

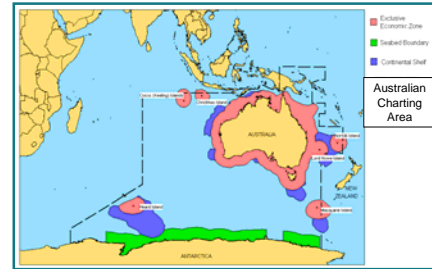
## The future of coastal navigation

Natship 09

Mr Mike Prince - Director, Charting and Information Management  
Australian Hydrographic Service



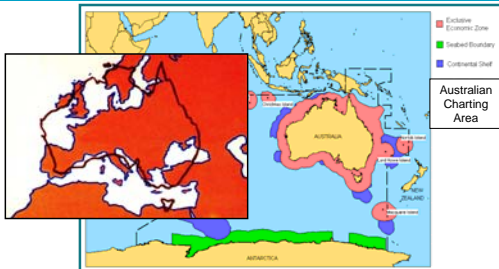
## Australian Charting Area



- AUS Charting Area 13 335 470 nm<sup>2</sup>
- Australian EEZ 2 609 596 nm<sup>2</sup>
- Areas < 200 m deep 762 640 nm<sup>2</sup>
- Coastline Mainland & Islands 32 255 nm



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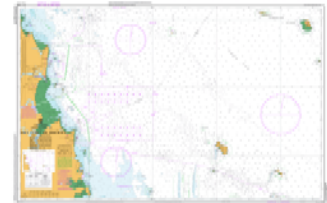


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## Scope

- IMO
- Forecast ENC timelines
- Why ENCs?
- Australian response

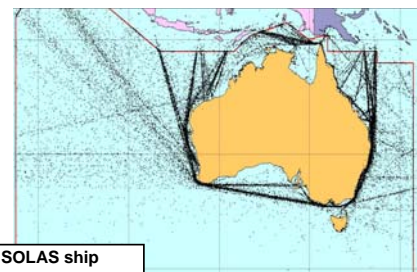


## Why ENCs?

- Denmark, Norway, Sweden, Britain
- Japan
- Australia



## Annual Shipping



- 3500+ SOLAS ship voyages
- 25 000 port entries



## Maritime Trade



- **696 million tonnes**
  - 99.9% by weight of all trade
- **\$249 billion**
  - 79.7 % by value of all trade



## Study – Australian Transportation Safety Bureau

- 240 marine accident investigation reports, 1982 – 2007
- 118 lapses in the conduct of vessels
- 71 incidents (60%) involved groundings

<b>Loss of situational awareness</b> (lost, no fixes on chart, inaccurate DR / EP, loss of fixing marks, wrong fixing marks, not paying attention)	<b>36</b>
<b>Ship handling</b> (wrong wheel orders, wrong rudder applied)	<b>10</b>
<b>Machinery failure</b> (propulsion, steering)	<b>9</b>
<b>Poor bridge procedures</b> (ignored charts, no charts or corrections, falling asleep)	<b>8</b>
<b>Weather</b> (dragging anchor, excessive leeway)	<b>5</b>
<b>Uncharted rocks or obstructions</b>	<b>3</b>



## Case study



**Peacock, Piper Reef, July 1996**  
after the Pilot (probably) fell asleep and the OOW lost all spatial awareness



## Case study



**Bunga Teratai Satu, Sudbury Reef, November 2000**  
failed to make a planned alteration of course and ran aground at 20 knots



## Case study



**HMS Nottingham, July 2002**  
struck Wolf Rock off Lord Howe Island while manoeuvring to recover her helicopter



## Case study

Peter Turner, 70, a veteran sailor with half a century of experience, and a crewman had to be plucked to safety by helicopter yesterday in a long-range rescue mission.

Mr Turner said his 15m cruising yacht Asolare, launched in June 2007, had been valued at \$1.67 million but was now unsalvageable.

