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Detailed multibeam bathymetric coverage of the entire Belgian part of the North Sea

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Hydro 2022, Monaco 5-8 December 2022

Belgian part of the North Sea

+/- 3500 km²

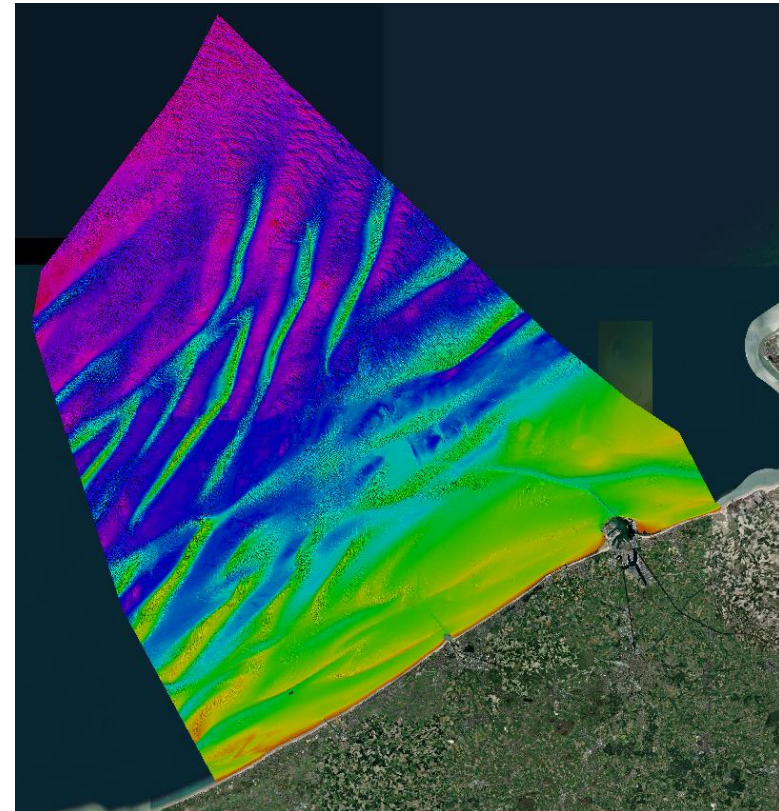
Depths at chart datum vary between less than 1 meter and approximately 45 meter

Prominent features are sandbanks with sandwaves of different sizes.

Tidal range of 3 to 5m

Dense shipping traffic (cargo, fisheries, windfarms, recreational ...)

