the power of where drives NZ's success

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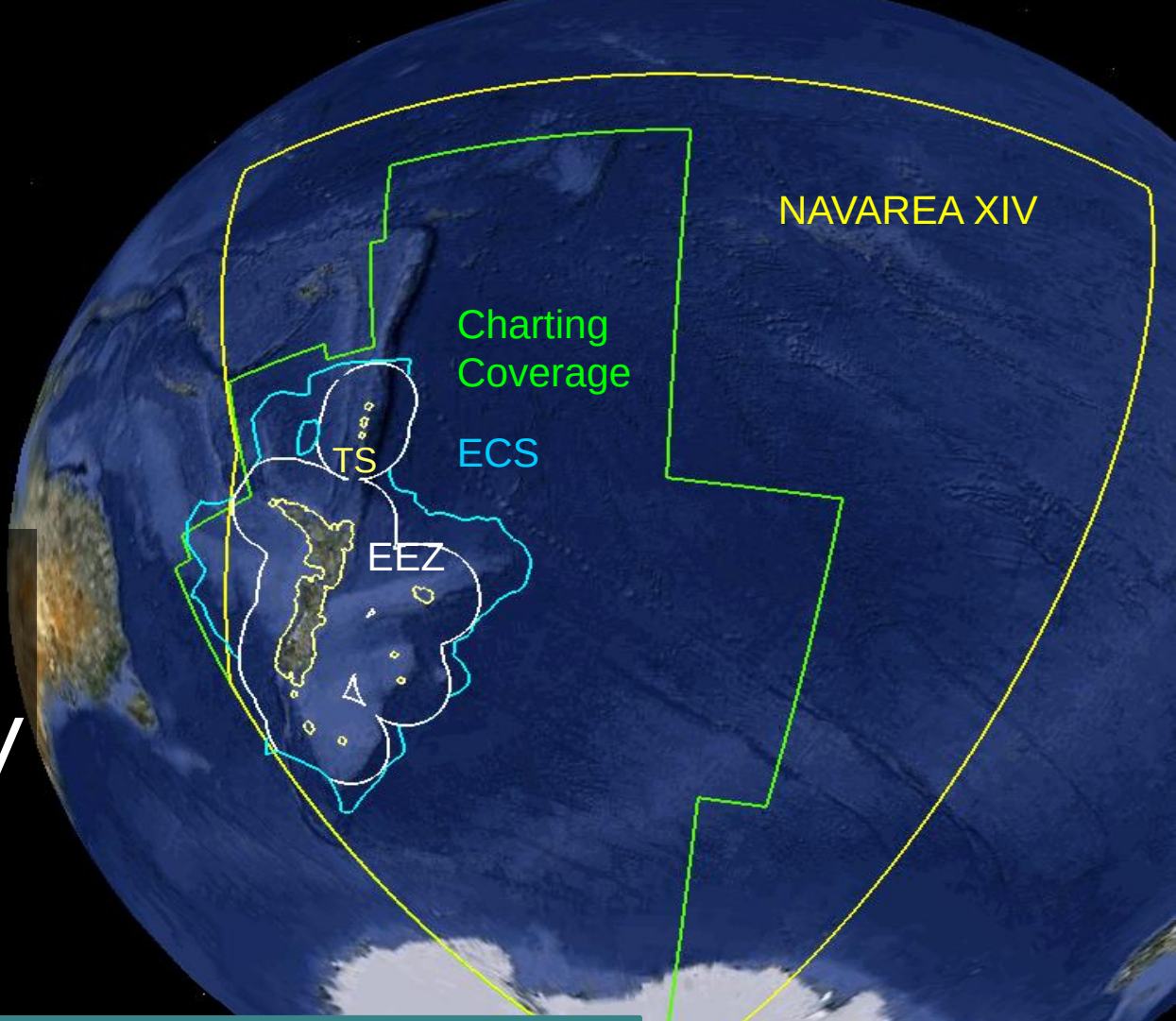
LINZ - Bathymetry in the near shore environment

