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The Superyacht REPORT

TRUTH • OPINION KNOWLEDGE • IDEAS AND EXPERT INDUSTRY ANALYSIS

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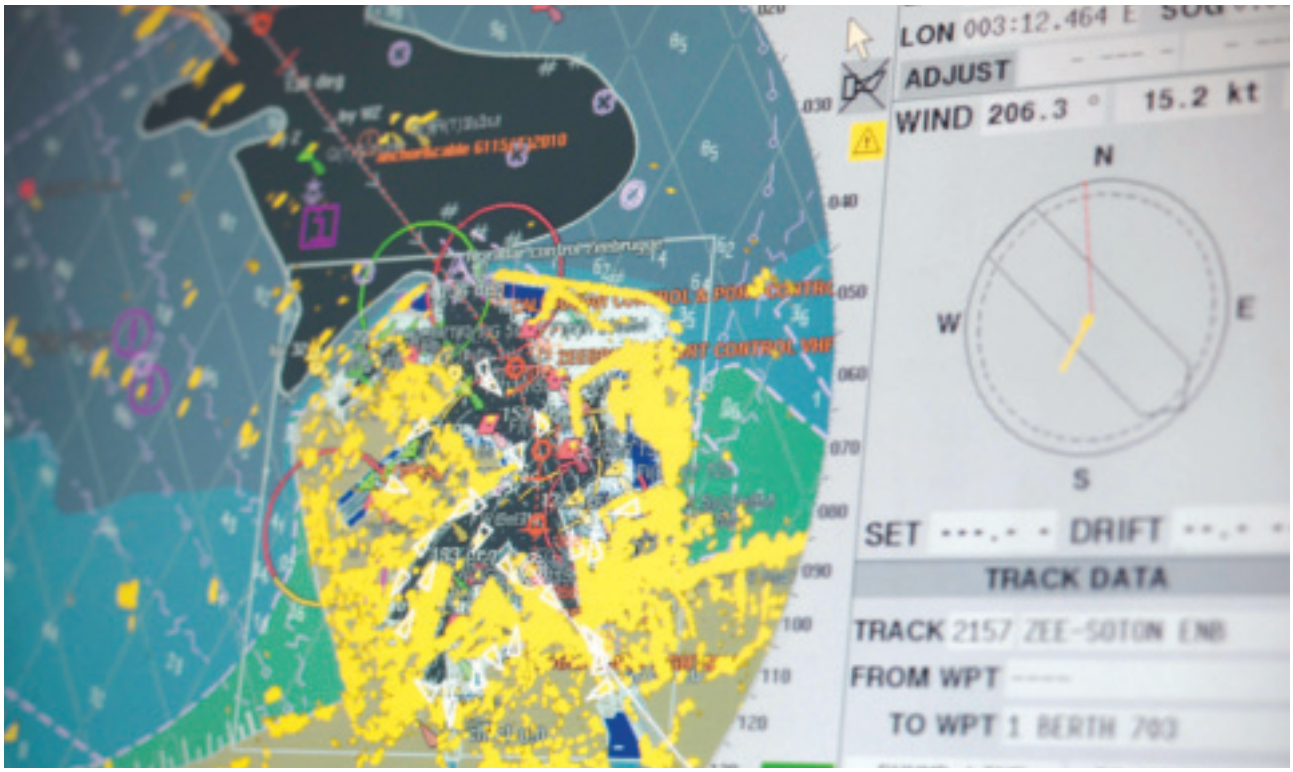
The ECDIS revolution

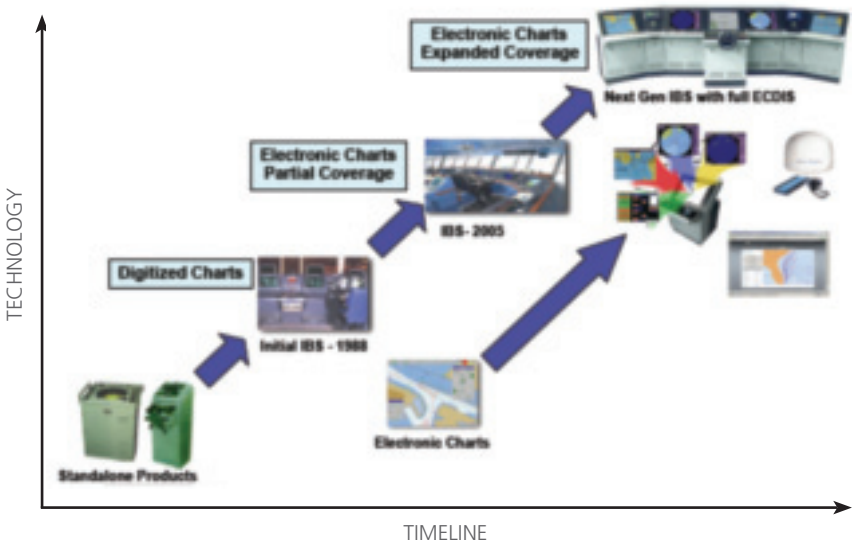


Justin Mann from Bluewater Books & Charts and **Mark Theissen** of Telemar Yachting examine the role of Electronic Chart Display and Information Systems.

