

**International Global Navigation Satellite
System (IGNSS) Society Conference
7 February 2018 at UNSW**

Maritime Industry Australia Ltd (MIAL) – CRC for Spatial Information Maritime Project

Presented by: Nuddin Tengku
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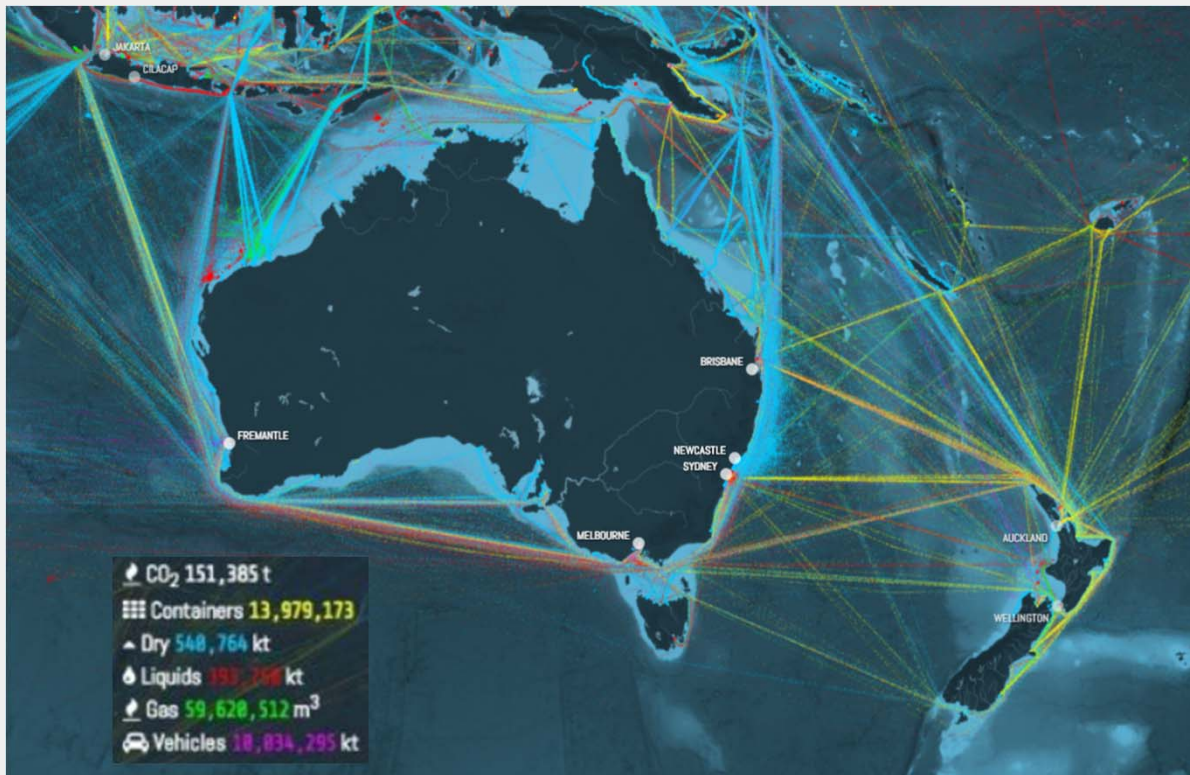


Australian Government
Department of Industry,
Innovation and Science



Business
Cooperative Research
Centres Programme

5th Largest Shipping Task in the World



- Long coast line
- Significant raw commodities for export
- Reliance on significant imports by sea
- The world's fastest growing cruise industry
- Highly active ports requiring a range of on-water services

