

ECDIS Display and Alarm Issues



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HYDROGRAPHIC OFFICE

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Dec 2011

Covering Note

- The following ECDIS display and alarm issues came to light purely by chance as a result of routine UKHO procedures for investigating reports of marine accidents for possible charting implications.
- None of the following examples have been the cause of any marine accident – they simply represent “what if” scenarios.



ISSUE 1 – DOES NOT DISPLAY BUT DOES ALARM

Wreck coincident with a depth contour

- This example came to light in January 2009 as a result of an enquiry from IHB regarding the encoding of a 1.8m wreck on a GB ENC.
- The enquiry was prompted by the MAIB report on the grounding of P&O ferry “Pride of Canterbury” off the Kent coast in January 2008.



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557 settings

Overscale pattern | Technical | Special Effects

Presentation

Points:

Areas/Line:

Layers

Colour scheme:

Display

Lights Full sector lengths

Accuracy pattern Accuracy symbols

Important text Other text

Safety contour labels Depth contour labels

Dangerous soundings Non dang. soundings

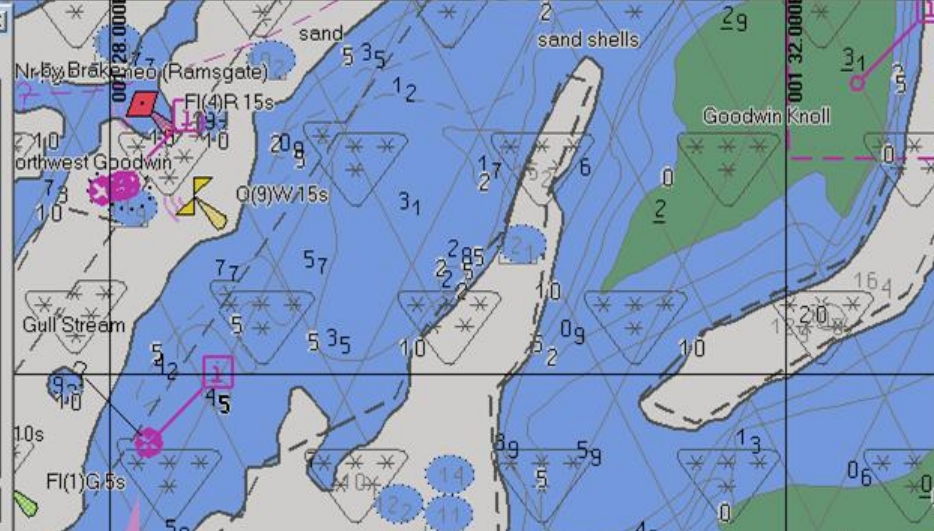
Isolated dangers in shallow waters

Shallow pattern Overscale pattern

Information points Symbol failed

Grid Chart borders

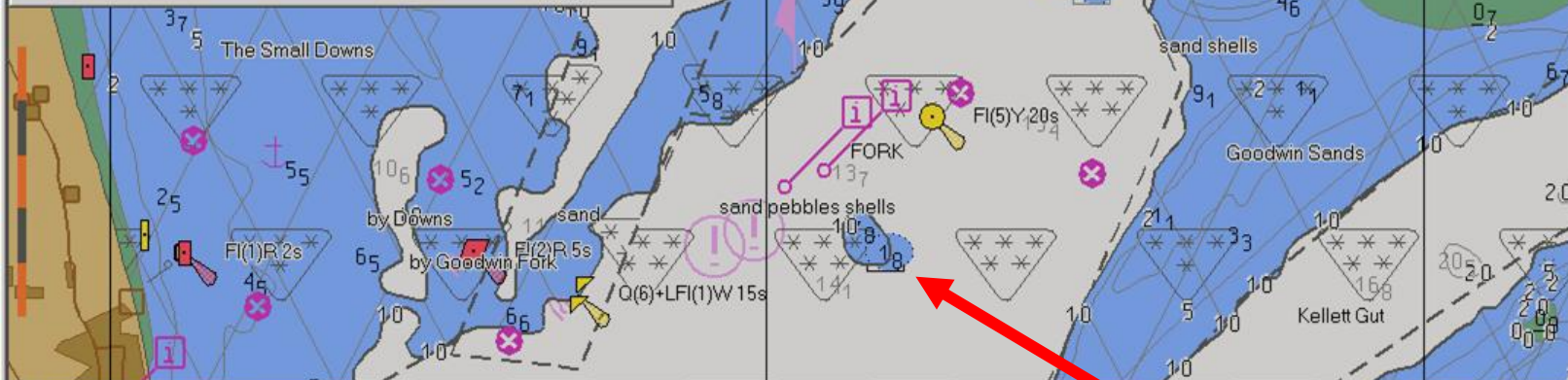
English names Local names



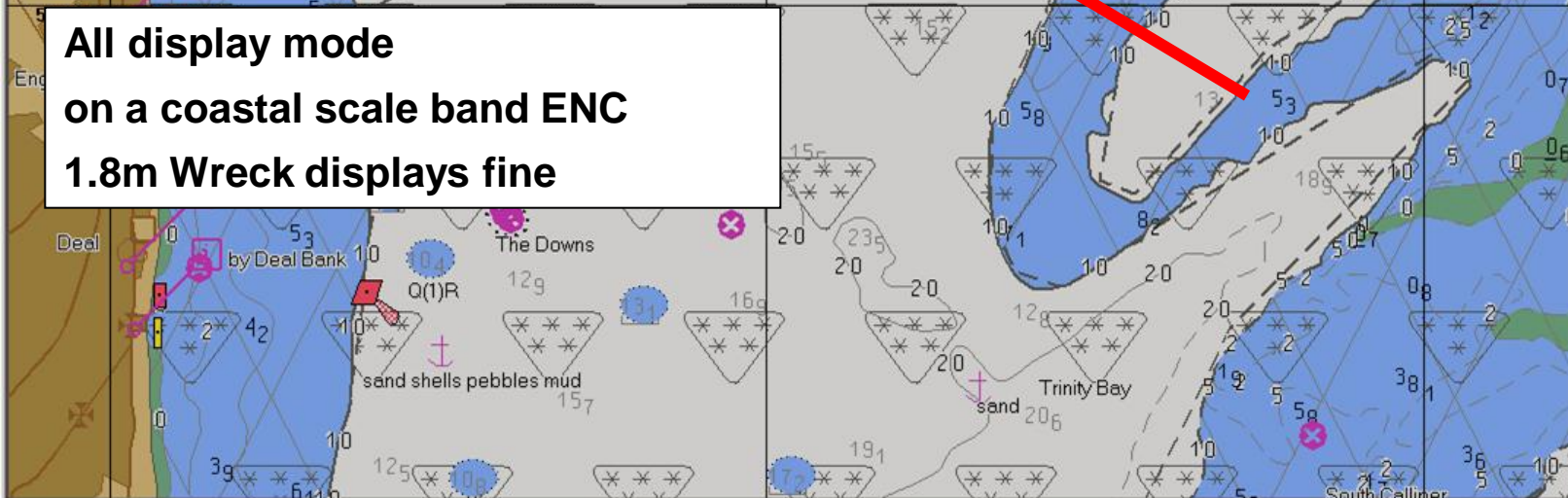
Lat: 51 14.114N
Lon: 001 29.305E
SC: 2570.24 nm 014.9

Legend | Editors | Radar

Vectors: TRUE 1 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 10.00
Safety contour: 10.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A



