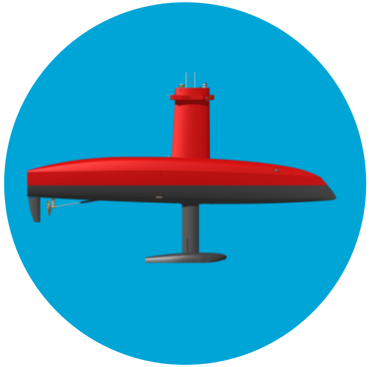
iXblue

DriX



The mapping tool of the future

An ocean of possibilities

David Donohue
Managing Director iXblue Pty Ltd

david.donohue@ixblue.com

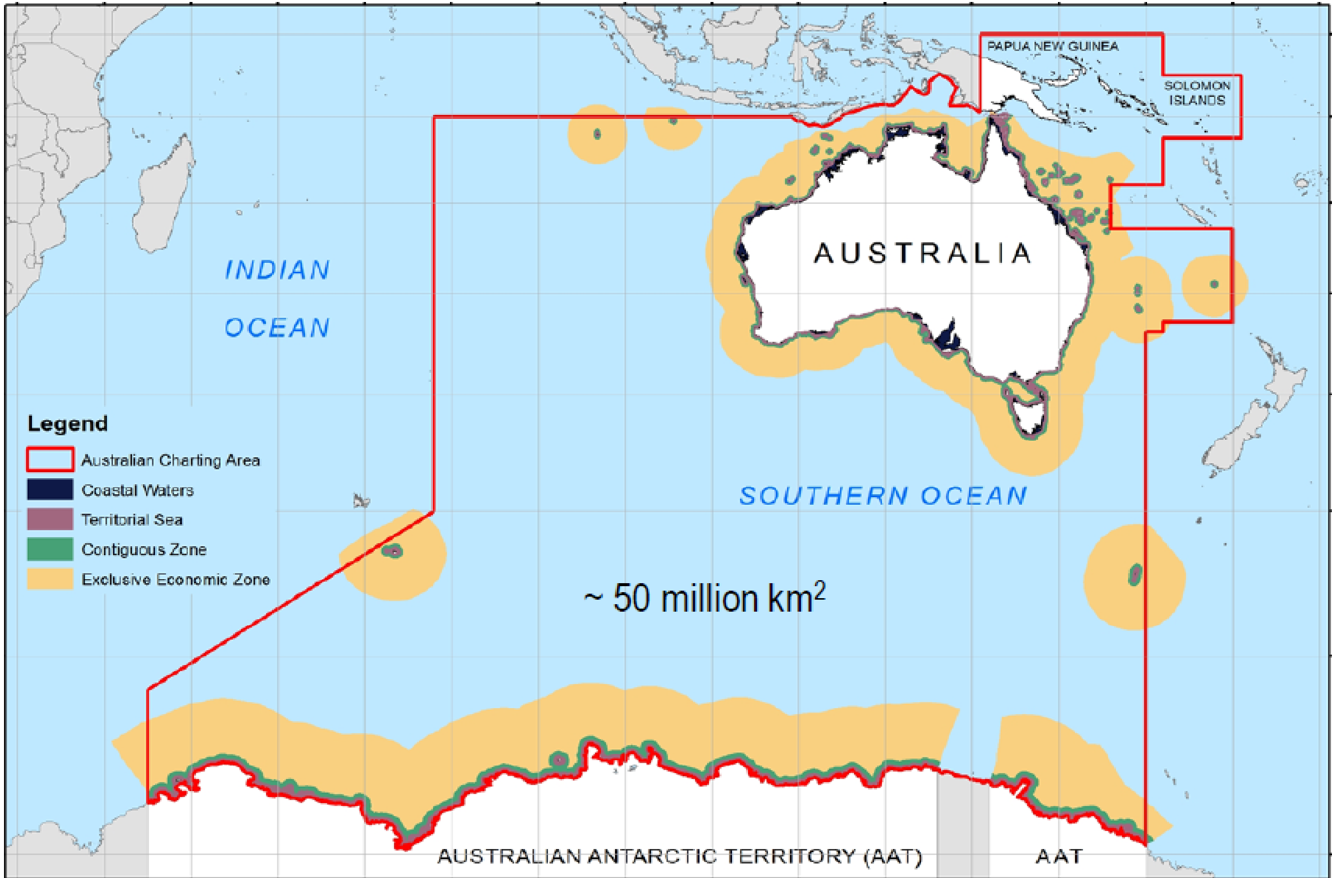
