



Kampfmittelräumung
STASCHEIT

Explosive ordnance detection and disposal in the North Sea and Baltic Sea -
Problem analysis and the way forward to sustainable solutions

2. DIGITAL OCEAN CONVENTION, ROSTOCK AUGUST 26, 2021

Dangerous Legacy

Unexploded ordnance from World War II

North Sea:

about **1.3 million metric tons**
of conventional munitions

about **90 metric tons**
of chemical weapons

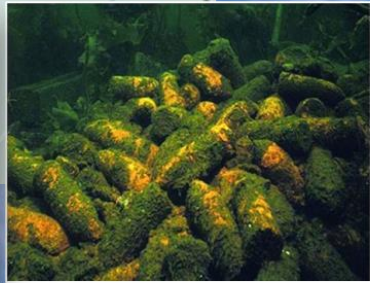
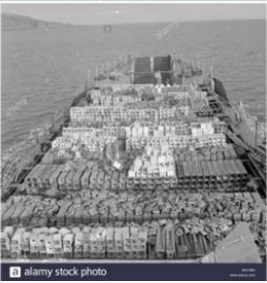
Baltic Sea:

about **300,000 metric tons**
of conventional munitions

about **5,000 metric tons**
of chemical weapons

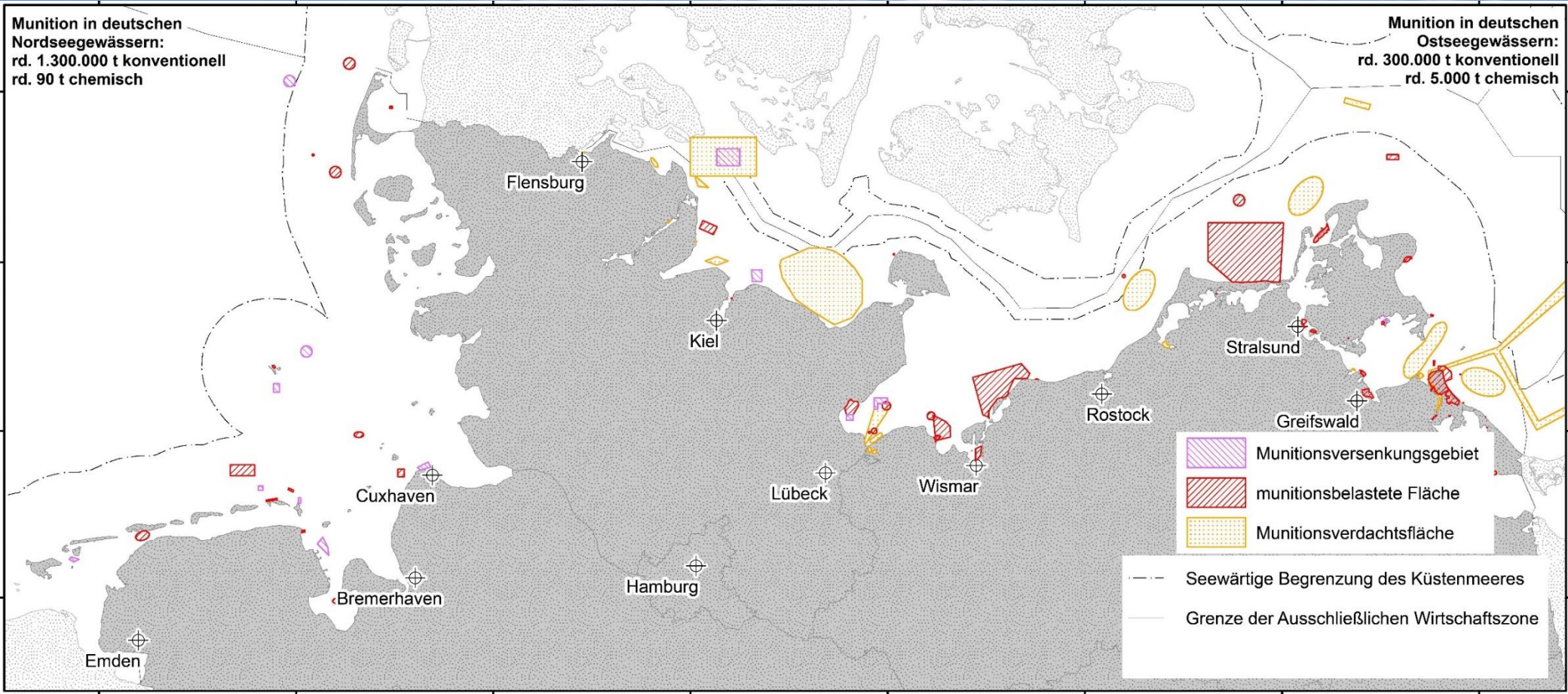


Globales Problem



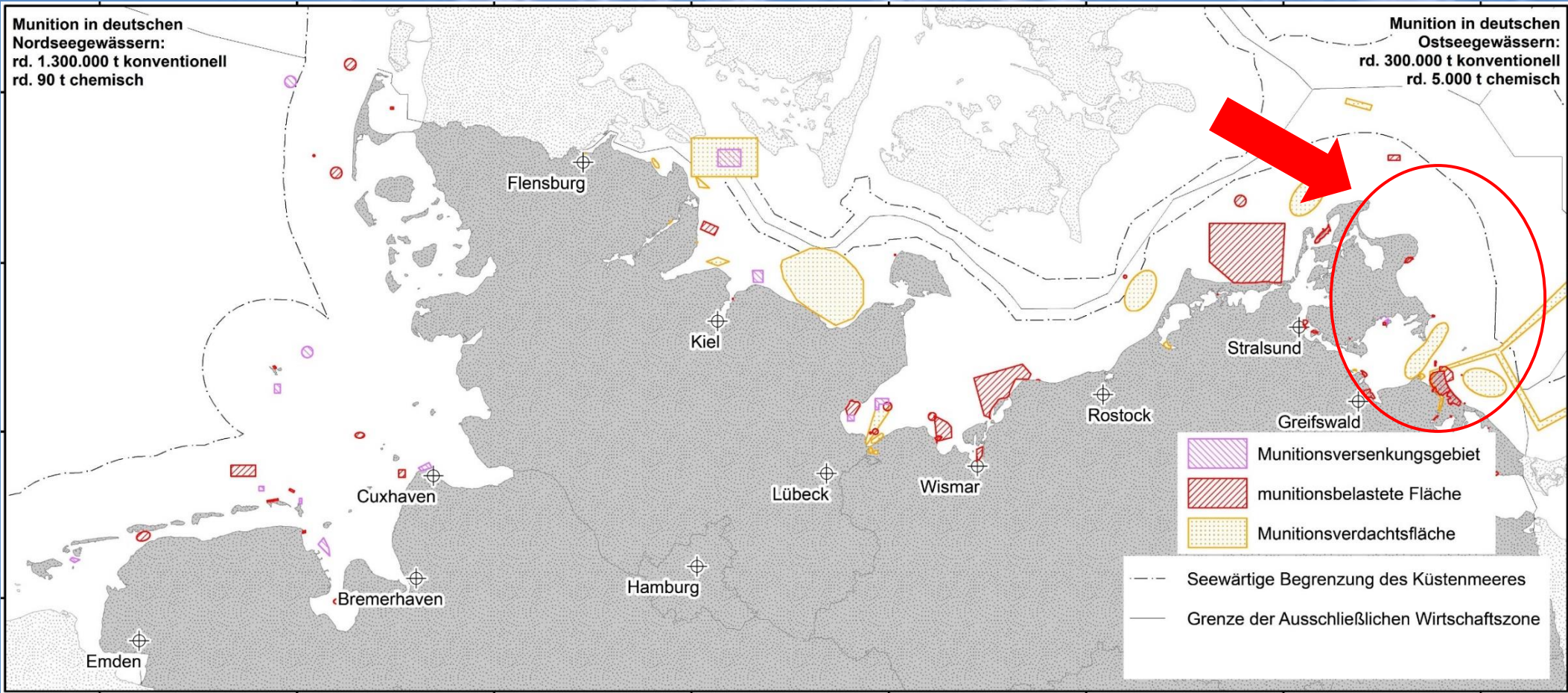
Source: BLANO, UX Consult Jan Kölbel

Does this information show the full extent of the problem?



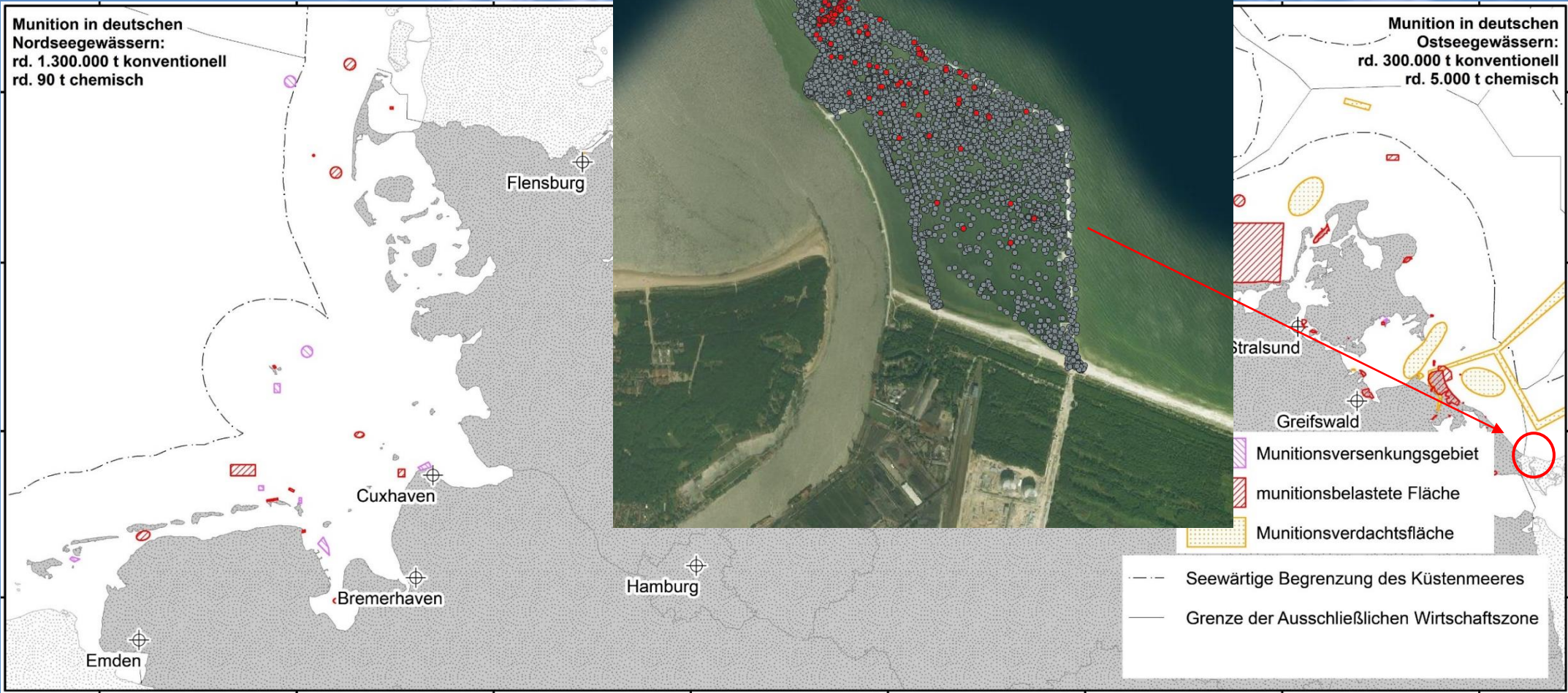
Source: BLANO

Examples from the practice of explosive ordnance disposal offshore east of the island of Rügen