**All display mode
on a coastal scale band ENC
1.8m Wreck displays fine**



Overscale pattern Technical Special Effects

Projection: Cylindrical

Depths

Use two colours for shallow waters

Deep contour, m: 30

Safety contour, m: 10

Shallow contour, m: 2

Safety depth, m: 10

Safety height, m: 10

OK

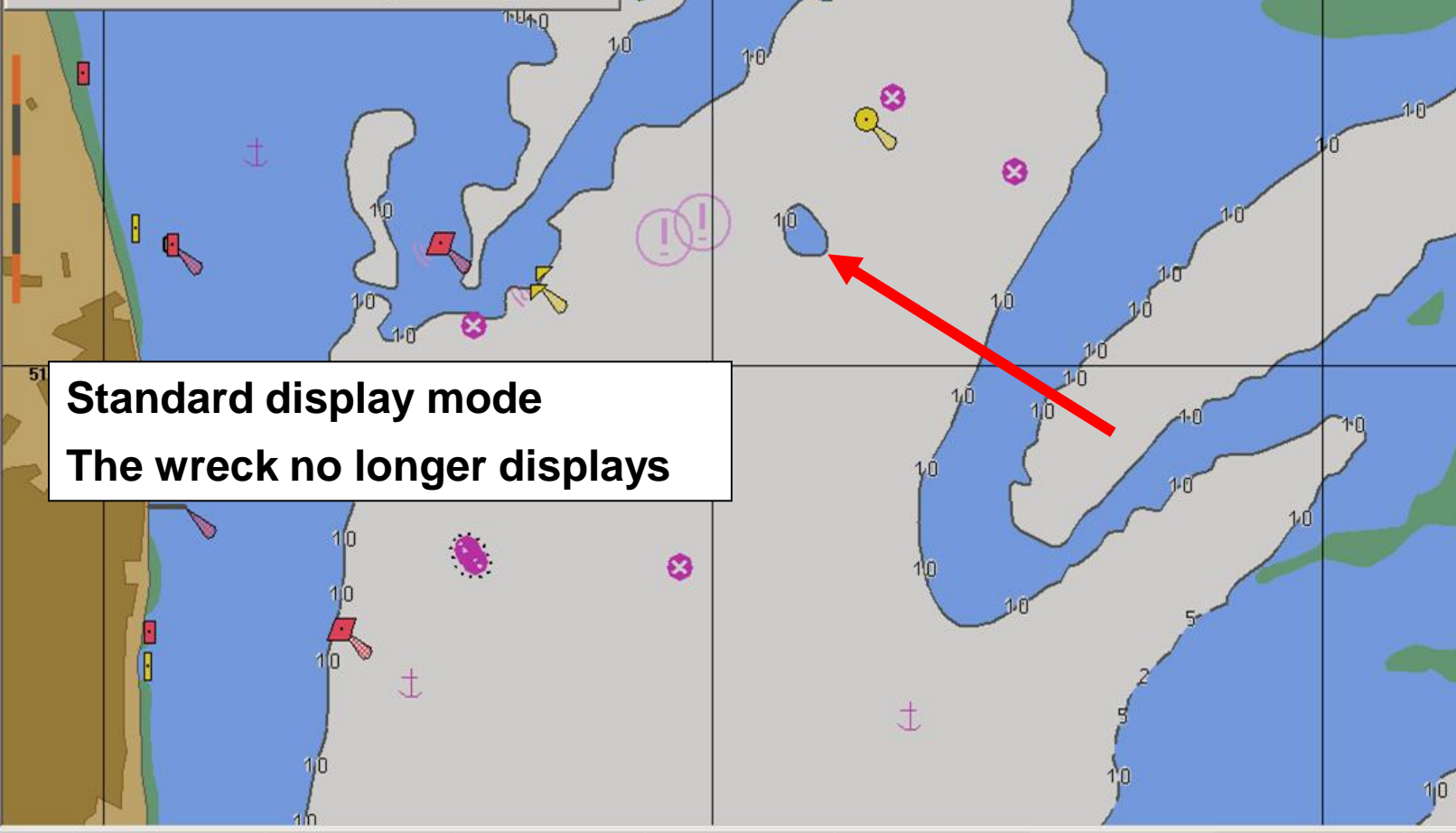
Cancel

Apply

Lat: 51 15.250N
Lon: 001 26.592E
SC: 2572.13 nm 015.2

Legend Editors Radar

Vectors: TRUE 1 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 10.00
Safety contour: 10.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A



Standard display mode
The wreck no longer displays

S57 settings

Overscale pattern Technical Special Effects

Projection: Cylindrical

Depths

Use two colours for shallow waters

Deep contour, m: 30

Safety contour, m: 5

Shallow contour, m: 2

Safety depth, m: 5

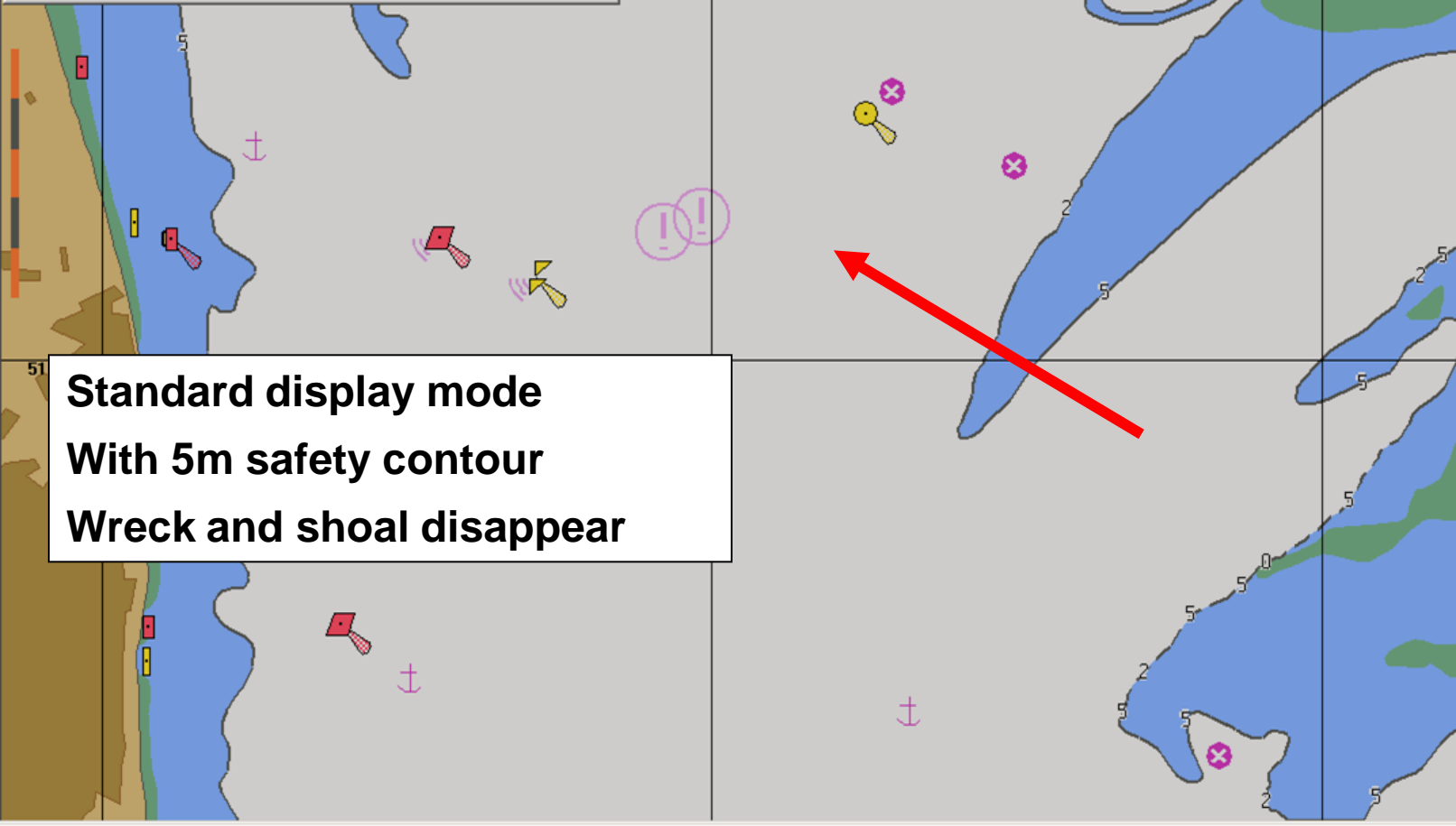
Safety height, m: 10

OK Cancel Apply

Lat: 51 16.091N
Lon: 001 29.216E
SC: 2573.57 nm 015.2

Legend Editors Radar

Vectors: TRUE 1 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 5.00
Safety contour: 5.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A

