

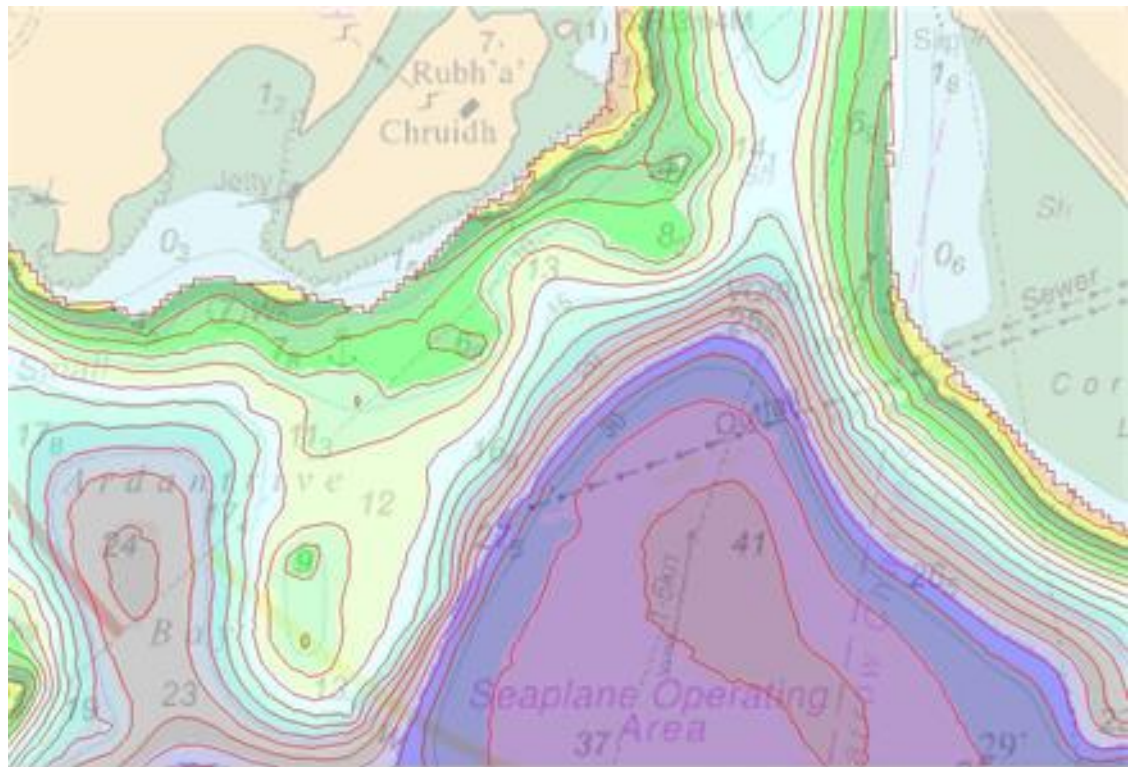


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Automated contouring algorithm