Photo: www.shipmap.org

Maritime Economic Benefits



Directly contributed \$9 billion to GDP
in 2012-13



Directly employed almost 31,000
people in 2012-13



Directly contributed over \$900 million
to taxation revenue in 2012-13

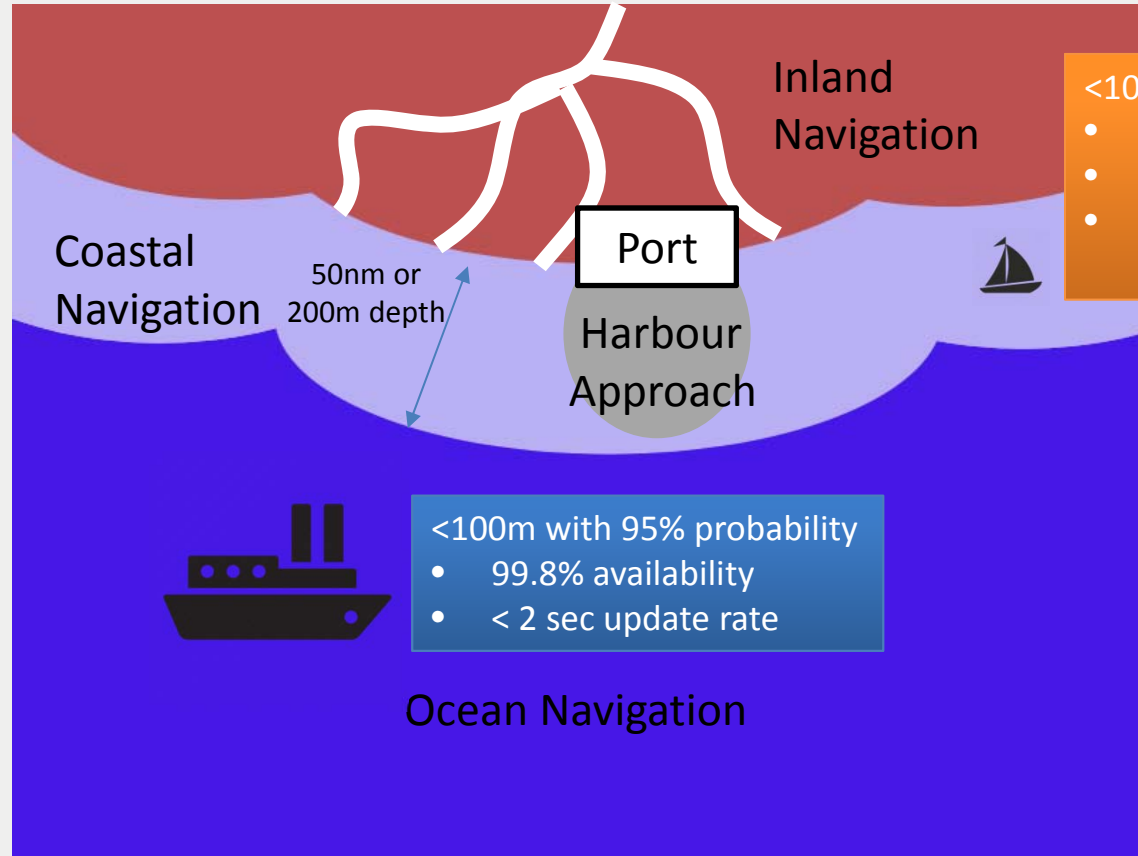
Areas of Positioning Applications

1. Survey
2. Navigation
3. Port Operations
4. Search and Rescue
5. Subsea & Oil and Gas



Navigation Requirements

IMO Resolution A1076 (27)

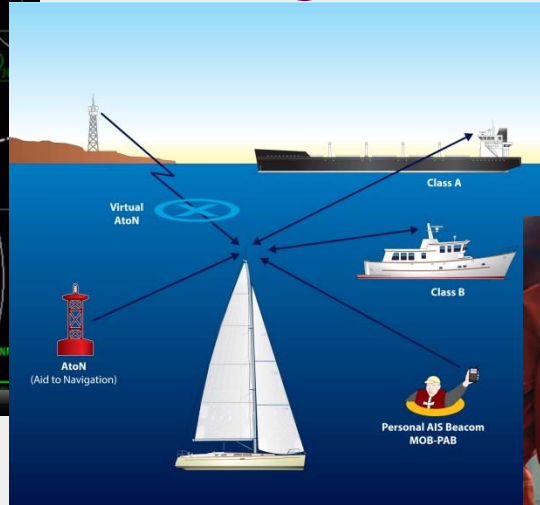


- <10m with 95% probability
- 99.8% availability
 - < 2 sec update rate
 - Integrity warning within 10 seconds

- <100m with 95% probability
- 99.8% availability
 - < 2 sec update rate

Ocean Navigation

Navigation



- Automatic Identification System (AIS)
- Electronic Chart Display and Information System (ECDIS)
- Australian Fisheries Management Authority (AFMA)
 - Vessel Monitoring System (VMS)