iXblue

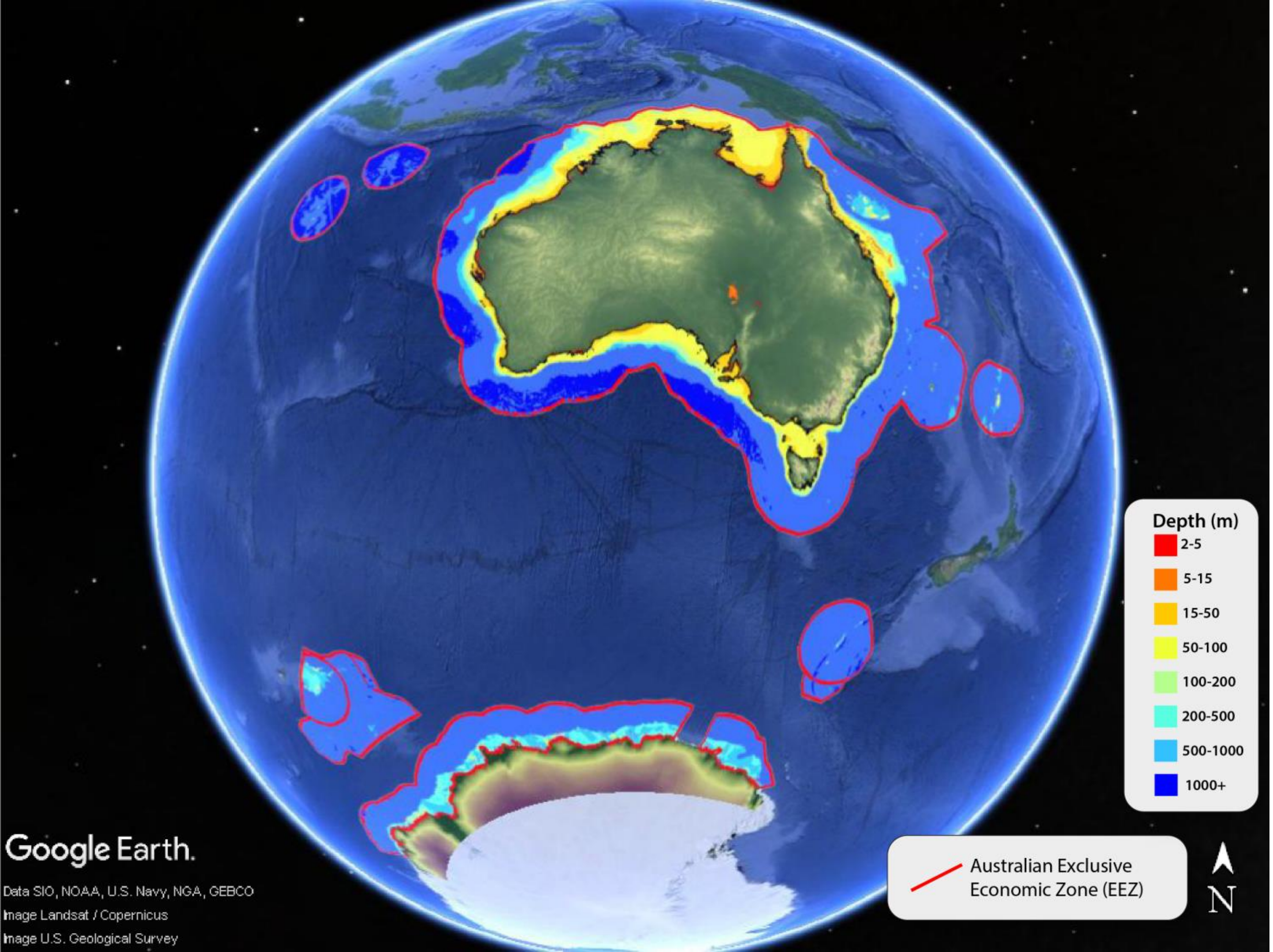
CONTENTS

iXblue

Australia's area of charting responsibility

1



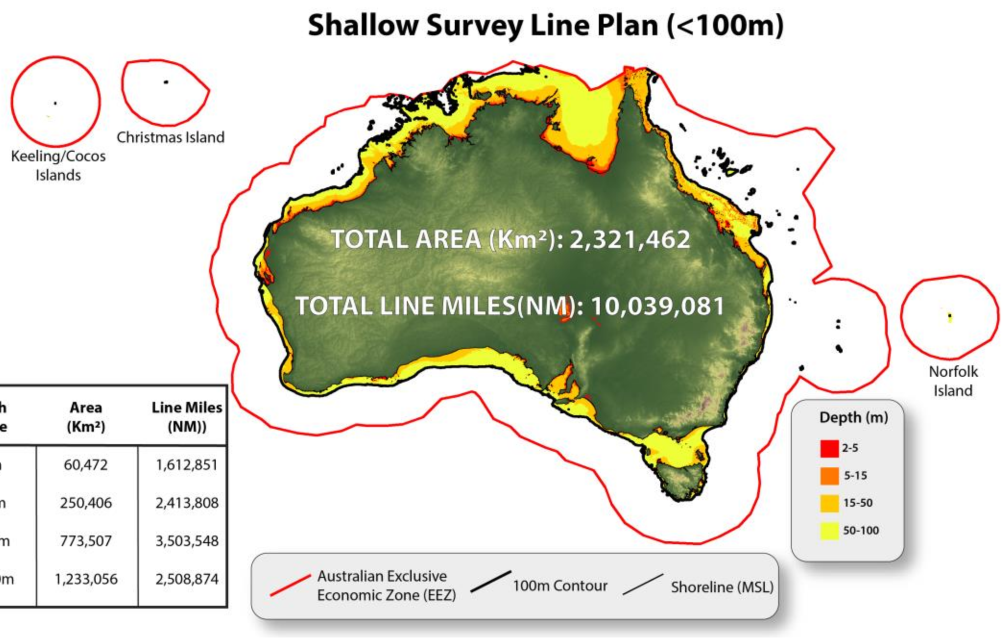


Australia's EEZ

Mainland
9.3m km²