Numerous wrecks of which several are protected areas for historical reason



Short history of multibeam surveys in Belgium

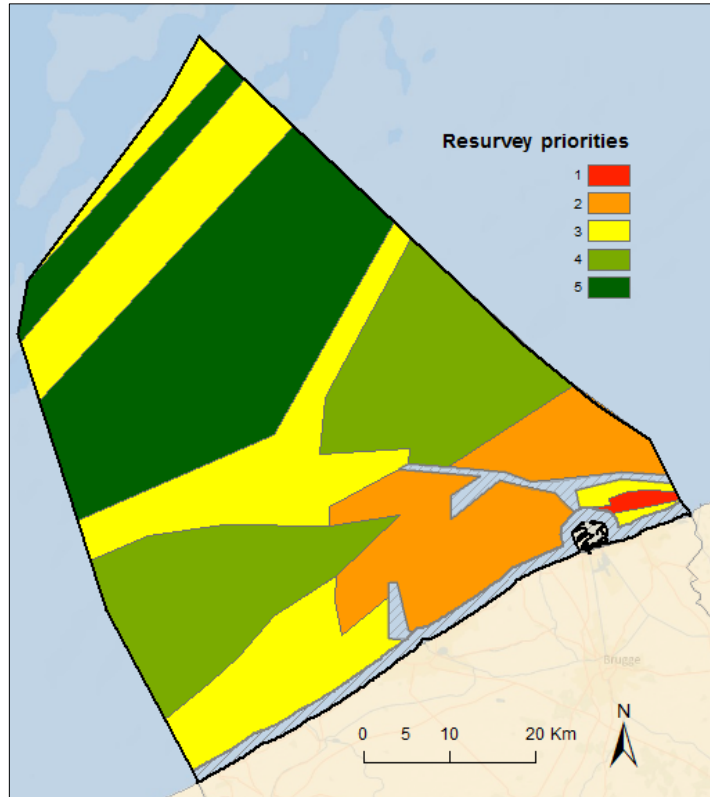
- ▶ 1994 : MB surveys in areas of special interest : mainly wrecks. General survey plans are based on single beam surveys.
- ▶ 1999 : first mention of a project for a complete MB survey of the Belgian part of the North Sea
- ▶ 2011 : first full coverage MB general surveys in the TSS North Hinder
- ▶ 2012 : GIS based survey strategy for the BCP
- ▶ 2013-2014 : Full coverage MB surveys of the mouth of the Western Scheldt.
- ▶ 2017 : Flemish Government decides to give priority to a complete MB survey of the Belgian Part of the North Sea.
- ▶ 2018 : KWINTE calibration area for Acoustic/MB surveys as part of Belgian Marine Spatial Plan 2020-2026
- ▶ 2016-2020 : improving data quality : drafting of calibration procedures and acceptance tests for survey vessels.
- ▶ 2022 : “Blauwe Cluster” document on survey planning, surveying and exchange of bathymetric data



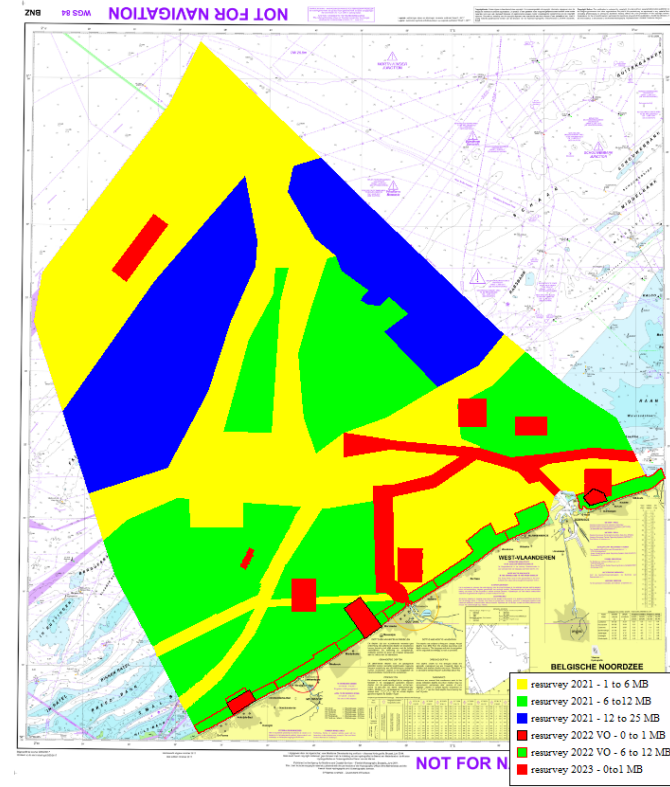
Technological progress that made it possible

- M2 tidal reduction using coastal tide gauges to LAT reference surface related to GNSS ellipsoïd
- Positioning corrections : post processing to RTK VRS online solutions
- MB technology : more and narrower beams, dual swath technology, data with less noise
- Processing and cleaning software : line based editing to area based editing
- New generations of user friendly acquisition software

Development of a “Resurvey Priority Plan”



