

Automatic Identification System

A small Introduction into the AIS Technology

Referent

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Bachelor

- Nautical Science
- Maritime Technology and Shipping Management

Master of Science

- Maritime Operations

What is AIS

- Automatic identification system
- Each merchant ship carries a transponder that automatically broadcasts information to all AIS stations by VHF radio link
- Introduced by International Maritime Organisation (IMO)
 - IMO is a UN organisation
 - International Convention for the Safety of Life at Sea (SOLAS)
 - Implemented in national (and EU) legislation
- Used by ships and vessel traffic services to exchange data, for navigation and surveillance

Mandatory Navigational Equipment

- International (SOLAS V/19) **AIS should be installed on board** of:
 - Cargo ships of ≥ 300 GT engaged on international voyages;
 - passenger ships, irrespective of size.
- Europäische Union
 - EU Directive 2002/59/CE provides a comprehensive system of rules for the use of AIS, stating the mandatory installation for ship of ≥ 300 GT with the exception of naval vessels and recreational crafts < 45 meters.
 - EU Directive 2009/17/CE includes fishing vessels with a length of > 15 metres

IMO - AIS



The AIS should improve the safety of navigation by assisting in the efficient navigation of ships, protection of the environment, and operation of Vessel Traffic Services (VTS), by satisfying the following functional requirements:

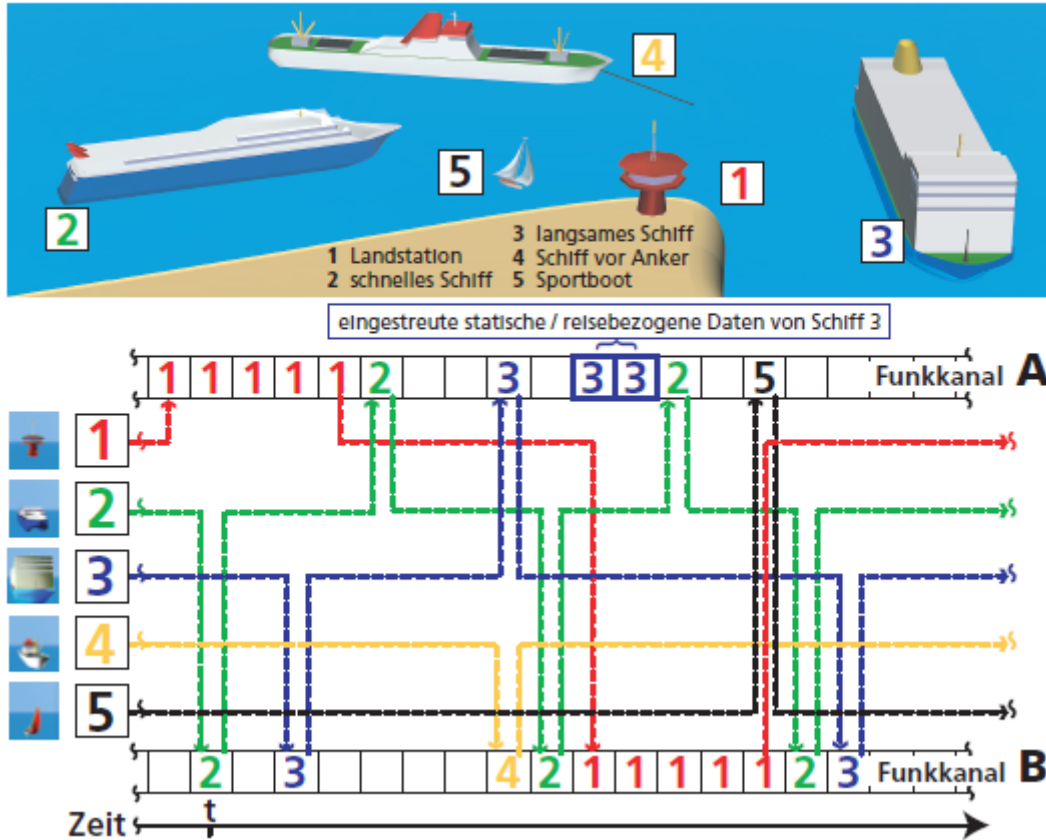
1. in a ship-to-ship mode for collision avoidance;
2. as a means for littoral States to obtain information about a ship and its cargo; and
3. as a VTS tool, i.e. ship-to-shore (traffic management).

