THE NAVIGATOR
Inspiring professionalism in marine navigators

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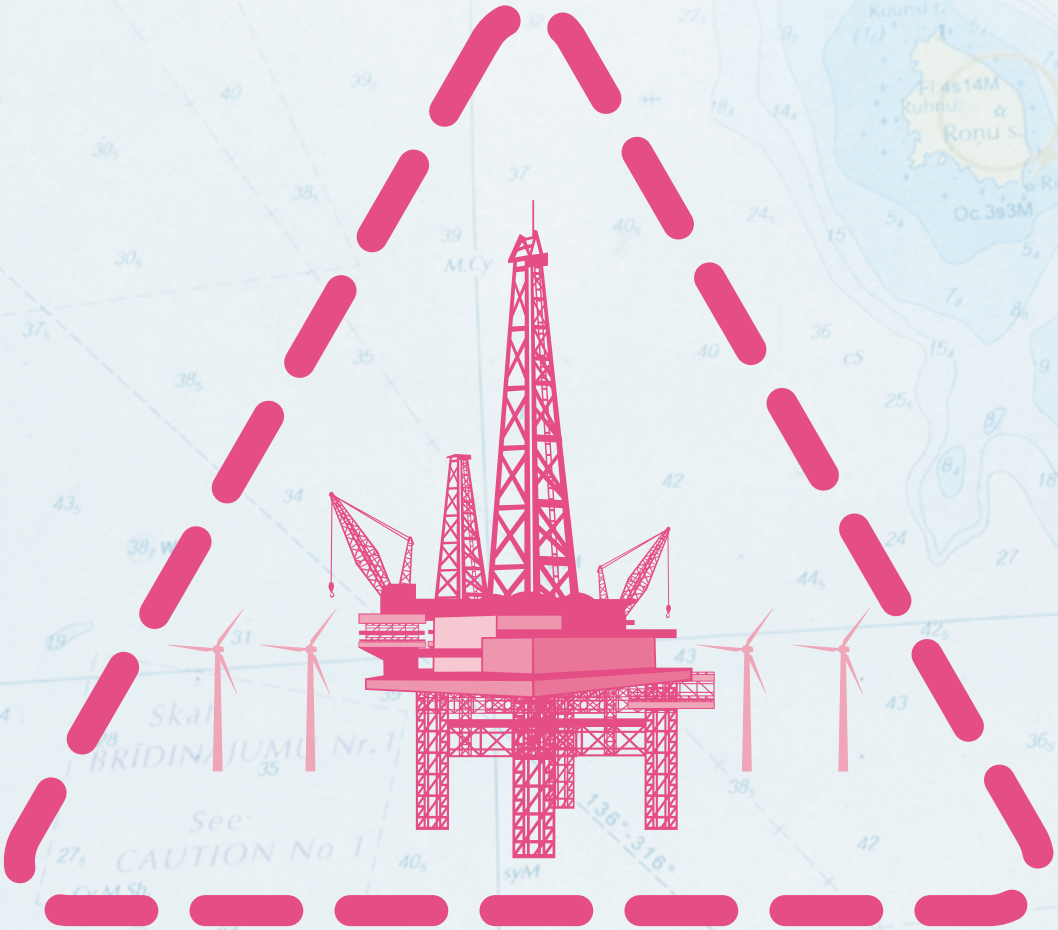

RESTRICTED AREAS

Knowing where they are and what to do about them

The Nautical Institute | Royal Institute of Navigation

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THIS ISSUE

FIND OUT MORE

ECDIS Skills Guide
Brush up on your ECDIS skills with this refresher from NorthStandard – a clear and accessible guide to bridge team knowledge, and understanding what's showing up on your screen

Check your knowledge
Intertanko's *Guide to Safe Navigation* is another excellent overview of navigation knowledge, including setting and managing alerts, and what to do if the equipment fails

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NAV BRIEF

with **David Patraiko FNI**
Director of Projects,
The Nautical Institute

Understanding restricted areas – and what they represent

Today's seas are becoming more complex to navigate, not least due to increasing numbers of restricted areas. Knowing where they are and what to do about them could make all the difference for a safe and smooth journey

As our seas become more crowded – not just with shipping and fishing, but with infrastructure for energy, aquaculture, underwater cables and pipelines – and with greater concern for protecting the environment, the opportunity for ships to sail in (reasonably) straight lines between A and B is becoming increasingly rare.