Andrew Price | Hydrographic Surveyor

NZ's Area of Responsibility



The Problem

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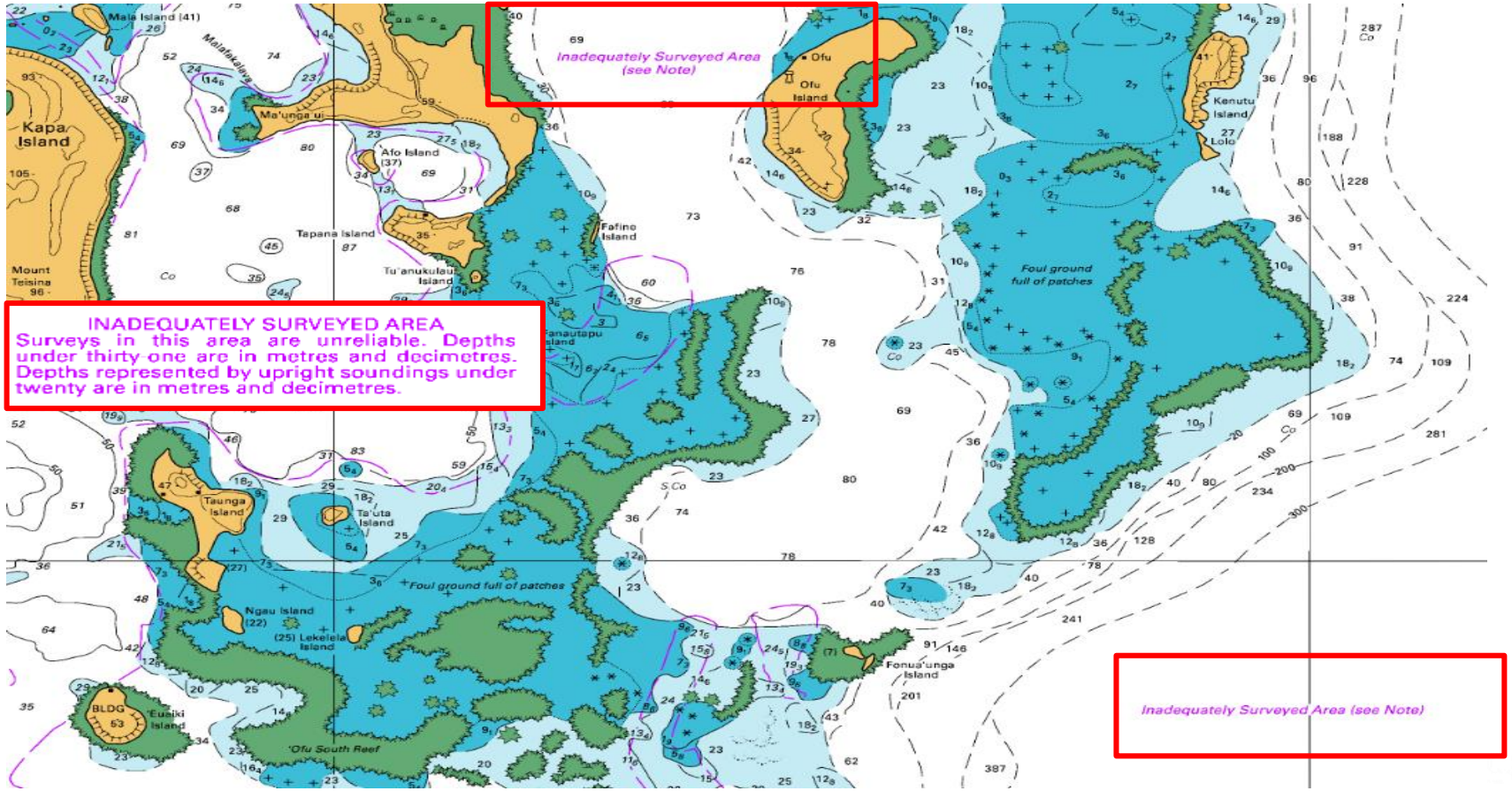
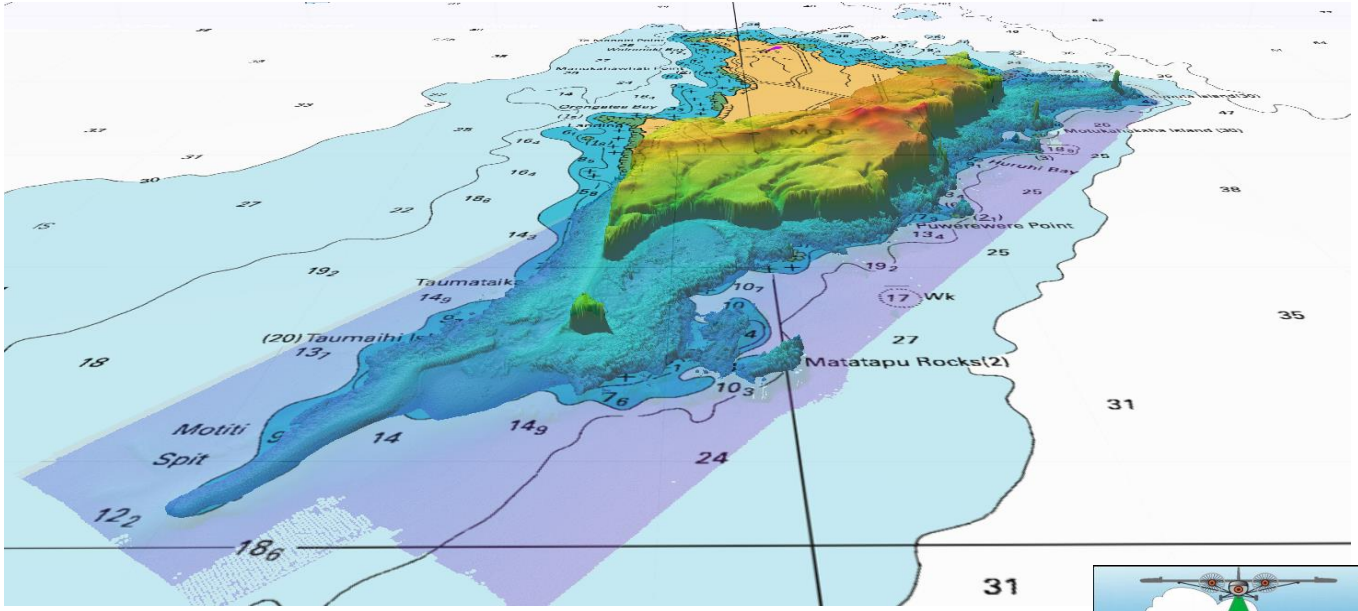
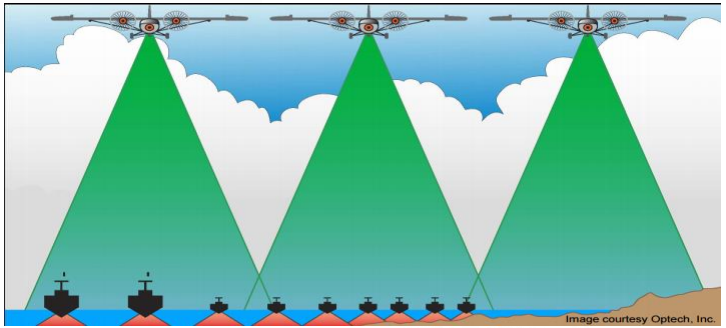