AIS Standards



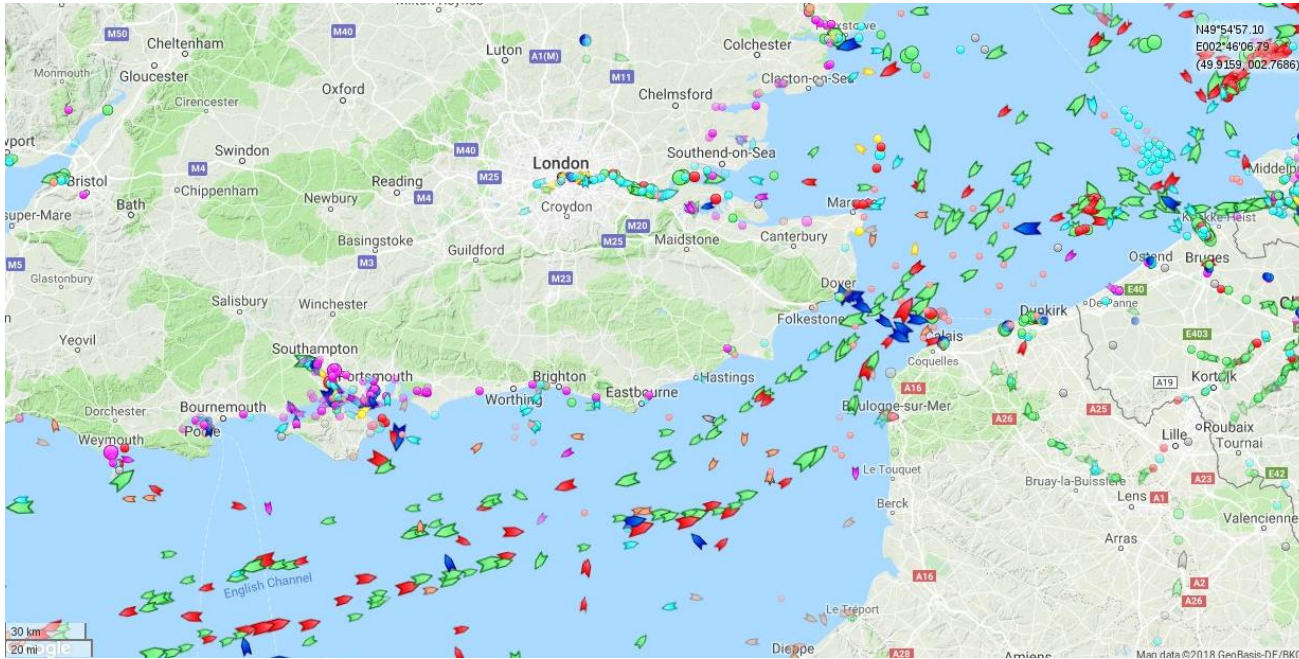
- Class A
 - MSC Res. 74(69) Recommendation on Performance Standard for AIS
 - A Res. 917(22) Guidelines for the operational use of shipborne AIS
- Class B
 - IEC 62287-2: Marine Navigation and Radiocommunication equipment and Systems – Class B shipborne equipment of the automatic identification system (AIS)

AIS Standards



- AIS information from a class A transponder will always be prioritized compared to B
- The new class B+ uses the same SOTDMA technology as Class A

AIS requirements



www.marinetraffic.com/

- There are over 100,000 internationally registered ships in service today using AIS
- AIS to be maintained operational at all times except where international rules or standards provide for the protection of navigational Information

