TECHNICAL UPDATE

Using an iPad for marine navigation

A white paper by Digital Yacht

This article focuses on the Apple range of devices. Of course, there are many Android tablet solutions too but our research shows that around 80-90% of boat owners utilise an Apple based device and there are more apps available for marine navigation on this platform.

Digital Yacht hardware is also compatible with many Android apps and devices

We've focused here on the iPad but the same information can apply to iPod and iPhone devices

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Introduction - (Updated June 2015)

We're all familiar with dedicated electronic chart plotters for navigation afloat. Since the introduction of GPS about 25 years ago, dedicated marine plotters have become the back bone of modern electronic navigation systems. But whilst smaller 4 and 5" plotters have tumbled in price, larger 8-15" devices remain stubbornly expensive. The cost of the electronic cartography can also be high and you'll often be hooked into a closed or proprietary "eco" system for accessories, upgrades or extra features.

Consumer devices like the iPad do offer an alternative and with total iPad sales of over 270 million units to date, they bring an economy of scale but also, importantly, a network of software developers making niche apps – many of which can be useful for marine utilisation.

The core iPad hardware revolves around a high resolution 7.9" or 9.7" touch screen display. With screen resolutions now at 2048 x 1536 pixels for the latest iPad Air, it outpaces dedicated products by a mile yet costs under £400 including vat.   They also feature wireless interfaces to allow integration with other on board devices and systems and with internet connectivity can bring a host of "cloud" data to your boat – from the latest weather reports to charts updates or crowd sourced data.

Whilst an iPad isn't waterproof, there's a variety of protective cases now available and of course 12v chargers, adaptors and mounting options. Sunlight viewing can also be challenging in very bright conditions but this document outlines some good solutions to this problem.

At Digital Yacht, we firmly believe there's a place for consumer devices integrated into a boat's system and we make hardware and applications that make this a reality. We're determined to offer better value in boating and electronic navigation, safety, communication and entertainment afloat and the iPad revolution is a big step forward here.

<div align="center">Good Boating!</div>

Nick Heyes

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How it started….

When the iPhone was first introduced, Navionics, the leading electronic chart manufacturer were quick to see the opportunities and introduced a low cost app designed primarily as a planning aid. The app included a region of charts which mimicked the large GOLD areas of coverage utilised by traditional plug in charts for plotters but at a fraction of the cost.

The app was also enabled to use the internal GPS of an iPhone or 3G/4G iPad, so that it could become a basic navigation tool showing current position, track and route information. It's fair to say that this app killed the market for hand held GPS chart plotters.

More recently, Navionics have added support to read GPS and Depth data from the boat's navigation system using our latest SonarServer product or any of our other wireless NMEA products.

The Navionics App is not the only marine navigation app in the Apple Store though, and there are now a wide variety of marine apps, utilising different charting formats and features at a variety of different prices. iPad navigation has arrived.

Choice of Apple hardware

Apple now offer a 7.9" iPad Mini and a 9.8" iPad Air. Both devices feature a Retina high resolution display which offers 2048 x 1536 pixels and multi-point touch capability. Multi touch enables the pinch to zoom type operation that makes navigating on an iPad easy and intuitive – more so than many dedicated plotters which utilise older technologies.

iPads with the 3G/4G capability have an internal GPS receiver which provides a quick route to navigation but long term, may not be ideal (see our section below)

iPads also incorporate wifi and Bluetooth wireless interfaces. The wifi interface is normally used to connect to the internet via hotspots but can also be utilised for connection to your boat's existing navigation and NMEA networks via a suitable interface.

How do I get data to the iPad and do I need a GPS enabled iPad?

iPads with 3G/4G capability have an internal GPS receiver. This means that there's no connection required to your boat's systems in order to provide positioning information for the charting and navigation applications. Whilst this is an easy way to get going, there are some disadvantages:

- GPS data from your boat's systems may offer better accuracy and reliability rather than utilising the internal GPS of the iPad. Plus, the iPad may not work below decks as there's no facility for an external GPS antenna
- Utilising the internal GPS on an iPad significantly decreases battery life

So on balance, we recommend integrating the iPad into the boat's other navigation systems using a WLN10 or NavLink NMEA to wifi adaptor. These low cost NMEA servers, available from Digital Yacht, create a local wifi hotspot on your boat so connecting to your boat's data is as simple as searching for the wifi point they create. They typically will footprint a boat up to 35m LOA and support TCP and UDP protocols for sending data. This makes them compatible with a wide variety of apps. Note that no connection to the internet is required.

The WLN10 is designed to integrate with NMEA 0183 systems and will suit 99% of all installations. The WLN10 is programed to accept NMEA data at 4800 baud. The WLN10HS is pre-set for 38400 baud data which is more appropriate for AIS enabled systems. Either unit can be reprogrammed if required. Up to 7 devices can simultaneously receive the transmitted data if a UDP connection is used.

