

# Use of R/V Aranda for new purposes - locating, identifying, documenting and assesement of environmentally hazardous wrecks



- Agile, capable, cost-effective and environmentally friendly multi-capacity research vessel for use in temperate coastal areas, oceans and polar seas
- Equipment and instrumentation allows efficient retrieval and analysis of most samples onboard, in real time

# RV Aranda

## Made to serve marine research

### Technical details

- Name Aranda
- Built 1989, Wärtsilä shipyard, Helsinki
- Renovated 2018, Rauma Marine Construction, Rauma
- Owner Finnish Environment Institute
- Home port Helsinki
- Call sign OIRY
- Classification DNV-GL 1A E0, Ice1A\*), Battery (Power), Silent R, Special Purpose Ship
- Length 66.30 m
- Width 13.80 m
- Draught 4.60
- Gross tonnage 1,969
- Main Propulsion Power 3,000 kW
- Cruising speed 10+ knots
- Endurance (max) 60 days
- Berths for researchers 27
- Crew 14
- Laboratory space 260 m<sup>2</sup> incl. wet lab, acclimated rooms, offices
- Workshop 7 m<sup>2</sup>
- Sampling facility 132 m<sup>2</sup>
- Sampling deck 190 m<sup>2</sup>
- Helicopter deck (winch only)
- Research and storage container facilities
- Sauna, gym and laundry
- Navigational instruments: DGPS (2), ECDIS, USBL
- Communications equipment: Inmarsat Fleet 77, Inmarsat C, VHF/MF/HF, MF/HF telex, DSC VHF/MF, aviation VHF GSM connections, VSAT
- Weather station
- ICT facilities



Photo: SYKE

### Weather station:

Readings every minute for wind speed and direction; air pressure, humidity and temperature; solar radiation; seawater temperature and conductivity.

### ICT facilities:

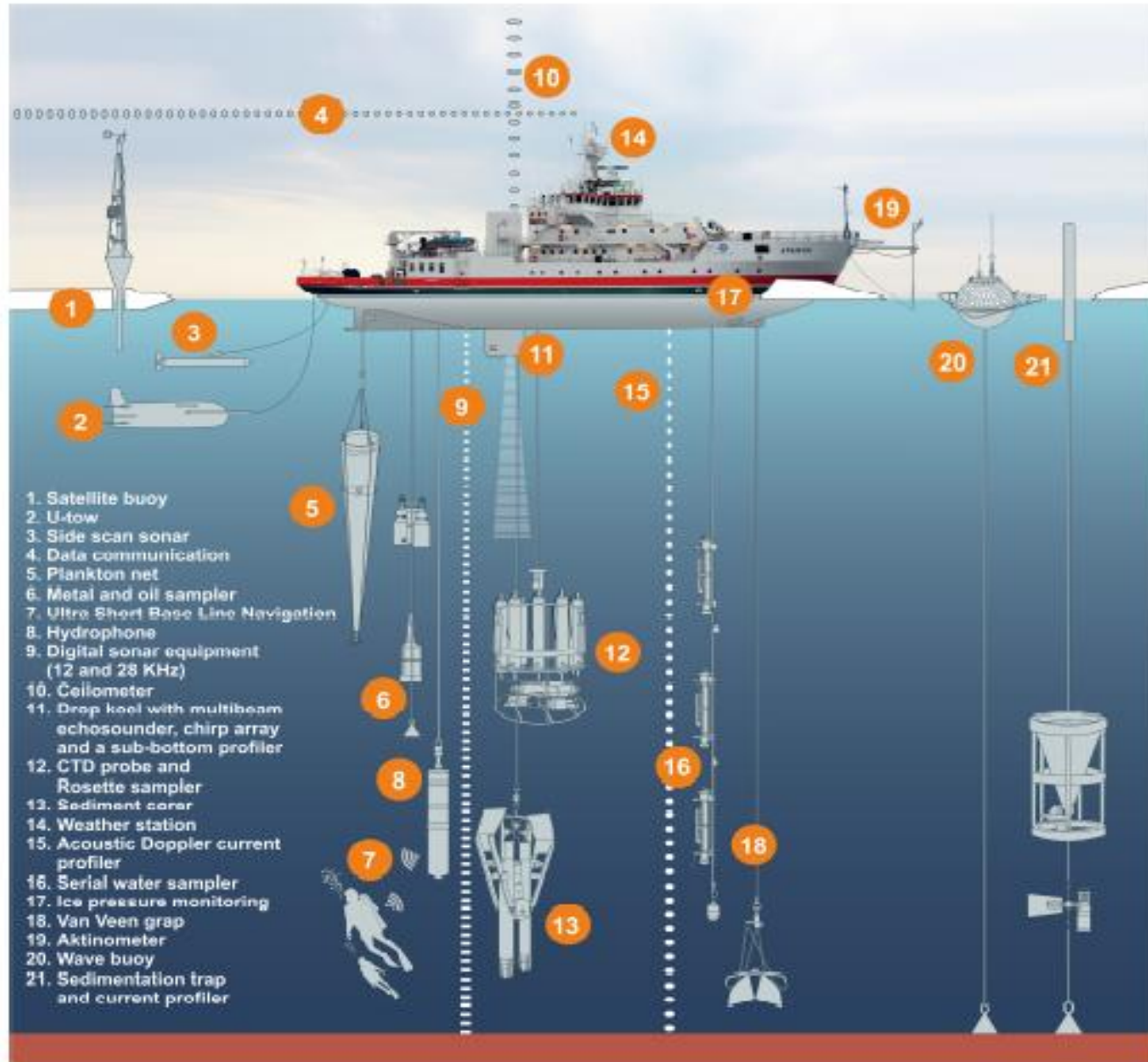
Lab computers connected to local network.