Whether navigating on land or at sea, there are always restricted areas we need to be aware of. They might be set up to protect the ship, the environment, individuals, society or all of them. At sea, it is critical that we not only recognise the existence of restricted areas, but also thoroughly understand how to manage them. The restrictions applied within an area may range from partial limitations on specific activities to a complete prohibition on navigation and/or anchoring. The space you have available to navigate in is getting more difficult and complex all the time.

Restricted areas are defined by the International Hydrographic Organization (IHO). There are several types of restricted areas, each with their own restrictions for different operations and even during different times. It is not just a question of 'do not sail here – ever'; many areas can be entered, but with limits on what you can do in them and when.

In this issue of *The Navigator* magazine, we hope to provide you with a better understanding of restricted areas, whether you are a junior officer or a seasoned Master. The most important thing to recognise is that you need to thoroughly understand what is coming up right from the passage planning stage. The entire bridge team can then plan how to manage the risks and impacts of the routeing choices from the very start. If you only realise the vessel is approaching a restricted area when it's just over the horizon – it's too late!

IF YOU ONLY REALISE THE VESSEL IS APPROACHING A RESTRICTED AREA WHEN IT'S JUST OVER THE HORIZON – IT'S TOO LATE!

This issue contains an excellent article by the United Kingdom Hydrographic Office (UKHO), providing an overview of restricted areas from a regulatory perspective, and explaining how they are shown on both paper and electronic charts (page 4). Commodore Nick Nash FNI shows what this looks like in practice, providing a step-by-step example of how a up-to-date cruise ship with the most modern equipment and data tools can plan and execute a passage in a most demanding area (page 6). Further articles discuss the quality of the data needed to make good decisions, an example of how a coastal state may monitor traffic for compliance and many tips for better understanding operational issues.

Understanding the restricted areas on an upcoming passage is best dealt with as a team. Planning should certainly include the bridge team, but also the engineers on board (particularly around any emissions control areas or similar) and with the shore-based safety teams as appropriate. Operating in and around restricted areas calls for the utmost levels of situational awareness, not only from the officer of the watch but from the bridge team as a whole. Often, different areas with different operational restrictions and times of application can overlap with each other. Shared knowledge is important as violations can lead to fines (at best) or even catastrophe.

As with all things in navigation, it is important not just to understand them yourself, but to also help your colleagues understand so that collectively you can make the best decisions. Ensure that all navigators understand the various areas you will encounter and the nature of the restrictions – but try also to understand the reason they are there. They represent the combined knowledge of those who have charted, regulated, and navigated these waters before us.

A navigator's guide to charting, classifying and understanding restricted areas

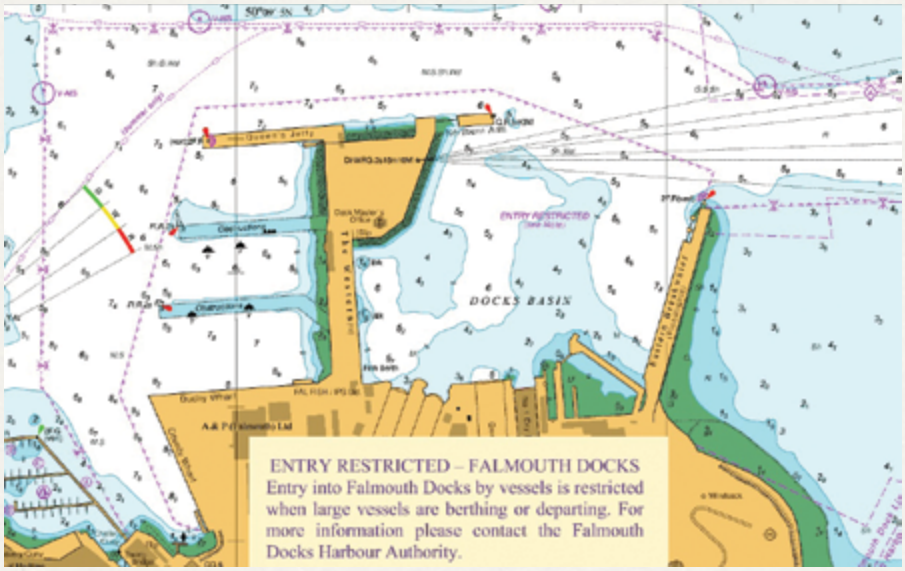
A restricted area is defined by the International Hydrographic Organization as a specified area that has been designated by an appropriate authority, within which access or navigation is restricted in accordance with certain specified conditions. What does this mean for your passage planning in practice, and how are they portrayed on paper charts and Electronic Navigational Charts?

by **UK Hydrographic Office**

Limitations on vessel movement or activities may be imposed for many reasons – whether that is for safety, security, environmental protection or operational reasons. For navigators, restricted areas are not there just for regulatory purposes – they are important features that demand recognition and understanding at every stage of the passage.