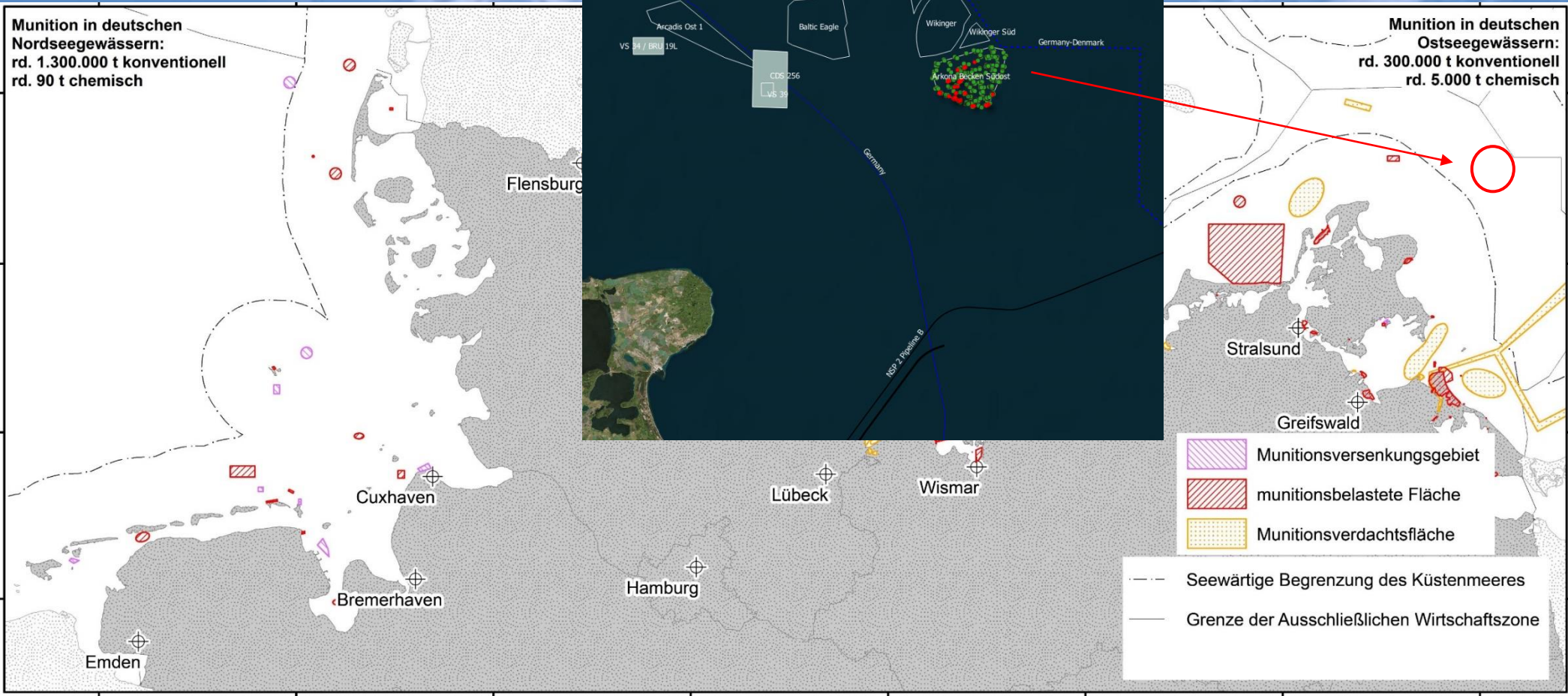
Source: BLANO

New build LNG Port Swinoujscie / Poland



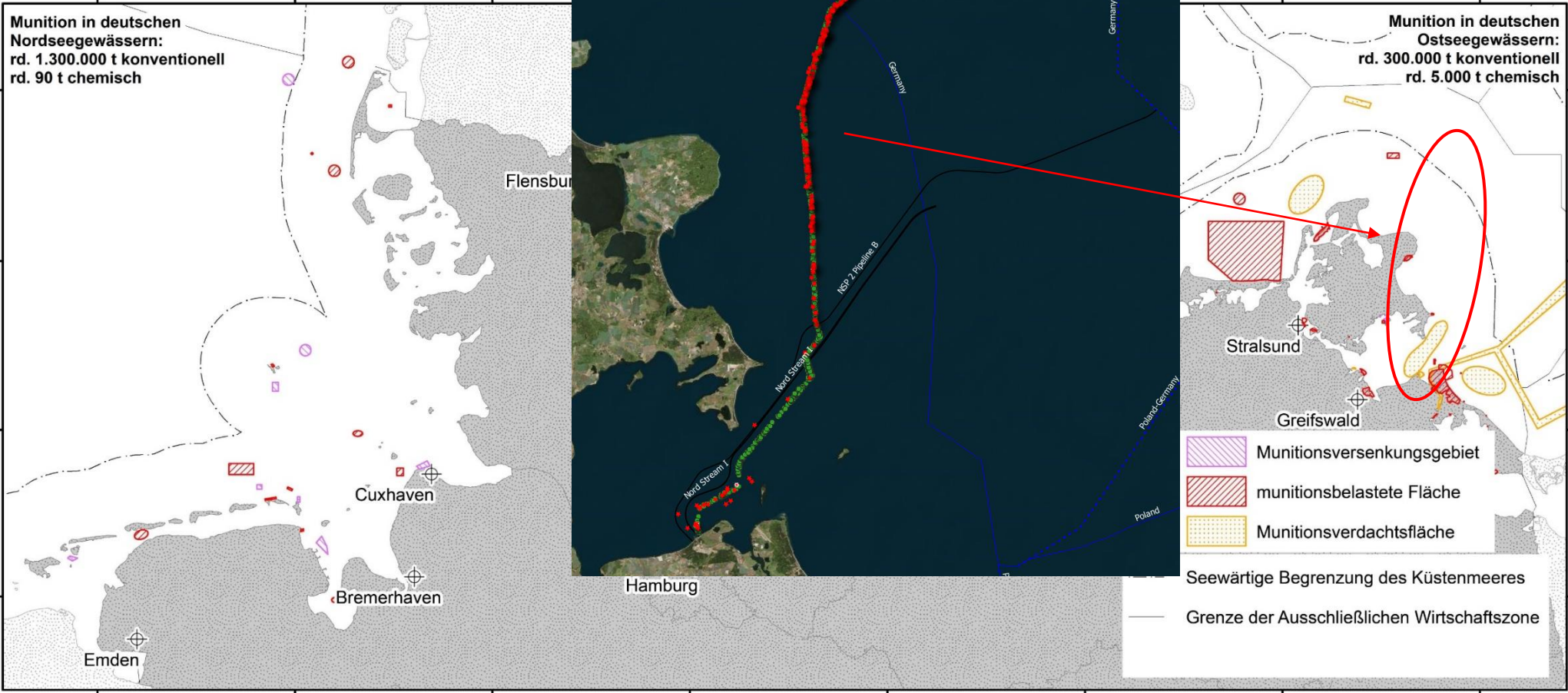
