Maritiem Instituut
Willem Barentsz

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North Sea Region
NSW
European Regional Development Fund

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# North Sea Wrecks

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# North Sea Wrecks

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- WWI and WWII wrecks and UXO in the North Sea region

- Risk management
- Requires information and knowledge about:
  - Location
  - Cargo (munition and bunkers)
  - Composition

Cross border problem!

Vlaams Instituut voor de Zee
Flanders Marine Institute

UKSH UNIVERSITÄTSKLINIKUM Schleswig-Holstein

FFI Forsvarets forskningsinstitutt
Norwegian Defence Research Establishment

AARHUS UNIVERSITET GEOSCIENCE

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EGEOS

AWI ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Periplus Group

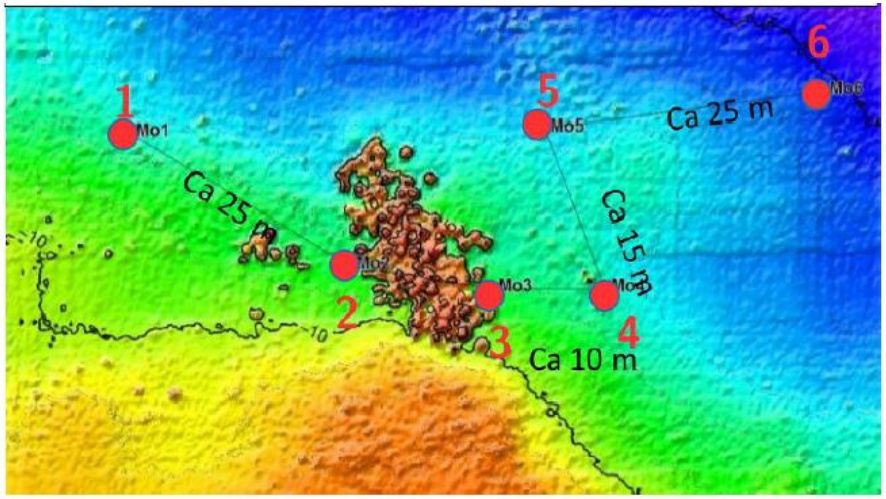
Deutsches Schifffahrts Museum

Toxikologie

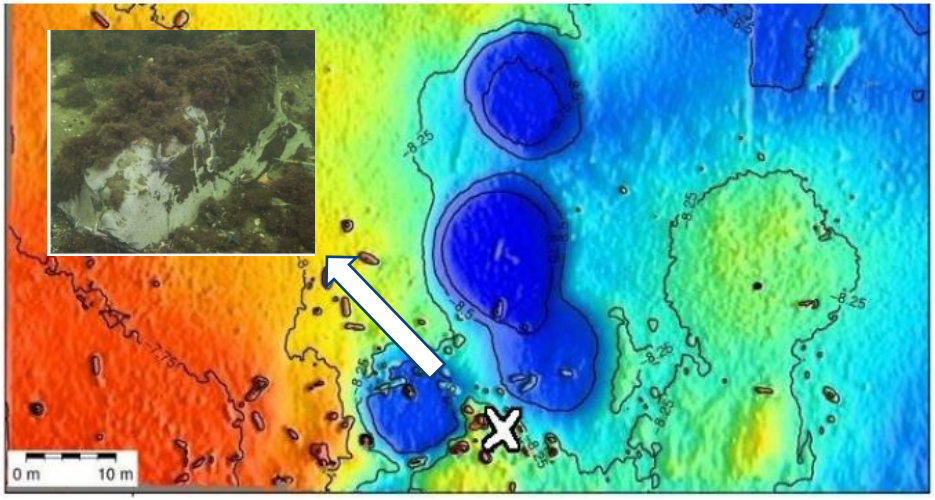
C | A | U

## Results from Baltic Sea

Mussels exposed at different distances to the mine mound at Kolberger Heide




Mussels exposed at a piece of unexploded hexanite lying on the sea floor

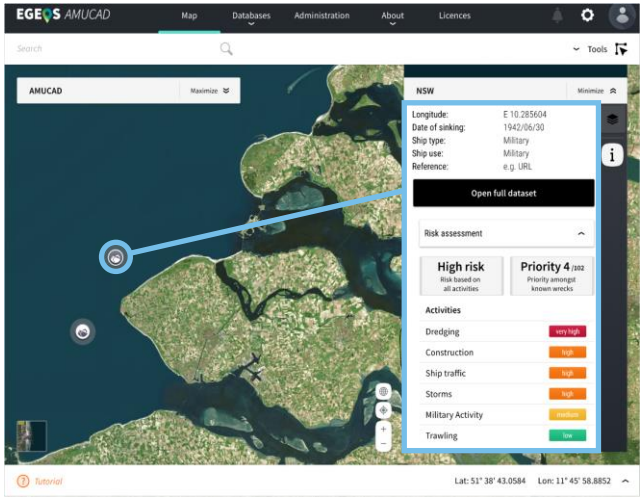



- TNT leaks from corroding explosive vessels.
- Blast in place (BiP) causes up to 50 times larger amounts of TNT and derivatives to enter the marine fauna.
- Initial risk assessments: highly exposed mussels are of carcinogenic risk.

# NSW Project

- 2018-2023
- Provide tools to assess and mitigate risks regarding wrecks and munitions in the North Sea.

- Output:
  - Decision Support Database based on case studies,
  - Risk assessment methodology and
  - Policy recommendations.

