

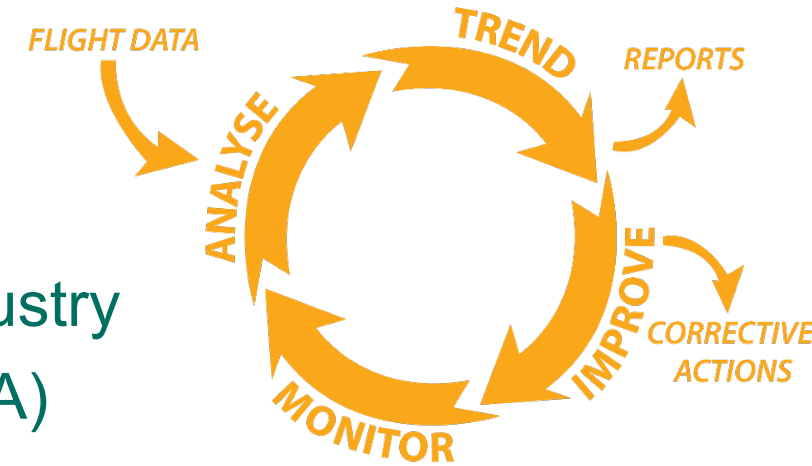


Pilot Operations Quality Assurance

An update since IMPA 2022

Refresh

- Pilot Operations Quality Assurance (POQA) is a maritime concept derived from the aviation industry Flight Operational Quality Assurance (FOQA)
- It is well established that accident causes are more predictable because of detailed knowledge
- Both POQA and FOQA combine data and operational experience to develop objective information to enhance safety, training effectiveness, operational procedures



FOQA is probably the most important safety tool available to aviation



POQA and TransitAnalyst

“Flight Operations QA”

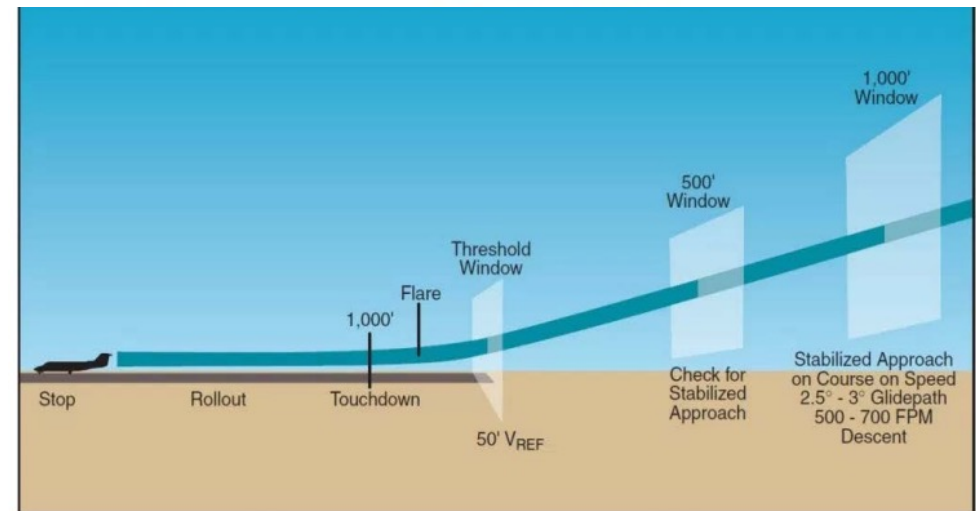
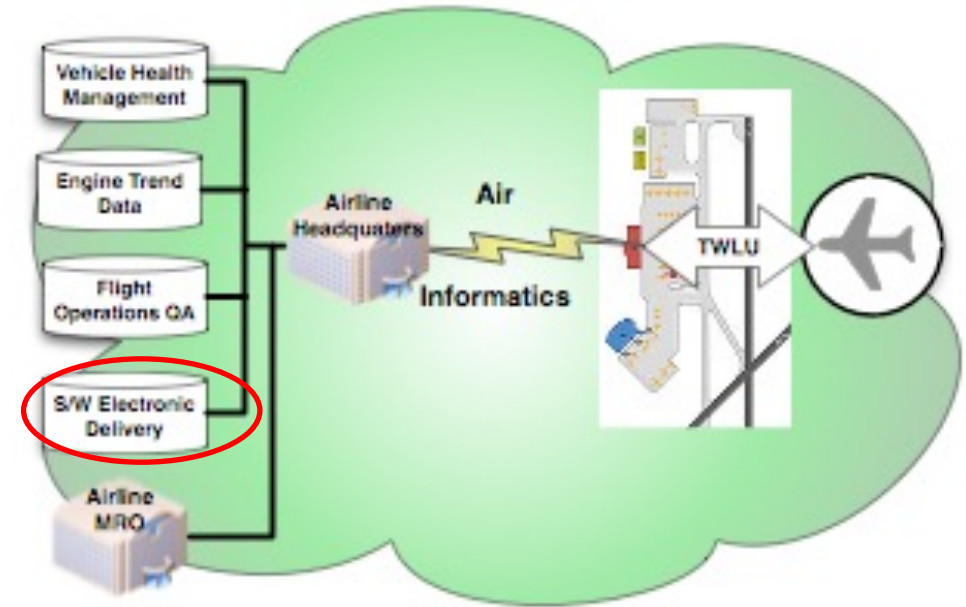
Air NZ presentation, NZMPA conference 2018

“A maritime equivalent was debated”

- A pivotal change marking the shift of pilotage into the ‘evidence-based’ domain of the ‘Age of Big Data’.

“Leading indicators” (Ravi Nijjer)

- Key goal is to look for “leading indicators” of potential problems. Identify **BEFORE** they occur.



“All flights must be stabilized by 1000 feet above airport elevation in Instrument Meteorological Conditions (IMC) and 500 feet above airport elevation in Visual Meteorological Conditions (VMC).”

Transit Analyst : Pilotage Operations Quality Assurance

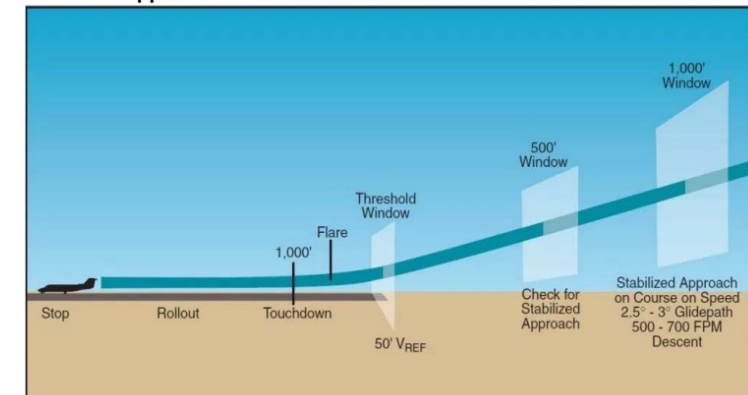
- POQA combines pilotage big data with simple analytics to rapidly improve operational safety and efficiency and create the pilotage organisations of the future.
- A proactive approach to safety management. Capturing and acting upon events, trends, incidents, and outliers in a timely fashion.
- The need to understand, and set, effective boundaries that give sufficient time to react appropriately to a breach
- Fits well as a risk management tool



Facilitates:

- Improved consistency and delivery of pilotage services,
- Evidence-based operational planning,
- Targeted training and retention of retired pilot experience,
- CPD (impartial peer review),
- Investigation of non-reportable incidents and near misses.

Stabilised Approach Criteria



"All flights must be stabilized by 1000 feet above airport elevation in Instrument Meteorological Conditions (IMC) and 500 feet above airport elevation in Visual Meteorological Conditions (VMC).

Modern Maritime Environment

- Zero community tolerance for maritime accidents
- Maritime accidents attract highly emotive and often negative publicity
 - accident involves pollution and/or loss of life the consequences for those involved can be very serious
- Accident and Safety Authorities conduct safety investigations and improve maritime safety by reducing the risk of similar accidents recurring
- Increased prosecutions of seafarers including pilots involved in accidents
- Increasing demands for efficiency and reduction in safety margins
- Application of increasingly sophisticated technologies
- Availability of reliable evidence post-event indicates a shift to an evidence-based world where transparency is the best option
- **‘Overwhelmingly’** high percentage of present-day systems and practices in pilotage/shipping are operationally successful

It is NOT Big Brother : The data is already being, or can be, analysed

“Maritime NZ’s investigation identified the pattern of excessive speed over many months and thousands of journeys.”

Maritime NZ, July 2020

In short:

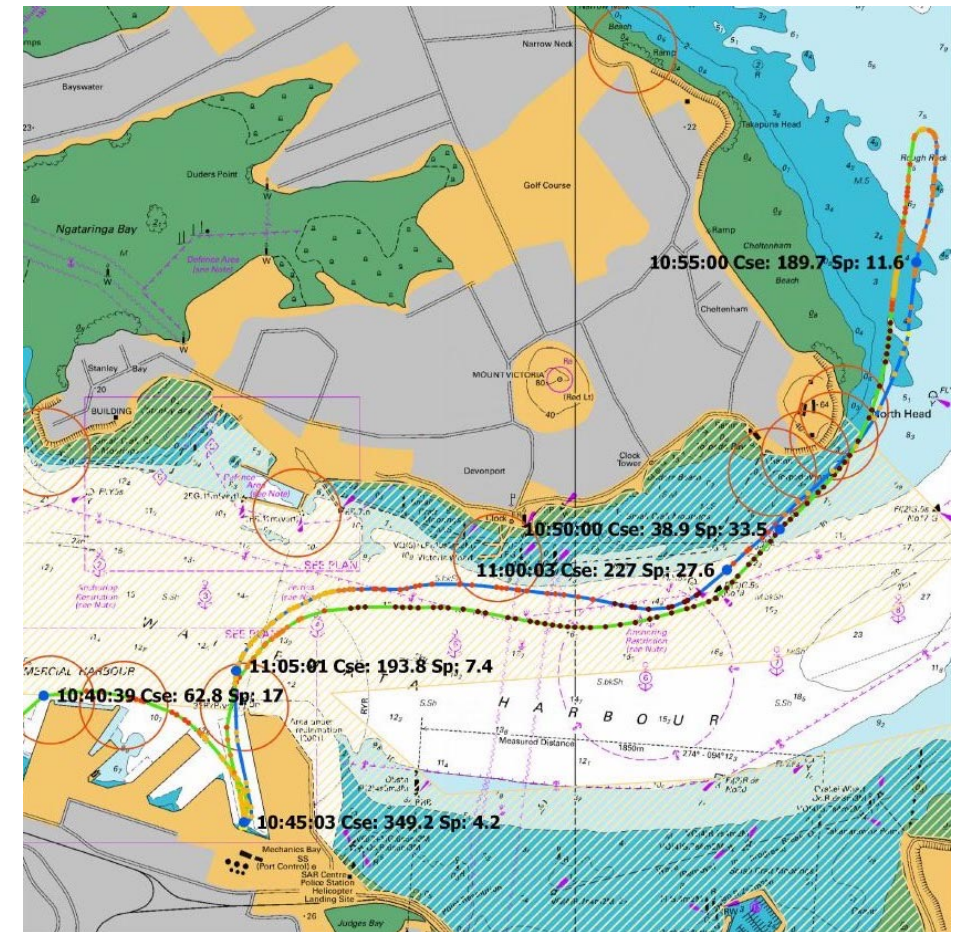
There are significant benefits which can be achieved through proactive marine safety management.