MIAL-CRCSI SBAS Testbed



ANZ-SBAS Testbed Project

Voyage coverage map

Legend

Ship Voyages



Over 12 Confirmed Voyages
November 2017 – April 2018

Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Image U.S. Geological Survey



View from Space (Altitude: 7281 mi)

Areas of Interest within SBAS Testbed



- 
- L1 SBAS
 - SBAS DFMC
 - PPP via SBAS

Availability

Coastal
Navigation

50nm or
200m depth

Inland
Navigation

Port

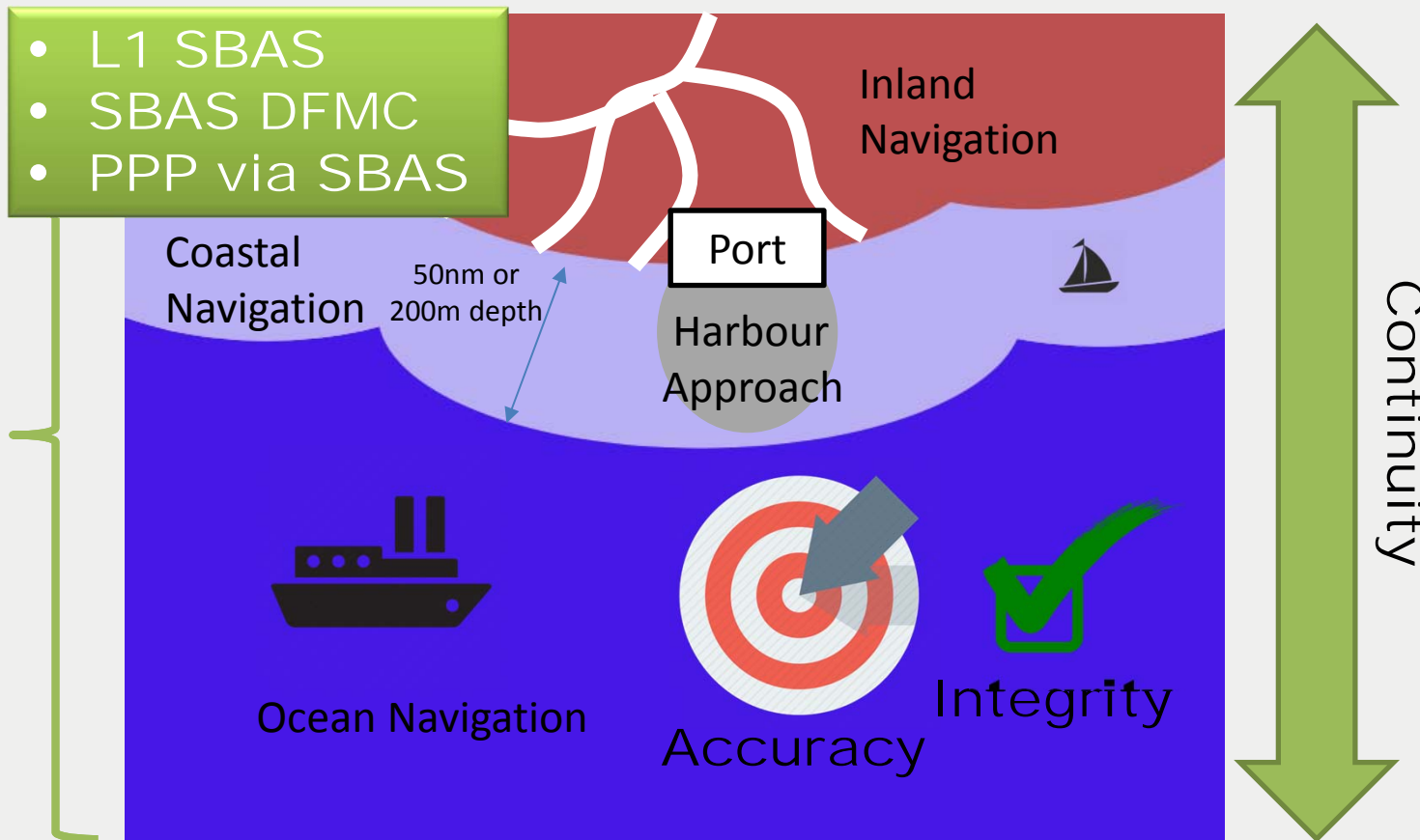
Harbour
Approach

Ocean Navigation

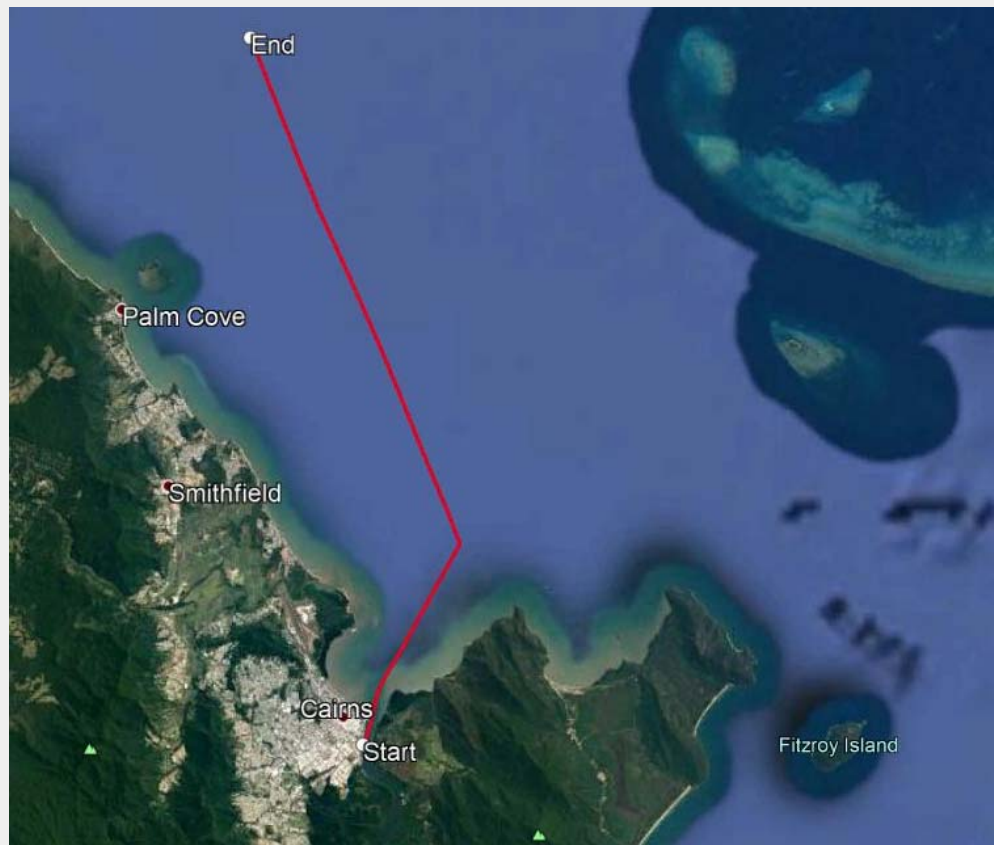
Accuracy

Integrity

Continuity



Preliminary Analysis



Accuracy and Availability
of PPP via SBAS
SeaSwift's Trinity Bay
5th December 2017