Not all restricted areas are the same. The restrictions applied within a single area may range from partial limitations on certain, named activities to a complete prohibition on navigation or anchoring. This variety is what makes having a strong knowledge of restricted areas so important. A navigator who is unfamiliar with how restrictions are classified might assume that a charted restricted area means that all activity is forbidden. Conversely, they might not appreciate the full scope of what is and is not permitted within it.

In some cases, transit through an area is permitted but particular activities are forbidden, for example anchoring due to underwater cables or pipelines. Sometimes, the restriction only applies to certain vessel types, sizes or draughts – or only at certain times of year.



ADMIRALTY Chart 18, Falmouth Inner Harbour Including Penryn. Showing the anchoring prohibited area entry restricted area, and the associated chart note

Environmental protection zones, for instance, may carry seasonal constraints linked to wildlife breeding cycles or sensitive habitats, with conditions that vary considerably depending on when and how a vessel is operating. It is also common for multiple restrictions to apply simultaneously within a single area.

As well as generic restricted areas, nautical products depict several related features that impose restrictive conditions but are defined as separate feature classes. These include:

- Prohibited areas, where navigation and/or anchoring are entirely forbidden.
- Precautionary areas, namely routeing measures requiring vessels to navigate with particular caution.
- Areas to be avoided (ATBAs), often established to enhance navigational safety or protect vulnerable environments.

Although these features differ in terminology and purpose, they all impose constraints on mariner

behaviour, and require clear, effective portrayal on nautical products.

Charted representation

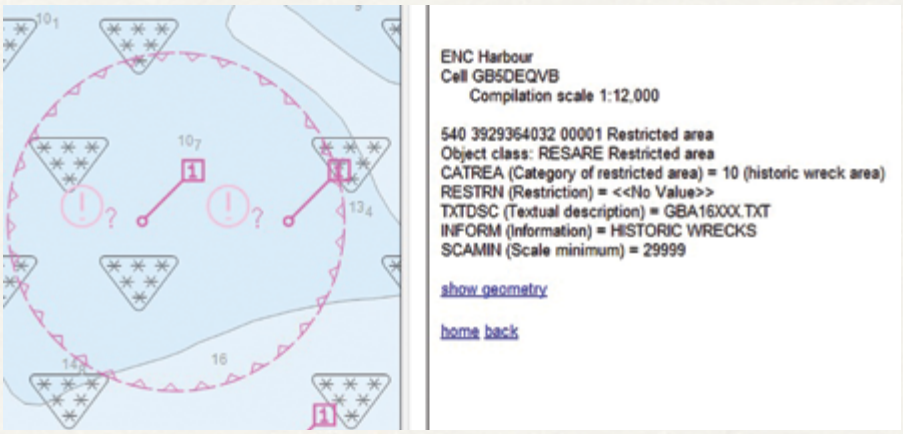
For a navigator, the chart is often the first and primary source of information about what is and is not permitted in a given area. Restricted and regulated areas must therefore be charted clearly so that mariners can identify limitations during passage planning and while passage is underway.

The consequences of misreading or overlooking a restricted area can range from a formal incident report to environmental damage or a collision with an unmarked hazard. The methods used to convey this information differ significantly between traditional paper charts and Electronic Navigational Charts (ENCs). That is why the methods used to portray restrictions on charts and the differences between chart types are worth understanding in detail.

Paper charts

On paper charts, restricted areas are portrayed using conventions defined in *International 1 (INT1) Symbols and Abbreviations used on Paper Charts*. This document is standardised globally by the IHO. Area limits are typically shown in magenta, bounded by T-pecked limit lines, with symbols indicating the nature of each restriction. These symbols may be placed at intervals along the boundary, within the area itself or both. Restricted area symbols may also be combined with other features.