Very beneficial to identify potential problems before the next incident can take place...

TAIC is about investigating for the sole purpose of avoiding the same occurrence a second time.

TAIC : identified that the most likely point of failure continues to be during “controlled” turns in approach channels.

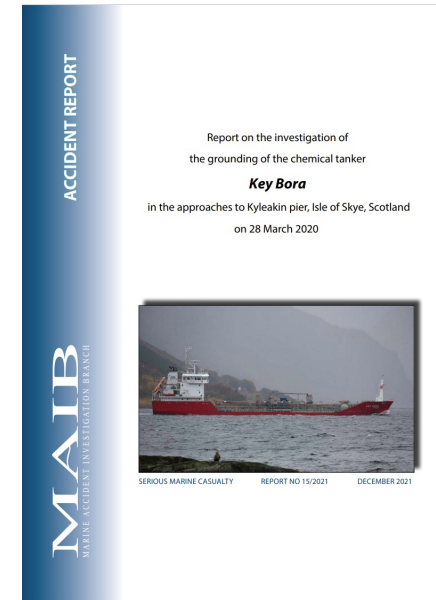
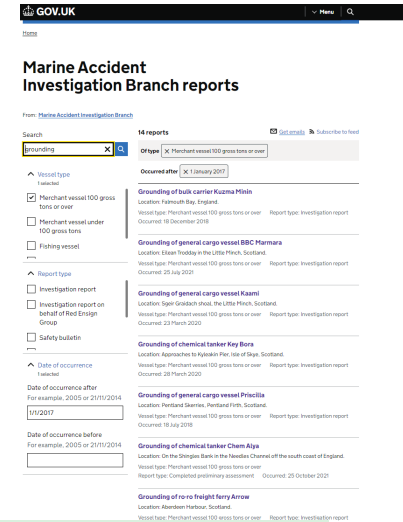
All of this making the point that “good practice and effective planning are essential” but not always conducted.



Maritime Accident Investigation Board

The MAIB recommends ports (and pilots) to actively manage their risk to avoid a visit by them

- Refer to the PMSC & GTGP
- Review your incidents and accidents
- Understand **your** risk controls



What does the Port Marine Safety Code mean for harbours, Marine Facilities, berths and terminals?

- Duty holder:** Formally identify and designate the duty holder, whose functions are individually and collectively accountable for compliance with the Code and their performance in ensuring safe marine operations in the harbour and its approaches.
- Designated Person:** A designated person must be appointed to oversee and coordinate the operation of the marine safety management system. The designated person must have direct access to the duty holder.
- Legislation:** The duty holder must ensure that the owners of their existing vessels based on local and national legislation, including additional powers if required in order to promote safe navigation.
- Duties and Powers:** Comply with the duties and powers under existing legislation as appropriate.
- Risk Assessment:** Ensure all marine risks are formally assessed and are reviewed or updated as low as reasonably practicable in accordance with good practice.

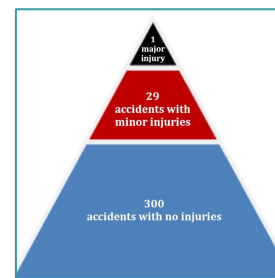
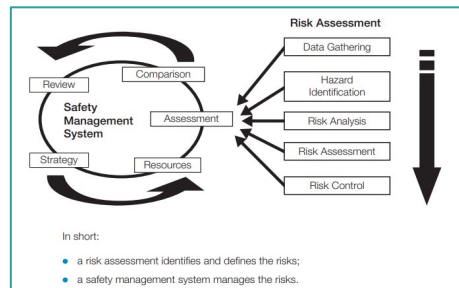
Marine Safety Management System: Operate an effective system which has been developed after consultation, is based on formal risk assessment and refers to an appropriate approach to incident investigation.

Review and Audit: Monitor, review and audit the risk assessment and the safety management system as a regular basis. The responsible designated person has a key role in providing assurance for the duty holder.

Competence: Use competent people before use to ensure a qualified and experienced in positions of responsibility for managing marine and navigational safety.

Plan: Publish a safety plan showing how the harbour or the Code will be risk assessed, assessed, assessed and performance against that plan is to be reviewed every three years.

Aids to Navigation: Comply with directions from the General Lighthouse Authorities and supply information in accordance with good practice.



laws Pilotage COLREGS
STCW BRM
directions
Towage Passage plan
Bye

The MAIB recommends that pilotage trips be reviewed

- Pilotage Plans
- Pilotage Routes



Irrefutable Evidence

Fact: **Marine investigations of ships under pilotage, are now based on ‘irrefutable evidence’ obtained from real-time recordings**

Questions:

- **“Can the job withstand scrutiny?”** (that is possible after the event with today’s technology)
- **“Does it meet the legal requirement of Due Diligence?”** (in regard to use of available knowledge on safety and technology)
- **“Are practices comparable to other hazardous industries?”**
- **“Does it meet expected community standards in regard to acceptable risk?”**
- **“Is there a ‘fit for purpose’ pilotage plan?”**
 - It also implies the need for very strong focus on protocols around data access and data use in a world where so much new data is created every second.

Investigators Perspectives and Frustrations

1. Investigations revealed “*very different perspectives*” of pilots and marine accident investigators on the conduct of pilotage
2. ‘Irrefutable evidence’ from recordings:
 - Marine occurrence reports repeatedly found pilots only using visual techniques, local knowledge and their intuition and ignoring other resources. And this is considered sufficient by pilots.
3. Safety investigators in addition to visual piloting, local knowledge, and pilot’s intuition also expect effective use of a passage plan, PPU, utilisation of Bridge Team, and ship’s bridge equipment
4. The use of a ‘system’ as against ‘individual’ approach.
 - The traditional individual approach as it is referred to is susceptible to a single point failure and unacceptable in today’s highly safety conscious world.
5. Despite two decades of safety accident investigations and recommendations, similar accidents continue to occur.
 - Evidence obtained from ship’s VDR and VTS recordings consistently shows that little has changed in the way that pilotage is conducted.
 - **Similar Accidents implies need for ‘Evidence Based Training’** (Captain Simon Henderson)

Conclusions

- Pilotage is being put under scrutiny as never before. This is only going to increase.
- “Whatever way pilotage is conducted, it has to be able to withstand scrutiny that is possible post occurrence with today’s technology”
- What is required is consistency, reliability and standardisation
- In an evidence-based environment transparency is the only option
 - the full implications of the use of VDR data and recordings for investigations has not been understood
- What are the consequences of not addressing issues related to revealed deficiencies in present day pilotage practices?
- Need for ‘Reconceptualisation of Pilotage’ to be understood and implemented*.

Introducing : TransitAnalyst

TransitAnalyst

Analyse AIS and PPU data along with environmental observations, vessel characteristics and pilot comments to identify pilotage risks and improve operations.

