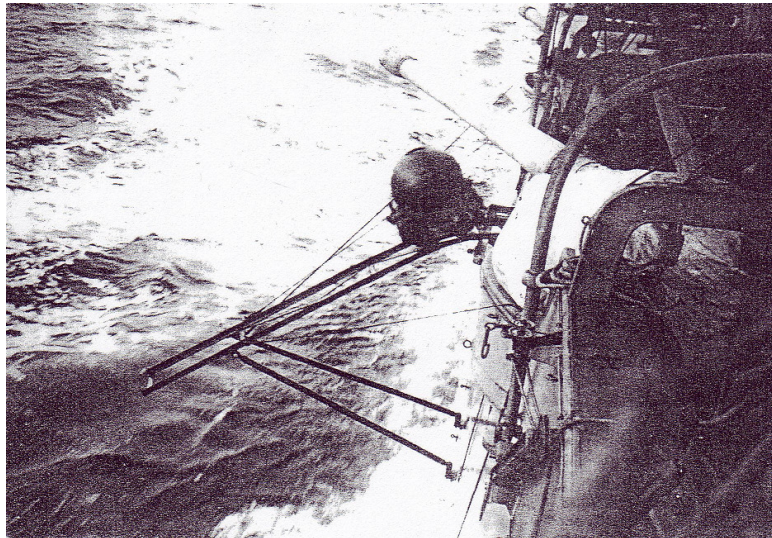


## **Problems in Locating Historic Dumping Sites**

Ladies and Gentlemen,

For the mine laying operation shown in the picture below

- we know the name of the ship: **BOGATYR**
- the date of the mine laying operation: **31.12.1914**
- and the position of the ship: **55° 12,5 `N 015° 51,5 `E**



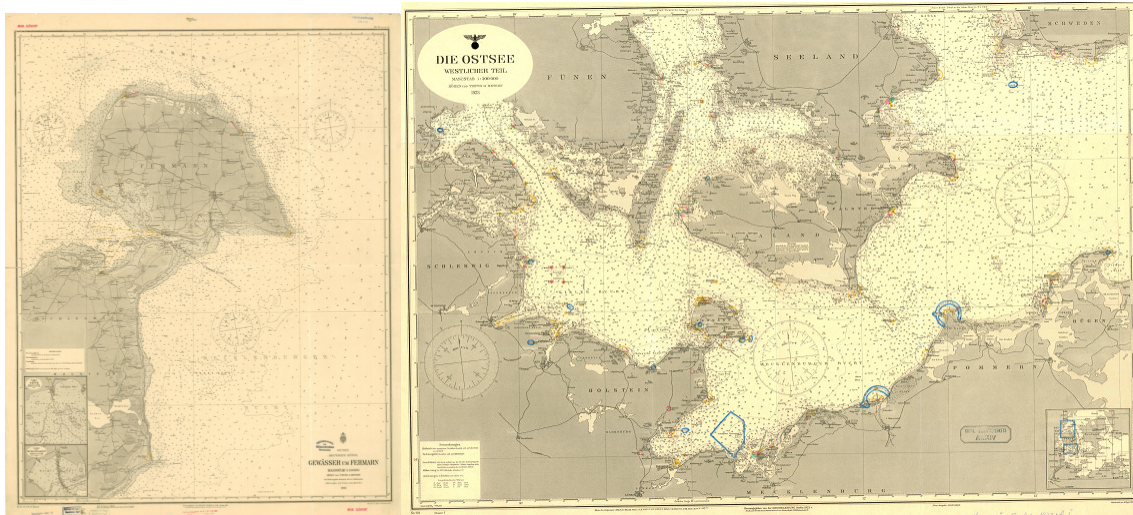
But if we search at this position today, what object would we find? Would we find the mine? I would say no and I will explain why:

There is a number of problems in locating historic dumping sites. Problems start at the position and in the moment of dumping of ammunition or other objects. Every action or every discovery of ammunition is an individual project and we must include all available factors.