2012



2023



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Contributors

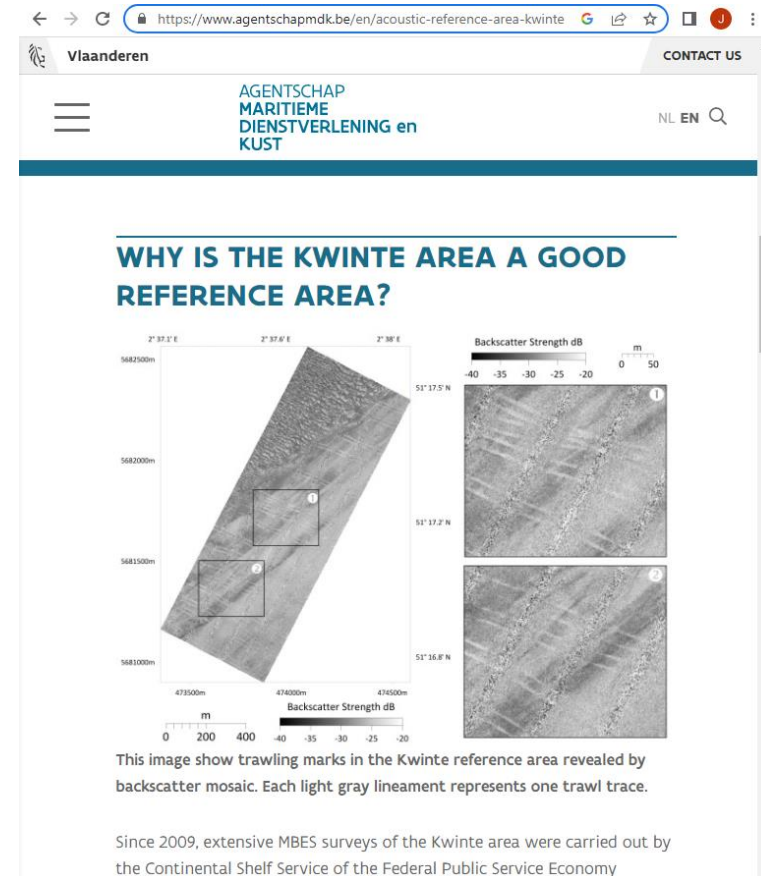
- Government owned and Hydrographic Office operated survey ships
- Third parties contracted by the Hydrographic Office through public tenders
- Survey data acquired for obtaining windfarm area licenses
- Survey data from scientific and morphological bathymetric surveys
 - Sediment transport studies
 - Monitoring of sand and gravel extraction

Optimisation of survey quality

- Evolution of survey specifications and acceptance tests
 - Positioning check
 - Sound Velocity profile check
 - Patch test
 - Lock Calibration
 - Small area survey coverage test
 - Kwinte area survey
- KWINTE reference area in Marine Spatial Plan 2020-2026 : bathymetric reference and acoustic backscatter reference area.

Optimisation of survey quality

- Evolution of survey specifications and acceptance tests
- KWINTE reference area in Marine Spatial Plan 2020-2026 : bathymetric reference and acoustic backscatter reference area.
 - <https://www.agentschapmdk.be/en/acoustic-reference-area-kwinte>



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Local administrative challenges

- ▶ #we the ocean as a reference to the preamble to the US constitution
- ▶ The Belgian equivalent :
 - × “We the people”
 - vs
 - × “Belgium is a federal State composed of Communities and Regions”as the first line of text of the Belgian Constitution.