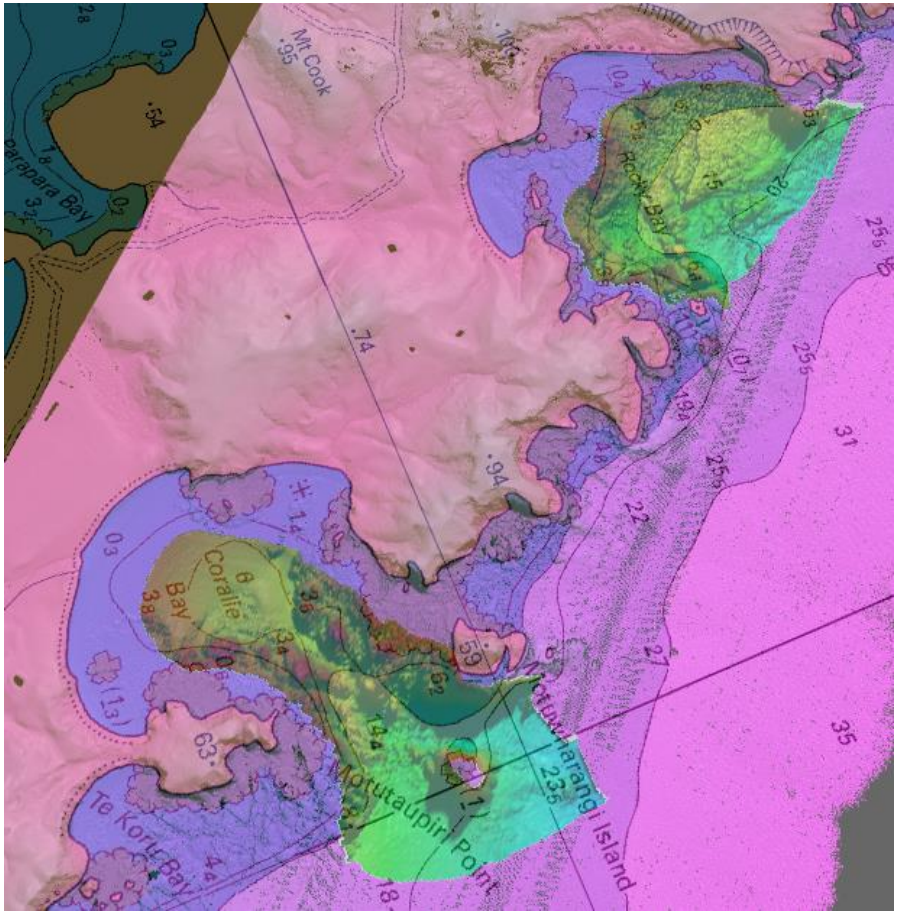
2013 - Bathymetric LiDAR Trial



- Combined Topo-bathy solution
- Coverage within Littoral Zone
- 4 Discrete test areas

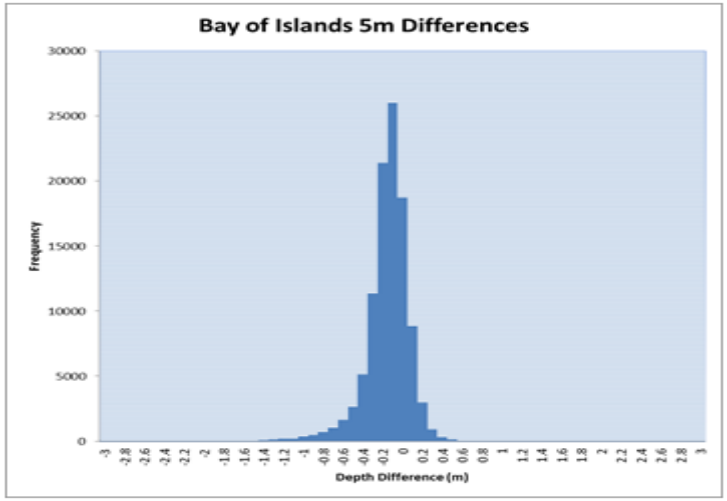


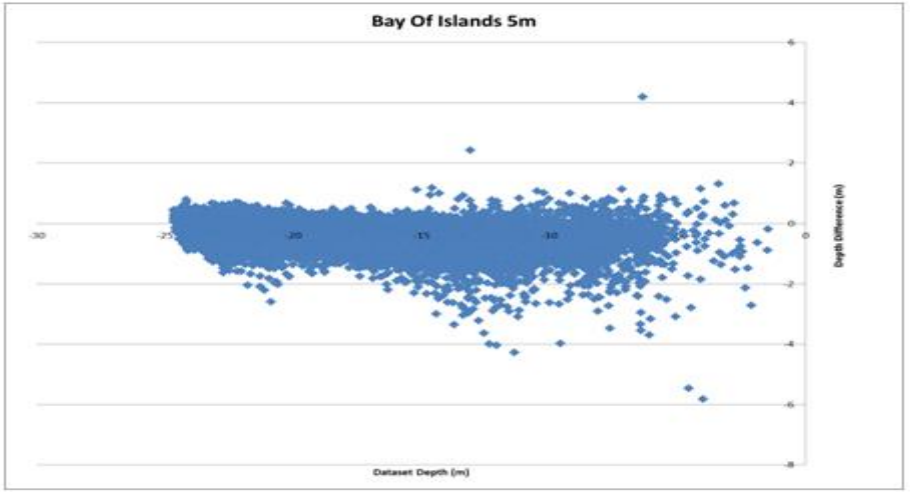
LiDAR Analysis



- 4 Discrete Areas with recent overlapping MBES data
- NOAA method
- Analysis run on Residuals between surfaces
- Where does LiDAR sit in relation to HYSPEC?
- How can LiDAR be utilised for Nautical Charting in NZ?

