



# Telemar GSM High Seas Connectivity

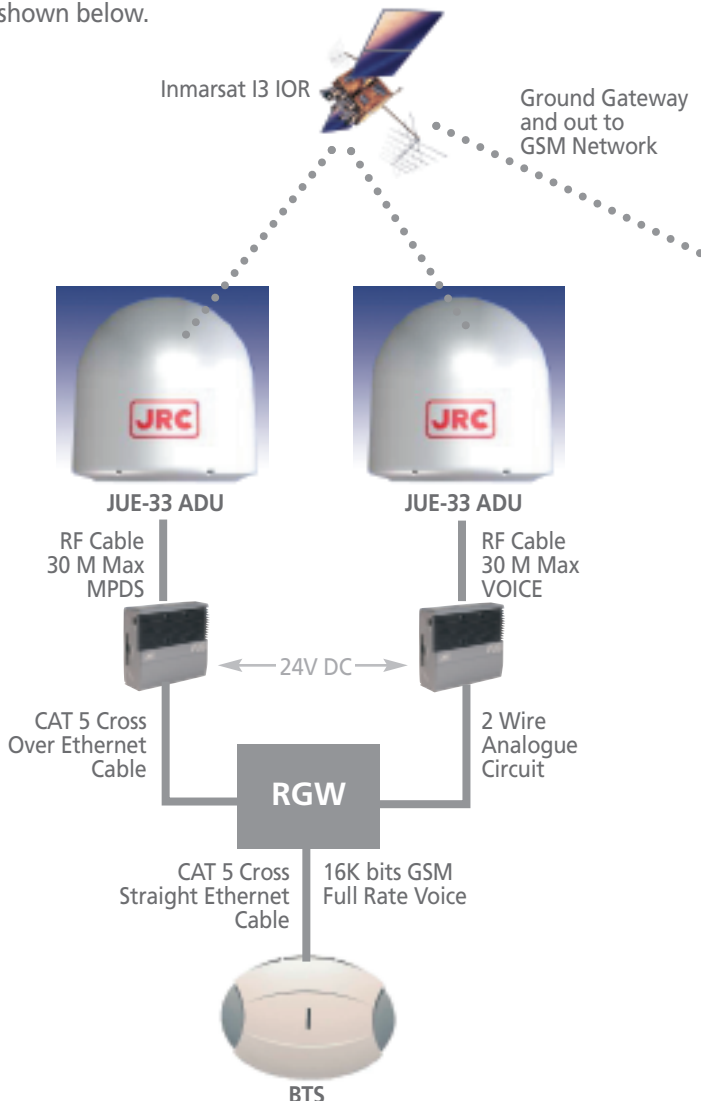
Powered by Blue Ocean Wireless System - High Level Ship Equipment Description

## 1. Document overview

This document provides a high level description of the BOW equipment fitted to the ship. It details the all the various components as well as the individual specifications specific to each separate component including, but not limited to, operating conditions, interfaces, power requirements and general operation.

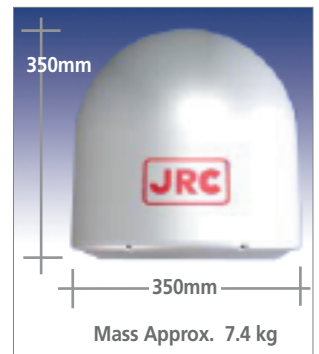
## 2. BOW system description

The BOW system is a shipborne GSM piconode offering voice, SMS & GPRS services through a standalone system. It encompasses 2 JRC Fleet 33 satellite modems, GSM Remote Gateway and a GSM picocell. The basic network topology is shown below.



## 2.1 System components - ADU

The system is split into 2 distinct areas, namely, the above deck units (ADU) and the below deck units (BDU). The ADU comprises 2 JRC Fleet 33 antennas which provide the connectivity to the Inmarsat constellation of satellites via an RF L-Band link. The diagram, right, shows the dimensions of the antenna radome which is the smallest in its class for providing Inmarsat type approved satellite communications. The 2 ADUs are mounted on a mast connected via a single coaxial cable (one cable each) to the BDUs which can be situated 30 metres away. The cables provide both the power and signalling for the units to operate and both antenna housings comprise GPS antennas and electrical compasses.