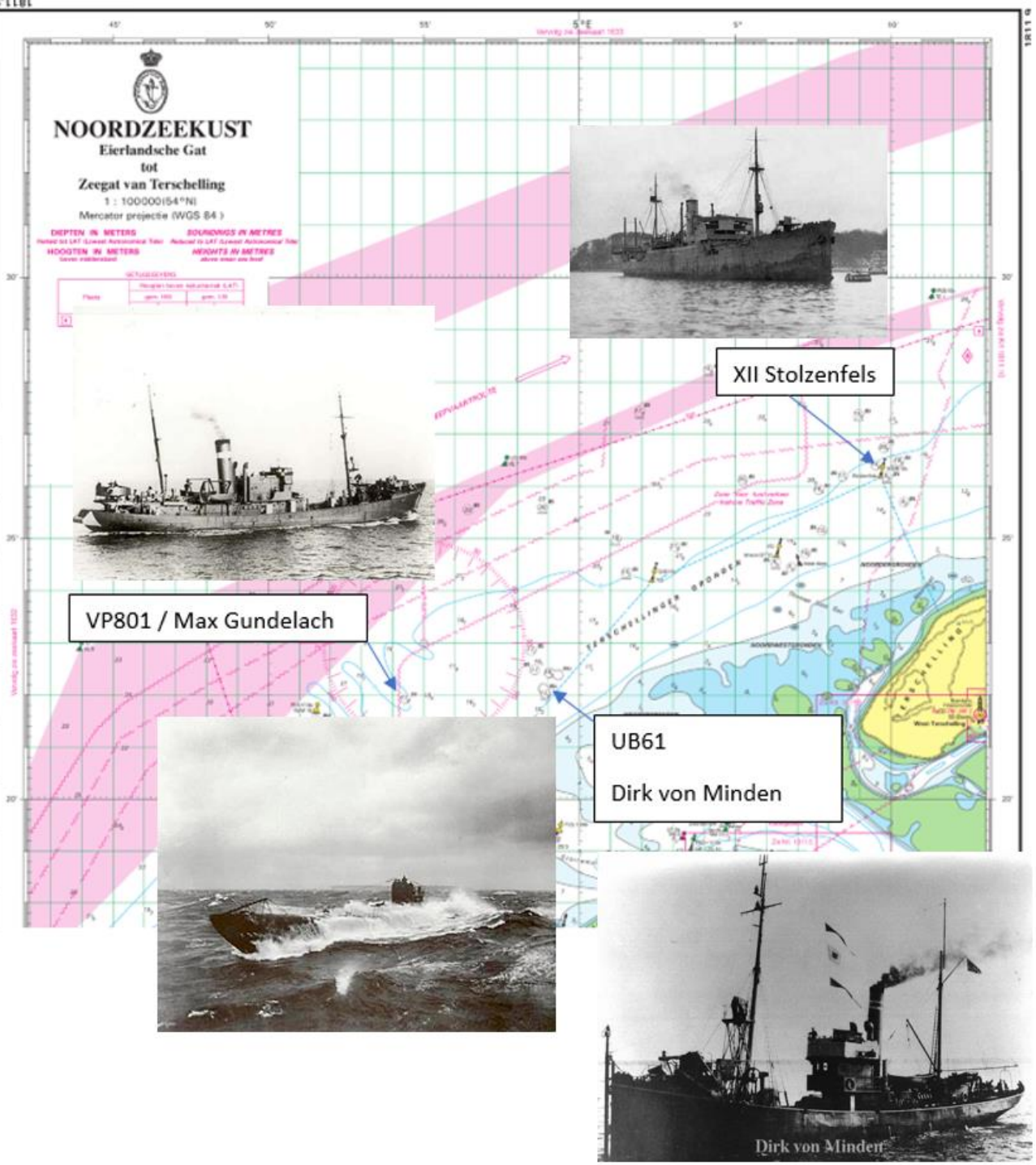



## (relevant)
## Work Packages

- **WP 3 Structuring information & analysis**
  - Determine data sources and relevant wrecks
  - Field tests: gather data on corrosion, cargo, sedimentation, toxicology
  - Define realistic scenarios

- **WP 4 Risk assessment**
  - Develop tool for estimating the probability of release of substances
  - Develop a method for risk assessment
  - Develop a Decision Support tool