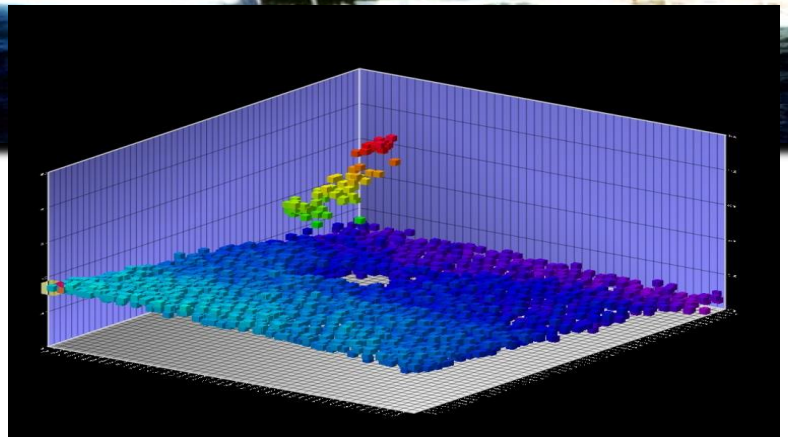
LiDAR Analysis

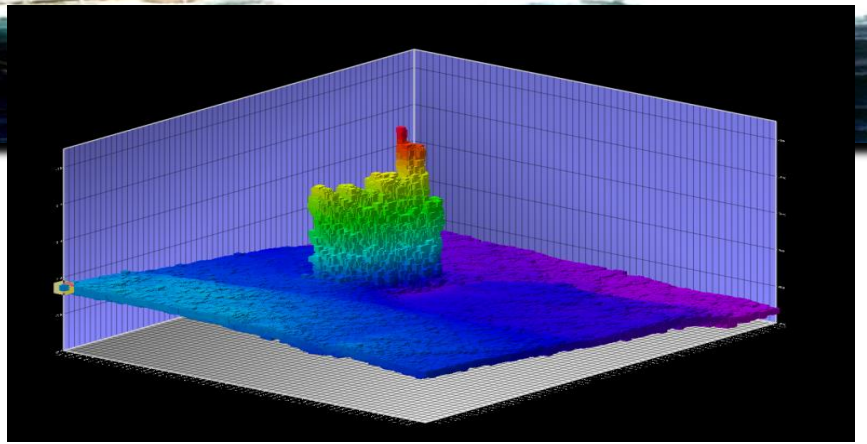




Dataset	Mean Δh (m)	σh (m)	% MB-1 target detection met	% MB-2 target detection met
Whitianga 5m	0.36	0.35	50	53
Motiti 2.5m	0.25	0.52	38	76
Motiti 5m (LADS Mk3 Only)	0.46	0.65	0	0
Great Mercury Island 2.5m	0.12	1.21	12	15
Bay of Islands 2.5m	No MBES Overlap		43	45
Bay of Islands 5m	-0.2	0.24	25	27

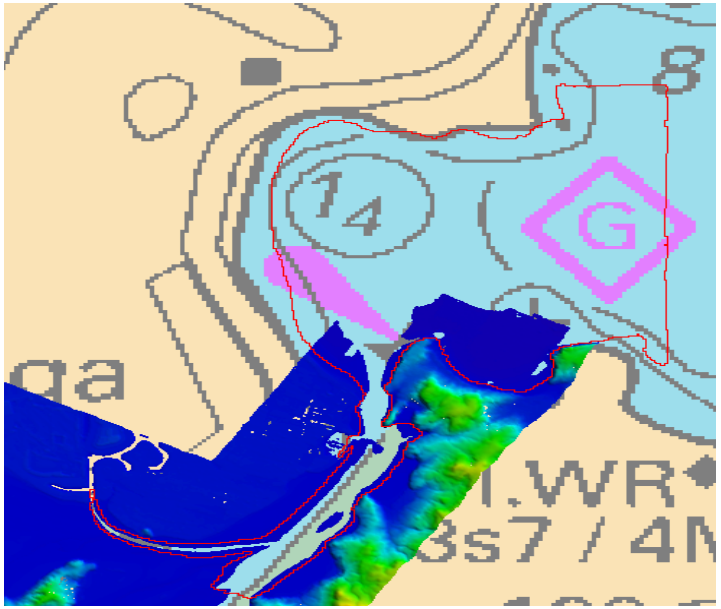
LiDAR Analysis - MV Taioma



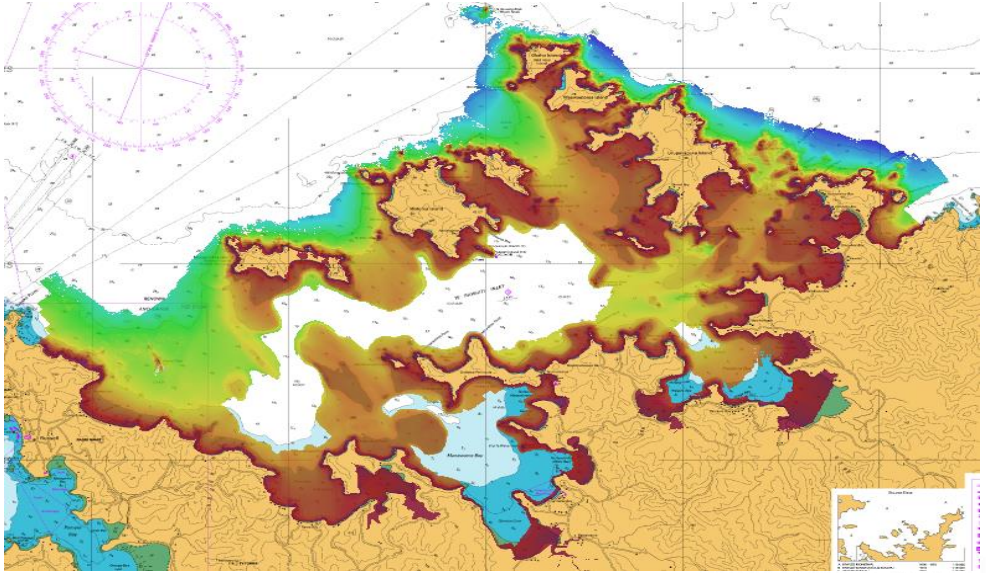


- LiDAR LD = 18.4m
- MBES LD = 17.7m

NZ Environmental Constraints



- Heavy Rain events
- Turbidity
- Swell Action



- Solution = Flexibility

LiDAR Analysis Results

- Depth uncertainty consistent with MB-1 & MB-2 standard
- Least depths over navigationally significant features to be augmented with MBES
- Requirement for redundancy in survey areas
- Strong potential for large area acquisition
- 5 NZ charts updated with data.

