With IMO's carriage requirement for ECDIS now in effect, vessel operators implementing the system will need to make sure they keep the equipment fuelled with ENCs. Innovations in Pay As You Sail licensing have promised to make this process easier and cheaper – Digital Ship spoke to Capt Artis Ozols at Tärntank Ship Management, an early adopter of the technology, about his experiences

The IMO's mandatory carriage requirement for ECDIS has now come into force, with new passenger ships and tankers the first in the phased implementation schedule to require the systems to be fitted. Eventually, by 2018, this will have extended to all vessels over 10,000gt.

As of July 1, new passenger ships greater than 500gt and new tankers over 3,000gt are required to have ECDIS onboard. These classes will be followed by new cargo ships in the next two years, with new cargo ships greater than 10,000gt to be equipped from July 2013 and new cargo ships greater than 3,000gt a year later.

Mandation on existing vessels will also begin to be phased in from July 2014, on passenger ships over 500gt, and then 3,000gt tankers a year after that. New classes of existing cargo ships will be included each July from 2016, for vessel sizes over 50,000gt the first year, 20,000gt in 2017, and finally 10,000gt ships completing the schedule in 2018.

For existing vessels, the ECDIS equipment is required to be installed by the time of the first

survey after the above implementation dates. Exemptions are in place for ships that will be taken permanently out of service within two years of their respective mandatory deadlines.

While the schedule for ECDIS mandation may be a little complicated, the requirements for compliance are not – ECDIS must be installed on the ship, and official Electronic Navigational Charts (ENC) must be used for the system to be legal for navigation.

Compared with traditional paper charts, electronic charts can be somewhat expensive, an issue unlikely to please vessel operators being asked to invest tens of thousands of dollars in the hardware alone.

However, the digital nature of these charts offer new opportunities in licence management that can help to keep these costs under control – and in some cases significantly reduce the cost of charting relative to what operators had previously been spending on their paper portfolios.

The latest innovations in electronic chart technology have seen 'Pay As You Sail' (PAYS) systems hit the market, utilising various types of tracking and communications technology to minimise the chart licensing requirements of ships at sea by only licensing charts as they were used – and thus minimising the associated costs.

With PAYS services, entire world folios of ENCs can be installed on the ship and are available for viewing, but licences only begin to be charged when the vessel travels in the area covered by the chart and begins to use it for navigation.

Dutch company Datema was the first to introduce such a system with its ENCTrack service. ENCTrack provides all available ENCs to mariners onboard for viewing before licensing is required, with a proprietary tracking system installed onboard to manage 'post payment' to charge for licences once the vessel has travelled into the charted area.

This system was finally approved by IC-ENC, the UKHO-led RENC (regional ENC Co-ordination Centre), in 2011, following two years of discussion (the other major RENC, Primar, had approved the service at its original launch in 2009).

In the first quarter of this year Norwegian company NAVTOR introduced its own PAYS-style service, using vessel tracking data, collected every 90 minutes via AIS (both satellite-based and coastal) or directly by Inmarsat-C polling, to determine when the vessel has entered the area and when the licence period should begin.

Shortly after NAVTOR announced the launch of its service, ECDIS manufacturer Transas became the latest to add its own version of the technology, launching its own PAYS system in March of this year.

With the Transas PAYS solution the vessel will have a licence and access to install, view and pre-plan using official ENCs provided in (S)ENC format, in areas where the necessary PAYS permissions have been obtained, without any additional cost.

Recording and reporting of charts used is done by extraction of data from the Transas Navi-Sailor 4000 ECDIS logbook, and vessels only pay for charts actually used for navigation monitoring.

Using this method, only charts that have been displayed on the screen together with ship's position or generated navigational alarms will be subject to licensing.

In principle, this should see a vessel licensing the 'best scale charts only', and not all charts and scale bands under the keel.

So the options for shipping companies looking to fuel their ECDIS systems with ENCs are increasing – but how do the benefits of these advancements in technology translate to the real world?

Electronic navigation in practice

Tärntank Ship Management, based in Sweden, is one of the first companies to begin using the Transas PAYS, having already been an existing user of Transas ECDIS systems.