- **WP 5 Action Plan Development**
  - NSR Management Guidelines (contribute to OSPAR)
  - Policy Recommendations

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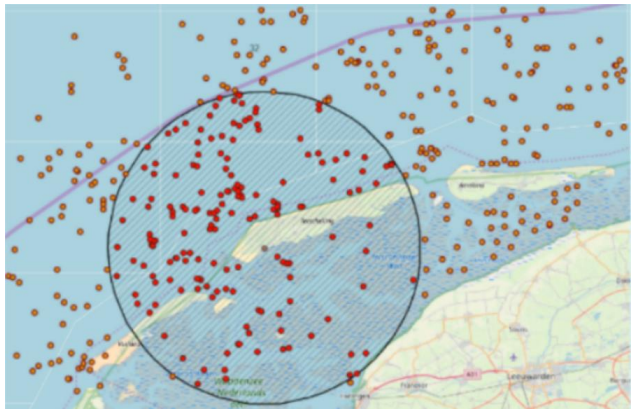

WP3 in the Netherlands

- Wreck selection
- Surveying
- Sampling

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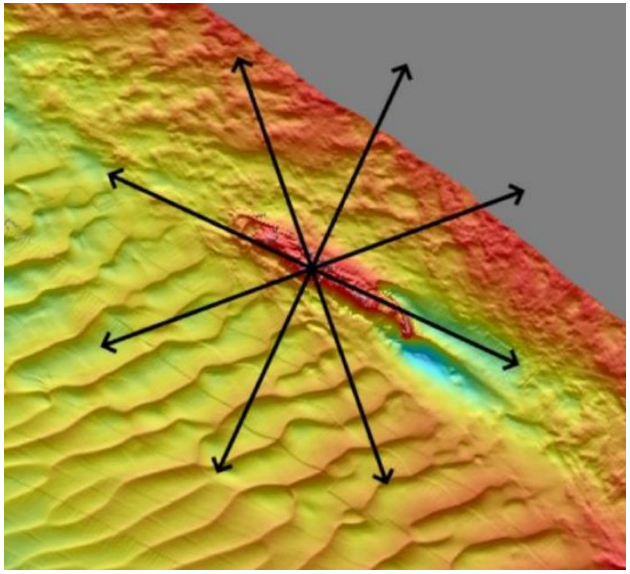
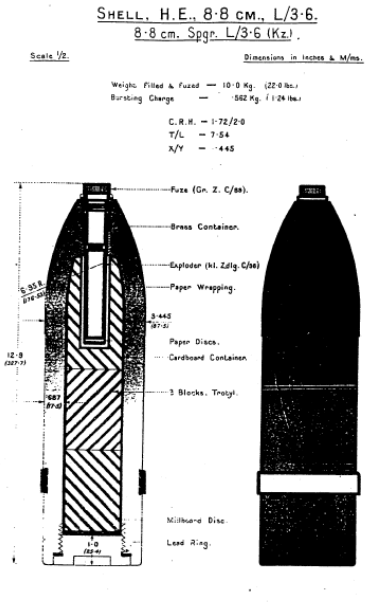
# Detecing munitions with hydrographic sensors?

