WHAT ELSE CAN AIS DATA PROVIDE?

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1

Introduction – What is AIS?

- Automatic Information System (AIS) is a Very High Frequency (VHF) radio based ship identification system
- Carried by all passenger ships, cargo ships above 300 G.T. trading internationally and 500 G.T. not trading internationally
- Transmit information @ up to 2 second intervals:
  - vessel identity – call sign, MMSI no., IMO no.
  - position – lats & longs
  - speed
  - course & heading
  - vessel dimensions
  - destination

2

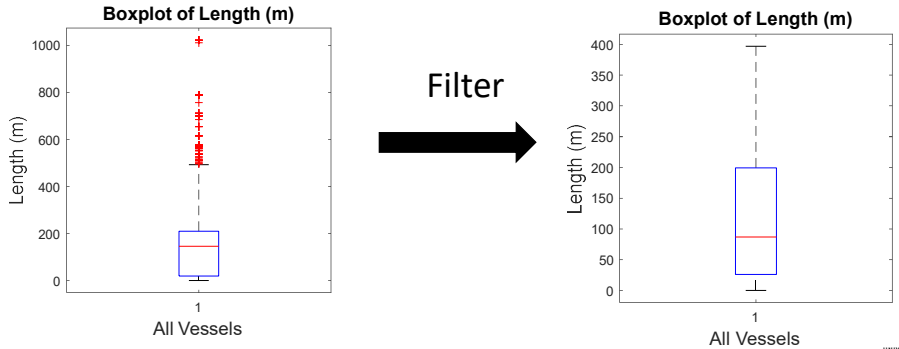
Data Source

- AIS data acquired for a coastal area
- Approx. 105 x 165 square nautical miles
- 5 min intervals for 5 year period (2015-2019)
- Approx. 5 million rows x 14 columns of data

3

Data Processing

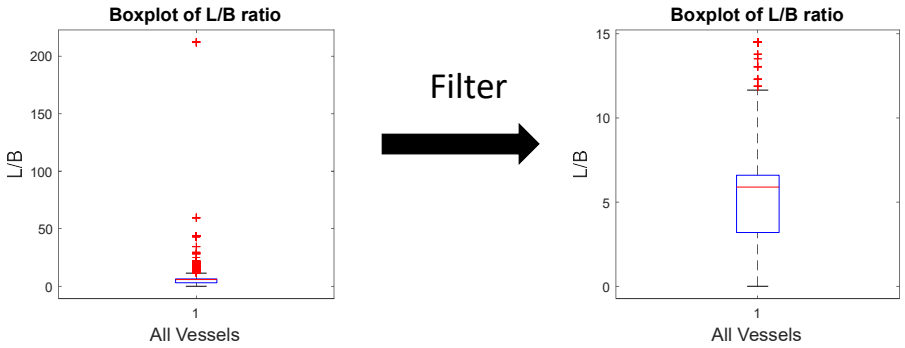
- Power BI, MATLAB & Excel
- Pre-processing scripts to filter out illogical / erroneous entries



4

Data Processing

- Requires careful oversight & some manual intervention
- Approx. 20% of the dataset were erroneous



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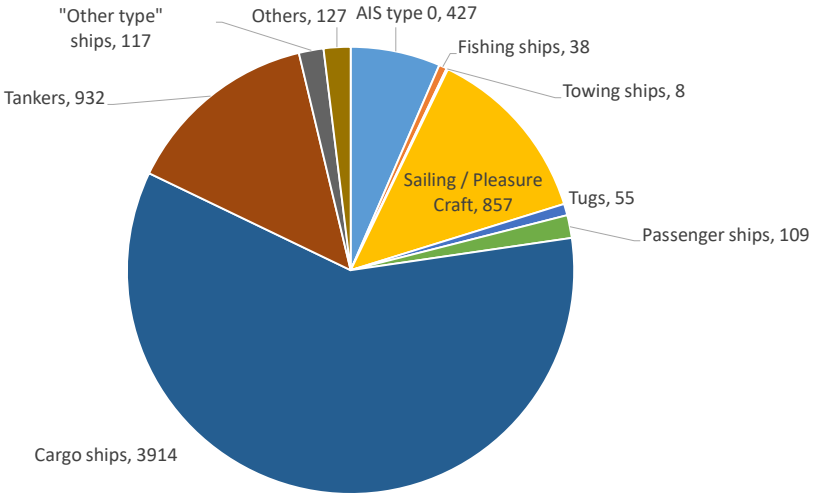
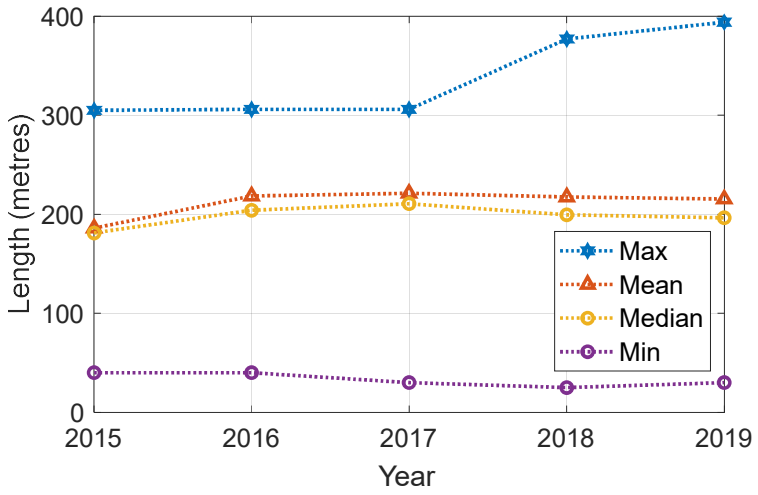
Number of Unique Ships 2015-2019