Improving the **safety & efficiency**
of pilotage operations



Search



Filter



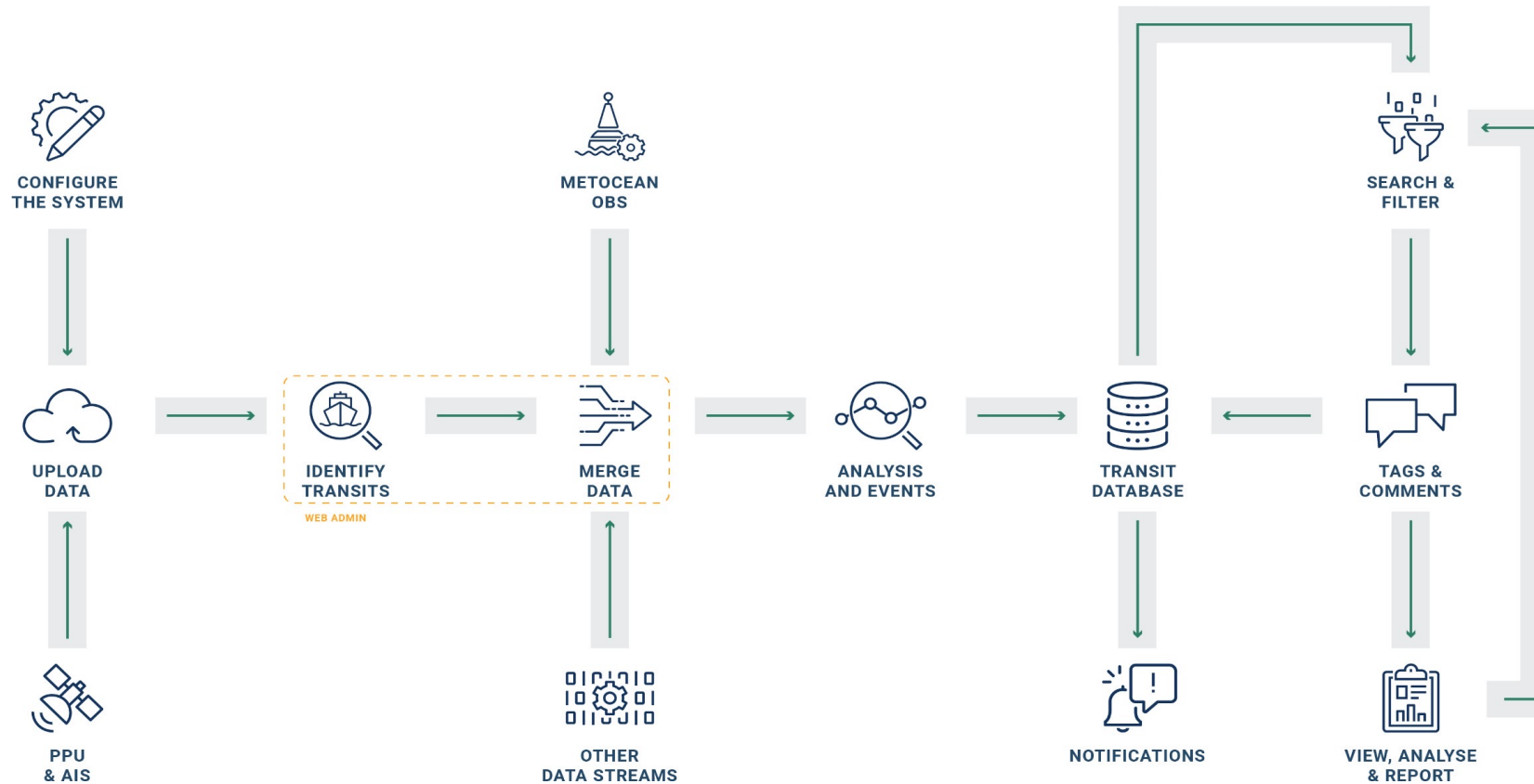
Visualise



Analyse

Overview


OMC's aim with TransitAnalyst is to empower users with an easy-to-use tool for visualising, analysing and acting upon pilotage big data.



TransitAnalyst can be configured to manage the **Critical Navigational Elements** (CNEs) of individual pilotage jobs (transits) and have analysis conducted against those CNE's and their unique **Safety Margins**.


DILIGENT PILOTAGE

Lessons Learned from the Jolly Nero



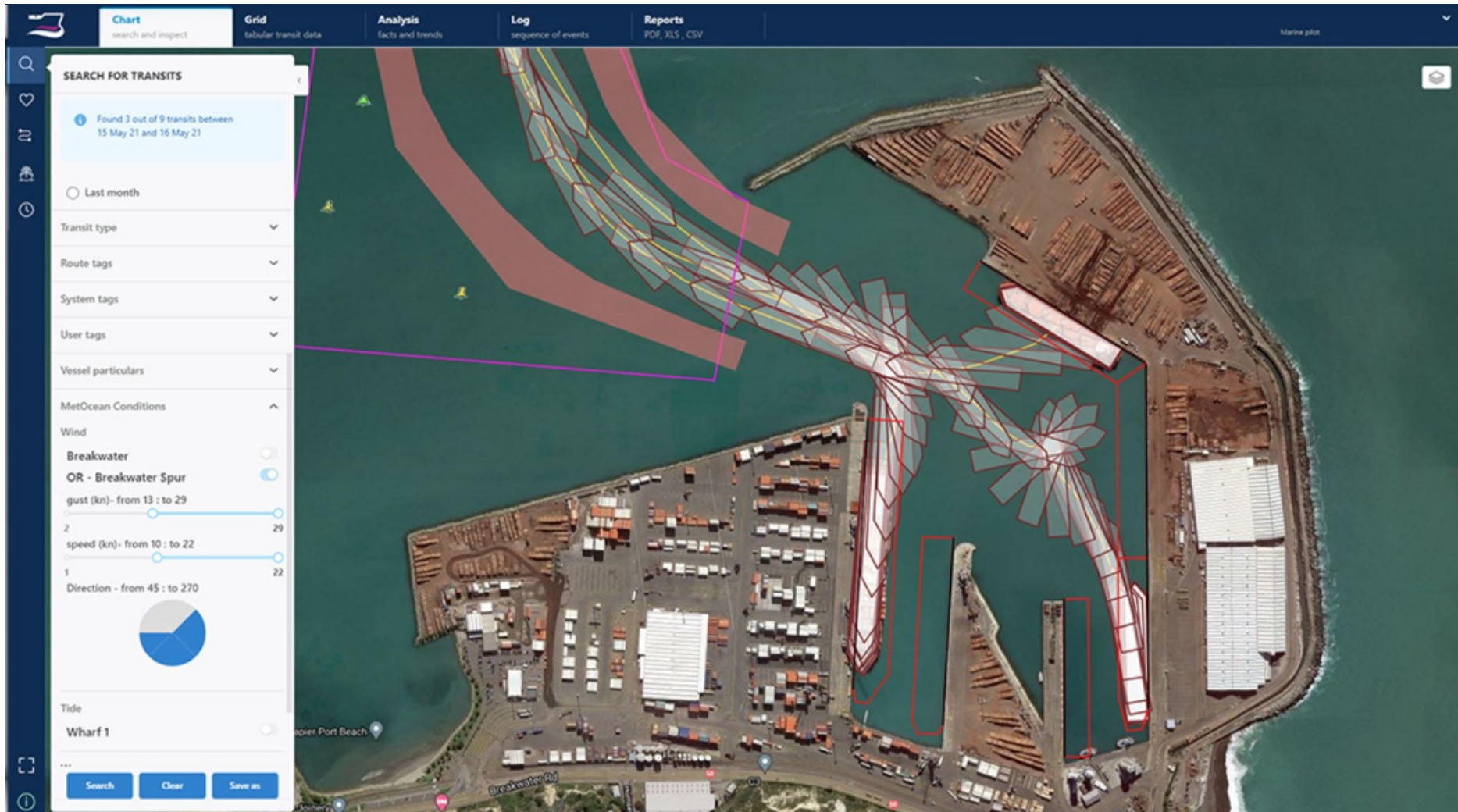
Antonio Di Lieto
with an afterword by Ravi Nigam

Reserve (Safety Margin)
This is the area which the ship may enter outside the planned corridor, but which is still safe.

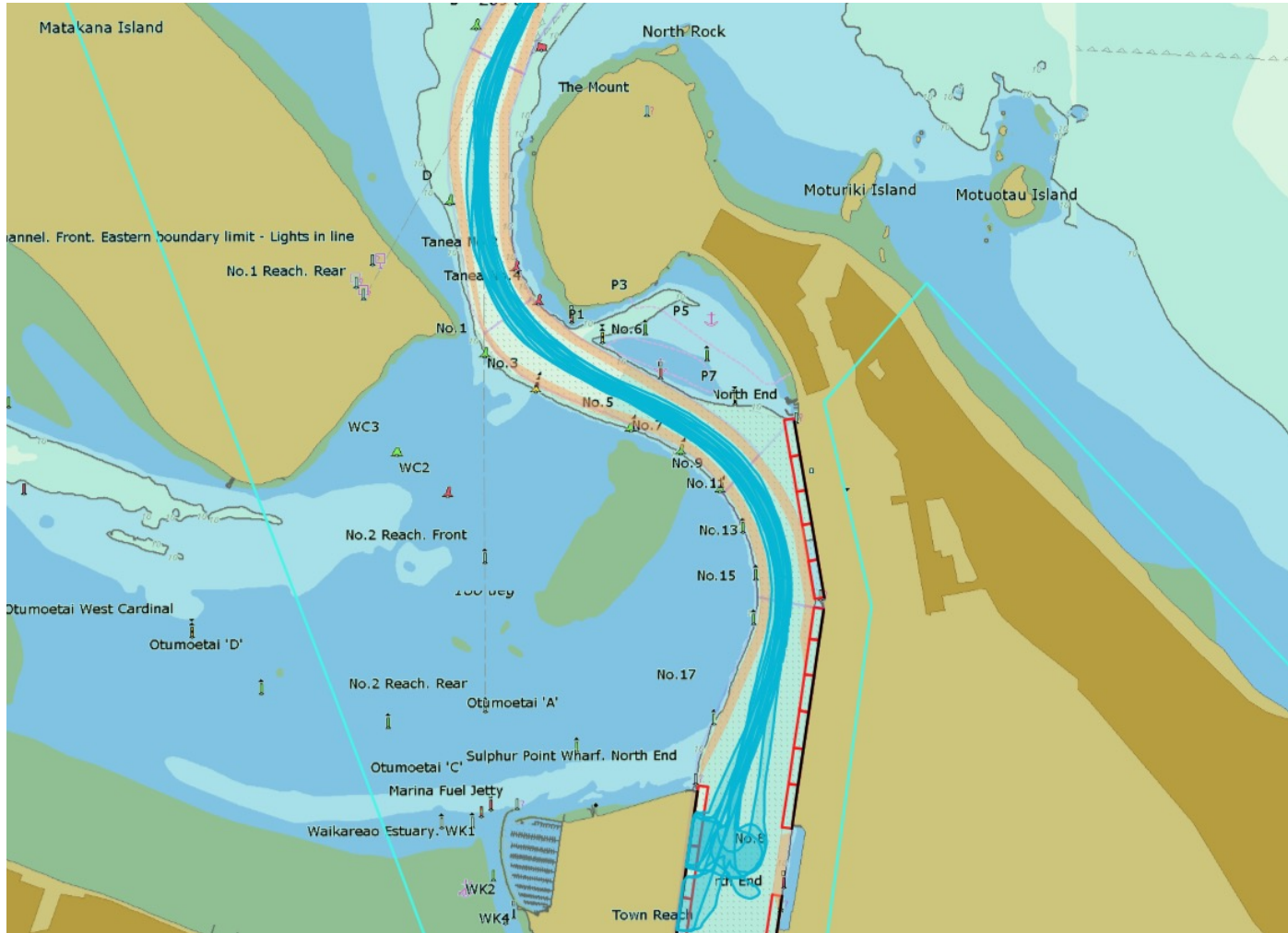


The planned corridor (aka route, or safety corridor) is shown in grey. The reserve is in white. The no go area is in blue.