Tonga Risk Assessment 2013

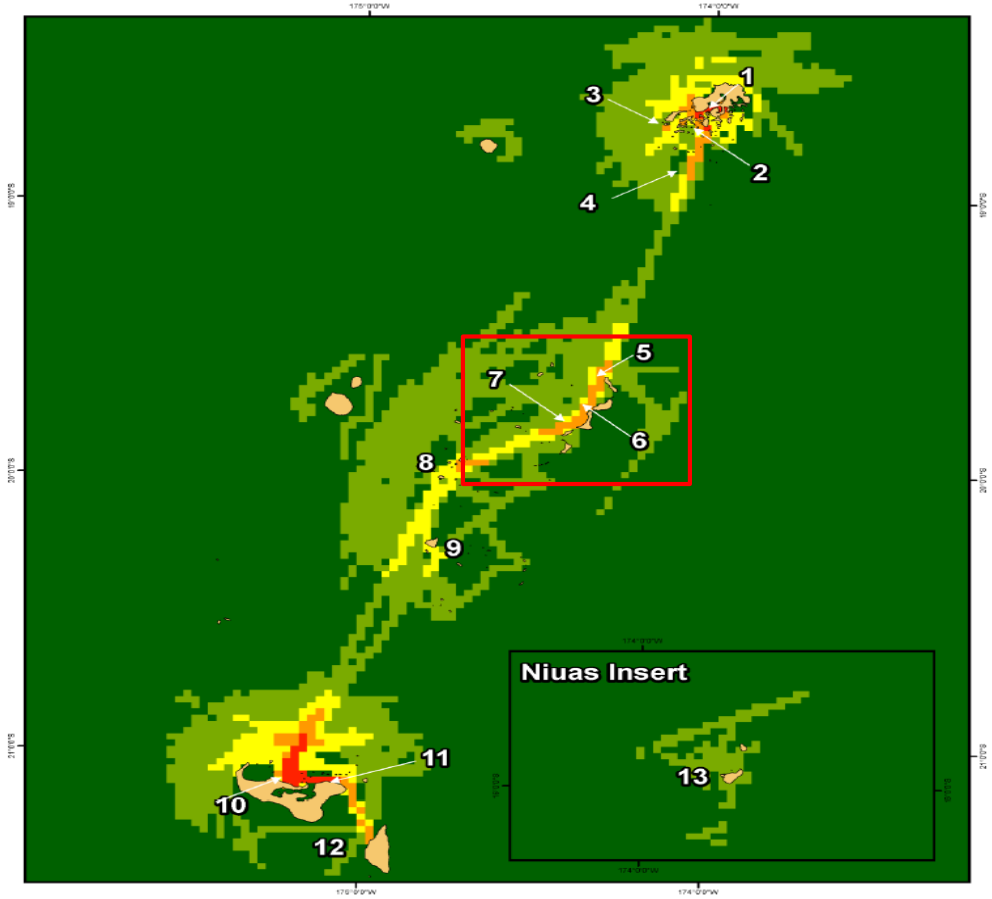
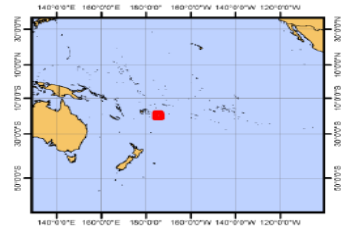


Figure Reference: 13NZ262_Tonga_RiskModel16_01

1	Vava'u Island and Neiafu Harbour
2	Sea area South of Kapa Island
3	Passage between Fofoa Island and Ovaka Island
4	Sea area between 'Euakafa Island and Richards Patches
5	Ha'ano Island
6	Foa Island
7	Lifuka Island and Pangai Harbour
8	Ha'afeva Island
9	Nomuka Island
10	Nuku'alofa Harbour and approaches
11	Piha Passage and coastal transit to 'Eua
12	Nafanua Harbour
13	Niuatoputapu Harbour Entrance

Figure 39: Tonga Risk Results Showing Key Areas of Risk



Legend

Insignificant
Heightened
Low
Significant
Moderate

Project No. 13NZ262	**Date** 01/10/2014	**Issue Number** Issue 01
Author Andrew Rawson	**Checked by** John Riding	**Scale at A3** 1:1,250,000

Data Source
Satellite AIS (S-AIS) vessel track dataset recorded:
- January to March 2012
- July to October 2013
- December 2013 to January 2014

Chart 14061 courtesy of LINZ.
S-AIS supplied by: exactAIS

Coordinate System: WGS 1984 UTM Zone 16S
Projection: Transverse Mercator
Datum: WGS 1984
Units: Meter

0 5 10 20 30
Nautical Miles

N

Produced by:
Marico Marine NZ
New Zealand
Tel: +64 04917 4959

Marico Marine Group
United Kingdom
Tel: +44 023 8081 1133

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SW Pacific Hydrography Risk Assessment