Networked servers give access to new lab+, observational and meteorological data systems.

Internal onboard communications via Intranet and Info-channel system.



# A brief look of available sampling systems...





## Why Aranda would be most suitable platform for wreck research and environmental assessment:

- Complete suite of instrumentation and personnel
- High capacity in especially biological and chemical oceanography
- Capacity to analyse most environmentally harmful substances on-board
- Capable and motivated personnel:
  - Hydroacoustics, visualising seabed and targets
  - Sampling
  - Analysis
  - Scientific diving capacity and know-how to 100m+
  - Interpretation of results
  - Complete package – results available online
- Good DP platform for ROV, AUV, Glider use
- Cost-efficiency: few sea days added to monitoring cruises – less mob-demob costs!
- Research vessel – no other duties which may interfere with research programs



The fact here is that what kind of hazardous materials wrecks contain, where and when is not very well known



Therefore, a comprehensive assessment of the situation is the first logical step forward!





# Using advanced voluntary groups as partners in environmentally hazardous wreck research – The Badewanne case



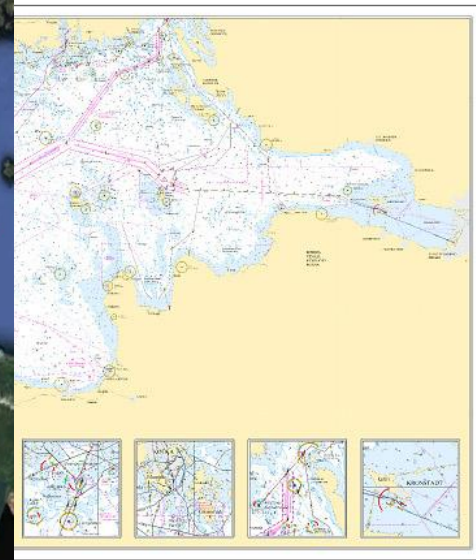
# Badewanne Team – historical documentaries is our bread & butter...