Antarctica
4.8m km²

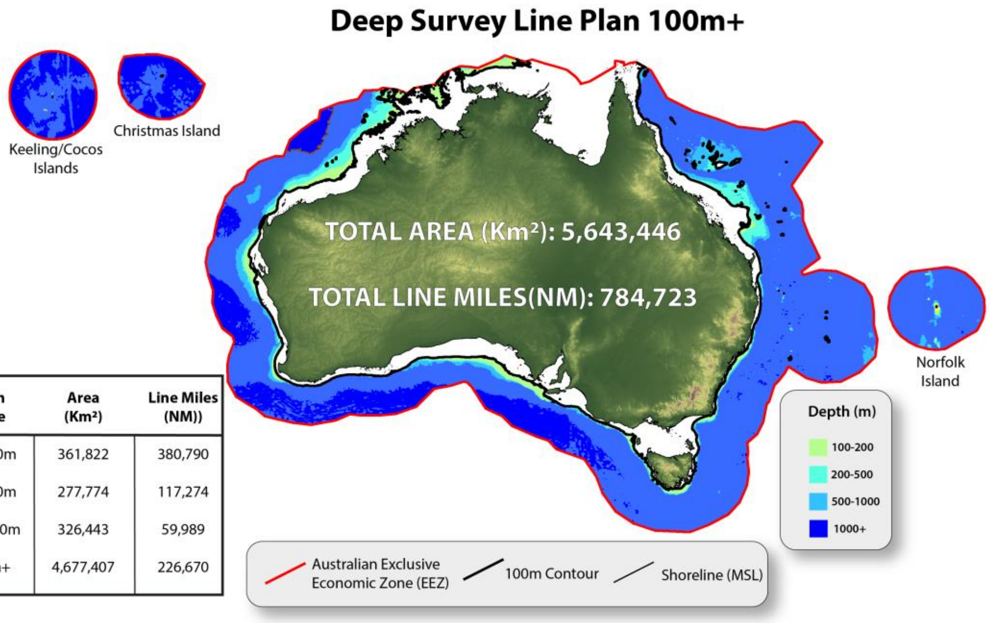
iXblue



Depth Range	Area (Km²)	Line Miles (NM))
2-5m	60,472	1,612,851
5-15m	250,406	2,413,808
15-50m	773,507	3,503,548
50-100m	1,233,056	2,508,874