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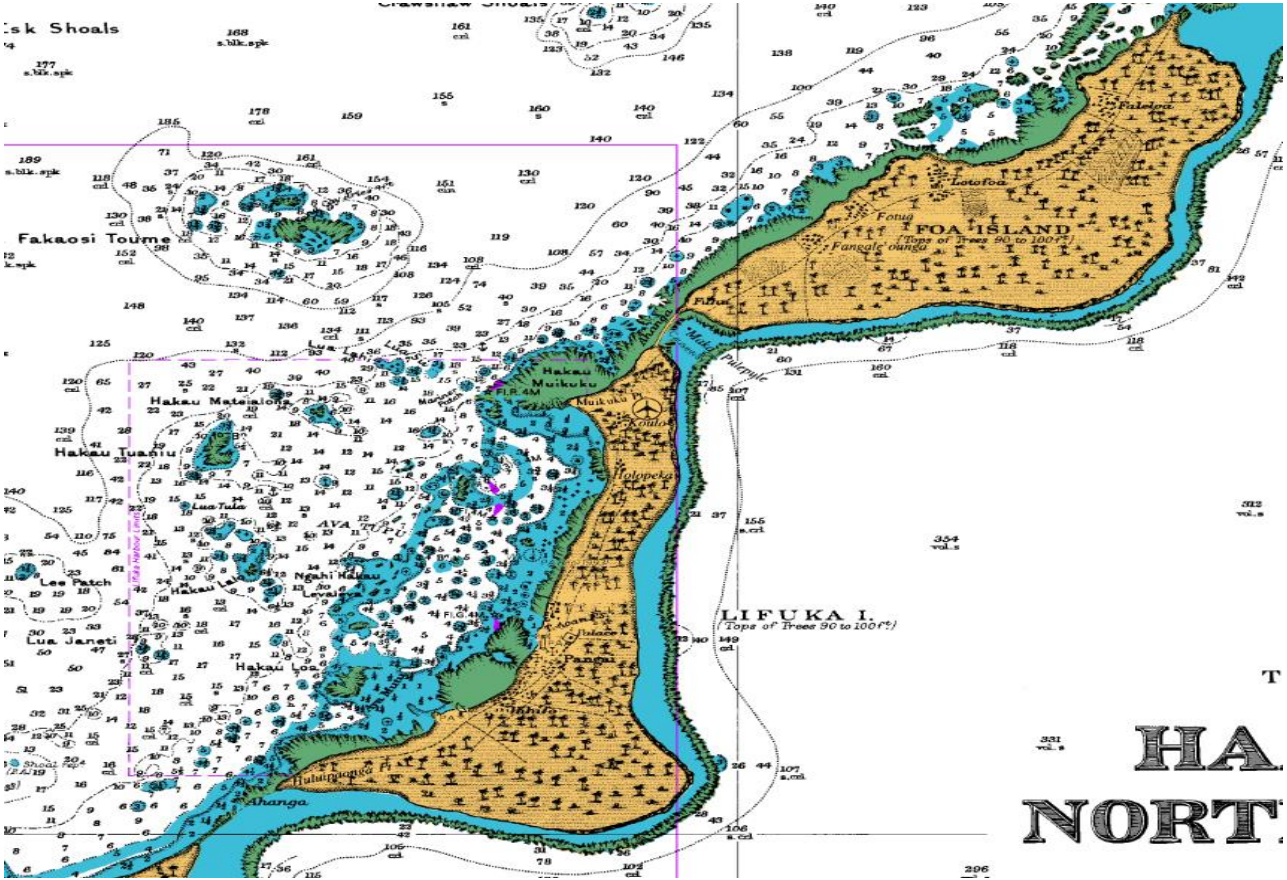
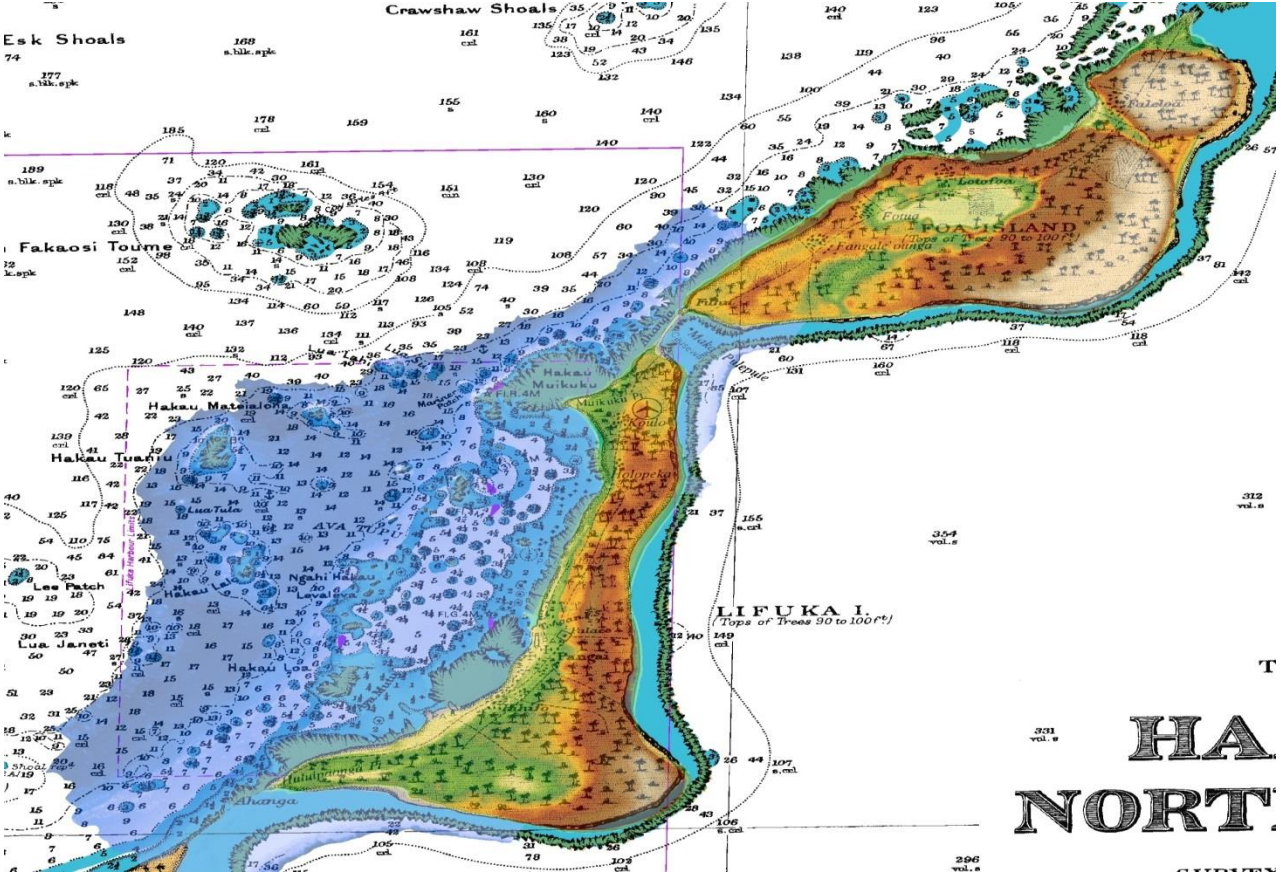
Hydrographic Authority

