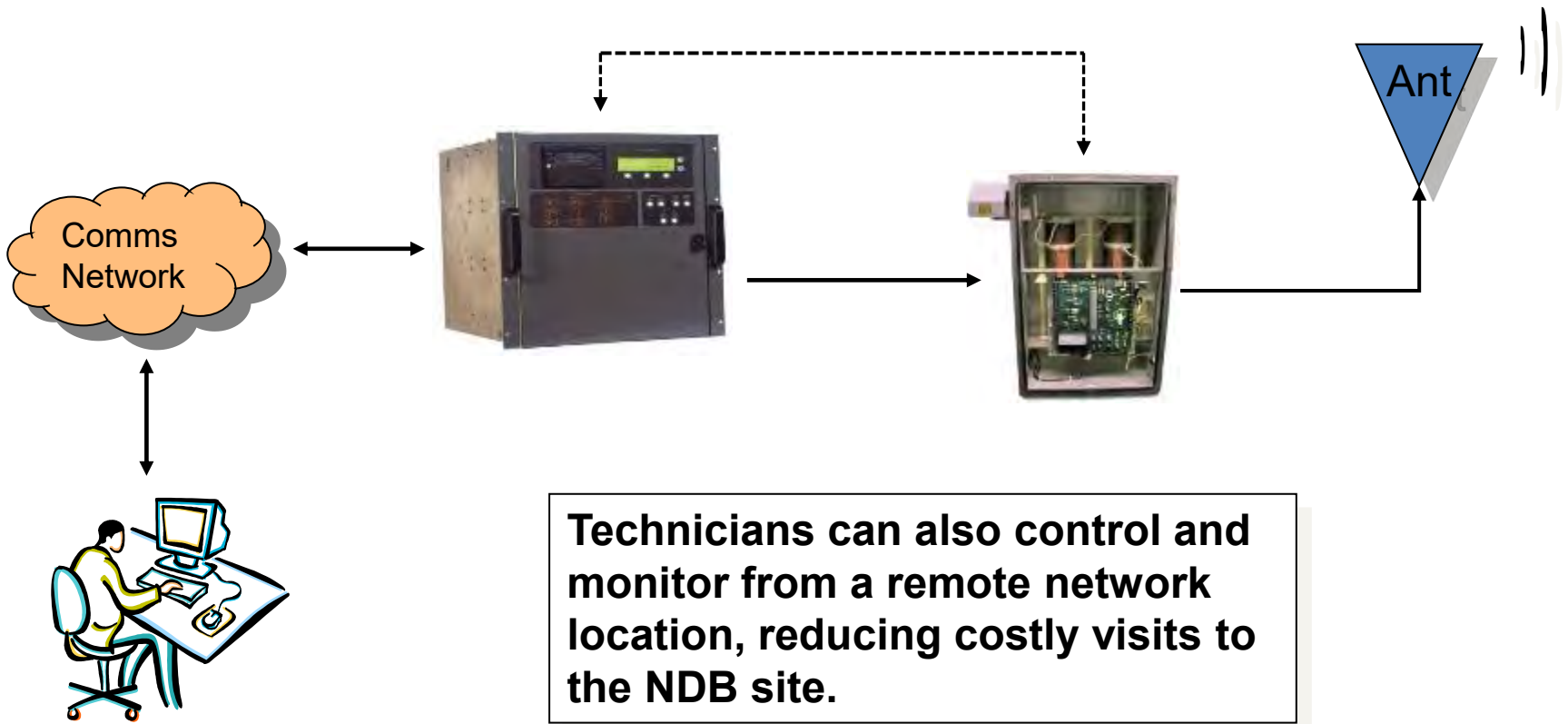
## Remote Control and Monitoring



**Serial interface bus allows a technician to control and monitor the ATU from the transmitter, where the RF field is well below unsafe levels.**

# VR125, 125 Watt Offshore NDB System

## Remote Control and Monitoring



Remote Network Location

**Technicians can also control and monitor from a remote network location, reducing costly visits to the NDB site.**

# VR125 NDB Transmitter

- Available in Single, Field Upgradeable Single and Dual (Main/Standby) Configurations
- Standard NDB carrier frequency band (190 kHz – 535 kHz) or Extended band (536 kHz – 1250 kHz and 1600 kHz - 1800 kHz)
- Standard emission modes: N0N, A2A, A2A & A3E
- Built in Diagnostics allows the user to easily identify fault to Lowest Repairable Unit locally or remotely
- Nonoperational side can be tested locally or remotely without need for dummy load while main side remains on air
- Enhanced Remote Control/Monitor to extended and remote control/monitoring locations





# Graphical User Interface and Display

## Analog Meter

User configurable display including, but not limited to, any one of any one of the following parameters: Forward Power, Reflected Power, Antenna Current, Modulation Percentage, DC Voltages, DC Current, VSWR, AC Voltage, Transmitter Temperature and PA Volts

## System Diagram

Provides user with local display of the status of the critical blocks within the transmitter



## Diagnostic Display

Allows complete local transmitter and ATU control, status and local/remote health monitoring, with digital metering and 256 event log

# Reliability, Repair Time & Warranty

## Reliability

- MTBF greater than or equal to 12,590 hours for single transmitter and 17,640 hours for dual transmitter using MIL\_HDBK 217E calculation methods

## Repair Time

- MTTR (mean time to repair) less than or equal to ½ hour at PWB/module level

## Warranty

- 36 months from date of shipment

# Compliances

- Designed with intent to comply with Safety Code 6, IEEE C95.1-1999
- Industry Canada RSS-117
- ICAO Annex 10, Volume 1, Part 1, Section 3.4
- R&TTE 1999/5/EC
- Compliance with EN60215:1996 safety requirements for radio transmitting equipment
- ANATEL
- SIRIM
- POSTEL
- FCC

# VR125 Installation



VR125, 125 Watt NDB Transmitter (front)