Local cooperation

- ▶ Public sector
 - HO
 - Federal agencies
 - Regional and Federal scientific and science supporting agencies
- ▶ Commercial parties
- ▶ “Blauwe Cluster” document on MB surveys and data : “survey once, serve all”



Local cooperation

- ▶ Public sector
- ▶ Commercial parties
 - Windfarm operators
 - seafarm operators
 - Cable laying operations
- ▶ “Blauwe Cluster” document on MB surveys and data : “survey once, serve all”



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Local cooperation

- ▶ Public sector
- ▶ Commercial parties
- ▶ “Blauwe Cluster” document on MB surveys and data : “survey once, serve all”
 - government agencies
 - scientific institutions
 - dredging companies
 - survey companies



AANBEVELINGEN
omtrent het plannen,
verzamelen en delen van
bathymetrische surveydata

https://www.blauwecluster.be/sites/default/files/aanbevelingen_bathymetrische_surveydaya_v1.2b.pdf

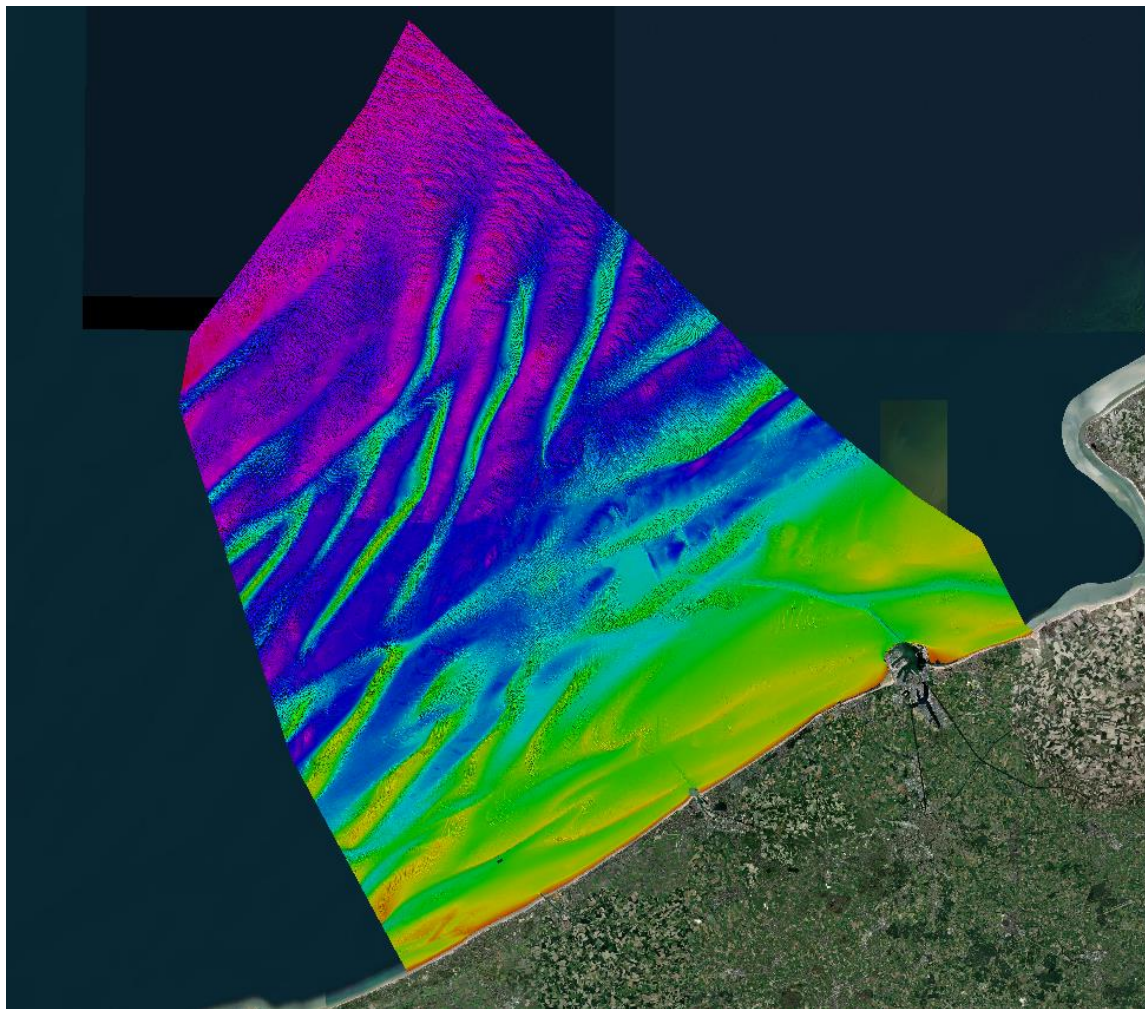


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The final result : full coverage

It's the year 2022 AD.

