

### **Report on a Virtual AtoN Demonstration**

This document is submitted by the General Lighthouse Authorities and reports on the outcome of a Virtual AtoN demonstration carried out during the week of March 3, 2008. It was conducted by the GLA R&RNAV Directorate at the Northern Lighthouse Board Depot in Oban, Scotland.

The main advantages of Virtual AtoNs are the speed of deployment and the minimal cost to the service provider. They could be of significant benefit to the mariner as they give almost immediate hazard warnings, for example indicating a new wreck. The current limitation on deploying an effective Virtual AtoN service, is the small number of ships equipped to display AIS AtoN targets.

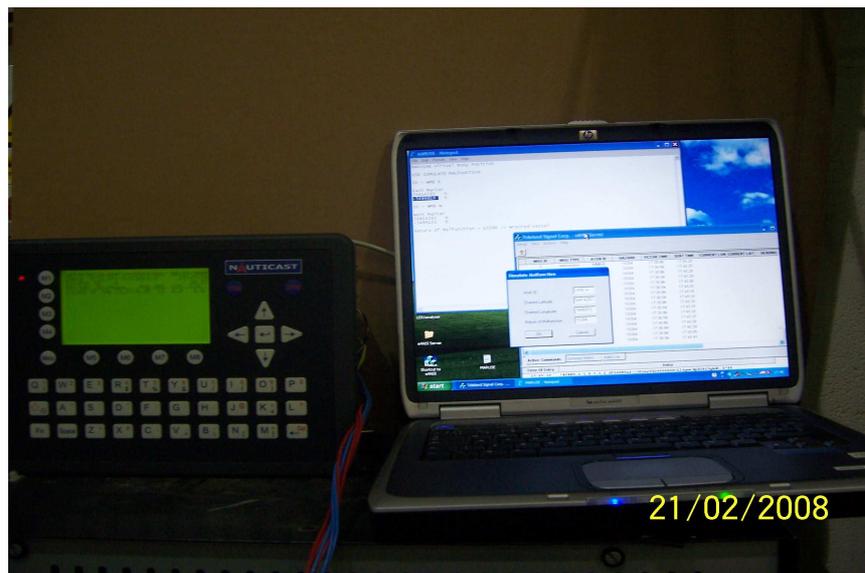
The Committee is invited to note the contents of this report.

## Introduction

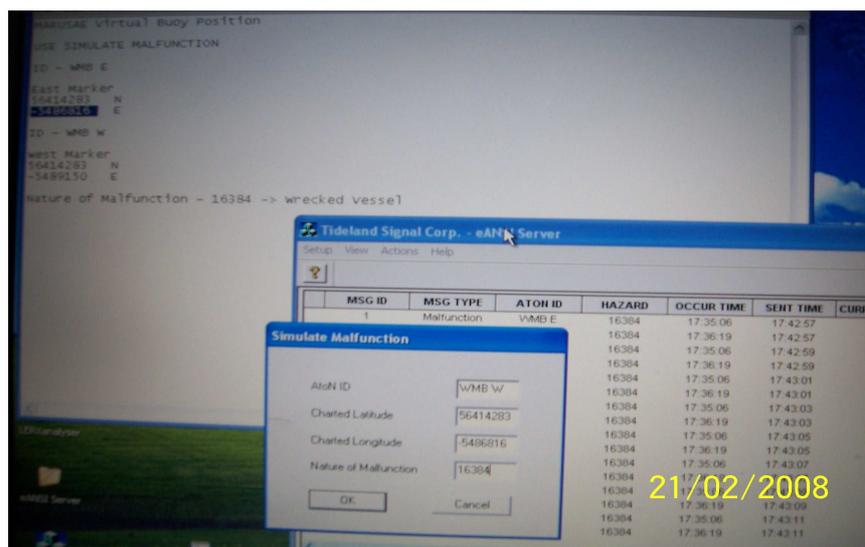
The Virtual AtoN demonstration showed the capability and potential of the AIS system to broadcast Virtual AtoN information to the mariner. An example of the benefits of Virtual AtoNs would be the near instantaneous marking of a wreck or an obstruction, by the local navigation authority, which can be subsequently displayed on an electronic chart. The demonstration took place on 3 March 2008, at the Northern Lighthouse Board depot in Oban, Scotland.