..but we can do other projects as well



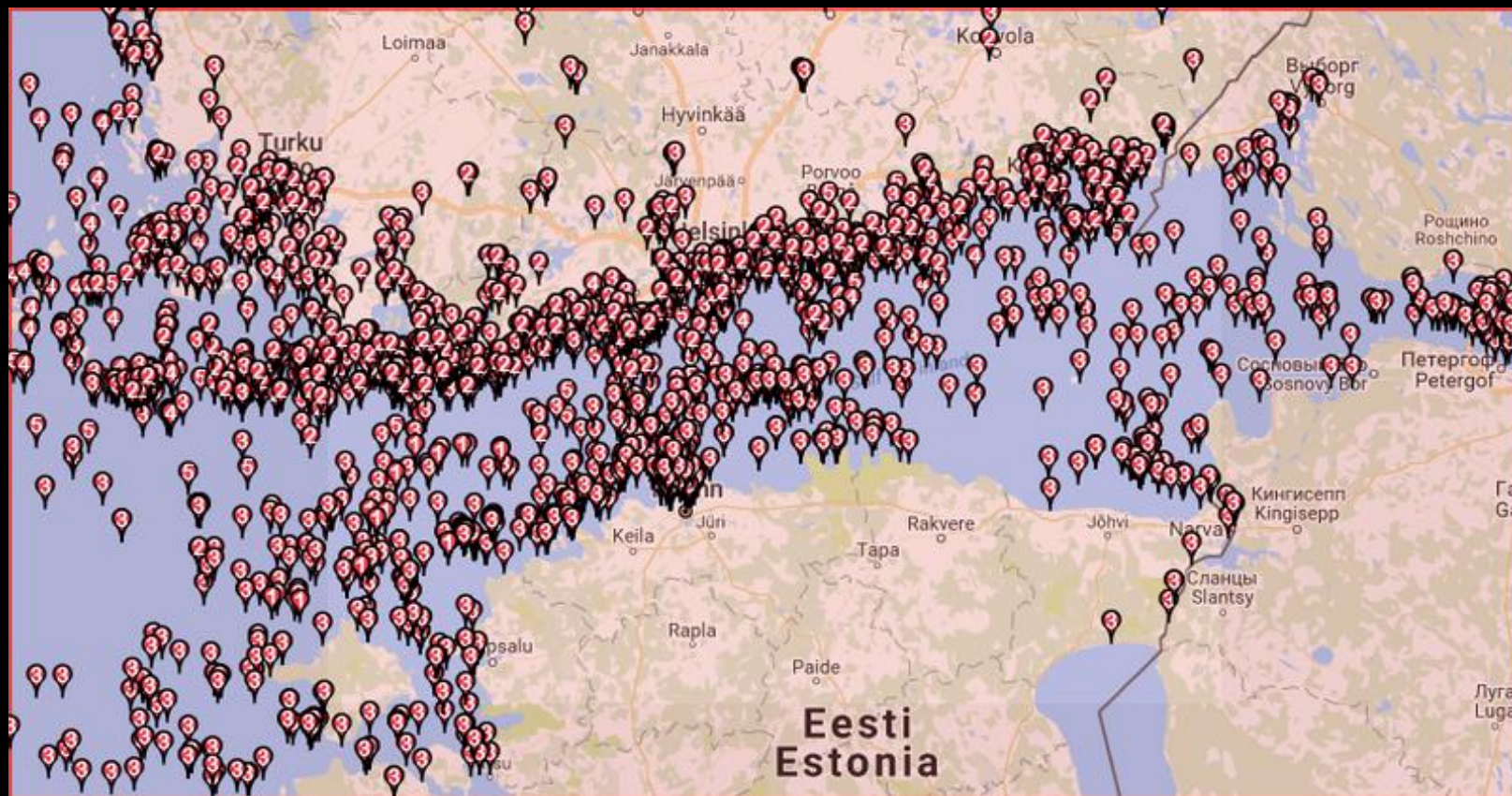
# Case: Gulf of Finland - one of the most important trade routes in the world



Russia's most important sea route since the times of Peter the Great. To protect the city and the route, he commenced building the St. Peter – St. Paul Sea Fortress – Most heavily mined sea area in both World Wars!



In both World Wars Northern Baltic and GoF were theatres for extensive sea battles – and they're not easy sea routes during times of peace either ...