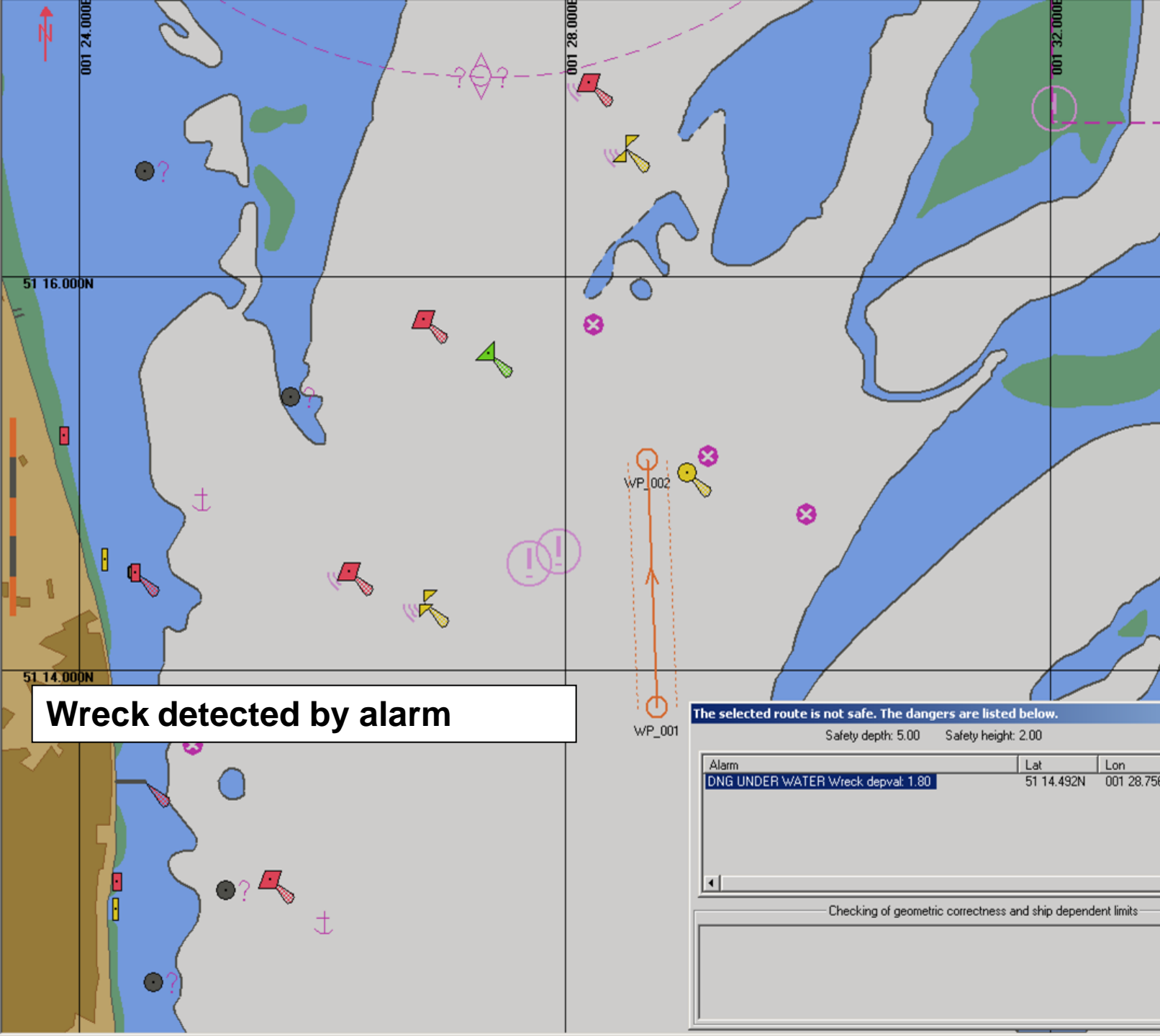


Standard display mode
With 5m safety contour
Wreck and shoal disappear

Lat: 51 17.563N
Lon: 001 33.277E
SC: 3057.95 nm 001.4

Legend Editors Radar

Vectors: TRUE 6 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 5.00
Safety contour: 5.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A



Wreck detected by alarm

The selected route is not safe. The dangers are listed below.

Safety depth: 5.00 Safety height: 2.00

| Alarm | Lat | Lon | Leg |
|------------------------------------|------------|-------------|-----------------|
| DNG UNDER WATER Wreck depval: 1.80 | 51 14.492N | 001 28.756E | WP_001...WP_002 |

Check route
Settings
Highlight all alarms
Close

Checking of geometric correctness and ship dependent limits

ISSUE 2 – DOES NOT DISPLAY OR ALARM

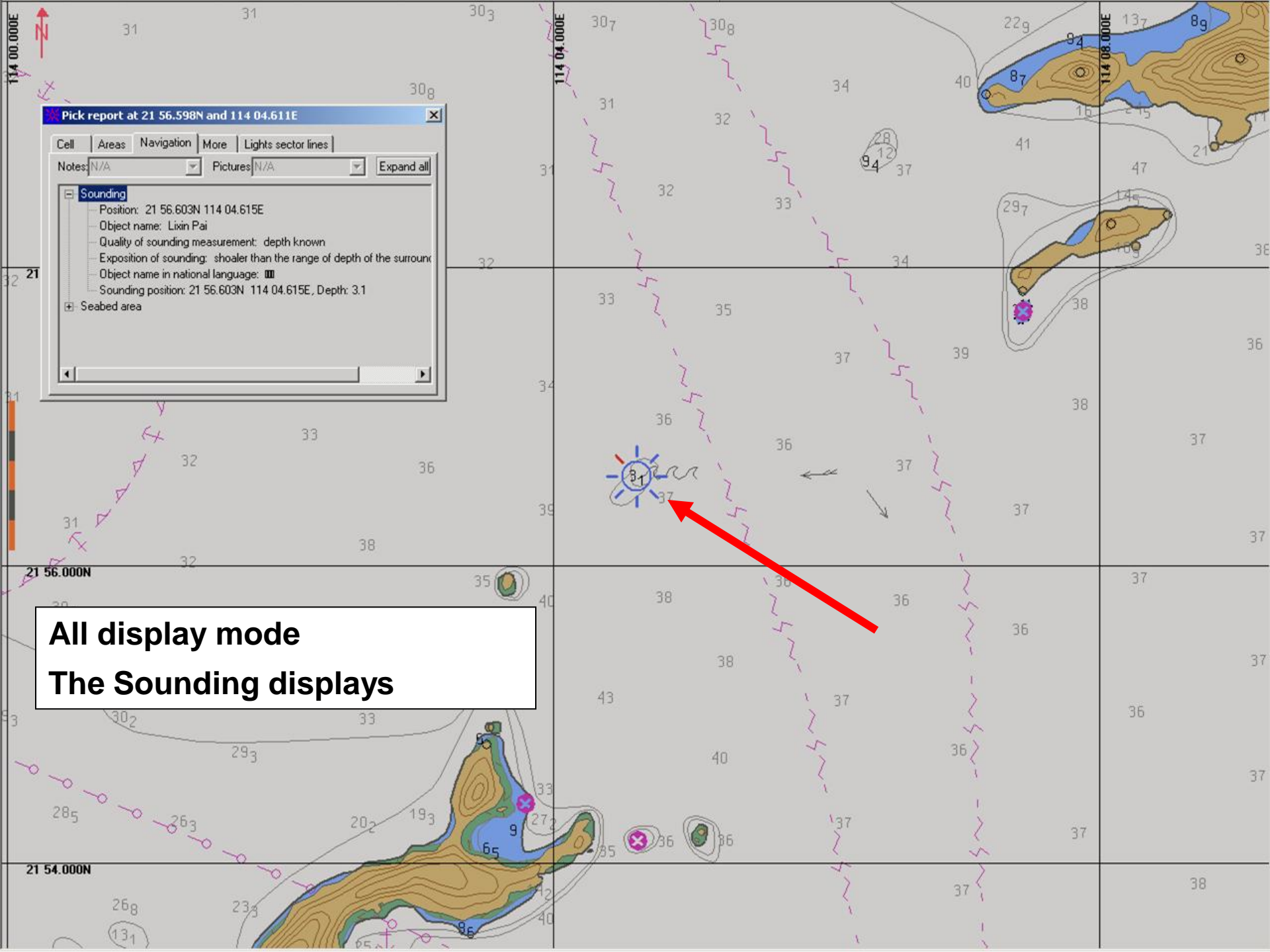
Soundings with EXPSOU=2

- This example came to light during a visit by MAIB in January 2010.
- MAIB chose to look at an area in the approaches to Hong Kong where the MV “Cosco Hong Kong” grounded on a 3.1m shoal in March 2009.

