

# Southern Avionics Company

*COMPANY PROFILE  
AND  
LAND SYSTEMS*





# Our Story

# Our Story



## Who We Are

- Location: Beaumont, TX, USA
- Number of Employees: 40
- Founded: 1962
- CEO: Brooks Goodhue
- Dir. of Engineering: Tim Hamilton

## Service

- Site Surveys
- Site Acceptance Tests and Flight Checks
- Technical Customer Service
- Installation
- Repairs
- Product training
  - On-Site
  - At factory

## Products

- Non-Directional Beacons
- DGPS Transmitters
- Helideck Monitoring Systems
- Antenna Tuning Units
- Antennas
- Remote Monitoring
- Replacement parts

# What is an NDB?

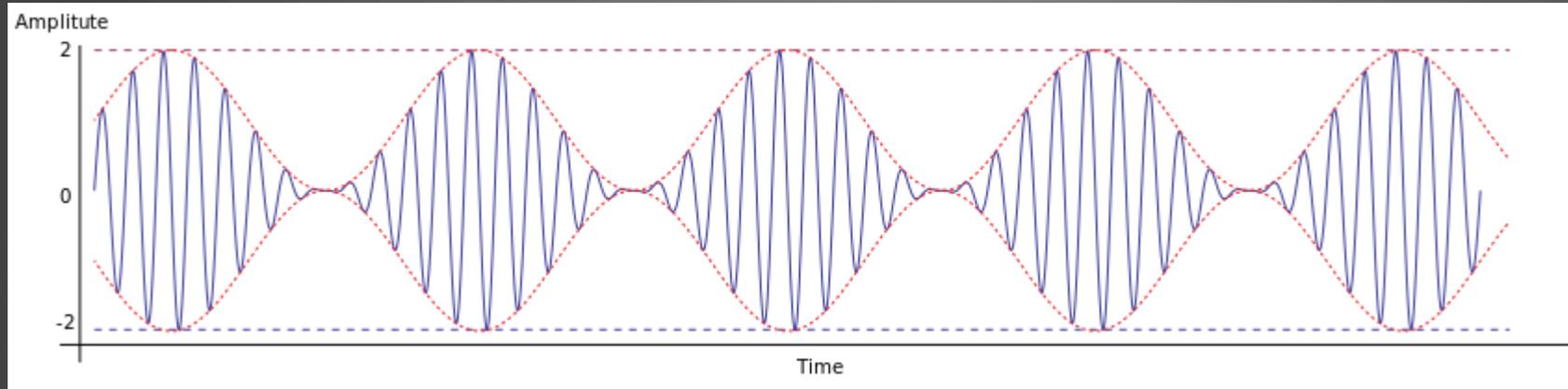


- **Non-Directional Beacon**
- **Radio broadcast station in a known location, used as a navigational aid**
- **Standardized by the International Civil Aviation Organization (ICAO)**
- **ICAO-standard three-letter identifications, which are broadcast in Morse Code to allow the user to identify the station**
- **Most widely used navigational aid in the world today**
- **Backup system in case of other equipment failures**

# What is an NDB?



## Modulation



## Modulation frequency

- 400 Hz or 1020 Hz

Each NDB must be registered with their local CAA (Civil Aviation Authority)

- Frequency assignment
- Call sign / Identifier (Morse Code)
- Power limitations

S A C  
... .- -.-

# LEGEND

Airports having Control Towers (Airport Traffic Areas) are shown in blue, all others in magenta. Consult Airport/Facility Directory (A/FD) for details involving airport lighting, navigation aids, and services.

## AIRPORTS

- Other than hard-surfaced runways
  - Hard-surfaced runways 1500 ft. to 8000 ft. in length
  - Hard-surfaced runways greater than 8000 ft.
  - Seaplane Base (SPB)
- All recognizable hard-surfaced runways, including those closed, are shown for visual identification.

## ADDITIONAL AIRPORT INFORMATION

- Private "(Pvt)" - Non-public use having emergency or landmark value.
  - Military - Other than hard-surfaced. All military airports are identified by abbreviations AFB, NAS, AAF, etc. For complete airport information consult DOD FLIP.
  - Heliport - Selected
  - Abandoned - paved having landmark value.
  - Unverified
- Services - fuel available and field tended during normal working hours depicted by use of ticks around basic airport symbol. Consult A/FD for service availability at airports with runways greater than 8000 ft.

★ Rotating light in operation Sunset to Sunrise.

## AIRPORT DATA

Indicates Flight Service Station on field.

Box indicates Special Traffic Area (See FAR 93)

**NAME** CT - 118.3★  
 ATIS 124.9  
 03 L 92 122.95  
 VFR Advy 125.3  
 Airport of entry

UNICOM

FSS - Flight Service Station  
 CT - 118.3 - Control Tower (CT) - primary frequency  
 ★ - Star indicates operation part time. See tower frequencies tabulation for hours of operation.  
 ATIS 124.9 - Automatic Terminal Information Service  
 UNICOM - Aeronautical advisory station  
 VFR Advy - VFR Advisory Service shown where ATIS not available and frequency is other than primary CT frequency.

03 - Elevation in feet  
 L - Lighting in operation Sunset to Sunrise  
 \*L - Lighting available on request, part-time lighting, or pilot-controlled lighting.  
 92 - Length of longest runway in hundreds of feet; usable length may be less.  
 S - Normally sheltered take-off area (SPB)

When facility or information is lacking, the respective character is replaced by a dash. All lighting codes refer to runway lights. Lighted runway may not be the longest or lighted full length. All times are local.  
 NFCT - Non Federal Control Tower

## RADIO AIDS TO NAVIGATION AND COMMUNICATION BOXES

- VHF OMNI RANGE (VOR)
- VORTAC
- VOR-DME

- Non-Directional Radiobeacon
- RBn POINT LOMA 302  
H + (M) & ev fm
- Marine Radiobeacon
- Other facilities, i.e., Commercial Broadcast Stations, FSS Outlets - RCO, etc.

Triangles in corners of box indicate Enroute Flight Advisory Service (EFAS) on frequency 122.0; Voice Call "Oakdale Flight Watch".  
 122.1R 122.6 123.6

**OAKDALE**  
 362 116.8 OAK

Underline indicates no voice on this freq  
 122.1R  
**CHICAGO CHI**

Heavy line box indicates Flight Service Station (FSS). Freqs 121.5, 122.2, 243.0 and 255.4 are normally available at all FSS's and are not shown above boxes. All other freqs are shown.

For Airport Advisory Service use FSS freq 123.6

122.1R  
**MIAMI**  
 Controlling FSS

Square indicates Transcribed Weather Broadcast (TWEB) available at this NAVAID.

Frequencies above thin line box are remoted to NAVAID site. Other freqs at controlling FSS may be available determined by altitude and terrain. Consult Airport/Facility Director for complete information.

In Canada all available FSS frequencies are shown.  
 R - receive only T - transmit only

**LOS ANGELES FLIGHT WATCH**  
 Remoted EFAS on frequency 122.0

## AIRPORT TRAFFIC SERVICE AND AIRSPACE INFORMATION

### AIRSPACE INFORMATION

Only the controlled and reserved airspace effective below 18,000 ft MSL are shown on this chart. All times are local.

092° V 3

Low Altitude Federal Airways are indicated by center line.

The limits of controlled airspace are

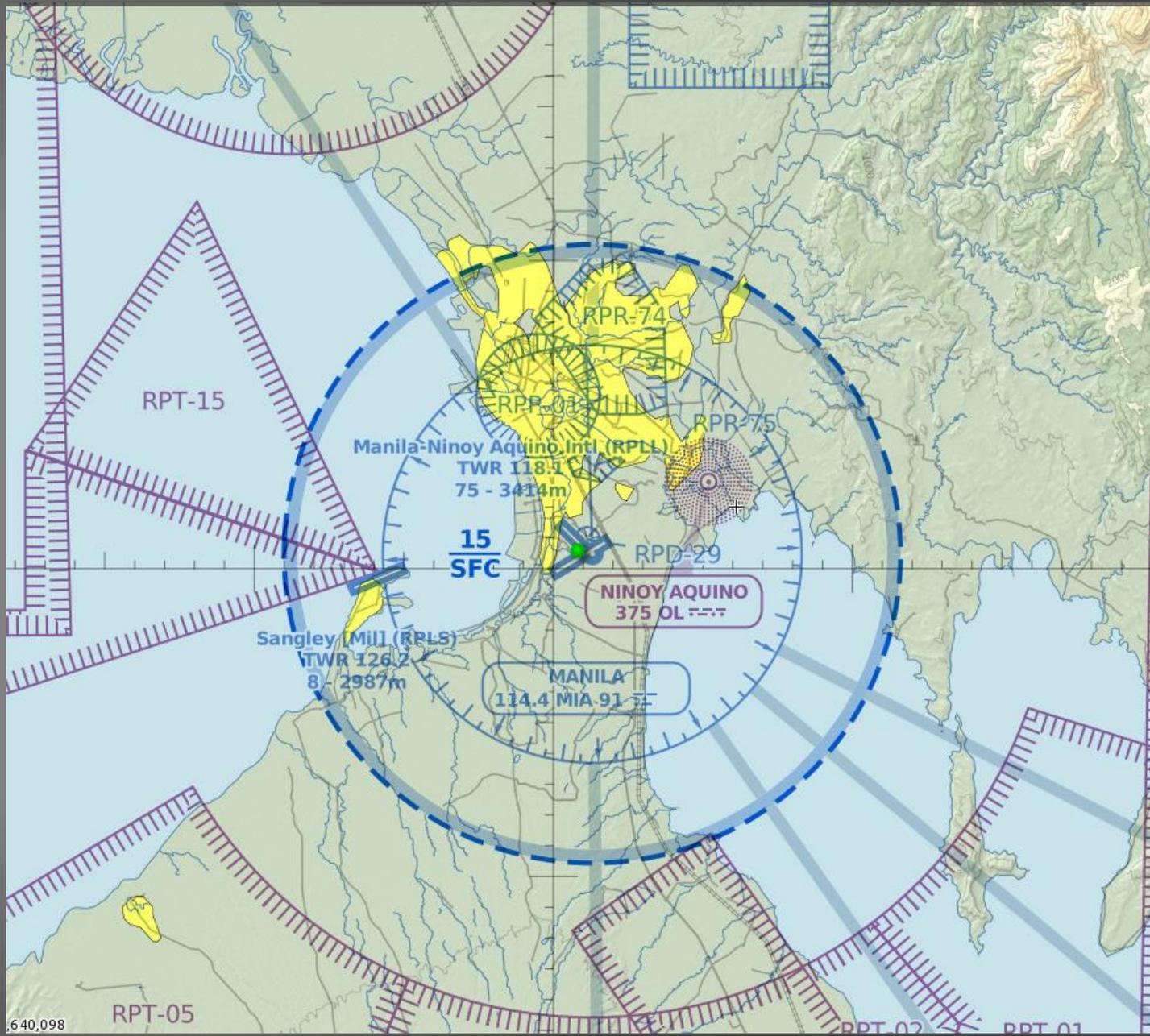
**AIRPORT TRAFFIC AREA**  
**Tower Controlled Airport**