Where symbols alone are insufficient, explanatory notes can be added to the chart face. This gives the mariner immediate visual cues; however, the scale of the chart and the need to avoid clutter both limits the amount of detail that can be shown. A symbol may show that a restriction exists, but cannot always convey the full picture. Navigators should consult the relevant Sailing Direction/Nautical Pilot publication, which may contain further information, or contact the local authority if restrictions are still unclear.



S-57 ENC GB5DEQQD Falmouth Harbour. Showing the Anchoring Prohibited area and the Entry Restricted area. Pick Report displaying the information associated with the anchoring prohibited area

Electronic Navigational Charts

ENCs portray restricted areas through a combination of symbols and structured attribution, with full details accessible via the ECDIS Pick Report. The Restriction attribute (RESTRN) supports more than twenty standardised restriction types. Additional attributes allow for further classification or free-text description where standard values are insufficient.

When information relevant to the safety of navigation is not directly associated with a specific feature, Cautionary Areas (CTNARE) can be used. These are intended to draw attention to dangers, risks or navigational advice, such as areas of continually changing depths or uncertain bathymetry.

Visually, ENCs broadly mirror paper chart conventions, with magenta used for regulatory features. However, where multiple restrictions apply to a single area, only the first restriction symbol is typically displayed. It is essential to review the ECDIS Pick Report to understand all applicable restrictions within the area.

Clear understanding supports safe navigation

Restricted areas are critical elements of nautical charting, whether they are represented as generic restricted zones or as specific features that inherently carry restrictions. They represent decisions made by authorities about how certain waters should be used, and the chart is the primary means by which those decisions are communicated to the mariner.

Paper charts and ENCs both aim to communicate these restrictions, but through different mechanisms. Paper charts rely on static cartographic symbology and notes, while ENCs combine symbology with rich attribution to deliver a greater volume of information without increasing visual clutter. By understanding restricted areas, mariners can ensure safe and compliant navigation.

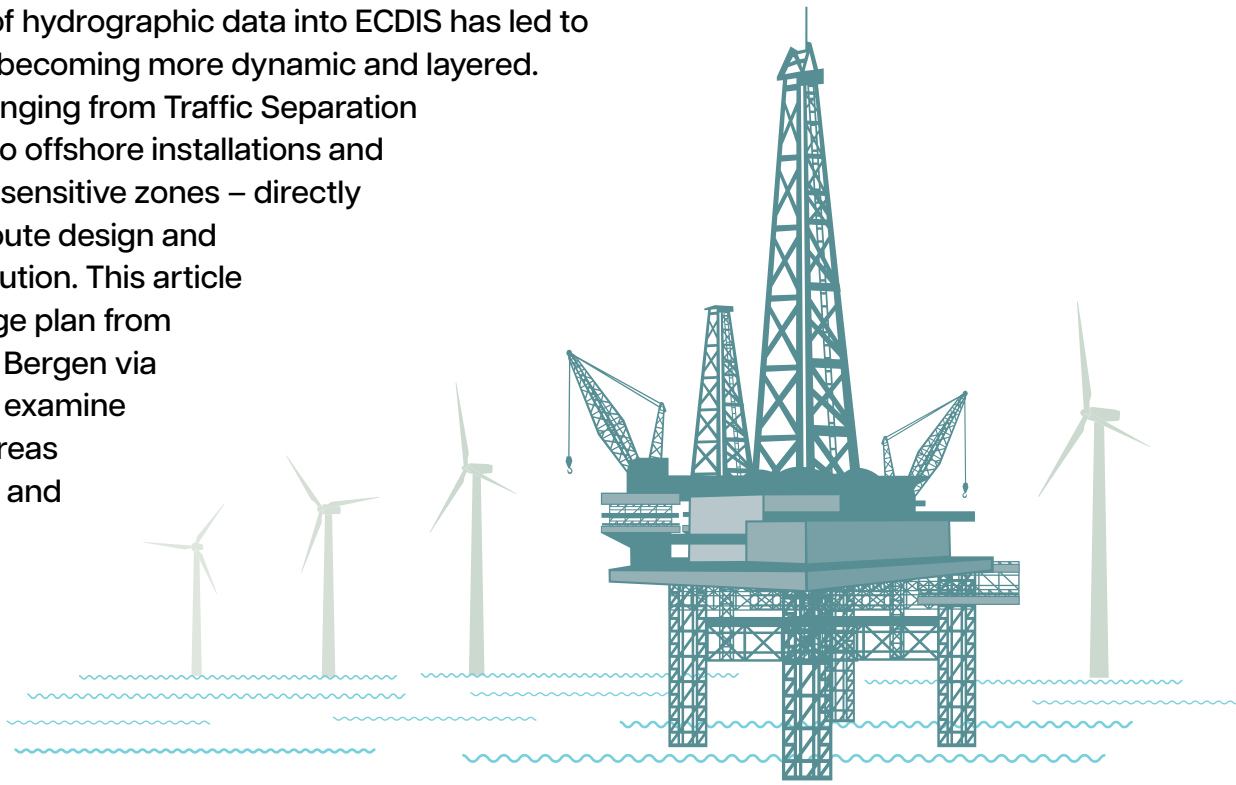
More information on how to update Admiralty Standard Nautical Charts is available at: https://www.admiralty.co.uk/charts/standard-nautical-charts#Support