Advanced filtering for all parameters and environmental conditions



Channel and Safety Corridor Assessment



Drill Down

All Vessels 13 March 2024

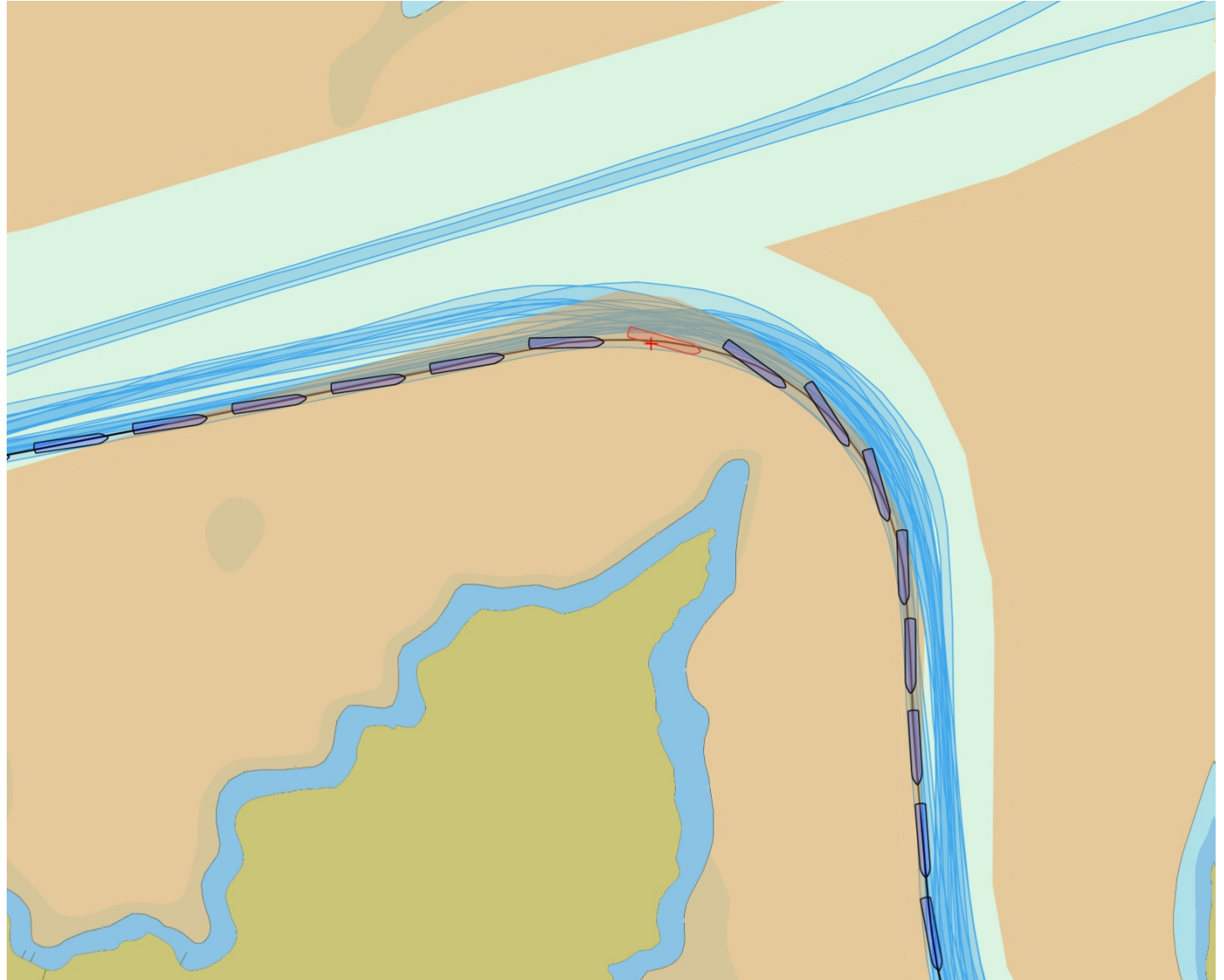
Differentiate Inbound and Outbound

Highlight transit channel (outbound)

Highlight Outliers (outbound)

Inspect Individual Vessels

Replay whole transit



Transit Inspection

The screenshot displays a maritime transit inspection interface. The main map shows a harbor area with various navigational markers, including buoys (No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7) and points (P1, P3, P5). A vessel, RIO NEGRO, is shown in transit, with its path highlighted in blue and yellow. The interface includes a top navigation bar with 'Chart' and 'Grid' tabs, and a user profile for 'Giles Lesser'. A left sidebar contains search and inspection options. A central data panel provides detailed information for the vessel 'RIO NEGRO (Container)', including its status (Inbound), dimensions (287.0 m x 40.0 m), heading (150°), speed (8.8 kn), and other parameters. A 'Feedback' button is located in the bottom right corner.

Chart search and playback | **Grid** tabular transit data | Giles Lesser System administrator - Tauranga

Inspect

RIO NEGRO (Container) Inbound 1hr 9mins

Pilot Boarding Ground at 02:07 Berth 24 at 03:11

Tags and comments

Comments 0

MetOcean data

- Wind data averages
- Watercurrent data averages
- Tide data averages
- Wave data averages

Transit admin

Data: Smoothed AIS: Recieved
Lateral offsets: 0 (Good) MetOcean: Recieved
Heading offset: 0 (Good) Calculations: Done

Processed: 28 Mar 2022 00:37:38 (+13)
Transit: XLS data download

replay transit | hide transit

RIO NEGRO (Container) 20 Mar 2022 02:45:50 (+13)

Inbound 287.0 m x 40.0 m (Draft 10.4 m)

Heading : 150 ° SOG : 8.8 kn
COG : 165 ° ROT : N/A
Drift : 15 ° CROT : -24 °/min

wind | watercurrent | tide | wave

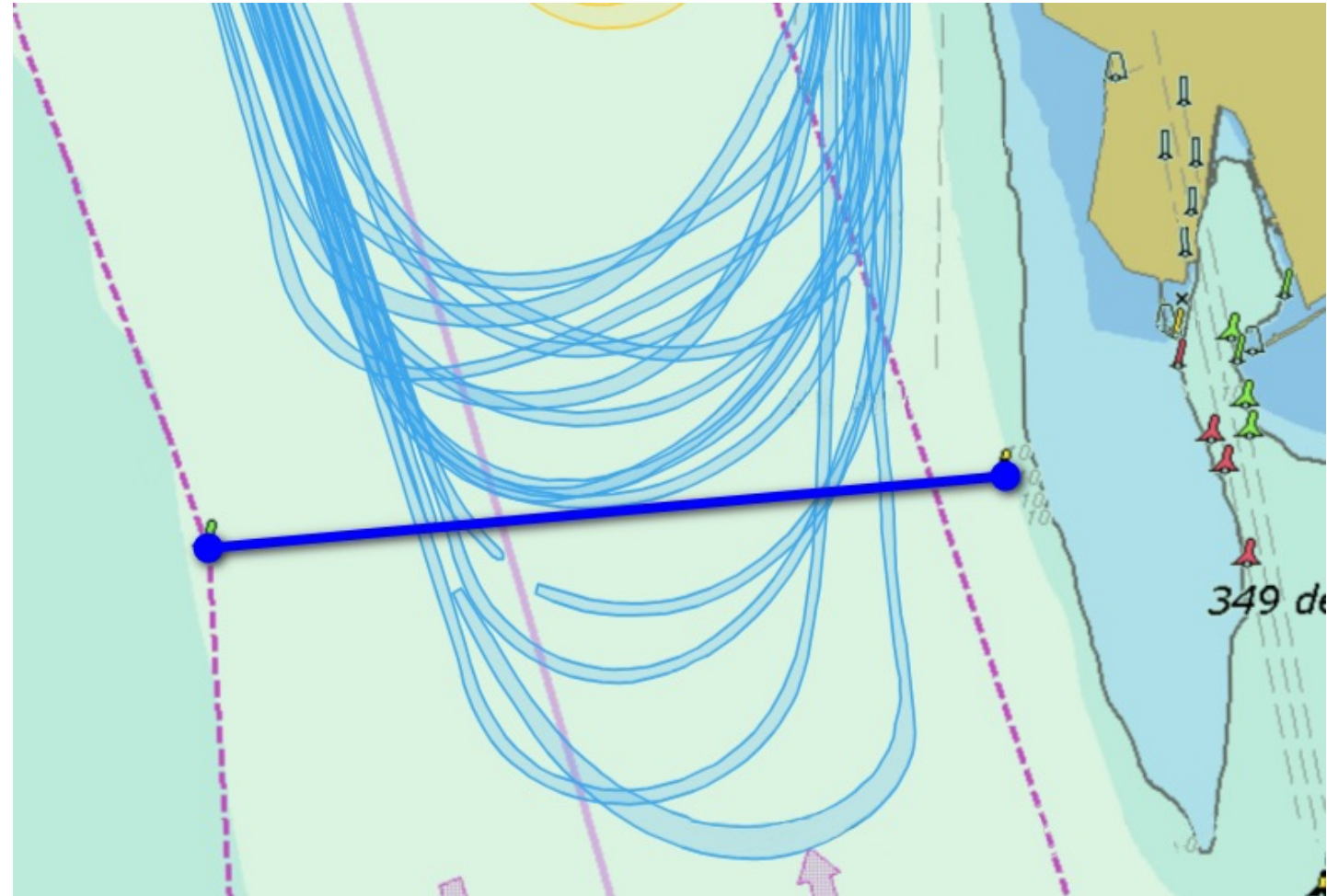
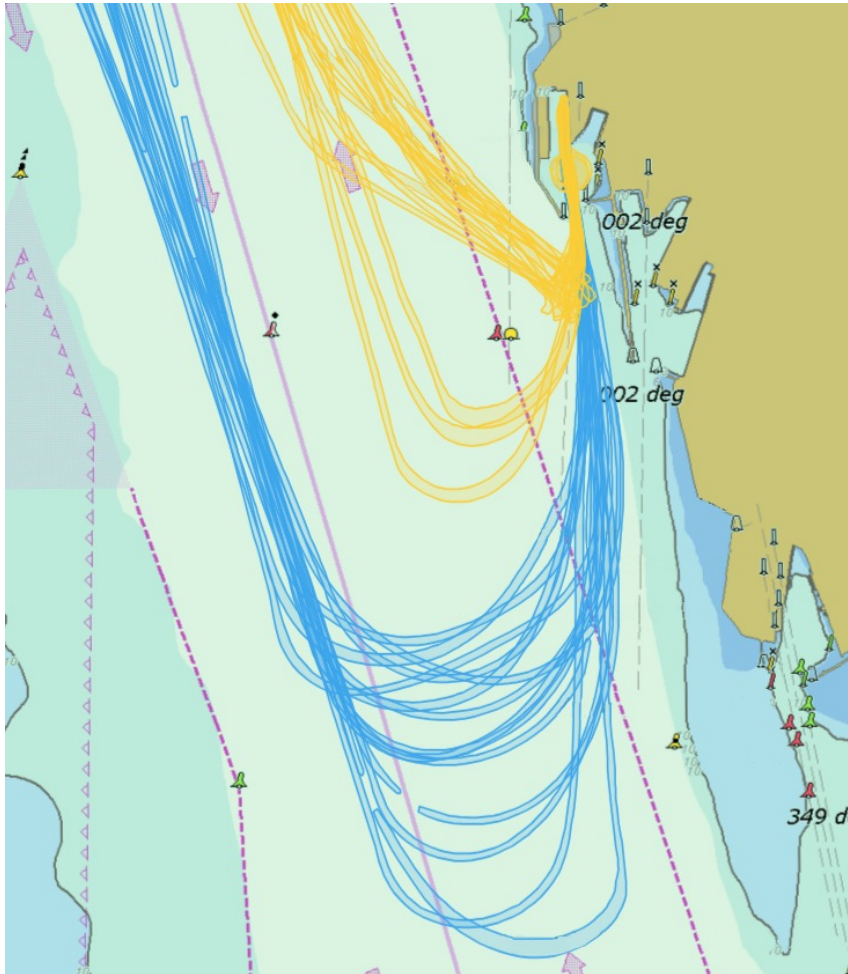
Tanea Buoy: 1.6 kn speed 334 ° direction (to)