DAYTON CT - 119.9  
 1008 L 70

**Special Airport Traffic Areas**

### TOPOGRAPHICAL INFORMATION

- Roads
- Road Markers
- Railroad
- Bridges And Viaducts



# What is an ADF?



## Automatic Direction Finder (ADF)

- Receiver inside aircraft to indicate direction to pilot
- Simple needle that points towards the NDB
- Optionally includes speaker to hear Morse code
- Used for non-precision instrument approaches



## Equipment onboard the aircraft includes two antennas:

- The “Sense” antenna is non-directional, and receives signal from all directions equally
- The “Loop” antenna receives signal strongly from only two directions
- These two signals are processed together to determine the direction of the signal being received

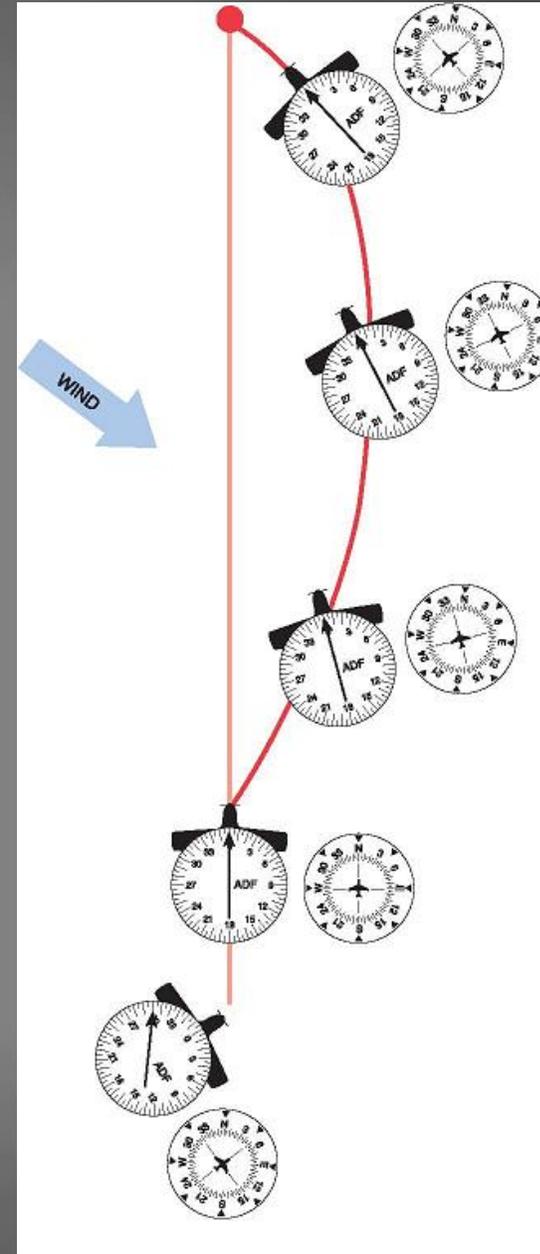
# What is an ADF?

## Bearings

- The ADF needle points directly toward the NDB station. This is called the “Relative Bearing” to the station.
- The “Magnetic Bearing” is the direction to the transmitting station relative to magnetic North

## Homing

- Flying the aircraft to keep the needle pointed at 0° Relative Bearing position
- With no wind, this would be a straight line