6

Ship Size Trends – Cargo Ship Length



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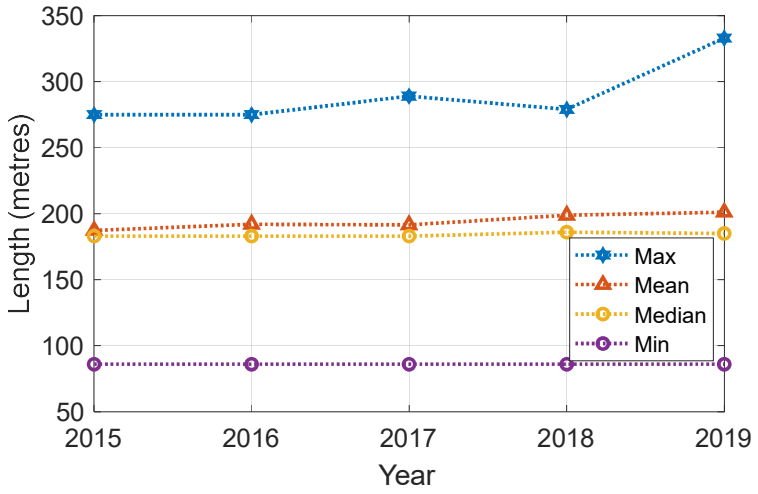
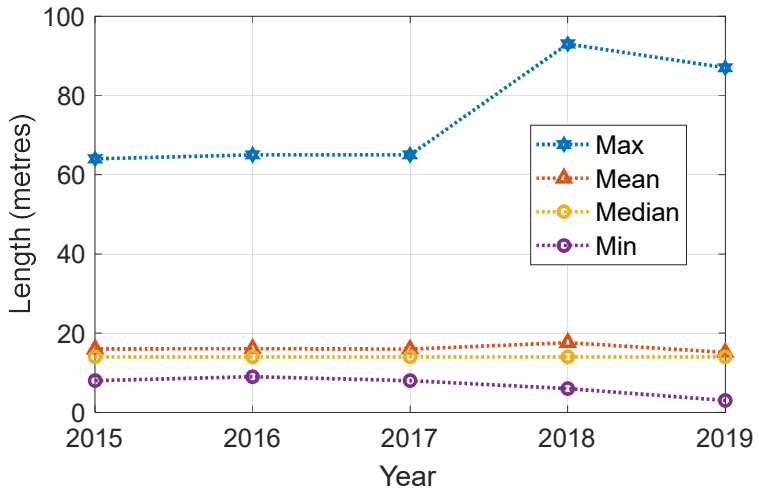
Ship Size Trends – Tanker Length



