

SOLIS

MARINE CONSULTANTS



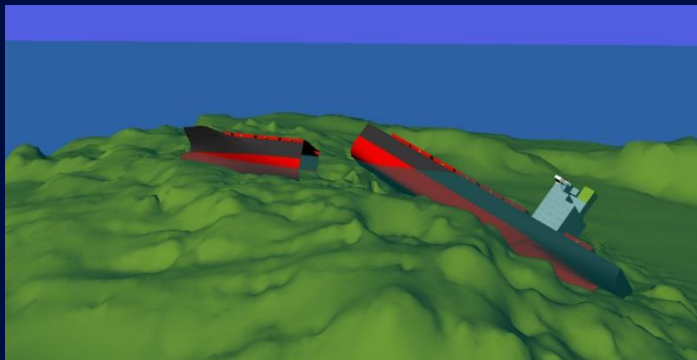
Collaborating to build the AIS base station network in South East Asia



www.solis-marine.com

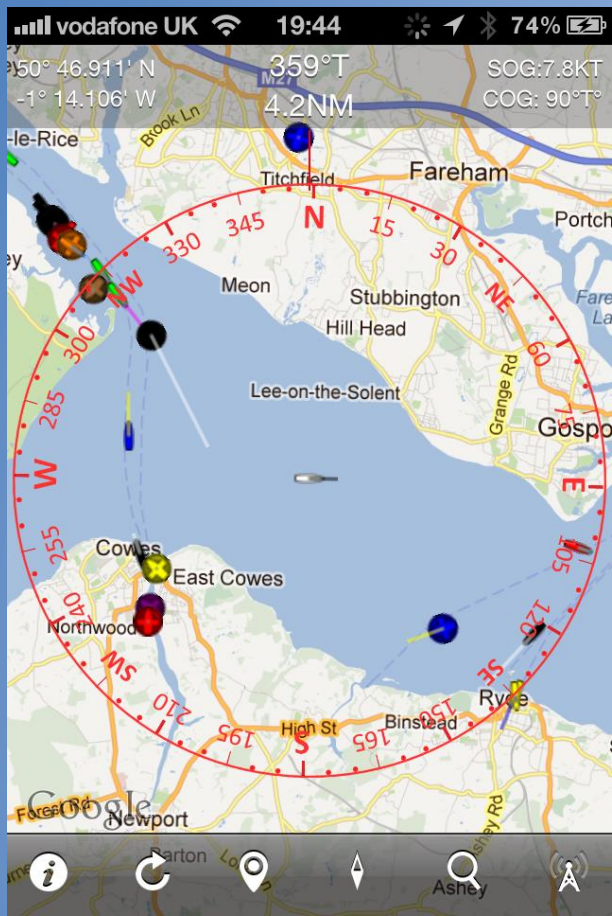
Solis Marine Consultants Pte. Ltd (Established 2012)

- UK, Singapore and Hong Kong
- Master Mariners, Naval Architects / Salvage Engineers, Structural & Civil Engineers
- Special Casualty Representatives (SCR)
- Salvage and wreck removal
- Shipping and maritime incidents
- Investigations, disputes, litigation
- **NAVIGATION DATA ANALYSIS AND RECONSTRUCTION**