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ENCWG 3, Wollongong AU





Context

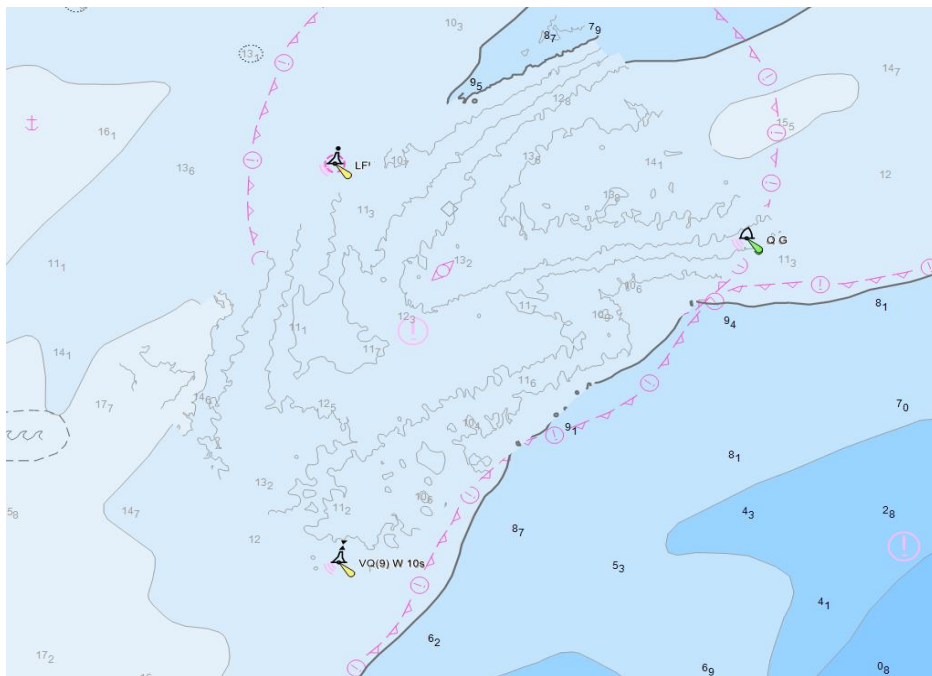
Increasing customer demand

- › More contour intervals – Safety contour
- › Speed of delivery

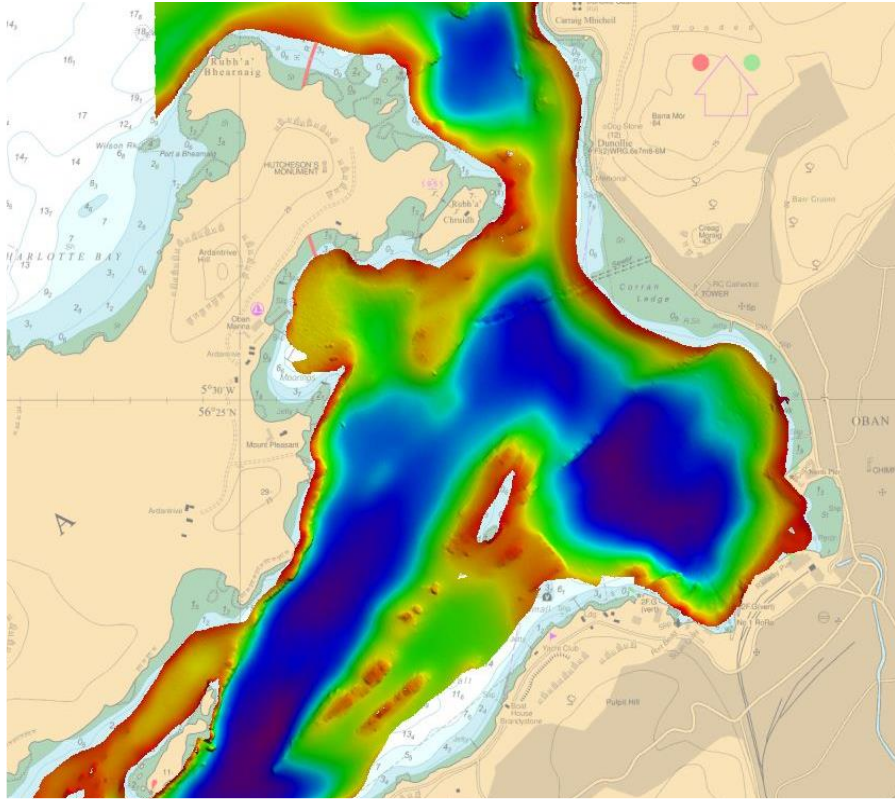
More data available

- › Autonomous surveying
- › Satellite Derived Bathymetry

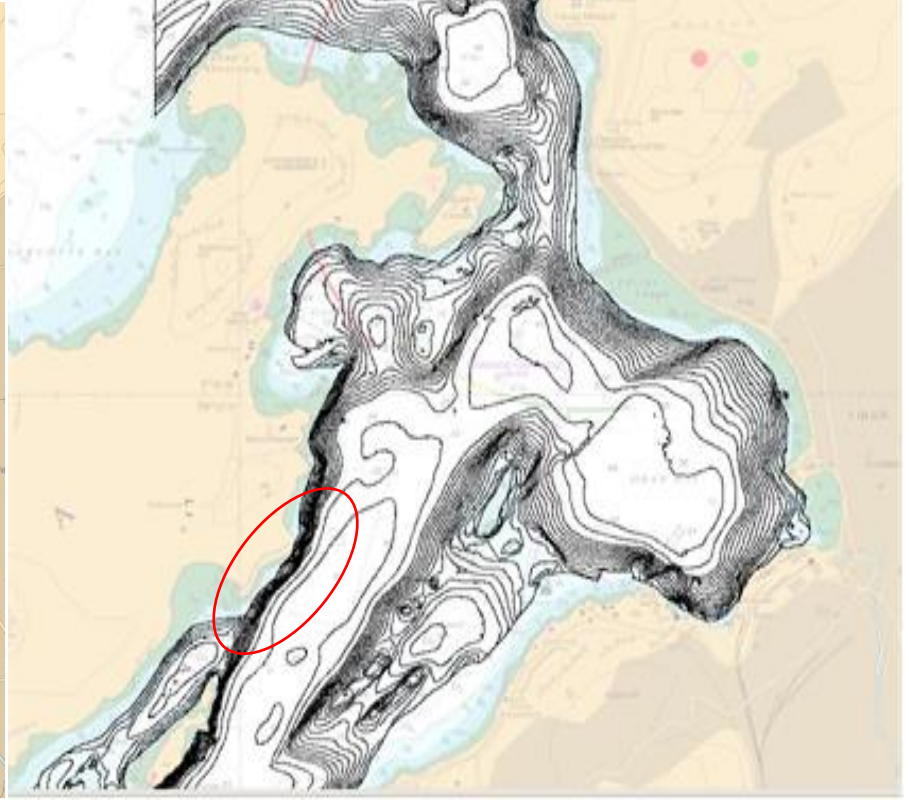
Same resourcing levels



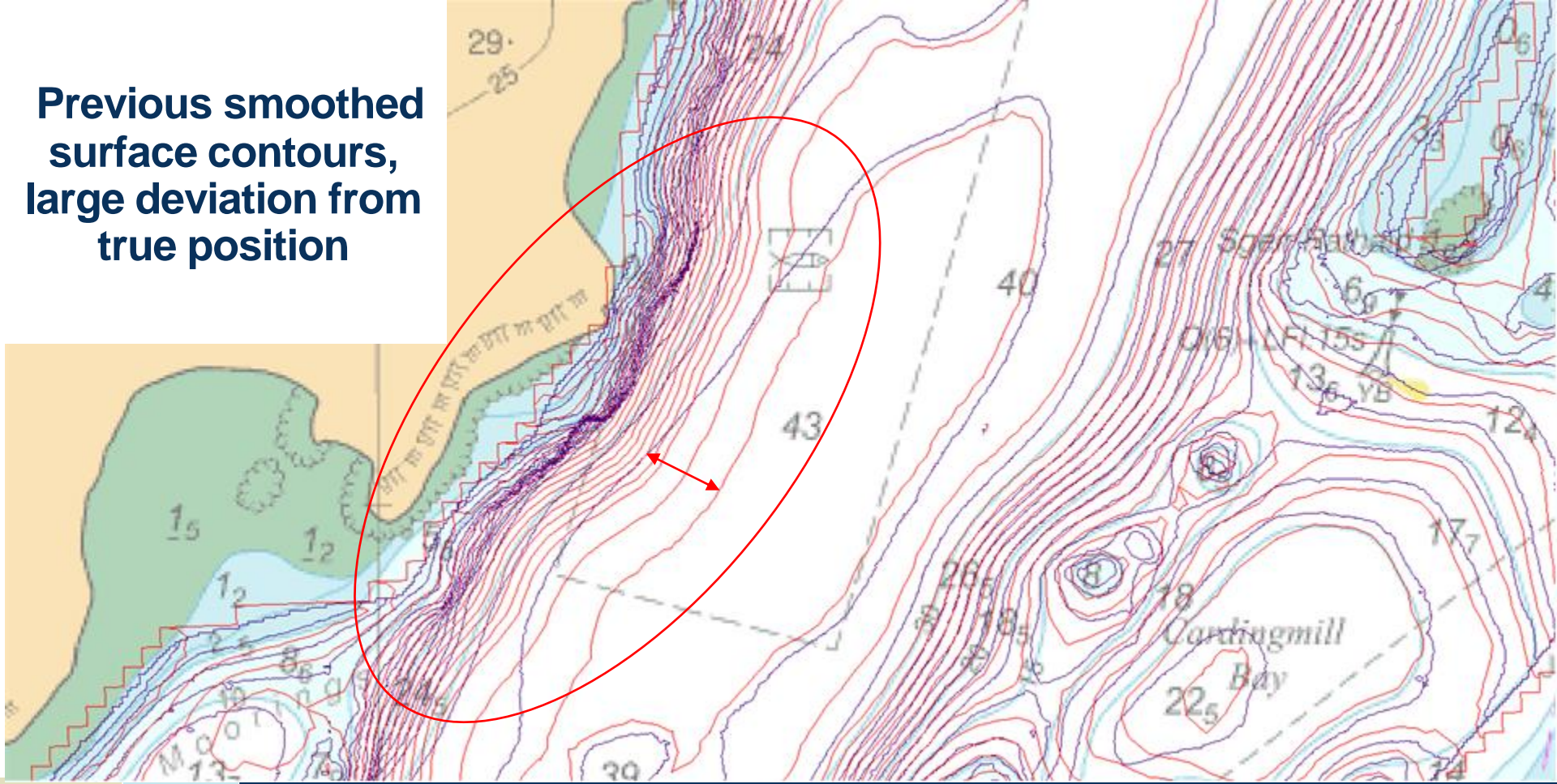
Original Smoothed Surface



Original Contours



**Previous smoothed
surface contours,
large deviation from
true position**





Analysis of new algorithm

Data Supplied to Caris

- Area of complex bathymetry (West coast of Scotland)
- Run through New algorithm (Now released in BDB 4.4.0)
- Combined Variable Resolution surface supplied back to UKHO

UKHO dual independent processing comparison

- UKHO cartographer compared automatically generated contours against human compiled contours on the same data set.
- Also compared new algorithm against existing algorithm.