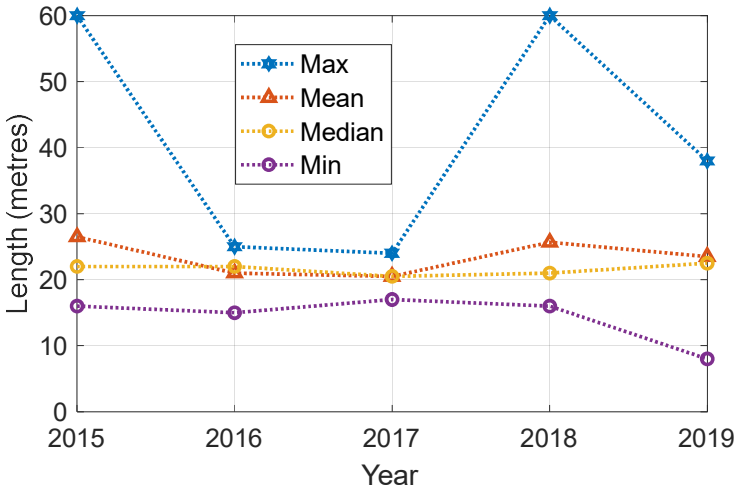
8

Ship Size Trends – Sail./Pleasure Craft Length



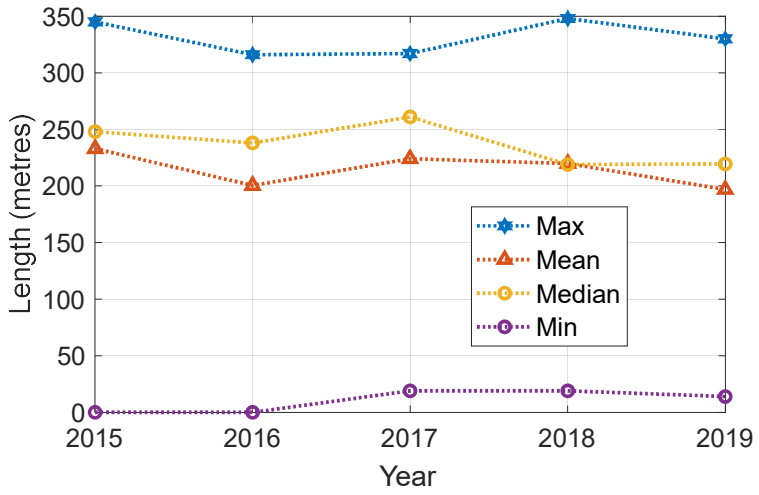
9

Ship Size Trends – Fishing Vessel Length



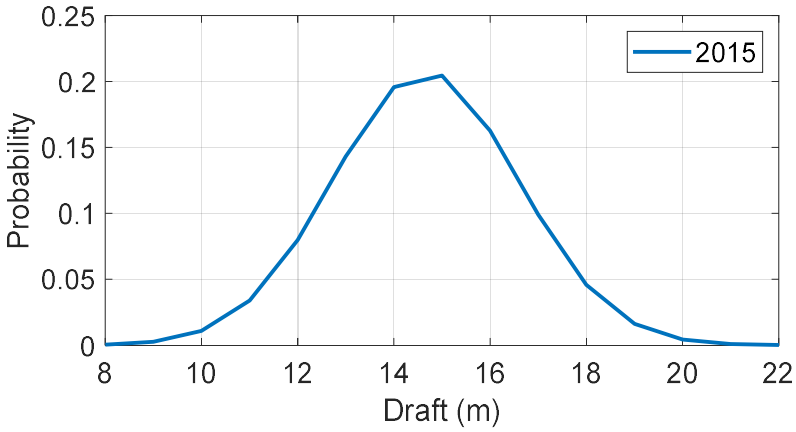
10

Ship Size Trends – Passenger Ship Length



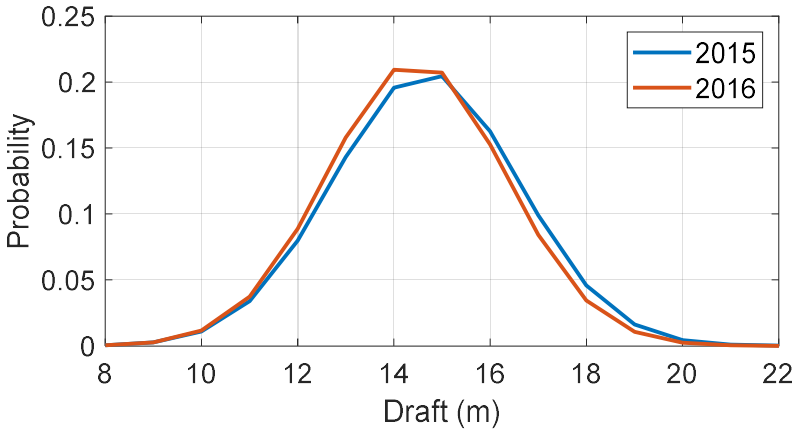
11

Ship Size Trends – Draft of Cargo/Tankers