Shallow (2-100m) requires
10.04 million
line miles of survey

93% of total line miles

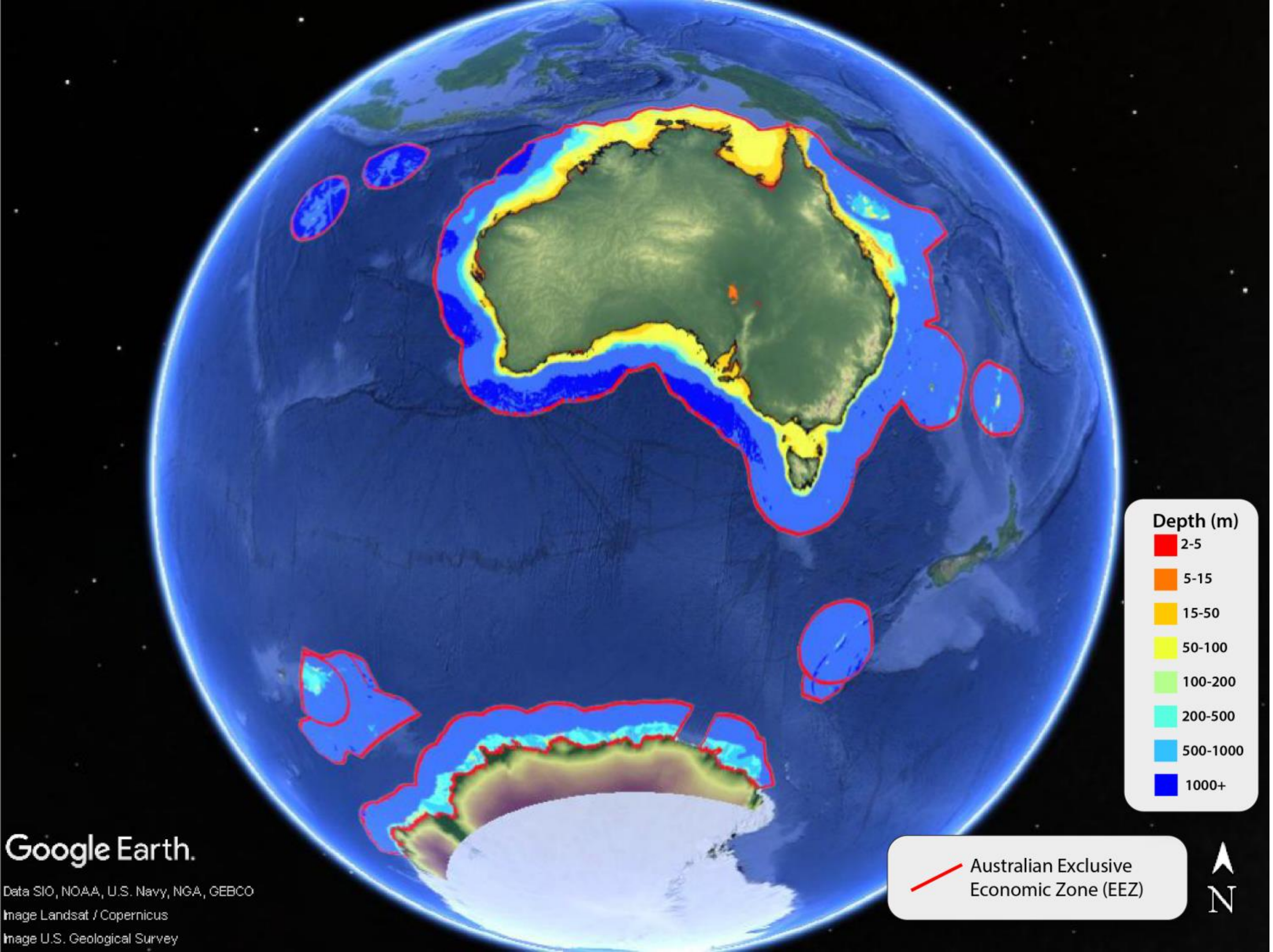


Depth Range	Area (Km^2)	Line Miles (NM))
100-200m	361,822	380,790
200-500m	277,774	117,274
500-1000m	326,443	59,989
1000m+	4,677,407	226,670

Deep (>100m) requires 785,000 line miles of survey

7% of total line miles even though it equates to 75% of EEZ by area

iXblue



How long will it take to survey Australia’s EEZ?

iXblue

Survey task too long and too expensive

How does industry increase output and reduce cost?

- **Major cost drivers for survey work:**
  - Expertise/Personnel
  - Equipment
  - Vessels
  - Risk – Weather, sea-state, unknown bathymetric complexity
- Automating the vessel (and everything onboard) provides the biggest cost-saving

Conclusion:

- Using multiple autonomous vessels from a single host vessel offers significant efficiencies if allowed to operate for long periods of time

Evolution of iXblue’s USV interest

Tried several USVs but remained unsatisfied

- Some were “good” but none were “perfect” for offshore use. All had some combination of:
  - Insufficient speed
  - Insufficient endurance
  - Poor sea-keeping
  - Bad acoustic sensor conditions
  - Insufficient payload
- iXblue had a shipyard, mechatronics and automation engineers, inertial navigation and acoustic systems engineers and surveyors – **So we created our own USV... DriX.**

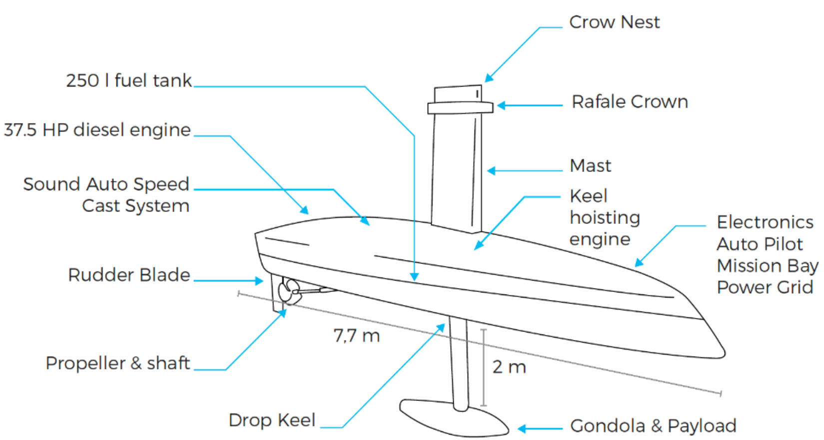
2

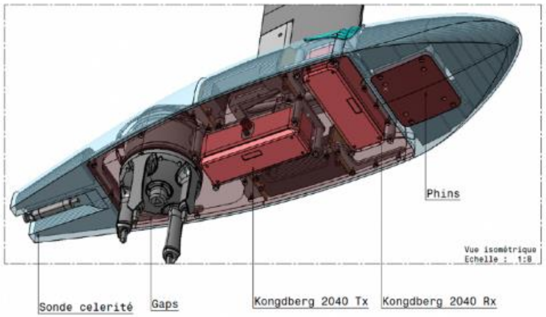
About DriX

iXblue

Designed for offshore survey

High speed, high endurance and versatile payload support





Speed: 14+ knots

Endurance:
- 14 days @ 4 knots
- 5 days @ 8 knots
- 2 days @ 14 knots

Sea keeping:
- Operational - Sea state 5
- Survival – unknown, unable to test (likely exceeds mothership capability)