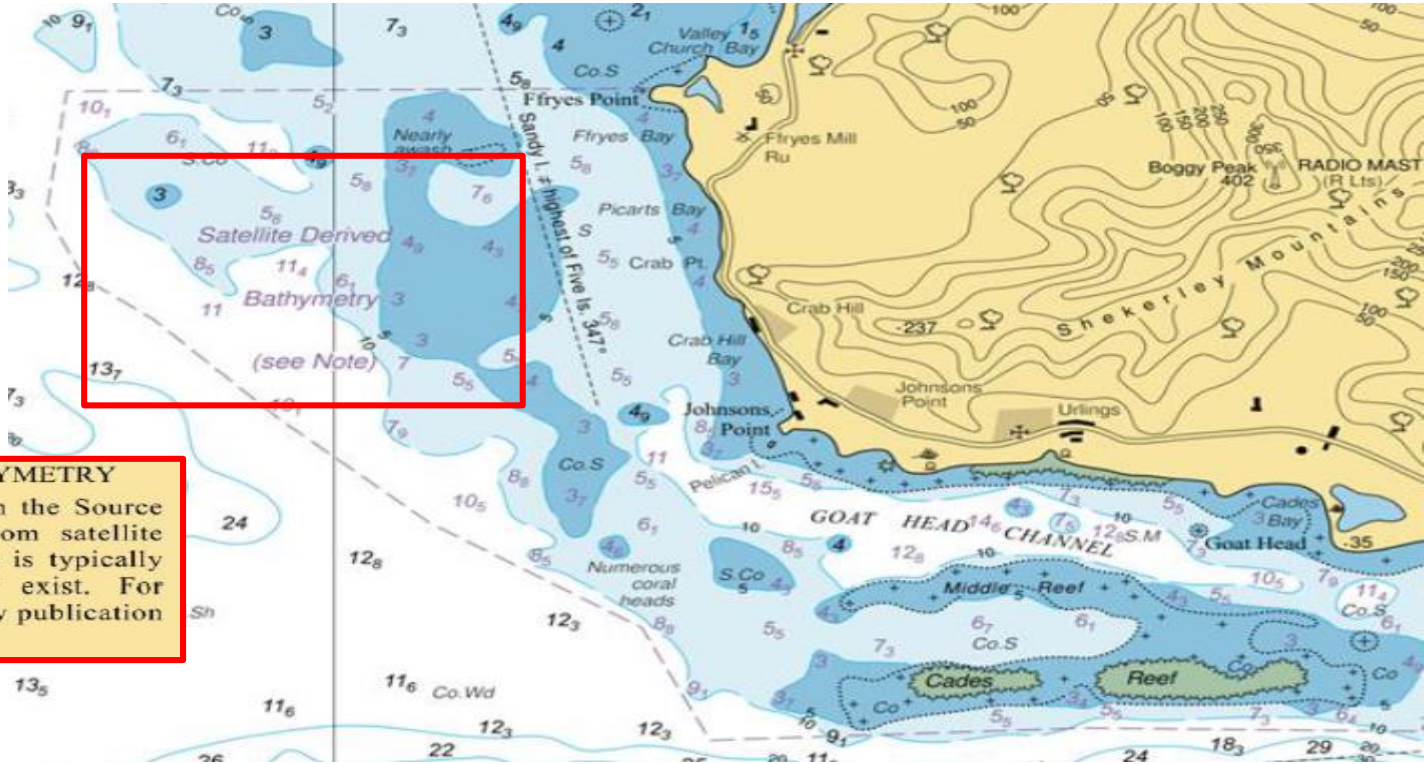
Data Gathering Investigation



Data Gathering Investigation

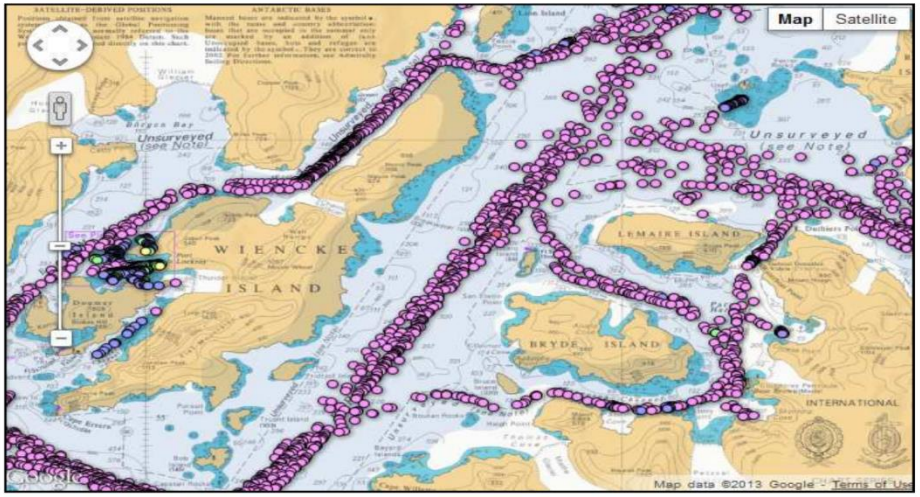


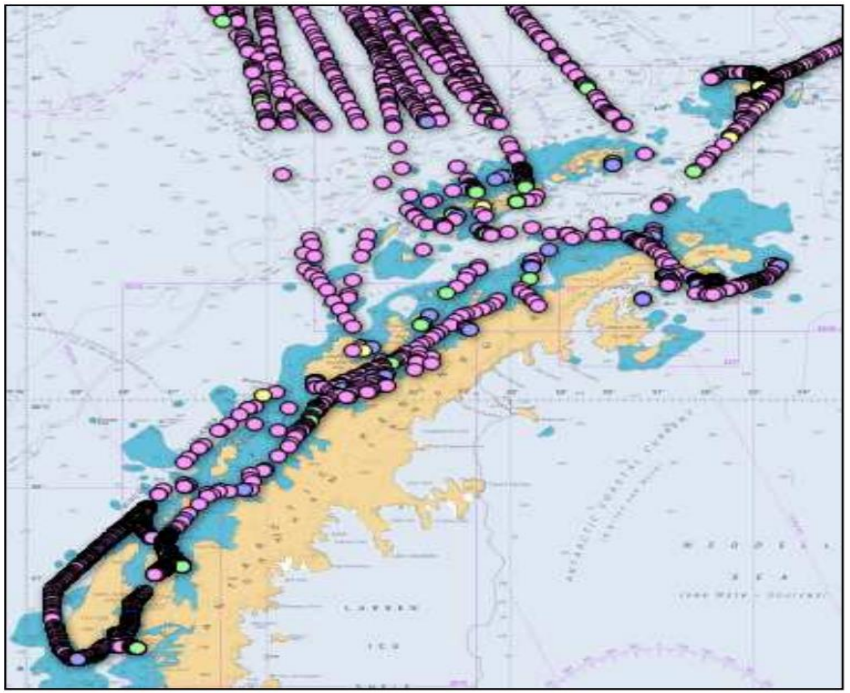
Satellite Derived Bathymetry



BA 2006

Crowd Sourced Bathymetry





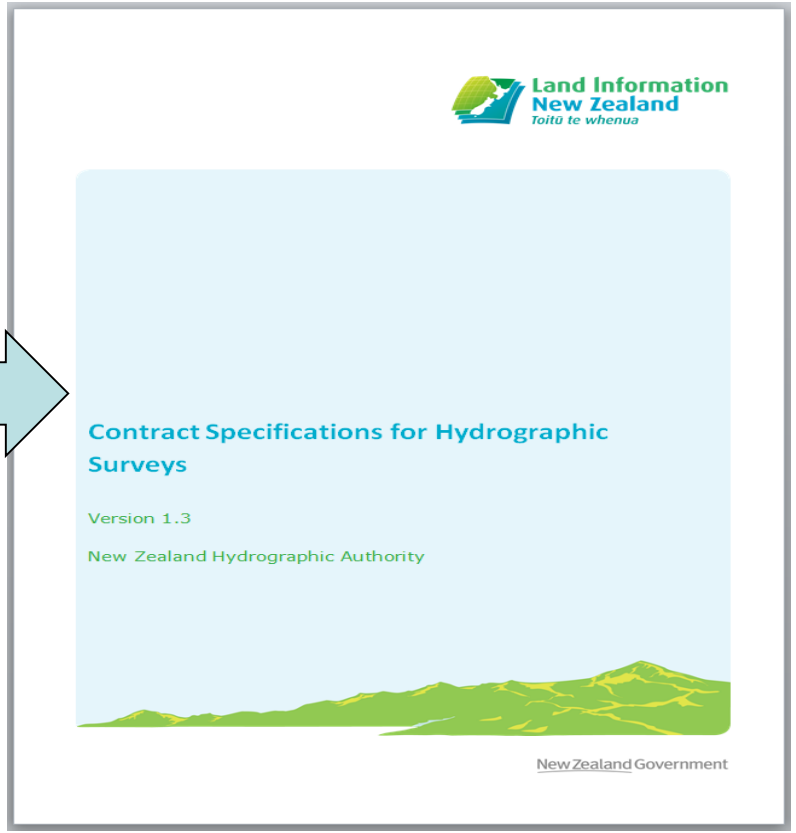
Standards: LINZ & S-44

Toitu te Land whenua Information New Zealand

Contract Specifications for Hydrographic Surveys, Version 1.2, New Zealand Hydrographic Authority

18th June 2010

LINZ HYSPEC v1.2 & v1.3