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Previous smoothed
contour algorithm at
1:50,000

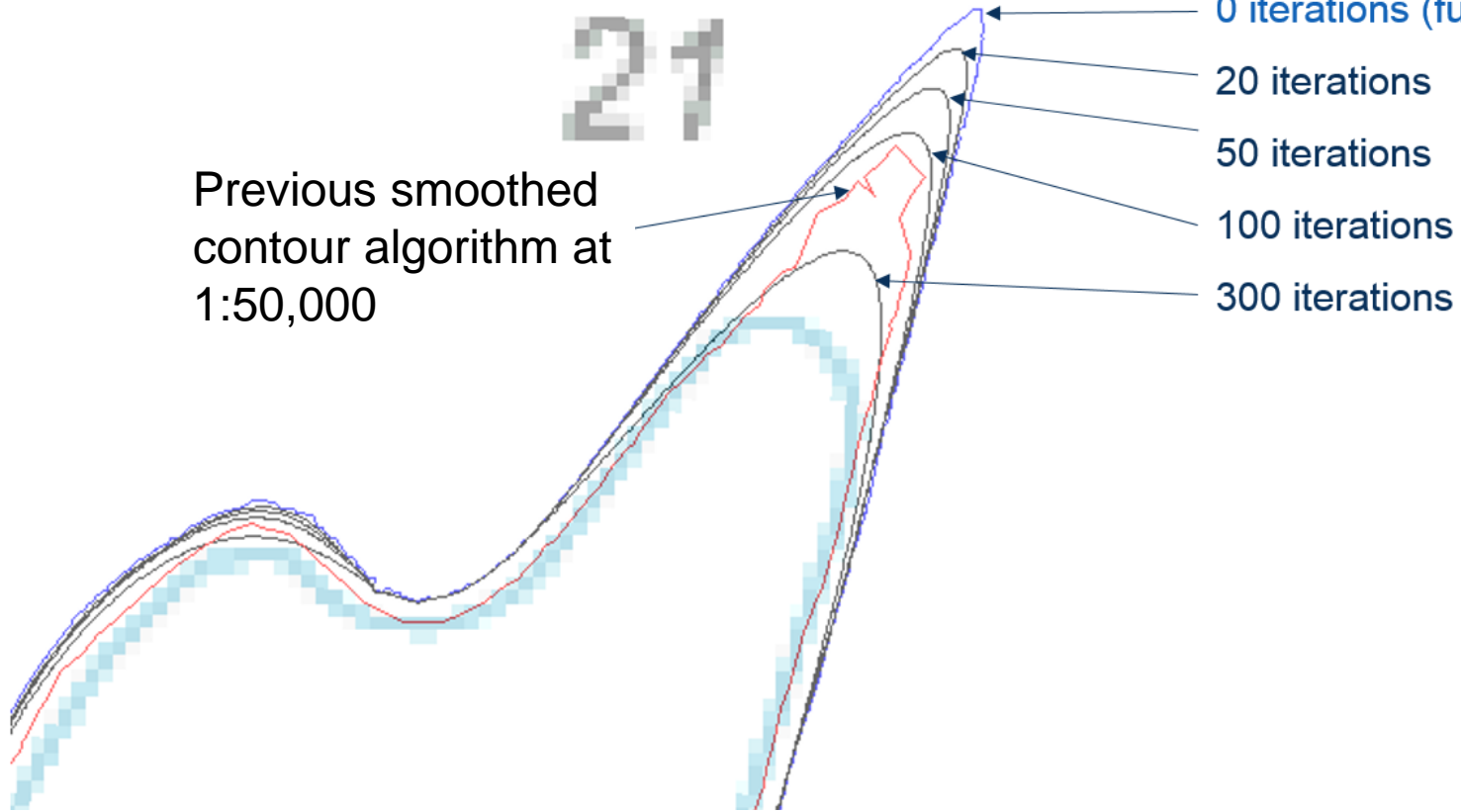
0 iterations (full resolution)