Source: BLANO, UX Consult Jan Kölbel

Offshore Windfarm ARKONA

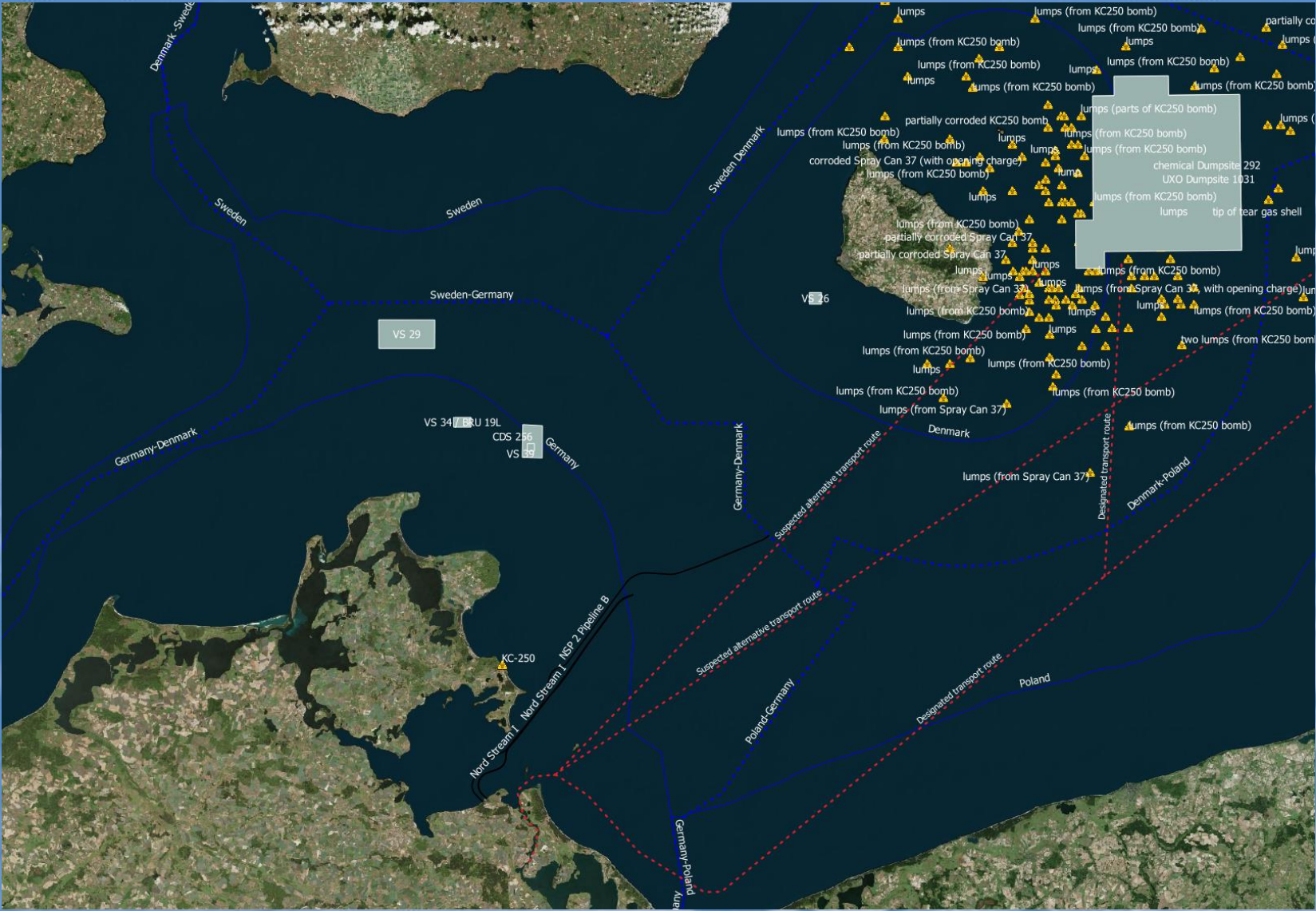


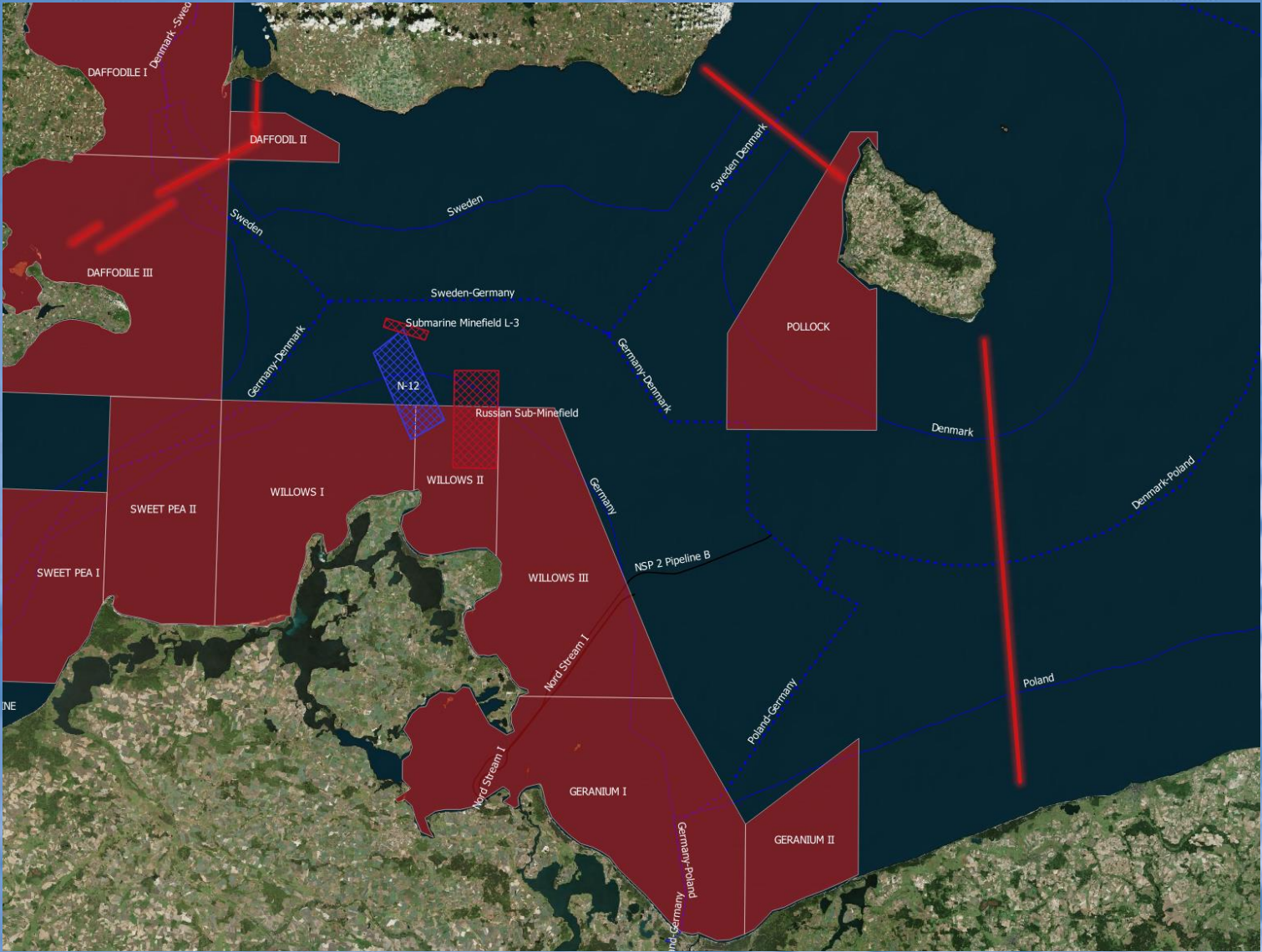