## 2.2 System components - BDU

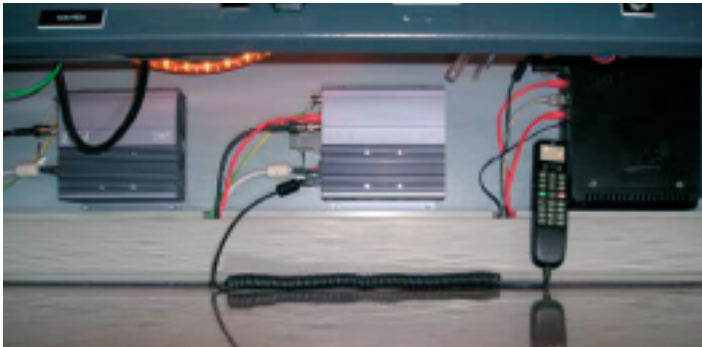
The below decks houses the rest of the equipment which can be split further into discrete areas, the first major component is the JRC Fleet 33 modems. The modems provide the interface to the rest of the BDU equipment via Ethernet, USB or RS-232 connections. They also provide the autonomous function of locating the satellites by using the in-built GPS receivers and seamlessly connect to the Land Earth Stations (LESs). Once this is achieved a connection is set up allowing the rest of the BDU systems to connect to the PSTN & GSM ground infrastructure.





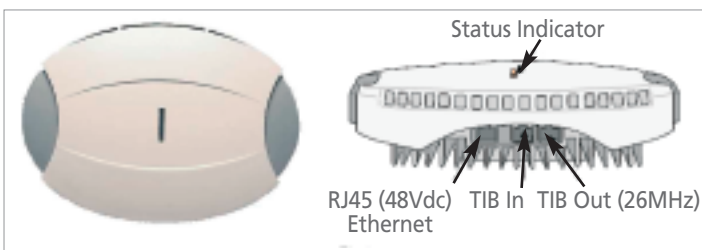
### 2.3 Remote Gateway

The Remote Gateway (RGW) houses a Linux server which controls the GSM signalling and call set up as well as the SMS & GPRS functionality. The unit essentially transcodes the GSM voice codec to a narrowband signal for transmission over satellite networks. Once the narrowband voice arrives at the ground it is recoded back to its original form so it can be sent across the GSM or PSTN networks. The SMS function takes advantage of the MPDS link so SMSs can be sent irrespective of a call in progress. The diagram below shows a typical ship installation with the RGW shown to the right.



### 2.4 Nano BTS

The Nano Base Station (BTS) is provided by ip.access. The ip.access base station is the smallest and most cost effective GSM Nano Cell package available today. It provides BOW with the capability to support voice, text and packet data services for Blackberry support. Its low power consumption and convection cooling make it an ideal product for installation aboard merchant ships. The ip.access BTS has been designed in accordance with the relevant ETSI specification to insure compatibility with GSM mobile terminals and the core GSM network. The nano BTS is a complete picocellular base station for deployment on board vessels to provide GSM & GPRS coverage and capacity. Picocells provide a low cost alternative to the traditional antenna based solutions and due to their small size can be located just about anywhere to provide the desired coverage.



### 3. Specifications

#### 3.1 JRC Fleet 33

Frequency Range TX 01626.5 to 166.5MHz  
 RX 1525.0 to 1559.0MHz  
 Output Power E.I.R.P. 21+1/2 dBW (MAX)  
 Receiving Performance G/T-12.5dB/k or more  
 Communication Global Beam Area:  
 • Voice 4.8 kbps

Spot Beam Area:  
 • Fax 9.6 kbps  
 • Data 9.6 kbps  
 (Up to 40 kbps via V.42bis/V.44 Compression)  
 • MPDS: Mobile Packet Data Service  
 (TX:28kbps, RX:64kbps:Best effort)

#### Interface

TEL/FAX (RJ11)  
 Ether-Net (RJ45)  
 USB

#### Power

Serial (RS232C)  
 Voltage 24V DC +/-10%

#### 3.2 Remote Gateway

Output power 200mW  
 Bandwidth 4.8Kbps  
 Zero utilisation when no calls in progress

#### Interface

TEL/FAX (RJ11)  
 Ether-Net (RJ45)  
 USB

#### Power Voltage

Serial (RS232C)  
 110-240 volt AC

#### 3.3 Nano BTS

Frequency Range	GSM 900	GSM 1800	GSM 1900
Transmit frequencies	925-960MHz	1805-1880MHz	1930-1990MHz
Channel spacing	200kHz	200kHz	200kHz
Max. output power	+20dBm	+23dBm	+23dBm
Output power control	12 steps	12 steps	12 steps
Receive frequencies	880-915MHz	1710-1785MHz	1850-1910MHz
Channel spacing	200kHz	200kHz	200kHz
Performance	GSM 05:05	GSM 05:05	GSM 05:05
Receive gain control	26 steps 2	6 steps	26 steps

Electrical Interface Single RJ45 auto-select 10/100 Ethernet supporting PoE Timing Interface Bus (TIB) providing nanoBTS interconnect for multi-TRX functionality

#### Dimensions & weight

Height 210mm  
 Width 280mm  
 Depth 77mm  
 Weight 2.7kg

#### Power Consumption

13W  
 Input Supply 38-50 volt DC  
 Temperature -5 to +45°C ambient  
 Humidity 5 to 90% non-condensing