AIS - Automatic Identification Systems

By Owen Mace, BE PhD
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Last updated November 2009

What is AIS?

There's been talk around the jetties recently about AIS, but what is it? Well, first of all AIS stands for Automatic Identification System. It's a clever radio system that lets others know where ships are and what they are doing.

All ships over 300 tonnes must carry AIS "transponders" (they are not really transponders but that's what they are called.), that is to say; they transmit and receive information on VHF channels 87 and 88. Ships regularly transmit their MMSI[1], position, heading, speed, rate of turn and other information at intervals that

depend on their speed. In addition, they transmit less frequently their name, call sign, destination, size, etc. In this way, vessels in the vicinity know where each ship is and what it is doing. In a busy sea lane, this is invaluable.

How does it Work

There are AIS receivers that plug into your chart plotter to show vessels in your vicinity. I know of at least one club vessel equipped with an AIS receiver; one called up a ship in Backstairs Passage at night (using the ship's call sign) as the skipper thought they might have been run over.
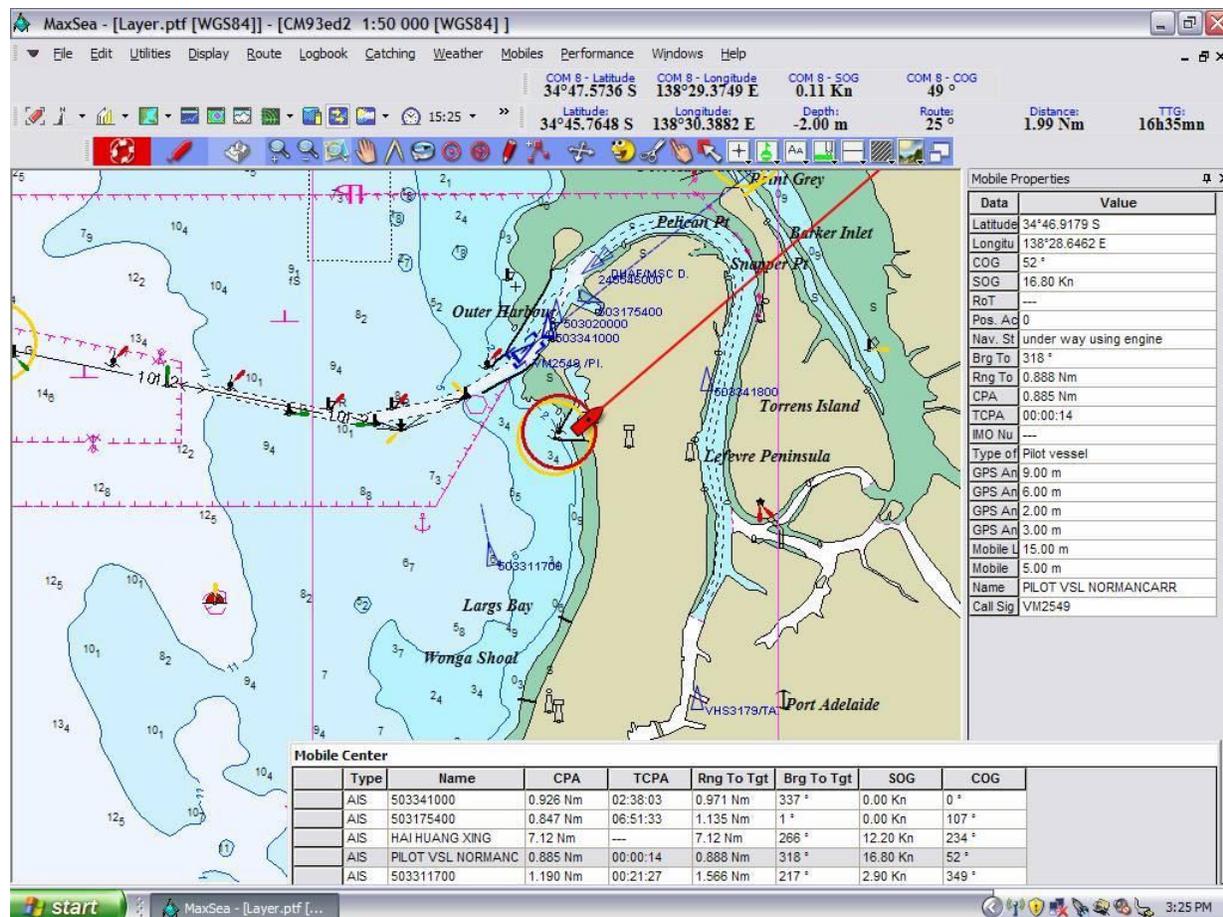