See here for more information on ENC symbols and abbreviations: https://www.admiralty.co.uk/news/understanding-encs-guide-symbols-and-abbreviations-ecdis

Rites of passage:

Restricted areas and the planning process

The integration of hydrographic data into ECDIS has led to restricted areas becoming more dynamic and layered. These areas – ranging from Traffic Separation Schemes (TSS) to offshore installations and environmentally sensitive zones – directly influence both route design and operational execution. This article looks at a passage plan from Southampton to Bergen via the North Sea to examine how restricted areas can be identified and managed using onboard ECDIS equipment



by **Commodore Nick Nash CMMAR FRIN FNI**

The North Sea is one of the most regulated, structured and operationally complex maritime environments in the world. From the moment a vessel departs Southampton, mariners are operating within a framework defined not only by geography and traffic, but by a dense network of restrictions, obligations and protected zones. The passage to Bergen is shaped as much by where a ship must not go as by where it can. It is this distinction that lies at the heart of safe navigation.

Restricted areas across the North Sea take many forms. They include statutory exclusion zones surrounding offshore oil and gas installations, complex routing structures imposed by Traffic Separation Schemes and critical protections afforded to subsea cables and pipelines. Military exercise areas, often subject to change and activated through Notices to Mariners, add a further layer of complexity. Environmental designations such as MARPOL Special Areas increasingly influence both routing and operational conduct.

Setting out from Southampton

On leaving Southampton, the vessel immediately enters a tightly controlled navigational environment. The Solent demands precision and awareness, with constrained waters, crossing traffic and defined channels requiring strict adherence to established practice. As the vessel proceeds into the English Channel and integrates with the Dover Strait Traffic Separation Scheme, 'restrictions' become less about prohibition and more about compliance with structured movement. The mariner is part of a managed flow of traffic where deviation carries both risk and consequence.

On clearing the Dover Strait and entering the southern North Sea, the navigational picture begins to change. The density of offshore wind farms increases, often charted as areas to be avoided or approached with caution, while subsea infrastructure becomes more prevalent. Fishing adds a further hazard, not always formally restricted,

but demanding equal respect. It is in this phase that the prudent navigator begins to widen margins, resisting the temptation to follow the shortest track, choosing instead one that preserves sea room and flexibility.

Critical central phase

The central North Sea is the most critical phase of the passage. Here, the density of offshore installations increases significantly, with large clusters of platforms, each surrounded by statutory safety zones, creating a complex and often congested operational picture. These zones frequently overlap or sit in close proximity, forming areas where a direct route is neither practical nor safe.

Military exercise areas may also be active within this region, requiring careful monitoring of Notices to Mariners and an understanding of the way they change over time. The navigator must move beyond simple route plotting and instead construct a deliberate corridor of safe water, ensuring that the vessel remains well clear of all restricted zones while retaining sufficient manoeuvring space. This is where the quality of passage planning really shows.

The North Sea's designation as a MARPOL Special Area adds an additional layer of responsibility. Increasingly, restricted areas are driven not only by safety considerations but by environmental protection and regulatory compliance. These zones are monitored, enforced and, in many cases, expanding. The modern mariner must therefore navigate not only with precision, but with an awareness of the broader impact of their actions.

Nearing Norway

As the vessel approaches the Norwegian sector, the character of the passage changes once again. Environmental sensitivity increases, and coastal routing systems become more prominent. The approach to Bergen introduces narrower waters, increased traffic density and the influence of local pilotage.

Here, precision rather than wide margins is your key defence. The vessel must adhere strictly to charted routes while maintaining full situational awareness. The transition from open sea to confined coastal navigation demands a corresponding shift in mindset, where anticipation and preparation are critical.