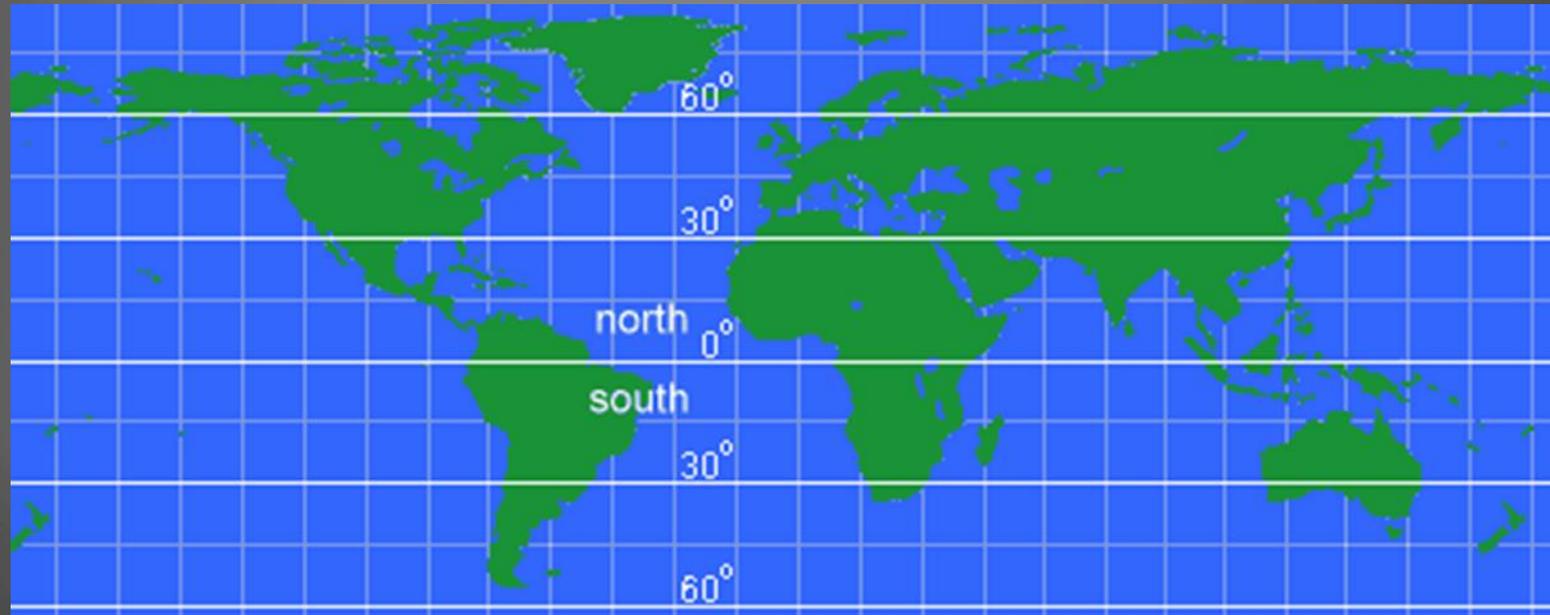
# Range and Antenna Theory



Range is defined as receiving the minimum allowable signal level

- 70uV/m typical
- Higher between +/-30° latitude

This is due to higher background noise typically closer to the equator



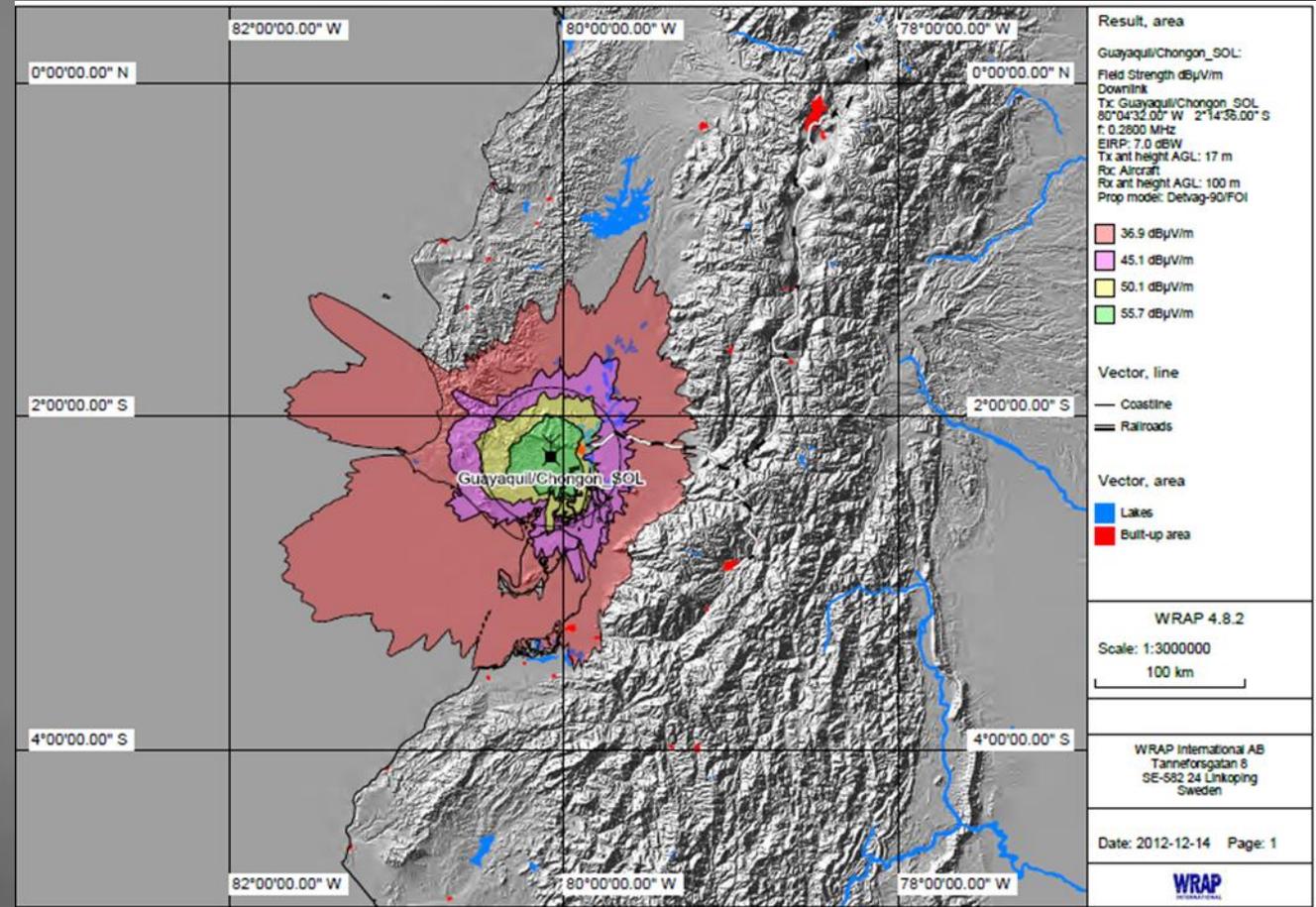
# Range and Antenna Theory



## Mountainous terrain's effect on ground wave propagation

### ➤ RF Propagation

- Seawater is best
- Mountains will reduce propagation range (Shading effect)
- Ground conductivity also shapes the propagation pattern



# SAC NDBs



- Industry leading NDB
- Numerous stationary and portable NDBs
- Thousands in service throughout the world
- Satisfies diverse site and operational requirements
- New product development achieved in-house
- Facilitated by the latest in computer hardware and software innovations
- Provide years of continuous, unattended operation in harsh environments
  - Extreme offshore conditions
  - Deserts
  - Equatorial jungles
  - Polar regions

# SE Series NDB Transmitters



## Models Available:

- SE125
- SE250
- SE500
- SE1000



SE125 IP66



SE500 Rack



SE125 Rack



SE250 Rack



SE1000 Rack

# SE Series NDB Transmitters



- Available in fully redundant, standby configuration
- BITE, DDS, LCD screen, membrane keypad & optional Ethernet interface
- Front panel keypad and LCD easily control all operations - no computer required
- Built-in Ethernet Interface:
  - Allows transmitter to be controlled by a personal computer, locally or remotely
  - Provides operation of the transmitter over LAN or virtually anywhere in the world
  - Contains an embedded web server - no software to load
  - Includes IP address and a built-in homepage accessed by local PC or Ethernet connection
  - Ethernet ready RJ45 jack on the Control Panel

# Southern Avionics NDB System

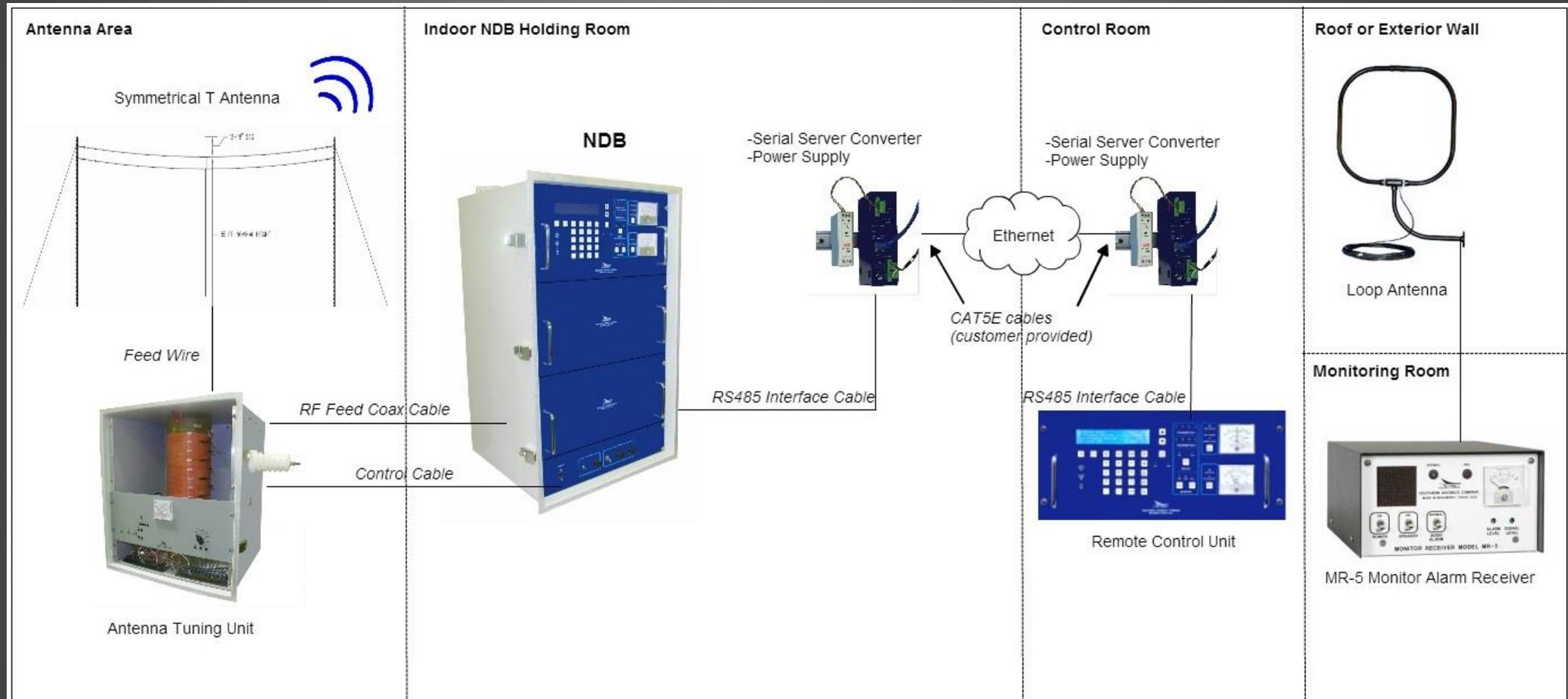


# Southern Avionics NDB System



- **Recommended NDB System**
  - **Transmitter**
  - **Antenna Tuning Unit (ATU)**
  - **Antenna**
  - **Remote Control Unit (RCU)**
  - **MR-5 Monitor Alarm Receiver**
  - **Spares Kits**
  - **Site Test Equipment**

# Southern Avionics NDB System



# Land SE125 Dual NDB System



# Land SE125 Dual NDB



## SE125 Dual Transmitter

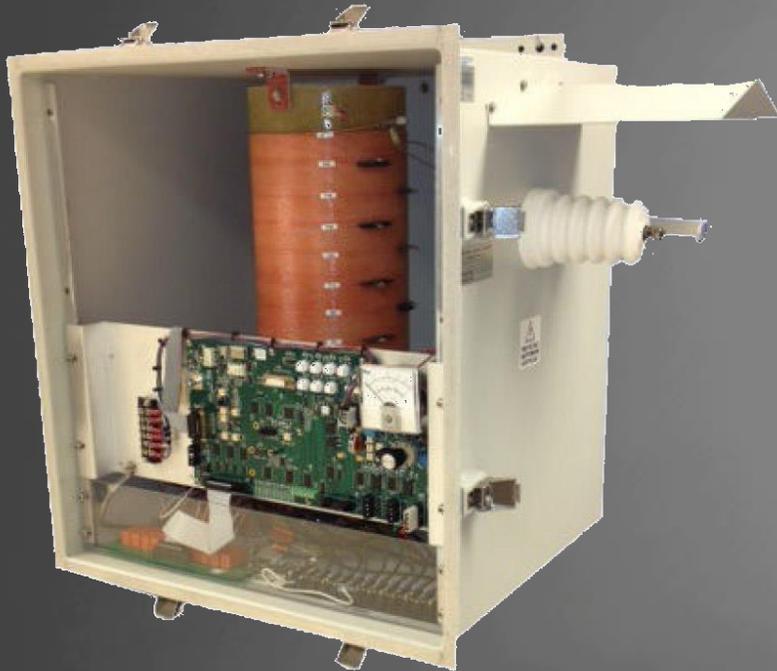


- 125 watt carrier power, fully redundant dual hot/standby configuration with auto-transfer circuit
- All operations controlled by front panel keypad
- Meets CAP670 requirements
- ANATEL and CE compliant
- Analog & Digital Metering
- 190-650 kHz operation (Optionally 650-1250, 1500-1800)
- Set of technical handbooks
- Built-in Ethernet interface
- Web server is embedded so there is no software to load