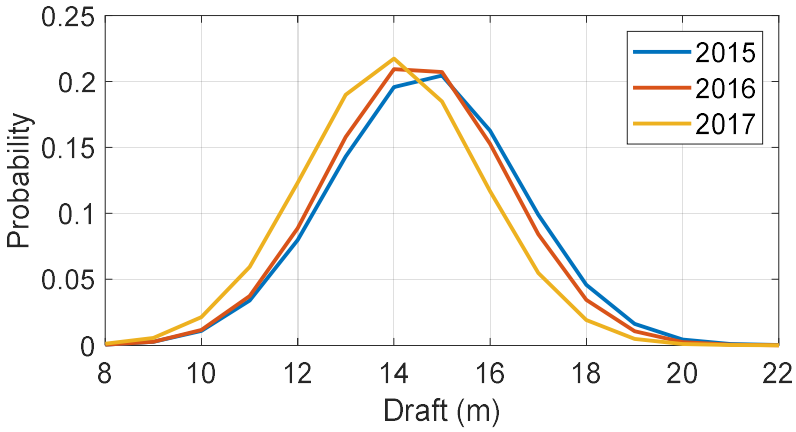
12

Ship Size Trends – Draft of Cargo/Tankers



13

Ship Size Trends – Draft of Cargo/Tankers



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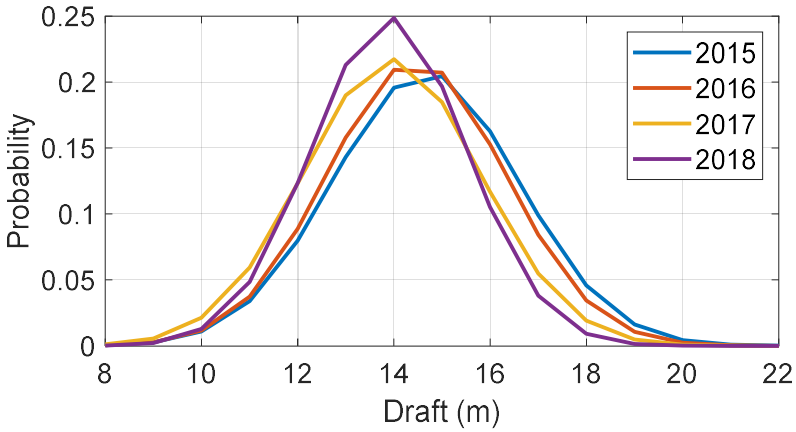
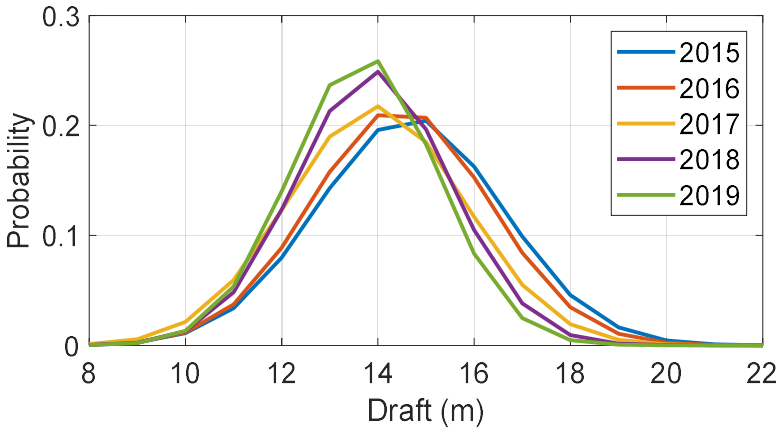
Ship Size Trends – Draft of Cargo/Tankers