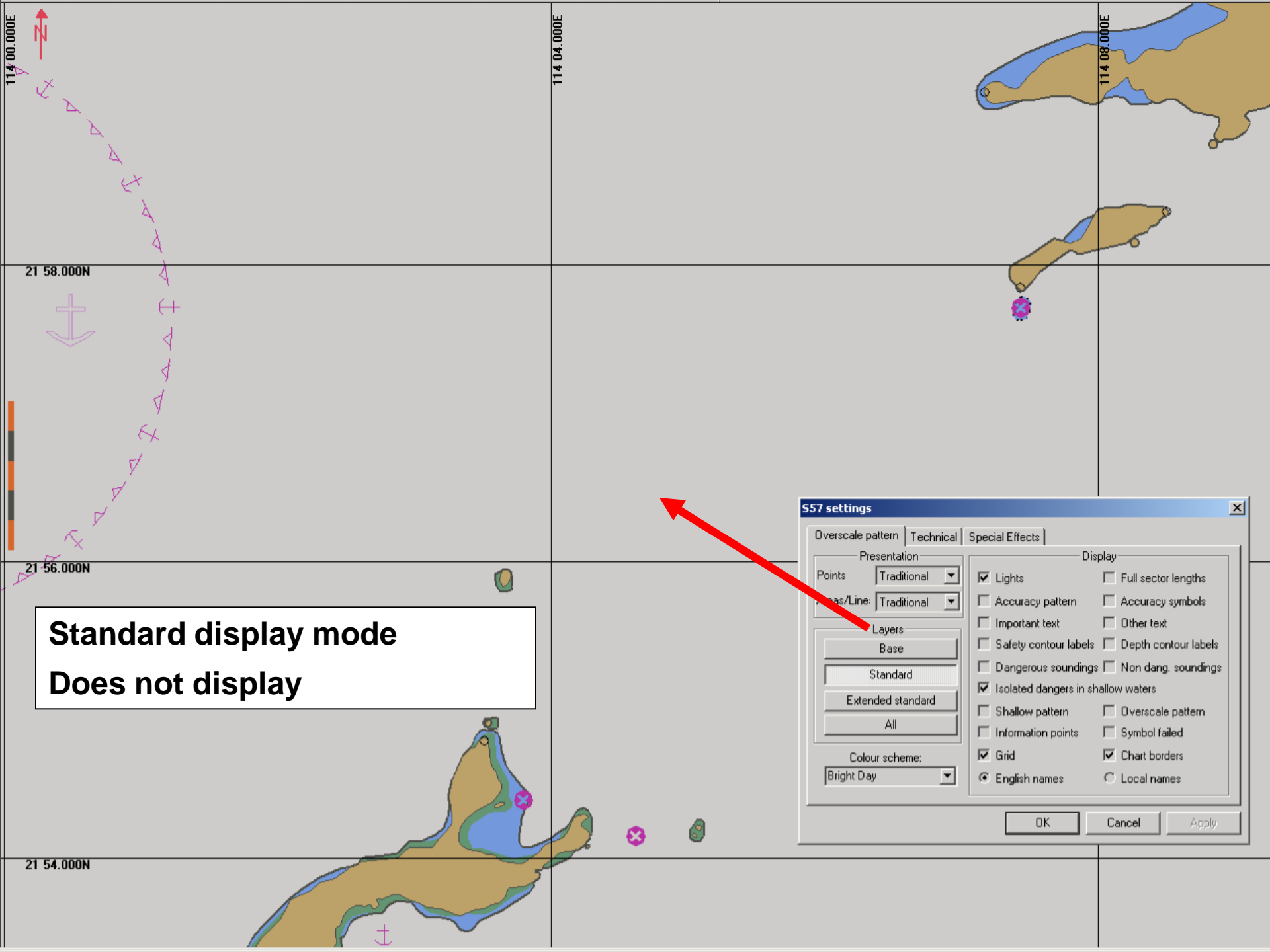
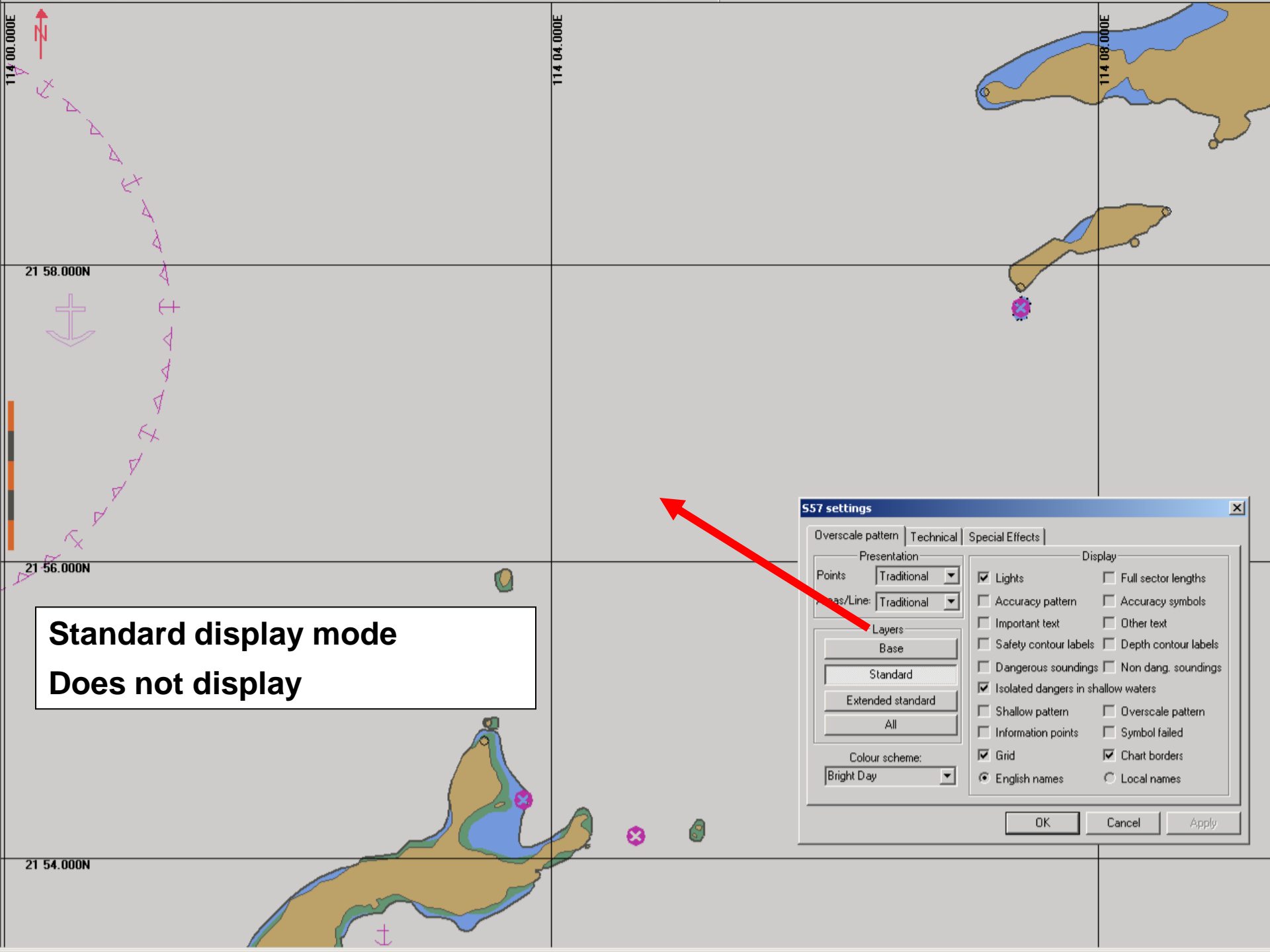


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All display mode
The Sounding displays



**Standard display mode
Does not display**

557 settings

Overscale pattern | **Technical** | Special Effects

Presentation
Points: Traditional
Areas/Line: Traditional

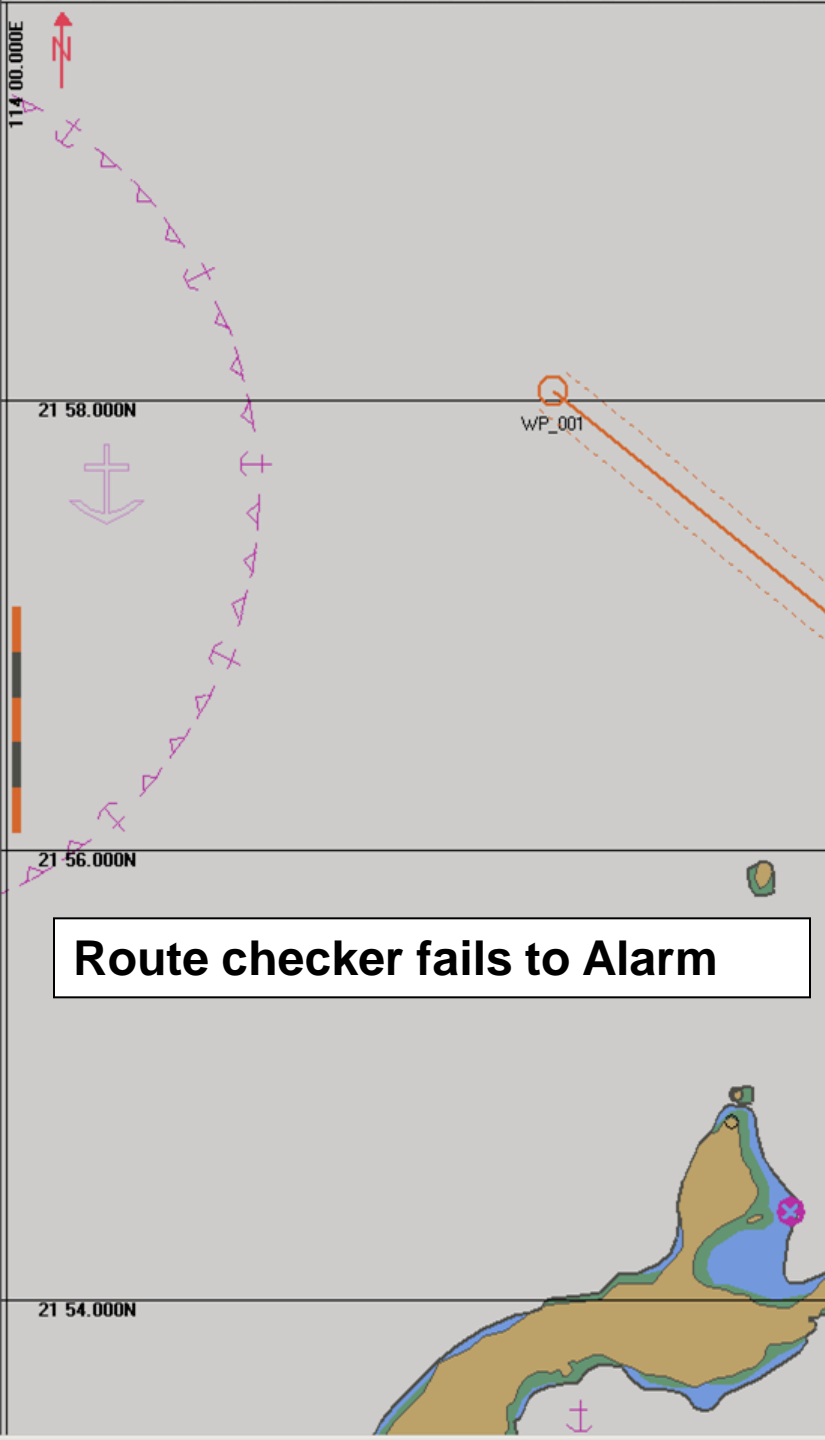
Layers
Base
Standard
Extended standard
All