AIS Data



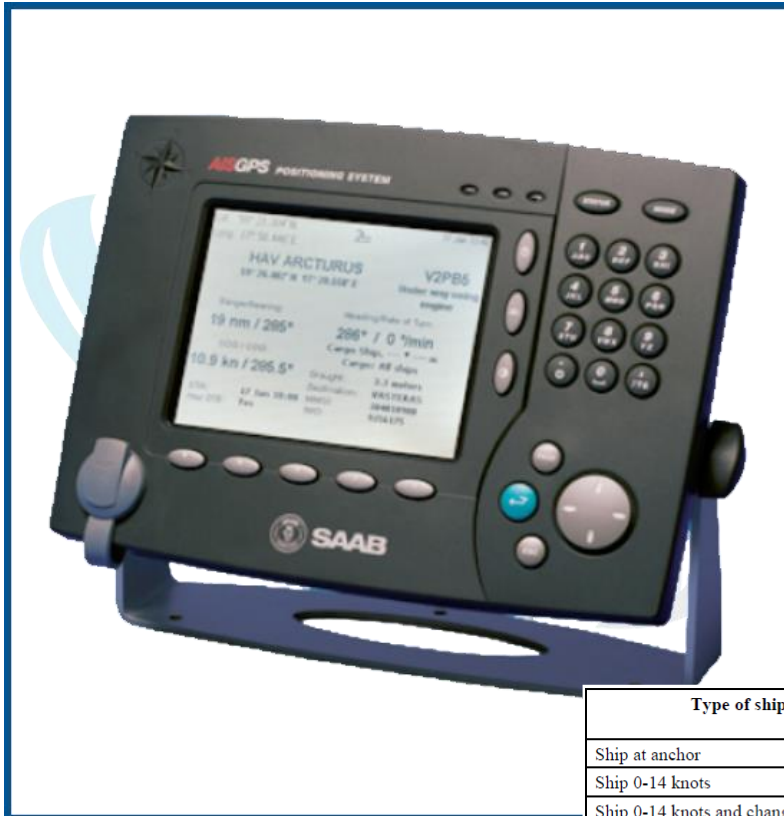
- Static
- Dynamic
- Voyage related
- Short safety-related messages

Static Data



- Information
 - MMSI, IMO number
 - Call sign
 - Name
 - Length and beam
 - Type of ship
 - Location of position-fixing antenna
- Transmission
 - every 6 minutes and
 - on request

Data



Type of ship	Reporting interval
Ship at anchor	3 min
Ship 0-14 knots	12 sec
Ship 0-14 knots and changing course	4 sec
Ship 14-23 knots	6 sec
Ship 14-23 knots and changing course	2 sec
Ship > 23 knots	3 sec
Ship > 23 knots and changing course	2 sec

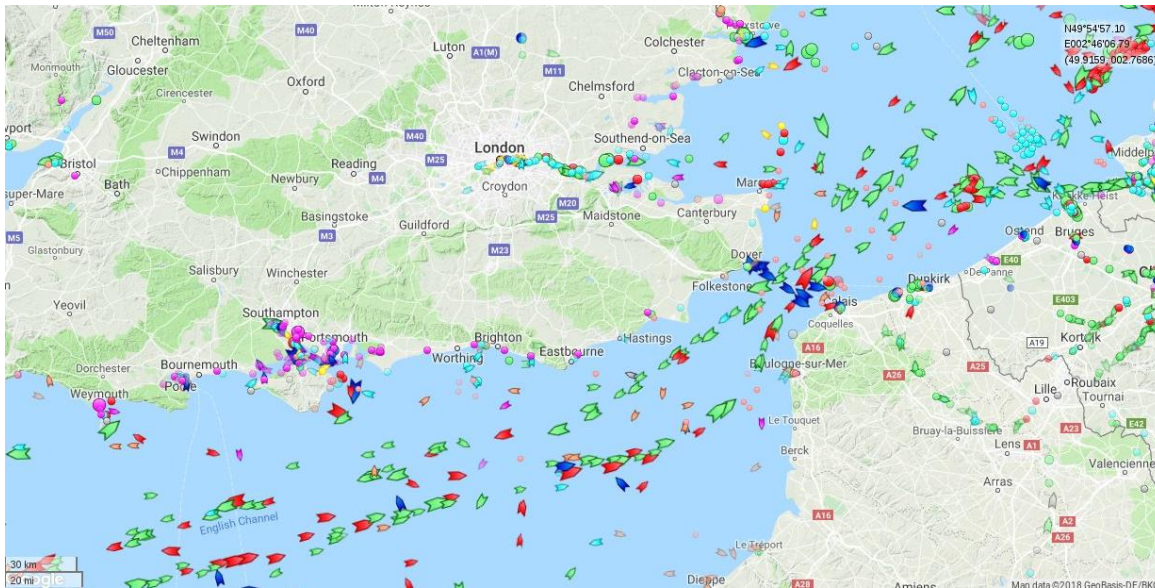
- Information
 - Ship's position with accuracy indication and integrity status
 - Time in UTC
 - Course over ground
 - Speed over ground
 - Heading
 - Navigational status (manual input)
 - Rate of turn (where available)
- Transmission
 - Dependant on speed and course alteration