- Only larger munitions
- Only with ‘star’ pattern

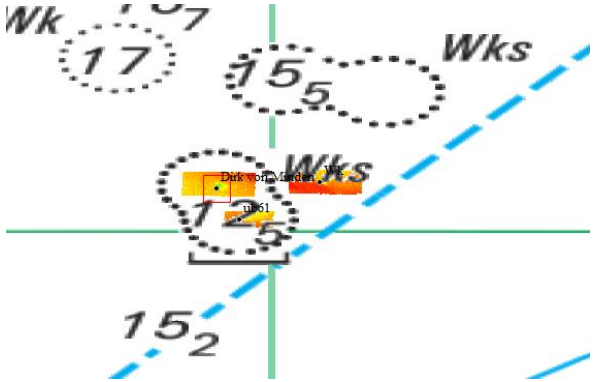
- Dive / ROV inspections are required:
  - Detect smaller munitions
  - Confirm detected object is munition

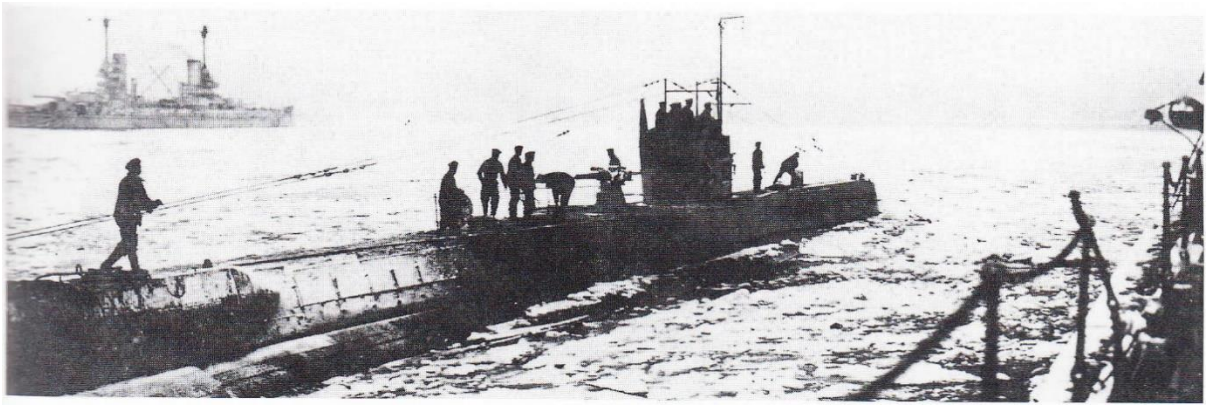





| Type | Dimensions (width*length) | Possible to detect? | System |
|---|---|---|---|
| Deck canon ammunition (1) | 3.5 cm * ? | No | - |
| Deck canon ammunition (2) | 8.8 cm * 30 cm | Yes | MBES, SSS |
| Deck canon ammunition (3) | 8.8 cm * 35 cm | Yes | MBES, SSS |
| Deck canon ammunition (4) | 8.8 cm * 45 cm | Yes | MBES, SSS |
| Grenades / Anti-aircraft ammunition | 10.5 cm * 76.9 cm | Yes | MBES, SSS |
| Machine gun ammunition | 1.3 cm * 9.9 cm | No | - |
| Machine gun ammunition (2) | 2 cm * 13.8 cm | No | - |
| Double canon barrel ammunition | 5.7 cm * ? | Unknown | |
| Torpedo (1) | 35 cm * 475.2 cm | Yes | MBES, SSS |
| Torpedo (2) | 45 cm * 565 cm | Yes | MBES, SSS |
| Torpedo (3) | 50 cm * 600 cm | Yes | MBES, SSS |