For over 20 years Badewanne Team has investigated these wrecks, which in addition to their very interesting history include environmental problems

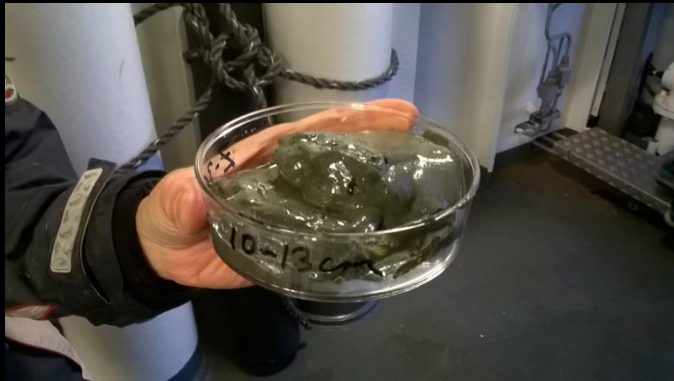


The very core of our skills, archival research, research diving, imaging, modeling of wrecks and data collection support the research of environmental problems encountered in wrecks



# Principal environmental threats in wrecks:

- Harmful substances, mainly oils and explosives
- Oil has been used as fuel for warships since WW1
- Some oils can be highly harmful and toxic
- Explosives both harmful and hindrance to wreck clean up operations
- Ghost nets, Derelict Fishing Gear (DFG)
- 10.000 nets are lost in the Baltic Sea annually
- Catching efficiency 20% after 3 months, 6% after 27 months of being lost
- Extensive pelagic trawling in GoF, lost trawls in practically every wreck



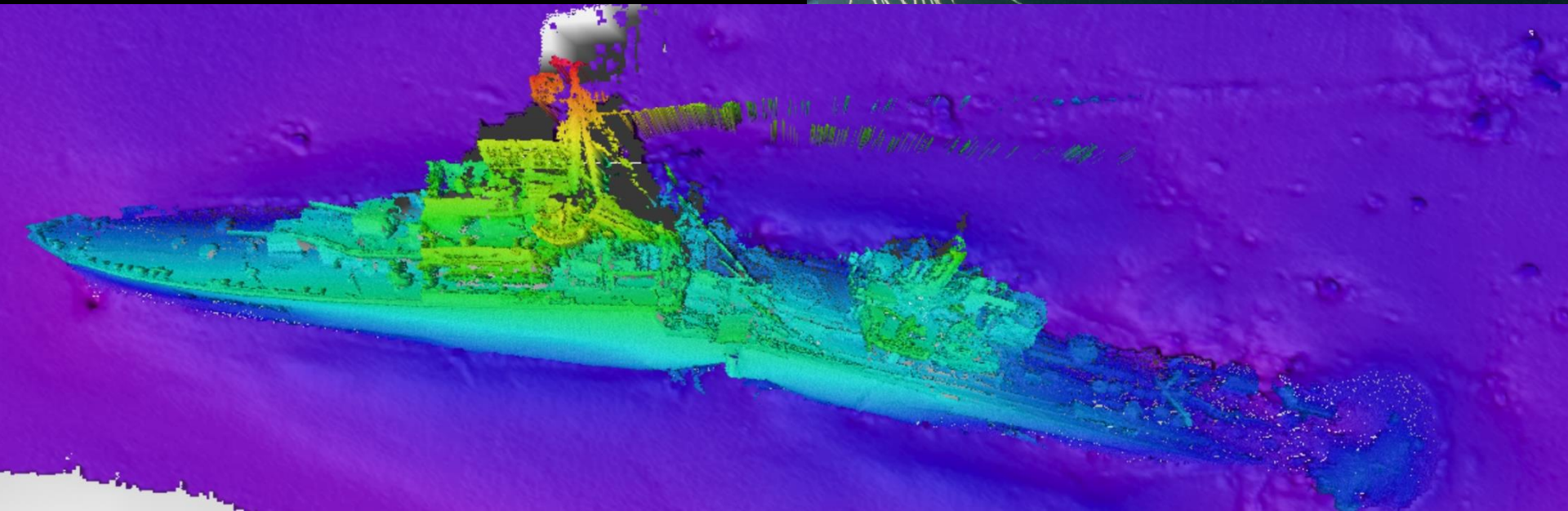
# How to observe these :

## Harmful substances:

- Archival research may reveal how much oil was onboard
- Oils can be also in sediments
- UXO's mostly clearly visible