# PC1000/C4 Antenna Tuning Unit



## PC1000/C4 Antenna Tuning Unit (ATU)

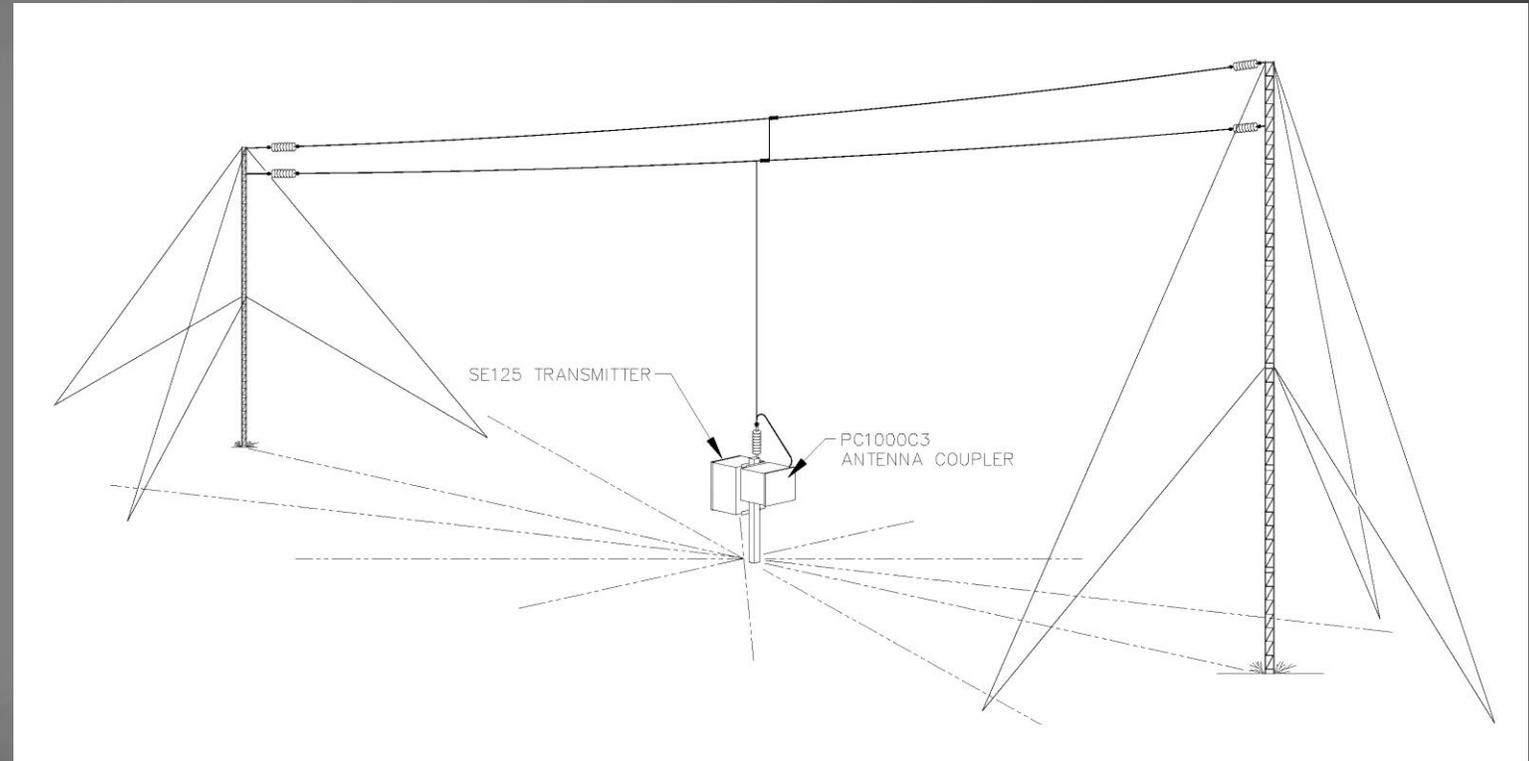


- Provides optimum matching of SE125 output signal & 200 – 1500 pF / 2 - 25 Ohms Antenna load.
- 190-625 Khz Operation
- Supplied in IP66 certified, weatherproof enclosure
- Auto-tune feature automatically maintains system tuning during changing environment conditions
- Variable coil ensures resonance is maintained
- Resistive matching network ensures the transmitter always sees a 50 Ohm load, minimizing VSWR

# Land Antenna Options



- SAC designs and supplies our own antenna systems specifically engineered to maximize the performance of our transmitters.
  - Symmetrical “T” Antennas
  - Mast Antennas
  - Whip Antennas

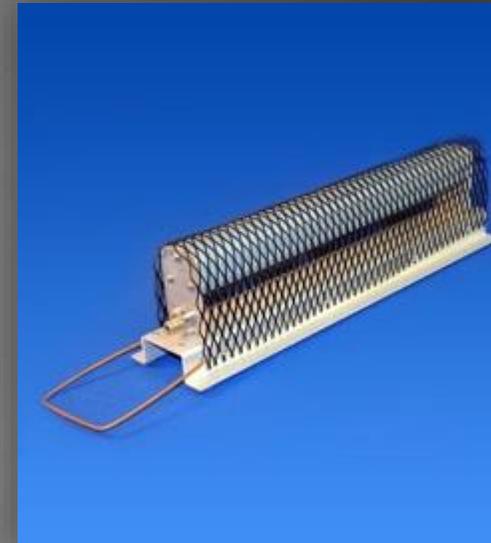


Symmetrical T Antenna

# Other System Components



- **Remote Control Unit**
  - Connection options available for fiber, radio link, Ethernet, etc.
- **Monitor/Alarm Receiver with Loop Antenna**
- **Spares Kit**
- **Battery Chargers (Internal or External)**
- **Test Load**
- **Antenna Simulator**
- **Obstruction Lights**
- **Anti-Ice Insulators**