NavLINK is an NMEA 2000 to WiFi adaptor for plug 'n play into NMEA 2000 systems but is more expensive. NavLINK takes core NMEA 2000 position, Instrument, GPS, Navigation and AIS data and makes this available to a connected device.
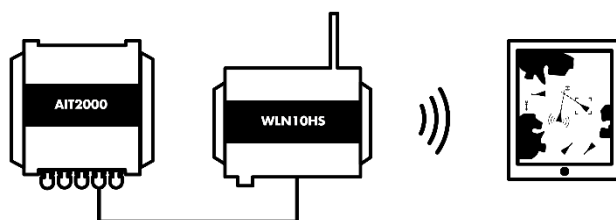
Use the WLN10HS to connect to an AIS based system such as our AIT2000 Class B transponder. GPS and AIS data will be made available for the iPad. The AIT2000 also has a multiplexer NMEA input channel so instrument data can also be combined

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For an even more sophisticated system, you can utilise iNavHub. This not only distributes NMEA 0183 data but also offers a WAN interface. With a WAN interface, you can connect to the internet via suitable hi power wifi devices (like the WL510 from Digital Yacht) or via a 3G type device. iNavHub creates a local, password protected network on your boat with NMEA navigation and internet data which can be shared by multiple users. So the kids can be surfing and watching Netflix whilst you're navigating!

LIMITATIONS FOR iPAD NAVIGATION

Of course, dedicated marine hardware for some users will be the solution but you'll need deep pockets and iPad navigation offers so much that you can't ignore it. In fact, most of the dedicated chart plotter manufacturers offer their own proprietary apps which act as a screen repeater/remote control of the main equipment. Many of these don't, however gather raw data for the iPad which is really key for maximum flexibility on the iPad. Getting core NMEA data to the mobile device is essential for the future.

Limitations we've discovered are:

- iPad isn't waterproof – But you can get some fantastic waterproof cases, mounts and/or use it at the chart table. Our recommendation is to get a cheap 4 or 5" plotter for the helm which is waterproof and use the iPad via a wireless server as an additional display or chart table navigator
- iPad screen isn't sunlight readable – the new screens are better and can be seen in bright conditions but do look faded under direct sunlight. Again, think about a cheap plotter for the helm and an iPad as an additional display
- iPad battery life – using the internal GPS shortens battery life but there's plenty of 12V chargers and using the iPad with one of our external wireless NMEA servers will significantly increase battery life.

APPS, APPS AND MORE APPS….

One of the benefits of iPad navigation is that as new apps are released, you can upgrade your navigation system. Some apps are free like our iAIS AIS viewing app and most are very reasonably priced. Most apps that accept external data are compatible with our hardware.
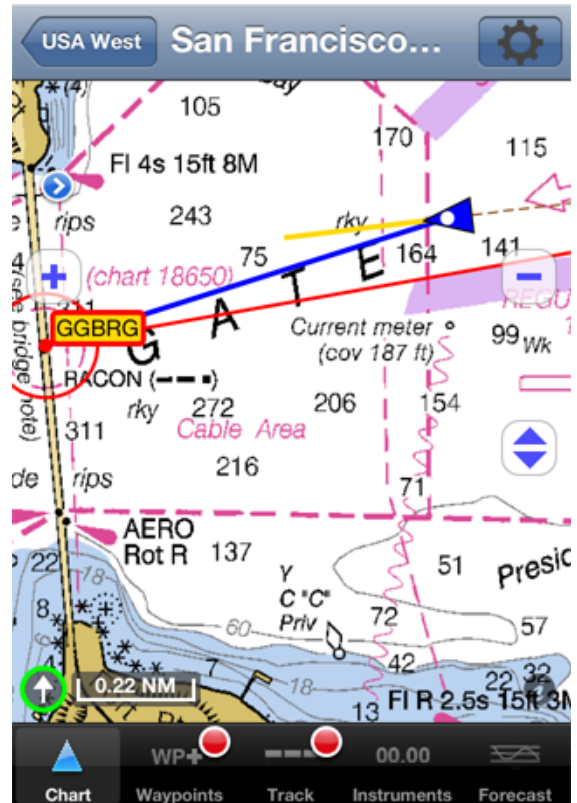
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iNAVX

We've already taken a brief look at the Navionic's app and it's a great entry level app – but hold on before you purchase. You're much better off buying iNavX – a more powerful app that can still utilise the excellent Navionic's charts but they need to be purchased separately via iNavX. They're still competitively priced so splash out on this app first and save having to duplicate chart purchases later. iNavX has some excellent features including

- Global charting coverage thanks to Navionic's support
- AIS overlays with drill down AIS data and CPA/TCPA alarms
- Instrument data displays
- Weather data overlays with GRIB files
- Super-fast planning and zooming

We thoroughly recommend this 3rd party app – especially if your boating takes you outside the UK or US

NAVLINK UK (also available for the US)

NavLink UK is produced by Digital Yacht. It's designed for use specifically by UK sailors and boaters and comes with detailed UK & Eire charts included.