Colour scheme:
Bright Day

Display

| | |
|--|---|
| <input checked="" type="checkbox"/> Lights | <input type="checkbox"/> Full sector lengths |
| <input type="checkbox"/> Accuracy pattern | <input type="checkbox"/> Accuracy symbols |
| <input type="checkbox"/> Important text | <input type="checkbox"/> Other text |
| <input type="checkbox"/> Safety contour labels | <input type="checkbox"/> Depth contour labels |
| <input type="checkbox"/> Dangerous soundings | <input type="checkbox"/> Non dang. soundings |
| <input checked="" type="checkbox"/> Isolated dangers in shallow waters | |
| <input type="checkbox"/> Shallow pattern | <input type="checkbox"/> Overscale pattern |
| <input type="checkbox"/> Information points | <input type="checkbox"/> Symbol failed |
| <input checked="" type="checkbox"/> Grid | <input checked="" type="checkbox"/> Chart borders |
| <input checked="" type="checkbox"/> English names | <input type="checkbox"/> Local names |

OK Cancel Apply



Route is safe

Safety depth: 10.00 Safety height: 2.00

| Alarm | Lat | Lon | Leg |
|-----------|-----|-----|-----|
| No alarms | N/A | N/A | N/A |

Check route
Settings
Highlight all alarms
Close

Checking of geometric correctness and ship dependent limits

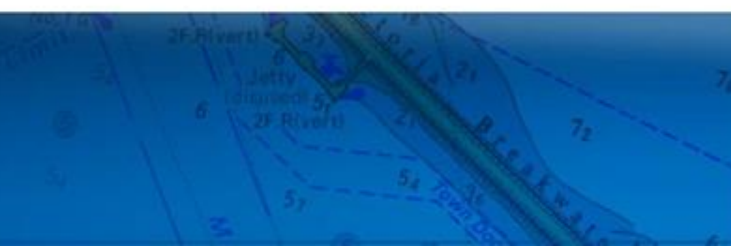
| Alarm | Leg |
|-----------|-----|
| No alarms | N/A |



ISSUE 3 – DOES NOT DISPLAY OR ALARM

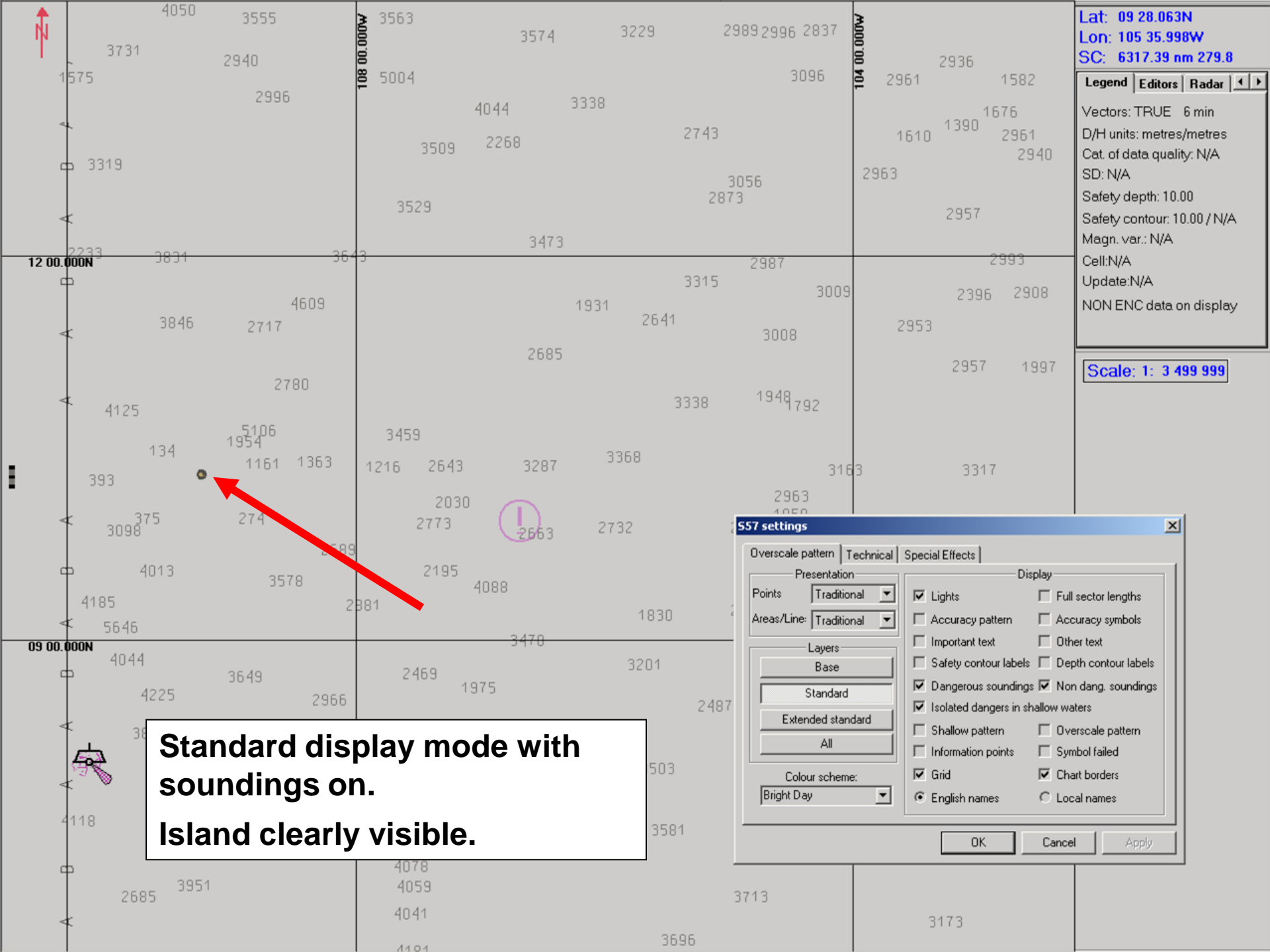
LNDARE objects with point geometry

- This next example came to light following receipt of a Hydrographic Note in April 2010.
- The H Note was sent in by chemical tanker “Sichem Osprey” following a grounding on Île Clipperton in February 2010.
- Île Clipperton is a small French atoll in the Pacific Ocean, about 1300km off the coast of Mexico.
- Accident Investigation Report shows ECDIS was not the cause of this incident





Sichern Osprey aground on the reef at Clipperton Island near Clipperton Rock



Lat: 09 28.063N
Lon: 105 35.998W
SC: 6317.39 nm 279.8

Legend | **Editors** | **Radar** | **◀** | **▶**

Vectors: TRUE 6 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 10.00
Safety contour: 10.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A
NON ENC data on display

Scale: 1: 3 499 999

Standard display mode with soundings on. Island clearly visible.