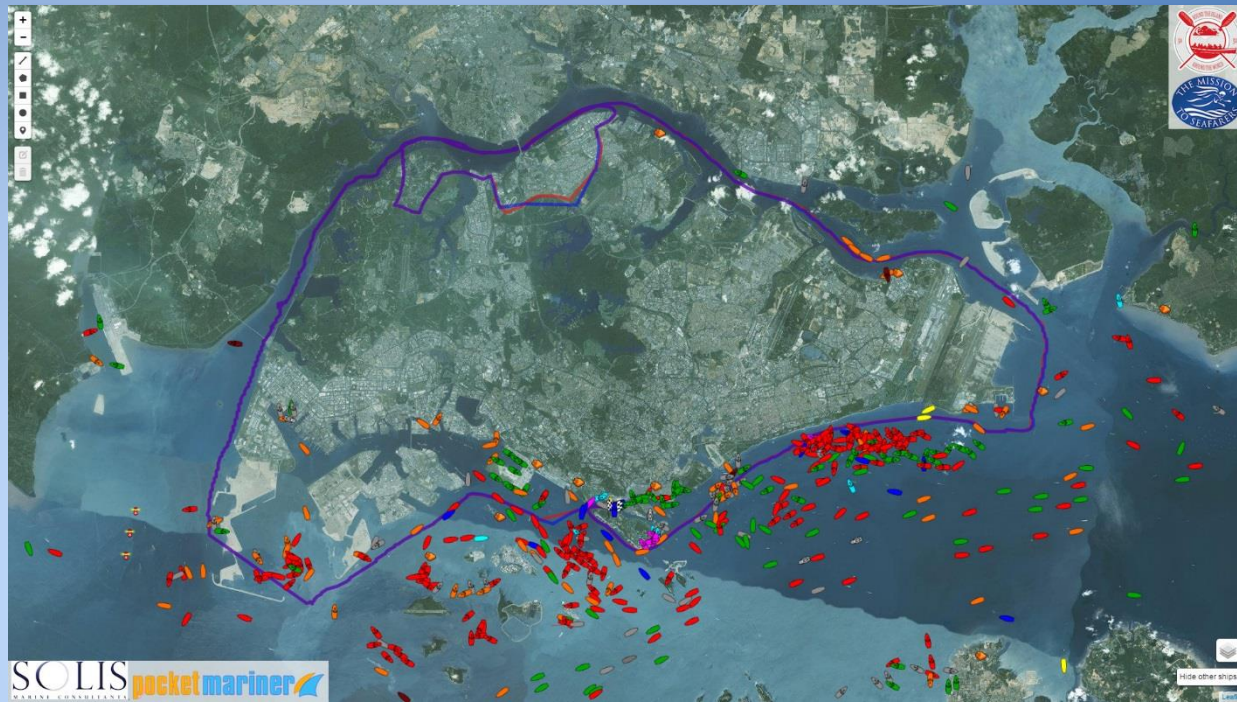


Pocket Mariner Ltd

- AIS data collection, distribution and analysis services using Cloud based computing platform.
- Global Live AIS Data coverage amongst the best in the industry with over 35,000 ships reporting every hour.
- Established in 2000.
- Proven track record in “world leading” apps and customer references - Portsmouth International Port, Transas, Digital Yacht, Port Harcourt, Solis...
- Share data with the UK Coast Guard, RNLI and Australian Voluntary Coast Guard.
- Current services and app portfolio includes Port, Fleet and Boat Watch, Boat Beacon, Compass Eye and SeaNav for Web, iPhone, Android and Mac.



Boat Beacon App



Boat Beacon – “Your app may have saved our lives”

BY ADMIN • ON MARCH 6, 2013 • IN AIS, BOAT BEACON, COLLISION AVOIDANCE



Captain Ian Engelbrecht and First Mate Ibolya Palko from [Worldwide Yacht Deliveries](#) sent us a report today on how Boat Beacon helped them when they were caught in fog 4NM off the South African coast. They were sailing a Jaguar 36 Catamaran on a 900 mile, 12 day voyage from Cape Town to Durban, South Africa.