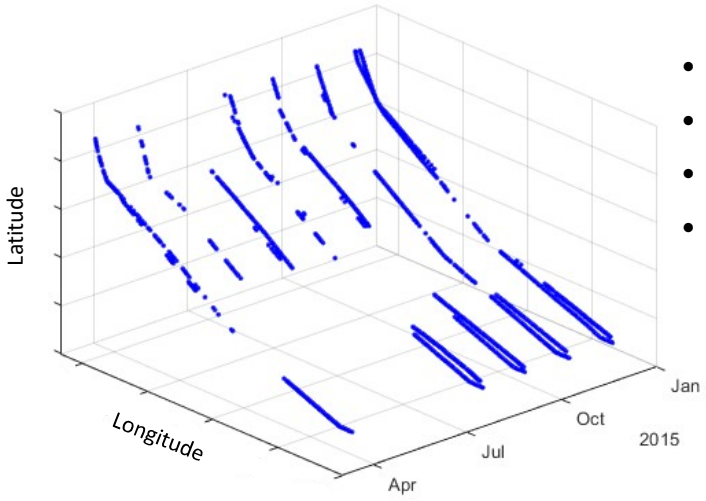
15

Ship Size Trends – Draft of Cargo/Tankers



16

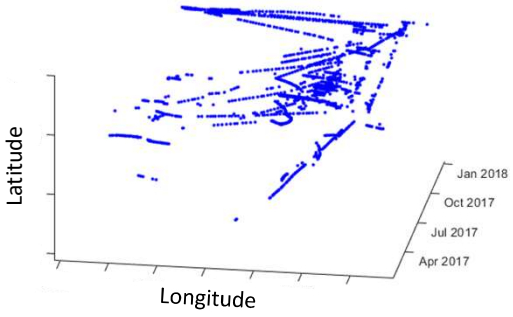
Analysing Number of Transits

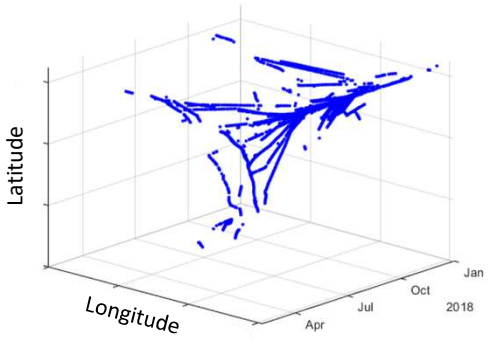


- 3D-plot of Lat, Long & Time
- Observe transit pattern
- Count number of transits
- Repeat for every vessel

17

Analysing Number of Transits

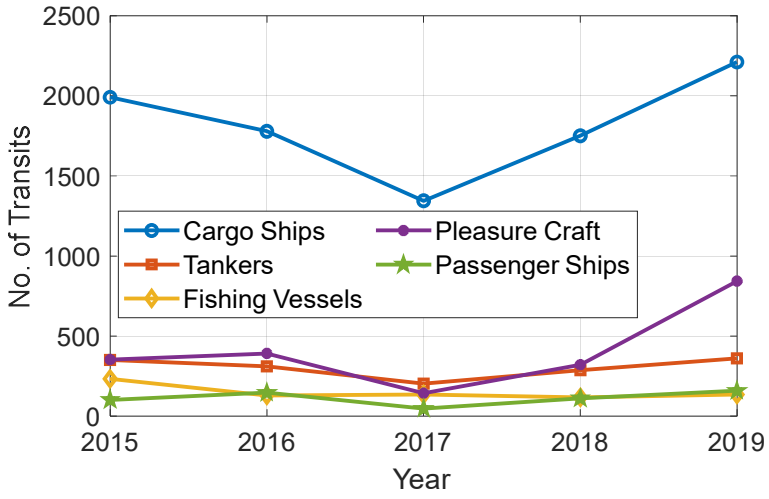




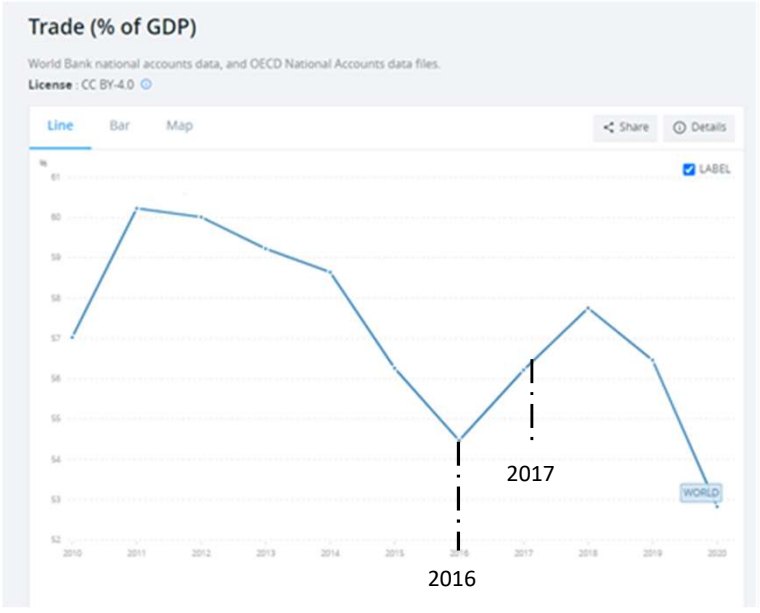
- Transit pattern varies with ship type
- Different approach required

