



Providing a Baseline for Future Change Along Australia's Coastline

<p>01 Survey #1: ALB Survey of the Entire Coast of NSW</p>	<p>02 Survey #2: Gold Coast - ALB Baseline and SDB Monthly Monitoring</p>	<p>03 Summary / Comparison of each Survey Solution</p>
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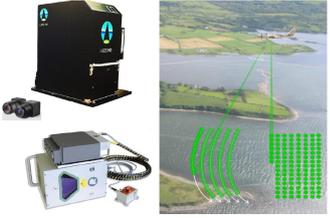
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NSW Coastline ALB Survey / Context

<p>Client: NSW Government Office of Environment and Heritage (OEH)</p>	<p>Objective: Acquiring a state wide, continuous, high resolution and accurate reference dataset over the entire length of the NSW coastal zone (~1,200 linear km), covering:</p> <ul style="list-style-type: none"> • Terrestrial areas within 200m landward of the MHW • Seaward extent of sediment compartment / extinction depth of the LIDAR beam
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NSW Coastline ALB Survey / Equipment & Survey Std.

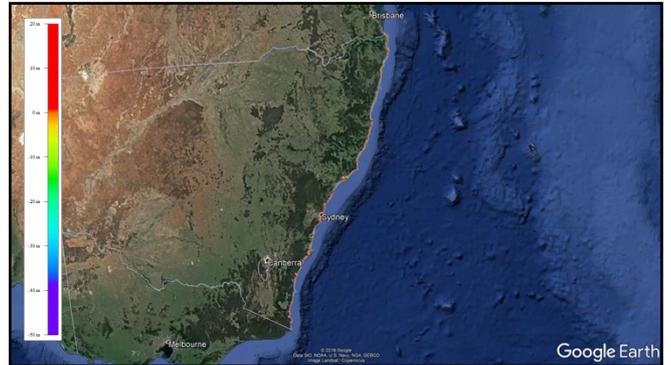


Equipment:
 Fugro's LADS HD ALB Sensor
 PhaseOne iXU-RS 100MP Camera
 RIEGL VQ-820-G ALB Sensor

Requirements	Accuracy standard / Imagery Resolution	<ul style="list-style-type: none"> Point cloud: ISO Order 1b Ortho mosaic: 10cm GSD
	Sounding density	<ul style="list-style-type: none"> LADS HD: 3.8 x 3.8m spot spacing RIEGL VQ-820-G: Nominally 1.8pts/5qM
Geodetic Datum	Vertical	<ul style="list-style-type: none"> Ellipsoidal height: GRS80 and Orthometric AHD
	Horizontal	<ul style="list-style-type: none"> GDA84 and GDA 2020

Survey Requirements

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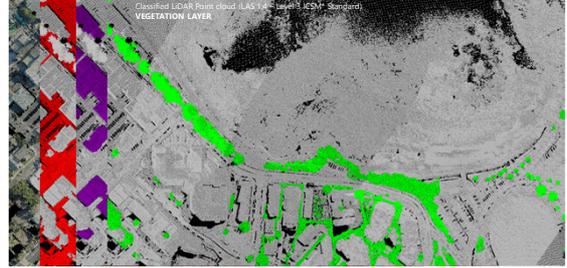
NSW Coastline ALB Survey / Final Products



Orthorectified Mosaic

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NSW Coastline ALB Survey / Final Products



Classified LiDAR Point cloud, LAS 1.2, LAS 1.3, LAS 1.4 (ICSM Standard) VEGETATION LAYER

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NSW Coastline ALB Survey / Accuracy assessment

Dry Benchmarks
(absolute accuracy check)

Run ID	No. of Comparisons	Mean Depth Difference	Std. Deviation
100011.1	3286	-0.11m	0.05m
100011.2	3287	-0.12m	0.05m
Mean		-0.12m	0.05m
St Dev.		+/-0.05m	+/-0.00m

Wet Benchmarks
(absolute accuracy check)

Run ID	No. of Comparisons	Mean Depth Difference	Standard Deviation
WB	1490	0.05m	0.13m

Internal Overlap
(relative accuracy check)

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2. Sample #2: City of Gold Coast – ALB and SDB Monthly Monitoring

Gold Coast ALB & SDB Survey / Context

Client:

- Council of the City of Gold Coast

Objective:

- Monitor coastal dynamics over 12 months
- July 2019 to June 2020

Services Provided:

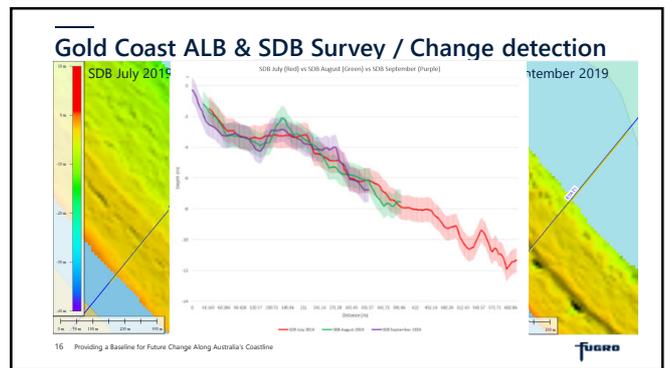
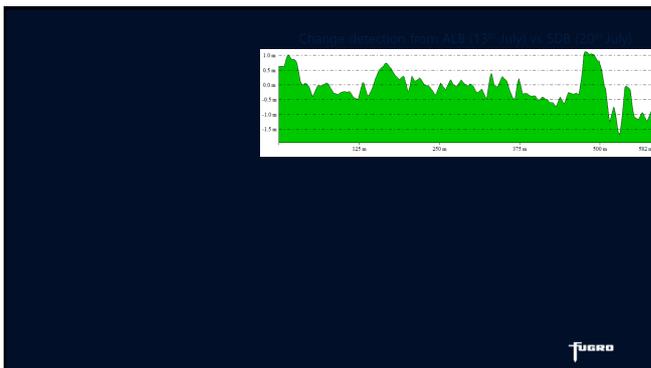
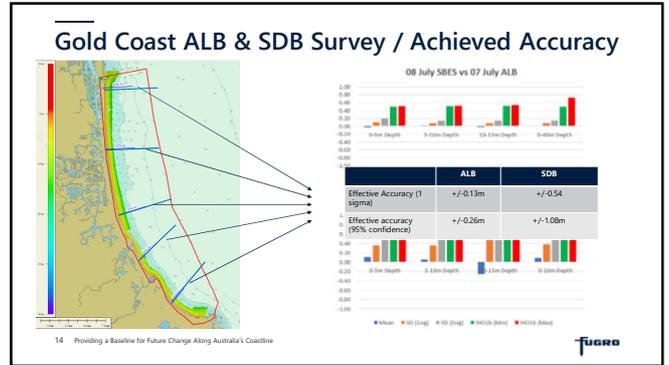
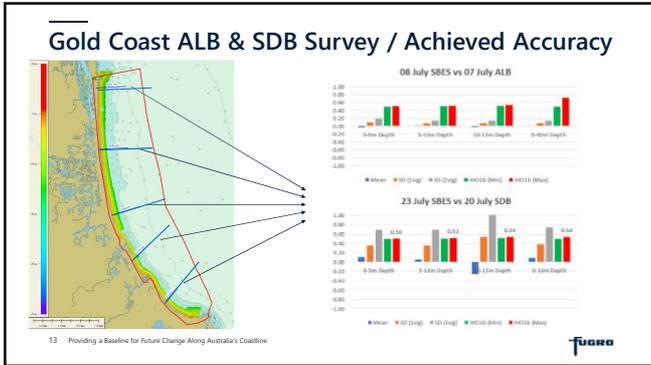
- Benchmark ALB survey
 - 11th to 13th July 2019
 - 3x flights
- Monthly SDB monitoring
 - SENTINEL-2 Imagery
 - 10m resolution derived using eolytics from EOMAP
 - Supported by regular SBES surveys (GCCC)

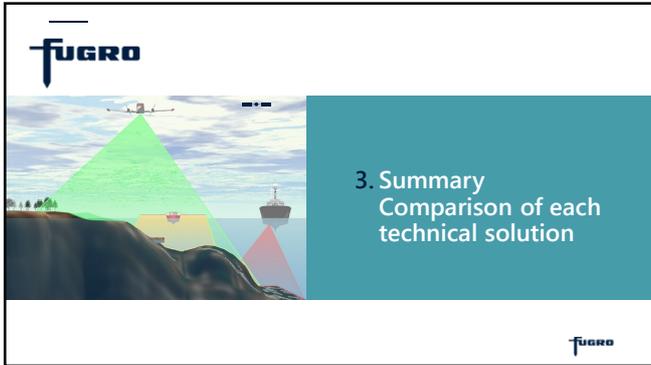
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Gold Coast ALB & SDB Survey / Achieved Coverage

	ALB	SDB
Resolution	3x3m	10x10m
Max Depth	-35-40m	-7-12m

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Summary / Comparison of each Survey Solution

SBES transect Solution:

Pros	Cons
Low cost providing the Area of Interest is easily accessible with a small vessel	Does not provide full coverage of the Area of interest
Provide accurate profile measurement irrespective of the environmental conditions	Does not provide continuous/seamless topo-bathy coverage

SDB Survey Solution:

Pros	Cons
Low cost irrespective of the Area of interest accessibility and area size, particularly for repetitive/monitoring survey	Depth performance largely impacted by environmental conditions (water clarity and reflectivity of the seabed)
Provide better coverage than SBES transects	Accuracy does not meet IHO order 1 std / only detecting gross changes >> 1 – 2 m
	Gaps in the coverage due to surf / clarity / non reflective seabed

ALB Solution:

Pros	Cons
Cost effective solution for large scale coastal surveys	Only cost effective for reasonably large area (> 50 - 100 SqKM) suggesting ALB campaign rather than ad hoc postage stamps survey
Provide dense and seamless topo-bathy coverage up to laser extension depth (Up to 80m pending conditions)	Depth measurement performance impacted by water clarity. Risk that can be mitigated by strong focus/management during data collection
Accuracy (Fully compliant with IHO1a standard)	
Allow production of various final products including Ortho rectified mosaic, reflectivity mosaic, fully classified point cloud data, etc.	