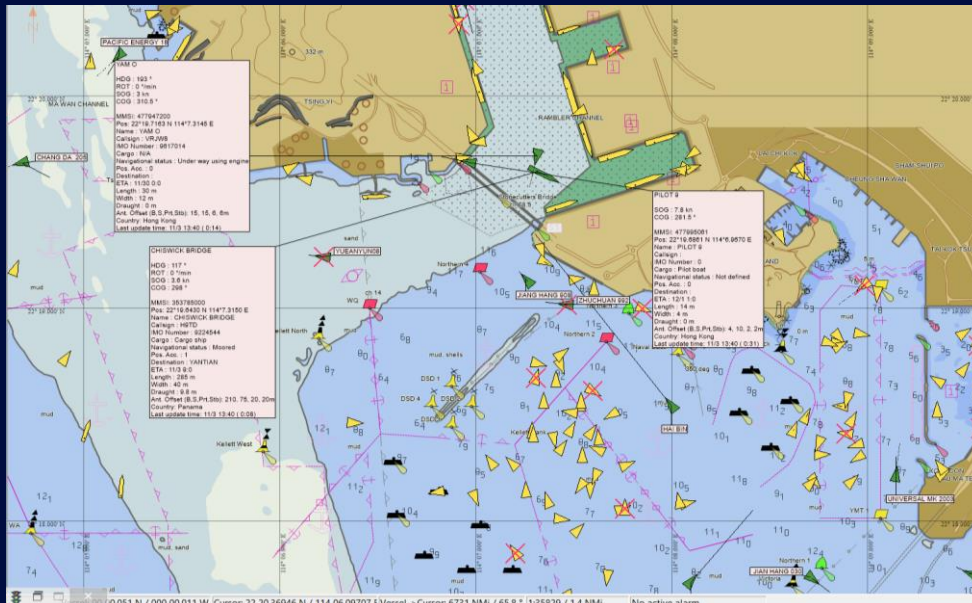
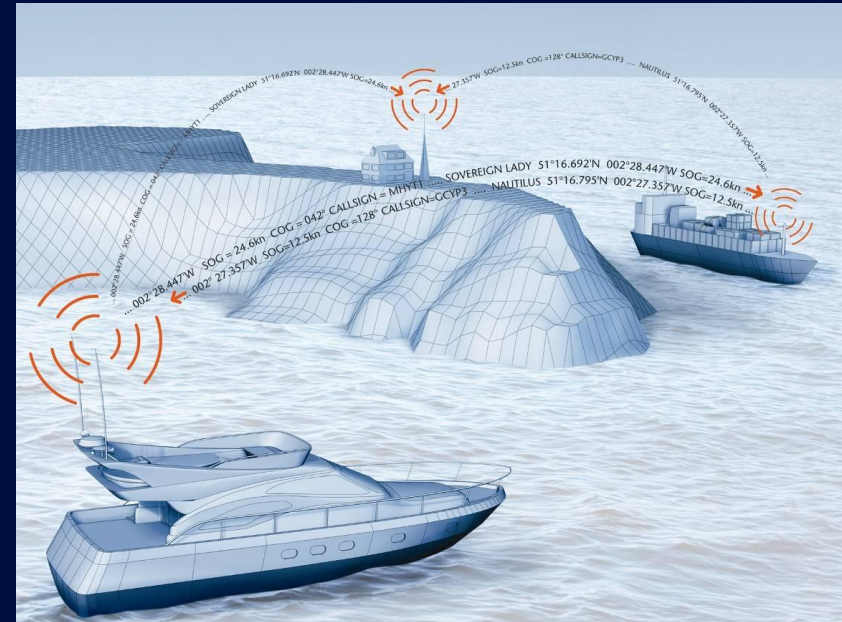


There is a map showing their planned route to the right. They had just passed Hamburg on their route up the East South African coast when they lost visibility. Their primary AIS system had failed. They did the right thing and diverted in close to shore to find shallow waters and avoid any commercial shipping (see the track map below). They were hoping there wouldn't be anything else so close in. They decided to power up Boat Beacon on their Android smartphone and leave it running to keep a look out.

<http://pocketmariner.com/boat-beacon-your-app-may-have-saved-our-lives/>

Automatic Identification System

- Primarily for collision avoidance
- Mandatory for all ships over 300gt, and all passenger vessels
- Transmitted continuously via VHF
- Transmitted as a communication between ships, but can be received by land based stations where data is then uploaded to the network via the internet



Provides a visual picture of the ships in a certain area, whilst also providing other essential information such as size and type of ship