I divide the factors into the following groups:

- Navigation and procedures**
- Documentation**
- Wartime influence**
- Effects of modern systems**

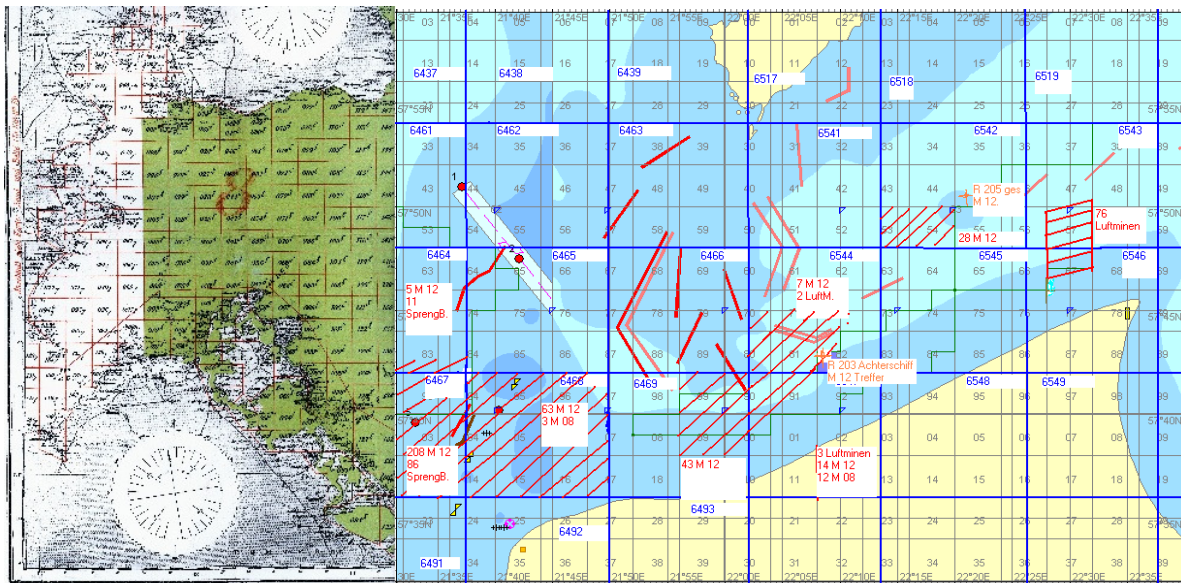
## Navigation and procedure



We start with a look at different sea charts. The German “Kaiserliche Marine” used sea charts (left) with the origin before or from 1902. With regard to the quality of data from this time, the sea charts were good charts.

30 and 45 years later the sea charts from the “Kriegsmarine” (right) were based on the same data as the charts from the “Kaiserliche Marine”. Of course, new information were implemented in the charts, but the fix status of 1902 was also sufficiently exact for this time’s Navy work. Consequently, we can determine that positions statements or documentations from this time have the same geodetic datum. Today, sea charts with the geodetic datum “ED 50” are long bygone history, “WGS 84” is still used, but for how long? - Electronic sea charts are the future!

During the wartime, in which “keeping something secret” played an immensely big role, the Navy worked with so-called “square charts”. Sea areas were appointed in squares and were named with an encoding figure or numbers. In both wars, the square charts were used by Navy and Air Force units. In the figure below we see a square chart from WWI on the left and a square chart from WW II on the right. In WW II, the position of objects in such “square charts” was not described using latitude and longitude. E. g., a position of a mine line was characterized by square nr. 6469 up-middle to down middle right sight. Here, I draw a modern grid system into the old map and we can see the positions of mine lines in both systems. By this way of documentation, we have no exact positions only areas or boxes but no information is lost.



## Navigation procedure.

During WW I navigation had to work without Radar or other navigation appliances such as DECCA, LORAN or GPS. The navigation with sea charts was rather based on land marks such as lighthouses, coastal lines, buoys and tons as navigation aids. Thus, optical navigation and the use of the depth log played an important role. Astronomic location was specifically so import as dead reckoning and was independent from the work of the navigator and the influence of weather conditions and currents. All factors were collected on the ship and got a part of the documentation.

During WW II, all Navies had the same basic navigation procedure and helping tools as in WW I. The development of Radar mainly aimed at detecting other ships or aircrafts, but did not serve as a navigation tool. Navigation radar and systems as DECCA and LORAN had the status “under development” or, in some cases, worked in order to gain basic experience. Thus, we can say, that the problems associated with exact positioning stayed on the same level during both wars.

## Documentation

The movements of all ships and units were documented in the daily logbook. Based on the navigation procedure and the sea charts and also the writer of the logbook, we see differences in how detailed documentations were.

War events were recorded in the war diaries. These mirrored more the events in the military behavior than actual locations of ships. Thus, a war diary alone is of little help in identifying positions of mines. We need to explore other sources of data: In addition to the war diary, we must always check or validate the logbooks, mine laying orders, mine laying reports, minesweeping reports and combat reports. As long as this material still exists, this work is straight forward.



