

SAFETY INFORMATION NOTICE

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ELECTRONIC CHARTS

Issue:

As part of the transition to Electronic Navigational Charts (ENC) as the primary international means of promulgating and updating navigational information, the Australian Hydrographic Office (AHO) is progressively withdrawing paper charts and related raster products. About 150, or 30%, of the existing coastal and harbour paper charts will be withdrawn throughout 2020. The detail contained on the withdrawn charts will only be available in ENC.

Notice:

Electronic charts

'Electronic charts' is a generic term used to define the electronic presentation of navigational data and could refer to one of several formats. There are two main types: 'raster' and 'vector'.

Raster charts

Raster is relatively old technology and provides a scanned image of an 'official' paper chart with exactly the same information as the paper chart. These charts require a lot of storage and the zoom in and out either magnifies or reduces the size of the fonts and features without providing more or less data.

Vector charts

Vector charts provide digital data in a multiple layer format. There is less information about land and other features and as you zoom in and out the level of information changes. When you zoom in more depths and details are displayed. Often as the scale of the display is adjusted the chart appearance changes smoothly and appears seamless. They present the data in a more user-friendly manner and most display systems provide the ability for the user to manipulate the data to customise the display to what the navigator requires.

Of the vector charts there are two different groupings: 'official' and 'unofficial'. The 'official' vector charts use the specific term 'Electronic Navigational Charts'. The term denotes both the specific International Hydrographic Office (IHO) format and specifications used and that they are produced by or on behalf of a National Hydrographic Authority (NHA) or other authorised government institution under the

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auspices of the IHO. The term ENC is specific to these official charts and is not a generic term that includes all electronic charts. The primary customers are commercial shipping throughout the world and naval forces.

The 'unofficial' commercial electronic charts come under several brands with a range of similar products of varying quality. They are produced by commercial companies with names such as C-Map, Navionics and BlueChart. The companies are licensed to reformat and reproduce contents from the 'official' charts for use in navigation information systems such as chartplotters. The main market for the private products is an affordable electronic chart for the fleets of recreational boats around the world.

Vector chart construction is challenging and the vitally important process involves dealing with vast amounts of data as well as assigning attributes governing when and how information is displayed as a user zooms in and out. The translation from a paper chart that may be close to 1m² in size to a small display that is 20cm across and which has far less resolution does present problems. The cartographer must make decisions to eliminate details that are not deemed as important. This is referred to as 'prioritisation'.

Comparison between ENC and unofficial charts

ENC

ENC contain all the data available on the 'official' paper charts plus additional information to further aid safe navigation. They are produced in a highly regulated environment, controlled by the IHO. There are rigid standards for format, content, encryption, display and performance using internationally agreed chart symbology.

Prioritisation in ENC is strictly controlled to determine the minimum display scale at which every individual feature, including every sounding, will still be displayed. Importantly, certain features, such as reefs, islands and the safety-depth contour, cannot become "hidden" at any display scale as they are part of a base display requirement set by the International Maritime Organisation (IMO).

Corrections to all licensed ENC are provided to the licensee weekly or fortnightly and available for direct download into the navigation system in use. This greatly simplifies the application of small corrections and ensures that the charts can easily remain corrected up-to-date.

Unofficial charts

'Unofficial' chart suppliers attempt to faithfully capture all of the information that is present on the 'official' source charts. The 'unofficial' edition suppliers control how cluttered or sparsely the information is presented to the user. The rules used vary between manufacturers and there is no agreed standard. Most content is copied from paper charts, with omission of data presenting a risk during the tracing and digital capture process. To address this problem, the leading companies are transitioning to use of official vector data, or subsets of that data, as their primary future source. The transition between displayed levels of data process may be incomplete either by simplified design when prioritising or at times through error.

Over recent years there have been several notable incidents where mistakes have been made in the prioritisation of 'unofficial' charts and dangers to navigation have been omitted altogether or not visible at smaller scales.

The Vestas Wind grounding in the Indian Ocean during the 2014-15 Volvo Ocean Race was an extreme example of the problem and its consequences. A similar incident was narrowly averted in the 2017-18 Volvo Ocean Race

in the vicinity of the Solomon Islands. An 'unofficial' product was used in both cases whereas chart data display with more sensible prioritisation and an indication of the navigation danger was available on the 'official' charts. Importantly, 'unofficial' charts are accompanied by a formal written caution and warning. They are not considered suitable for navigation without reference to 'official' navigation products from government charting authorities. 'Unofficial' charts are marketed as an aid to navigation designed to facilitate the use of official government charts, not replace them.

Supporting navigation systems

Electronic charts are displayed on a variety of systems. The most capable is an Electronic Chart Display and Information System (ECDIS) which is a highly regulated IMO system with set standards and routine inspections to monitor compliance. The chart data is provided by ENC only. This complex system is unnecessarily sophisticated for a racing yacht.

All other chart display systems, which are not tested to show compliance with the ECDIS performance standard are generically designated as Electronic Chart Systems (ECS).

ECS can be interfaced with onboard instruments and use 'unofficial' vector charts, raster charts and some can use ENC. As a minimum an ECS will display vessel position, using the Global Navigation Satellite System (GNSS), and movement on a nautical chart from the chart source loaded into the navigation system. These latter systems are typically referred to as chartplotters and include brand names such as Raymarine, Garmin and Brookes and Gatehouse.

What might follow paper charts

Some NHA have been experimenting with an alternative to the paper chart that enables users to specify the extent, scale, and paper size of a personally customised paper chart product - 'custom charts'. The AHO is hoping that by 2025, users would be able to log onto the AHO website and save/print the ENC or the customised part of one or more ENC as a PDF, JPEG, TIFF or other form of file. Depending on the level of international certification these printed copies may be considered as an 'official' government chart.

The AHO has the necessary systems working internally to produce such a chart in a test environment, but the outputs are being refined before going public. A basic online viewing system showing both ENC and raster chart content will be available late 2020 to gauge public reaction. The initial functionality is intended to support comparison of 'official' charts against 'unofficial' charts and save simple screen captures where they differ. Additional functionality will be added based upon user feedback.

What does this mean

SR 4.10.1 has been amended and requires:

- offshore racing yachts are to carry navigational charts that cover the race area and may be:
 - 'official' paper charts and related raster products (while available), or
 - ENC, or
 - 'unofficial' electronic charts, or
 - 'custom charts' provided through a NHA (when available).
- a solely electronic means of providing charts is acceptable,

- electronic charts are to be displayed on an ECS using either ENC or raster charts or an 'unofficial' source of chart data,
- if using an 'unofficial' source of electronic chart data it should be checked against an 'official' chart source before the race in accordance with the manufacturer's warning,
- an ECS is to be connected to the boat's power system and/or if battery powered have an adequate supply of spare batteries for the race,
- electronic chart data and any associated permits are to be downloaded on to the hard drive of the ECS or provided on a dongle or data storage device and not dependent on an internet or phone connection,
- a back-up ECS with independent power and chart data (can be hand held), or a set of paper charts, is required for Category 1 and Category 2 races, and
- if a boat is using official paper charts or individually selected ENC it will need to carry charts that have sufficient details for likely ports of refuge.

Notwithstanding that there is no longer a requirement to carry paper charts a boat may consider it prudent, particularly in Category 1 or Category 2 races, to carry paper chart coverage of the entire race area at a small scale or as a 'custom chart'. In an emergency this would provide the ability to navigate to harbour entrances in the traditional manner as well as providing an easy view of offshore hazards. Such a chart would also be useful for passage planning and briefing the crew.