S57 settings

Overscale pattern | **Technical** | Special Effects

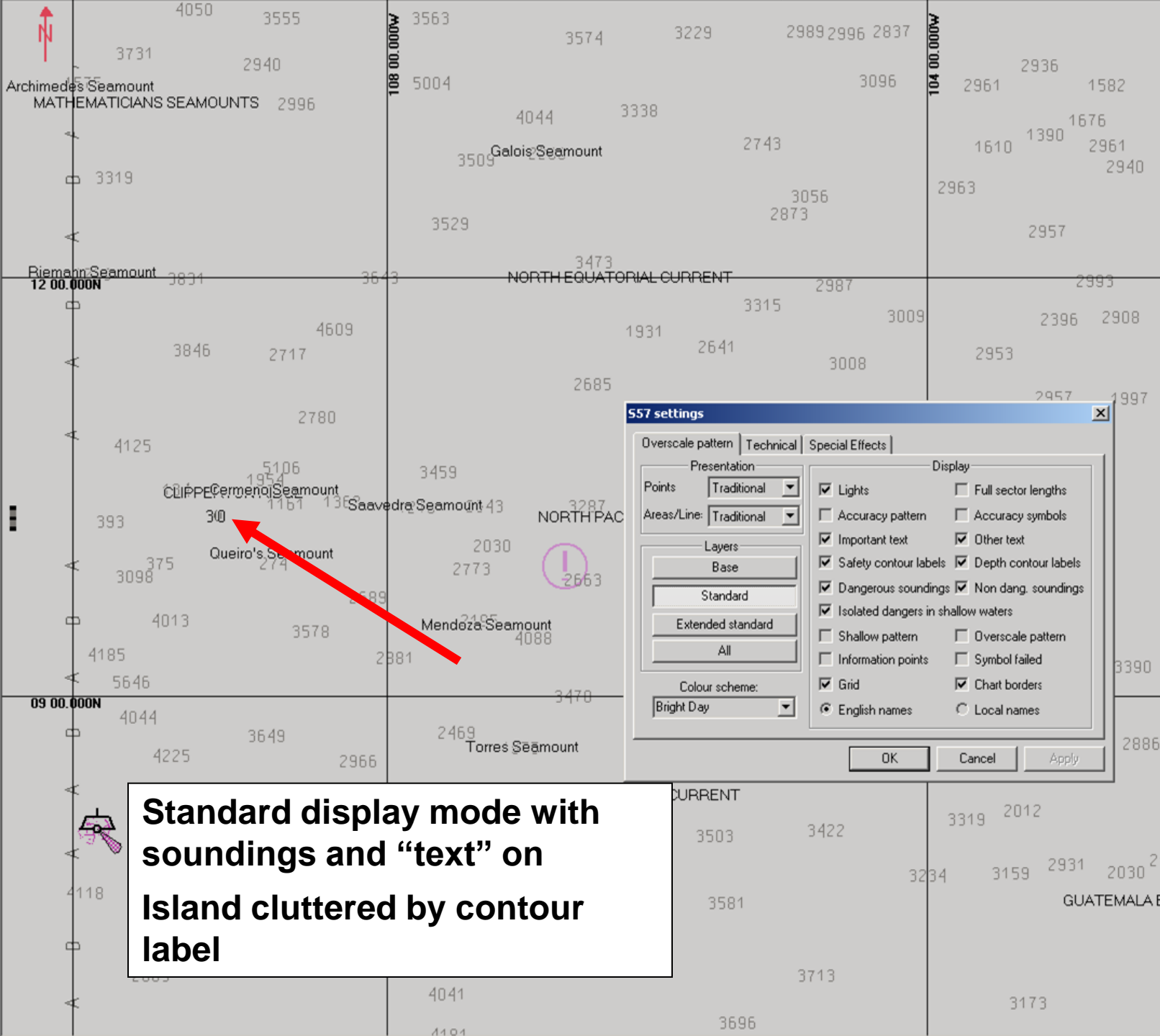
Presentation
Points: Traditional
Areas/Line: Traditional

Layers
Base
Standard
Extended standard
All

Colour scheme:
Bright Day

Display
 Lights Full sector lengths
 Accuracy pattern Accuracy symbols
 Important text Other text
 Safety contour labels Depth contour labels
 Dangerous soundings Non dang. soundings
 Isolated dangers in shallow waters
 Shallow pattern Overscale pattern
 Information points Symbol failed
 Grid Chart borders
 English names Local names

OK Cancel Apply



Lat: 13 20.041N
Lon: 102 40.737W
SC: 6133.20 nm 283.6

Legend Editors Radar

Vectors: TRUE 6 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 10.00
Safety contour: 10.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A
NON ENC data on display

S57 settings

Overscale pattern Technical Special Effects

Presentation
Points: Traditional
Areas/Line: Traditional

Layers
Base
Standard
Extended standard
All

Colour scheme:
Bright Day

Display
 Lights Full sector lengths
 Accuracy pattern Accuracy symbols
 Important text Other text
 Safety contour labels Depth contour labels
 Dangerous soundings Non dang. soundings
 Isolated dangers in shallow waters
 Shallow pattern Overscale pattern
 Information points Symbol failed
 Grid Chart borders
 English names Local names

OK Cancel Apply

Standard display mode with soundings and "text" on Island cluttered by contour label

Lat: 12 42.245N
Lon: 104 24.933W
SC: 6236.93 nm 283.1

Legend **Editors** **Radar** ◀ ▶

Vectors: TRUE 6 min
D/H units: metres/metres
Cat. of data quality: N/A
SD: N/A
Safety depth: 10.00
Safety contour: 10.00 / N/A
Magn. var.: N/A
Cell: N/A
Update: N/A
NON ENC data on display

Route checker fails to Alarm

Route is safe [X]

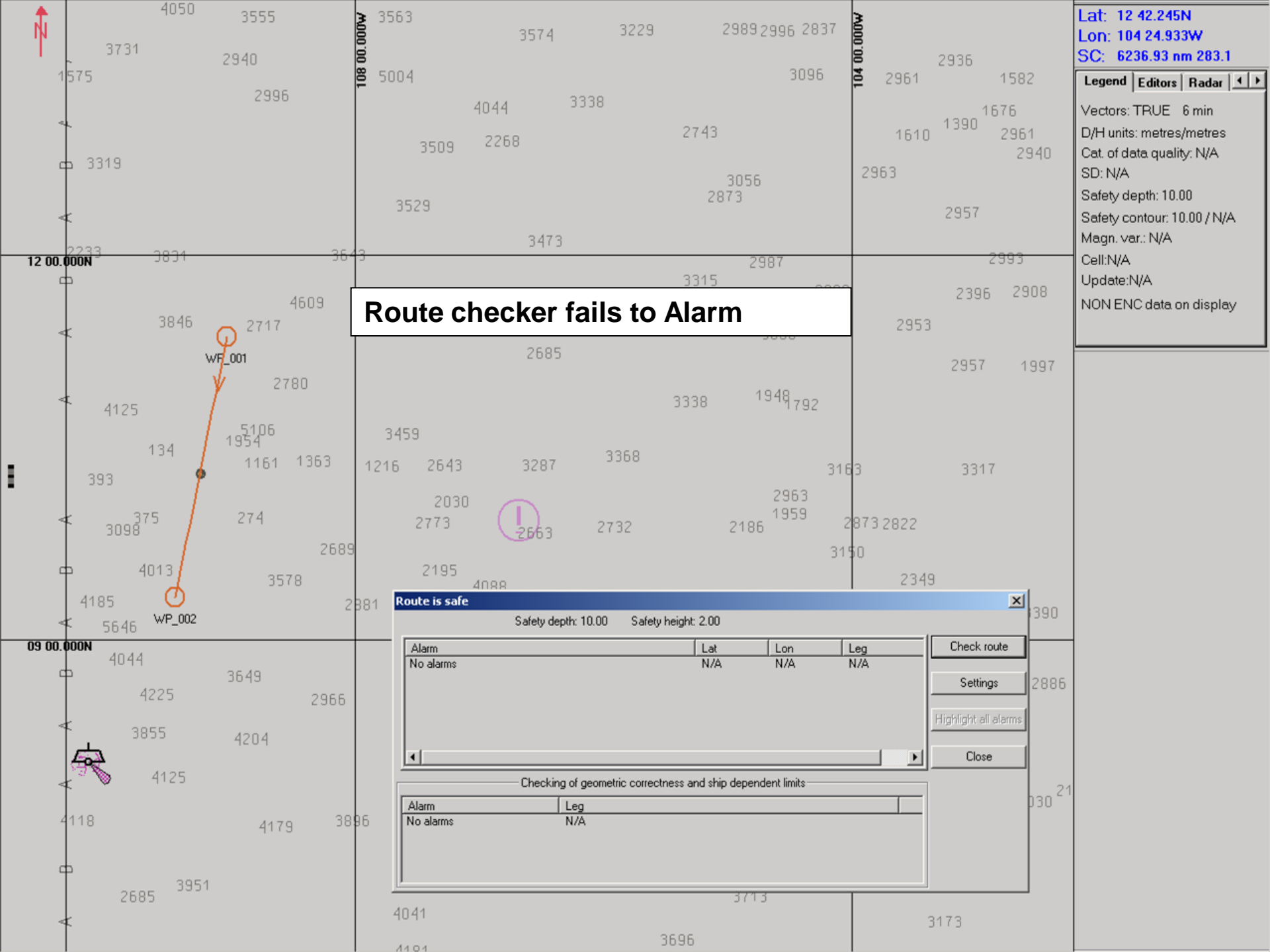
Safety depth: 10.00 Safety height: 2.00

| Alarm | Lat | Lon | Leg |
|-----------|-----|-----|-----|
| No alarms | N/A | N/A | N/A |