Slot Map

- TDMA (Time Division Multiple Access)
- 2,250 slots each minute per channel

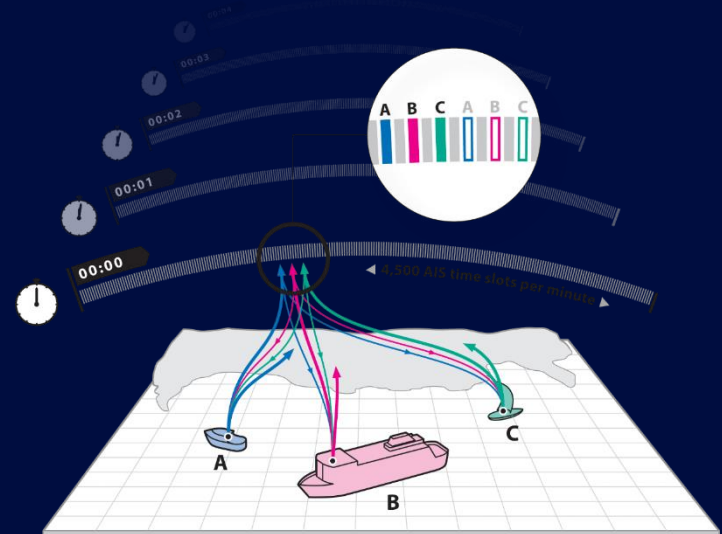
VHF – 2 channels:

“87B (161.975 MHz) and 88B (162.025 MHz), and use 9.6 kbit/s Gaussian minimum shift keying (GMSK) modulation over 25 or 12.5 kHz channels using the High-level Data Link Control (HDLC) packet protocol.”

Data period

- Frequency depends on what the ship is doing

<http://www.allaboutAIS.com/>



| Ships dynamic conditions | Not Changing Course | Changing Course |
|--|---------------------|-----------------|
| At anchor or moored and moving less than 3 knots | 3 min | 3 min |
| At anchor or moored and moving faster than 3 knots | 10 secs | 10 secs |
| 0 to 14 knots | 10 secs | 3 1/3 secs |
| 14 to 23 knots | 6 secs | 2 secs |
| Over 23 knots | 2 secs | 2 secs |

27 different types of AIS message available

Most common use of AIS data:

- Static data – Vessel Particulars, voyage data
- Dynamic data – Position, speed, heading, course etc.

Others include:

- Time-stamp
- Base station management
- Aids to navigation (AtoN)

| Message ID | Name | Description | Priority | Access scheme | Communication state | M/E |
|------------|--------------------------------|--|----------|-----------------------|---------------------|-----|
| 1 | Position report | Scheduled position report; Class A shipborne mobile equipment | 1 | SOTDMA, RATDMA, ITDMA | SOTDMA | M |
| 2 | Position report | Assigned scheduled position report; Class A shipborne mobile equipment | 1 | SOTDMA | SOTDMA | M |
| 3 | Position report | Special position report, response to interrogation; Class A shipborne mobile equipment | 1 | RATDMA | ITDMA | M |
| 4 | Base station report | Position, UTC, date and current slot number of base station | 1 | FATDMA, RATDMA | SOTDMA | B |
| 5 | Static and voyage related data | Scheduled static and voyage related vessel data report; Class A shipborne mobile equipment | 4 | RATDMA, ITDMA | N/A | M |
| 6 | Binary addressed message | Binary data for addressed communication | 4 | RATDMA, FATDMA, ITDMA | N/A | M/E |
| 7 | Binary acknowledgement | Acknowledgement of received addressed binary data | 1 | RATDMA, FATDMA, ITDMA | N/A | M/E |
| 8 | Binary broadcast message | Binary data for broadcast communication | 4 | RATDMA, FATDMA, ITDMA | N/A | M/E |
| 9 | Standard SAR aircraft position | Position report for airborne stations | 1 | SOTDMA, RATDMA, ITDMA | SOTDMA, ITDMA | M |