20 iterations

50 iterations

100 iterations

300 iterations

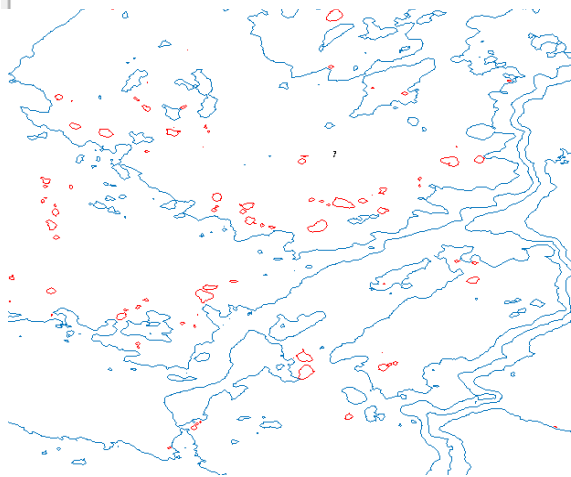




Delete small isolated deeps

Rule Description:

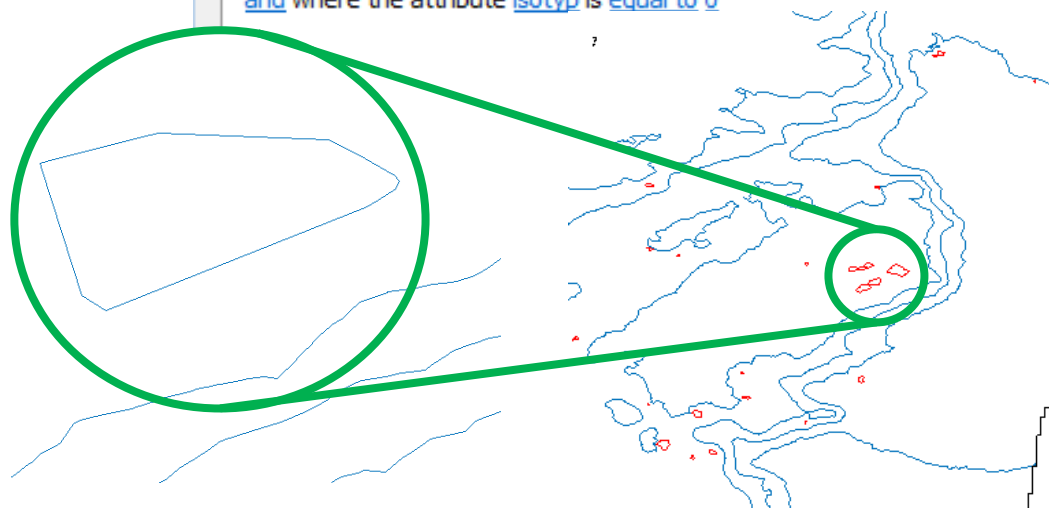
Include objects
where the perimeter is shorter than 100 metres
and where the attribute isotyp is equal to 1



Merge small isolated shoals

Rule Description:

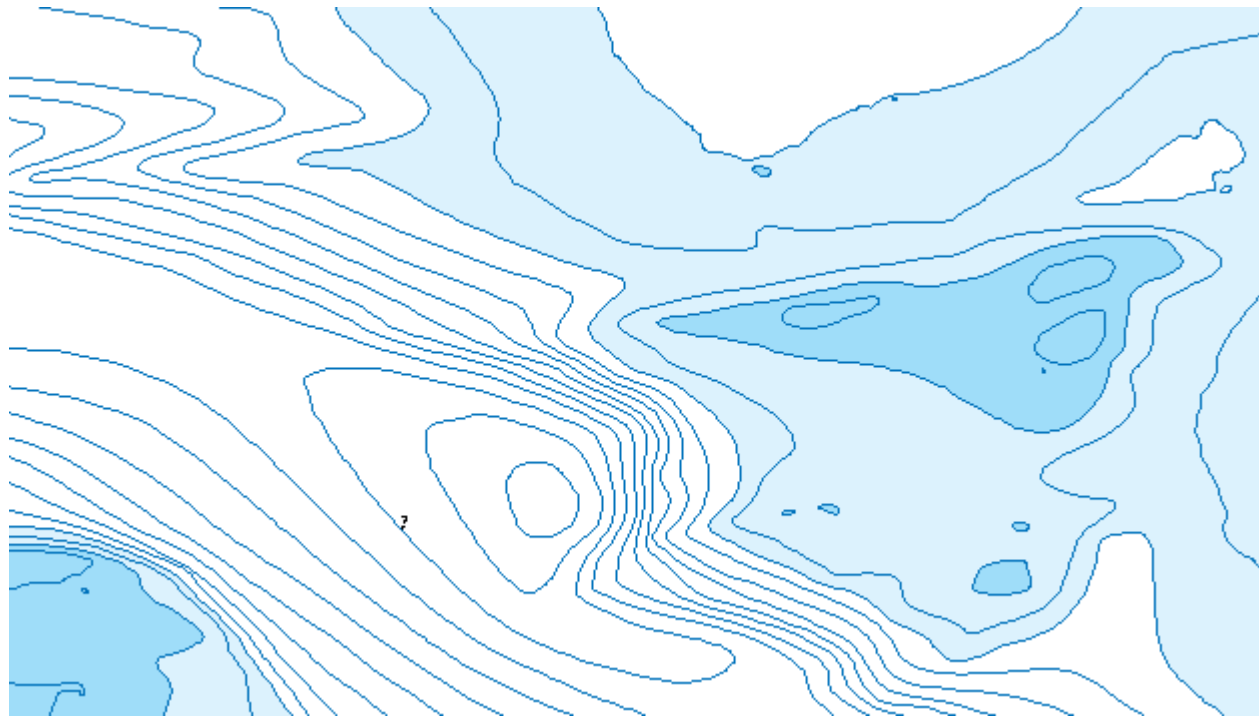
Include objects
where the perimeter is shorter than 100 metres
and where the attribute isotyp is equal to 0





