



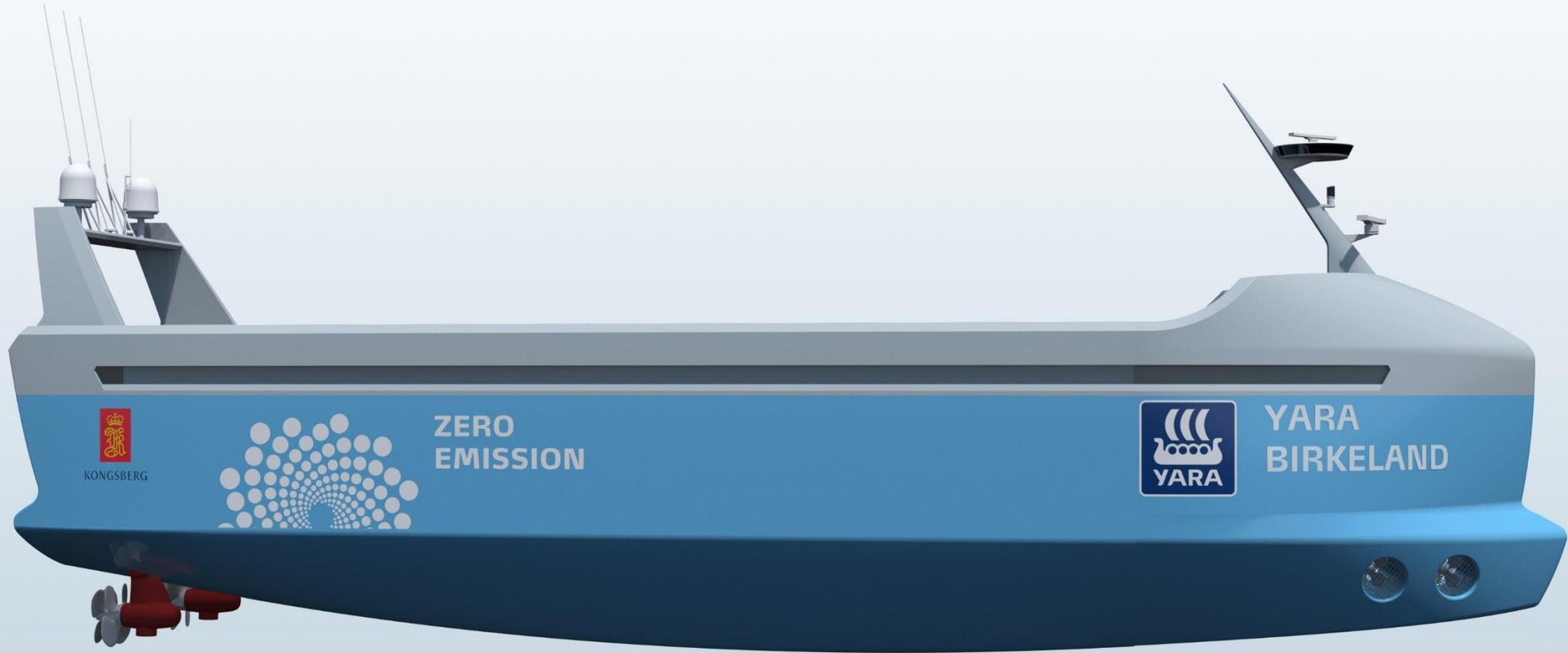
# 13<sup>th</sup> Meeting of the Hydrographic Services and Standards Committee