All of the Belgian part of the North Sea is covered with detailed multibeam surveys ...



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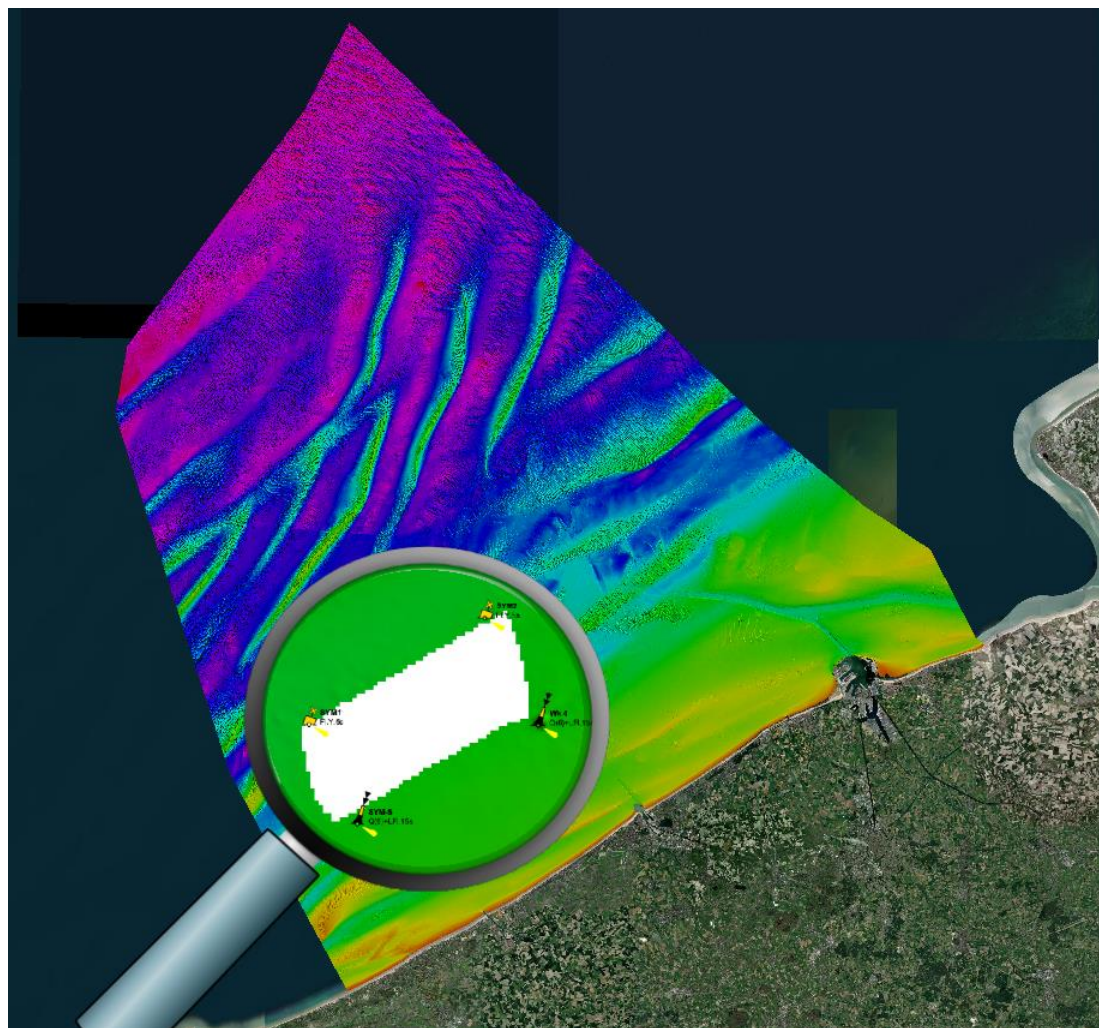
Full coverage : “dark corners”

It's the year 2022 AD.