Source: BLANO, UX Consult Jan Kölbel

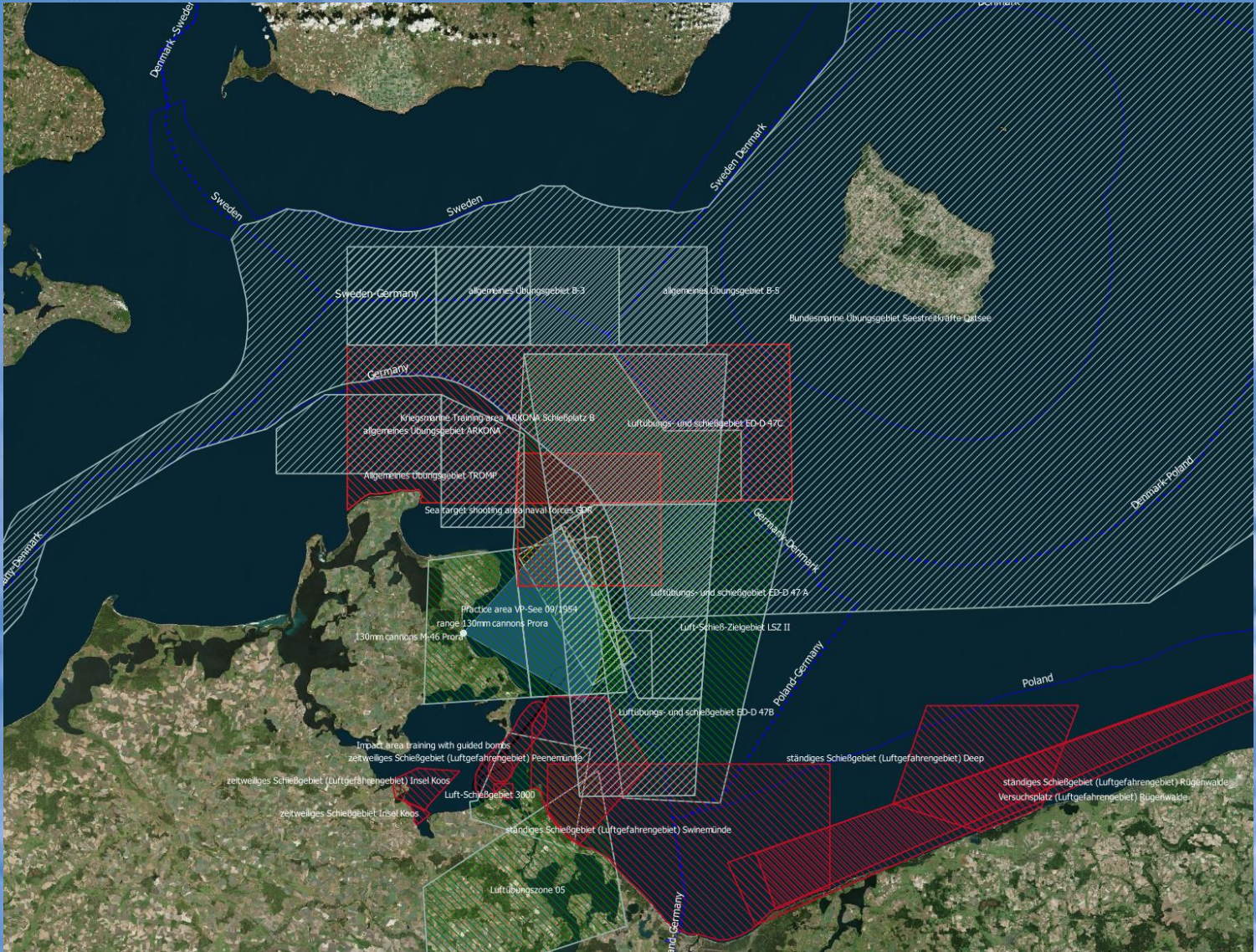
Cable routes to cluster western Adlergrund