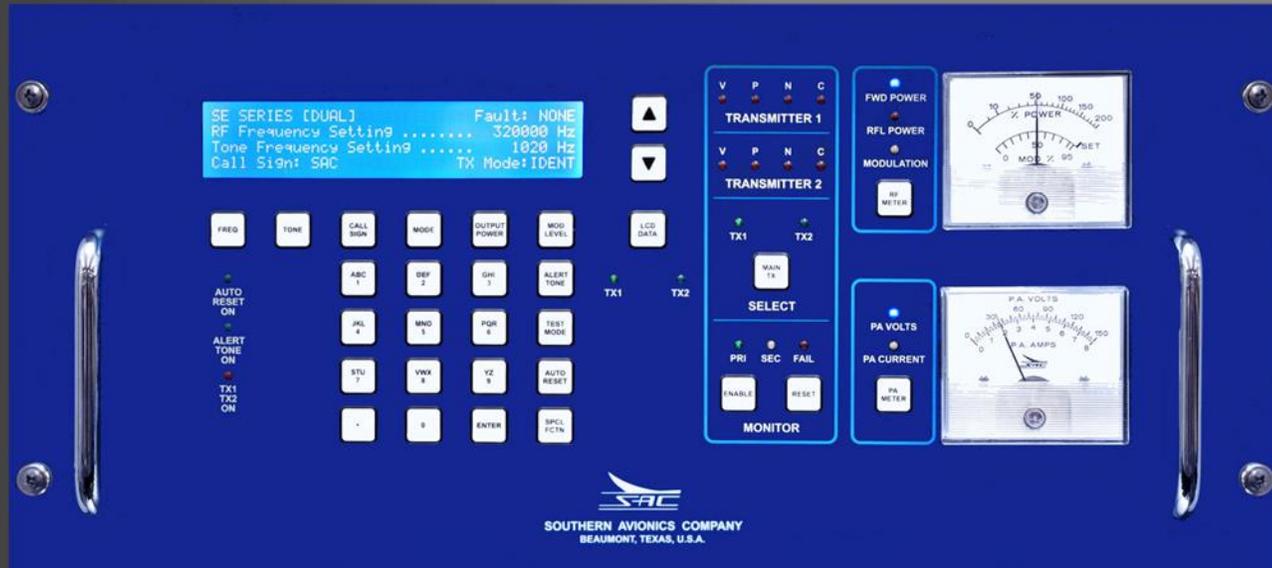


**Test Load**

# Monitor and Control Options



# Remote Control Unit (RCU)



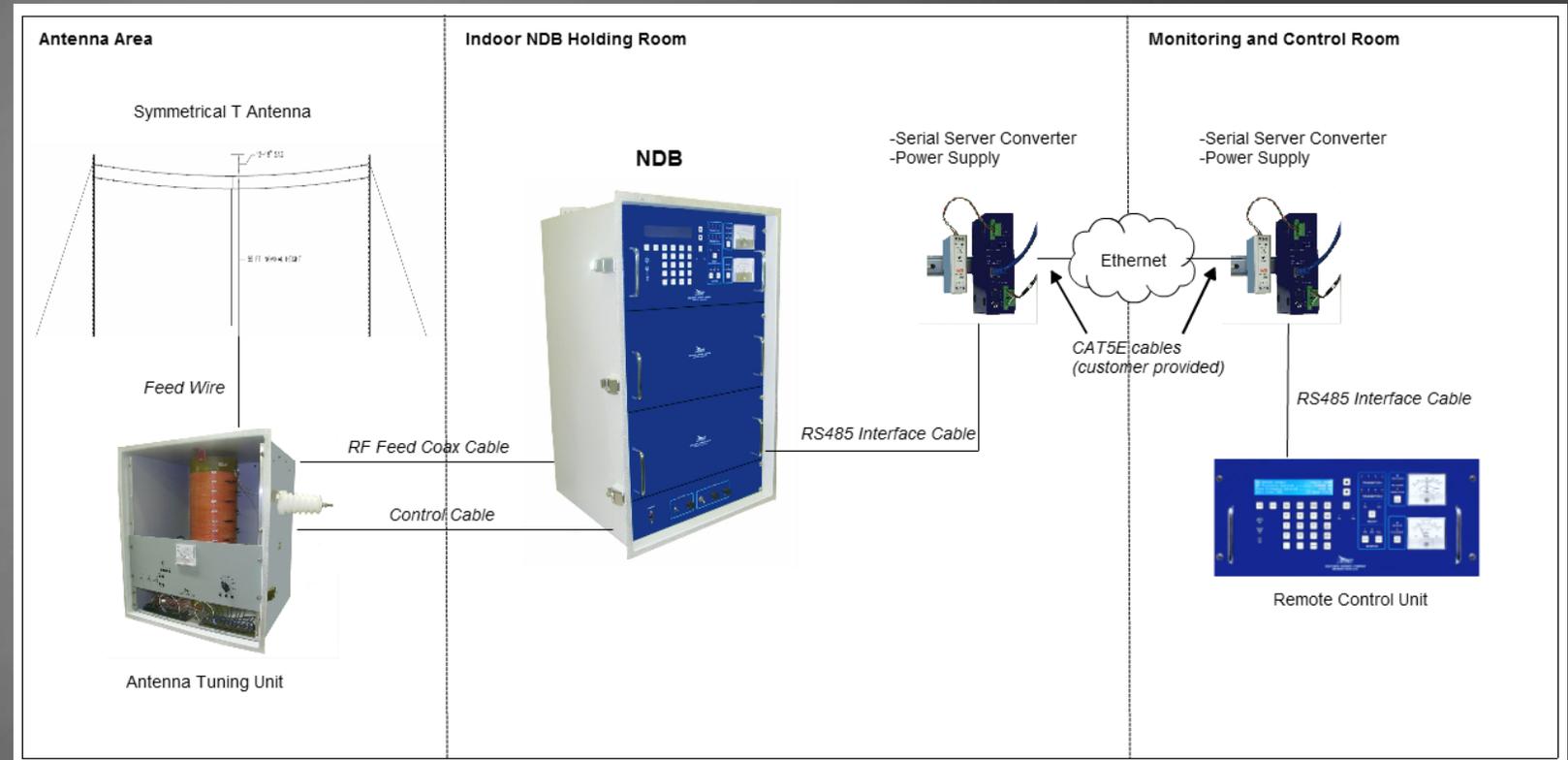
- Full monitoring and basic control of the transmitter.
- All readings at the transmitter are available at the RCU via RS485 at a distance of up to 4,000ft (1,220m)
- Selection of Primary Transmitter can be made and the system can be powered up or down
- All Built-In Test Equipment data is displayed on the 40 character by 4 line LCD
- Indications for Primary, Secondary and Fail are provided, as well as, those for ICAO Annex 10 Chapter 3.4 shutdown requirements

# Remote Control Connections



## Multiple connection options

- RS485 to Fiber Converter
- RS485/RS232 to Ethernet Serial Server
- Remote Control Over Ethernet Radio Link
- Daisy chain multiple RCU's
- Use in conjunction with Web Watch software to monitor and operate your system from virtually anywhere

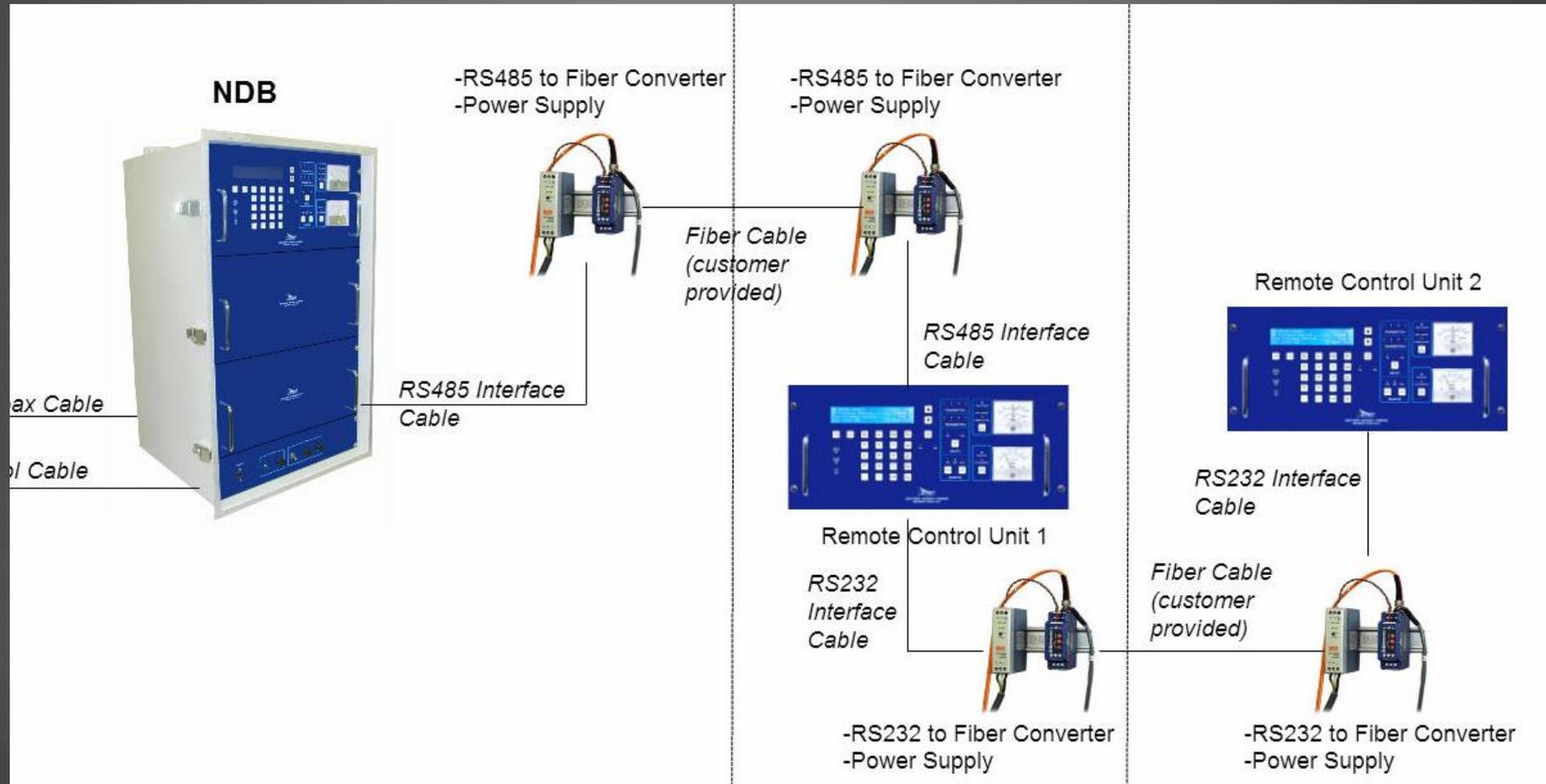


Serial Server Converter

# Multiple RCUs Option



## Daisy Chain RCUs via Fiber connection



# Web Watch Monitoring and Control



# Ethernet Options



- Server or user-definable IP address accessible by local PC or Ethernet connection
- Transmitters embedded web server; no additional software to load
- Connection Options Include:
  - Radio Link
  - Fiber Optic Connection
  - Land Line Dial-Up
  - Leased Line Modem
  - Ethernet Extender

**SOUTHERN AVIONICS COMPANY**   
MANUFACTURERS OF LOW FREQUENCY RADIOBEACONS AND ASSOCIATED PRODUCTS

**SE1000 Transmitter (Version 3.00)**

TRANSMITTER 1 ●

<b>PRIMARY</b>	<b>TEST</b>	<b>ATU</b>	<b>VOICE</b>
TX1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Primary	Secondary	Fail	<input type="button" value="Reset"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

V	P	N	C	Fault: NONE
<input type="checkbox"/>				

Thu Aug 8 14:01:06 2013					
Call Sign	Frequency Setting		Location		
SAC	320000Hz				
Forward Power	Reflected Power	Modulation	VSWR	Frequency Measured	Antenna (I)
1240 W	0 W	97 %	1.00	320000 Hz	0.1 A
AC Input Voltage	Battery Input Voltage	Battery Discharge	PWM Drive Level	MOD Drive Level	Combiner Temperature
242 V	0 V	-0.0 A	4.9 V	1.4 V	24 C
PCM / SPA SAMPLE STATUS (1)					
Power Control V	Power Supply HV	5VDC	SPA Current	VMOD	Temperature
122 V	196 V	5.1 V	5.3 A	55 V	26 C
PCM / SPA SAMPLE STATUS (2)					
Power Control V	Power Supply HV	5VDC	SPA Current	VMOD	Temperature
125 V	197 V	5.1 V	4.2 A	56 V	29 C
PCM / SPA SAMPLE STATUS (3)					
Power Control V	Power Supply HV	5VDC	SPA Current	VMOD	Temperature
123 V	194 V	5.1 V	5.6 A	55 V	26 C
PCM / SPA SAMPLE STATUS (4)					
Power Control V	Power Supply HV	5VDC	SPA Current	VMOD	Temperature
126 V	198 V	5.1 V	4.4 A	57 V	26 C

- [Primary TX](#)
- [TX Setup](#)
- [Calibration](#)
- [IP Configuration](#)
- [SysLog Configuration](#)
- [Time & Date](#)
- [Location Site](#)
- [Manage SSL Certificates](#)
- [Save](#)
- [Change Admin Password](#)
- [Change API Password](#)
- [Change Tech Password](#)
- [Change Monitor Password](#)

# Ethernet Options



Fiber Converter

# Web Watch

## NDB Ethernet Control and Monitoring



Web Watch is a system-embedded Web Site providing the user with network access to key system parameters via the NDB system's own Home Web Page including:

- System status at a glance
- Operational control
- Local or Remote Configuration
- DHCP capabilities
- Monitoring Built-in Test Equipment (B.I.T.E.) parameters
- Logging of 300 events such as failures or user operational changes



# MR-5 Monitor Alarm Receiver



The SAC MR-5 Monitor Receiver with Loop Antenna monitors the antenna signal and emits an alarm in the event of a fault, giving immediate notification of a potential problem.