Datum Uhrzeit	Ursprung des Lichts, Zustand, Richtung, Seegang, Beleuchtung, Sichtbarkeit der Luft, Mondschein usw.	Vorkommnisse
26. IV. 6 <sup>h</sup> 7 <sup>h</sup> 50	<u>findi</u> NO 2; von 1 <sup>h</sup> ab auffrischend Stärke 4. Seegang 3	ausgelaufen. Gerät ausgebracht. Arbeiten südlich der Sperre auf 0-80 Kurs fortgesetzt. Keine Minen gefunden. Die südlichste Mine gesprengt. Eine zweite Mine, deren Ankertaum nur durch- schlagen war, abgeschossen. Zwei gefaltete Minen aus dem Gerät entfernt. Dicht an der Sperre vorbei mit N 3/80 gesteuert, dann noch einen Streifen zur Kontrolle nach Süden gelegt. Keine Linen gefunden. Gerät aufgenommen und eingelaufen. Skizze).
11 <sup>h</sup> 30		an Bord. <u>Ergebnis:</u> Die Sperre ist einreihig und scheinbar von Torpedobooten geworfen, da die Linen ungenau liegen. Sie erstreck- ten sich 37° 31' 0" N und 21° 16' 1" O nach 37° 32' N und 21° 16' 0" O; Länge 1,1 sm; Richtung N-S. Es wurden in ganzen 5 Linen festge- stellt, davon sind 3 beseitigt worden. Die Minen sind Pendelstörminen von grün- er Farbe. Anstrich stellenweise gut er- halten. Tiefenstand der Linen schwankt zwischen 2 und 4 m.
1 <sup>h</sup> 5 3 <sup>h</sup>		

Datum Uhrzeit	Ursprung des Lichts, Zustand, Richtung, Seegang, Beleuchtung, Sichtbarkeit der Luft, Mondschein usw.	Vorkommnisse
21. 6. 0410	Mittlere Ostsee windstill, leicht be- wölkt, gut sichtbar	M 252, M 23, M 202 von F.d. Minisch zu „Ver- sailles“ u. „Grille“ detachiert u. angehängt in T gelb. Marsch von Olands-Rey nach Hamarn enge.
0854		Minenschiffe H rot M 252 als Sicherung vor Verband gesetzt, M 23 St.Bachteraus von „Versailles“, M 202 B. B.schteraus von „Grille“ In Hamarn Enge werden einer Minensperre markiert. M 23 dabei einzelne W.B. geworfen. Nach Durchführung M 252, M 23, M 202 U-Boote sicherung auf geradem Kurs vor Minenschiffen gefahren bei 15 sm Marschfahrt.
0910, 1050		Eingang F.T. von F. d. M. Nord an Chef 5. M. S. P. 5. M. S. Flo. nach Entlassung U-Jagd in Quadrant 8450, 8440, 8470, 8480 Vor Swinemünde von „Versailles“ entlassen. Da Boote teilweise nur noch 55 to. Brennstoff haben, augenblicklicher Standort Chef 5. M. S. P. nicht bekannt ist, dieser nach Kopplung aber gerade mit „Preußen“ u. „Skagerak“ Swinemünde eingelaufen sein kann, wird zur beschleunigten Übergangsung eingelaufen
1500		Flottille wird jedoch nicht angetroffen. Nach Meldung bei F. d. M. Nord Befehl: Nach Übergangsung in breiter Dwarlinie U-Jagd über Quadrat 8525 nach Quadrat 8475. Dort weitere Befehle durch Chef 5. M. S. Flo. der hierüber von F.d. M. Nord durch F.T. unterrichtet wird.
1700		Swinemünde ausgelaufen. L gelb Abstand 7 sm (sichere U-K Reichweite M 23, M 202, S-Gerät, M 252 K.B. ausgefah- ren, da S-Gerät unklar. Da bei Wassertiefen um 15 mtr mit getauch- fahrenden Booten weniger zu rechnen --, höchste
1800	Swinemünde	
2045 2115		

War diary WWI Minesweeping Flotilla  
Kaiserliche Marine 1915

War diary WW II COM Minenschiffe (Minelayer)  
21. June 1941

However, the loss of records or documentation (may it be intentionally or unintentionally) impedes the investigation immensely. For example, in a given case we know the date, the engaged squadron, we know how many airplanes started with which mine cargo and that this air mining was actually enforced. But we have no information on the position: The fact that the most part of documentation about operations of the “Luftwaffe” have been destroyed at the end of the war by high order is one of the most serious obstacles in locating mines.