# VR125 Installation



RF Output (Type N) & Ground



AC Input, ON/OFF



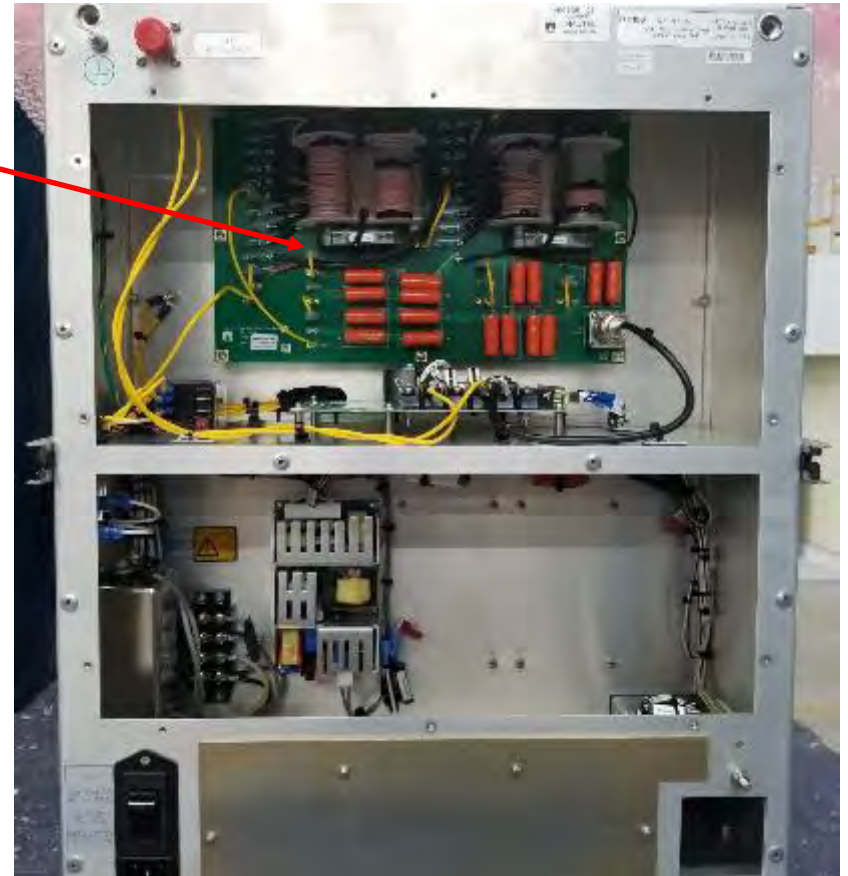
VR125 (rear)

# VR125 Installation

Harmonic Output Filter



VR125 (rear cover installed)



VR125 (rear cover removed)

# VR125 Installation



ATU Serial Data Bus  
(RS-485)

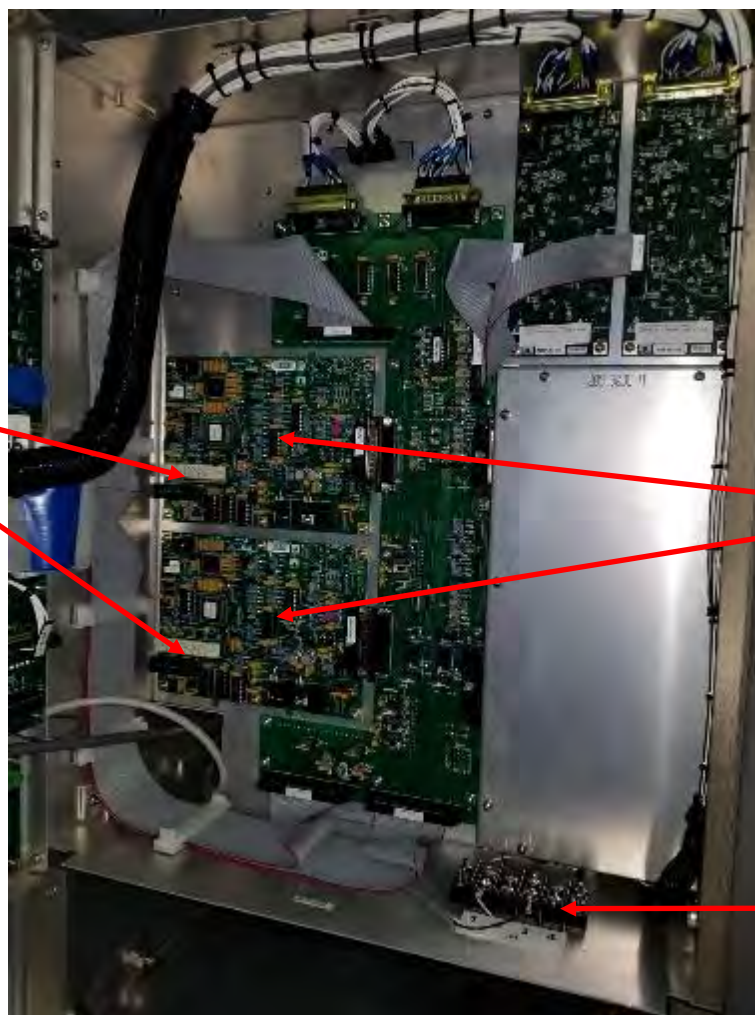
Remote Control/Monitoring I/O  
(RS-232 or RS-422)  
Connection to VR-Link2

Site Interface Board Option  
Connection to stand-alone ECMP3  
or 3<sup>rd</sup> party RCM system

VR125 (front panel, inside)



# VR125 Installation



Carrier Frequency selection

Carrier Frequency Synthesizers (Side A & Side B)

DC Supply Output (to ATU)

VR125 (front inside)



# VR125 Installation

VR125 IP66 rated Cabinet (right hand side)



VR125 Installed in IP66 rated Cabinet



Cable Glands (6)

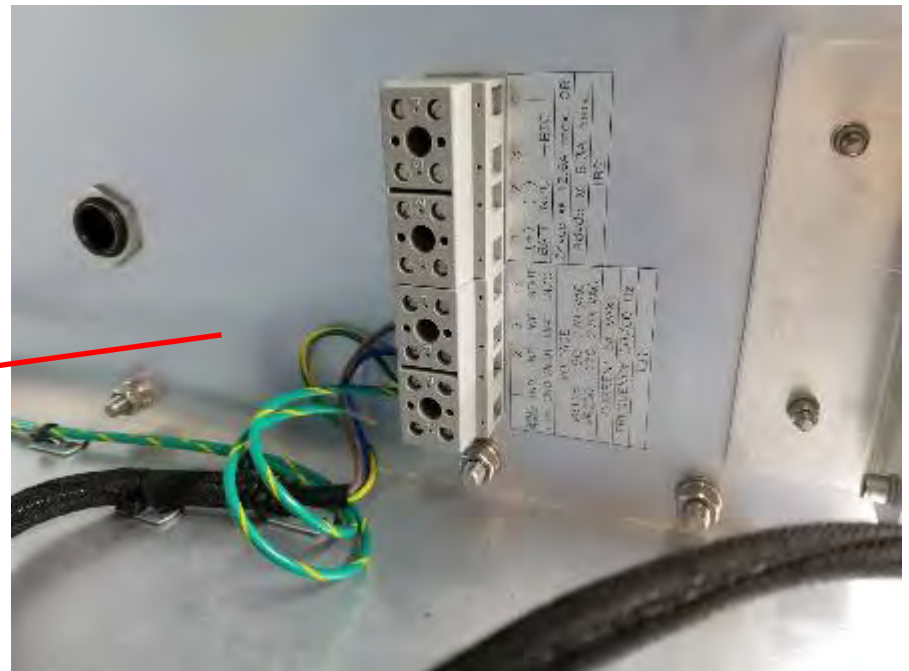
Grounding Stud

RF Output (Type N)