Check route
Settings
Highlight all alarms
Close

Checking of geometric correctness and ship dependent limits

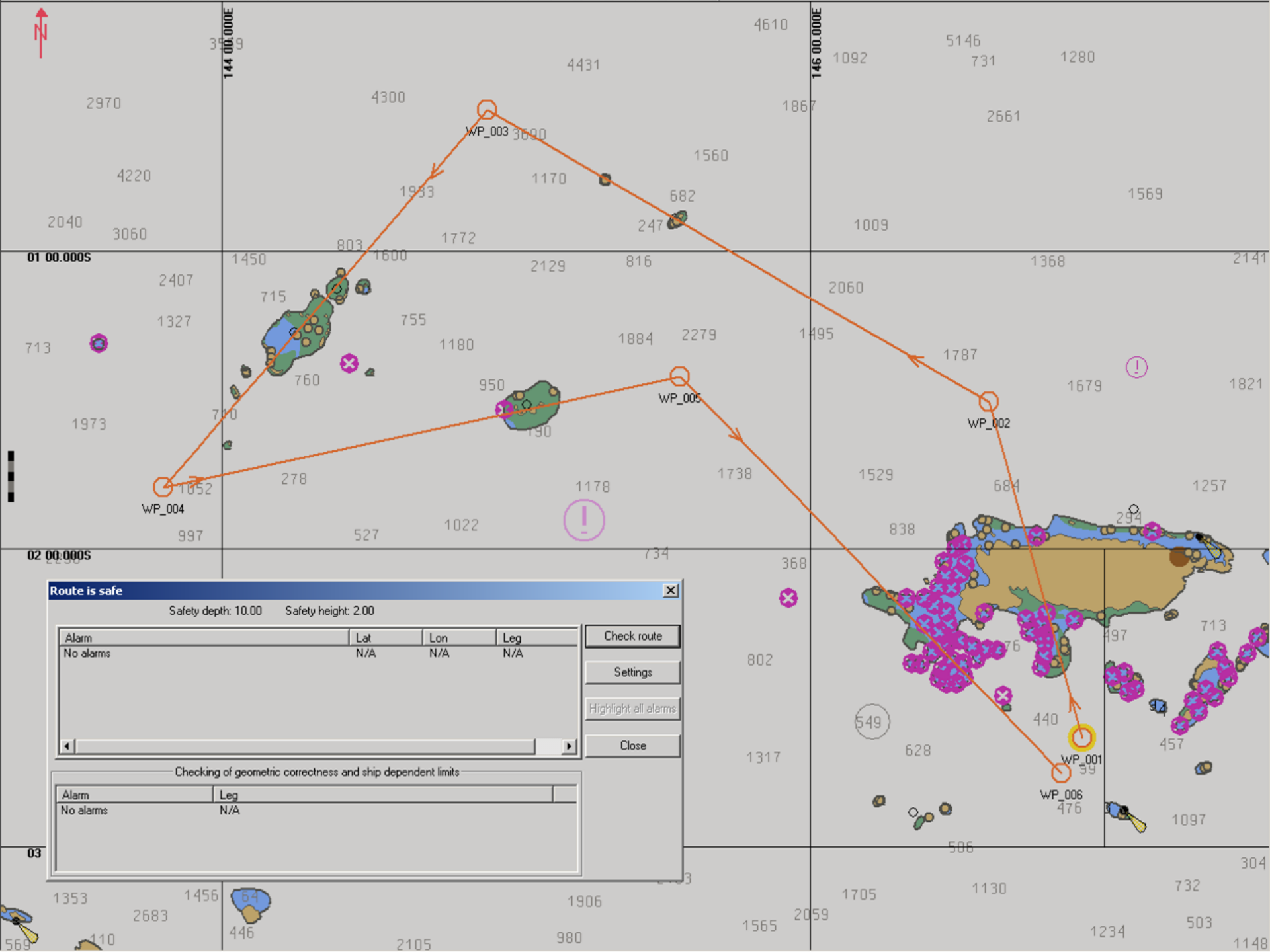
| Alarm | Leg |
|-----------|-----|
| No alarms | N/A |



Route checking on small scale ENC's

- On further investigation, we found that some OEMs have implemented route checking with a scale limit.
- These scale limits have been implemented in different ways by different OEMs.
- IEC 61174 states: “The largest scale data available...shall always be used by the ECDIS for all alarms...”
- In many areas, small scale ENC's in usage band 1 or 2 represent the largest scale chart data available.





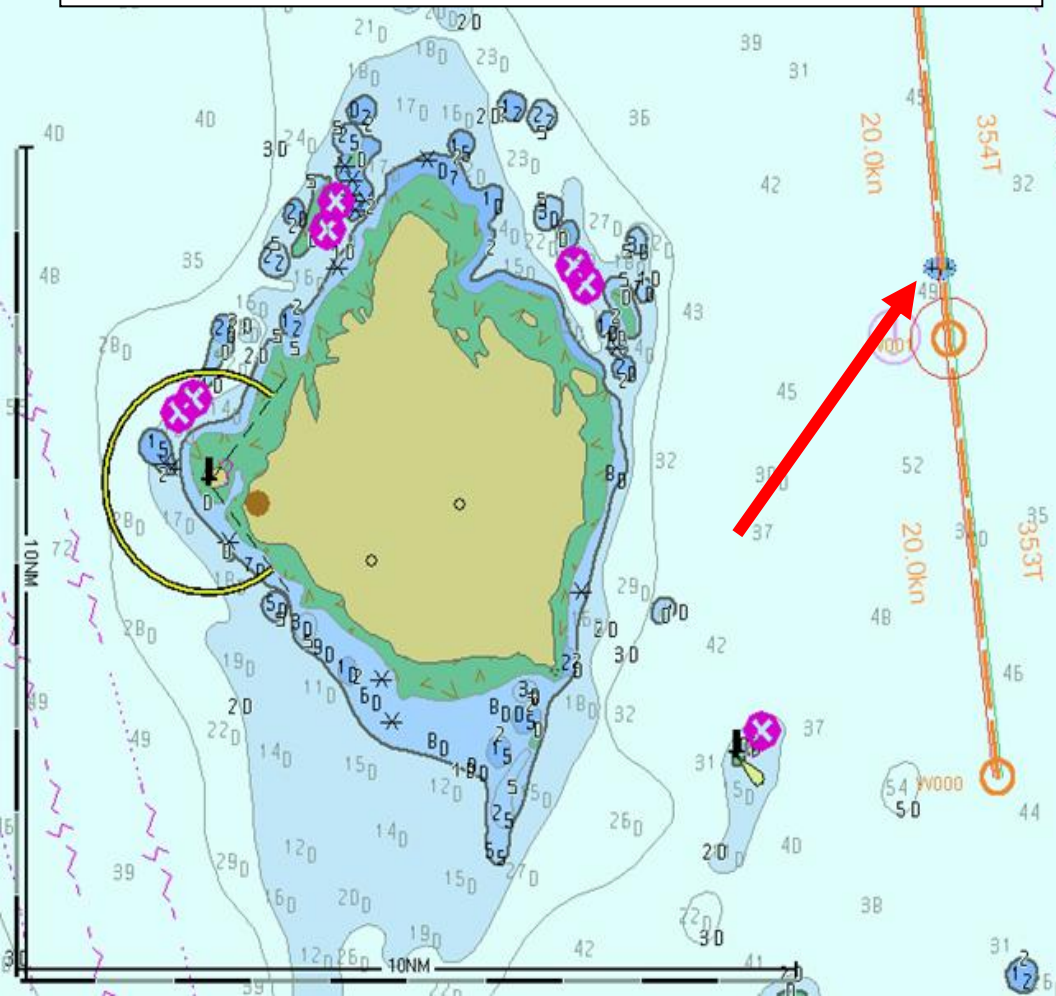
Limited Systematic Analysis

- The previous examples came to light purely by chance.
- UKHO Safety & Quality and Operations Standards branches therefore carried out a more systematic analysis, but still limited just to:
 - display and alarm functionality
 - potentially hazardous underwater features (64 test cases)
 - on a small number of ECDIS systems representing some the main suppliers in the market