## **Autonomous Vessels and Navigation**

**Mark Casey - Head of Research, Design and Innovation  
UK Hydrographic Office**

### **Agenda Item x.x**

HSSC-13, VTC Event, 3 – 7 May 2021



KONGSBERG



ZERO  
EMISSION



YARA  
BIRKELAND



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# DEGREES OF AUTONOMY

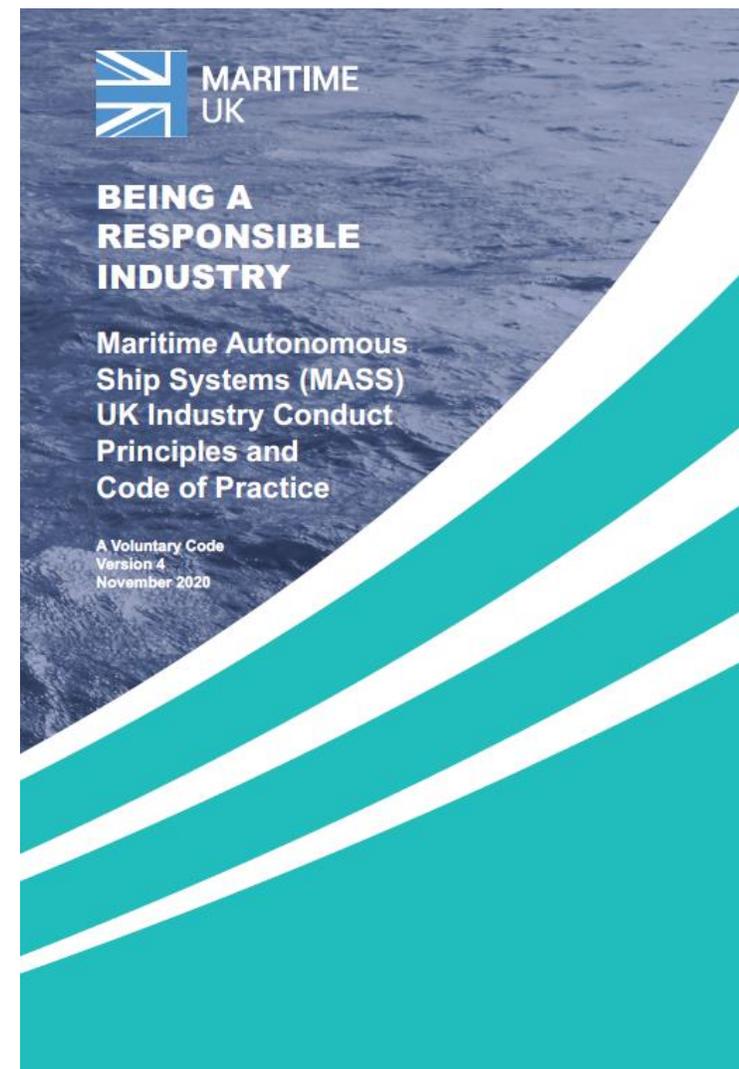
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- **Ship with automated processes and decision support (most likely to be a conventional ship):** seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated.
- **Remotely controlled ship with seafarers onboard:** the ship is controlled and operated from another location, but seafarers are on board (which would include a Periodically Unmanned Ship and a ship with a Periodically Unmanned Bridge).
- **Remotely controlled ship without seafarers on board:** the ship is controlled and operated from another location. There are no seafarers onboard.
- **Fully autonomous ship:** the operating system of the ship is able to make decisions and determine actions by itself.





- Marine Autonomous System Regulatory Working Group
- Looking at equivalence model
- Code of Practice published (vessels <24m)
- Deliberately not prescriptive and therefore no mention of the format of navigational data
- Seen as best practice
- Has got the attention of the IMO





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# **REGULATIONS - IMO SCOPING STUDY**

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- Scoping study to address how existing IMO regulatory instruments can be applied to Marine Autonomous Surface Ships
- Scope includes:-
  - SOLAS
  - COLREGs
  - Load Lines
  - Training and certification standards
  - Maritime Search and Rescue
  - Tonnage convention
  - Special trade passenger ship instruments
- The scoping study will take 2 years and several years before we see changes!