# VR125 Installation

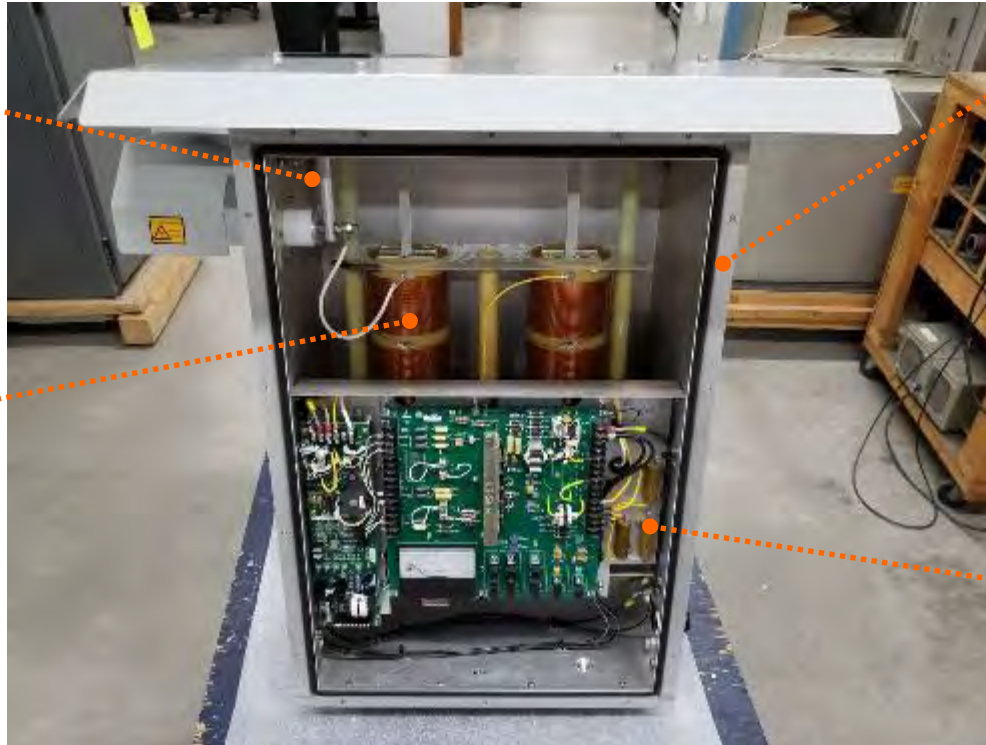


VR125 IP66 rated Cabinet  
(VR125 removed)



VR125 IP66 rated Cabinet  
Internal AC Input Termination

# ATU500SROS Antenna Tuning Unit



Adjustable Spark Gap with intrinsic static drain

IP66 rated enclosure manufactured from Marine Grade Aluminum with protective finish suitable for global environments

Servo Controlled and Automatic Fine Tuned Astatic pair of Loading coils which can be connected in series or parallel for maximum inductance range

Available series resistance to minimize sideband attenuation when using short antennas

ATU500SROS Automatic Antenna Tuning Unit  
(front access cover removed)

# ATU500SROS Installation

ATU500SROS (right hand side)



Cable Glands (2)  
RF Input (Type N)

Mounting Brackets (4)  
(shown in rear mount position)



# ATU500SROS Installation

ATU500SROS (front, access cover removed)



ATU Serial Data Bus  
(RS-485)

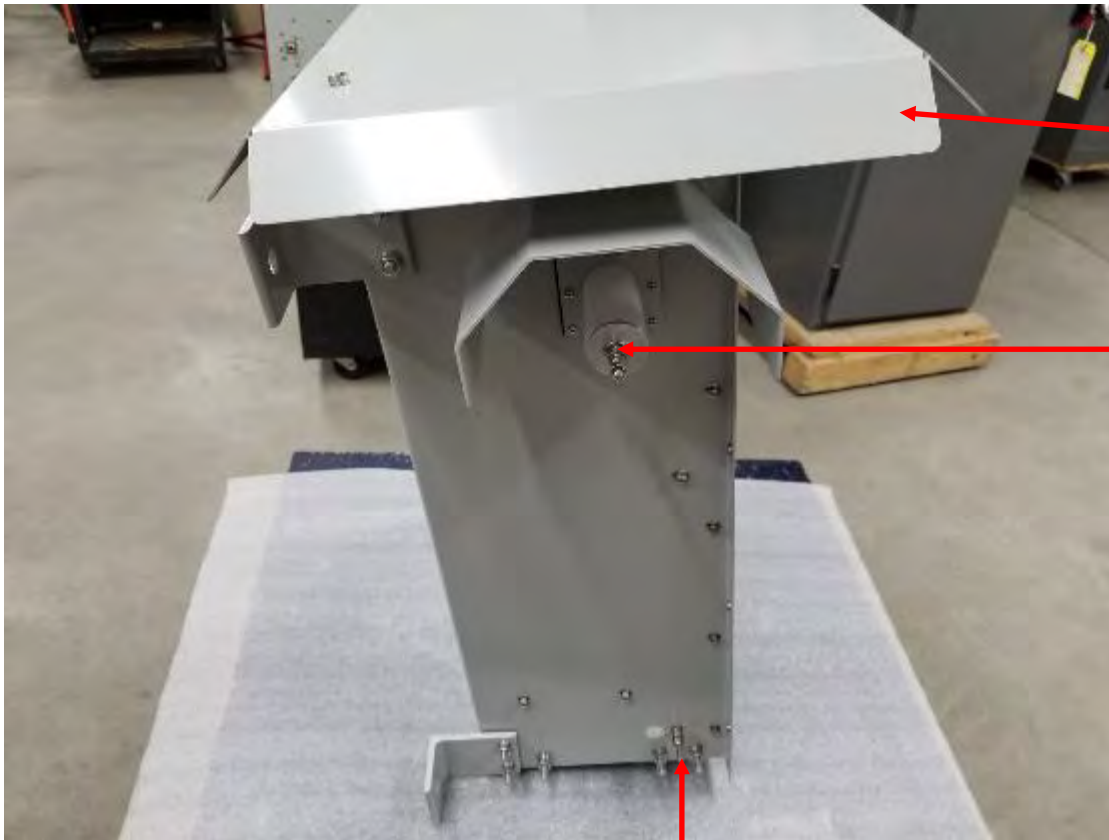
or

DC Supply Input  
(from VR125)



# ATU500SROS Installation

ATU500SROS (right hand side)