Figure 1: A screen shot from a CYCSA vessel in its berth at the club recently

In the screen shot from a CYCSA vessel in its berth at the club recently you can

recognise the river and the channel. The table at the bottom lists vessels that the AIS

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receiver has received messages from, including the Pilot Vessel *Normancarr* travelling at 16.8 knots after having seen off the *Hai Huang Xing* which is departing the port at 12.2 knots. On the right of the screen is further information on the *Normancarr*, including its location. The other vessels are indicated by their MMSI in the table and on the chart (at Outer Harbour) but had not yet transmitted their name, etc

when the screenshot was taken. There is also a vessel heading northwards at 2.9 knots from Largs Bay but it has not yet transmitted its name.

I bought an SR161 receiver from Milltech Marine[2] for about $300 over a year ago and have plotted vessels in Spencer Gulf from my home in Glen Osmond. On board, I reckon I can pick up ships up to about 20 nautical miles.
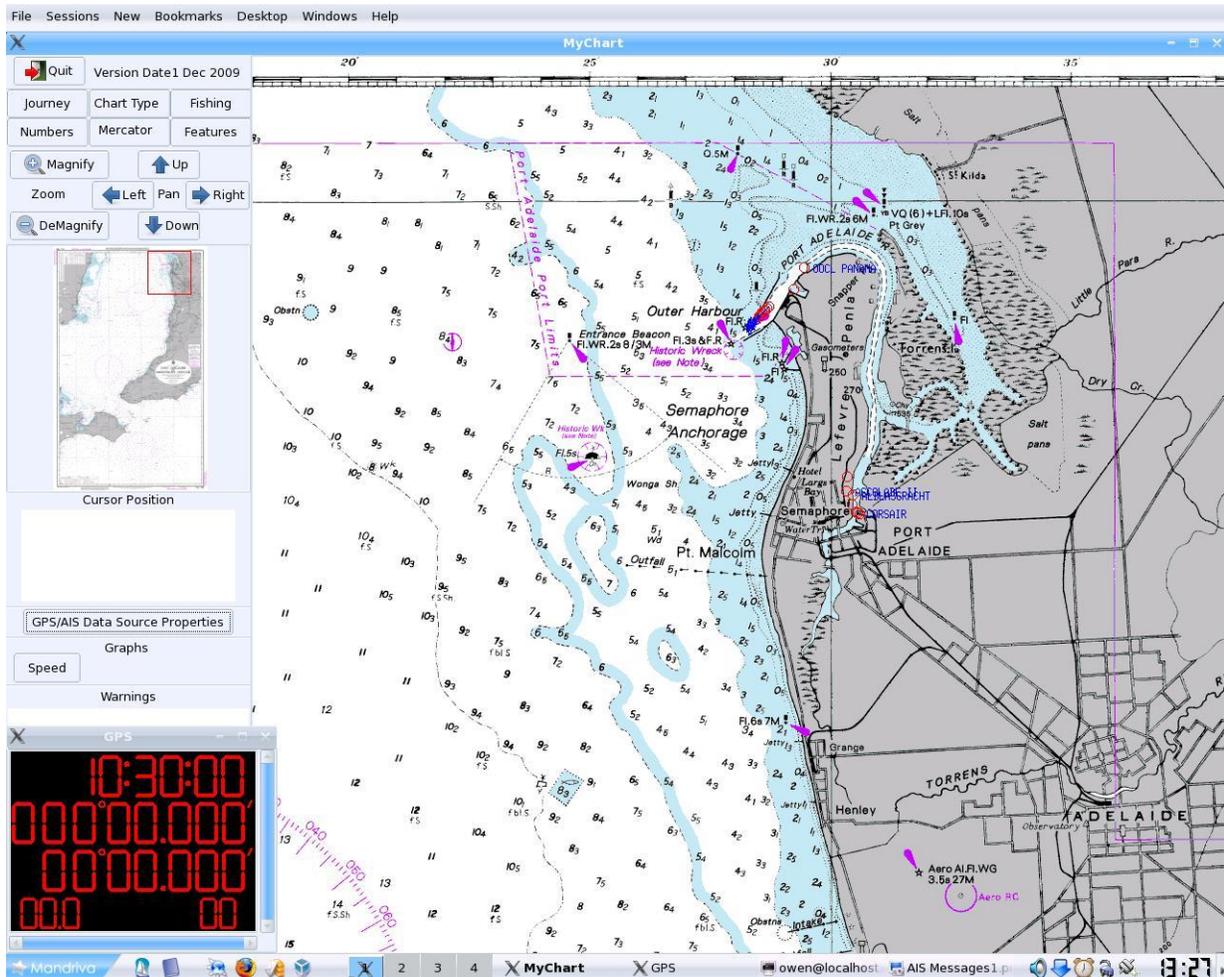