Voyage related Data



- Information
 - Ship's draught
 - Hazardous cargo (type)
 - Destination and ETA (at masters discretion)
 - Optional
 - Route plan (waypoints)
- Transmission
 - every 6 minutes,
 - after changes

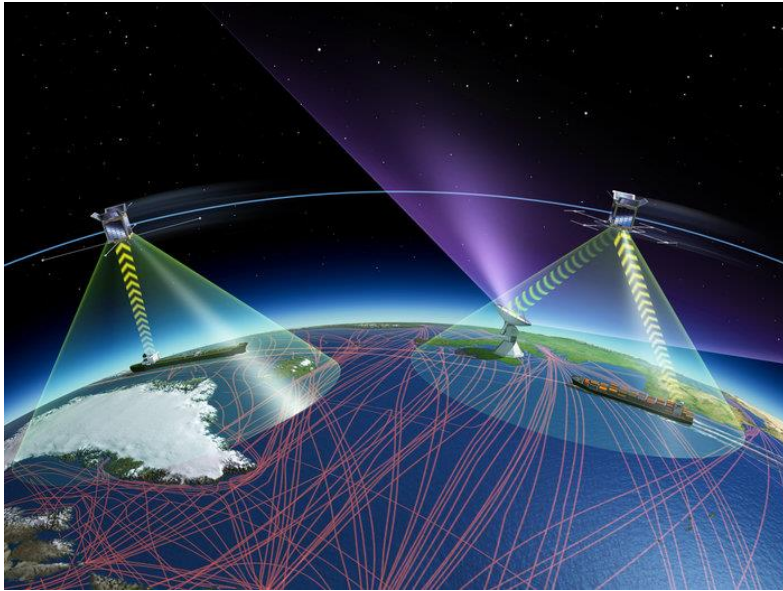
Transmit Power



[/www.marinetraffic.com/](http://www.marinetraffic.com/)

A	B+	B
12,5 W	5 W	2 W
20 – 25 nm	10-12 nm	7-8nm

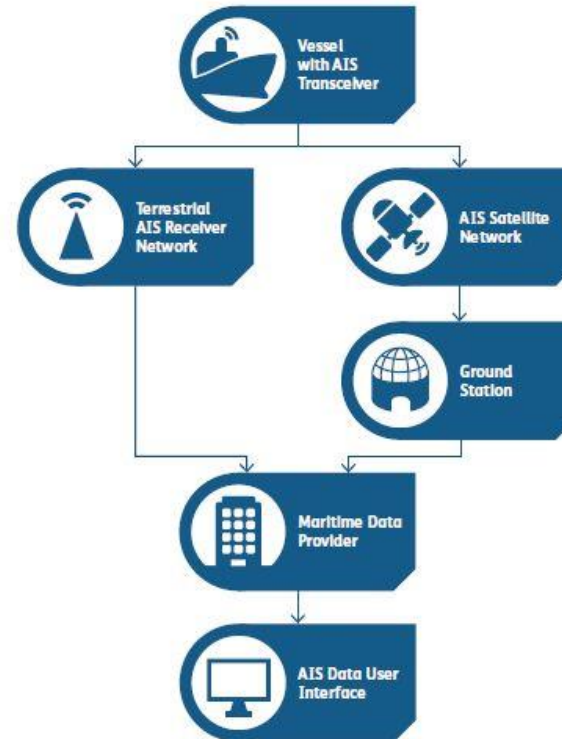
Satellite AIS



[/www.esa.int/](http://www.esa.int/)

- AIS has a major limitation because Earth's curvature limits its horizontal range to about 74 km.
- AIS traffic information is available only around coastal zones or on a ship-to-ship basis.
- Satellite AIS (S-AIS) tracks the location of vessels in the most remote areas of the world, especially over open oceans and beyond the reach of terrestrial-only AIS systems.
- Tracking ships using microsatellites (S-AIS) the ship's identity is recorded and decoded by satellite then sent to ground stations for further processing and distribution.