Sun Shield  
(optional)

RF Output  
(to antenna)

Grounding Stud

# Extended & Remote Control/Monitoring

## VR-Link2 with ECMP3



## ECMP3



*Extended Control/Monitor Panel*

## NRB4



*Beacon Monitor Receiver*



*Remote Control/Monitor with  
Extended Control/Monitor Panel*

## NLA/2



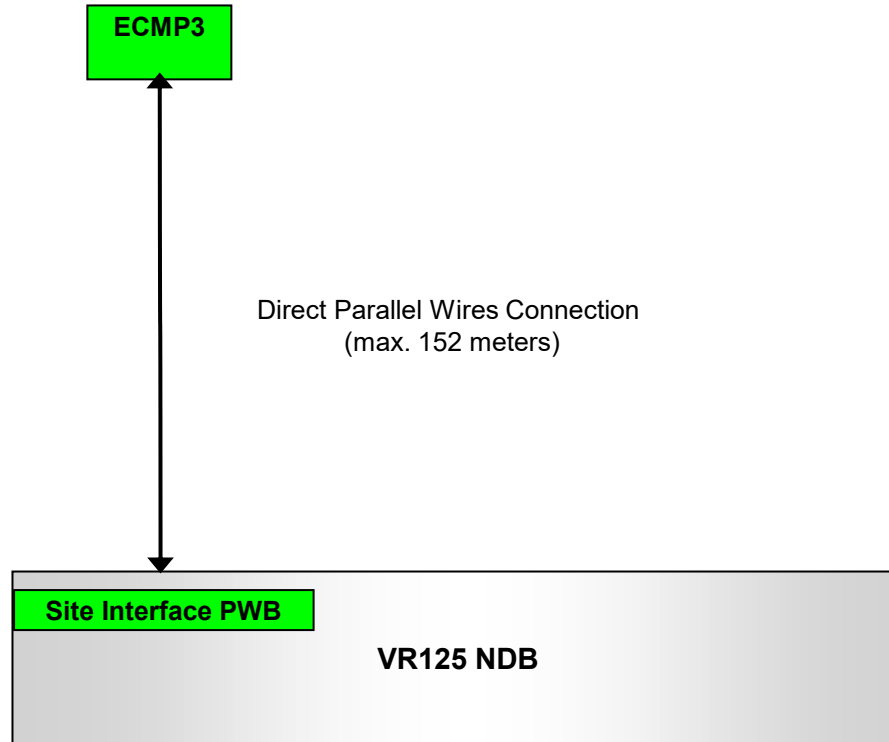
*Receiving Loop Antenna*

# ECMP3 – Extended Control/Monitor



- Extended control and monitor functions within a maximum distance of 152 m (500 ft) from the VR125 NDB transmitter.
- 7 visual system indicators (LEDs) and indicator Test switch. LED brightness is adjustable to one of three levels.
- 2 switches for remote command (RF ON/OFF & TIMER ON/OFF) and 1 user configurable spare command switch.
- User configured and enabled timer and audible alarm.
- User configurable for extended monitoring of any of the VR125's remote monitor points.
- Interfaces to VR125 via Site Interface PWB (option).

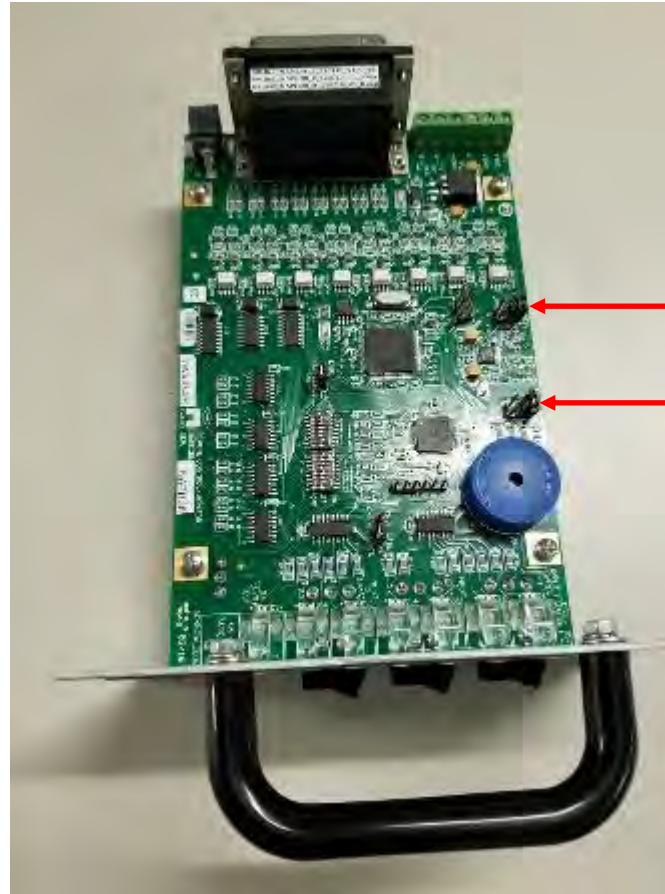
# VR125 & ECMP3 Interconnection



# ECMP3 Installation

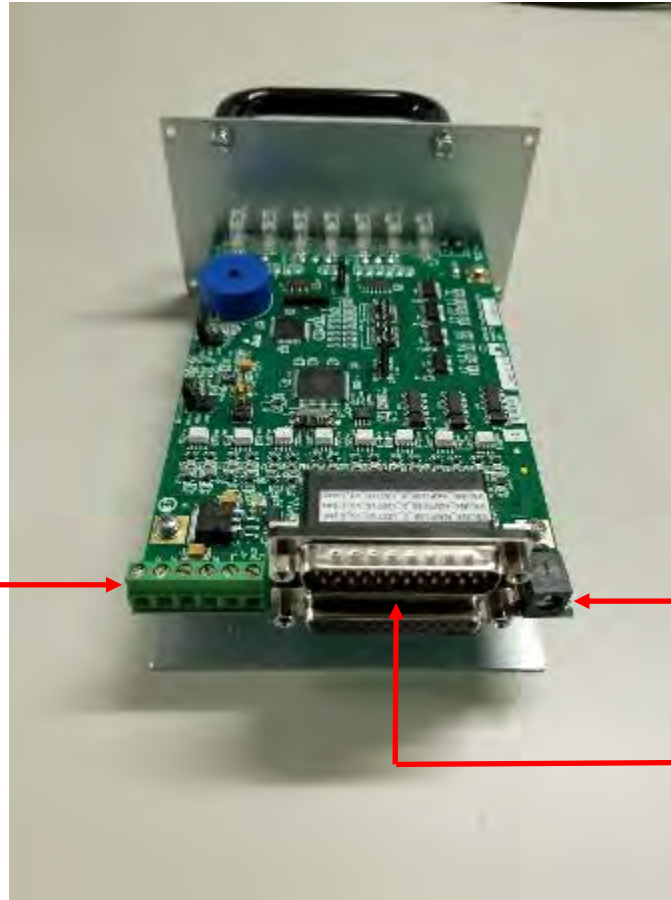


ECMP3 (front)