There has been much discussion recently about Electronic Chart Display and Information Systems (ECDIS) and the role it can, and will, play as the centrepiece for navigation in years to come aboard ships of all sizes and classes. It is a critical component of shipboard navigation and is designed to integrate data, information and, above all else, improve the safety of the vessel. Training and education cannot be stressed enough; as with all 'sharp' tools, if not used properly one will get cut. We have seen several occasions where improper use and zero familiarity with an ECDIS have led to groundings. The purpose of this article is to define in simple terms what ECDIS is, if implementation is mandatory for you and, having discussed these topics, consider whether ECDIS is right for your vessel/operation.

Before we can begin to address the question: 'Is ECDIS right for you?', it would be prudent to have a clear understanding of what an ECDIS is. However, ECDIS, and electronic navigation in general, really has a language unto itself. So even before we can understand what ECDIS is, we first need to ensure we are familiar with the terminology used in discussing electronic navigation, otherwise we risk putting the cart before the proverbial horse. Don't believe it? Consider just some of the following; TX-97, CM-93, ECS, ENC, IMO, IHO, vector, raster, S-57, S-52, SENC, the list goes on. All of this terminology is relevant when discussing electronic navigation, let alone ECDIS, but before we get lost in lexicon purgatory, let's see if we can't define some of these acronyms and terms in their appropriate context.

A good starting point would be with the two broad categories of navigation systems: Electronic Charting System (ECS) and ECDIS. For now, we are going to focus on the ECS category, which is going to help us not only understand some of the terminology but also clarify what ECDIS is not.



An ECDIS has to be properly installed by a factory-trained engineer who follows strict guidelines/standards for digital interfaces for navigational equipment within a ship.

Most mariners today have had at least some experience with an ECS system even if they never referred to their navigation system in this way. So what is an ECS? Generally, it is any electronic navigation system or program that uses vector or raster charts that does not meet the Performance Standard defined by the IMO. An ECS could be a Garmin chartplotter, but it also could be a Transas system using Transas TX-97 charts running on a dedicated navigation computer with multiple monitors, configured to display chart data, radar and a myriad of other options.

Another bridge solution on yachts these days is a dedicated navigation system such as Sperry, using C-Map CM93 commercial charts. Between the broad spectrum just defined, with chartplotters at one end and Transas and Sperry at the other, are the equally prolific recreational programs, such as Nobeltec, MaxSea, Rosepoint and Boatcruiser, just to name a few. These systems run a variety of vector and raster charts from different manufacturers and operate on a number of platforms such as standalone desktops and off-the-shelf monitors or marinised versions thereof. They are very capable, but all have one thing in common – they are not ECDIS.

So what is ECDIS, and is a dual ECDIS enough to go 'paperless?' To answer, let's look at what this acronym stands for: Electronic Chart Display Information System. As opposed to ECS, a true ECDIS entails type-approved hardware as one system (computer, monitor, keyboard), back-up arrangement, approved data, installation and an updating service. The hardware must be of approved type according to MSC232 (82) and must conform to with the requirements by IMO defined in IEC 60945 (environmental) and IEC 61162 (data interfaces). Once these criteria are met, an ECDIS has to be properly installed by a factory-trained engineer who follows strict guidelines/ standards for digital interfaces for navigational equipment within a ship. Besides redundant sensor feeds to both units, they must have UPS, transition power and be connected to emergency power supply of the vessel. The system must run Electronic Navigational Chart (ENC) data.

Unlike an unofficial electronic chart (EC), an ENC must meet two requirements. To be considered official data, the chart must be using information approved by a national hydrographic office and the data must be produced in the IMO type approved S-57 format and presented on the display using the IHO S-52 standard. However, even though all ECDIS units are designed to read these specific types of charts, to get them to run properly in the program they must be converted into a System Electronic Navigation Chart (SENC). A SENC is the database that is created for use in your ECDIS from the ENC data.

No system is 100 per cent foolproof and there have been documented incidents of groundings and accidents involving vessels running approved ECDIS systems.

With a basic understanding now of what an ECDIS system is, and equally important what it is not, it is only logical to ask: 'How does this affect me, and do I have to implement this?' For most yachts, the short answer is 'no', unless your vessel falls under the passenger ship or passenger yacht code and is 500gt+ or you are classified as a cargo ship of over 3,000gt+ than ECDIS is not mandatory. Given the criteria, we know there are only a handful of vessels required to carry ECDIS. Consider the definition of your class and then refer to the timeline for implementation.