Putting the route together

The entire process requires a structured and disciplined approach to voyage planning and verification. On the cruise ships that I work on, the initial route is constructed and electronically checked by the Voyage Planning Officer, using ECDIS to ensure that all charted restricted areas, safety contours and navigational hazards are correctly identified and avoided. The Deputy Voyage Planning Officer then reviews the plan independently, providing a critical second set of eyes to challenge assumptions, verify clearances and confirm that no restricted or cautionary areas have been inadvertently infringed.

The route then passes to the Environmental Officer to ensure full compliance with environmental regulations, MARPOL requirements and any applicable protected zones. This stage is increasingly important as environmental considerations expand across modern navigation. On other ships, of course, these tasks will need to be performed by the duty officers and the captain.

Only once these stages are complete can the plan be presented to the captain for final review and approval. This is a deliberate command decision where the overall strategy, margins and risk profile of the passage are assessed. The captain's approval confirms that the route reflects both safe navigational practice and the operational intent of the voyage.

Following approval, the passage plan is formally presented at the pre-departure briefing to both the bridge and engineering teams. This ensures that all departments have a shared understanding of the intended route, where restricted areas are, and any operational considerations that may influence the passage. It reinforces Bridge Resource Management principles and promotes a unified approach, where awareness of restricted zones is maintained not only on the bridge, but across the wider ship's operation.

A natural focal point

Throughout the passage, restricted areas must be clearly visible, properly understood and continuously monitored. Over-reliance on automation is a known hazard, and the mariner must ensure that safety contours, cross-track limits and alarm settings support, rather than replace, good judgement. This process must be supported by cross-checking with publications and Notices to Mariners, especially where dynamic or temporary restrictions may apply.

Restricted areas provide a natural focal point for team awareness and engagement. They should be clearly identified and discussed during the passage briefing, with an emphasis not only on their location but on their purpose. Understanding why an area is restricted reinforces compliance and supports better decision-making. The distinction between a hazard that may be managed and a boundary that must not be crossed is fundamental, and must be shared by the entire bridge team.

Restricted areas are not obstacles to be worked around at the last moment. They are the framework within which the entire passage is planned and executed. The professional mariner recognises this and responds accordingly, shaping the route with care, ensuring that every boundary is respected without compromise.

Remote control?

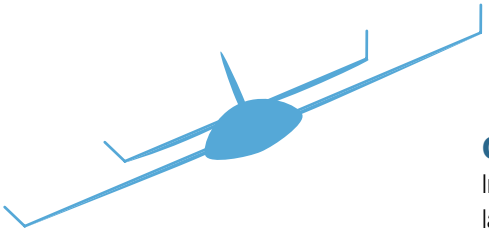
How remotely piloted aircraft are being used to help monitor compliance within restricted areas and reduce the risk of unwanted incidents

The rise in remotely piloted aircraft and drone technology is increasingly allowing the ability to monitor restricted maritime areas, such as protected zones and exclusion areas. Intended to provide real-time situational awareness, these drones are helping to detect behaviour like unauthorised entry into designated restricted areas, as well as environmental risks including pollution and illegal emission levels. They are also being used to monitor and respond to safety risks.

Case study one: EMSA

The French Directorate General of Maritime Affairs, Fisheries and Aquaculture is using remotely piloted aircraft provided by the European Maritime Safety Agency (EMSA) to measure sulphur and nitrogen emissions from ships operating in the Emission Control Area (ECA) of the North Sea and English Channel. The so-called 'sniffer drone' is able to sample air quality from the funnel to check that passing ships are complying with rules that cap the content of certain pollutants in the fuel being burned. Ships that are suspected of being out of compliance based on the results from the drone sampling may be subject to inspection at the next port of call.

Emissions monitoring campaigns frequently take place in this area, as the busy shipping lanes are well within the flight range of the aircraft being deployed. Remotely piloted aircraft system services are offered free to all EU member states by EMSA and have been developed to assist in maritime surveillance operations and ship emission monitoring. They can provide support to traditional coast guard functions too, including search and rescue and pollution prevention and response.