ECMP3 (left hand side)

# ECMP3 Installation



Serial Data Bus  
(RS-485) to  
VR-Link2

DC Supply Input  
(from external power supply  
or VR-Link2)

Parallel wiring to VR125 (Site  
Interface Board) for stand-  
alone ECMP3

ECMP3 (rear)



# VR125 RCMS via VR-Link2



- Economical means of remote control/monitor of one VR125 NDB system.
- Standard VR-Link2 connections to the NDB include RS232, RS422.
- Remote control/monitor of the VR125 and ATU500SROS using a text based display via hosted web page.
- ECMP3 (Extended Control/Monitor Panel) can be integrated into VR-Link2 or a total of 3 ECMP3's can be connected externally to the VR-Link2 via RS-485 serial communication.

# VR-Link2 - Web Based RCMS

- Web based remote monitoring and control of VR125 and ATU
- Remote access to alarm/information logs

The screenshot displays the Nautel VR-Link2 web-based Remote Control and Monitoring System (RCMS) interface for a Vector device. The interface is divided into a left-hand navigation menu and a main control area.

**Navigation Menu (Left):**

- Lab NxLink**
  - Home
- Equipment**
  - Vector
- Administration**
  - Site Configuration
  - User Administration
- You are logged in as root
- Logout

**Main Control Area (Right):**

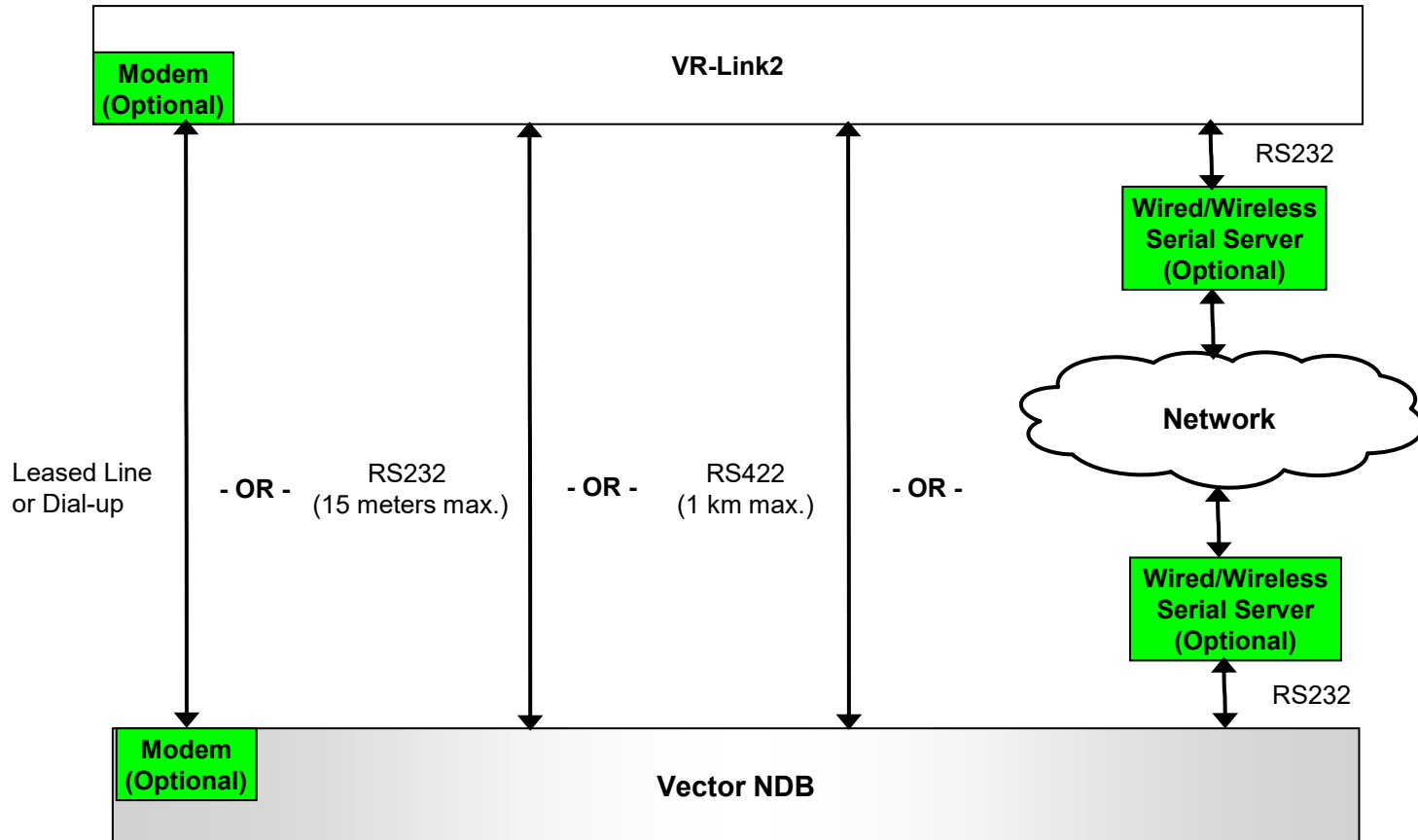
**Device: Vector**  
Data retrieved 2008-05-07T14:56:58