# Example: UB61

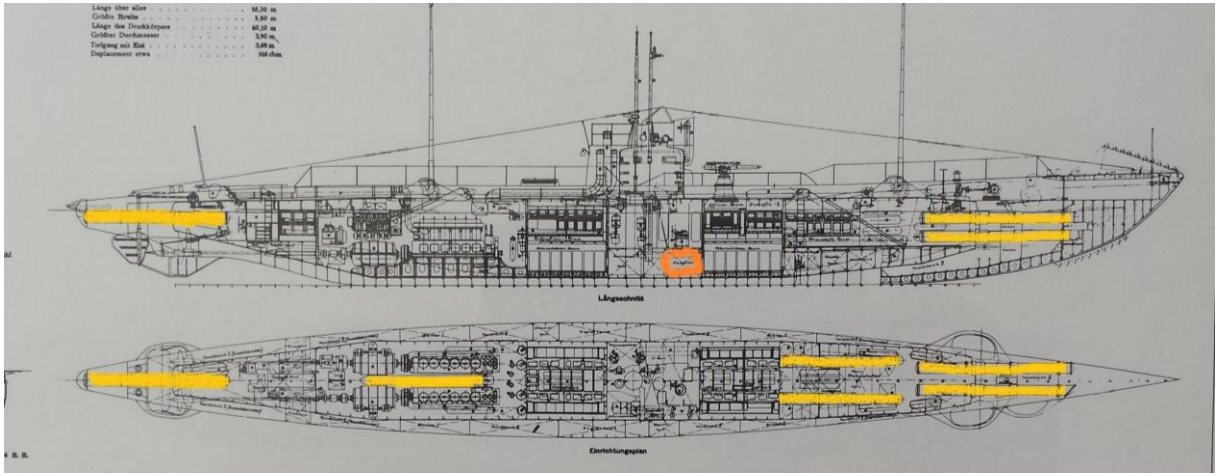


1917 lost with all hands after hitting a mine

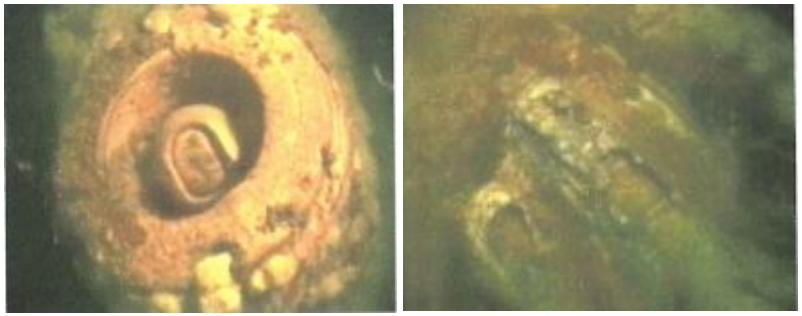
Archive research reveals:

- Fuel?
- 2 stern torpedo's?
- 2 main torpedo's?
- 8.8 cm grenades (inside)
- 8 mm rounds



# Earlier dives on the UB61, salvage / looting

- 1986:
  - wrecks is found and deck gun salvaged by dive club ‘Ecuador’
  - Dive photos taken, baseline for wreck condition
- 1986>:
  - regular visits by wreck divers
  - ‘hearsay’ is that all visible elements including muntions have been removed



# NL North Sea Wrecks Survey campaign

Nov 2018: MBES / SSS survey - RV Octans,
- UB61, Max Gundelach, Dirk von Minden, Stolzenfels

July 2020: High resolution MBES - Xception (G2),
- UB61, Max Gundelach, Dirk von Minden