# Spare Parts

Spares Kits increase system availability. If a component fails, you can switch it with your spare. Send us the failed part for repair or warranty replacement.



SE125 Field Repair Kit

# Additional Equipment



Southern Avionics offers optional equipment for numerous types of upgrades, equipment installation, weather protection, as well as for equipment maintenance and testing.

- **Test Load**
- **Antenna Simulator**
- **Anti-Ice Insulators**
- **Obstruction Lights**
- **Battery Chargers (Internal or External)**
- **Custom Solutions**



# Portable NDB System

- The Portable NDB System is designed for simplicity in transportation, quick installation, and minimum space and operational requirements. It is also designed to meet CE requirements.
- The system consists of 2 sub-assemblies:
  - Portable Antenna
  - Portable NDB (SE125 transmitter) and ATU (PC1000C/3 coupler)



# Land Installations



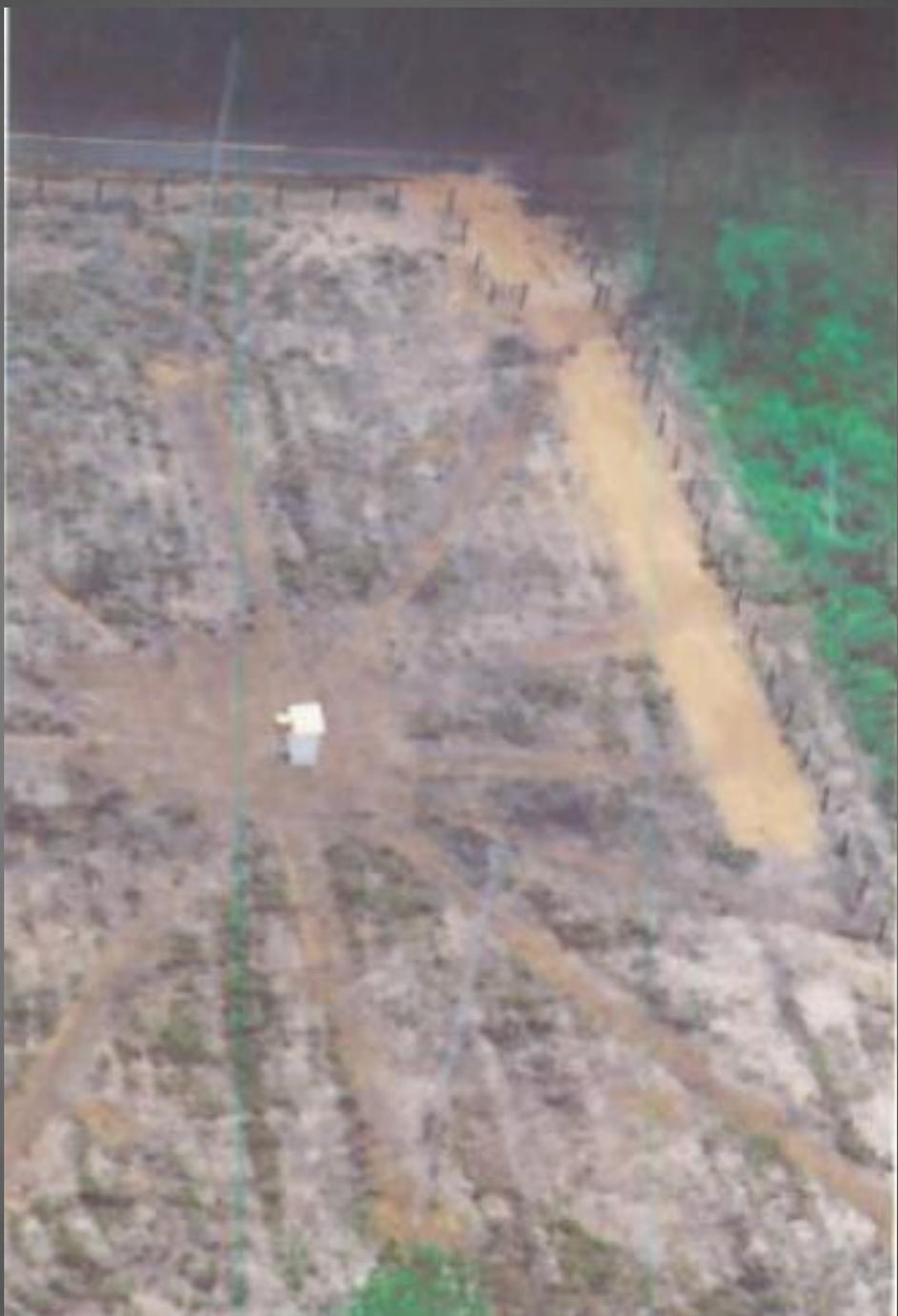








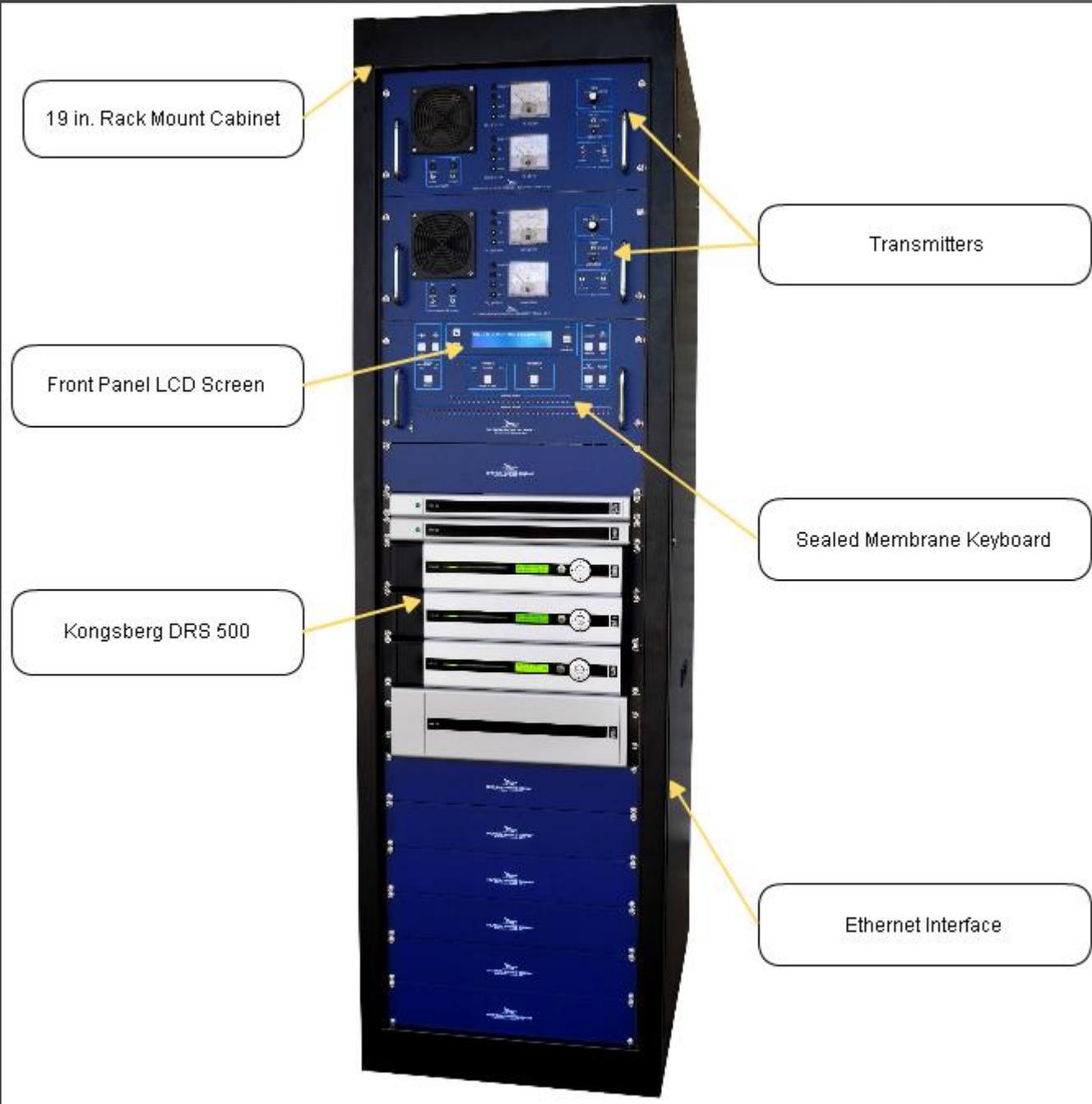
11.01.2011





# DGPS Solutions





# DGPS Solutions

# Services



# Services



## On-Site:

- Installation/Oversight/Range Calculations
- Site Commissioning
- On-Site Diagnosis and Repair
- Site Acceptance Tests
- Site Surveys

## In-House:

- Telephone Assistance from our technicians
- PCB repair or replacement
- Testing
- Training
- Range Report Calculations

# Factory Training



The Southern Avionics factory training course offers lectures, ‘hands-on’ training and in depth discussions on all aspects of NDB ownership and operation.