- Es wird gebeten, folgende Versenkungen durch I/W vornehmen zu lassen, Reihenfolge der Aufzählung gibt Wichtigkeitsgrad an:
1. Südlicher Moon-Sund zwischen Breite des Südufers Sahlidau (Kessu) und Breite  $58^{\circ} 34'$  zirka 40 Luftminen.
  2. Sölo-Sund Westeinfahrt in weissem Ansteuerungssektor von Kap Toffri (Töhrvinses) bis zu zwei Seemeilen Abstand vom Feuer zirka 20 Luftminen.
  3. Sölo-Sund Ostausfahrt mit TriggisReede zwischen den Breiten  $58^{\circ} 39'$  Nord und  $58^{\circ} 36,5'$  Nord und den Längen  $22^{\circ} 33'$  Ost und  $22^{\circ} 45'$  Ost. Dieses Gebiet bitte zweimal versenken mit insgesamt zirka 80 Luftminen.
  4. Moon-Sund-Fuhrwasser bei Kumaru-Madalike-Elizstorne zwischen den Breiten  $58^{\circ} 47'$  und  $58^{\circ} 45,5'$  Nord zirka 20 Luftminen.
  5. Wornes-Sund-Fuhrwasser beiderseits Insel Harilaid zirka 20 Luftminen.
  6. Irbenstraße bei Kap Zerel (Solive) zwischen den Breiten  $57^{\circ} 32'$  und  $57^{\circ} 54,6'$  Nord und den Längen  $22^{\circ} 05'$  und  $22^{\circ} 10'$  Ost zirka 20 Luftminen.
  7. Irbenstraße Südlich Zerel-Riff zwischen den Punkten
    - a)  $57^{\circ} 48,1'$  Nord und  $21^{\circ} 57,4'$  Ost.
    - b)  $57^{\circ} 48'$  Nord und  $22^{\circ} 02'$  Ost
    - c)  $57^{\circ} 45,4'$  Nord und  $21^{\circ} 59'$  Ost
 Zirka 20 Luftminen.
  8. Oessi, Fettelbucht (Fetelabuhl) nördlich  $58^{\circ} 13'$  Nord und westlich  $22^{\circ} 50'$  Ost zirka 20 Luftminen.
  9. Moon-Sund-Reede vor Insel Papilaid zwischen  $58^{\circ} 39,5'$  und  $58^{\circ} 41'$  Nord und den Längen  $23^{\circ} 21,5'$  und  $23^{\circ} 23'$  Ost (mögliche Beschusststellung gegen Warden) zirka 20 Luftminen.

Gruppe Nord 04525 G.Ekos.

Zusatz:

Luftflotte eins wird um Weiterleitung Fernschreibens gegebenerfalls



6. Irbenstraße bei Kap Zerel (Solive) zwischen den Breiten  $57^{\circ} 32'$  und  $57^{\circ} 54,6'$  Nord und den Längen  $22^{\circ} 05'$  und  $22^{\circ} 10'$  Ost zirka 20 Luftminen.
7. Irbenstraße Südlich Zerel-Riff zwischen den Punkten
  - a)  $57^{\circ} 48,1'$  Nord und  $21^{\circ} 57,4'$  Ost.
  - b)  $57^{\circ} 48'$  Nord und  $22^{\circ} 02'$  Ost
  - c)  $57^{\circ} 45,4'$  Nord und  $21^{\circ} 59'$  Ost
 Zirka 20 Luftminen.