**Navigation Tabs:** TX Status/Control, ATU Status/Control, Standby List, Meters, Monitor Points, Control Points, Alarms

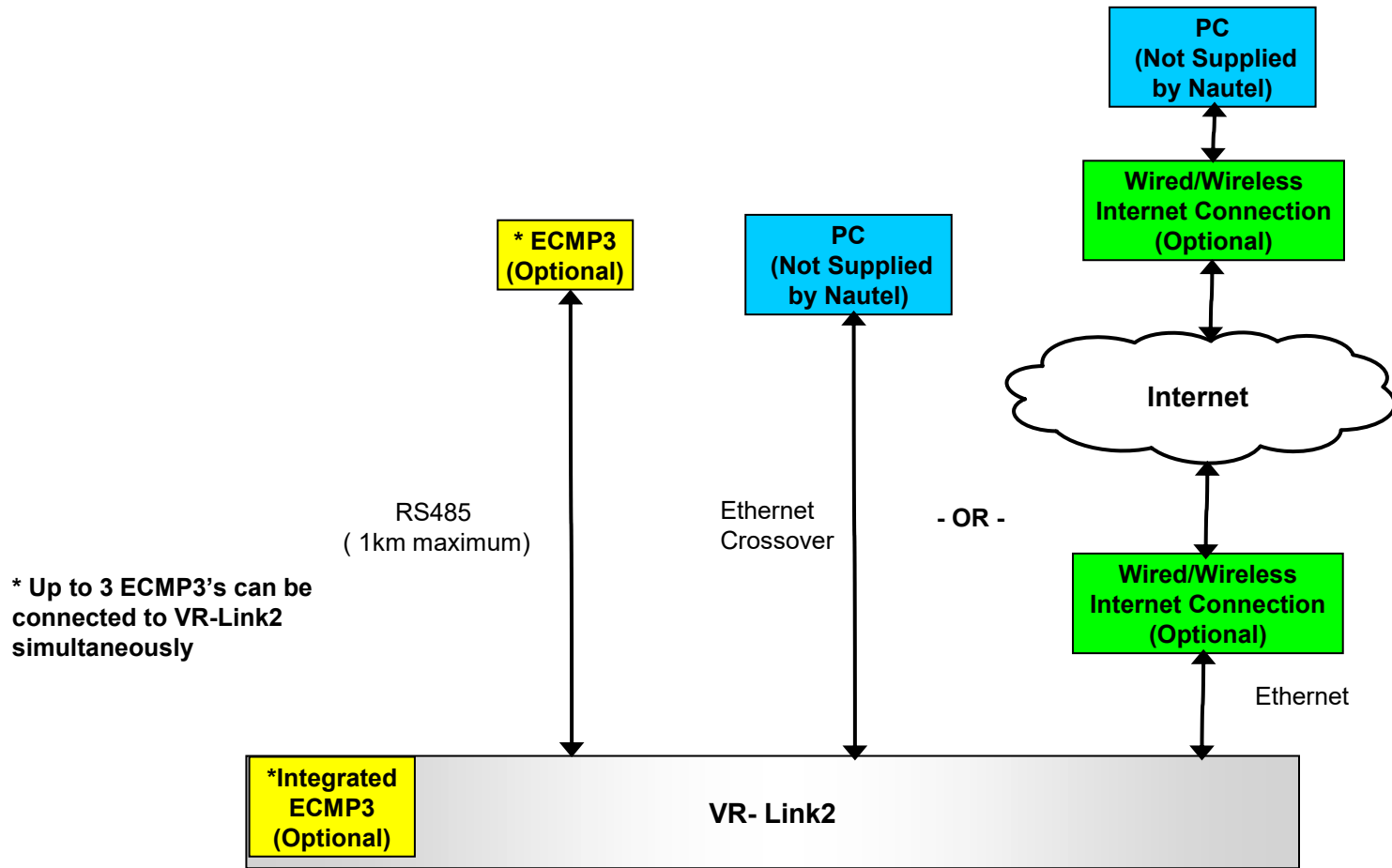
**Sub-Tabs:** Hardware Reset, Alarm this equipment, Save, Event Log

RF Power	Off	<input type="button" value="Off"/>	<input type="button" value="On"/>
System Control	Remote		
Forward Power	0 W	<input type="button" value="Increase"/>	<input type="button" value="Decrease"/>
Reflected Power	0.0 W		
Antenna Current	0.0 A		
Antenna Current Feedback	Disabled	<input type="button" value="Disabled"/>	<input type="button" value="Enabled"/>
Active Side	A		
Main Side	A	<input type="button" value="A"/>	<input type="button" value="B"/>
Active Power Source	AC		
<b>Automation Control</b>			
Monitor Mode	Normal	<input type="button" value="Bypass"/>	<input type="button" value="Normal"/>
Automatic Shutdowns	Enabled	<input type="button" value="Disabled"/>	<input type="button" value="Enabled"/>
AC Power Supply	Enabled	<input type="button" value="Disabled"/>	<input type="button" value="Enabled"/>

# VR125 & VR-Link2 Interconnection



# VR125 RCMS via VR-Link2



\* Up to 3 ECMP3's can be connected to VR-Link2 simultaneously

# VR-Link2 Installation



VR-Link2 (front)

# VR-Link2 Installation



VR-Link2 (rear)



# VR-Link2 Installation

VR-Link2 (rear)

DC Supply Input



AC Supply Input



Remote Control/Monitoring I/O  
(RS-232 or RS-422)  
Connection to VR125 Transmitter

# VR-Link2 Installation

Ethernet Port



VR-Link2 (rear)