Tanea Buoy Prediction: 1.9 kn speed 21 ° direction (to)

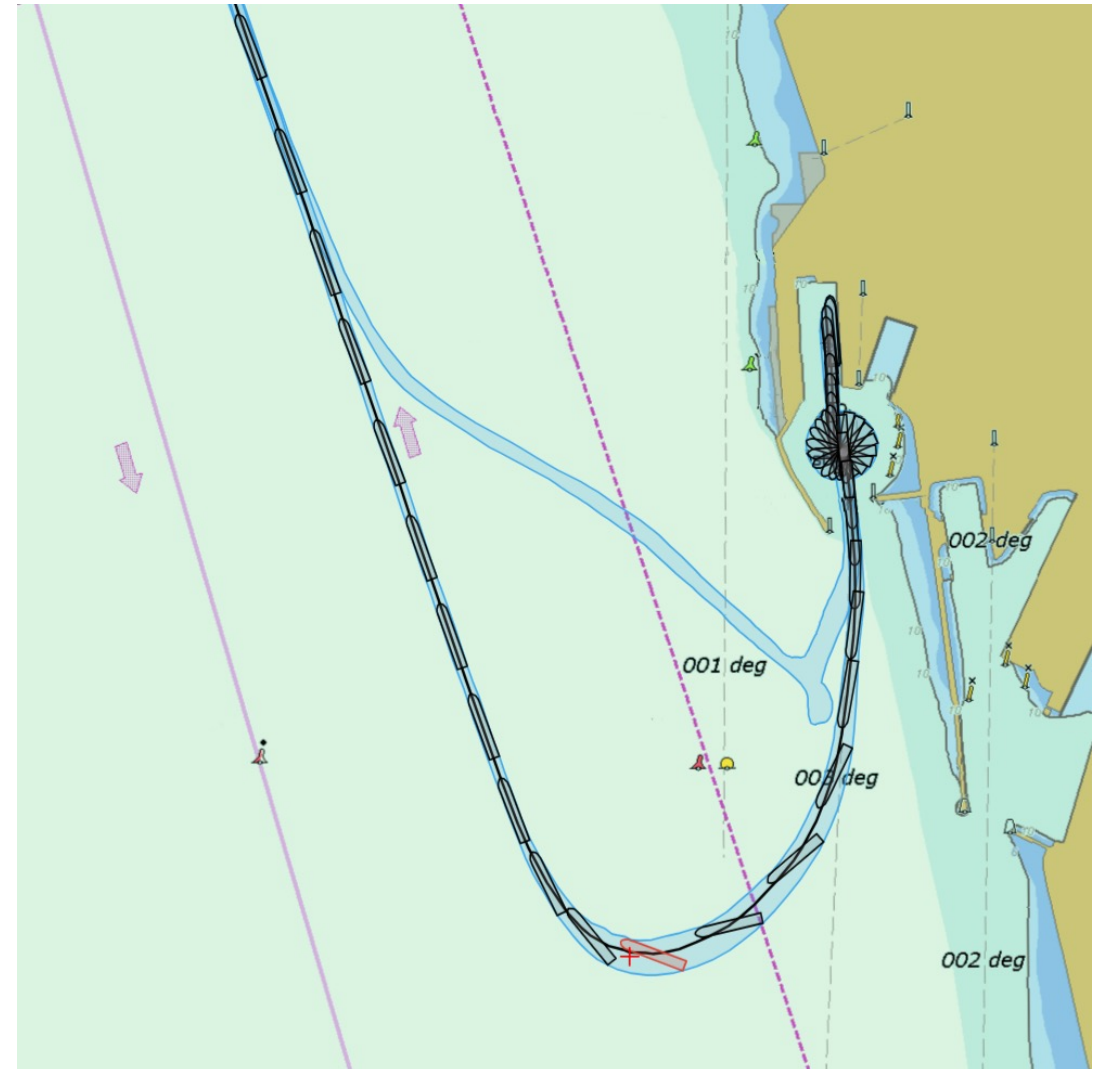
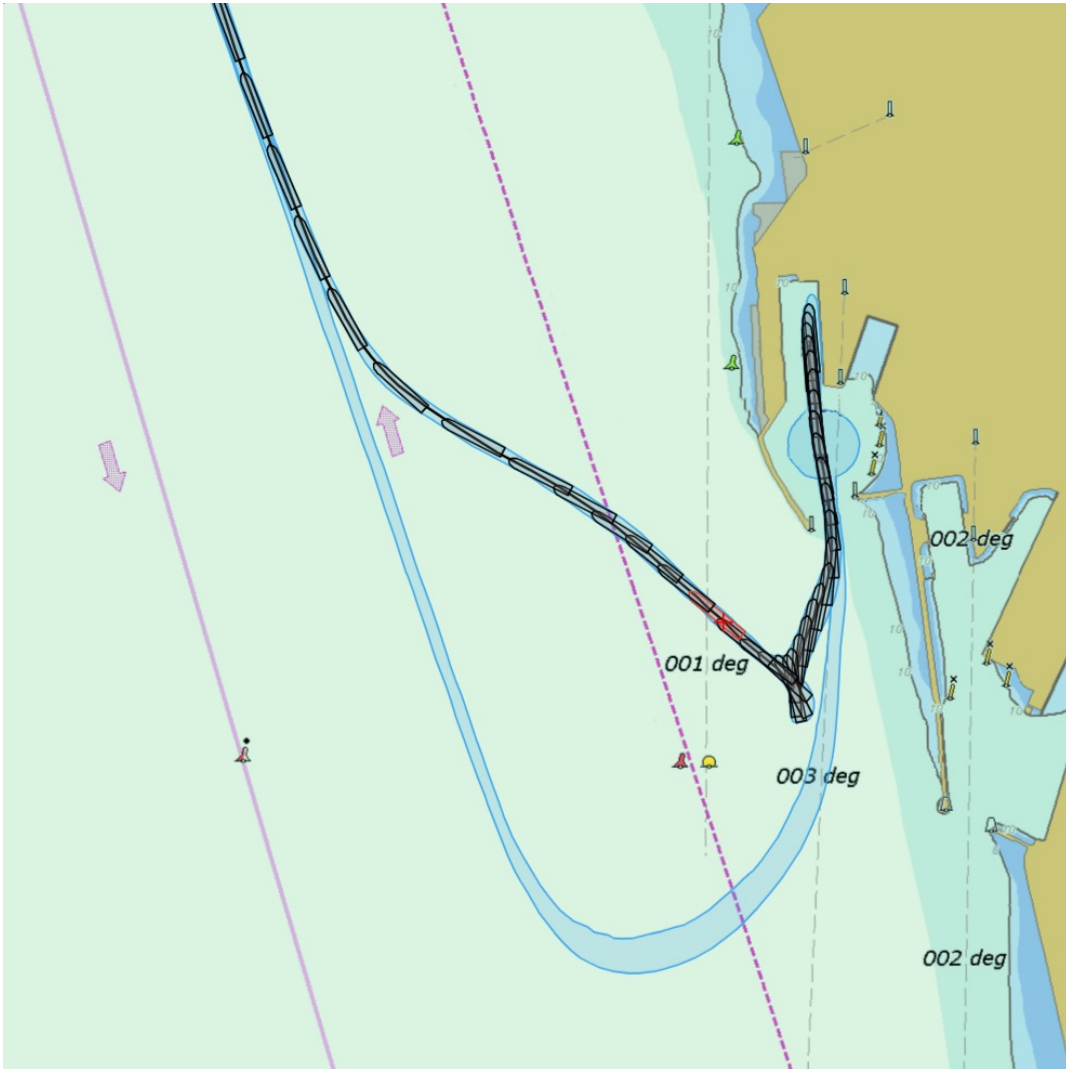
replay | hide