All of the Belgian part of the North Sea is covered with detailed multibeam surveys ...

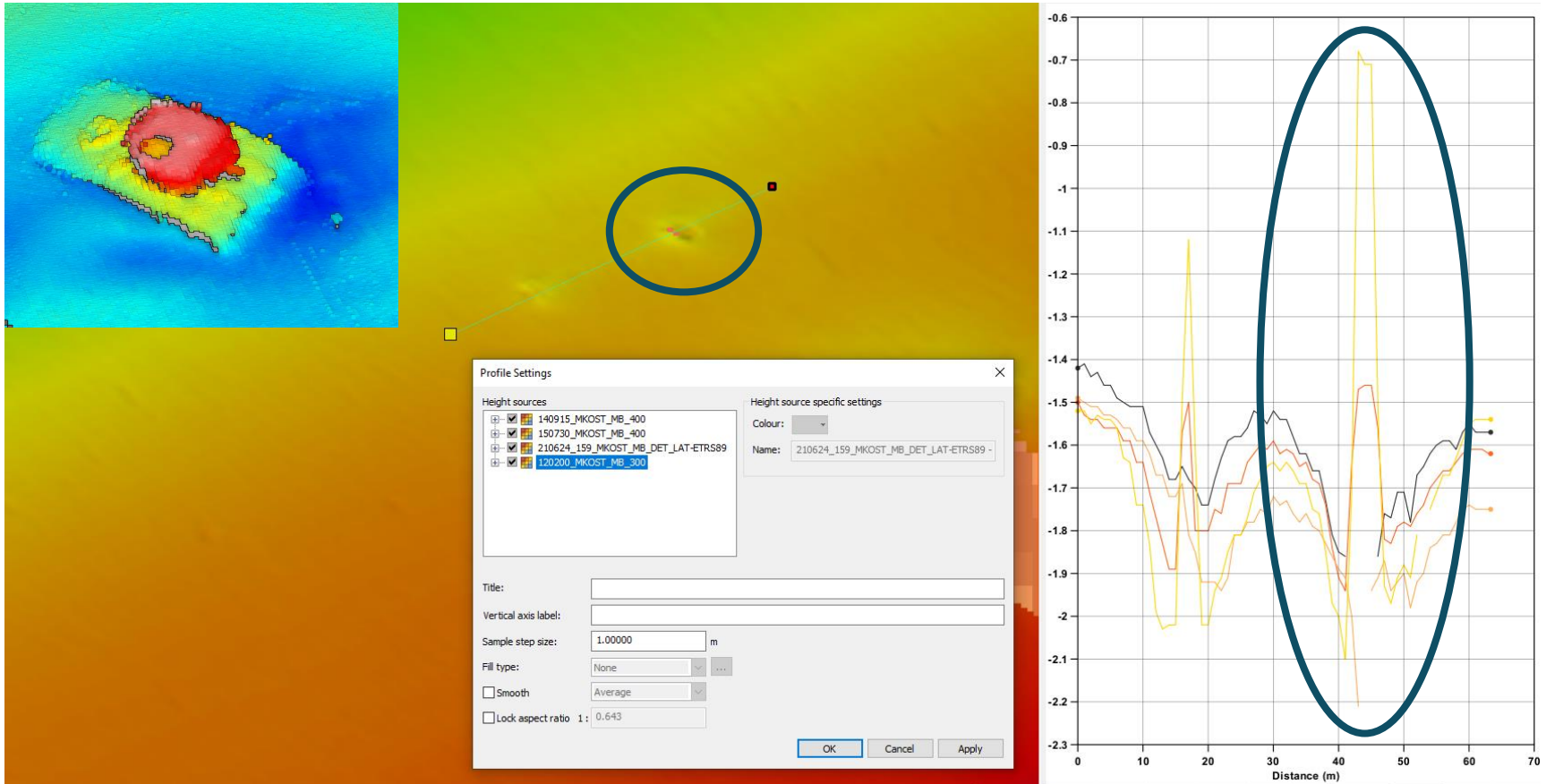
Well, not all of it.