He said he had to escape in a life raft about 4am after hitting an "uncharted" reef in the Coral Sea near Willis Island, about 400km off Cairns. "Nowhere is nice to smash into a reef," he said.

"Our charts did not show any reef in that area at all."

Cairns Post 3 Aug 08



**Yacht 'Asolare' – August 2008**



### Case study

### Case study

### ECDIS timeline

- 2011 - 2018
- 2008 - 2010 (high speed craft)

### Starting point – paper charts

Target	Reality
450+ (rationalised from 600)	454 published (but not all the right ones)
All metric / WGS84 / LAT all surveys incorporated	277 metric / WGS84 / LAT 159 with surveys to be incorporated

100 x Aus, 40 x PNG require full recompilation

### Existing charts

### Existing charts

### Existing charts

1952

1945

1978

PNG

### Age and currency

Aus 807, 1:150 000

0 - 150 m difference

### Accuracy

### Old → New → ENC

Imperial

Metric

ENC

### ENC coverage – 2005

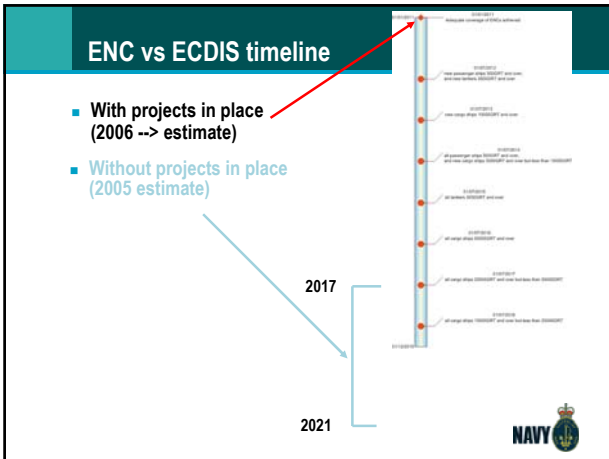
- Swathe capture - Weipa to Cape Weymouth
  - High density data vs S-57 conversion (5 to 20 metres)
- Swathe capture - Cape Weymouth to Bundaberg
  - Paper chart conversion
- 12 – 16 years to do remainder

### ENC vs ECDIS timeline

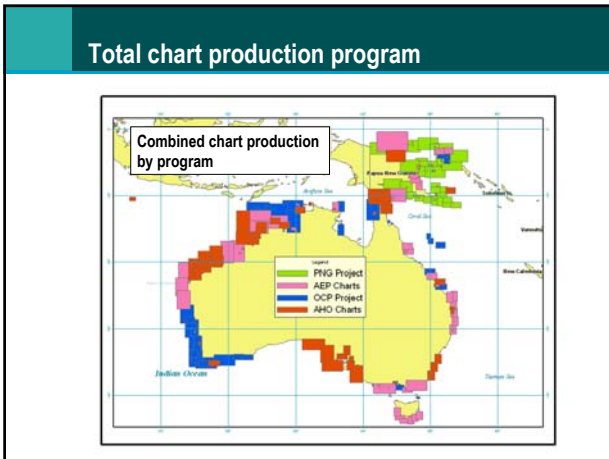
- Without projects in place (2005 estimate)