**2021:**

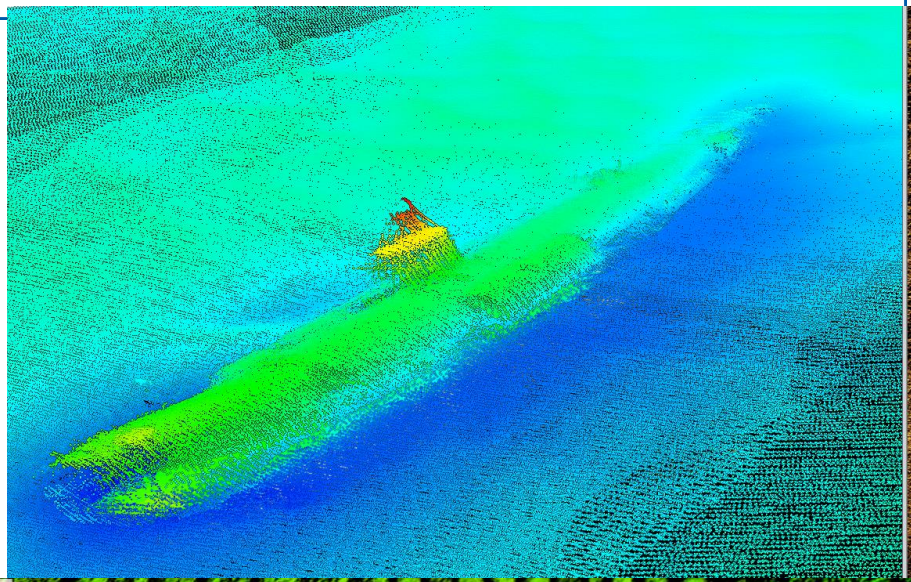
April: High resolution MBES - Xception (G2),
- UB61, Max Gundelach, Dirk von Minden, Stolzenfels

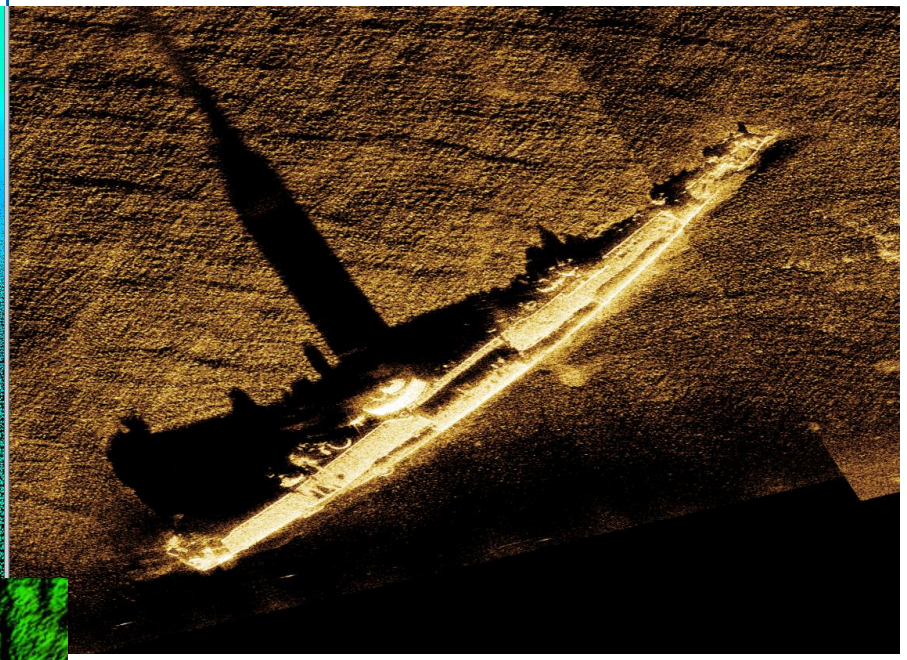
May: High resolution SAS - HNlMS Geosea
- UB61 and Max Gundelach

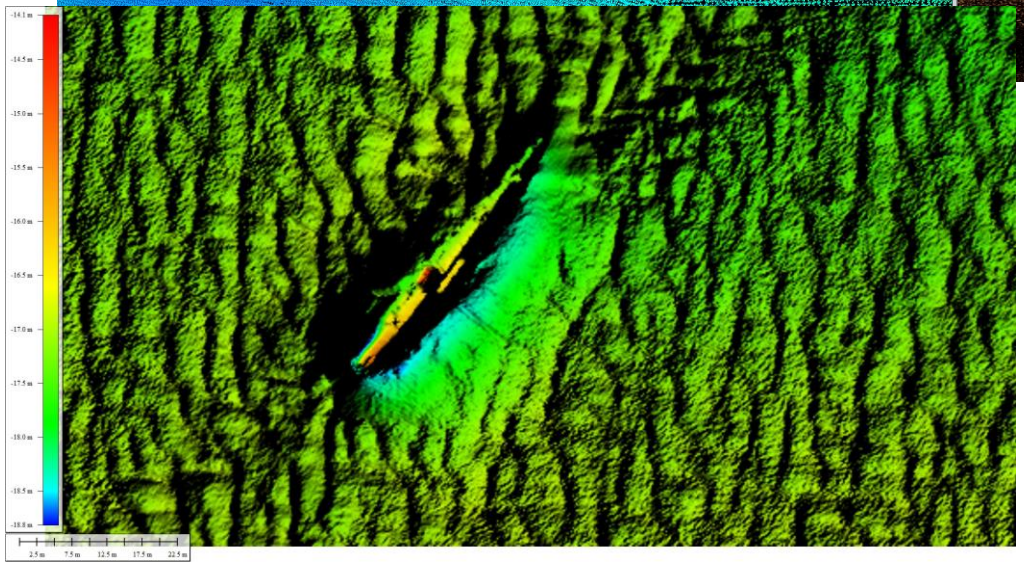
June: Diving, sampling - HNlMS Geosea
- UB61, Max Gundelach