Figure 2: Screen shot from "mychart"

In the screen shot from "mychart", (the charting software system that I wrote), you can see a vessel (whose details have not yet been transmitted) entering Port River,

some vessels at the Inner Harbour and the *OOCL Panama* berthed at Outer Harbour. Her details can be seen over the page:

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Figure 3: Details of the *OOCL Panama* berthed at Outer Harbour

Equipment Options

Recreational vessels may transmit, too, and Comar Systems[3] make a range of receivers and "transponders". Their "transponder" for recreational vessels sells for about £500 UK (around AUS$1,000, depending on the day's exchange rate). No doubt there are other manufacturers and a short time spent on Google and e-bay will locate them.

If you want a very cheap option, take a look at a New Zealand Company website AIS on VHF[4] where there is a "filter" for sale for under US$100. It seems to take the audio from a VHF receiver and feeds it to the sound card input on a laptop where software decodes the signals. There is an even cheaper way, if you are handy with a soldering iron. An article in the magazine Cruising Helmsman earlier this year described how to modify a VHF receiver (another filter, but one you make yourself). So there are plenty of options.

AIS Benefits[4]

- Anti-collision system
- Tracks ships in 400 square Miles
- Displays on screen clutter free
- Alarms on safety circle breach
- Shows closest point of approach
- Works in any weather
- Superior to radar
- Works with every VHF radio
- Is used across the world
- Every ship uses a transponder

Issues with using AIS

First of all, they emit messages that your chart plotter must be able to understand. Fortunately, the messages are standardised so most modern chart plotters can interpret AIS messages, which are not dissimilar from NMEA 0183 messages (which begin with a $) and, for what it's worth, the picture below shows what they look like:

Figure 4: Window showing AIS message

Comar offers USB and RS-232 interfaces. Be sure you buy the right one for your chart plotter and that your plotter can interpret the messages. By the way, there are stand alone AIS systems with their own (crude) local charts.

The next problem is the aerial. Since AIS uses marine VHF, you can use a marine radio VHF antenna.

If you wish to use the same antenna as your VHF marine radio, you must have an antenna splitter (see Comar's web site[3]).

The splitter ensures that transmit power from your VHF radio ends up in the antenna and not in your AIS receiver: important if you don't want to destroy your AIS receiver.

You could have another VHF aerial and cable (provided the transmitted signal power

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is suitably attenuated by the time it reaches the AIS aerial) – a splitter is easier but it does weaken <u>all</u> received signals and seems to be a relatively costly option.

So there you have it; A simple system for knowing where other vessels are.

Does it replace radar? No but it certainly helps navigation when there are large vessels around.

Hot off the Presses

People are starting to think and make useful products.

Look at this[5]: a dual channel AIS receiver that includes NMEA and NMEA multiplexing and antenna splitter from Milltech Marine for about US$420!

Important Note:

- This information is provided for your interest only. It is intended to be a starting point only for your own research. It is not to be relied upon for any decisions.
- For feedback, questions or updates please contact:
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References and Footnotes

[1] MMSI – Maritime Mobile Service Identities (MMSIs) are nine digit numbers used by maritime digital selective calling (DSC), automatic identification systems (AIS) and certain other equipment to uniquely identify a ship or a coast radio station. MMSIs are regulated and managed internationally by the International Telecommunications Union in Geneva, Switzerland, just as radio call signs are regulated. (U.S. Coast Guard Navigation Center**)**
www.amsa.gov.au/Search_and_rescue/Distress_and_Safety_Communications/Maritime_Mobile_Service_Identity/

[2] Milltech Marine Inc., www.milltechmarine.com

[3] www.comarsystems.com/

[4] www.aisonvhf.com/index.html

[5] http://www.milltechmarine.com/AIS-MULTI.htm