An area designated to seafarming research resolutely resists the survey ships again and again ...

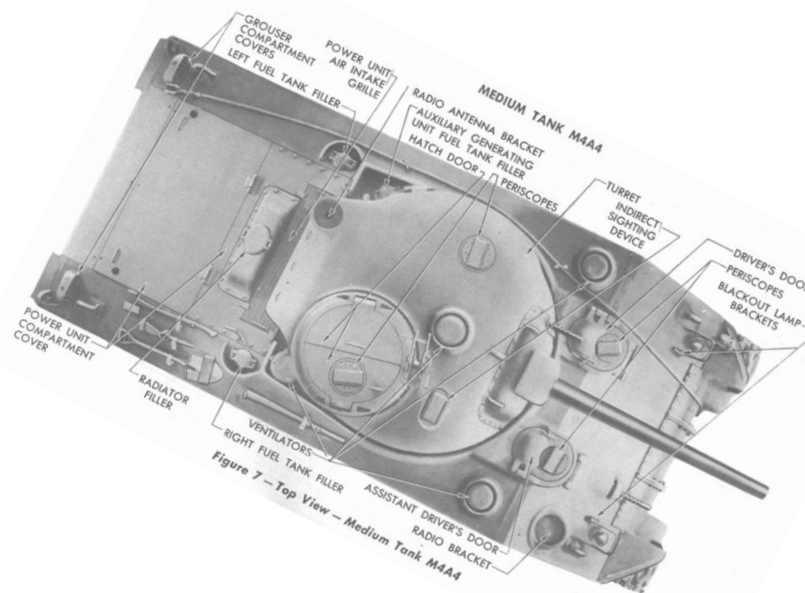
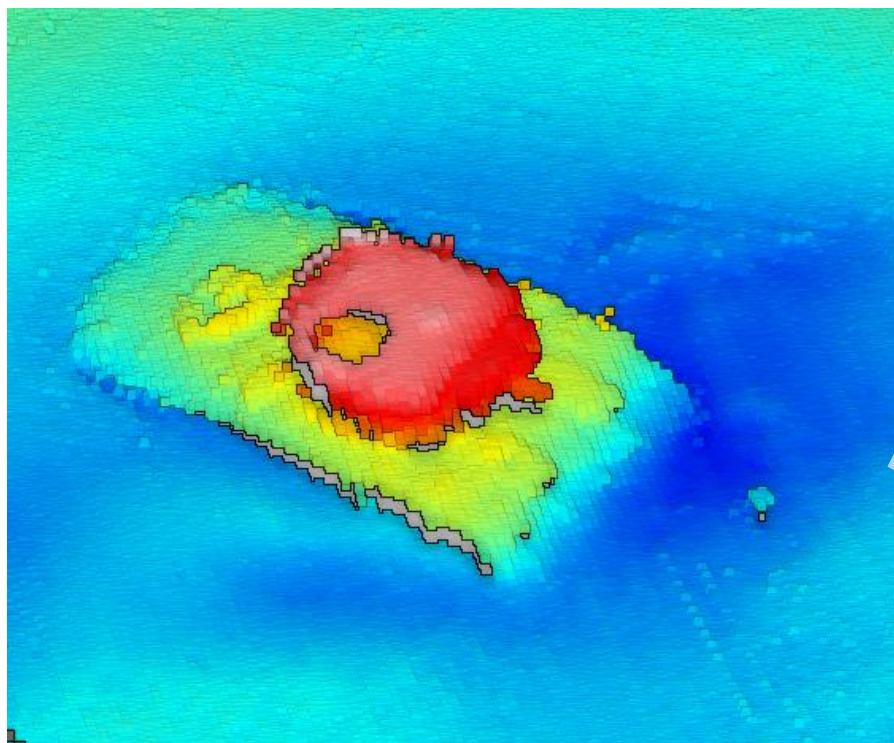