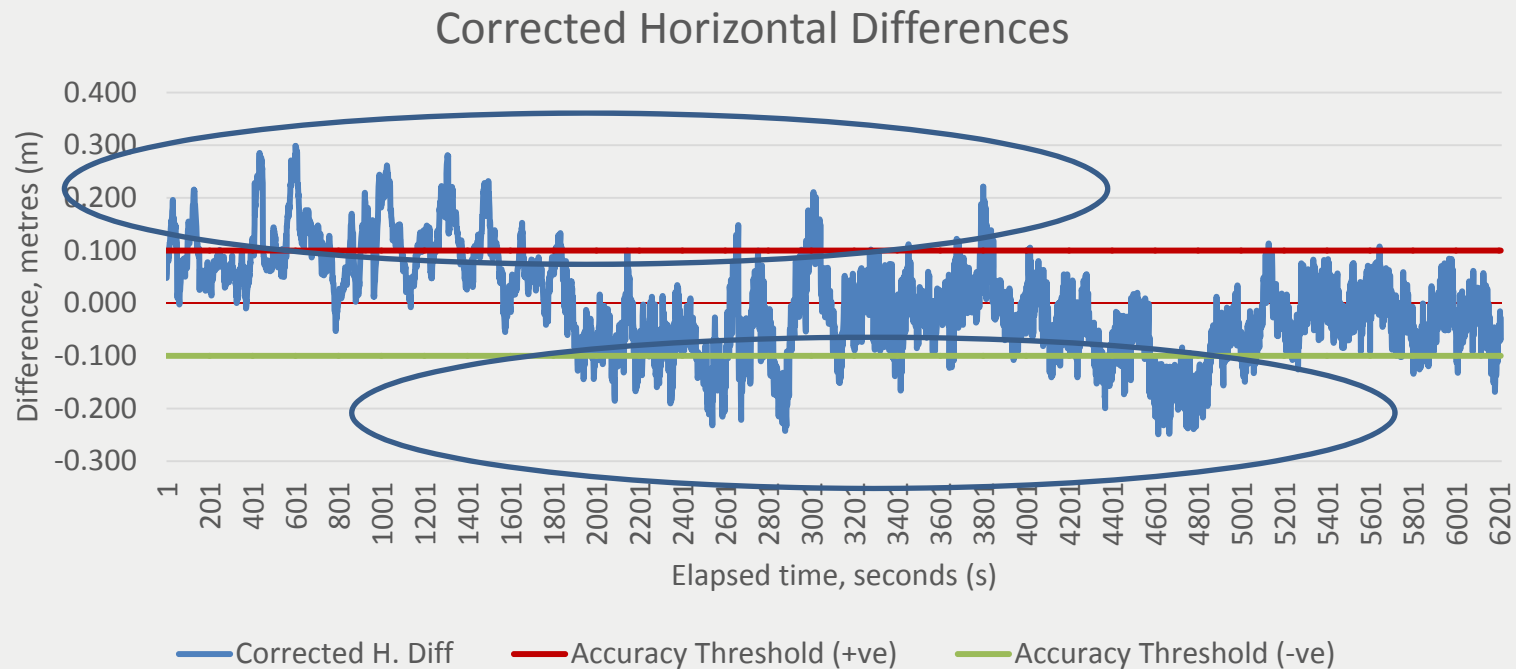
Results

- Availability
 - 100% (over 1 Hr 43 Min) – 1 second epoch
- Accuracy Analysis (Moving Ship)
 - Baseline processing as ‘reference truth’
 - Summary Statistics for Magnitude of Difference:

Component	Average (m)	Std Dev (m)	Min (m)	Max (m)
Horizontal	0.258	0.095	0.009	0.557
Height	0.152	0.038	0.017	0.254