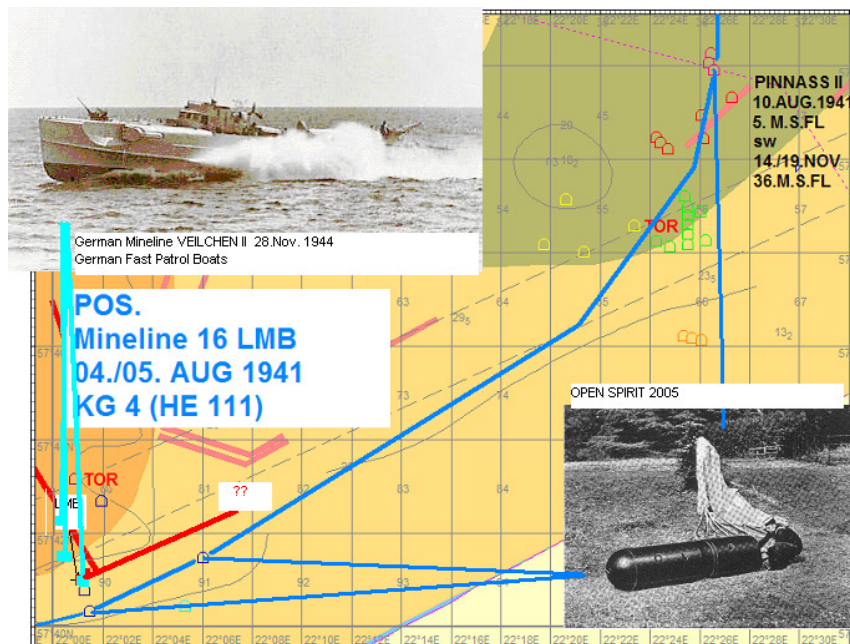
Locating mines from historic data is always a "puzzle". As an example from a postwar mine clearance operation, I explain how this puzzle works:

The concrete finding of three air dropped mines and the actual positions are the starting point. This finding can be related to the small part of documents seen in the figure above.

- We further check which units laid the mines mentioned in the documents and in the vicinity of the known area.

- It is important to check which tactics have been used by the Air Force and which the prevailing weather conditions were. Also we must check which way and which formation the aircrafts flew.

The answers to all the questions raised above and the collection of all needed data resulted in today's knowledge, that half of the minefield in question has been found and destroyed.



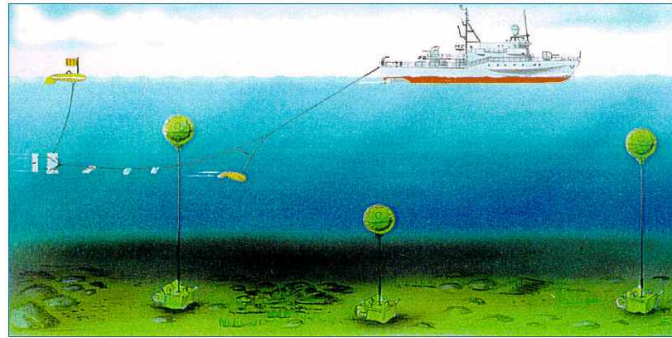
## Wartime influence

Own mine barriers were normally known by the own forces and they are able to operate within these barriers. But the enemy's mine barriers and especially the air minefield hindered the ships from free movement. The result of a research with an undated stop point is that approximately 174 000 mines have been laid in the Baltic Sea in the time between 1855 ( Krim War) and 1945 (WW II) and the approach waters by the different nations. These mines, unrecognized under water hampered the shipping movements in the wartime and a long post-war period.

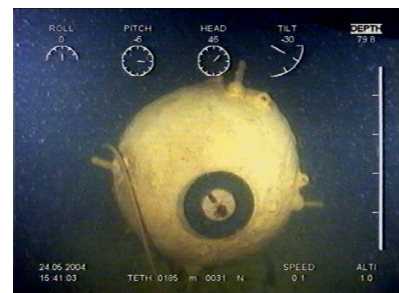
Beside the mine laying the combat and attacks of surface ships and submarines as well as from coastal artillery or even air attacks and air defense had an impact on locating dumped ammunitions today. The defense against the threat of attacks got a much higher priority than the exact documentation of the movements or the loss or dumping of objects. Documentation of absolute positions were not at all the emphasis on board the ships during or soon after many air attacks with arms used so often.

Minesweeping gears are created to reduce the function of mines. If the mechanical gear grasps the anchor wire of a mine, it cuts the wire. During past mine sweeping operations in such cases the mine came to the surface and could be destroyed by gun-fire with or without explosion and it sunk immediately. If the wire was not cut as desired, mines and anchor chairs were relocated to a new unknown position without documentation. Discovery of anchor chairs and mine cases shows us the reality, that minesweeping gear has moved a number of mines.