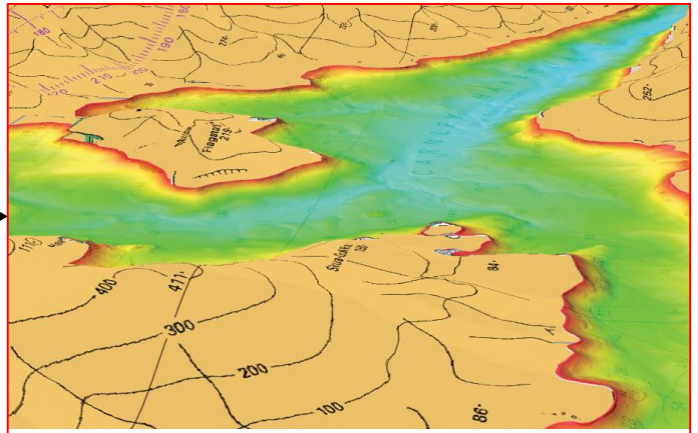
LINZ HYSPEC 2.0

IHO S-44 Review

Data Requirements & Technology Drivers

LINZ HYSPEC v1.3

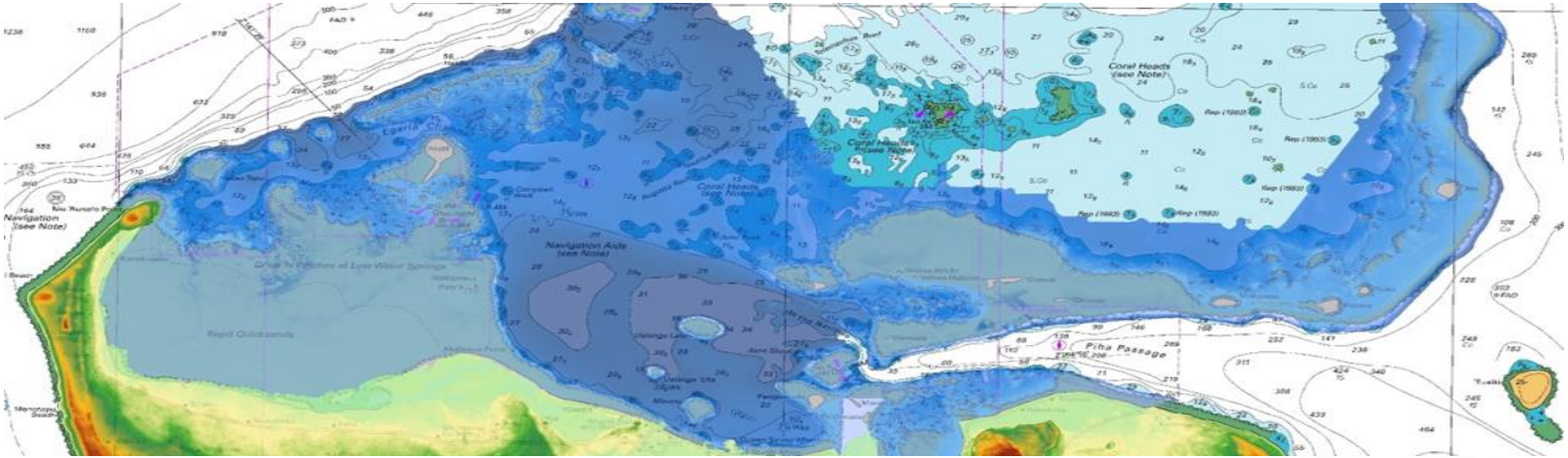
LINZ HYSPEC 2.0



Data Driven
Beyond Nautical Charting

Conclusions

- Areas of NZ Charting Area inadequately surveyed
- Technology development appealing - the toolbox is getting larger
- International need to update Standards & Specifications
- LINZ requirement to update HYSPEC



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Thank you & any questions?