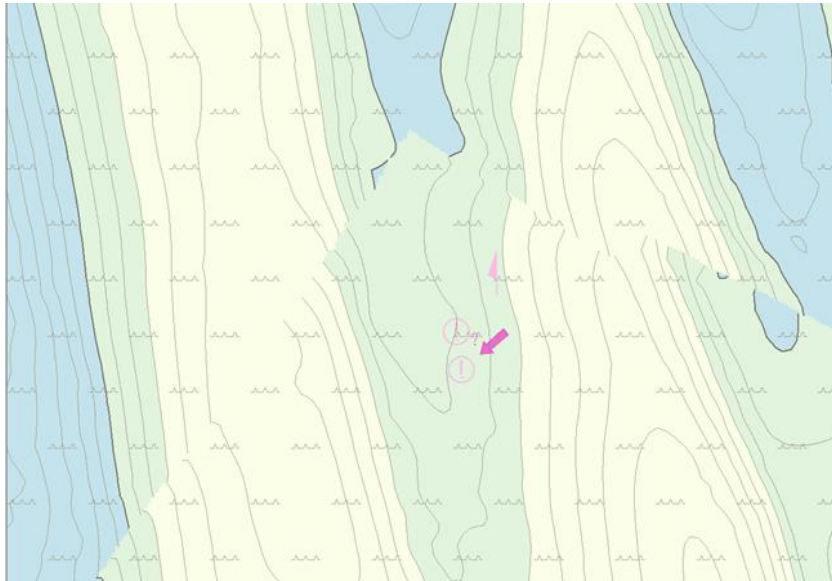
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Create depth areas from contours and cut into existing data





Integrate new data





Conclusions

New surface generalisation algorithm will significantly reduce amount of manual editing required.

- Efficiency savings, particularly in ENC compilation and database maintenance.
- Requirement to integrate new data with existing data will remain, edge matching.
- Application toward high resolution (increased contours) ENCs.

Further use required to build confidence

- Performance in different seabed morphologies, rocky areas require more iterations
- Implications on amount of verification effort if repeatable process