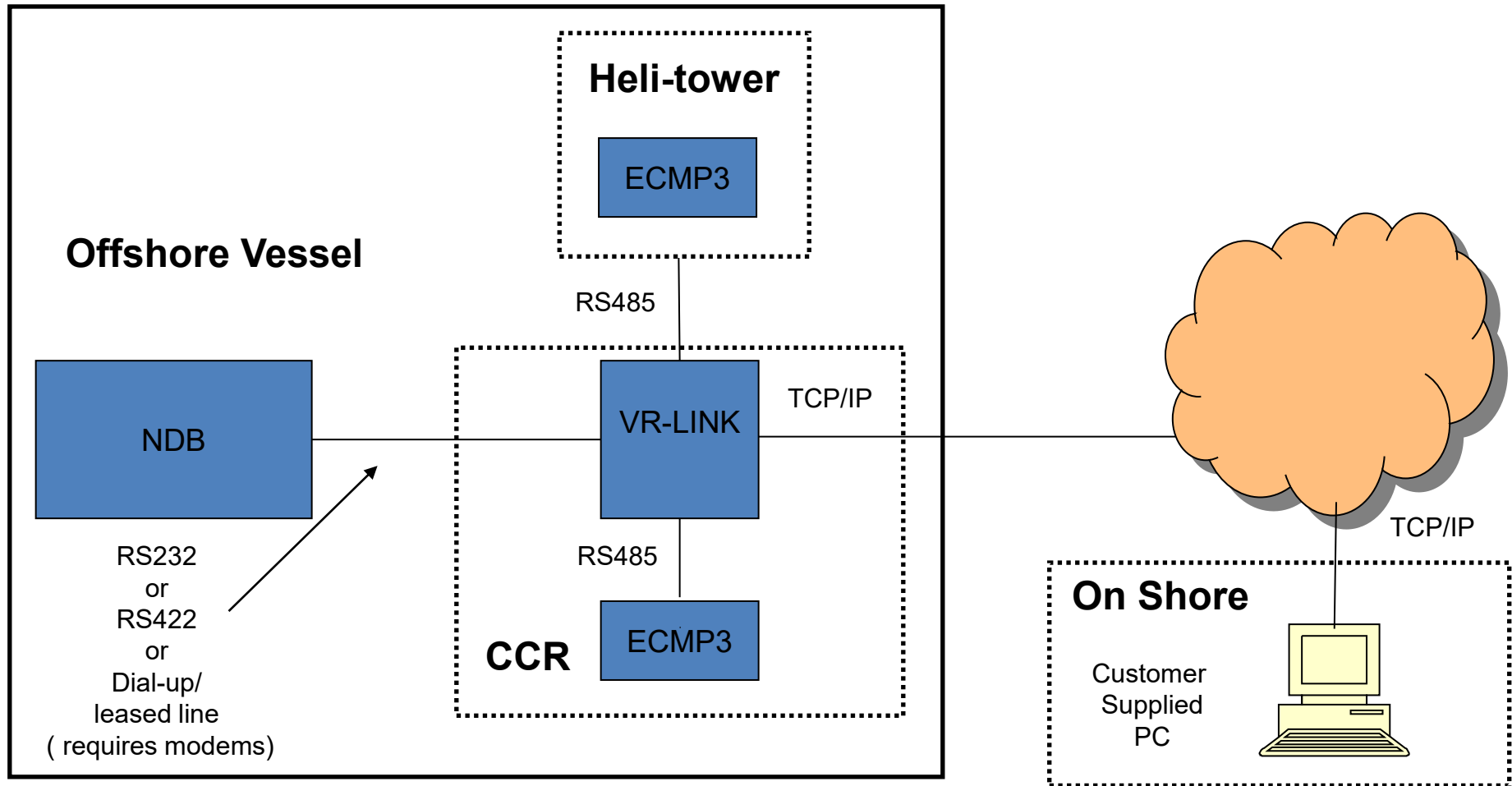
# VR-Link2 Installation

VR-Link2 (rear)



Serial Data Bus connections  
(RS-485) to ECMP3  
(up to 3 external ECMP3's can be  
connected to the VR-Link2)

# Typical Offshore RCMS Configuration



# NRB4 Installation



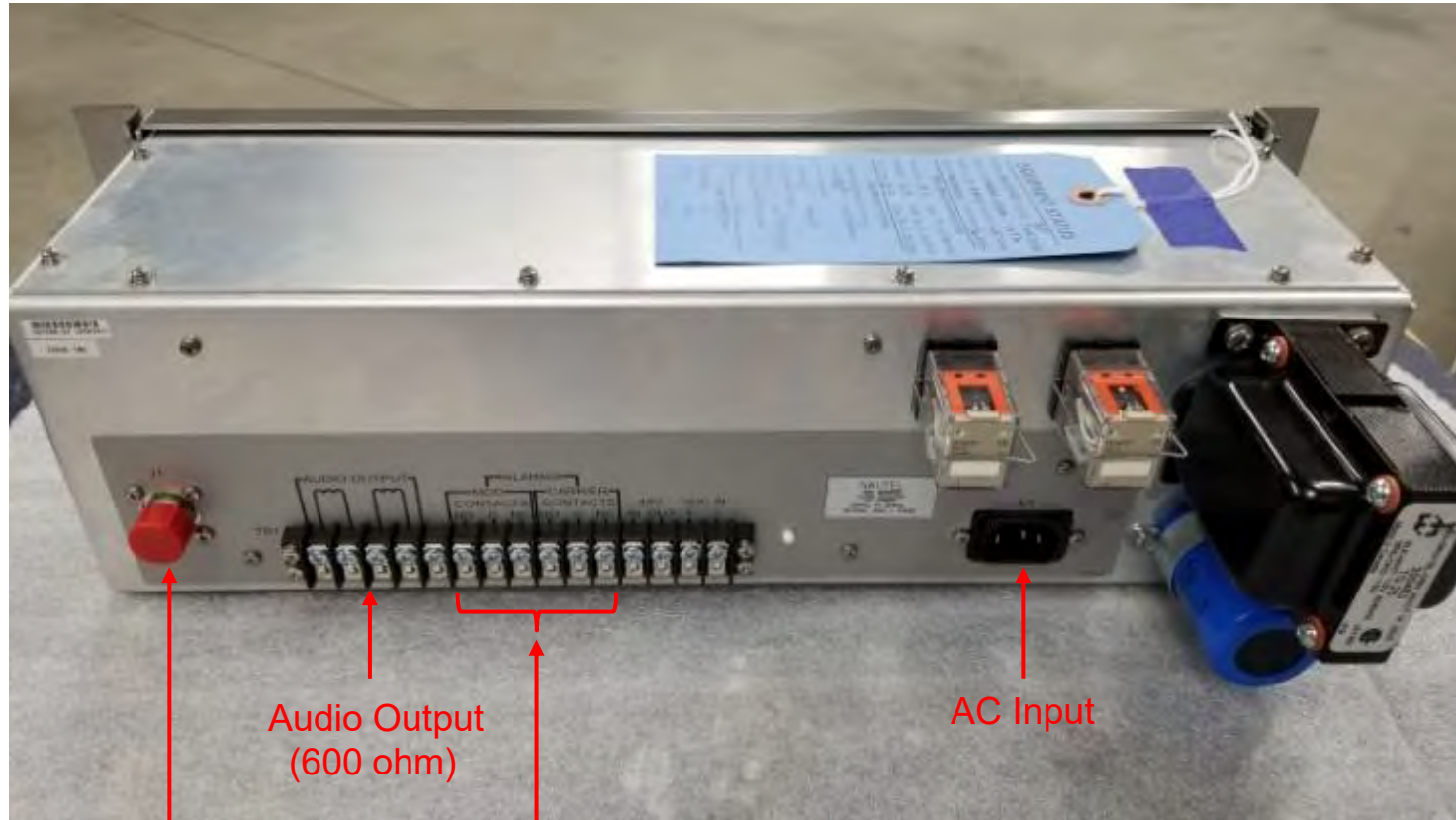
NRB4 Beacon Monitor Receiver (front)

Monitors (off-air):

- Presence of Carrier
- Presence of Keyed Tone
- Provides visible alarm if either carrier or modulation fall below thresholds.