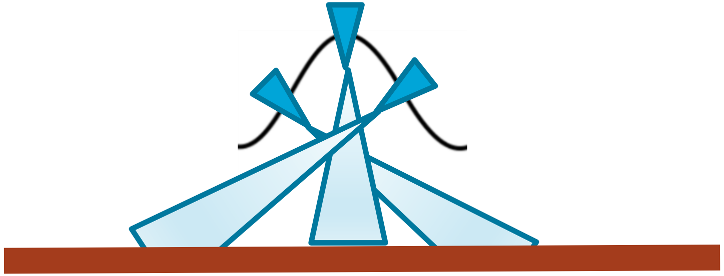
Payload: INS, USBL, MBES, GNSS, SVP, Radio broadband/UHF/Wifi/Satcom

Navigation/Safety: Panoramic visible/IR cameras, AI object recognition, adaptive path planning, AIS, COLREG compliant lights and whistle, hi-vis colour scheme and wide/high mast, radar reflectors, watertight bulkhead with crash box.

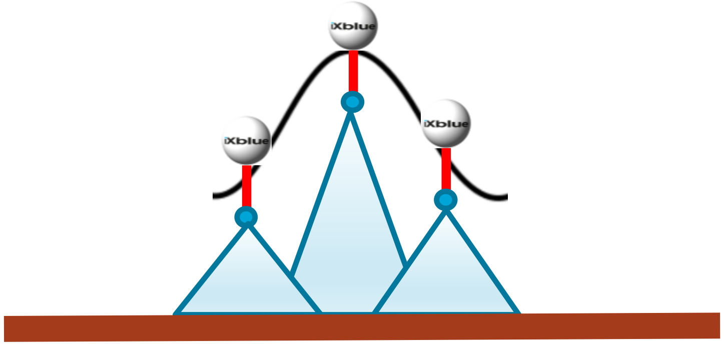
iXblue

Designed for offshore survey

Stability for optimal coverage and sensor performance



Planing V-shape hull



DriX – ballasted wave-piercing round-bilge

Planing V-hulls roll. The steeper the deadrise, the more the vessel will roll in response to wave action.

DriX is a ballasted round-bilge. DriX remains upright even in high sea states with very little lateral roll.

Planing V-hulls pitch and 'slam'. This produces high bubble-sweepdown (aeration) around the hull which reduces acoustic performance.

DriX is a wavepiercer design. It pitches much less than a traditional V-hull. Instead, it cuts a smooth trajectory through the sea

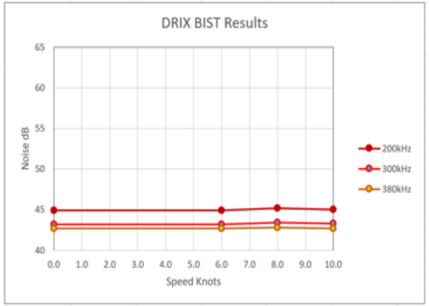

2017/07/27

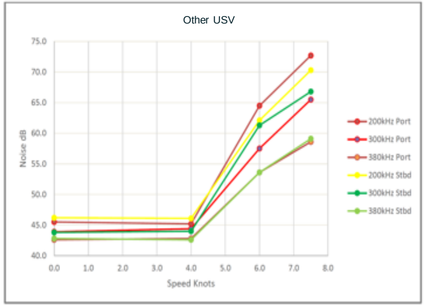
Acoustic Performance

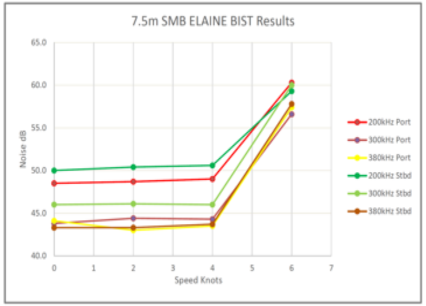
Designed for offshore survey

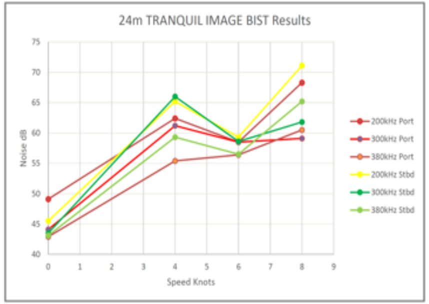
Silence for optimal sensor range and accuracy

DriX	Other USV 5m length	Elaine	Tranquil Image
	(photo excluded for commercial reasons)		







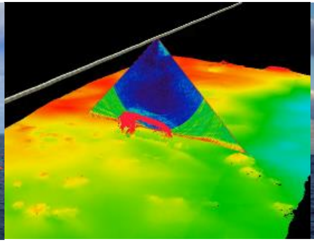


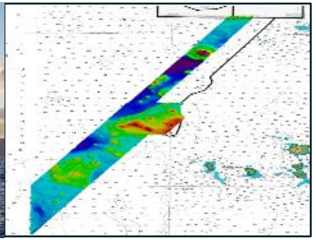
Low noise optimises acoustic sensor performance by increasing the SNR

3

DriX Case Study

Large offshore survey – Tonga 2018





DriX Case Study

Mothership with DriX as force multiplier

Project location: Kingdom of Tonga
Client: Land Information New Zealand

Specifications: Improve navigational safety in wide corridors of over 200km in length.