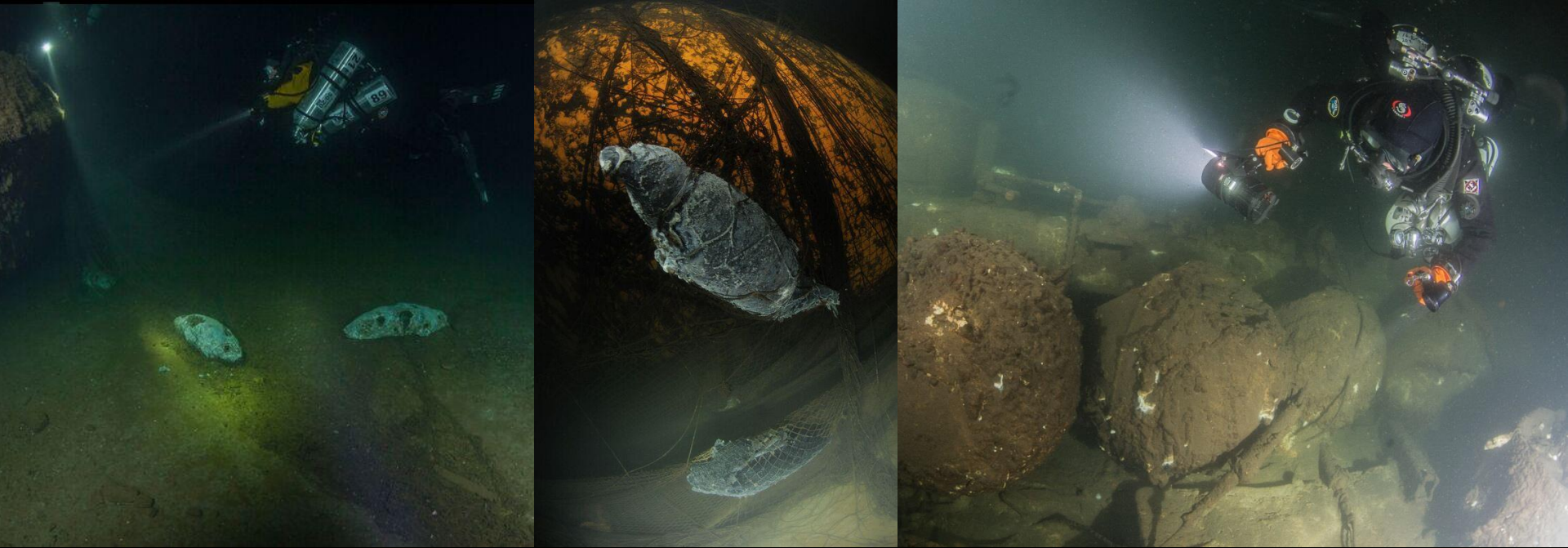
## Derelict Fishing Gear (DFG):

- Can be gillnets, longlines or trawl
- Modern materials practically indestructible
- Mostly easily observed