Charts of France, Benelux, Germany and Denmark are also available as In-App purchases.

It utilises UKHO (Admiralty) vector charting data for excellent detail, accuracy and reliability.

Dynamic nav display with waypoint bearing, distance, ETA and VMG. Use the arrow keys to jump to the next waypoint in the route. The STAR indicates active waypoint

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Charts are updated quarterly and the price includes 1 year of chart updates. Key features include:

- Supports all Digital Yacht Wireless NMEA products and allows the boat's NMEA data to be utilised on an iPad or iPhone when using this app with these devices
- North up and course up displays
- Real time tracking and track export to Google maps
- AIS overlay when connected to compatible AIS system
- Waypoints and routes with full route editing and planning function
- Position, COG, SOG, VMG, bearing, distance and ETA displays
- Configurable layers: Buoys, lights, depths contours, spot depths, wrecks, traffic zones, anchorages
- HorizonView - Overlays nav-aid and targets onto iPad/Phone camera display for easy real time viewing and location
- Automatic free chart updates included for 1 year
- Weather buoy data – shown right here
- A-B chart ruler for quick and easy bearing and distance measurement
- All UK & Ireland charts are included in the price
- Tide and sunrise/set displays
- US version also available (NavLink US)
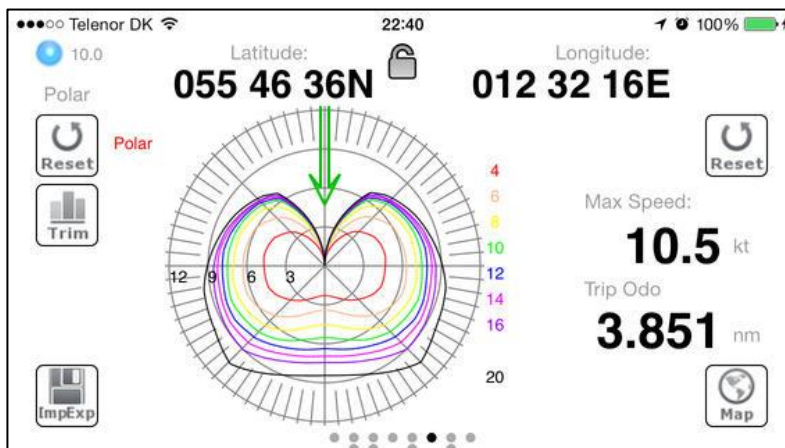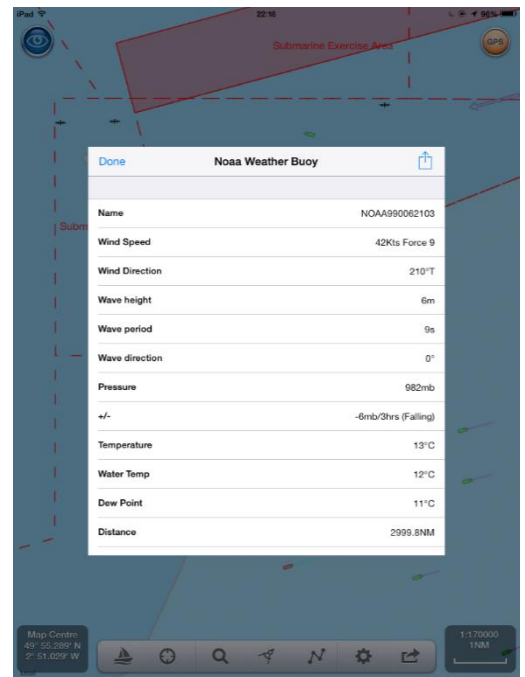
iREGATTA

iRegatta is a powerful and popular tactical sailing application for both the racing and cruising yachtsman. It doesn't include any charts in the basic App, but if you purchase the Pro version, you can get Transas charts as an in-App purchase.

Ideal for any yachtsman involved in racing or who simply enjoys getting from A to B in the most efficient manner. iRegatta supports Polar calculations, has some really useful numeric nav data pages and a good AIS display. Highly recommended as an additional app once you've got your charting sorted.

BEST OF THE REST

We can't list every app here but here's a few to investigate:

- NMEA REMOTE – Great NMEA repeater app with large displays
- iONBOARD – simple NMEA data repeater – ideal for the helmsman
- MAXSEA/NOBELTEC – Nice 3D displays but doesn't accept external data – As Maxsea is part owned by Furuno, they're keen to keep you investing in dedicated hardware!
- IMRAY – Attractive raster charting and they have recently added AIS support
- iSAILOR – Very popular with commercial users as it uses familiar Transas based vector mapping Can also be used with our PilotLINK wireless interface

For the most up to date list of the Best Marine Apps for Apple devices please click here.

Since we first published this White Paper, our wireless NMEA product range has expanded and we now have nine different products available for a wide variety of applications. To learn more about the products and solutions available please click here.