# NRB4 Installation



Antenna Input  
(Type N)

Audio Output  
(600 ohm)

Alarm Outputs  
(N/O & N/C relay contacts)

AC Input

NRB4 (rear)

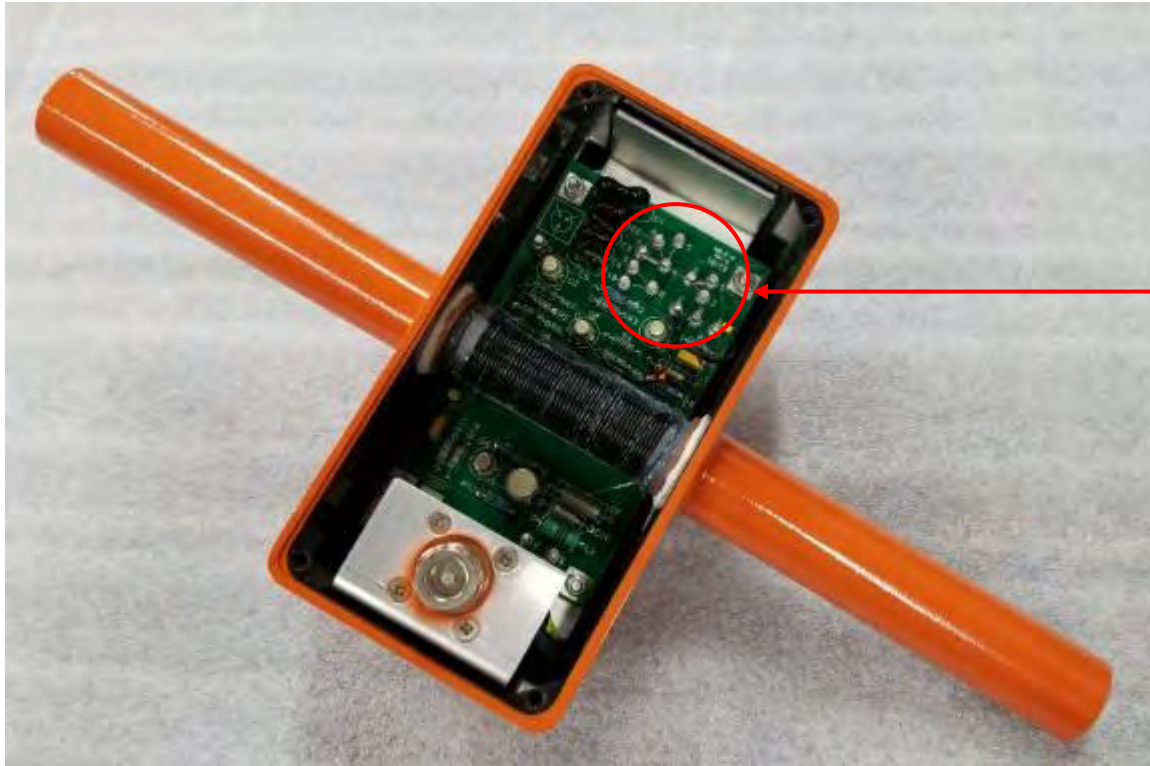
# NLA/2 Installation



NLA/2 (front)

RF Output  
(Type N)

# NLA/2 Installation

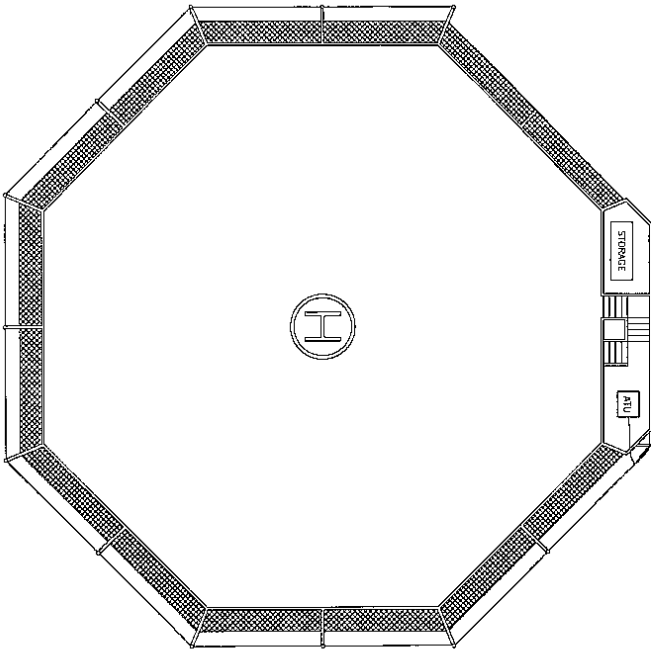


Carrier frequency band selection links

NLA/2 (interior)

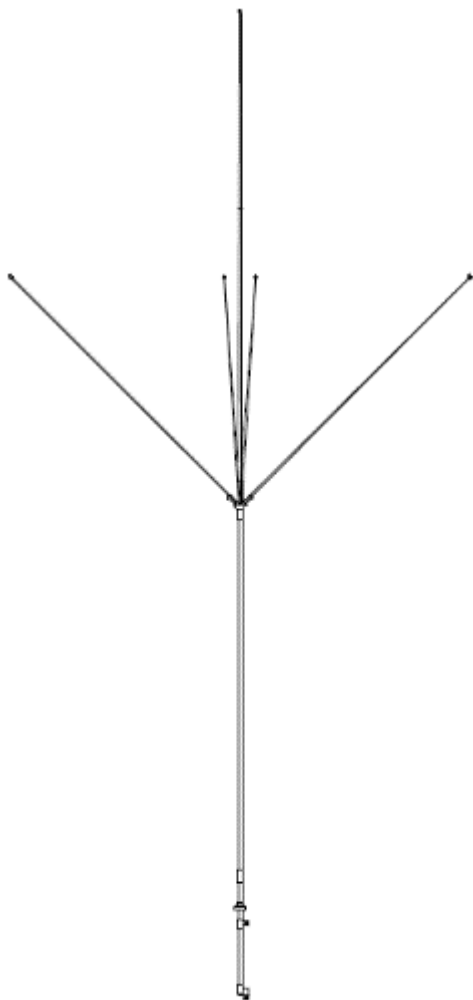
# Offshore NDB Antennas

## CL-HD Helideck Long-wire Antenna



- Designed to suit a variety of Helideck configurations
- Designed for Compliance to CAP437
- 190 kHz – 1800 kHz operation
- Approx. 9.8 pF/m (3 pF/ft)

# Offshore NDB Antennas



Comrod AS1R

## Whip Antenna

- 8 m (27 ft.) high
- Low Cost
- Ease of installation
- Frequency Agile



# Customer Service & Training

- Emergency technical support is available 24 hours a day, 7 days a week and is provided by Nautel Customer Service technical staff
- Facilities house a full inventory of parts, modules, and sub-assemblies to support customer's maintenance needs
- Nautel's first priority is getting customers back on the air, even if the model in question was shipped in 1970
- RF Basics, System Specific Training and Certified Installer/Maintainer programs, comprised of classroom as well as hands-on practical instruction, are available from Nautel



# The Nautel Advantage

- 50+ years of excellence in RF design, manufacturing and support
- Cost competitive
- Highly reliable
- 3 Year warranty
- Over 40 staff in Engineering and Customer Support teams
- Multiple facilities to ensure uninterrupted supply of equipment and spare parts

# Contacts

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# Questions?

# Thank you