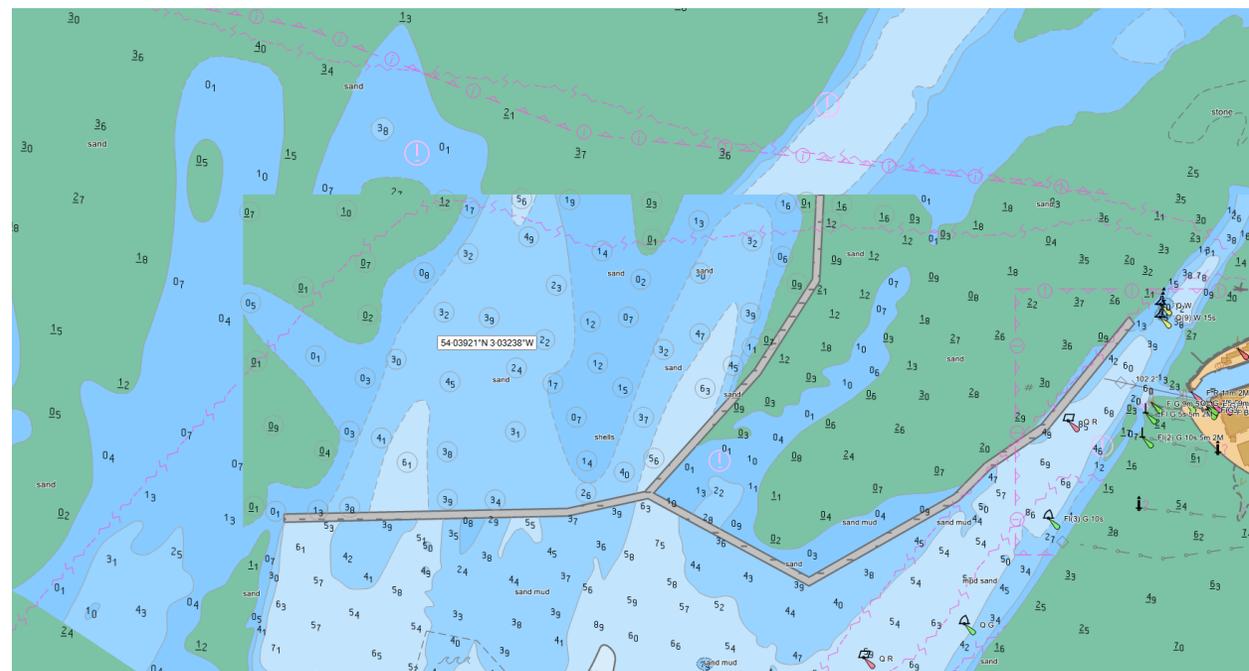


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# CURRENT CHARTS NOT FIT FOR PURPOSE FOR AV NAVIGATION

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- Charts (ENC) are still fundamentally designed to be viewed and interpreted by a human being
- Charts are a subjective cartographic representation of the real world
- Charts suffer from data inconsistencies
- Charts suffer from horizontal inconsistencies
- A lot of contextual information is captured in text notes
- S-57 is not extensible