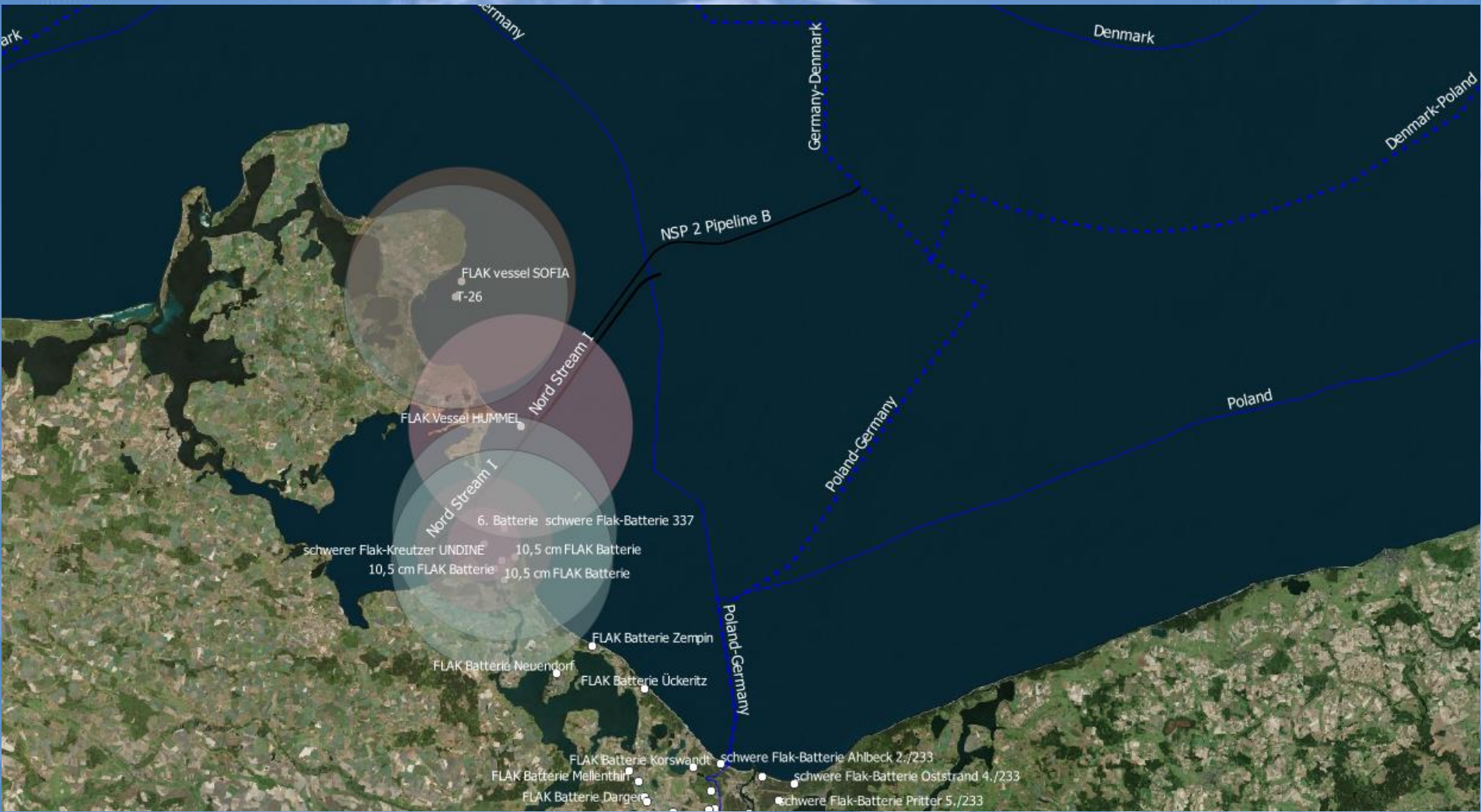


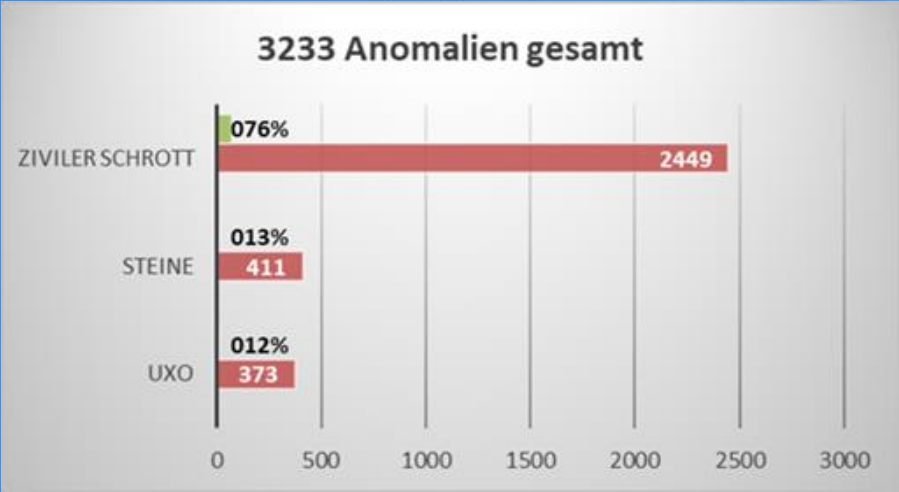
Source: BLANO, UX Consult Jan Kölbel











Percentage distribution between "unwanted" bycatch and real UXO.



UXO or magnetic boulder ?