Issue: Doesn't always display and doesn't alarm

**Safety Contour and Safety Depth=10m
Dangerous Wreck, depth unknown
Display Mode = OTHER**

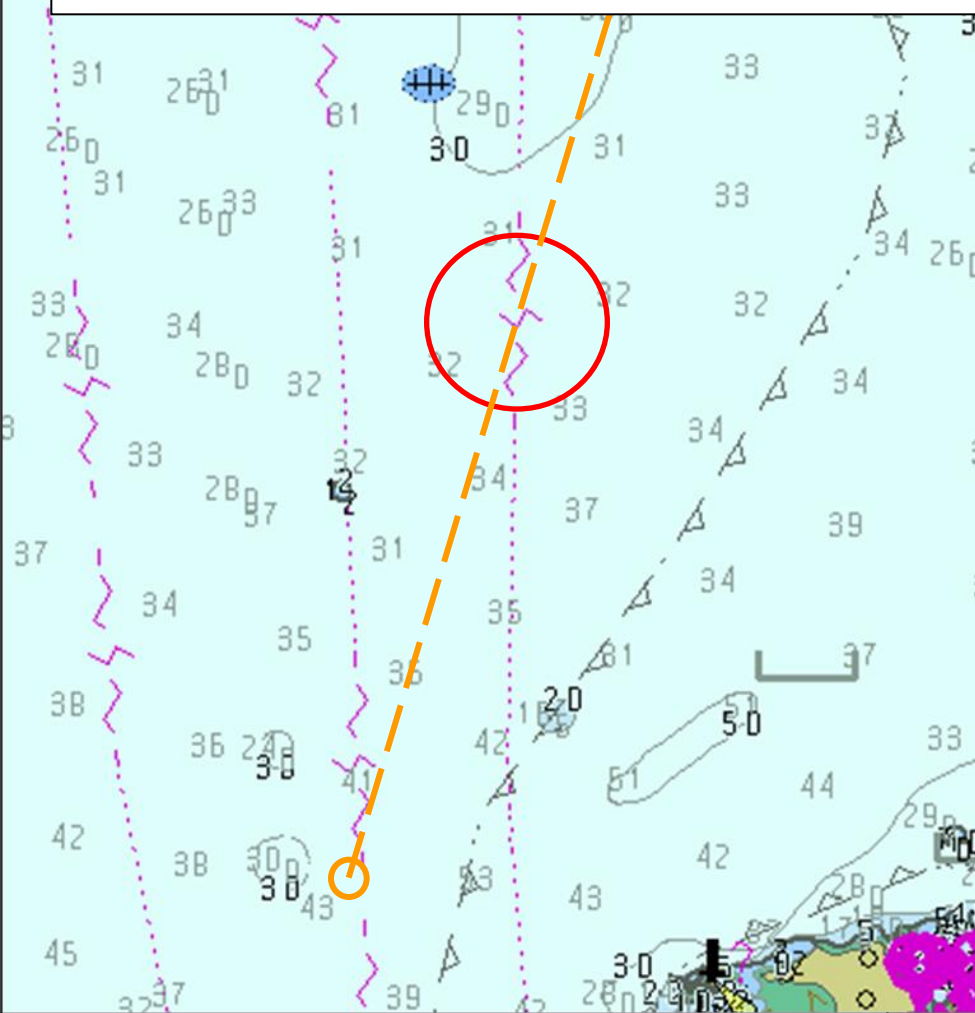


This ROUTE cross neither safety depth nor dangerous area.

This check is just an advice to your navigation.
Any judgment regarding safety navigation must be made by mariners.

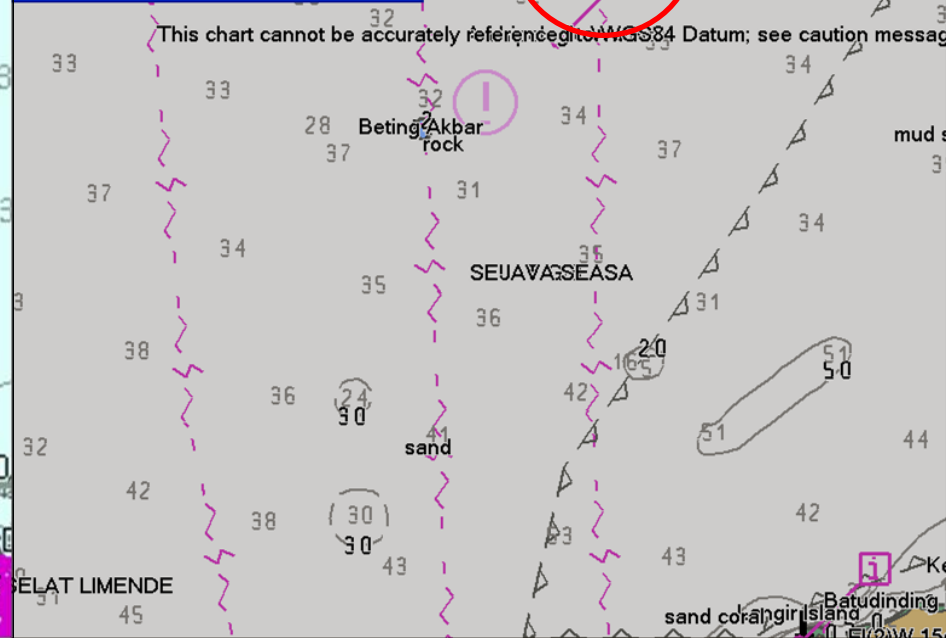
OK

Issue: Doesn't display but does alarm
Stranded Wreck



Report at 02 30.7045 and 107 06.863E

| | |
|-------------------------|------------------------|
| Chart ID: 300063.000 | Depth units: metres |
| Scale: 180 000 | Agency code: 0 |
| Edition number: 1 | Issue date: 2010/02/10 |
| Update date: 2010/02/10 | Version: 10.1 |
| South: 03 40 137S | East: 107 50 082E |

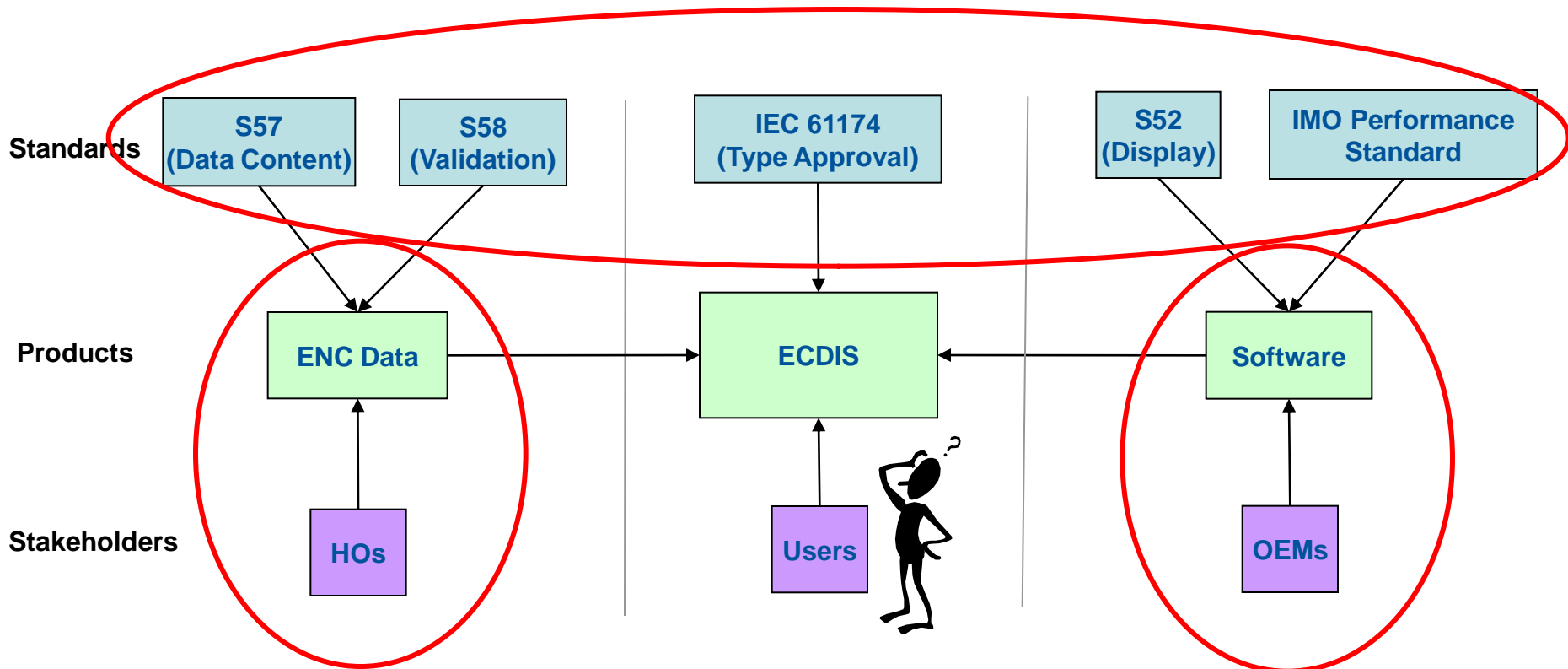


This chart cannot be accurately referenced to WGS84 Datum; see caution message



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UKHO has some influence over the development of these standards



UKHO has full control over UKHO-produced ENCs;
only limited control over FGHO-produced ENCs

UKHO has little or no influence over the
development of ECDIS software



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Summary of actions

- MCA and IHO informed as and when issues were first discovered
- RNWs issued (Navarea I warnings 37/10, 230/10, 317/10)
- Papers submitted to IMO MSC88 (Dec 2010) and MSC89 (May 2011)
- Dec 2010: IMO MSC circular on “ECDIS Anomalies” issued (MSC.1/Circ.1391)
- Feb 2011: MCA Marine Information Note on “Reporting Operating Anomalies Identified within ECDIS” issued (MIN 406 M+F)
- Oct 2011: Simple ENC check dataset issued by IHO

