Aids to Navgation
Device features, requirements and IEC standards

All About AIS

AIS based Aids to Navigation devices offer three different transmission types and use two different transmission protocols. Type one AtoNs offer transmit only features, type two offer transmit and receive via another technology - for example GSM - and type three offer transmit and receive functionality via AIS.

An AtoN AIS unit operating in RATDMA (Random Access Time Division Multiple Access) mode uses its receiver to listen to both AIS frequencies for about one minute, and makes and stores a map of all the AIS "slots" [or message spaces] on the VHF data link [VDL]. It then looks for two free adjacent slots in which to send its [2-slot long] AtoN message 21 or meteorological and hydrological message 8.

RATDMA is ideal for many applications because the AtoN or weather/tide AIS unit can be placed at any location, and requires no reservation of slots by a base station. It can be used whether base stations exist in the area or not. Its drawback is that in order to transmit to the AIS slot map the unit must turn its receiver on for at least one minute before transmitting, and this is the main power consuming factor with an RATDMA AtoN or weather AIS unit.

An AtoN AIS unit operating in FATDMA (Fixed Access Time Division Multiple Access) mode will transmit in a pair of slots which are reserved by an AIS base station. Ships receive a message from the base station, indicating that certain slots are reserved. The ship AIS transponders store this reserved slot information in their slot maps, and do not transmit in these slots. The FATDMA AtoN is programmed to transmit in two consecutive slots of those reserved by the base station. It is possible to "re-cycle" slots by having a number of AtoN units use the same pair of slots, but use them sequentially. FATDMA allows greatly reduced power drain for an AtoN AIS unit, because no receiving period to build a slot map is needed.

Requirements

- 2W transmission power
- Flexible reporting rate depending on voyage status (2 seconds to 3 minutes)
- RATDMA and FATDMA communication protocols
- Variable connection interfaces
- Active GPS antenna
- Low power due to limited power options
- High IP rating due to harsh environmental conditions

Standards

- IEC62320-2 Edition 1 IEC standard, AIS Aids to Navigation
- IEC60945 Edition 4 IEC standard, environmental requirements
- ITU-R M.1371-4 Universal AIS Technical Characteristics
- IEC61162-1/2 Edn. 2.0 IEC standards, digital interfaces
- IEC61108-1 IEC standard, GPS receiver equipment