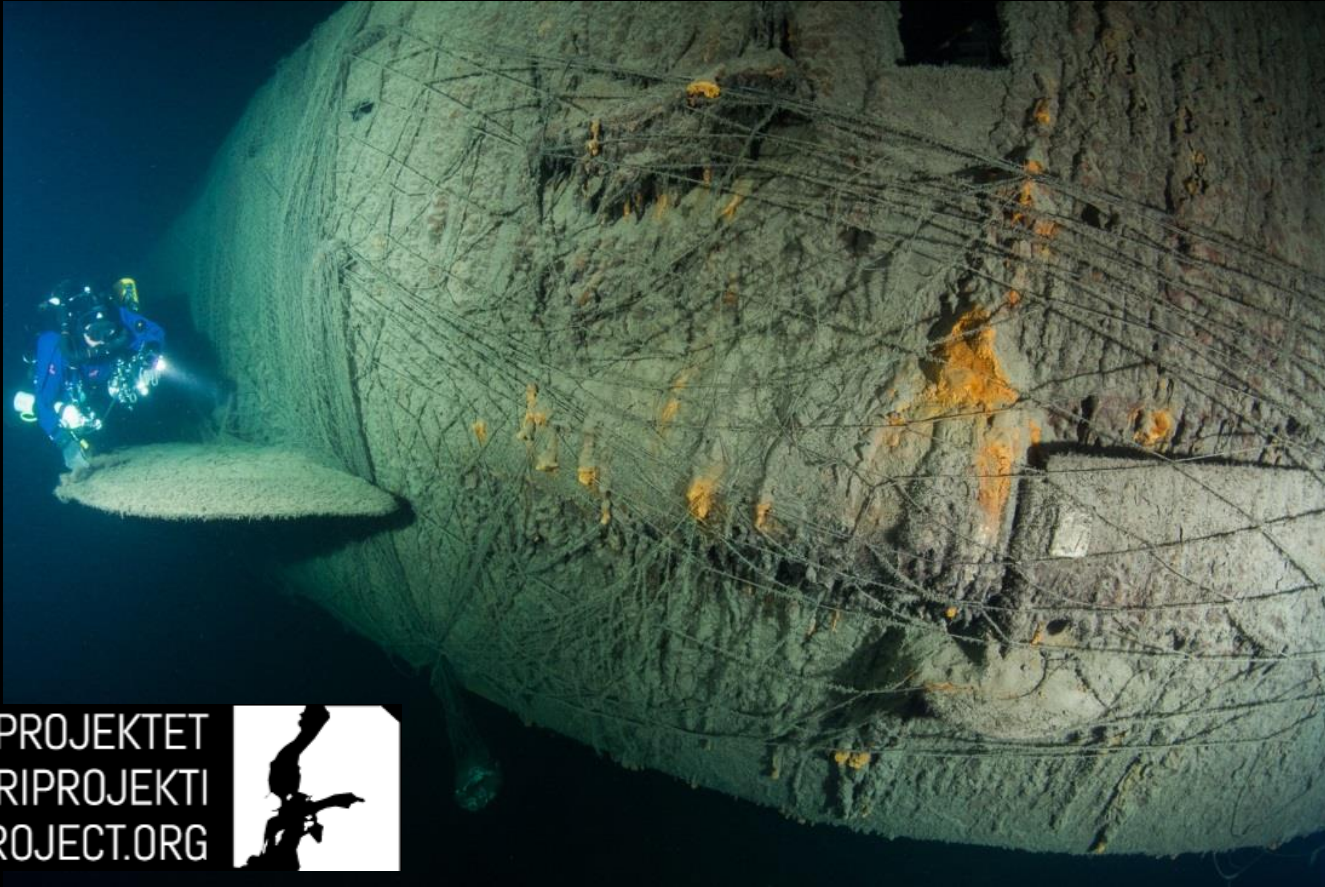


# How much, what or where – nobody knows!



This is where Badewanne Team can help: with support from funding organisations like Ålandsbanken Baltic Sea Projects and Naturbonusen projects, we have gathered observations, data, imagery and all kinds of material, and continue with next steps forward...

# Steps forward: Data collecting, and what else?



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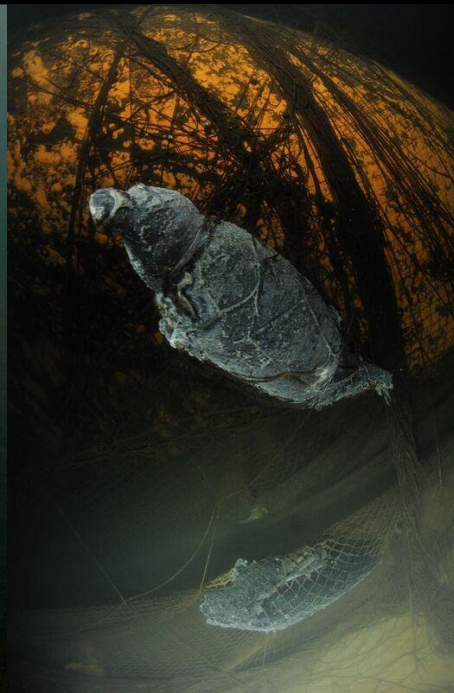


In February 2017, Badewanne received funding from Ålandsbanken for mapping and data collecting of harmful substances and ghost nets from wrecks in Gulf of Finland – this work commenced in 2017 and has continued since