A Master de-conflicted surface would avoid complex cutting in process

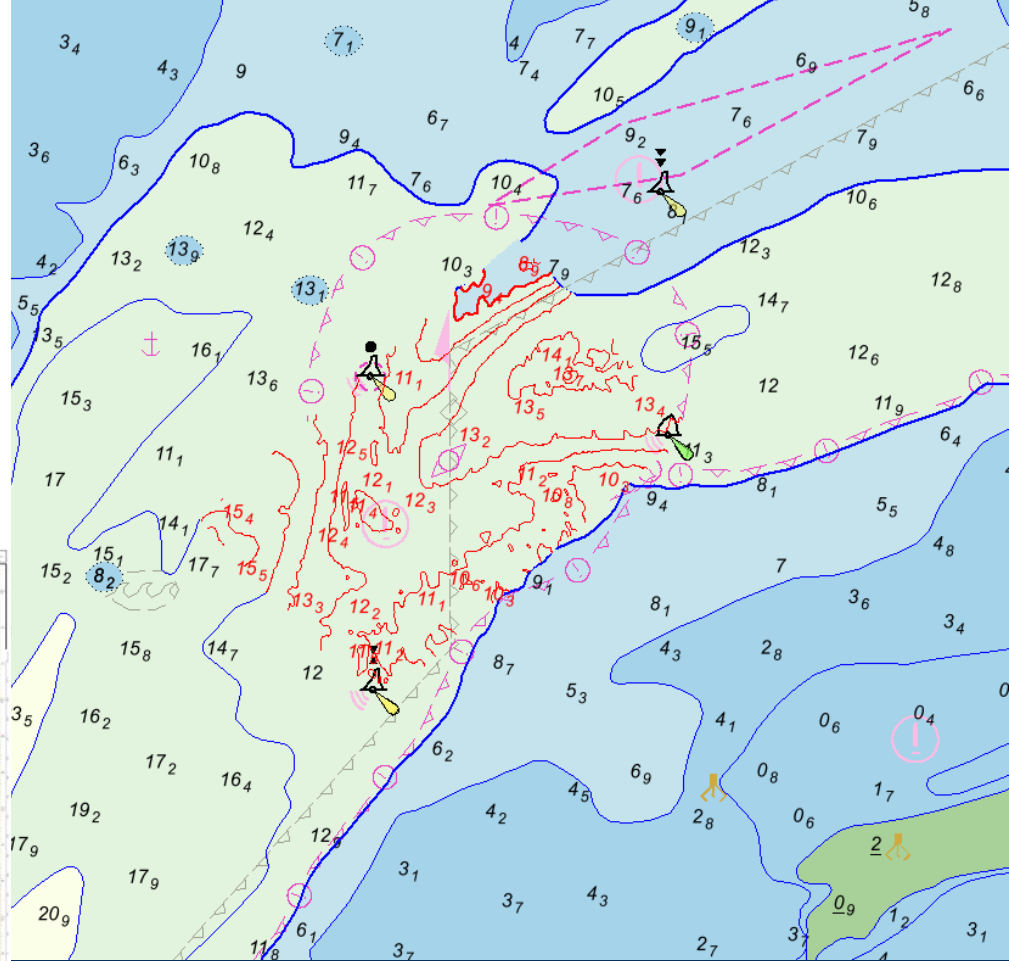
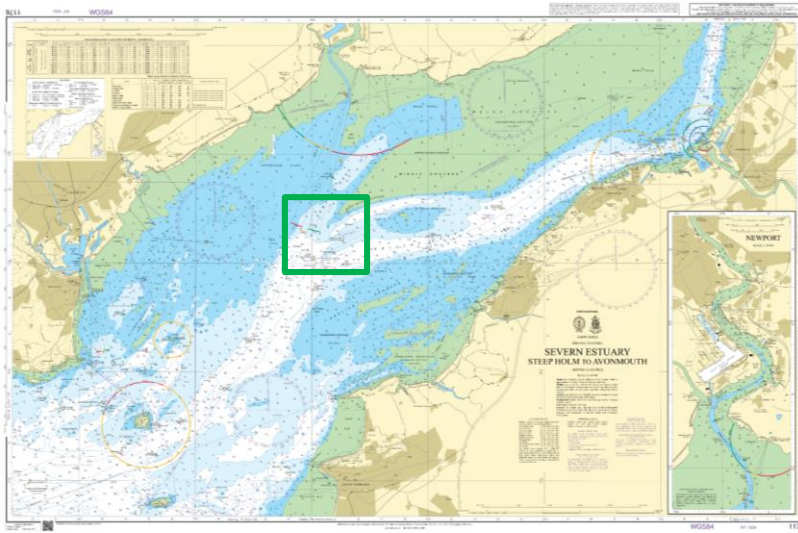
- Variable Resolution could enable this



Practical application of New Algorithm

Bristol Channel: Bridge Patch HD ENC

- 1m contours – few depths
- Embedded in Band 4 area – no edge matching
- 6 mths update - survey frequency
- Achieved 2 week turnaround from receipt of survey to ENC availability
- ENC coverage = survey limit