Feedback

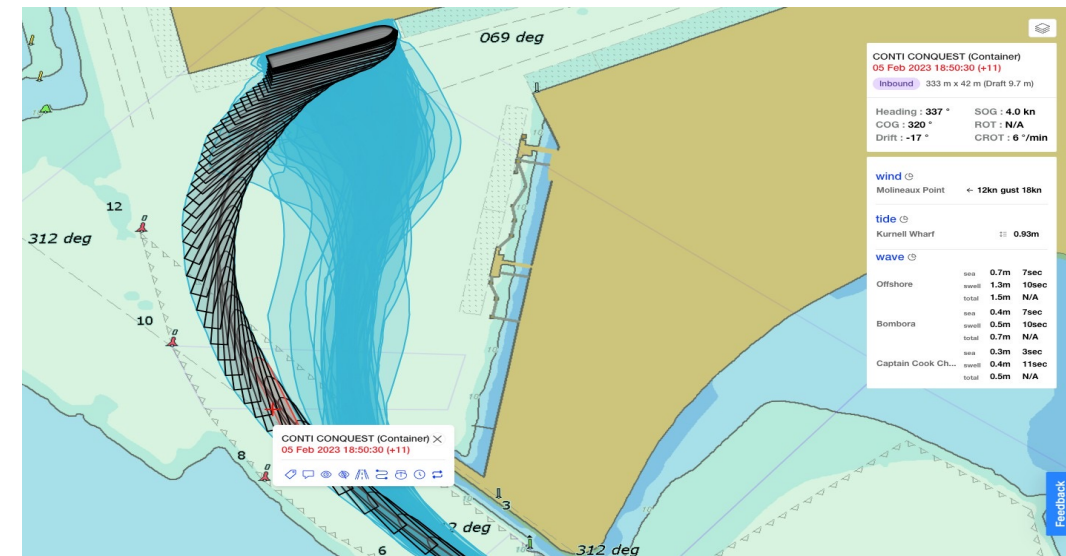
Procedures fit for purpose?



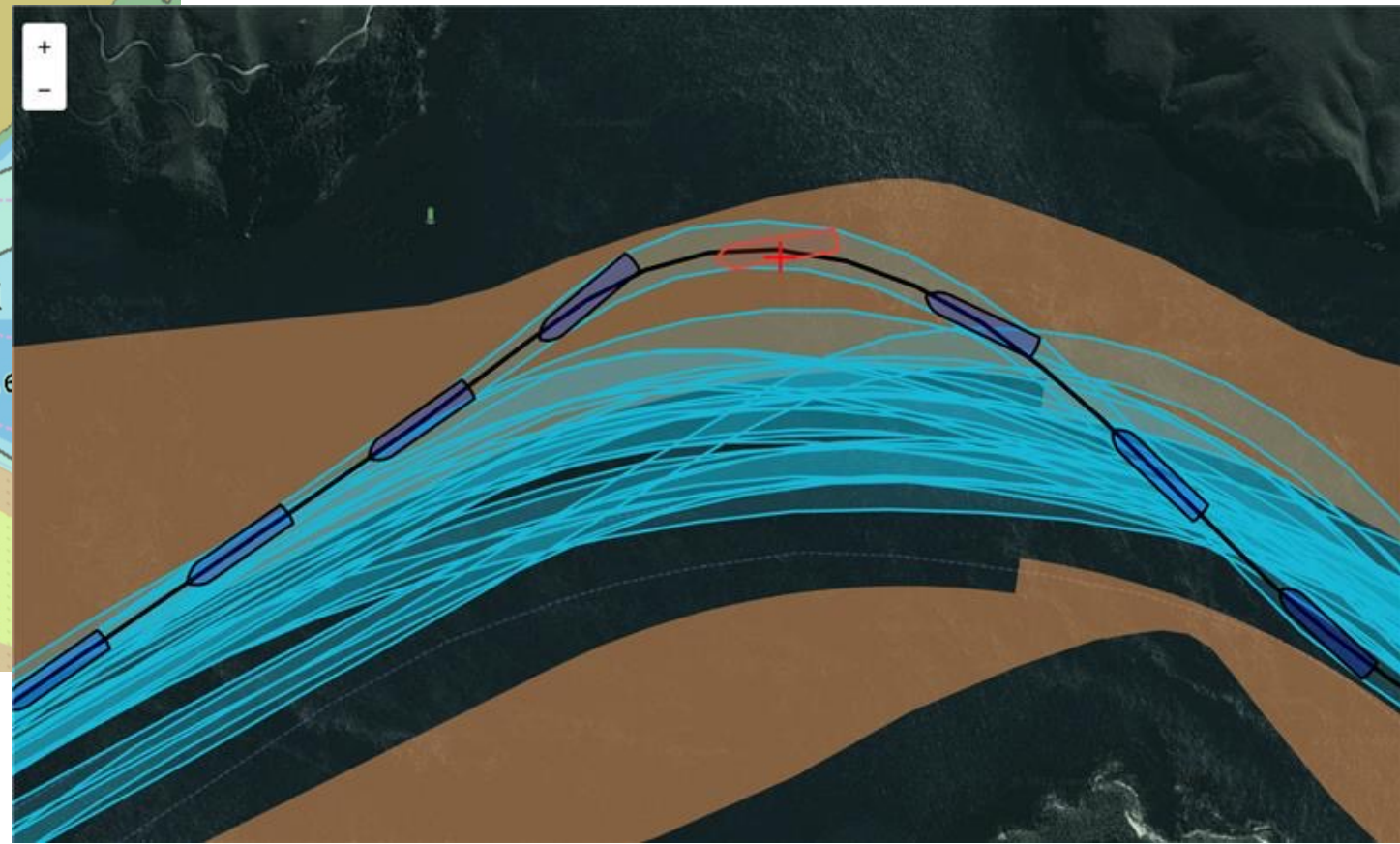
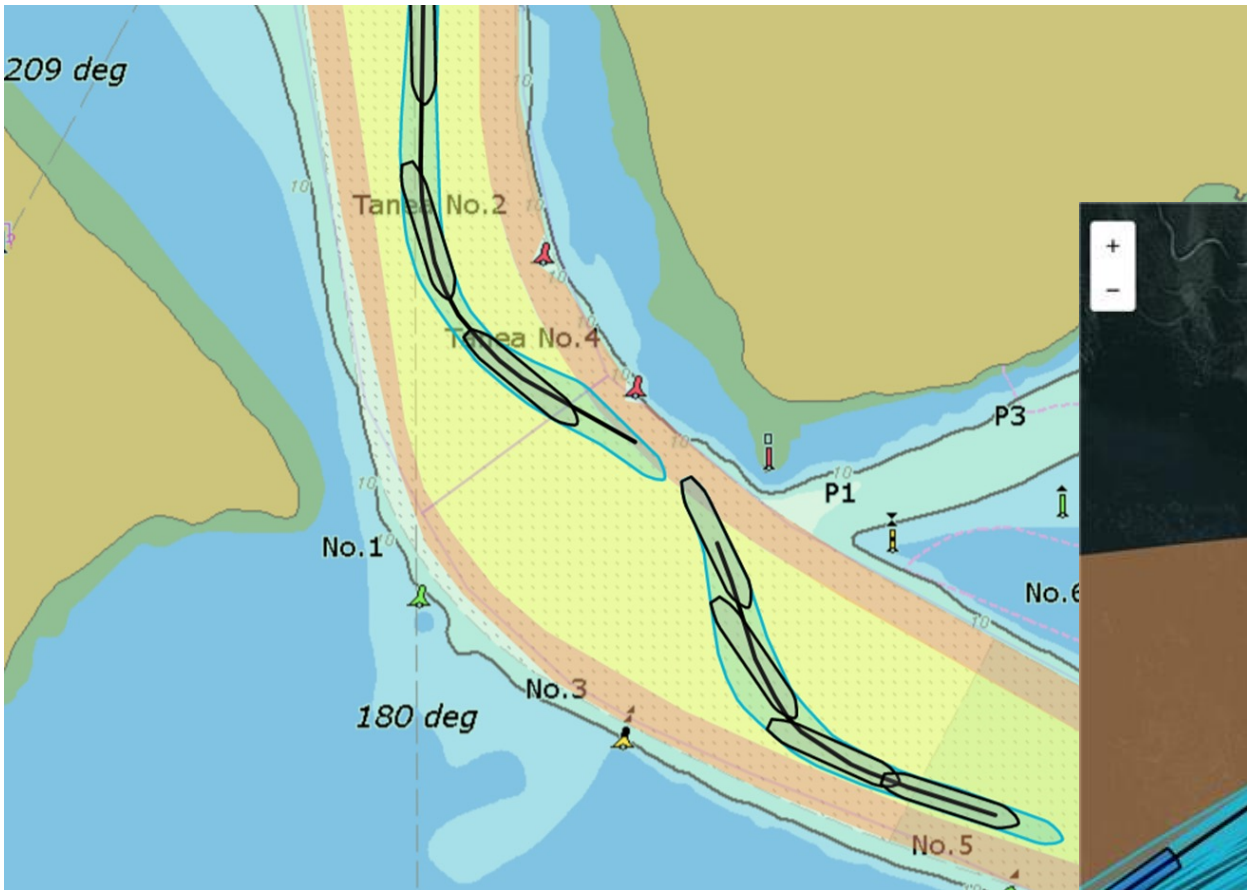
Alternative plans (wind direction)