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# **CURRENT CHARTS NOT FIT FOR PURPOSE FOR AV NAVIGATION**

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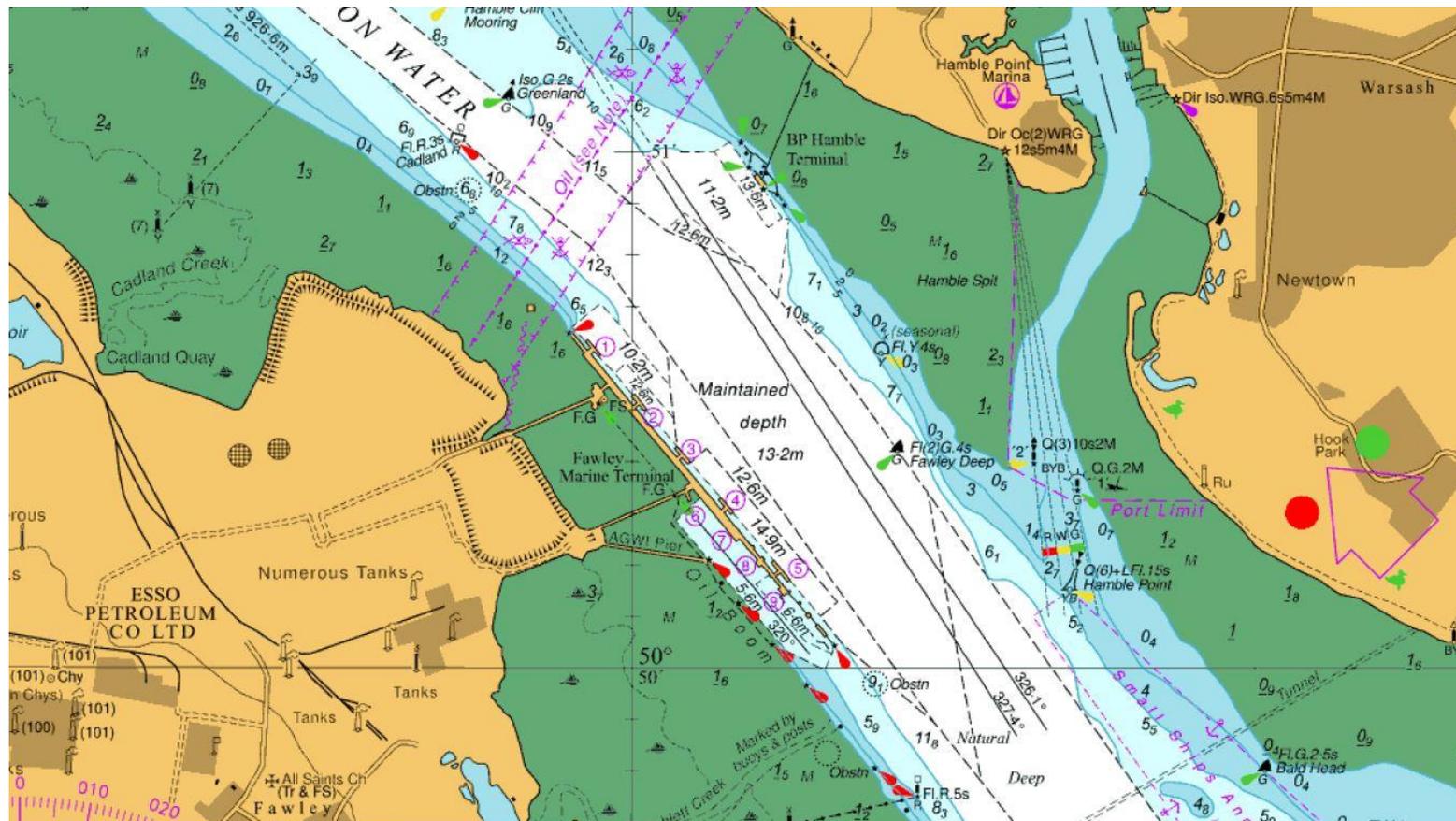