2017

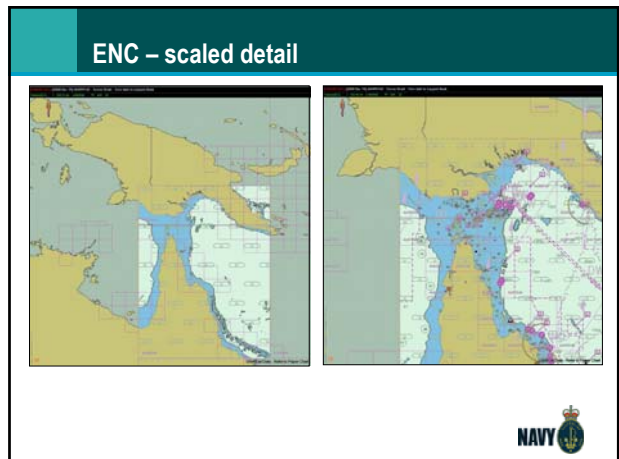
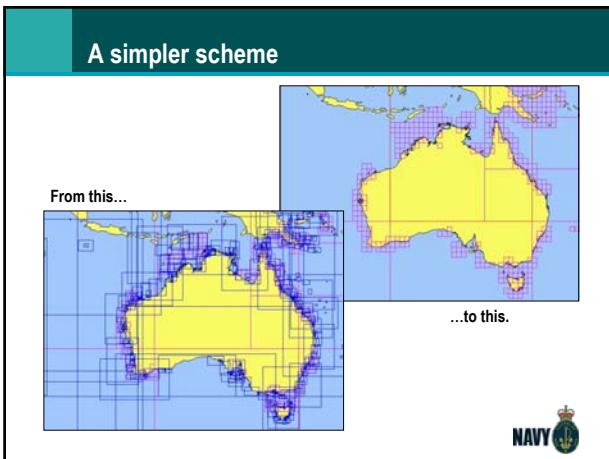
2021



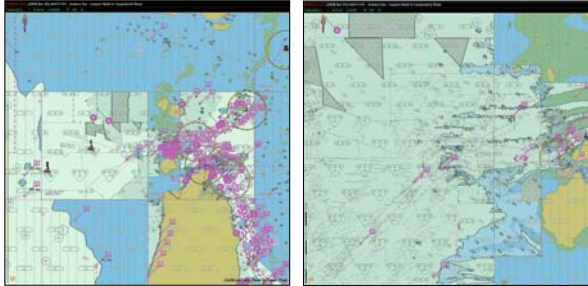
- ### Charting initiatives
- PNG Charting Programme:**
    - \$8M – Asia Development Bank funded
    - 40 charts recompiled + ENC conversion
    - 20 charts direct ENC conversion
    - Chart completion Feb 2008
    - ENC completion Sep 2009
  - Accelerated ENC Project:**
    - \$9M - Defence funded
    - 38 charts direct ENC conversion
    - 180+ charts recompiled + ENC conversion
    - ENC completion Dec 2010
  - Chart reconciliation:**
    - Reconcile charts through all scales from ENCs
    - Add new survey data
- 



- ### ENC scheme – 1, 10 and 30 degree cells
- Navpurpose:**
    - 1-Overview: Route planning, oceanic crossing (30°)
    - 2-General: Navigating oceans, approaching coasts, route planning (10°)
    - 3-Coastal: Navigating along the coastline, either inshore or offshore (1°)
    - 4-Approach: Navigating the approaches to ports or major channels, or through intricate or congested channels (1°)
    - 5-Harbour: Navigating within ports, harbours, bays, rivers and canals, for anchorages
    - 6-Berthing: Detailed data to aid berthing
  - Chart based approach retained for Usage Code 5**
    - Meets mariner requirement for pilotage ("I want to enter Sydney Harbour")
- 
- 