18

Number of Transits

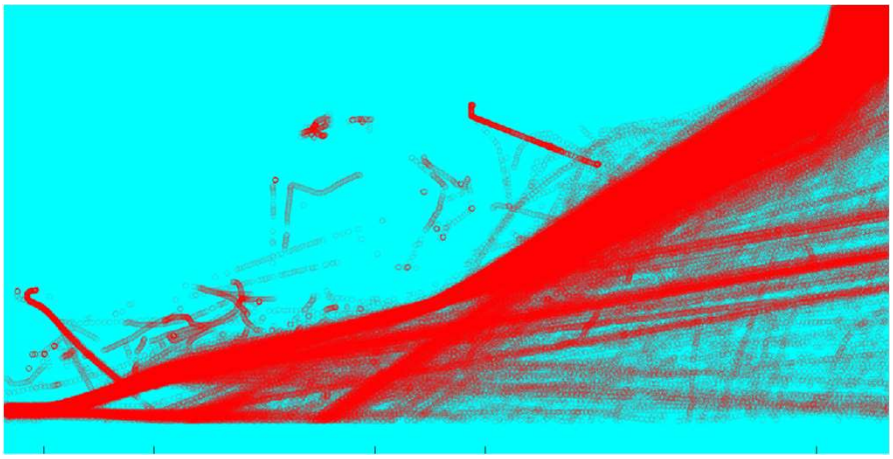


19



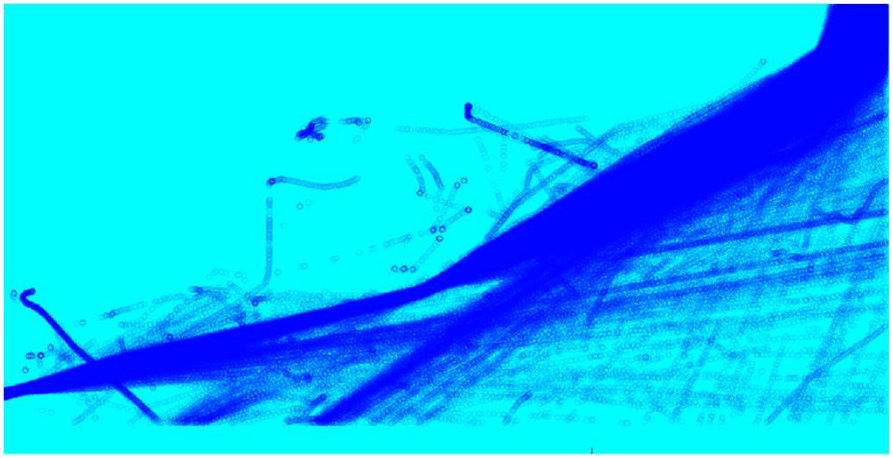
20

Cargo Ship Traffic Pattern – East Bound



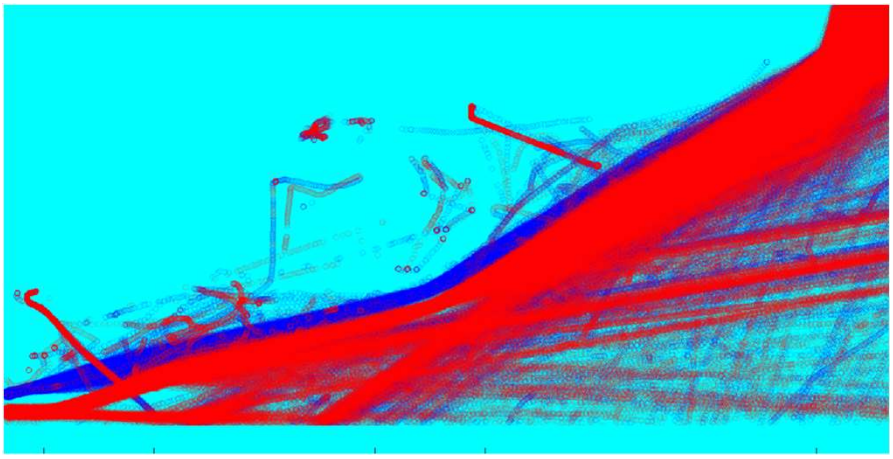
21

Cargo Ship Traffic Pattern –West Bound



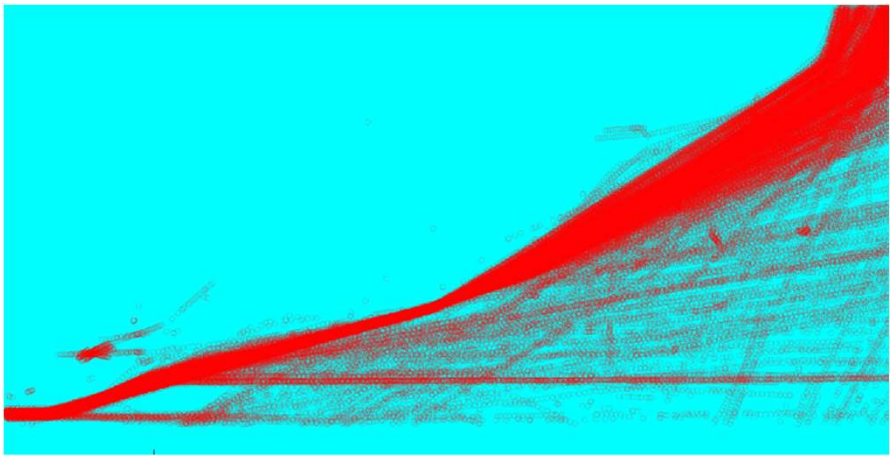
22

Cargo Ship Traffic Pattern –All



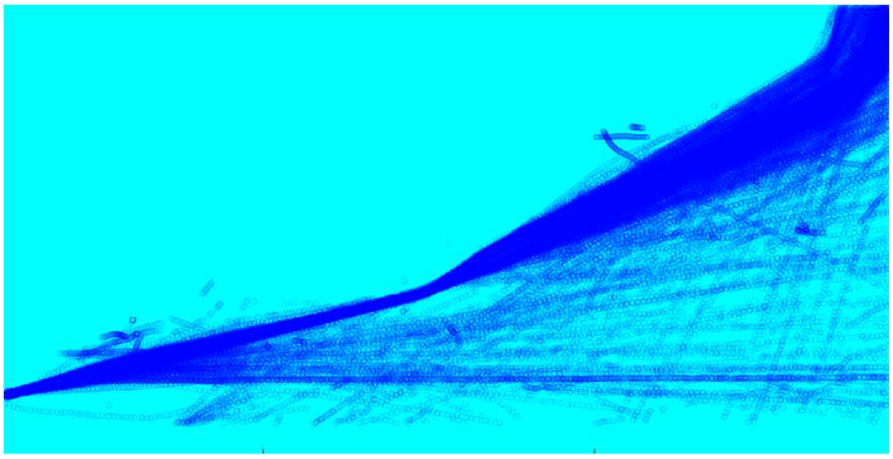
23

Tanker Traffic Pattern –East Bound



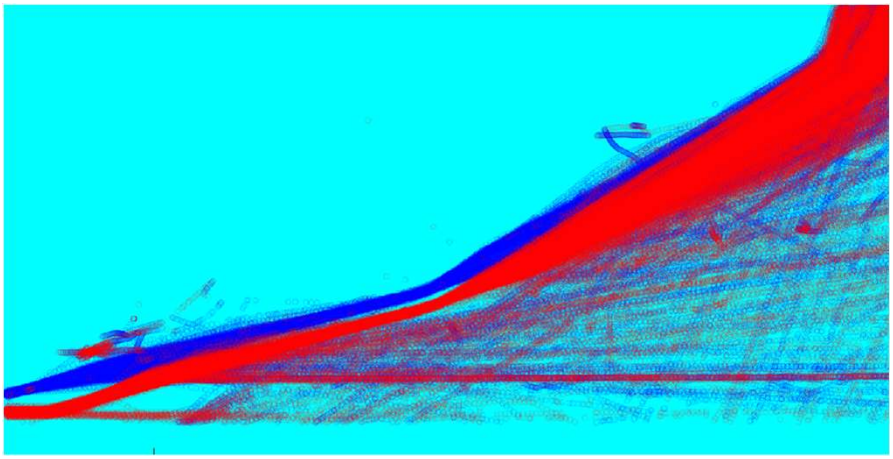
24

Tanker Traffic Pattern –West Bound



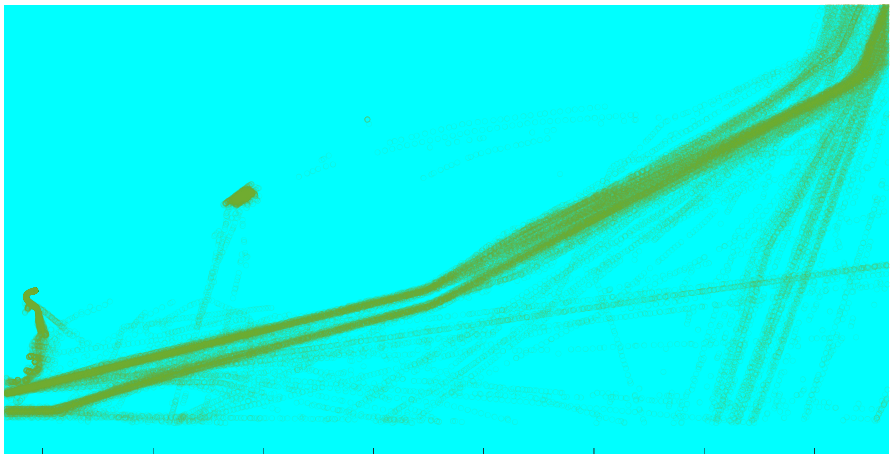
25

Tanker Traffic Pattern –All



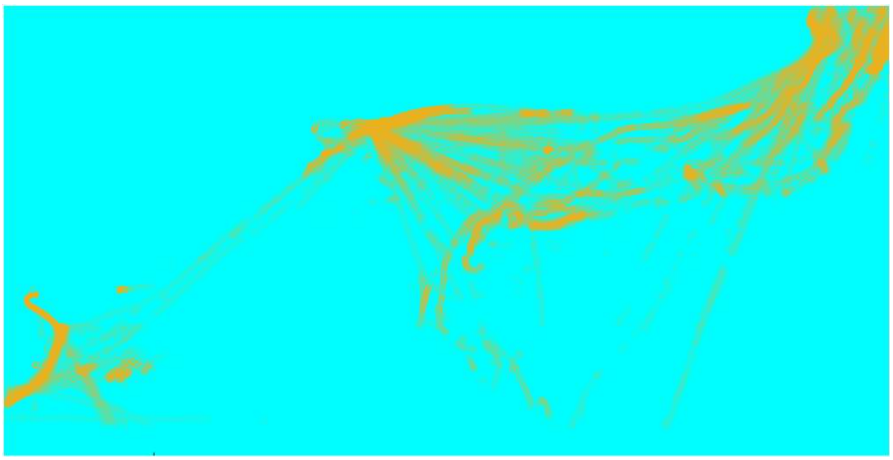