Vessels (MV Silent Wings and DriX) to cover 694km^2 (over 7,500 planned linear km).

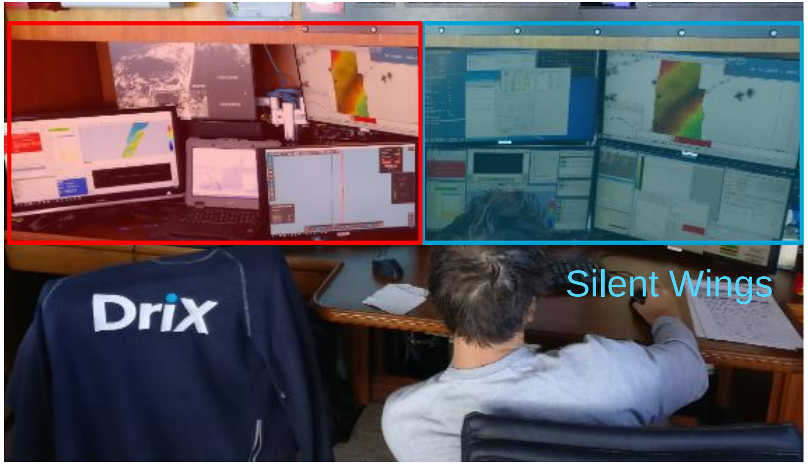
MV Silent Wings
Fitted-out as
Mothership and
as survey ship

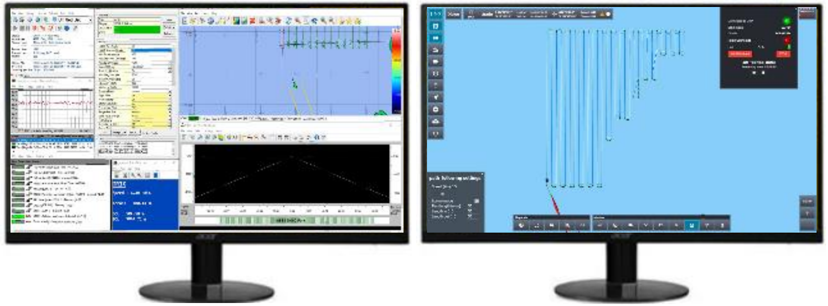
iXblue

DriX Case Study

24/7 Operations

- DriX and MV Silent Wings operated within 3.5km of one-another
- DriX remained deployed for 24/7 operations
- Majority of data captured up to sea-state 4 with both vessels able to operate simultaneously in these conditions
- Single operator for DriX and MV Silent Wings survey systems





iXblue

DriX Case Study

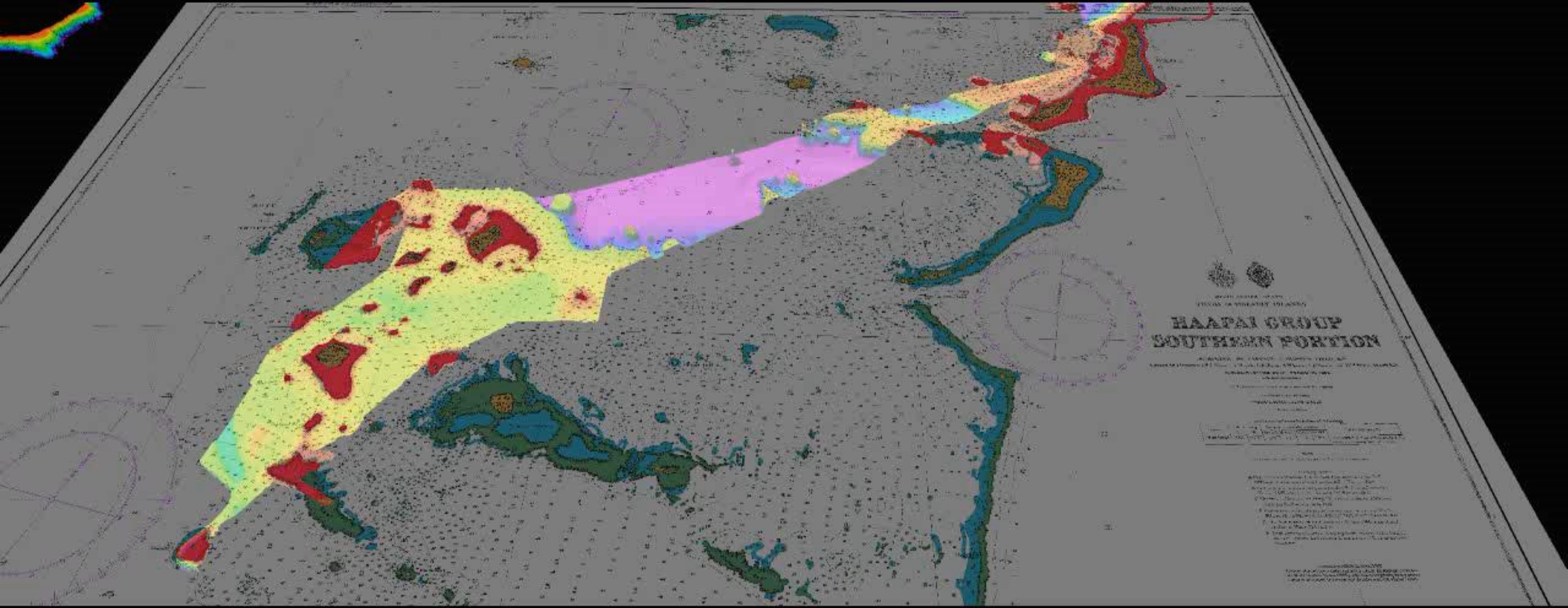
Lower cost per NM, improved environmental footprint