Alternative berthing options



Incident Analysis



Outlier Trends

Identification of Outliers

Specific Vessels

Specific Channels / Turns

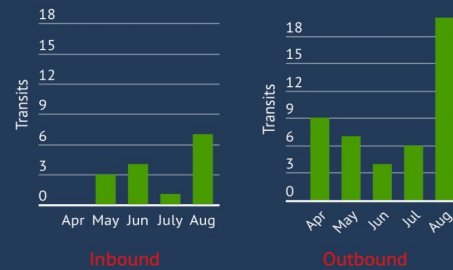
Seasonal

Direction

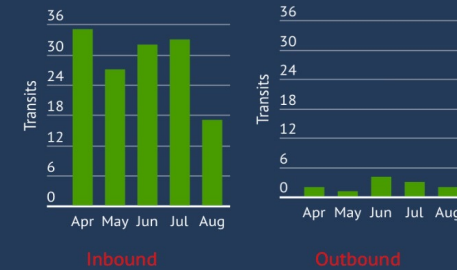
CPP Outlier Trends

Transits that used more than 50m of the Safety Margin

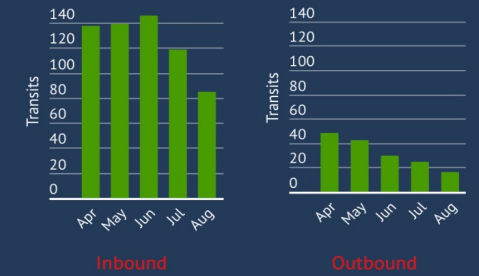
QCS East



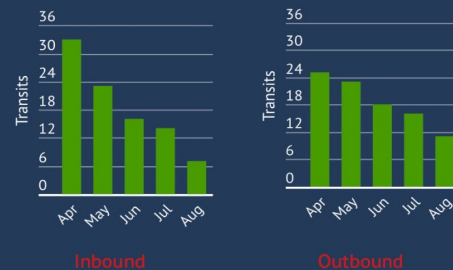
CNZ



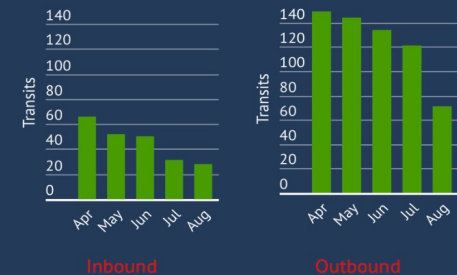
Ruaomoko



QCS West



Tory

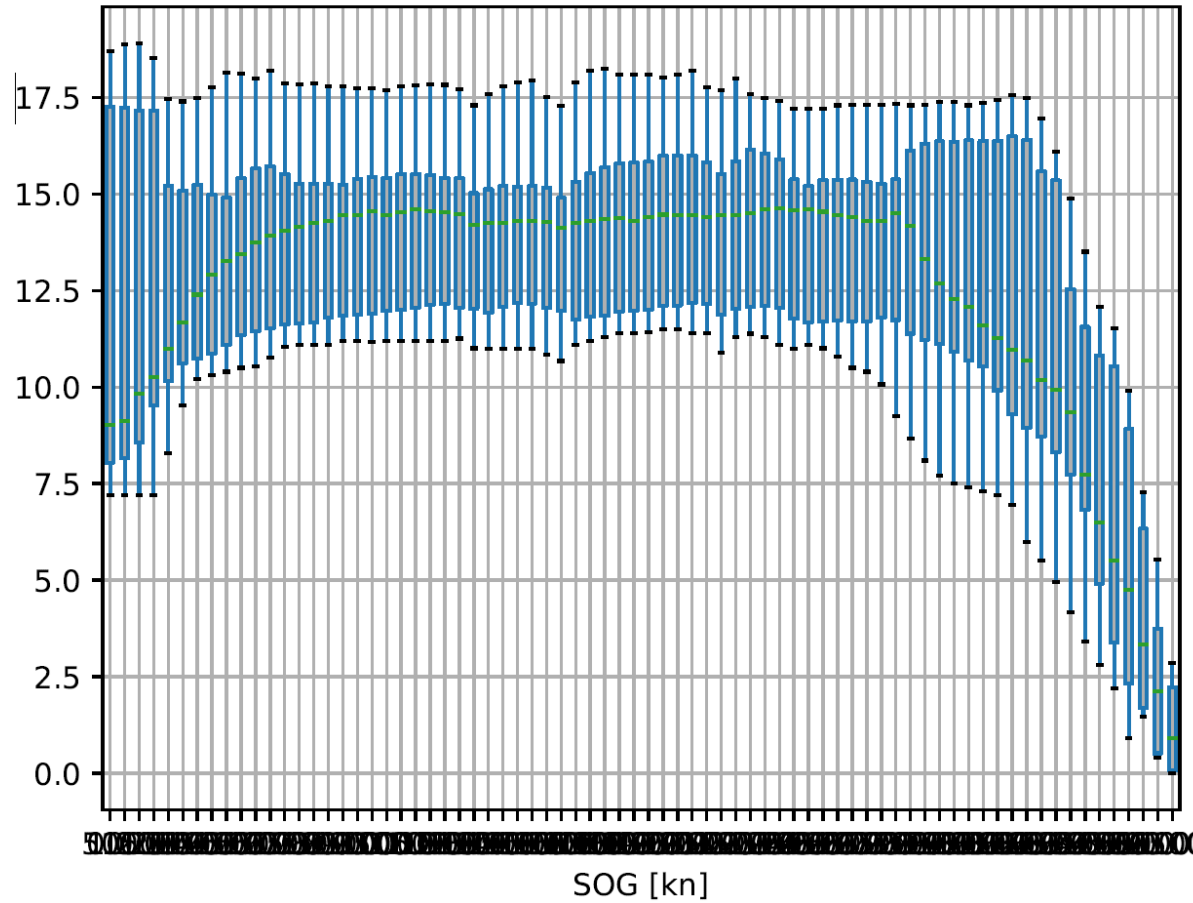


Dieffenbach

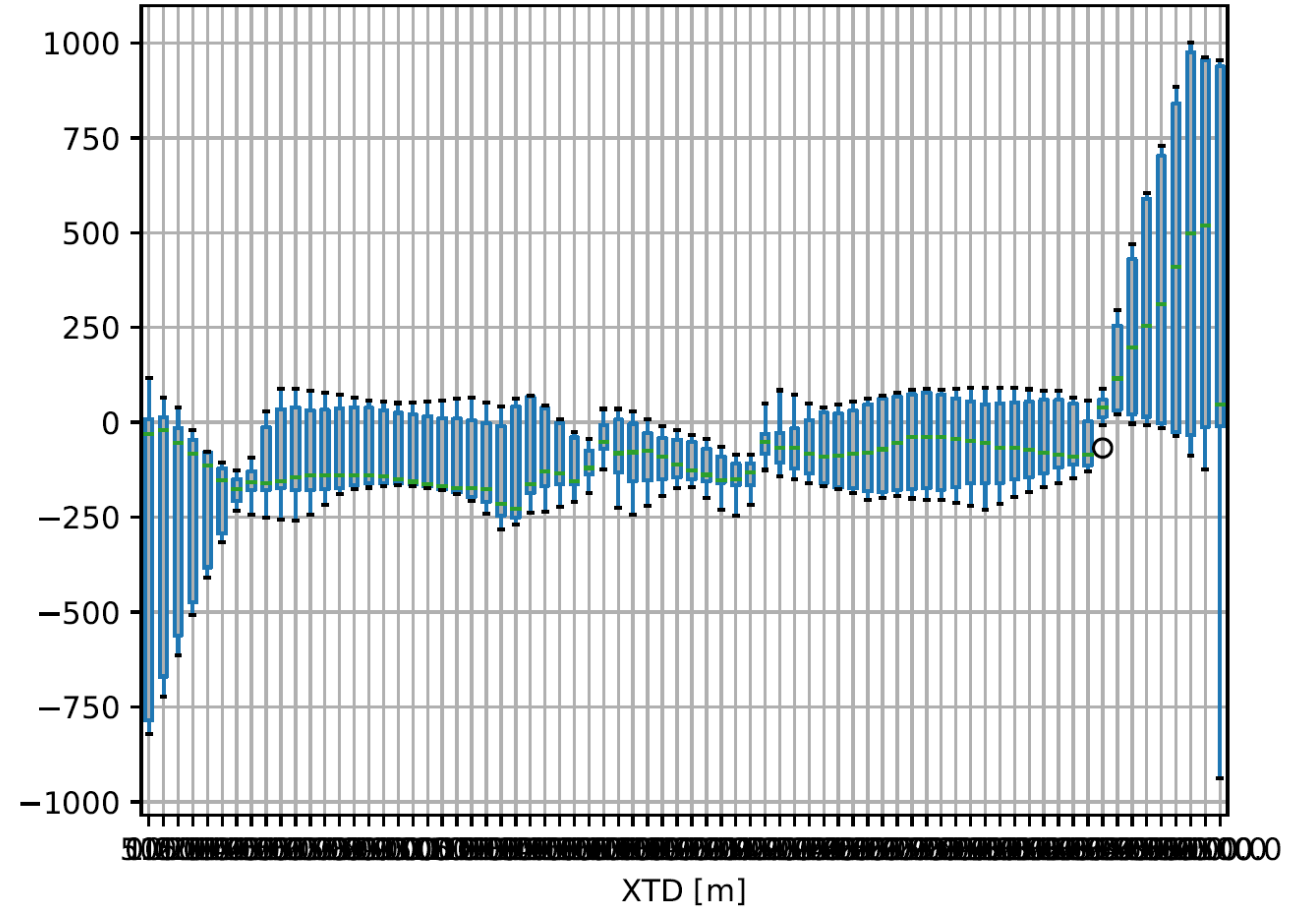


Advanced Metrics

Speed Over Ground - Along Transit



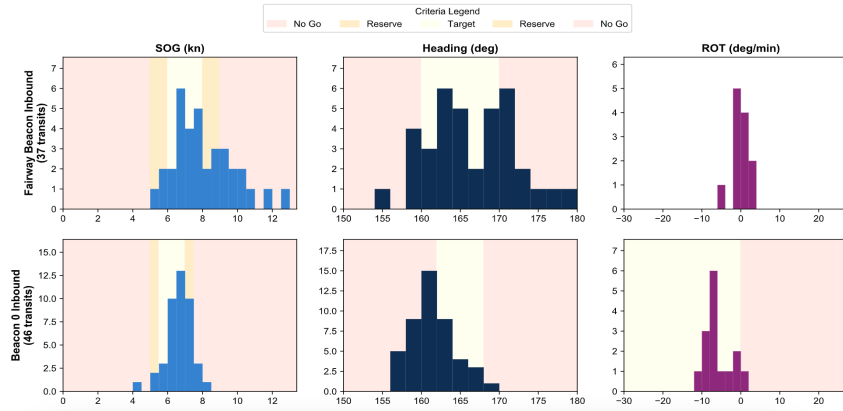
XTD - Along Transit



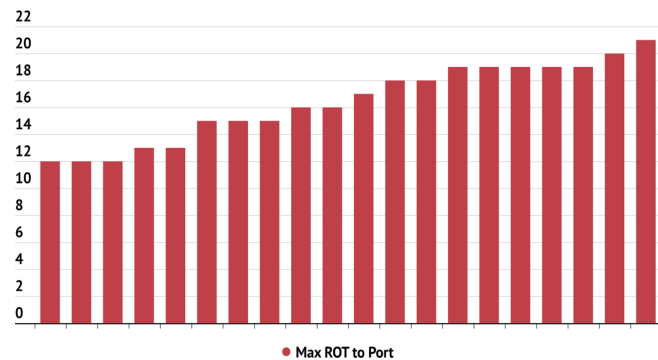
Speed, Course and ROT Assessment



**Inbound Vessels with LOA greater than 220m
49 transits
Manoeuvring Criteria**

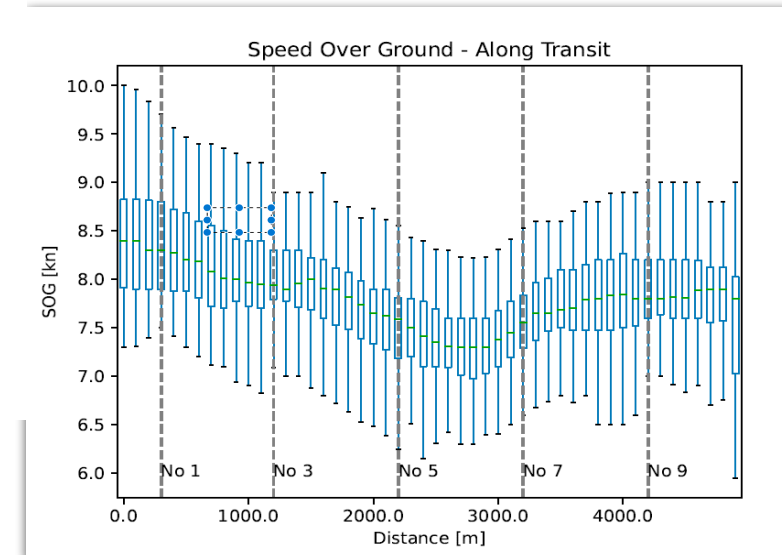
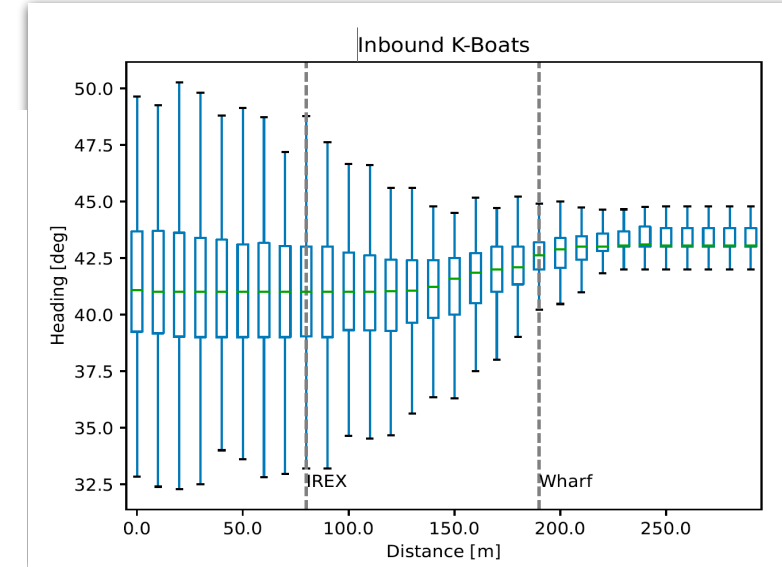
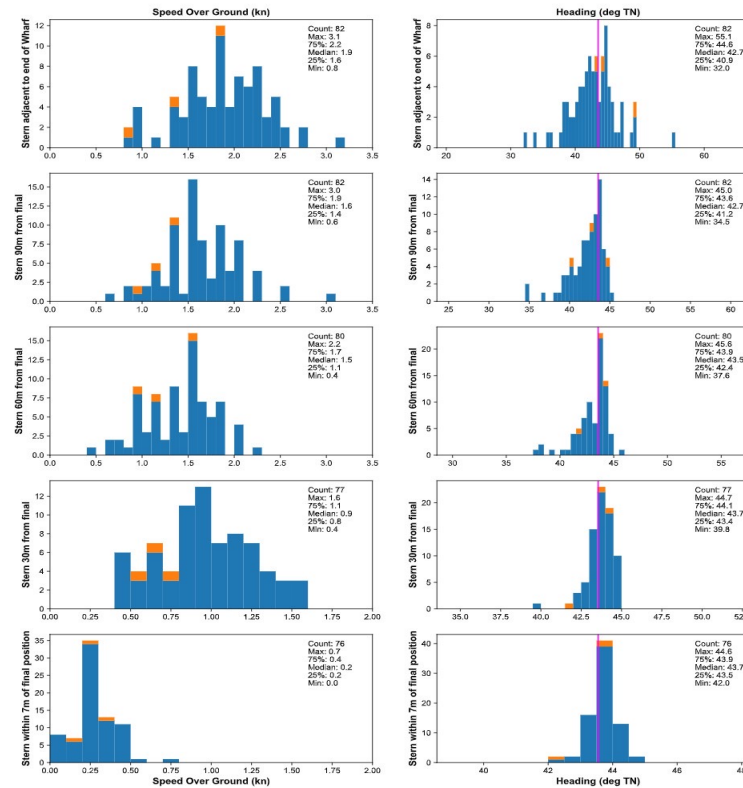


**21 Inbound Transits, Vessels >300m LOA, to Brotherson No6
December 2022 - February 2023**

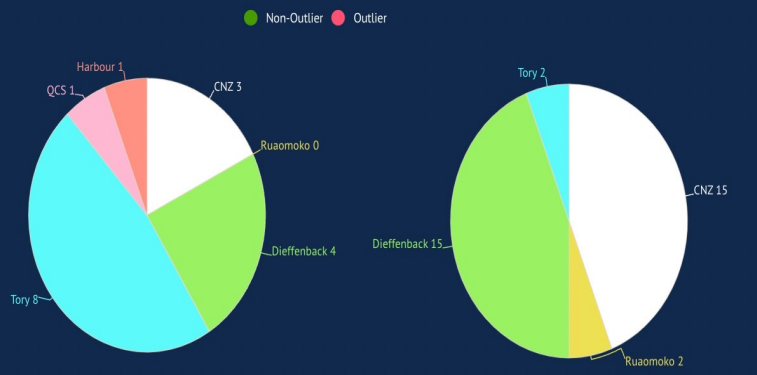
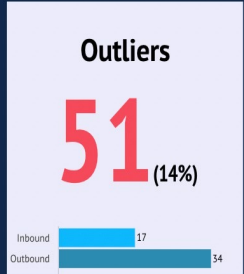
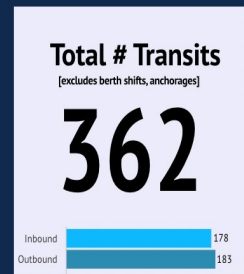


Berthing data for INBOUND transits of the KAIARAHAI at Picton.

Transits berthing in high winds (speed > 25kn or gust > 35kn) are highlighted in orange.
Berth fender line bearing (43.55°) is shown as a magenta line.



Customisation



Transits that significantly used the Reserve

Inbound Outliers (17)

Outbound Outliers (34)

Outcomes

- Improved and consistent delivery of services
- Fit for purpose passage plans and MPex
- Effective pre-planning of critical vessels