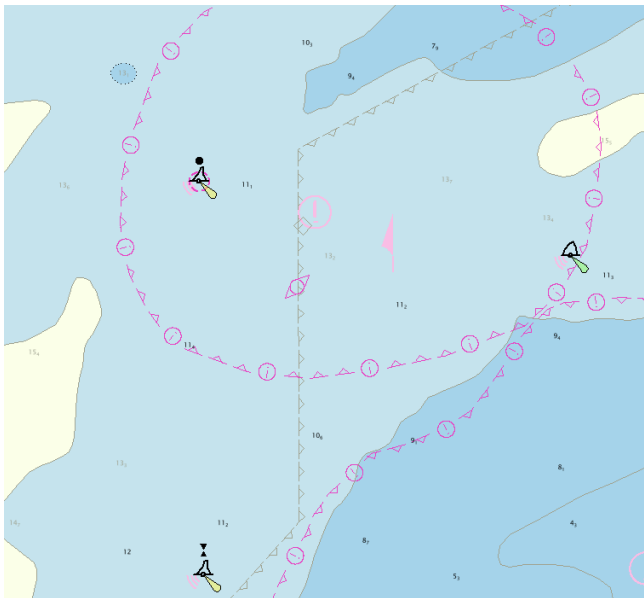




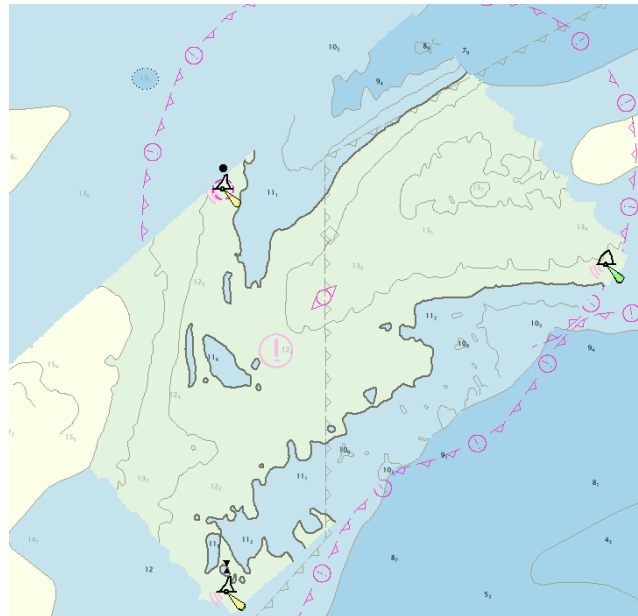
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Safety contour set at 12 metres

ECDIS without the HD Band 6 cell
– *system defaults to 15 m contour*



ECDIS with the HD Band 6 cell



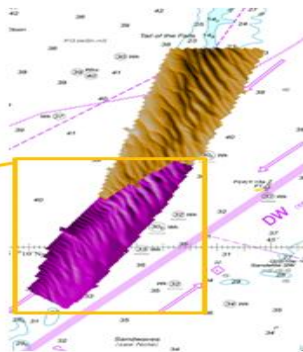
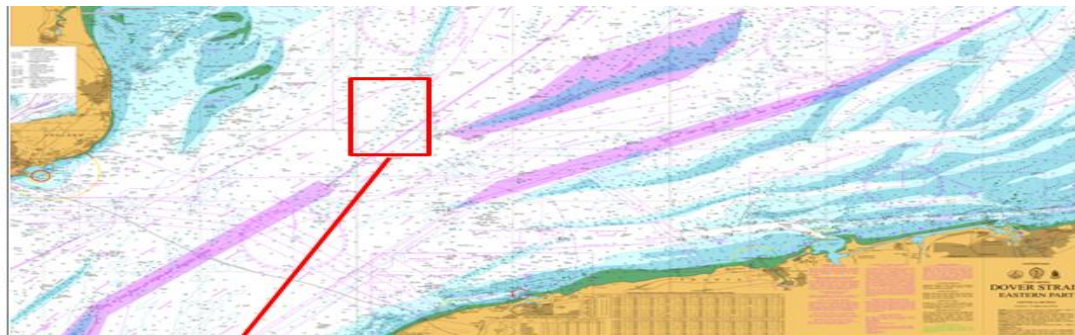


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Huge benefits for RRS

Speed up provision of data

High resolution – set more precise safety contour



Area
C3

Area
C1

Approval / Design phase

HD ENC for Dover Strait RRS is currently being tested & trialled.

First HD ENC covering area of complex hydrography

Discussed at Civil Hydrography Working Group

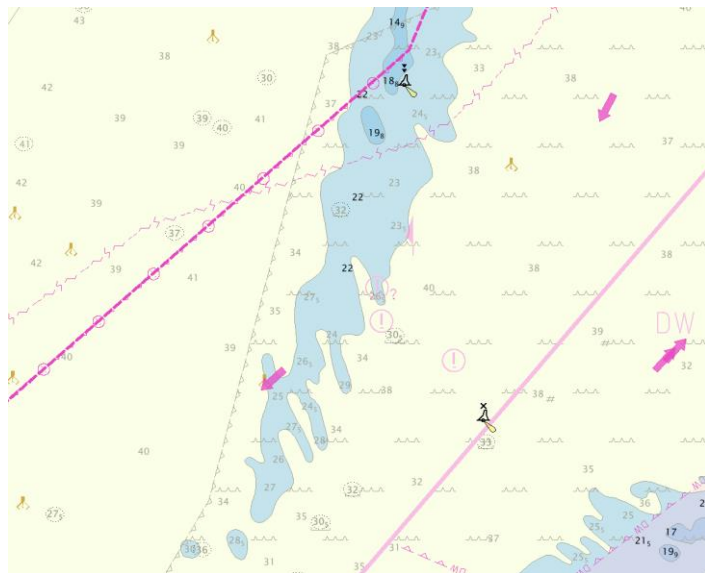




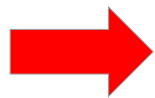
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Safety contour set at 22 metres

ECDIS Without Band 6 cell – defaults to 30 m contour



ECDIS With Band 6 cell – defaults to 22 m contour in area of cell





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Thank you