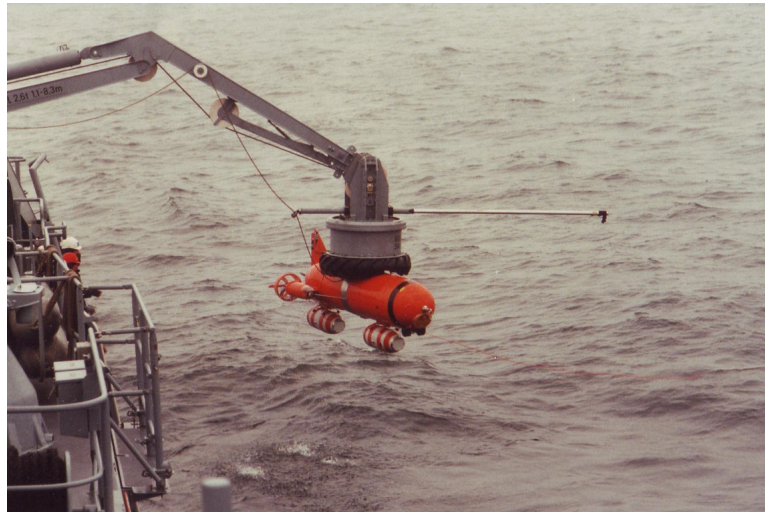
But also post-war examples show an impact on still existing mines. Fisheries after the wars (mainly operating with trawl nets) “caught” or relocated enormous quantities of ammunitions from the original positions. Unfortunately, three Dutch fishermen died in 2005 after the explosion of old ammunition in their net. In the case shown below fishers had more luck, because EOD specialists were able to dispose of the mine caught in the trawl net in 2006.



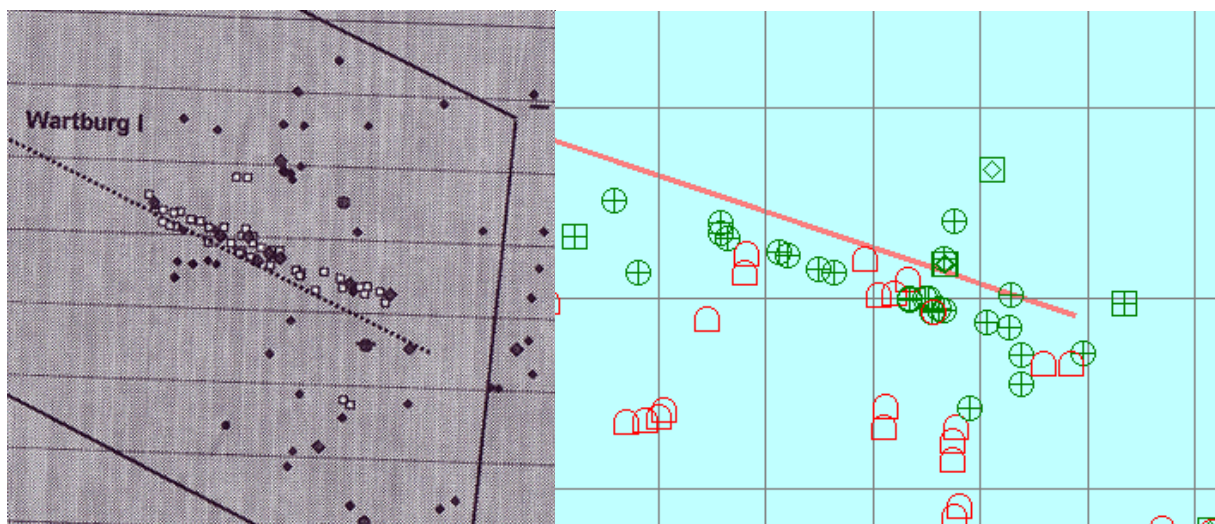
Impression from the Baltic Sea, mines and torpedos from 1914 -1945

## Effects of modern systems

With modern underwater-drones, which are equipped with sonar systems of newest construction and with navigation support by GPS, we are able to locate and identify ammunition very exactly. In order to determine from which task this ammunition originates, all the known factors must be investigated for this position. When all factors have been considered, a picture will be established with the “dumping situation and finding situation” in one overview.



An example is the record of the “finding dates” of a mine clearance operation carried out in 1999 (left). Below, we have drawn the known data into a plot. The picture on the right represents the actual situation in the area after validation of sea charts, reports, and other information. After implementation of all factors, the following conclusion was drawn: **Sea charts with different geodetic datum, change of navigation procedures, loss of information in historic documents, weather conditions as storm, fog, snow and current, wartime influence, minesweeping influence and fishery influence show us a difference of up to 2 nautical miles between old (documented) and new (finding) positions.**





**Photo: Archive Uwe Wichert, RSwN, unknown sources**