Vobal Technologies’ Commercial Maritime GSM Solution Over FleetBroadband

Ultra-low Bandwidth for Voice and SMS Over Background IP Channel

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# Contents

1 Overview ................................................................................................. 1

2 Hardware ............................................................................................... 1
   2.1 S3 Base Station Server .................................................................. 1
   2.2 Mobile phones ................................................................................. 1

3 Service .................................................................................................. 1
   3.1 Free Onboard Service ................................................................... 1
   3.2 Long-distance Service .................................................................. 2

4 Setup .................................................................................................... 2
   4.1 Equipment Contents ..................................................................... 2
   4.2 Equipment Setup .......................................................................... 3

5 Technical Specifications ................................................................. 5

6 Further Support and Information .................................................. 5
1 Overview

GSM for the commercial maritime industry

Communications at sea is a challenge faced by all seafarers. While technologies have improved, the high cost of voice communications prevents regular use of the telephone by crew members. Vobal Technologies has developed a network of S3 base station servers that improves the convenience and significantly reduces the cost of communications at sea, for both the seafarer and the vessel operators. Vobal utilizes the network of base stations to provide regular, pre-paid mobile phone service.

Vobal's GSM solution reduces the costs of providing mobile phone service at sea through patented technology to minimize bandwidth utilization. This architecture abandons standard “landline-based” GSM systems in favor of Vobal’s unique Voice over IP (VoIP) backhaul solution. Vobal requires just a fraction of the bandwidth compared to other existing GSM solutions. Furthermore, this is accomplished by utilizing the less costly background IP channel of Fleet Broadband, as opposed to the more expensive streaming channel. Vobal's solution is currently the only one that is designed to operate this way.

2 Hardware

2.1 S3 Base Station Server

The S3 base station server is exceedingly easy to setup. With a range that is designed to reach to all parts of the crew area of a typical commercial ship, there are no additional repeaters required (though repeaters are an option for “atypical” ships where extended range is desired or required). The server comes with an analog phone, an analog telephone adapter (ATA), as well as all required cords and antennas. Once the data service provider opens up a predefined list of IP addresses and ports in the firewall, the system is plug-and-play. Simply connect the adapter to the satellite terminal, plug in the S3 server and the ATA to an uninterruptible power supply, and magnetically mount the antennas to the wall and the system is ready to go.

2.2 Mobile phones

The Vobal Network is compatible with most “global” phones. Specifically, a mobile phone that is compatible with a 900MHz GSM 2G network will work with the Vobal network while out at sea. There is no need to change a SIM card, so even phones that are locked to their own SIMs should automatically connect. In general, a mobile phone that a seafarer would have to use in a foreign port of call will work on the Vobal Network with no need of changing out a SIM.

3 Service

The Vobal Network provides the ability to place and receive phone calls and to send and receive SMS messages.

3.1 Free Onboard Service

Upon starting up the service for the first time, all functioning, compatible mobile handsets onboard will receive a welcome SMS and an SMS assigning each one a unique local 5-digit extension (e.g., 10452). All phones with assigned extensions will be able to call or SMS each other for free. This onboard communication functions even in the case that the Fleet Broadband (or other satellite Internet connection) is temporarily non-operational.
3.2 Long-distance Service

Once a mobile phone is attached to the network, the caller may purchase a Voucher just like buying prepaid mobile phone services. By sending the 12-digit voucher number via SMS, the phone is assigned a US phone number and an account number. The account balance is the Voucher value. Calls and SMS messages may now be sent and received until the balance runs out, (an audio prompt informs the crew of the remaining balance before each call). In addition, there is a $5.00 monthly fee for maintaining the phone number active. Additional Vouchers, also known as “top up cards”, may be purchased as needed to add funds to the account. As long as an account balance is maintained, the phone number (and balance) will remain with the SIM card, even if the crew member joins another ship using the Vobal Network (though in this case, the 5-digit local extension will likely change).


4 Setup

A diagram of the completed setup is below:

4.1 Equipment Contents

<table>
<thead>
<tr>
<th>S3 Server + power adapter cabling</th>
<th>Analog Telephone Adapter (ATA) + power cabling – Unit that connects the S2 to the Internet and to the analog telephone or PBX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two (2) Ethernet cables – one blue, one yellow</td>
<td>Two (2) Antennas – Large receive and small transmit antenna</td>
</tr>
</tbody>
</table>
| Analog Telephone + cable (RJ11 connectors) | }
4.2 Equipment Setup

1. Connect one end of the yellow Ethernet cable into the Ethernet port in the back of the Vobal S3 Server.

2. Connect the power cord into the back of the S3 Server.

3. Connect the analog telephone phone cable to both the telephone base unit and to the green port of the ATA, (Phone).

4. Connect the free end of the yellow Ethernet cable into the yellow port of the ATA (Ethernet).

5. Connect one end of the blue Ethernet cable into the blue port of the ATA (Internet) and the other end into the Internet source.

6. Connect the ATA power cord to both the ATA unit and the power source. After several seconds you should see 2 green lights on the ATA indicating power and Internet. If you do not, check that the Internet connection is live and that power is applied to the ATA.

7. Connect the S3 Server’s power cord into the power source.

8. If less than 30 seconds have passed since powering on the ATA, wait. Otherwise power on the S3 Server by pressing the power button on S3 front panel.
9. After about 2 minutes, a third green light on the ATA lights up indicating that telephone service is available.

10. Pick up the analog telephone handset and dial a test telephone number - with or without a leading 00 prefix. For example, a U.S. telephone number would be dialed “1-312-444-3456” or “001-312-444-3456”.

11. The Vobal VoIP automated attendant will inform you of the available pre-paid balance (in minutes and seconds remaining) prior to connecting your telephone call.

12. Please note that shoreside correspondents calling your telephone number will also be informed of your remaining calling balance (in minutes and seconds, not in dollars) prior to the call being connected.

13. Turn on a mobile handset. At sea, it should automatically connect to the Vobal network (on land you may need to manually select the network due to competing background telephone services).

14. Dial an extension (the analog phone is extension 90001).

15. Assuming your phone has never been attached to a Vobal network before and does not already have an existing telephone number and balance, SMS a voucher number to extension 10000. You should receive a new US telephone number as a response.

16. Dial a test telephone number as listed above.
5 Technical Specifications

| Compatibility       | – “Always-on” satellite connection (e.g., Inmarsat FleetBroadband)  
|                     | – 900 MHz GSM 2G compatible handsets |
| Number of calls:    | – Up to 7 simultaneous calls |
| Range:              | – Crew area (~75m or 7 Levels)  
|                     | – Optional extension cables available  
|                     | – Additional antennas and/or GSM repeater available for even greater coverage |
| Bandwidth consumption: | – Less than 5MB/month idle bandwidth  
|                     | – Less than 8kbps per call (total voice+overhead) |
| Power:              | – 110-240V, 50/60Hz |
| Temperature/Humidity: | – 3°C to 45°C  
|                     | – 0% to 90% non-condensing |
| Size:               | – PC chassis (35 X 32 X 15cm)  
|                     | OR  
|                     | – Standard 2U 19” rack-mounted chassis (48 X 70 X 9cm)  
|                     | – Ethernet/PBX ATA interface: 10 X 10 X 3cm  
|                     | – 2 Wall-mounted magnetic antennas: 33 and 50 cm |
| Interface:          | – Ethernet |

6 Further Support and Information

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