AIS Data Provider



/Lloyd's List Intelligence/

AIS Data Integrity

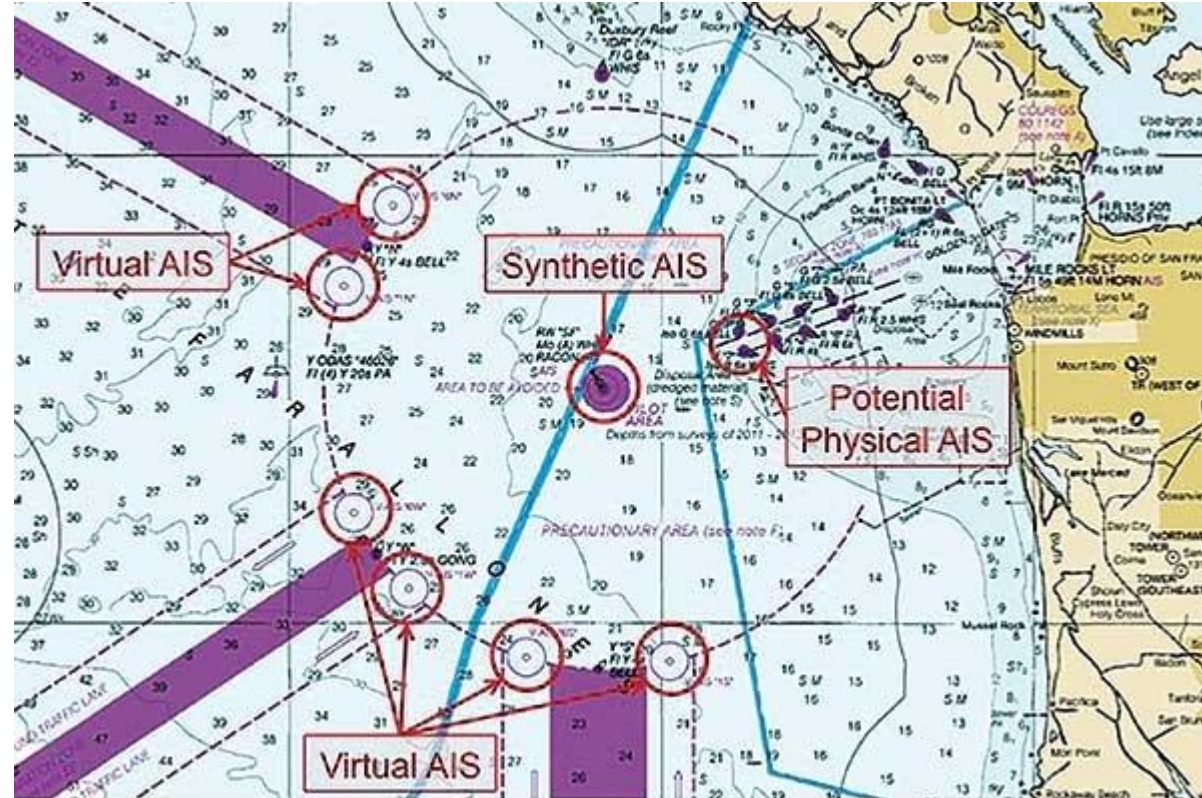


- How sole reliance on AIS data could undermine your organisation's
 - AIS equipment is not required to be continuously switched on
 - AIS message transmission is not secure and can be falsified
 - AIS was not designed to be a global tracking system
 - Satellite - AIS has message collection and latency limitations