The company operates nine modern bulk chemical tankers, trading mostly in Europe, in the Baltics, the North Sea and occasionally in the Mediterranean, though it has also had two vessels trading in Africa over the last two years and has done occasional trade in the US.

All of these tankers operate with fully redundant ECDIS, allowing them to sail 'paperless' – a fact that demonstrates the company's dedication to installing the latest technologies when it comes to onboard navigation, according to Capt Artis Ozols, safety manager / superintendent, at Tärntank Ship Management.

"We have been trying all the time to be innovative, with all of the technologies that have been coming out, to improve safety and take the workload away from the officers so they can concentrate on the safety of the vessel and its performance," he told us.

"We've put a lot of money and focus into those aspects. In fact we have triple (ECDIS) systems, because on most of the vessels we also have a conning display with an additional processor unit."

As far back as I can remember, in 1999, we had the first Transas electronic chart system, not a true ECDIS system but just used as an additional aid, the main navigation was still done by paper. Even that was very good then. From 2007 we started going over to full ECDIS on all of the vessels."

With more than 10 years of electronic navigation experience within the company, Tärntank has been through the process of moving from paper to digital that many more will experience over the next few years following the ECDIS carriage requirement.

"It's like any new technology, until you really know it you cannot fully trust the system," said Capt Ozols.

"In the beginning it can be an unfamiliar feeling when you only have electronic charts and don't have any paper charts to check. On a paper chart you can just open it, and here is Europe and here is America, a general chart and a big chart – unlike on an electronic chart where you have to scroll everything."

"With the Transas system you can do it quickly, which is good, but some of the systems I have seen you had to first load some kind of planning mode before you could review the passage plan even. That took quite a long time, and for paperless navigation wasn't really usable."

Training is a major issue for companies looking to introduce ECDIS, though for Tärntank Capt Ozols notes that this has been relatively straightforward, due to the crews' extensive existing experience with the technology.

"We are following the regulations, we have been having generic and type specific training for all officers," he said.

"Since we have Transas on all the ships and the crew has been working with the system for many years, for the type specific training they know it all already. But they need the certificate."

"I have done a Transas trainer course myself, so I can do training for crew onboard. When I do the training I focus more on the safety parameters, and some tips that can be useful for passage planning and safe navigation, because the general things they are using on a daily basis."

While Tärntank crews have many years of experience using ECDIS and managing ENCs, it should be noted that the manufacturers do still recommend that thorough training is undertaken by seafarers that are going to use the new licensing and chart handling arrangements, to make

sure they can access the available benefits – and having ECDIS onboard the ships has created a number of benefits, according to Capt Ozols.

"Firstly, of course, is the fact that you don't have to move away from the navigation panel. You can still be there and you can still see outside," he said.

"It also allows you to see things like weather and other information. And it has big advantages during ice navigation. Since it's also connected to the Automatic Identification System (AIS) you can see where other vessels are going, and if they are all doing 15 knots, for example, it will tell you that it's easy ice."

"With a few clicks you can see the passage plan of the other vessel and see where she's going, so you can follow the same way through the ice."

PAYS

As a long time user of ECDIS and electronic navigation, Tärntank is in an ideal position to judge the benefits of advances in ENC delivery and licensing technology.

The company started using the Transas PAYS system last year, on a single vessel, prior to its official launch, before extending this to the rest of the fleet.

"We decided we wanted to continue with this for all of the ships, because it was not only the Pay As You Sail function but also the fact that we could automatically get updates," said Capt Ozols.

"In order to have this system fully operational we needed to have a class approved firewall,

which we bought from Transas, which was needed for automatic updating. That also allows us to get remote support and service if it's needed, Transas can connect to the ECDIS remotely."

"That's very useful, though we have stopped that for the moment as in order to have the remote service you need unique IP addresses and the IT guys are saying they are not able to give so many right now. In the autumn they (Transas) say they are going to launch a new firewall that will not need a specific IP address for each vessel computer."

Installation of the PAYS service involves a software upgrade, and the firewall, and then the Transas Navi-Planner application, replacing the Chart Assistant that the company previously used. According to Capt Ozols, full implementation can typically be achieved in a single day.

"From ship to ship it will be a bit different, but it usually takes a full day to have it fully running. If everything goes smoothly," he said.