- Evidence based risk management and risk analysis integration
- Data-backed overview and oversight rather than reliance on memory

Marlborough District Council

Common Passage Plan

MCP (v.0.1) 1 SEPTEMBER 2023

Harbourmaster's Direction	3
Purpose	4
Area of Operations	4
Standard Routes	4
Planning Chartlets	
Transit Monitoring	
Safety Margins	
Outlier Transits	
Additional Resources	
Standard Routes	
1. Tory Channel to Picton Harbour	
2. Picton Harbour to Tory Channel	
3. Northern Entrance to Picton Harbour	
4. Picton Harbour to Northern Entrance	
5. East Channel	
6. Waimahara Wharf	
7. Anchorage No1	
8. Ship Company Anchorage	
9. Resolution Bay Anchorage	
Planning Chartlets	
1. Critical Navigation Zone (CNZ)	
2. Northern Approaches	
3. Tory Channel East	
4. Tory Channel West	
5. Dieffenbach/Ruaomoko	
6. QOS East	
7. QOS West	
8. Inner Harbour	

MCP (v.0.1) 1 SEPTEMBER 2023

Planning Chartlets

1. Critical Navigation Zone (CNZ)

INBOUND AND OUTBOUND ROUTES

INBOUND CORRIDOR

MCP (v.0.1) 1 SEPTEMBER 2023 10

Concerns and Usage

- Thoughts by some that it could be used in nefarious ways
- The storage of data and confidentiality, especially in incident investigation
- That should not be used retrospectively – historical data must be “anonymised”
- That all parties adopt an agreed protocol for use

- Usage discussion – Matt Conyers, Port of Nelson

Airline pilots now accept that operations are being recorded and analysed, and that safety improves because of it. Maritime is only just starting on this voyage.

Final thought

“Everybody is on the same road, some are walking, some are running and some are just standing around wondering how to get started”

Captain Tony Herriott