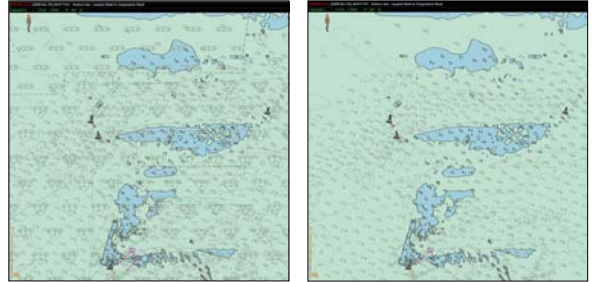
### ENC- layered for larger scales



Gannet and Varzin Passages



### ENC – selectable display

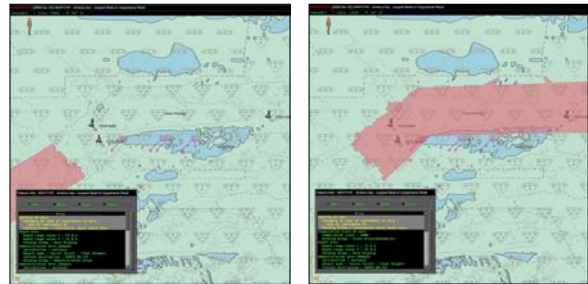


Additional

Traditional



### ENC – additional information



+/- 1 metre

+/- 0.5 metres



### ENC – safety depth

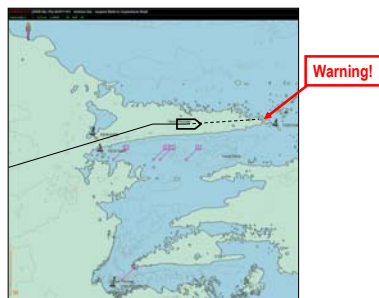


8 metres

11 metres



### ENC – smart data



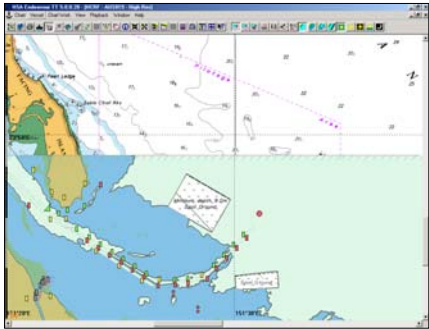
Look ahead + safety depth



### Port ENC – additional contours

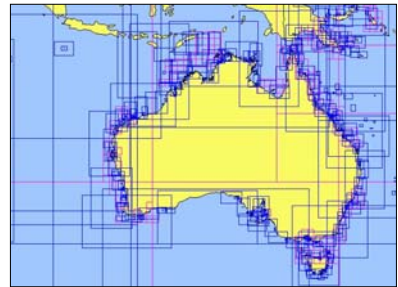


## Dual fuel – ENC plus RNC



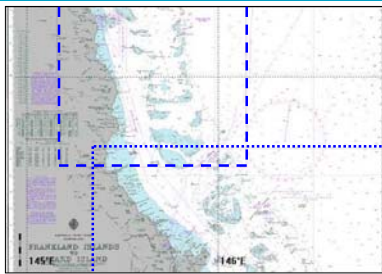
## Paper charts

- At least 2020
- Review of scales and coverage
- Reduce number
- Revised pricing
- Printing review

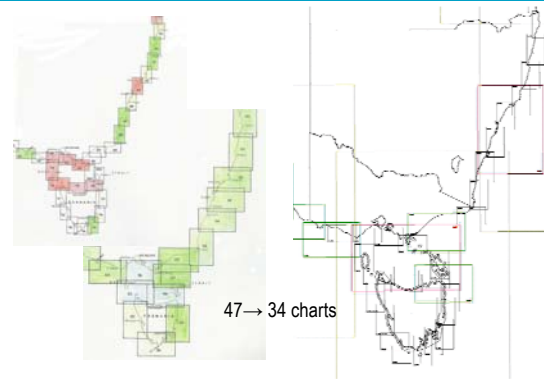


## Review

- Coastal:
  - Full coastal coverage 1:150 000 or 1:300 000
- Intermediate:
  - Selected coverage 1:500 000
- Ocean passage:
  - Full coverage at 1: 1 500 000
- plus:
  - ports, plans etc
- 650 → 400 charts



## New scheme 150K or 300K, plus 500K



## The future

- Initial metric / WGS84 ENC coverage by end 2010 (not all to LAT, but will match paper chart datum where OK)
- Create seamless database
- Future surveys and data to then progressively replace 2011 load
- New Editions of paper charts and ENCs to be compiled from pre-2011 charted bathymetry plus new source data
- New Editions of paper charts and ENC all to LAT
- Expand 1 metre contour areas
- ENC Berthing Charts



"A General Chart", published 1784  
containing data from 1619 to 1780 and made available to the First Fleet in 1787