"They do checks of the system and everything, upgrading the software and so on. We've been trying to do all of this during the vessels' stays in the shipyard. It's a good idea to do it in the shipyard, at one stage we had problems installing the firewall and had to change to a new firewall, which was good to do in the shipyard (rather than at sea)."

This system is connected directly to the onboard satellite communications set-up, via the firewall to ensure security, which can be used to deliver PAYS chart licences to the ECDIS. This eliminates the need for the trips over and back between the chart display and the PC that were previously required.

"It's only possible with the firewall, because it's a DNV class-approved system which allows it to be connected. Even though our computer guys are saying that the internet environment is safe, it needs this special firewall to allow it to be connected to the ECDIS," said Capt Ozols.

"Previously we would put the request from the ECDIS onto the memory stick, and then from the memory stick we would send the request to Transas from the computer. You could automatically or manually choose what chart you need and they would send the licence, and

then you install the licence on the ECDIS from the memory stick."

"It doesn't take much from the communications really, it just takes quite a bit if we connect to the remote system (for maintenance and support). For something like this we have to increase the broadband. We haven't really been doing it yet, but we can increase the broadband for one or two hours if it is needed for maintenance. Up to now we've managed without this."

Benefits

According to Capt Ozols, the potential benefits of this kind of system will vary depending on the type of ship using the technology and the crews' existing skills in managing electronic chart folios.

"One of the obvious benefits is that we can avoid paying for something we don't use," said Capt Ozols.

"Another thing is that we can view all of the world (folio of ENCs). You can see it, so you know that if there are some changes in voyage orders and instructions you will have that possibility."

"As our crew is quite skilled in the system I don't know if we gained that much (from licensing being done automatically), when I do training I can see that the crew has control of the system and avoids ordering too many charts. There have been some cases where too many charts were ordered, and that brings extra costs, but we have put in place limits on ordering. If, for example, there is more than $500 ordered we will question why they need those charts and if they really need them or not."

On the negative side, the only issue that Capt Ozols has had with the PAYS system to date has been with the hardware coping with the large amounts of data required to keep a full world folio

of electronic charts onboard and updated, and available for licensing.

"What we experience now, and it's one of the things to improve, is that the system is getting overloaded. There are thousands of approved system charts, and they are all there. It takes time to update," he said.

"I was thinking it should maybe be divided into areas, like we have the navigation warning areas and safety areas, where you have Area 1, Area 2, up to Area 16. Then you could pick that you want Area 1 and 2 activated, or if your circumstances change you can add more."

This suggestion from Capt Ozols has already been acted upon, with Transas confirming that the next version release of the system in September will include an 'Areas' capability.

Aside from these technical challenges, one key issue that will affect the effectiveness of a PAYS system from an operational point of view will be the type of trade that the ship is involved in.

As Capt Ozols notes, ships on a predictable and repeating route stand to see a minimal benefit, as they have predictable charting needs. More significant advantages could be achieved on vessels whose voyage patterns are less certain.

"One vessel was on time charter during the winter season, going from Russia to Tallinn and occasionally going to Copenhagen and Hamburg. I think it was going breakeven with ordering (the ENCs via PAYS)," he said.

"There was no saving really on this one because it was always the same charts they had already been choosing before. But if you're going to places where you don't know where you're going, and you're only going there one time, that gives you savings."

"It's not just about cost savings though, it's about time saving for the crew, and it's about avoiding mistakes. If someone is not fully familiar with the licensing he could do the wrong

order, and that creates extra problems. You could say it reduces training a bit, but they also need to know those things if anything goes wrong, so they can do it the old way.”

However, even in cases where shipping companies are operating on predictable routes and may not see major savings through the use of PAYS, Capt Ozols still believes that this type of technology will become the standard for ENC licensing in the maritime industry.

“There aren’t so many companies today like Tärntank that have been using ECDIS for so many years and have such good knowledge of the system. With the coming regulations that ECDIS should be installed on all vessels I think this Pay As You Sail concept is great for companies not so experienced<” he said.

“Of course, you still need to learn all of the licensing and the rest of the system, but generally I think this concept will be chosen by most shipping companies. If you’re on tramp or going on passages where you don’t know where you’re going, then it’s saving you money. I think this will be the future.”

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