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# CURRENT CHARTS NOT FIT FOR PURPOSE FOR AV NAVIGATION

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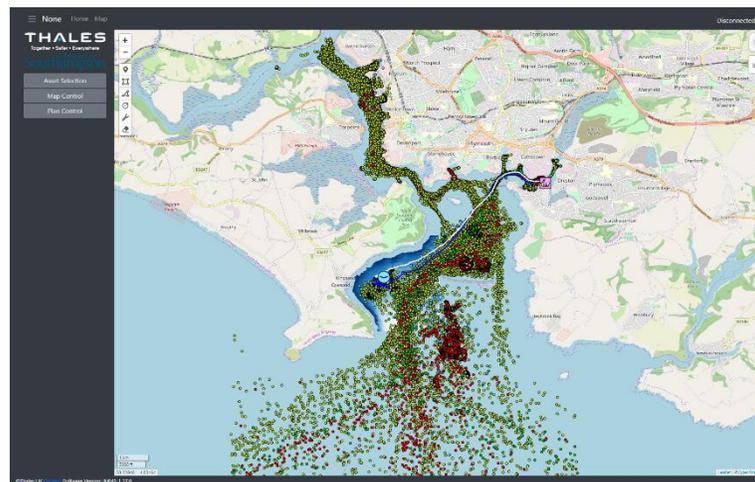
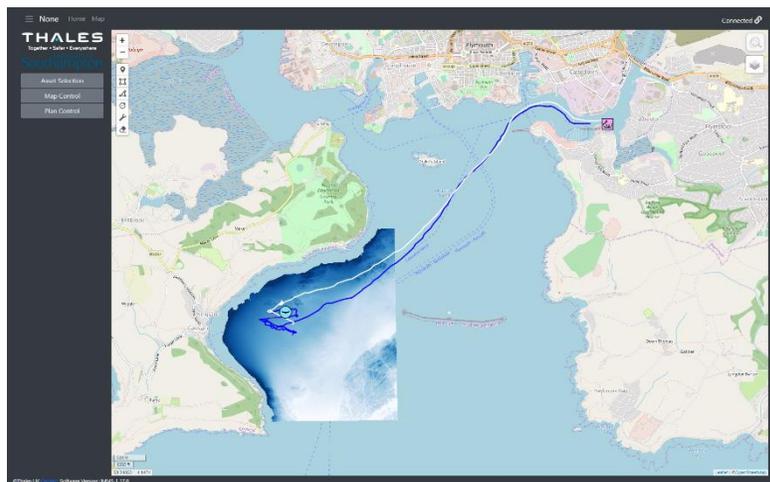
**10. Speed Regulations:** Consistent with safe navigation, vessels drawing 6.0m or over must not exceed a speed over the ground of 7 kn when approaching or passing the Fawley Marine Terminal, or the BP Hamble Terminal. Other vessels should not pass the terminal at excessive speed. Vessels passing the Fawley Marine Terminal and the BP Hamble Terminal should not navigate closer than 130 m from the face of the jetties in order to protect vessels alongside, to guard against the interaction between vessels and to prevent the risk of naked lights within these areas. There is a speed limit of 6 kn in the area north of a line joining Hythe Pier (50°52'49N 1°23'60W) and Weston Shelf Light Buoy, 3 cables NE.