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!AIVDM,1,1,,A,169G<dPP008:Kgn<ht;13rI206:p,0*1B
!AIVDM,1,1,,B,B77nPdh0722VT63<Jd`?Gwi5kP06,0*49
!AIVDM,1,1,,B,177nPb0P008:TH6<h>@Pbgw40L4T,0*20
!AIVDM,1,1,,B,16:fOvwP018:J`><hg7P0?w40<21,0*3D
!AIVDM,1,1,,A,18IB6t00i7`:IKH<ibb`w;20@DQ,0*39
!AIVDM,1,1,,A,16:fWUwP008:KI1<hu>@0?w40D0e,0*06
!AIVDM,1,1,,B,169TRJ0P008:SWj<hsb>@0?w628De,0*3B
!AIVDM,1,1,,A,16:CuGPP018:Mm@<iq6h0?w606:p,0*67
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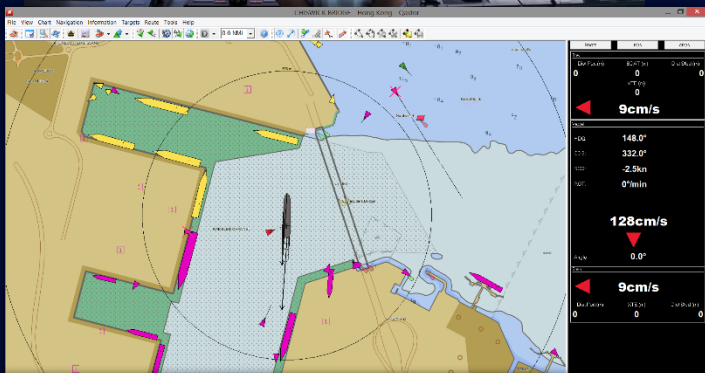


| GPS Latitude | GPS Longitude | Centre Latitude | Centre Longitude | HDG | SOG | COG | ROT | Position |
|--------------|---------------|-----------------|------------------|-----|-----|-----|-----|----------|
| 22.328 | 114.122 | 22.32854729 | 114.1221438 | 10 | 2.8 | 19 | -9 | 1 - high |
| 22.328 | 114.122 | 22.32854953 | 114.1221335 | 9 | 2.7 | 18 | -9 | 1 - high |
| 22.32816667 | 114.122 | 22.32871619 | 114.1221335 | 9 | 2.7 | 16 | -8 | 1 - high |
| 22.32833333 | 114.122 | 22.32888493 | 114.1221231 | 8 | 2.7 | 15 | -7 | 1 - high |
| 22.3285 | 114.122 | 22.3290516 | 114.1221231 | 8 | 2.6 | 14 | -7 | 1 - high |
| 22.32866667 | 114.1221667 | 22.32922017 | 114.1222793 | 7 | 2.6 | 13 | -7 | 1 - high |



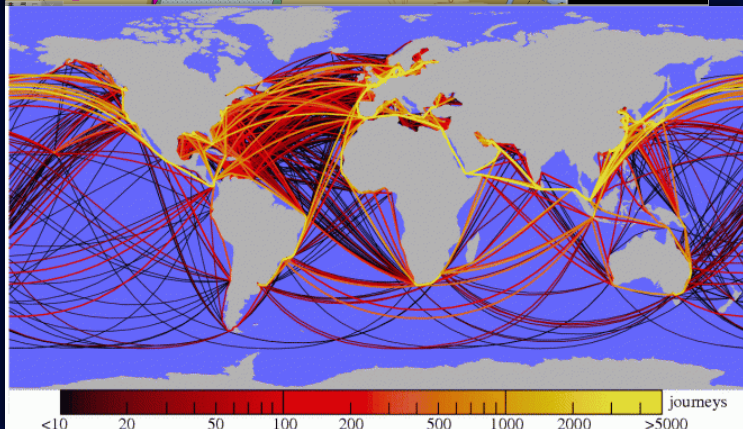
Primarily for navigation:

- Identify other vessels for communication
- Determine Closest Point of Approach (CPA) for collision avoidance
- Visualise traffic before entering a port
- Low visibility navigation



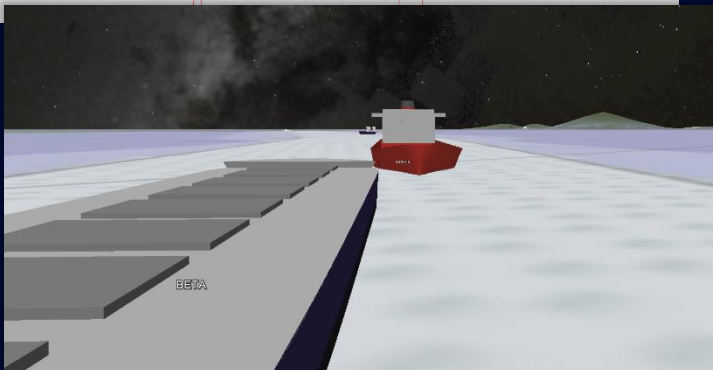
Visualizing vessel movements:

- Pilots navigating into port
- Harbour master or authorities monitoring port activity and traffic
- Remote monitoring, i.e. shipping company head office
- Safety and emergency response services



Macro analysis of vessel movements:

- Monitor world shipping trends
- Route and logistics optimization
- Monitor ship types to show commodity flows
- Identify high traffic areas



Incident reconstruction:

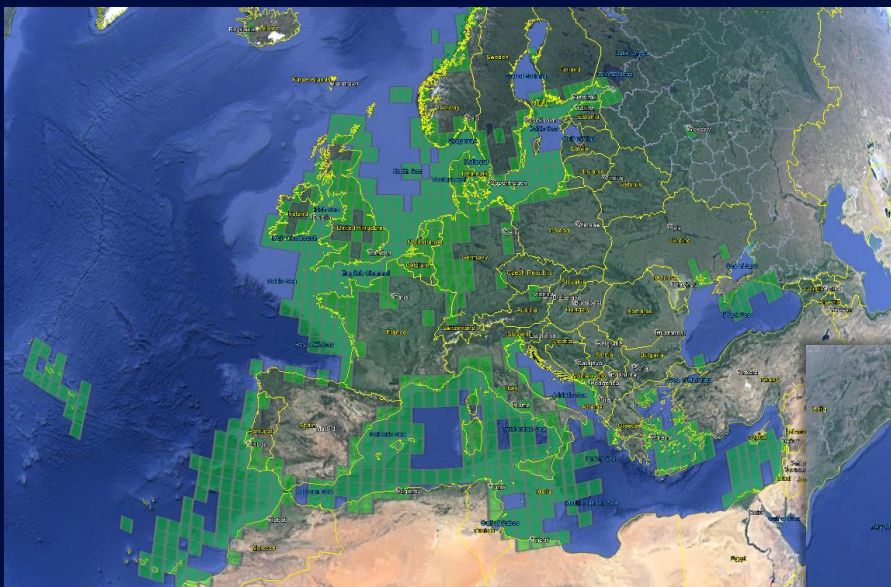
- Recorded data used to reconstruct vessel movements
- Accurate position, heading, course and speed information used to assess decisions made
- Used in legal proceedings and to improve safety measures

Berth approach analysis:

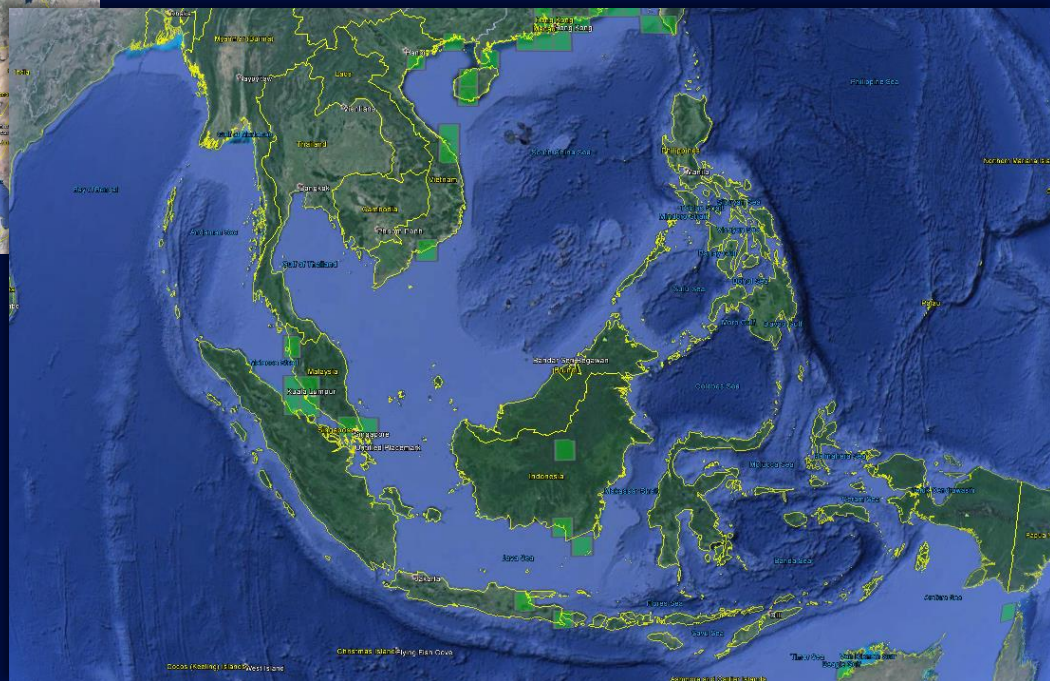
- Post-incident reconstruction of vessel movements to determine whether an approach was suitable
- Can be used to improve berth design or for training master and pilots