## Set up and demonstration

Demonstrating the capability of Virtual AtoNs required two components:  
A shore station for the message creation and transmission over AIS;  
A ship station to receive and display the messages.



**Figure 1:** Shore station set-up. AIS base station and laptop computer running Tideland Virtual AtoN message creation software.



**Figure 2:** Virtual AtoN user interface

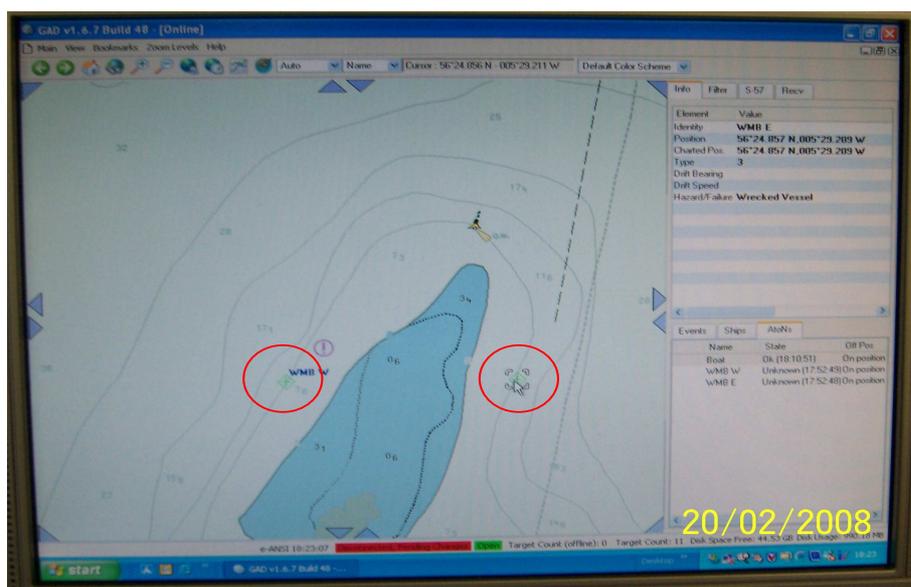
Figure 2 shows a screen close-up of the base station laptop. The window in the foreground prompts the user for the Virtual AtoN variables such as *Position* and *Identity*. The last field, *Nature of Malfunction*, gives the ability to send additional

information regarding the Virtual AtoN. In this case the numerical character sequence 16384 is used to convey the message "Wrecked Vessel". Once all the fields are entered the message is created and sent at a user-defined period, to the AIS base station for transmission.

Note: For this demonstration and to prevent confusion to mariners, a proprietary type of addressed binary message (AIS Message Type 6) was used rather than the standard broadcast AIS AtoN Message (AIS Message 21); this meant that the messages were only delivered to the receiving station with the MMSI target address. This ensured that other AIS users within transmission range were unable to receive potentially confusing information.



**Figure 3:** Ship station set-up: AIS unit and electronic chart display computer, showing the Oban Bay area; on the right hand side of the chart there is a text area listing various parameters of the selected AIS target.



**Figure 4:** Electronic chart display showing two Virtual AtoN targets received via AIS

Figure 4 gives a closer view of the Oban shoal and its North Cardinal buoy. Also shown are the green diamond shaped icons of the Virtual AtoN targets situated to the East and West of the shoal (circled for clarity). The right hand (or East) icon has been selected with the pointer; this brings up information in the text area on the right hand side of the display. The *identity, position and nature of hazard*, in this case *Wrecked Vessel*, is displayed which corresponds to the code 16384 as explained in Figure 2.

### **Conclusions**

This demonstration has shown that Virtual AtoNs have a useful role as a quick and cost efficient method of providing the mariner with navigational information.

Possible applications include: near instantaneous emergency wreck marking; selective channel marking, where only certain vessels can 'see' a Virtual AtoN marked channel; dynamic channel marking that can quickly respond to changing conditions such as a shifting sandbank.

Where a national network of AIS base stations is deployed, it will be possible to create and deploy Virtual AtoN targets anywhere within range of the network, from a single control centre.

However, for ships to benefit from this technology, their AIS units must be capable of processing AIS AtoN messages and they should be provided with electronic chart software capable of displaying virtual AtoN targets.