Case study two: MPA Singapore

In a related use case, The Maritime and Port Authority of Singapore (MPA) launched a trial last year using drones to detect and respond to chemical spills at sea – in particular for identifying methanol fires, which burn invisibly. The trial will explore how drones can be deployed for 'routine surveillance and anomaly detection,' according to reports in the *Straits Times*. MPA has previously tested drones equipped with a methanol detector, an infrared camera – which detects heat signatures – and plume-modelling capabilities to help it identify methanol leaks during a methanol bunkering operation. Drones can also be used for firefighting and mitigation, as well as detection.

The Nautical Institute's Mariners' Alerting and Reporting Scheme (MARS) – https://www.nautinst.org/resource-library/mars.html – comprises a fully searchable database of incident reports and lessons, updated every month. If you have witnessed an accident or seen a problem, email Captain Paul Drouin at mars@nautinst.org and help others learn from your experience. All reports are confidential – we will never identify you or your ship.

WHO'S NAVIGATING

Name: Capt. Ann Pletschke CMMar FNI
Current Position: STEER Project Manager for The Nautical Institute

STEER-ing the ship, charting the course

Ann Pletschke discusses her sea-based career and work ashore, researching the impact of technology on seafarers

Q Why did you decide to pursue a career at sea?

A I had my heart set on being a future Master from the age of four, due to a well-established family history of previous generations having spent long careers at sea. This desire never wavered, and at 16 years old I started my own seagoing career as a deck cadet on deep-sea reefer vessels and obtaining my Master's licence at the age of 27.

Q Tell us about the STEER Project and your involvement in it.

A I'm Project Manager for The Nautical Institute's STEER project, which is a two-and-a-half-year global research project into the impact of technology on seafarers, both positive and negative. The project will result in practical tools that will improve the impact of technology on seafarers, including increasing internet connectivity for personal technologies, such as apps on phones, improving operational technologies like the Bridge Navigation Watch Alarm System and looking more deeply into emerging future technologies.

I started in the role in January 2026 after disembarking my last vessel in November 2025. I had studied some aspects of technology impact as part of my MEng a few years ago and previously worked for a company that introduced remote technologies into bridge watchkeeping and overall vessel operation. So, it was a role that appealed to me.

It's really important to me that we represent all seafarers, of all ranks and on all types of ships around the world, including those that work on high-tech ships and those that do not. Technologies can have such a big effect on safety and crew wellbeing and, as a seafarer myself, I want to find and address the impacts that have the most effect, or are the easiest to improve.

Q What have been some of the most rewarding and most challenging moments of your career?

A There have been so many! Signing the Official Logbook as the vessel's first ever Master and then taking it out of the shipyard for the maiden voyage was one of my most rewarding moments and one that make me think, "pinch me!" – it was really happening! Otherwise, successfully completing tricky ship handling without a scratch never fails to be rewarding, once the adrenaline has worn off!

In terms of challenging moments, one testing aspect or working at sea is the difficulty to change between ship types. I'd always fancied working on a tanker but because I had no tanker experience, I could never transfer.

My biggest challenges have unfortunately come from other crew members, which I think is common for many seafarers. We can sail with some wonderful shipmates, but sadly harassment, abuse and bullying are all too common at times, and can make good ships with good voyage schedules incredibly challenging.

Finally, it's not always about your own journey, seeing one of my mentees get her EOOW Certificate of Competency after a long road coming from a country with no maritime academy or training programme was also just as rewarding as any of my own successes.

TECHNOLOGIES CAN HAVE SUCH A BIG EFFECT ON SAFETY AND CREW WELLBEING... I WANT TO FIND AND ADDRESS THE IMPACTS THAT HAVE THE MOST EFFECT, OR ARE THE EASIEST TO IMPROVE

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The digital data revolution

George Shaw from the Royal Institute of Navigation looks at the impact that the increase in restricted areas is having on navigation and discusses how digital maritime services are evolving to address higher demands on mariners' situational awareness

Globally, restricted areas (RAs) are growing rapidly in number, size and diversity of purpose. This means that vessels are being squeezed into more confined navigable spaces. For example, offshore renewable energy installations, with turbines located to maximise wind capture, may spread over hundreds of square nautical miles at considerable inconvenience to shipping. Vessels may now need to negotiate several banks of closely spaced turbines that are either formally designated RAs or simply not safely navigable by large vessels with limited manoeuvrability.

An increase in RAs could force more vessel routes to converge, conflict or introduce dog-leg manoeuvres that deviate unexpectedly from the natural course. The increased density of shipping around the boundaries of RAs raises encounter rates, so that vessels come into close proximity more often. Mariners have to remain alert for possible collision avoidance actions and maintain situational awareness under rapidly changing conditions. They must gather information from multiple onboard systems, supported by intensive visual lookout.