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# DATA SUPPLY - THALES

International Hydrographic Organization





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DATA SUPPLY

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**AntsOnDeck.com**

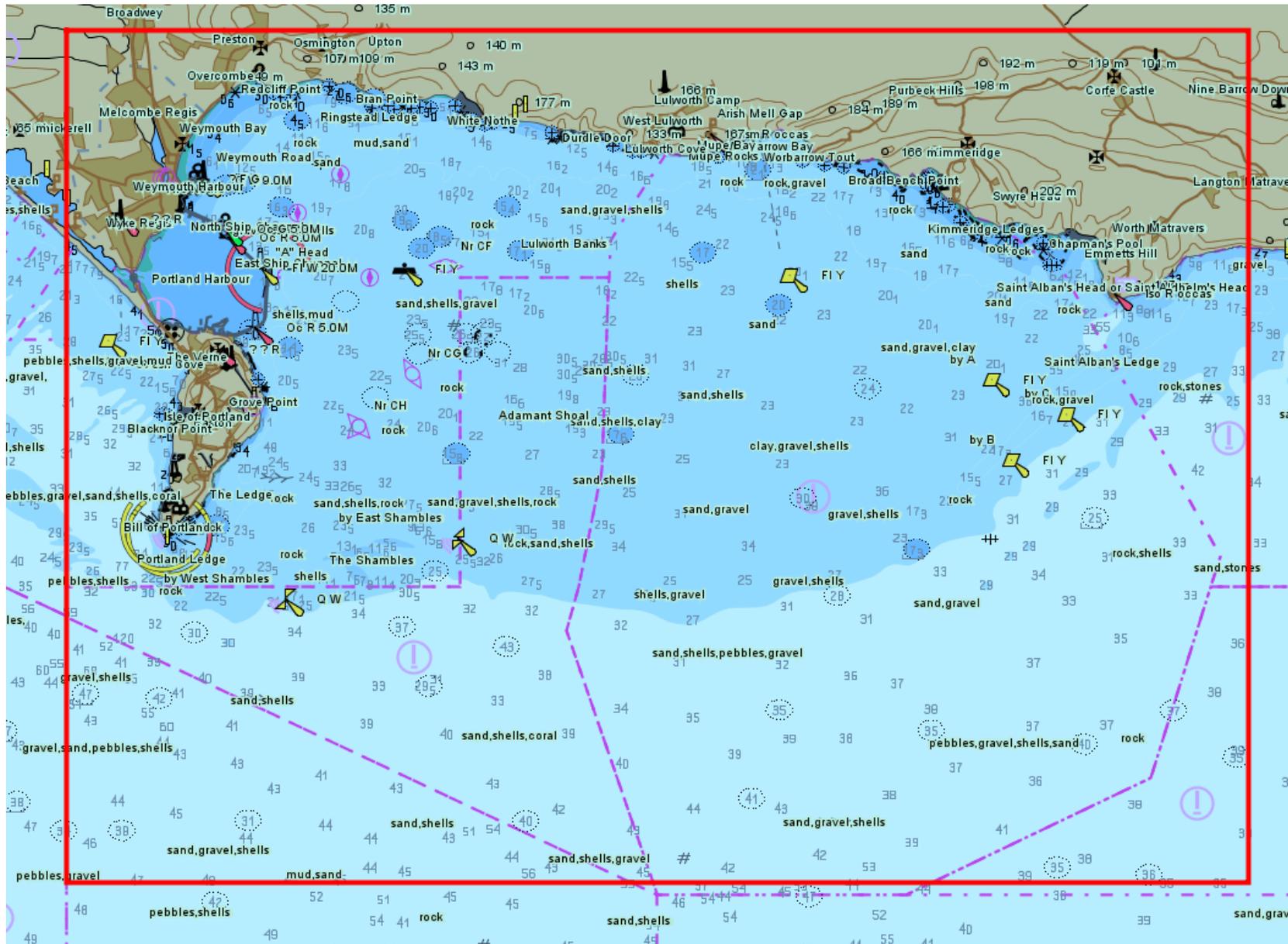
from Polaris Consulting



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# REGULATIONS - MCA MARLAB

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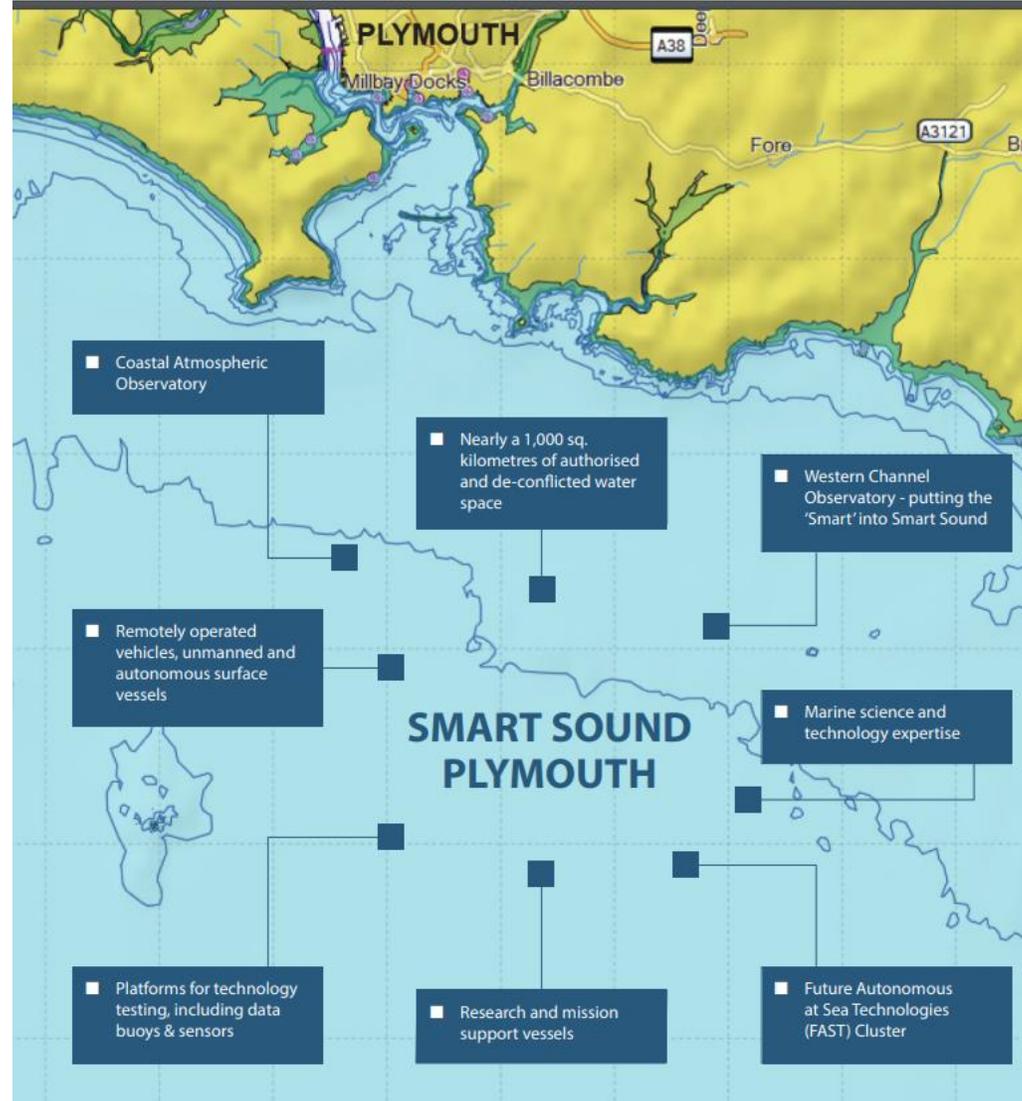
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# DATA SUPPLY - PLYMOUTH SMART SOUND

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**SMART  
SOUND**  
PLYMOUTH



**MARITIME UK**  
**SOUTH WEST**



**FAST  
CLUSTER**



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# AUTONOMOUS VESSEL EVENT CHALLENGE

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**ADMIRALTY**  
Marine Innovation Programme

## Unlocking Autonomous Navigation Challenge

[Overview](#) [About the challenge](#) [Support](#) [Timeline](#) [Enter](#) [Judging criteria](#)

The ADMIRALTY Marine Innovation Programme helps innovators and start-ups to develop new solutions that support safe, secure and thriving oceans.

For this challenge we are looking for participants to identify, trial and prove how navigational data can be used to support the safe navigation of Marine Autonomous Surface Ships. Each entrant will have access to world leading ADMIRALTY data and expertise, with winners receiving prizes worth £175,000 and an opportunity to launch their product in a sector estimated to be worth £111bn by 2030.

### Why should I participate?

- › As a participant, you'll be given the opportunity to work closely with the UK Hydrographic Office to develop your solution for a sector that's estimated to be worth £111bn by 2030.





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# MOST ASKED FOR DATA SETS

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- High res Bathy surface (2m 3D) – S102
- Access to tidal heights and streams via API – S104 & S111
- ENC's – S101
- Environmental Protected Areas – S122
- Wrecks – S101
- Cables – S101
- Anchorages – S101
- Contextual Information from SDs (restrictions, constraints, speed limits etc) - ????