Since most yachts are not required to carry ECDIS, some of you

may be tempted to stop reading at this point. After all, if you are not going to be forced to do this, why bother? Consider the reason ECDIS was mandated in the first place for so many vessels: improved vessel safety. A fully implemented ECDIS, with properly trained crew, is designed to improve vessel safety

What else could any particular crewmember be doing which would be more beneficial to the vessel, other crew or guests if they were not otherwise pre-occupied with the administration and correction of paper charts on board?

for navigation. No system, though, is 100 per cent foolproof and there have been documented incidents of groundings and accidents involving vessels running approved ECDIS systems. However, safety, albeit the most important factor aboard any vessel and reason enough to consider ECDIS, is not necessarily the only factor to evaluate when understanding if ECDIS is right for you.

From a total operational cost standpoint there is a case that could be made when considering whether ECDIS is right for you. On a commercially registered yacht utilising an ECS with paper charts as back-up there are a number of factors which must be addressed to keep your charts, both electronic and paper, in good working order in order to be compliant, safe and implemented using industry best practices. What are some of these factors and is there a cost associated with them? Let's look at a typical environment for a commercially registered yacht over 500gt and flagged with a Red Ensign.

In this scenario we will assume the boat is using Transas with TX97 charts, and a complement of full paper chart folios for back-up purposes. The Transas system should have an updating system in place. Typically, this is a subscription-based service with an annual cost, which can also be automatically integrated through various satellite communication terminals (VSAT, Inmarsat, mini VSAT etc.). Periodically, updated discs will need to be sent to the vessel and in many cases this is another cost. If paper charts are to be corrected and up to date, there must be a system in place to do this. Typically, an on-board chart correction service is utilised. These chart correction services are also normally through an annual subscription, another cost. The charts will have new editions that need to be purchased and, in many cases, shipped to the vessel, resulting in more costs.

What about out-of-season chart folios? Many vessels store these folios off the vessel, since space on board always seems to be at a premium, no matter what size the ship. In some cases there is an additional cost associated with the storage and handling of these folios. When these folios come out of storage, many vessels utilise chart agents around the world to update their folios by analysing, correcting and replacing old editions of charts, which all result in more charges.

So, there are 'hard costs' associated with the maintaining of paper folios and whatever ECS is used as the primary means of electronic navigation, but these are not the only costs to be considered. There are, of course, the man hours associated with the administration, handling and maintenance of paper charts on board. These can be referred to as 'soft costs'. Since crew, of course, do not work for free, the hours spent correcting charts need to be factored into the business case equation as well.

There is also the opportunity cost to be considered when operating in an ECS/paper chart environment on a commercial yacht – which is to say, what else could any particular crew member be doing which would be more beneficial to the vessel, other crew or guests if they were not otherwise pre-occupied with the administration and correction of paper charts on board? Since a crewmember correcting paper charts cannot be engaged in other activities during this same time, there is an opportunity that is lost and this should be considered when evaluating the cost/benefit of implementing a full ECDIS on board.

One cannot ignore the efficiency and safety aspect that ECDIS systems are designed to provide, assuming they are properly implemented with back-up arrangements.

However, what about ECDIS and what are the costs with this system, you might ask. To be sure, there are substantial upfront charges associated with the acquisition, installation, implementation and training associated with any ECDIS deployment. Furthermore, having installed in an ECDIS environment does not guarantee the vessel will have achieved the holy grail of going 'paperless'. There are many factors to address before this status can be even

considered, such as risk assessment, safety equipment certificate, training, etc. There are also on-going costs associated with ECDIS as well. We will look at some of the costs to maintain an ECDIS, following implementation and commissioning.

Assuming the initial charges for an ECDIS have been taken into account, which can range from between 30k and 60k (turnkey), what does a bridge crew face when maintaining a proper ECDIS after set-up? Like their unofficial counterparts, ENCs, an ECDIS requires updates. In this case, weekly updates must be applied. These are available via download and included in the subscription costs of the charts, but sometimes can require discs to be sent, as patches cannot be 'pushed' over the Internet due to size constraints. In this case, there would be shipping costs incurred.

ENCs are not owned, they are subscribed to for some duration, be it three, six, nine or 12 months. However, once the time expires, they must be re-licensed, so there is a cost associated with the renewal. Although required publications are not strictly addressed in this discussion, they should be considered as certain ones are required for commercially registered vessels and, like their paper chart cousins, must also be kept up to date. Since most on-board correction services include the publication corrections along with the paper corrections, this is not a problem in a traditional environment; however, in an ECDIS scenario one needs to consider how these corrections will be handled. For some boats, this means using an on-board correction service, which again brings an annual charge (see graphic opposite).

Having an understanding now of what ECDIS is, the operating costs associated with the system and the impact to bridge operations as it relates to navigation, it is arguable there a number of factors which can be evaluated when considering the move to ECDIS. Whether or not the system is the right fit for your vessel, provided it is not mandatory, only you can decide. As much as going 'paperless' may seem almost out of reach, one cannot ignore the efficiency and safety aspect that ECDIS systems are designed to provide, assuming they are properly implemented with back-up arrangements. If your goals are to optimise your vessel's bridge operations, reduce the carriage of your paper folios and increase situational awareness, then ECDIS may be right for you. ■

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