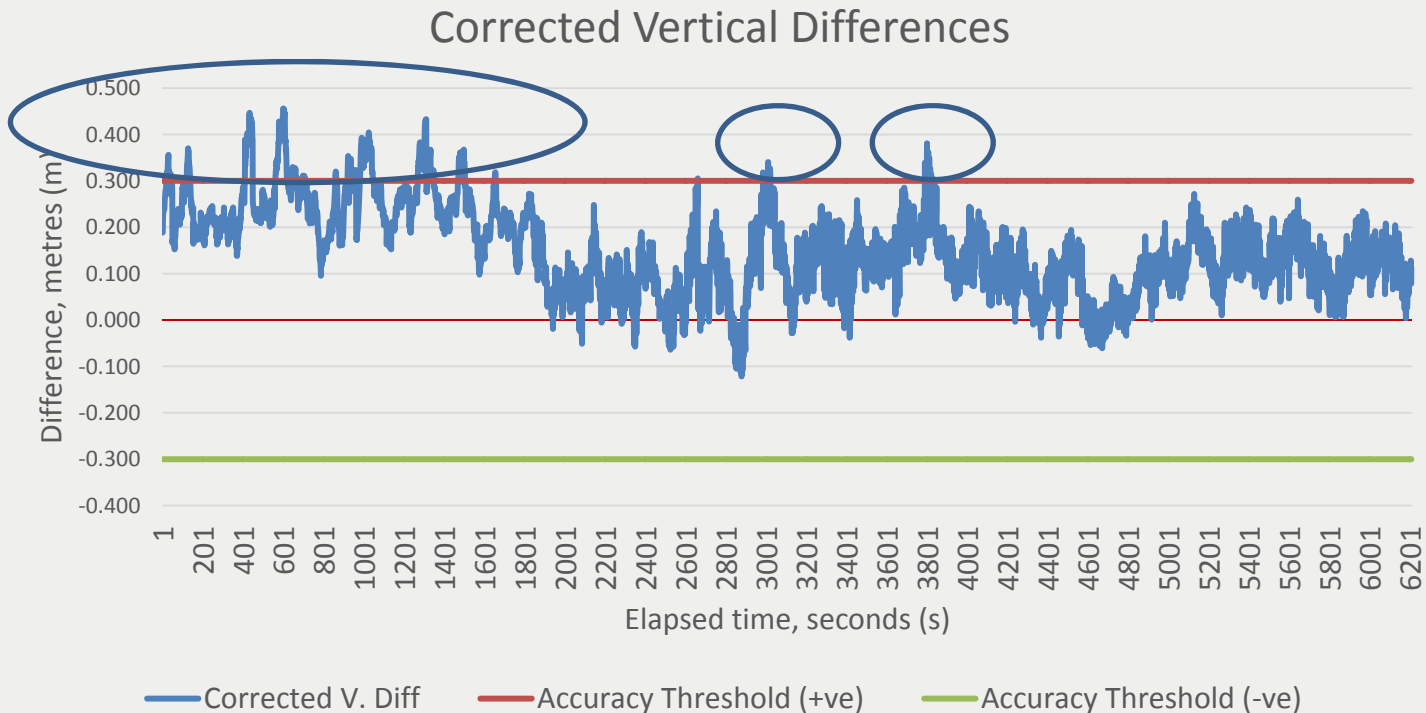
Analysis & Considerations

- Horizontal Accuracies

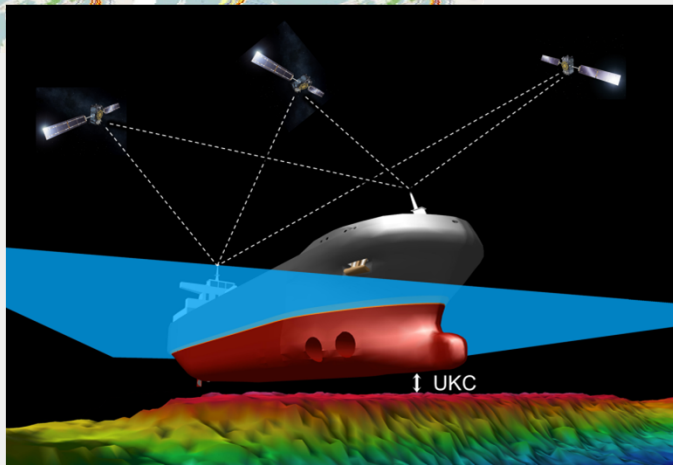
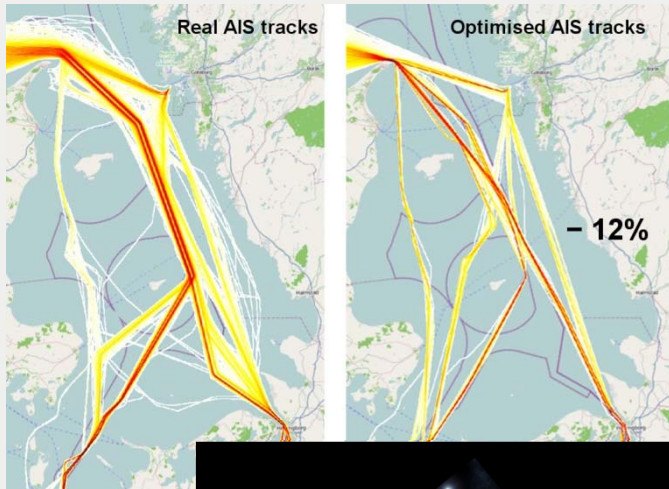


Analysis & Considerations

- Vertical Accuracies



Benefits & Conclusion



Source: www.famosproject.eu

Greater
Efficiency &
Safety

Increased GDP

Reduced
Environmental
Impact