26

Passenger Ship Traffic Pattern



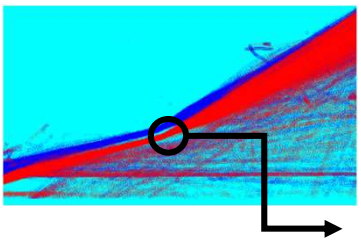
27

Fishing Vessel Traffic Pattern

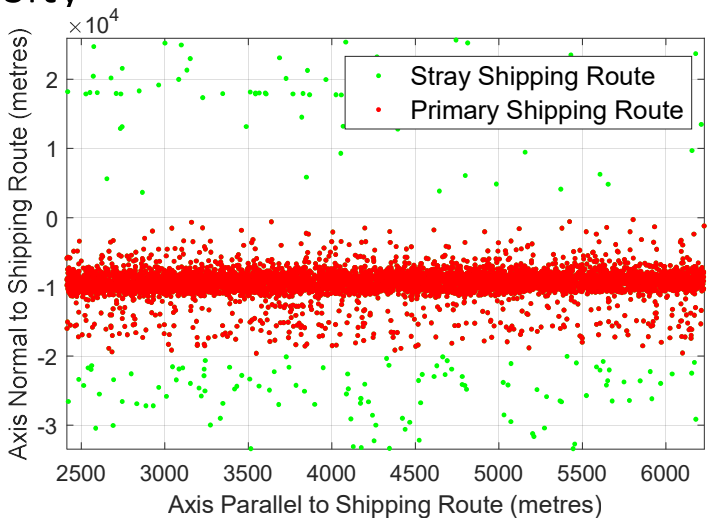


28

Ship Traffic Density



- Assess effectiveness of local traffic separation scheme



29

Ship Traffic Density

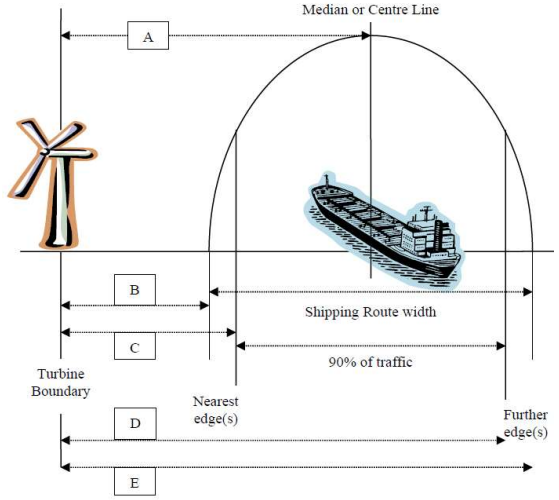


Figure adapted from Martime and Coastguard Agency, (2021), *MGN 654 Safety of Navigation: OREIs – Guidance on UK Navigational Practice, Safety and Emergency Response*

- A = Turbine boundary to the shipping route median or centre line
- B = Turbine boundary to nearest shipping route edge
- C = Turbine boundary to nearest shipping 90% traffic level
- D = Turbine boundary to further shipping 90% traffic level
- E = Turbine boundary to further shipping route edge

30

Conclusions

- 5-years worth of AIS data has been analysed
- Requires careful processing
- Offers various insights including :
  - the demography of ships in the area
  - ship size trends over the years
  - number of transits over the years
  - traffic patterns
  - traffic density

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31

THANK YOU!

ANY QUESTIONS?

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32