Digital evolution

Digital maritime services are evolving to address the increased demands on mariners' situational awareness and monitoring of encounters. The IHO has standardised its S100 digital charting products, which now indicate RA boundaries and local speed restrictions (eg S-122 data for Marine Protected Areas and S-130 polygonal demarcation). Another helpful tool is the S-421 Route Plan Exchange Format, which allows nearby vessels to declare their routes and intended manoeuvres

MARINERS MUST REMAIN AWARE OF FUNDAMENTAL DATA QUALITIES AND GRADUALLY GAIN FAMILIARITY WITH THE USE OF LIKELY ERROR ESTIMATION IN SERVICES

The upgrade from AIS to VDES allows for increased communication bandwidth and data authentication, enabling robust services and countering AIS data spoofing. This data revolution should enable clear ECDIS portrayal of high density traffic around RA boundaries, and give early safety indications when possible collision avoidance situations develop. Data services like these could eventually be extended to safe navigation around dynamically varying RAs, such as for seasonal protection of migrating mammals.

Data quality

Resilient digital services must adapt to the quality of underlying data, for example estimated accuracy of chart surveys and uncertainties in sensor measurements. Ideally, the information displayed should indicate where there are potential errors in derived data, such as circular error probable for position, or uncertainty in minimum passing distance (CPA). If digital information is displayed without error bounds it may seem convincing, but it can become hazardously misleading. Safety alarms should be triggered when estimated error is greater than a certain set limit, while maintaining low false alarm rates. Mariners must remain aware of the fundamental qualities of the data they are using and gradually become familiar with the likely error estimation.

Position data derived from GNSS remains a key input to multiple maritime services, although it may not be immediately evident when it is in use, such as in AIS reporting of vessel locations. For maritime users, GNSS positioning suffers integrity limitations, as can be seen near current conflict zones with some large errors in reported ship locations. GNSS accuracy can be degraded or denied by natural or intentional interference. Determining reliable error for GNSS positions is technically challenging, so mariners should always consider the risk of hazardous GNSS errors being transferred to derived information – including the AIS-derived CPA. Radar remains the principal sensor supporting collision avoidance decisions.

TAKE 10

Read on for ten tips to help you understand, identify and navigate restricted areas at sea

1 Understanding

The extent of permitted activity in restricted areas varies, from limited use to total exclusion. Make sure you understand what restrictions apply.

2 Purpose

Understand **why** the restrictions are in place – not just what they are! This supports your ability to make better decisions.

3 Planning

It is essential to take restricted areas into account at the passage planning stage, not just as you approach them.

4 Team work

It is not just the bridge team who need to be aware. Engineers and the company safety team may also need to be kept informed.

5 Situational awareness

If passing close to or between restricted areas, be aware of your safe corridors and ability to manoeuvre to avoid collisions or other operations.

6 Overlap

Watch out for areas where different restricted areas overlap. If you are in an overlap area you must comply with both.

7 Timing

Some restricted areas are time sensitive. This may be to protect animal migration routes, for military exercises or even for emergency situations. Monitor Notices to Mariners and safety messages to ensure awareness and compliance.

8 Recognition

Information about restricted areas uses specific symbols. The way information is presented is different on paper and electronic charts. Further information may be needed from sailing directions or local sources.

9 Change

New restricted areas are being applied all the time. Even if you are on a regular route, don't assume you know about the areas. Always review the passage plan for each passage and monitor local broadcasts.

10 Mentor

Share your knowledge and understanding of restricted areas with the whole bridge team – do not assume they already know! Only when the whole team has the same understanding will full situational awareness be achieved.

WIN AN iPAD

Just post a picture of you with your *Navigator* on Instagram, including the hashtag #NAVsnap, or send us a message on Facebook with your photo attached (www.facebook.com/thenauticalinstitute) and tell us the name of your ship or your college, if you have one. Let us know if you're a member of The Nautical Institute, too (everyone gets entered in the draw, whether you are a member or not!) Or send us the information in an email!

AND THE WINNER THIS ISSUE IS...

Our winner for this issue is second officer Michael Jan Manero, who sent us his photo from on board *MN TOUCAN* – a ro-ro vessel that is specially designed to carry launcher components for the Ariane satellite programme

MICHAEL JAN MANERO