The following topics are covered:

- Overview of NDB technology
- Low frequency transmission and antenna theory
- Basic operation of NDB equipment
- Detailed circuit theory
- Installation considerations and ‘best practices’
- Factory Acceptance tests
- Site Acceptance tests
- Preventive maintenance procedures
- Troubleshooting and fault resolution
- Southern Avionics technical support procedures
- Warranty policy and returns
- Overview of Southern Avionics’ history, products, and quality processes



# Certificate of Completion

This is to acknowledge that

**Reza Divsalar**

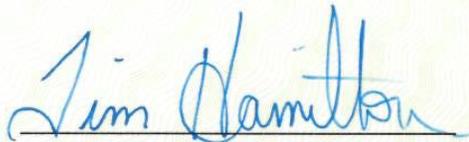
has completed a three (3) day course by a certified instructor to include  
Installation, Operation and Maintenance of the

**SE125 NDB System**

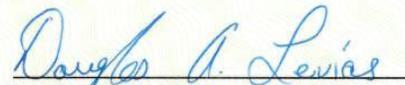
Awarded this 11<sup>th</sup> day of June 2014

in accordance with basic standards required and established by

**SOUTHERN AVIONICS COMPANY**



Tim Hamilton, Director of Engineering



Douglas Leviae, Authorized Training Instructor

Valid for two (2) years from date of issuance.

MANUFACTURERS OF LOW FREQUENCY RADIO BEACONS AND ASSOCIATED PRODUCTS

U.S.: 1-800-648-6158 ■ International: +409-842-1717 ■ U.S. Fax: +409-842-2987 ■ P.O. Box 5345 ■ Beaumont, TX 77726-5345 ■ [www.southernavionics.com](http://www.southernavionics.com)

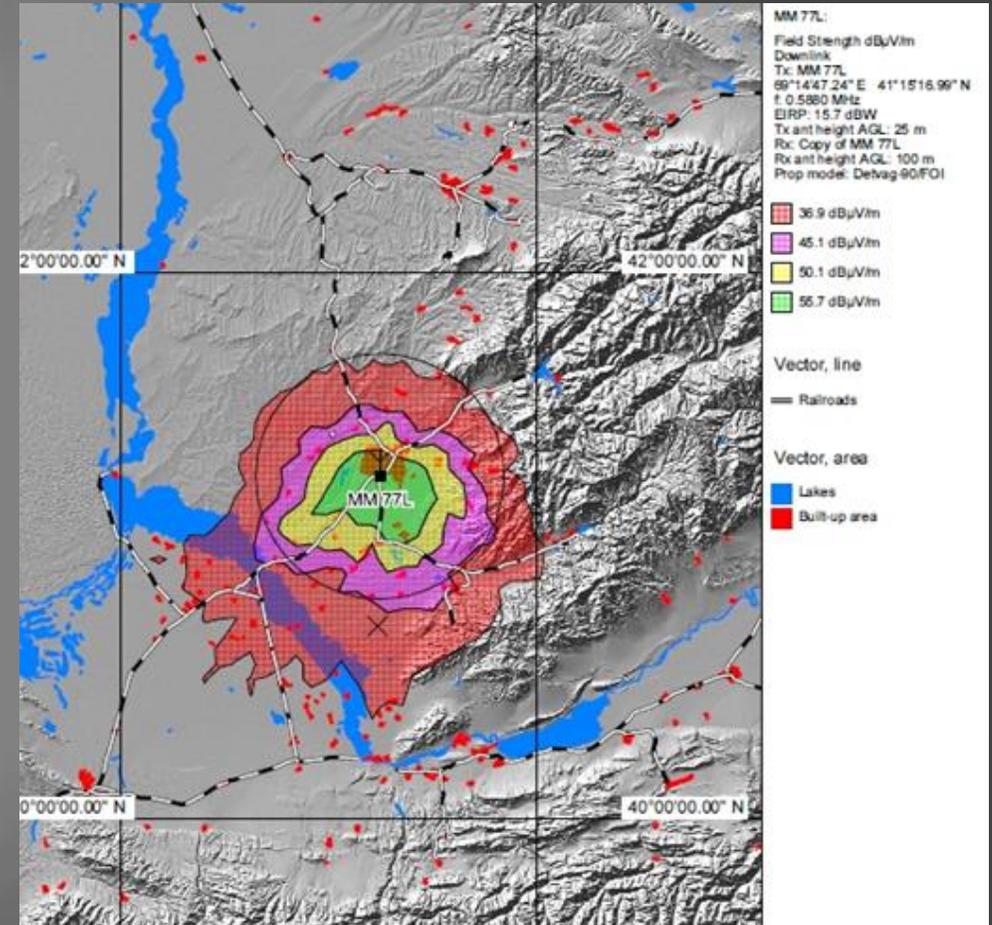
# The SAC Advantage



# SAC Advantage



- ▶ Range Report Calculations
  - ▶ We are the only NDB manufacturer to provide these detailed reports and recommendations
- ▶ Simplicity in Operation
  - ▶ Built-in software
  - ▶ Numerous ways to monitor and control your NDB system
    - ▶ SAC offers the most options in the market



# SAC Advantage

- ▶ Custom Solutions

- ▶ We take every system and installation on a case-by-case basis. Every solution is custom to our client's specific needs.



# Certifications and Declarations



EC R&TTE

EC Low Voltage Directive

EMC Directive

Interoperability within European ATM

CE Mark

UKAS Quality Management

UK CAA 4391

UK CAP 670

RTE TAC - China

ANATEL - Brazil

POSTEL TAC - Indonesia

ISO 9001: 2008

Ingress Protection 66

# Product Comparison



# Product Comparison



Feature	Nautel's NDB	Telerad's NDB	Southern Avionics
Standard Enclosure	(extra cost)	19 inch rack cabinet. IP66 not available	IP66, also available in Rack Mount configuration
Analog Meters	1 Multi-Function	None	2 Multi-Function
Digital Display	4 Line by 24 Characters	Unknown	4 Line by 40 Characters, LCD Display
Customer Interface	Membrane Keypad, 11 Keys	3 Control Keys	Membrane Keypad, 30 Keys

# Product Comparison



Feature	Nautel	Telerad	SAC
Remote Monitoring and Control Options	Leased-Line Dial-Up Radio GSM/GPRS modems Ethernet RS232 RS422	RS232	Ethernet Fiber Optic Serial Server Radio Link Leased-Line Dial-Up Ethernet Extenders RS232 RS485 Combination of these items
Harmonic Levels	70 dB below carrier with Antenna Tuner	Less than -45 dB at the transmitter Less than -65 dB after the antenna	Greater than 70 dB down with Antenna Tuner 60 dB below carrier out of transmitter

# Product Comparison



Feature	Nautel	Telerad	SAC
Modulation Percentage	✘	✔	✔
Transmitter Power Level	✔ (only up or down)	✔ (up to 100 Watts)	✔ Input any value between 5 and 125 Watts via key pad
CE Certified	“Designed for compliance”	✘	✔
Test Mode ON/OFF	✘	✘	✔

# Product Comparison



Feature	Nautel	Telerad	SAC
Ethernet Ready	✘	✘	✓
Data Log	✓ (256 logs)	✘	✓ (300 logs)
Callsign Change	✘	✓	✓
Built-In Test Equipment	✓ (Limited)	✓ (Limited)	✓ (Full Access)

# Sales History



## SE Series Users List

Date Range: 2010 to 2015

Country	Qty	Country	Qty
Azerbaijan	1	Nepal	1
Brazil	8	Netherlands	15
Canada	2	Nigeria	1
Chad	1	Norway	2
Chile	1	Offshore	61
China	116	Pakistan	2
Congo	1	Qatar	1
Denmark	2	Saudi Arabia	2
Ecuador	25	Singapore	125
Estonia	2	Spain	4
Ghana	2	Sweden	2
India	12	Trinidad & Tobago	1
Indonesia	45	Turkey	30
South Korea	11	United Arab Emirates	23
Libya	1	United Kindgom	35
Malaysia	22	United States of America	3
Mexico	1	Vietnam	4
Myanmar	2	West Indies	1
		Total	568

# Letters of Recommendation





U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Technical Operations Services

800 Independence Ave., SW.  
Washington, DC 20591

December 3, 2013

Mr. John Brooks Goodhue  
President  
Southern Avionics Company  
P.O. Box 5345  
Beaumont, Texas 77726-5345

Dear Mr. Goodhue:

The following products manufactured by your company are in use in the National Airspace System (NAS) as non-Federal systems:

Non Direction Beacon (NDB) Transmitters (SA25, SA50, SA100)  
NDB Transmitters (SE Series 125-Watt)  
Antenna Couplers (PC1000C, and PC-1000C3 Antenna tuning units)  
MR-5 Monitor Receiver w/ Loop Antenna  
MR-7 Monitor Receiver  
34 Foot Mast LF/MF Antenna

If we can be of further assistance, please contact Maura E. McGrath, non-Federal Program Manager, AJW-137 at 202-267-7856

Sincerely,

A handwritten signature in black ink, appearing to read "Jo L. Tarrh".