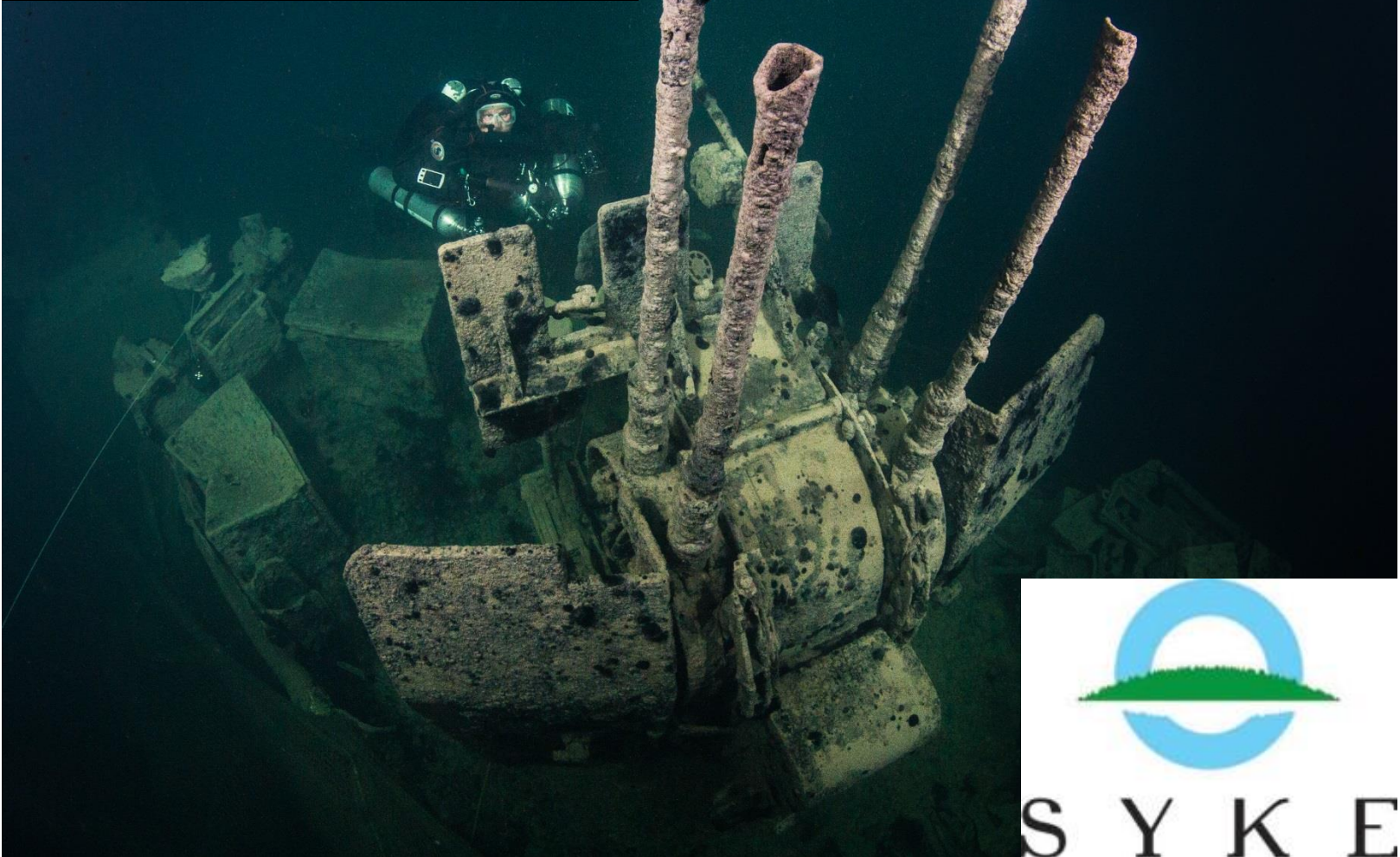


Why do we want to do all this?

We all care for the Baltic Sea, it's environment and history. Historical documentaries is our thing, but if we can help in environmental issues...



..then why not? With added resources, we can collect environmental data, and as specific projects, experiment with net removal. Our aim is to collect all this information, and make it available to authorities, officials and scientists to support them in estimating and planning wreck clean up operations!



Thank You for your attention!