



AIS – German Coast

Improved safety and fleet management for vessel traffic

In recent years, vessel traffic on German coasts has increased substantially. Traffic on the Baltic Sea, for example, has risen sharply, in keeping with the economic growth in Russia and the Baltic states. Sea route surveillance has accordingly become an increasingly complex task.

The German Federal Waterways and Shipping Administration (WSV) is responsible not just for the administration of the federal waterways but also for monitoring, information and control of vessel traffic in German sea areas. Seven directorates and 39 water and shipping authorities make sure that the traffic flows are managed safely.

Vessel traffic is partly controlled and monitored through traffic observation. The necessary equipment for this is combined in the “System Maritime Traffic Technology” (SMV).

AIS – German Coast

To successfully cope with increasing demand, the WSV is currently setting up the Automatic Identification System (AIS). This new technology allows ships around the world to identify themselves with the help of on-board devices that provide information on their position, course, speed, destination, cargo and other data. As an additional tool to ensure maritime traffic safety, AIS also serves to prevent collisions at sea, enabling ships to exchange information with one another and with coastal Vessel Traffic System (VTS) centres.

ESG is the prime contractor for the entire project. Within the project „AIS – German Coast“ we have equipped 31 VTS relay stations along the North German and Baltic Sea coasts, five VTS relay stations along the Kiel Canal, the platform of the windpark

BARD Offshore 1 as well as three vessel traffic data processing centres and a reference system with the respective hard- and software. We also equipped seven VTS centres with hard- and software to display the AIS situation picture.

ESG developed and integrated the entire software and brought the whole system into operation. We always ensured that the project strictly adhered to all standards and norms such as, for example, the IALA (International Association of Marine Aids to Navigation) standard.

We also took into account the future worldwide eNAV standard, which ensures adherence to security-relevant criteria in conjunction with electronic navigation. The AIS software developed by ESG has been certified by the German Federal Maritime and Hydrographic Agency. For the procurement

of the different hardware components (e.g. antennae) and their installment, ESG worked with the following companies: ARCHE Systemtechnik GmbH, SAAB TransponderTech AB, Hopf Elektronik GmbH and Navicon A/S.

The AIS system has been in operation since the end of August 2009.

HIGHLIGHTS

- ▶ Automatic Identification System for the identification of ships off the German coast
- ▶ Better control of vessel traffic
- ▶ Improved maritime traffic safety and environmental protection due to prevention of collisions at sea
- ▶ Improved vessel traffic flow



Lighthouse equipped with AIS antenna

AIS Mode of Operation

In sea areas with high traffic density, the use of AIS data will complement the existing means to ensure the safety of vessel traffic. Alongside the established radar monitoring of traffic, AIS technology will in future contribute to a further increase in the precision of the traffic situation displayed in the VTS centres. Data on the vessels and their current courses and speeds is available at any time, thus providing the VTS centres with an effective instrument for the continuous monitoring of the traffic environment in the estuaries.

In sea areas with average traffic density – which up to now have not been monitored by radar because of their distance from the coast – the AIS technology in connection with the Electronic Chart Display and Information System (ECDIS) opens up a new quality of traffic monitoring. With the display of the received AIS data, the vessels can be informed about dan-

gerous situations. This can be done in sufficient time by combining manual observations of the traffic data and the generation of automatic alarms, e.g. when ships deviate from their usual set course. In addition, the use of Anomaly Detection – the comparison of AIS data with globally available data (e.g. Lloyds database) or with radar data – enables the organisations responsible for coastal protection (e.g. coastguard, navy) to detect deviations from a vessel's specified course or schedule. Thus the prevention of accidents and collisions will be considerably improved, particularly in sensitive sea areas such as the Kadetrenden, north of Rostock.

AIS data from sea areas with low traffic density or mainly fishing and pleasure boats are also used for automatic traffic monitoring. If automatic monitoring is not possible because of the geographical conditions (e.g. in tidal flats with continuously changing courses), the reception of the AIS data nevertheless ensures that in special cases the VTS centre can inform itself immediately about the situation on-site and initiate specific courses of action.

Using AIS technology, the VTS centres will also be able to send short messages either to a particular vessel, to all vessels or to the ships in a particular area. Therefore navigation warnings, information on traffic regulations or port information can be passed on to the vessels at any time. The AIS technology thus contributes to making vessel traffic not only safer at sea but also plays a significant role in the safety and ease of traffic in sensitive

offshore sea areas and in the approaches to ports.

ESG Services

The successful launch of the AIS system demonstrates ESG's outstanding competence in software development and integration for maritime applications.

Preparation of a detailed work plan:

- ▶ Update of tender specification
- ▶ Preparation of system architecture and hardware/software architecture
- ▶ Preparation of database design
- ▶ Preparation of a test concept/plan
- ▶ Preparation of an integration and installation concept
- ▶ Preparation of a redundancy concept

Technical realisation:

- ▶ Installation/start of operation of hardware (AIS base stations, servers, IPCs, time reference, LAN) incl. documentation
- ▶ Preparation/integration of software incl. documentation
- ▶ Preparation of test documentation
- ▶ Preparation of user documentation (user manual, diagnosis manual, operation manual)
- ▶ Training of nautical and technical personnel incl. preparation of training concept as well as preparation of required training documents

How does AIS work?

Data is exchanged automatically at short intervals between vessels and the VTS centres via special UKW transmitters and receivers. This procedure is standardised worldwide and operates on all seas, so that vessels that are equipped with AIS shipborne equipment from different manufacturers can "see" each other. AIS also enables an overview of obstacles and thus complements the radar picture display. Depending on the height of the antennae, an AIS station has a range of 20 to 30 nautical miles (up to 55km).

AIS supports the vessel's command and the VTS centres on the coast with automatic exchange of information on the position and movement of the vessels. Information is therefore available more quickly and is more precise than heretofore. On board the vessels, the AIS data can be displayed together with the radar information; in the VTS centres on the coast, the AIS data are used to create a clear picture of the traffic situation. With the increasing expansion of AIS, accidents at sea can be more easily avoided, thus considerably improving overall traffic safety. This increased security also contributes significantly to the protection of the marine environment.

Source: German Federal Ministry of Transport