Jo L. Tarrh  
Director, Operations Support, AJW-1



**A.S. Molooobhoy Pvt. Ltd.**

(formerly known as A. S. Molooobhoy & Sons)

ESTD 1905

Suppliers and Service Providers of Marine Safety and Electronic Equipments, Survival Crafts and Chemicals

"Anchor House", MbPT Plot No. 58, 1<sup>st</sup> Darukhana Cross Street, Mazagaon, Mumbai - 400 010, INDIA

91-22-23786800 / 23724911 / 23737590

91-22-23742678 / 23745168

admin@asmolooobhoy.com

www.asmolooobhoy.com



An ISO 9001:2008 Enterprise certified by Bureau Veritas

Distributors & Service Providers for : 

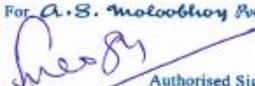
Certified for Radio/VDR Survey by : 

### TO WHOMSOEVER IT MAY CONCERN

We, M/s A.S.Molooobhoy Pvt. Ltd, as end user of product, confirm the successful performance of the contract for **SE-125** equipment , delivered by M/s Southern Avionics Company, 5055 Belmont St, Beaumont, Texas -77707-5345 U.S.A., under contract PI-1408-033 dated 25<sup>th</sup> Aug,2014 ( our order SI-22/08-14 dated 21<sup>st</sup> Aug,2014).

The equipment was installed and commissioned into service on vessel –**SEAMEC 1** and is currently in operation.

If you need further information, please do not hesitate to contact us.

 For **A.S. Molooobhoy Pvt. Ltd.**  
  
Authorised Signatory

**SOM NEOGY**  
CHIEF OPERATING OFFICER

Place : Mumbai, India

Date : 9<sup>th</sup> June,2015

**JASON ELECTRONICS (PTE) LTD**

194 Pandan Loop #06-05 Pantech Business Hub Singapore 128383  
TEL: +65-6477 7700 | FAX: +65-6872.1800 | www.jason.com.sg | co. reg. no. 197800377K



Date: 11th June 2015

**To: whom it may concern**

We, Jason Electronics (Pte) Ltd, Singapore Distributor of Southern Avionics Company, had successfully supplied and installed SA-100 Single and SE-125 Single & Dual to below list of projects.

Equipment was bought and supplied by Southern Avionics Company of 5055 Belmont St., Beaumont, Texas 77707 U.S.A.

No.	Jason Electronics Purchase Order No.	SAC Sales Order No.	Part No.	Product	Type	Hull No.
1	PO-1210003868	S13120029	SLF30501	SA-100, Single	Jack-up Drilling Rig	Noble JU3000N #6
2	PO-1210004045	S14030011	SLF33402	SE-125, Dual	Drilling Rig	71-3068
3	PO-1210003770 PO-1210003646	S13110028 S13100023	SLF33400	SE-125, Dual	Jack-up	Su Tu Nau
4	PO-1210004471	S14080012	SLF33300	SE-125, Single	Semi-Sub	Prosafe Rig #2
5	PO-1210004334	S14060041	SLF33400	SE-125, Dual	Semi-Sub	B362
6	PO-1210001629	S11120013	SLF33400	SE-125, Dual	FPSO	22-0331
7	PO-1210004693	S14110005	SLF33400	SE-125, Dual	Semi-Sub	Q7000

If you need any further information, please feel free to contact us.

Sincerely,

Jason Electronics (Pte) Ltd.

May Lim

Procurement Manager



Date: Jun 10, 2015

To whom it may concern:

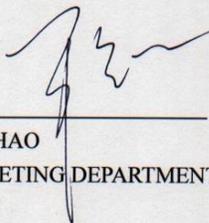
**LETTER OF REFERENCE TO SAC'S NDB**

Yuantong Marine Service Company Limited is a wholly owned Hong Kong subsidiary of China Ocean Shipping (Group) Company. → ( COSCO (H.K.) Ltd ) .

For the stable development in the ocean shipping business as well as enhanced service to our customers in ocean shipping and inland transportation, we have restructured its assets, combining the operations of the previous Marine Service Department and Hoi Tung Communication and Navigation Company Ltd. and with a capital injection of HK\$43 million,

Our business includes supply and installation of equipment and spare parts for existing vessels, new vessels, and oil drilling projects at sea and on land; port traffic navigation and communication equipment as well as information management systems equipment. To provide customers with strong technical support.

One of our major product line is **SAC**'s NDB, before we start NDB business, we have observed and examined the stability and reliability, we considered that **SAC**'s NDB can fulfill our requirement, so we put a lot of effort to promote them to our end users all around the China area, go through our skillful and hard working sales team, and with the firmly support from **SAC**, eventually we have a fruitful result in China NDB market. Run true to form, we will continue to recommend SAC's NDB to our end users, such as SE series, SC series and homing beacon DS410. Etc.



---

YIN CHAO  
MARKETING DEPARTMENT

# O'CONNOR'S

9 June 2015

## **To Whom It May Concern**

Dear Sir / Madam

### Reference Letter From Customer In Malaysia

We, O'Connor's Engineering Sdn Bhd (hereinafter referred to as "OCE") is a Telecommunication System Integrator in Malaysia and we have been actively present in the Oil and Gas Sector in our country region for more than twenty (20) years. In fact, OCE has been working closely with Southern Avionics Company (thereinafter referred to as "SAC") as their counterpart for the past years; we are the recognized Distributor and Technical Representative for the NDB products of SAC in Malaysia.

NDB products of SAC have been well deployed in offshore platforms since many years ago and it becomes a recognized brand for Oil & Gas Operators in Malaysia region. The old NDB model named SA100 can be found and it is still in working condition in most of the offshore platforms. The life span / reliability of the products have exceeded the expectation of most Oil & Gas Operators.

Besides that, SE125 has been supplied to offshore platforms recently as for the replacement of SA100, such as SUPG-B Platform (SBO Operations), Duyong-B Platform (PMO Operations) & Pulau-A Platform (PMO Operations) and the feedback from the Operators are positive too.

The spare parts availability does meet most of the Operators' requirement for their planned Preventive Maintenance / un-planned replacement activity. Generally, OCE is proud to say that SAC never fail to deliver the required spare parts to Operators in Malaysia whenever there is requirement.

Last but not least, we trust the above is in order and please feel to contact us if you need further assistance.

Thank you.

Yours faithfully  
O'CONNOR'S ENGINEERING SDN BHD



TAN SWEE TICK  
Senior Manager  
Radio Communication Department



Certificate No. KLR 42304

O'Connor's Engineering Sdn Bhd  
(Company No. 379824-P)  
Bangunan O'Connor, 13 Jalan 223,  
46100 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia.  
Phone: (603) 7953 8400  
Fax: (603) 7957 7871  
Website: [www.oconnors.com.my](http://www.oconnors.com.my)

## PT WIRA KENCANA SEJAHTERA

Jl. Sukarjo Wiryopranoto 31-A, Jakarta, Indonesia 11160  
Tel: +62-21 6393 017, Fax: +62 21 659 2939

10<sup>th</sup> June 2015

To Whom it may concern,

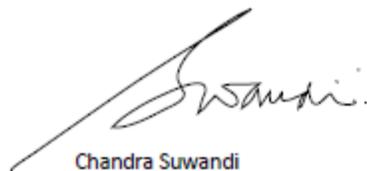
Please accept this letter as my personal and professional endorsement of SAC (Southern Avionics Company) as an outstanding business partner to PT Wira Kencana Sejahtera.

Since my earliest involvement with Mr Brooks Goodhue in 2010, I have found their company, products and after sales services to be world class in many ways. To date, SAC's performance in engineering, packaging and in keeping with their promised delivery schedule has been first-rate. The equipment we have received has been of high quality, meeting or exceeding our expectations with fabrication quality, attention to detail and quality packaging. Among other things, SAC's engineering and support team has been an asset to SAC's future success with their innovation and fantastic customer service.

We have used SAC in multiple projects in the oil and gas industry and have the highest confidence in SAC's ability to provide quality equipment at competitive price, and have been pleased with SAC's professionalism and prompt after sales support for minor problems which often occur when working in the field.

I would highly recommend SAC as a high quality supplier of NDB equipment, backed with highly knowledgeable personnel, and with history of successful projects from around the world.

Sincerely,



Chandra Suwandi  
President Director  
PT Wira Kencana Sejahtera

Ulstein Belga Marine  
Rua Curuzu 58 – São Cristóvão  
Rio de Janeiro – Brasil.  
CEP: 20920-440

Rio de Janeiro, June 9th, 2015.

To Whom It May Concern:

This is to confirm that we have been representing Southern Avionics in Brazil and Southern Avionics has been a client of our company for the last 5 years, and maintains a satisfactory business relationship with our company.

This reference is issued for the interested party, and does not impose any responsibility to Ulstein Belga Marine

Sincerely,



André Britto  
Diretor  
Ulstein Belga Marine

André Britto  
Diretor  
Ulstein Belga Marine

**NATS Services**  
NSL Engineering  
Project & Design  
1<sup>st</sup> Floor East  
Heathrow House  
Bath Road  
Hounslow  
TW5 9AT

10th September 2010

TO WHOM IT MAY CONCERN

**SAC SD25-100 DUAL NDB**

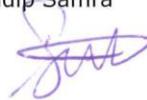
Southern Avionics of 5055 Bemont St, Beaumont, Texas 77707 U.S.A have supplied SA 50 and 100 NDB's to NATS for over 10 years.

NATS placed an order 45288976 for new type SD 25-100 in May 2009, SAC and NATS T&Cs were met and full payment has been made.

The SD 25-100 NDB intallation and commissioning took place in August 2010 and the NDB has been in operational service for over a year.

If you need any further information please do not hesitate to contact us.

Yours Faithfully  
Kaldip Samra



Nav/Met Systems Engineer  
Tele: 020 8750 3674  
Email: [kaldip.samra@nats.co.uk](mailto:kaldip.samra@nats.co.uk)