Civil scrap, but modelled as a possible UXO

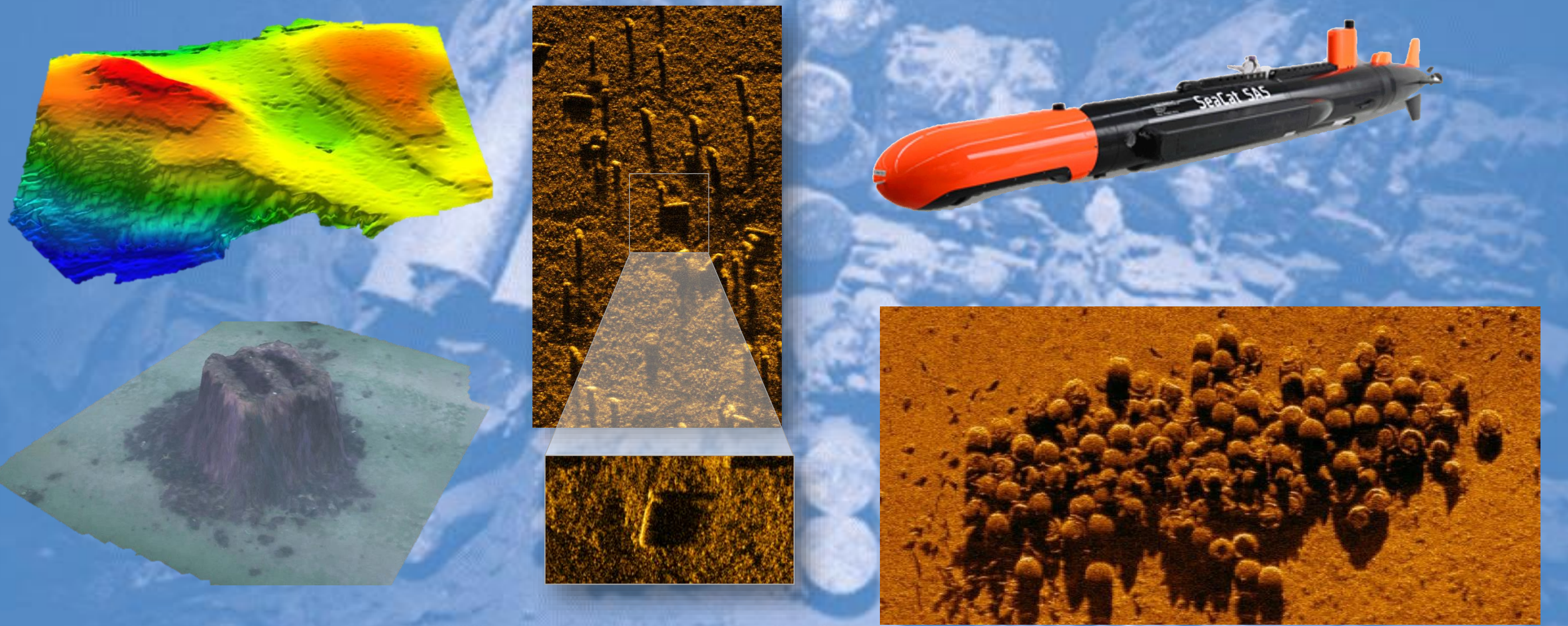


The "true" objects of desire

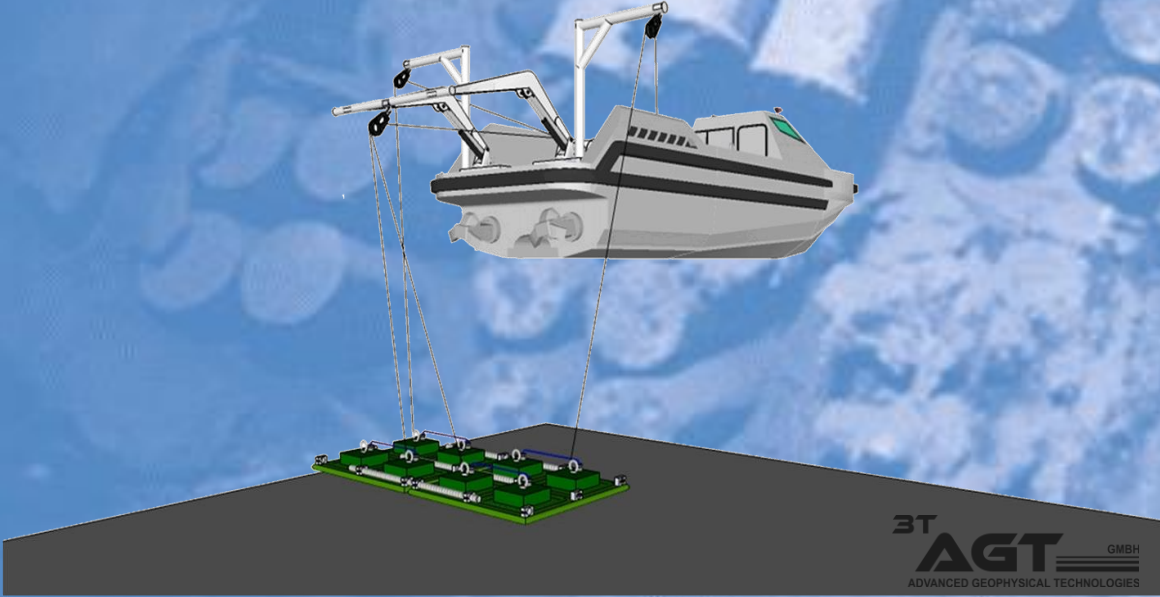
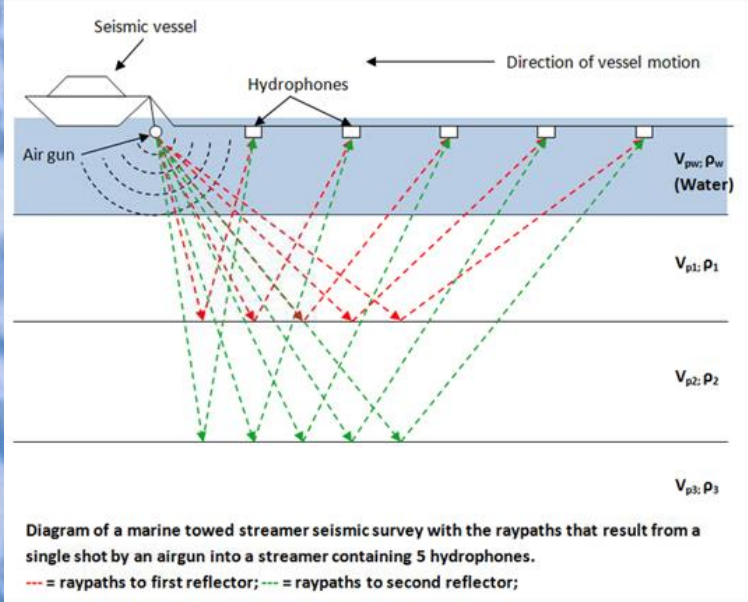
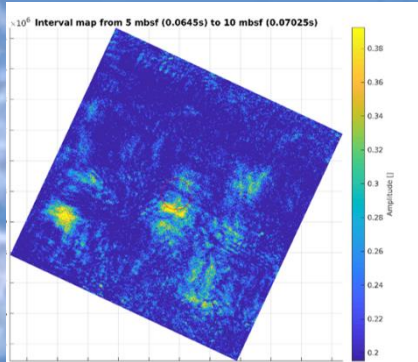
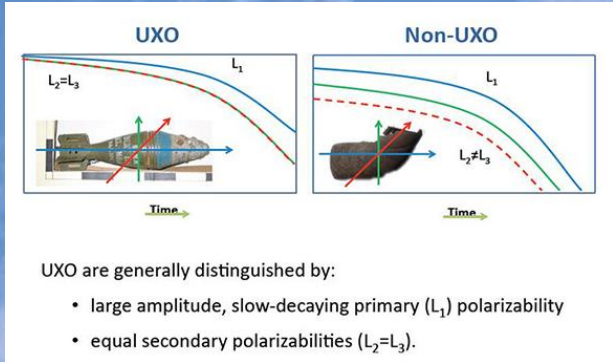
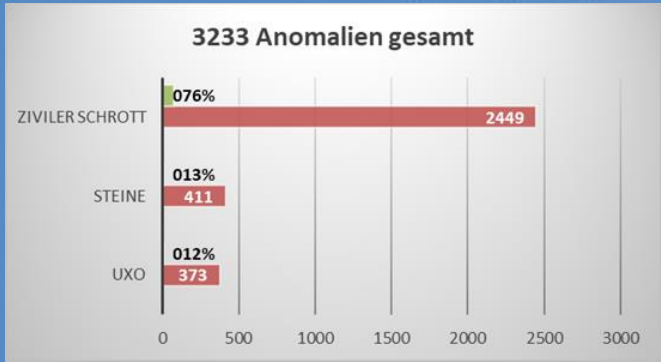