3D reconstruction

- Real data used to create visualisations of vessel movements
- Easy to interpret for seagoing and non-seagoing personnel alike
- Used in legal proceedings or for training purposes



Good base station coverage in Europe and the Americas



Currently a shortage of AIS base station coverage in South East Asia, with gaps in major shipping areas.

HOW HAMS ARE GETTING INVOLVED

Pocket Mariner currently has HAMS providing AIS data in the UK, Australia and Africa and the Americas

- Best understanding of radio and how to receive the data
- Good aerial positioning, often with access to very high locations
- Information sharing through existing communications and forums
- Benefits to HAMS

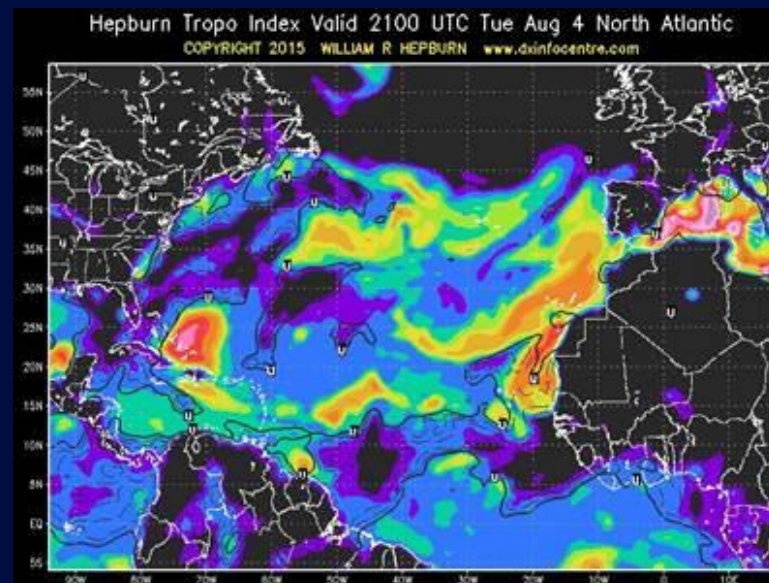


Highest aerial so far

Dominican Republic

80ft tower, 3,165ft above sea level

Call sign: WP4MJP



Longest range

West Coast of Africa

AIS received from 800km offshore

Good Tropospheric Ducting

Call sign: 6W7RT



Equipment required can be very simple and can be provided by pocket mariner:

- Most basic system is “plug-and-play” and only requires an Aerial, AIS Dual Channel Receiver, a power source and a live internet connection.
- Home-made systems are possible, and necessary software can be provided by Pocket Mariner



AIS Dual Channel Receiver

<http://pocketmariner.com/ais-ship-tracking/cover-your-area/pocket-mariner-ais-dual-channel-receiver-for-99/>

Aerial

<http://nmearouter.com/docs/ais/aerial.html>



Benefits of contributing to the network:

- Free AIS receiver for areas where we have poor or no coverage
- Free copy of the Boat Beacon live AIS app for iOS and Android
- Free web page showing the live AIS data from your aerial, includes a measuring tool to check the distances and a data rate graph. This can also be embedded into personal web pages.

<http://pocketmariner.com/ais-ship-tracking/cover-your-area/>

<http://pocketmariner.com/apply-for-an-ais-receiver/>

support@pocketmariner.com



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Thank you

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