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Full coverage : Lost and found



Full coverage : Lost and found



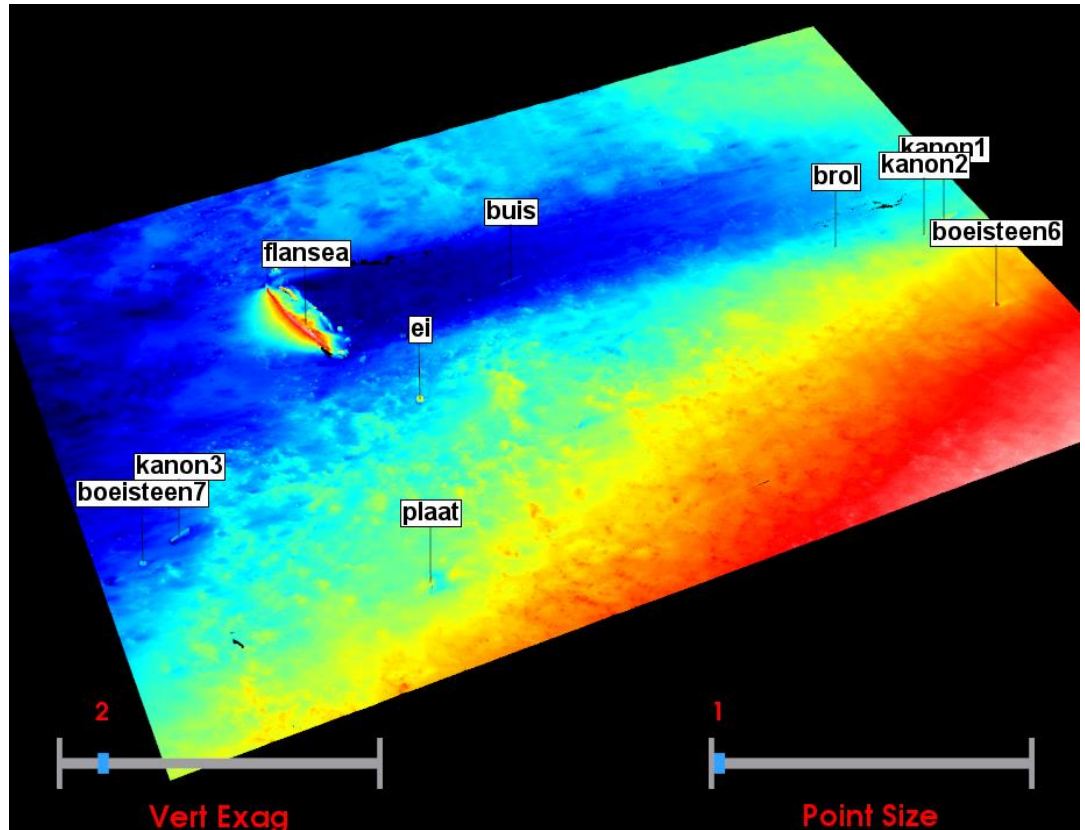
RA PD 24397



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Full coverage : micro obstacles

- Often filtered during processing
 - sub-special order
 - sub-exclusive order
- Often with more potential archeological interest than for charting and navigation
- Interpretation based on multibeam surveys alone can be somewhat speculative



A team effort



But several people are missing : one of our main surveyors,
Division management, administrative support, third parties, ...



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► Questions



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