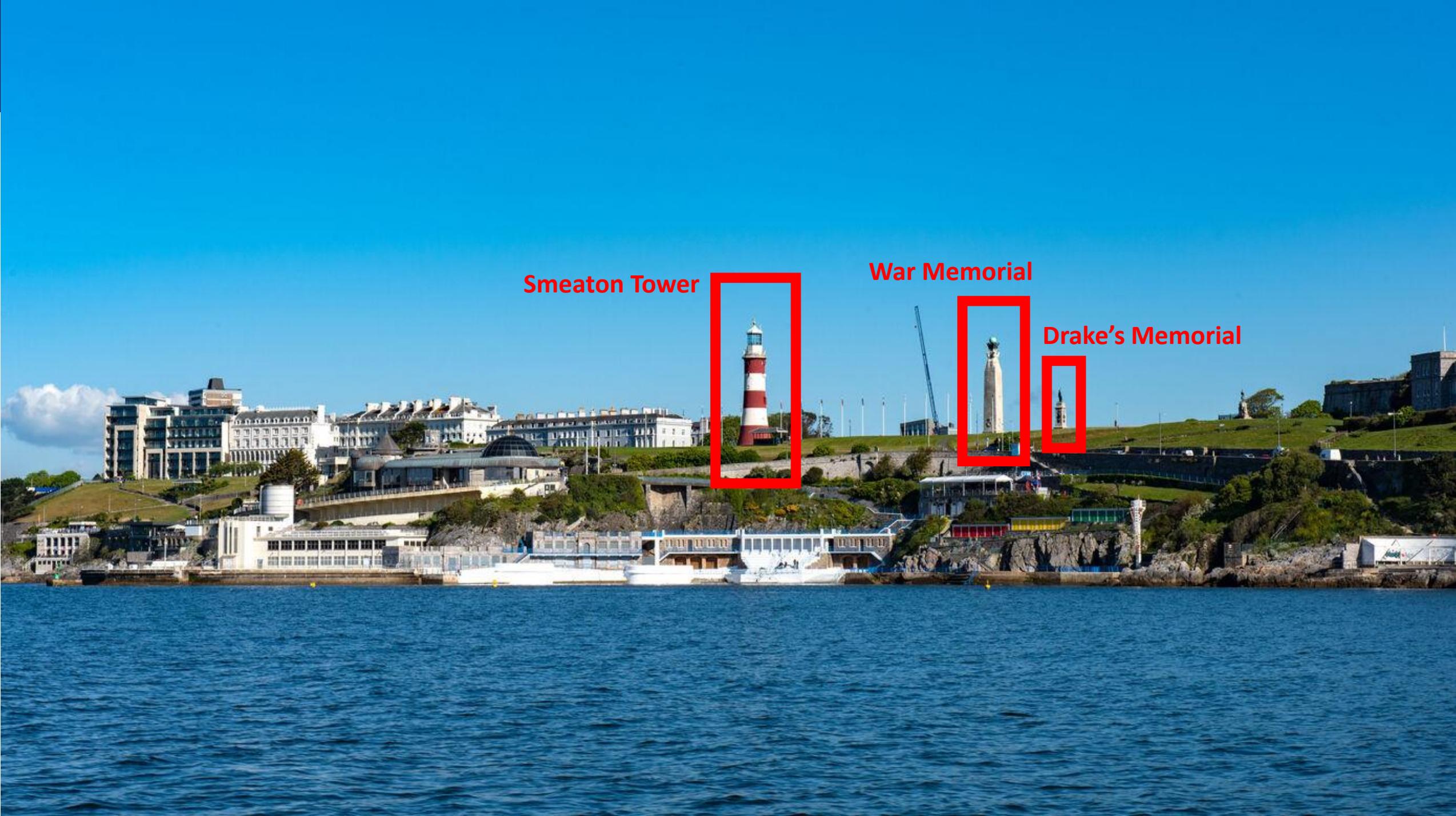
**Smeaton Tower**



**War Memorial**



**Drake's Memorial**





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# DIGITAL TWIN POC



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# MAYFLOWER AUTONOMOUS SHIP

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# **WORKING GROUP/PROJECT TEAM?**

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