- Efficiencies realised by use of DriX
  - 33% project duration decrease
  - 20% overall cost decrease
  - **34% reduction in project carbon footprint**

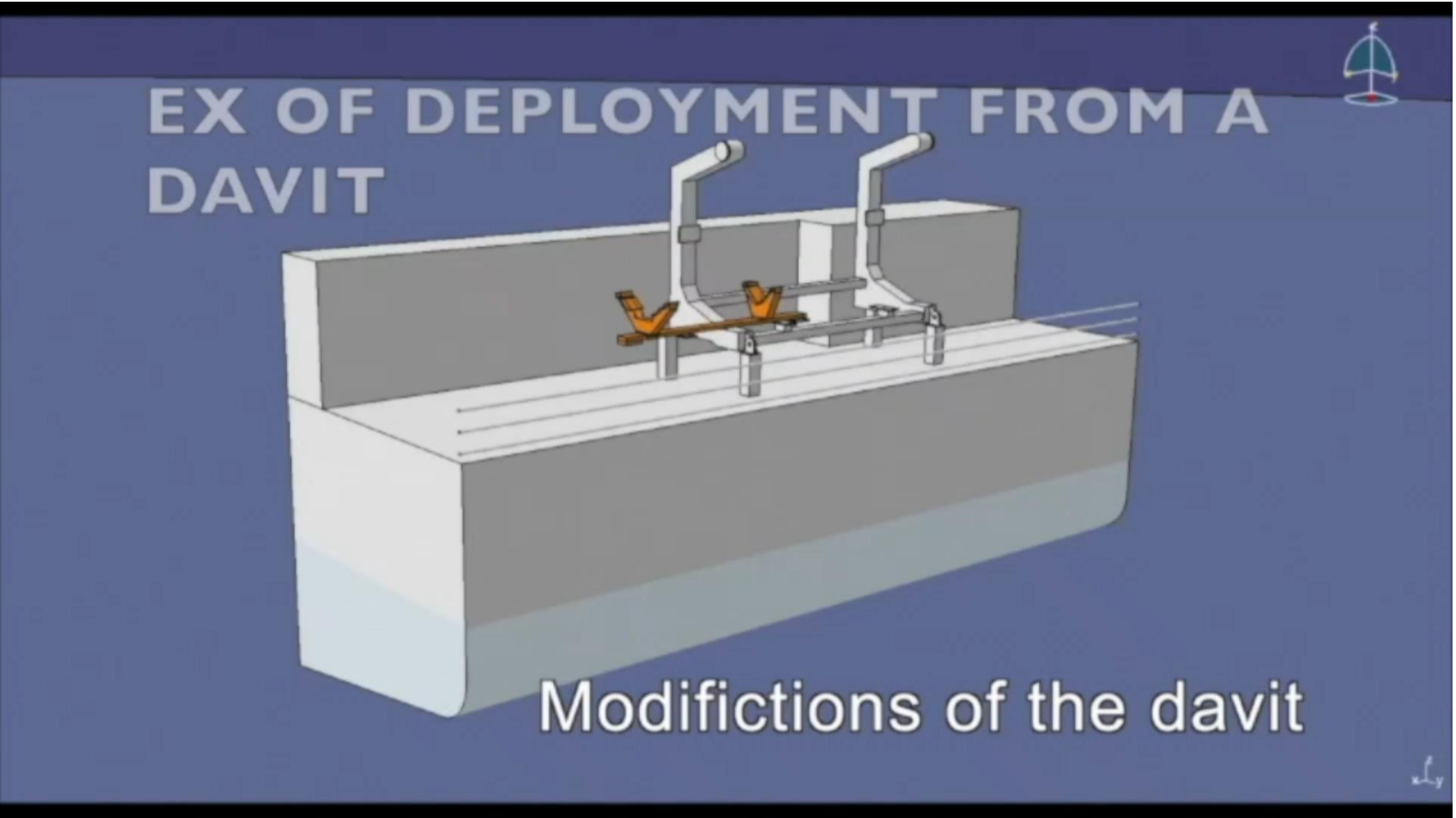
Tonga Project Metrics

Parameters	Drix	Mother Ship
Overall Line km	7,450	
Line km	2,360	5,090
Effective survey time (hours)	166	358
% of total line km	32	68
Total use (days)	19	37
Average survey speed (knots)	7.6	7.6
Average transit speed	10	10
Autonomy (days)	4-5	7
Surveying fuel consumption (l/hr)	2.4	66

