# Analysis of ORBCOMM S-AIS Product


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### *Executive Summary*

This report describes an analysis of ORBCOMM's space-based AIS product. ORBCOMM supplied 30 days worth of data taken in April 2012, which comprised of Class A AIS position and static messages as well as Class B position and extended messages. The Class A position messages were of Types 1, 2 and 3, while the static messages were of Type 5. The Class B messages were of Types 18 and 19.

Utility of the AIS messages depends on the performance of the space-based AIS system and on the reliability of the content within the AIS messages themselves. The vendor of space-based AIS messages has no control over the latter since AIS is a self-reporting system and occasionally the messages are erroneous either due to equipment malfunction or human error from incorrect entry of parameters..

It is recognized that different users have various objectives and that the performance metrics should reflect these. Wide area maritime surveillance and port loading are two principal objectives that are normally considered. Maritime surveillance requires a high probability of detection, low error rates and low time latency. Port loading is much less demanding and the required probability of detection, error rate and time latency are much easier to achieve.

The main performance metric is the number of unique Maritime Mobile Service Identity (MMSI) numbers per day; each ship is allocated a unique MMSI number, which is contained in all of the above messages. This provides a measure of the number of ships that are detected by the system. This is important because AIS signals from ships located within view of the satellite can often interfere with one another and may be lost or not correctly received.

The number of unique MMSI numbers also depends on the orbits of the satellites and often users are typically interested only in specific areas. In this study global statistics are derived along with an example of the Canadian maritime approaches.

Along with the unique MMSIs, secondary statistics are provided; these include the number of incorrect MMSI numbers, the number of errors in position reports and the ratio of Type 1 to Type 5 messages, which is another indicator of the ability of the system to handle interfering signals.

It is found that, where expected, the characteristics of the AIS messages provided by the ORBCOMM system are very similar to those of other systems. This provides a check on the validity of the data. The performance of the ORBCOMM system is comparable to that of the best



[1] http://www.London-Research-and-Development.com

currently available space-based systems[2] and is significantly better than that of systems based on the previous level of technology. The requirements of applications such as port-loading can almost certainly be satisfied by the present satellite constellation. The requirements of maritime surveillance can be partially fulfilled at this time but will be satisfied with the advent of more satellites which are planned to be launched within the next two years.

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