August: Diving, sampling - HNlMS Schiedam
- Max Gundelach, UB61


# UB61 – Survey results







- Inner hull in good condition
- Bow shows clear damage, torpedoes gone?
- Stern below the sand, torpedoes still there?

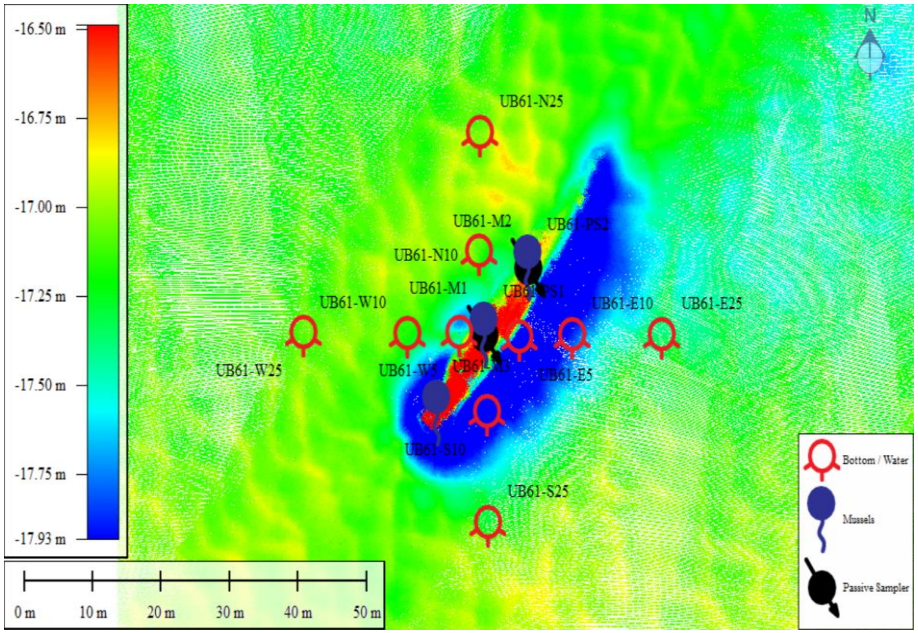
Survey data april 2021:

- Deepest point: ca 18.5 ref LAT
- Shallowest point: ca 13.5 m ref LAT

# UB61 – Dive results

# Sampling

- Bottom samples @ 5, 10 and 25 meters offset N, S, E, W
- Water samples @5, 10 and 25 meters offset N, S, E, W
- Passive samplers (2 cages with 2 samplers per wreck)
- ~~Mussels at 3 locations per wreck~~



## Issues during sampling

- Some cages with passive samplers gone after storms
- Mussels died before deployment  (weather standby)
- Labeling requires attention
- Visibility is an issue for state determination

## Results for the UB61

Water samples on UB61: all but one < Level Of Detection
Bottom samples: all < Level of Detection
Passive samplers: significant results for
- TNT (41 ng/PS)
- 2ADNT (43 ng/PS)
- 4ADNT (37 ng/PS)

**Conclusion for the UB61:**
- Small traces accumulate over time (water vs passive sampler)
- (Current) Concentrations not deemed dangerous for food safety
- Long term environmental / food safety requires more research

**Other wrecks can have different results!**
e.g NSW results from VLIZ: VP1302 John Mahn, higher levels in sediment but also more visible munitions (depth charges)

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# Bedankt voor uw aandacht

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