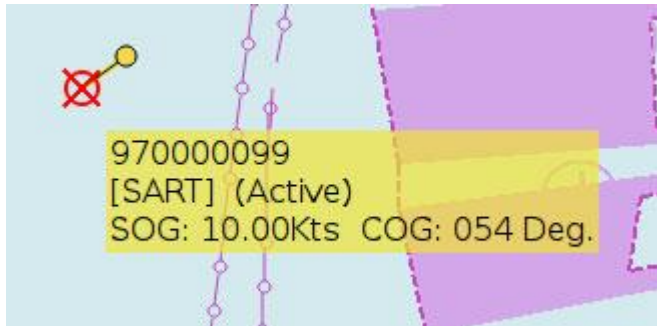
Navigational Applications



AIS-assisted buoys (Real AIS ATON)



Safety Applications



[/www.yachtingworld.com/](http://www.yachtingworld.com/)

AIS Data Storage



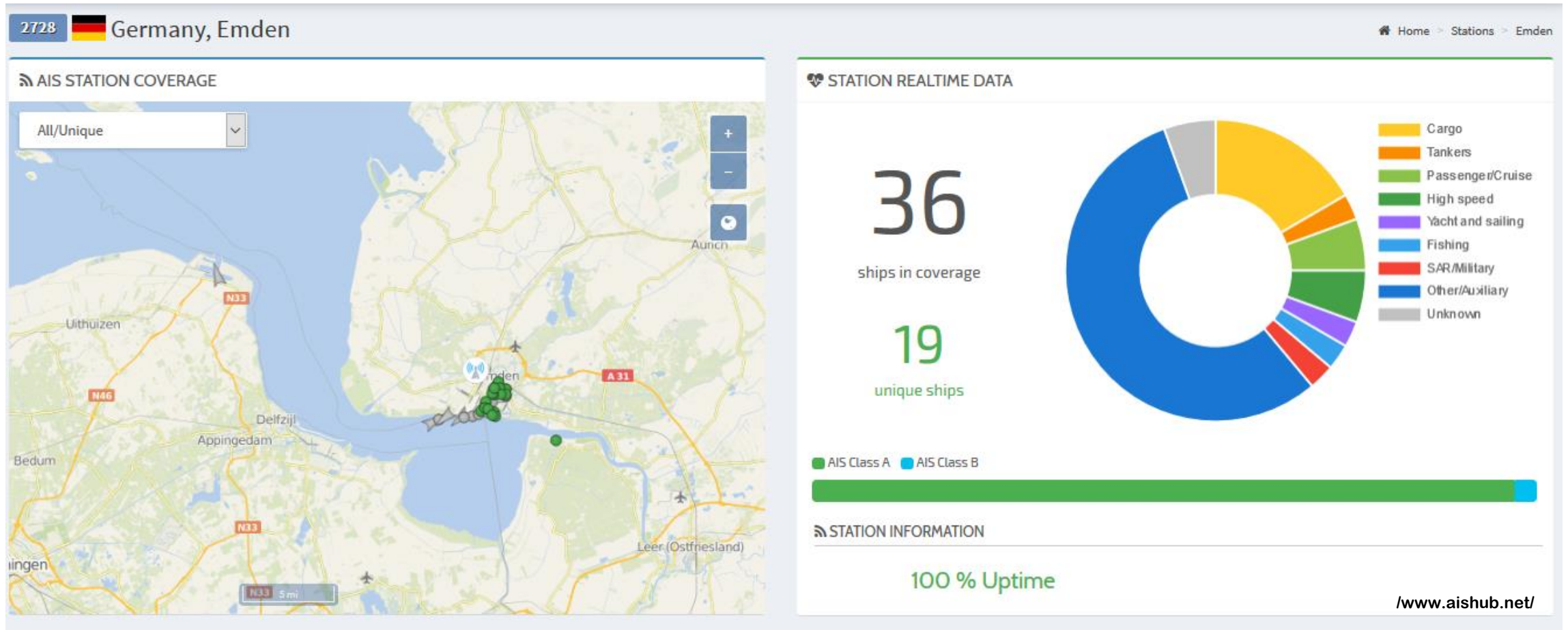
- AIS receiver located at the University in Emden
- AIS network connection (AIS hub, Marinetraffic)
- MySQL database
- > 100.000 datasets per day

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Receiving AIS Data



Vielen Dank für ihre Aufmerksamkeit