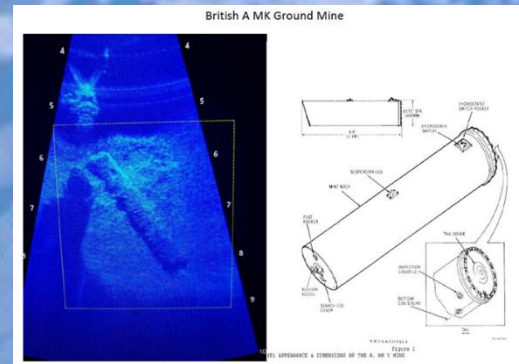
Boulder or rather a Ground Mine?

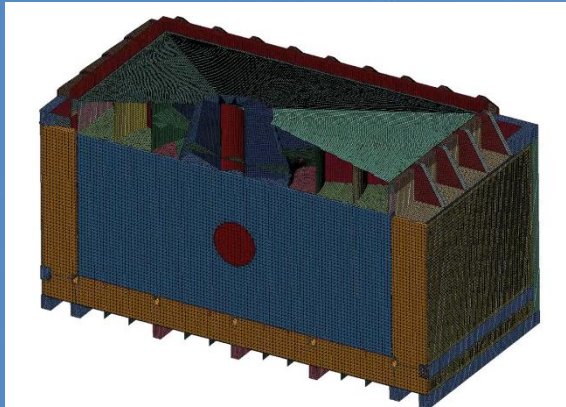
High-efficient state of the art survey by use of towed ROTV's and AUV's possible today



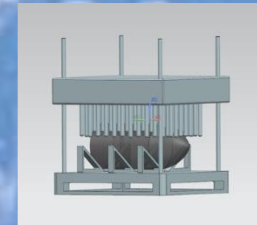
Detection systems for classification, i.e. differentiation between scrap without prior visual inspection, also for objects, buried in sediment in development or ready for use



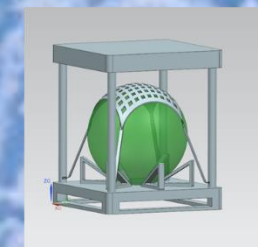
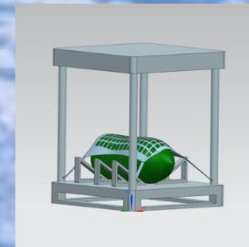




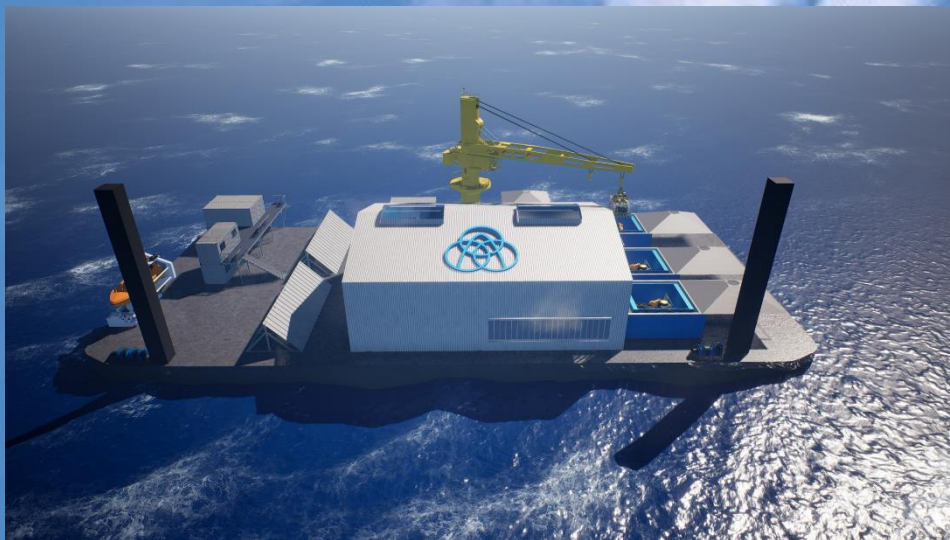
- Simulation auf Basis eines Basic Design
- Annahme: 300kg TNT-Äquivalent (500kg Belastungsgrenze)
- Druck- und Splitterbetrachtung



Detonationsfreie Räumung / „lebendige Schweinswale“



- Securing UxO for transport without divers intervention
- Move to the water surface
- Übergabepunkt zum UAN / klare Schnittstelle
- Direct feed into delaboration chamber without intermediate storage on board
- Direct cutting in the transport and storage container, (no additional relocation necessary)





Thank you for your attention