iXblue


HAAPAI GROUP
SOUTHERN PORTION

DriX launch and recovery



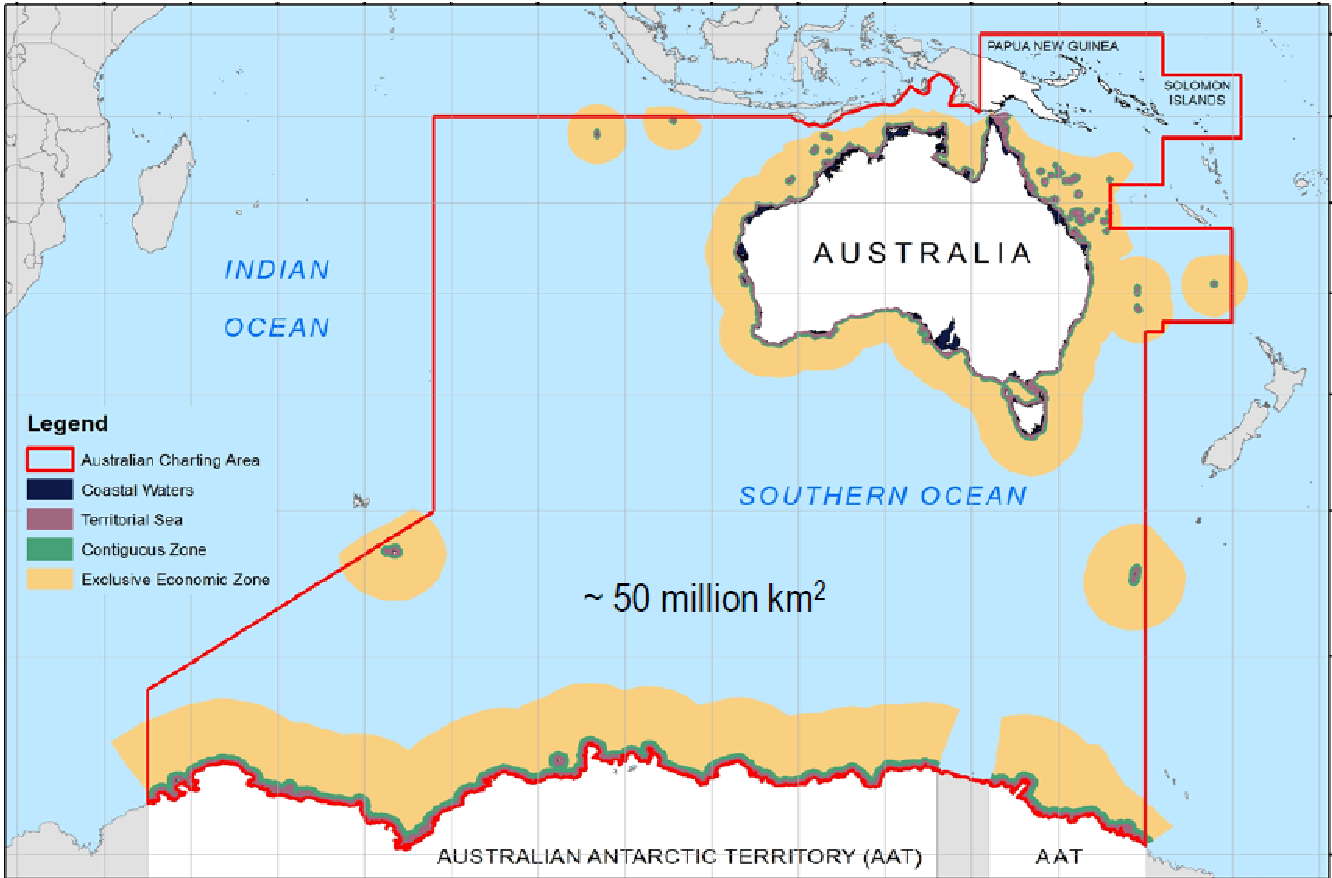
iXblue

NOAA Ship Thomas Jefferson

iXblue

Enormous Challenge

4



Final thoughts:

- Unmanned survey vessels have the potential to significantly increase the rate of effort of EEZ seabed survey
- USV have the potential to significantly reduce the cost of seabed survey
- The degree to which USV technology delivers cost effective seabed survey under the HIPP is now a function of the contracting model
- Industry can deliver survey at $250/line mile if given sufficient budget to operate USV efficiently and on a large scale
- Assuming a budget of $100M per annum, there exists the possibility to have Australia’s EEZ fully surveyed within 50 years

DriX