

SUBZONE

Maritime archaeological  
site survey  
Huis te Warmelo 1708-1715.

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Fieldwork report 2017-2018



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## Summary

Subzone Oy conducted during the summer 2017 and 2018 an archaeological survey of the wreck of the North Holland Admiralty's frigate Huis te Warmelo located 1 nautical mile West from Kalbådagrund lighthouse, Porvoo, Gulf of Finland. Lat 59° 59,2089' Lon 25° 33,6103' (ETRS89/WGS84).

The main goal was to continue the production of 3D model of the wreck, that has register number 2381 in the Finnish Cultural Heritage Agency's Registry of Ancient Monuments. The name in the register is Huis te Warmelo. Other names used of the wreck are Frigate of Porvoo and Kalbådagrund Gunship.

Earlier research conducted by Subzone Oy in 2016, confirmed the identity of the wreck. In 2017 and 2018 only few documentation dives could be made to the wreck. The main results were documentation of the main and mizzen masts and additions to the 3D model of the main deck of the wreck.

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## Introduction

The Kalbådagrund gunship wreck was found in 2002 by Finnish Maritime Administration during hydrographical surveys. She lays at the bottom of the Gulf of Finland (Suomenlahti), off the town of Porvoo. The Finnish Maritime Administration provided a report with multibeam sonar image of the target to the National Board of Antiquities in 2004. The wreck site is open to the divers and since 2004 various hobby divers have visited the wreck. According to the Finnish National Board of Antiquities Registry of Ancient Monuments, the diving team of Jussi Kaasinen photographed and video shot the wreck in 2006. A video by Pasi Raasakka from Jussi Kaasinen's team was the first documentation of the wreck done by divers. Jussi Kaasinen's team estimated the wreck to be a warship from 18<sup>th</sup> century. The photos from the year 2006 by Jussi Kaasinen's team are presented in the Registry of Ancient Monuments. In 2011 Mikhail Ivanov was measuring and observing the details of the wreck and made the first sketch of the wreck which he provided to the National Board of Antiquities. Mikhail Ivanov also noticed looting of the dishes in 2011 and reported that to the National Board of Antiquities. In 2013 and 2014 the Badewanne diving team was photographing the wreck and the photos from 2014 are presented in the Registry of Ancient Monuments.

Between 29.06 – 02.07.2016, 24.08.2016 and 26.08.2016 maritime archaeological surveys were undertaken at the Huis te Warmelo wreck site in the Gulf of Finland by SubZone Oy in partnership with the Cultural Heritage Agency of the Netherlands and the City of Medemblik.

The purpose of the research in 2017 and 2018 was to continue the production of 3D model and documentation of details of the wreck by videography and photography.

## Technical data

Register number: 2381  
Permit numbers: MV/130/05.04.01.02/2017 and MV/136/05.04.01.02/2018  
Municipality: Porvoo  
Name: Huis te Warmelo  
Coordinates (ETRS89/WGS84): Lat: 59° 59,2089', Lon: 25° 33,6103'  
Date of surveys: 07.10. and 14.10.2017 and 29.-30.4.2019  
Research area: 900 m<sup>2</sup>  
Company: SubZone Oy  
Responsible researcher: Maili Roio  
Report: SubZone Oy  
Museovirasto, arkeologian keskusarkisto  
The Cultural Heritage Agency of the Netherlands  
The County of Medemblik

## Personnel:

Immi Wallin – project manager, diver, videographer, data post processing  
Maili Roio – maritime archaeologist, responsible researcher  
Kari Hyttinen – diver, videographer, data post processing  
Pasi Lammi – diver  
Toni Nevalainen, diver  
Sami Paakkari – diver, photographer  
Jenni Westerlund – diver

## Technical equipment:

### Research vessel Yoldia (Fig 1)

Length 12,2 m  
Beam 4 m  
Draft 1,7 m  
Gross Tons 19 T  
Engine Doosan L136 147kW Heavy Duty  
Communications, Navigation and Sounding Electronics:  
VHF Marine Radio (2), EBIRB, AIS A-Class, Radar (4kW antenna), DGPS,  
Autopilot Robertson AP-35, Depth Sounder (100-200 kHz), Side Scan Sonar  
(400/900 kHz), Deck crane Hiab 250, Life raft 10 pers., compressor for breathing  
air, breathing gas mixing system (Trimix)  
Side Scan Sonar  
DSME Sonar Beam UTech S-150S 400kHz

### Underwater cameras

Canon EOS 5D Mark III with Easydive Leo housing, various lenses  
Sony a7s with Nauticam housing, various lenses

### Lights

2x100w led Northern Light Scuba

2x32000 Lumen led Northern Light Scuba

2x1kW led Northern Light Scuba

2x80w Lumen led Easydive

#### Diving equipment

Each diver had drysuit and closed-circuit rebreather unit and 3-4 bailout cylinders

#### Data processing equipment

2xpc each with 64bit OS, 32G memory, Intel i7 8 cores 2.80 GHz CPU, 3TB HD,

Two NVIDIA GeForce GTX 980 GPU



Fig. 1. The research vessel Yoldia. Photo: Immi Wallin.

Since the fieldwork in 2017 and 2018 were continuation for the fieldwork done in 2016, also this report is continuation for the research report 2016. Subzone Oy, Maili Roio, Immi Wallin, Kari Hyttinen: Maritime archaeological site survey Huis te Warmelo 1708-1715. Therefore, following chapters of the research report are in the report of our field work done in 2016:

The documentation of the wreck

Historical background

Site and Environment

Condition

Historical Background

## Field work

An archaeological survey was conducted in 2017 and in 2018 to continue documentation of the wreck and its immediate surrounding by photography and videography.

The research vessels were berthed in Herttoniemi, Helsinki (Fig. 2). Distance to the wreck site is 23 NM and the cruise to the target took 2,5 hours with the RV Yoldia.

The documentation by diving requires very good weather conditions in terms of wind and waves.



Fig.2. Rv Yoldia at Herttoniemi harbour. Briefing before the fieldwork is going on with Immi Wallin, Kari Hyttinen, Pasi Lammi and Jenni Westerlund. Photo Sami Paakkari.

## Documentation of the wreck by videography

Detailed documentation of the wreck site by videography was conducted to make 3D photogrammetry models of the whole wreck and parts of it. Video data was also used for perception of details.

During 2017 and 2018, 5 dives were conducted to the wreck site having 2-3 divers in a team. The bottom time on the wreck site was approximately 25 – 35 minutes per dive, giving the total dive time 1,5 – 2,5 hours.

The visibility at the site varied from 0,5-2 meters. As previous years, the water column from the bottom up to 2-5 meters above the bottom had fine white silt making it look like a cloud had covered the wreck.



The dive teams included one camera man and 1-2 light divers carrying external video lights. Our target was to continue the 3D photogrammetry modelling of the wreck that we started in 2016. In 2017 and 2018 video shooting was done of the mizzen mast, main deck and port side at the bottom. Still photos were taken from part of mast that lies separately on the port side of the wreck, the pile of wooden parts behind the transom on the bottom and cannons on main deck starboard side. (Fig. 3).

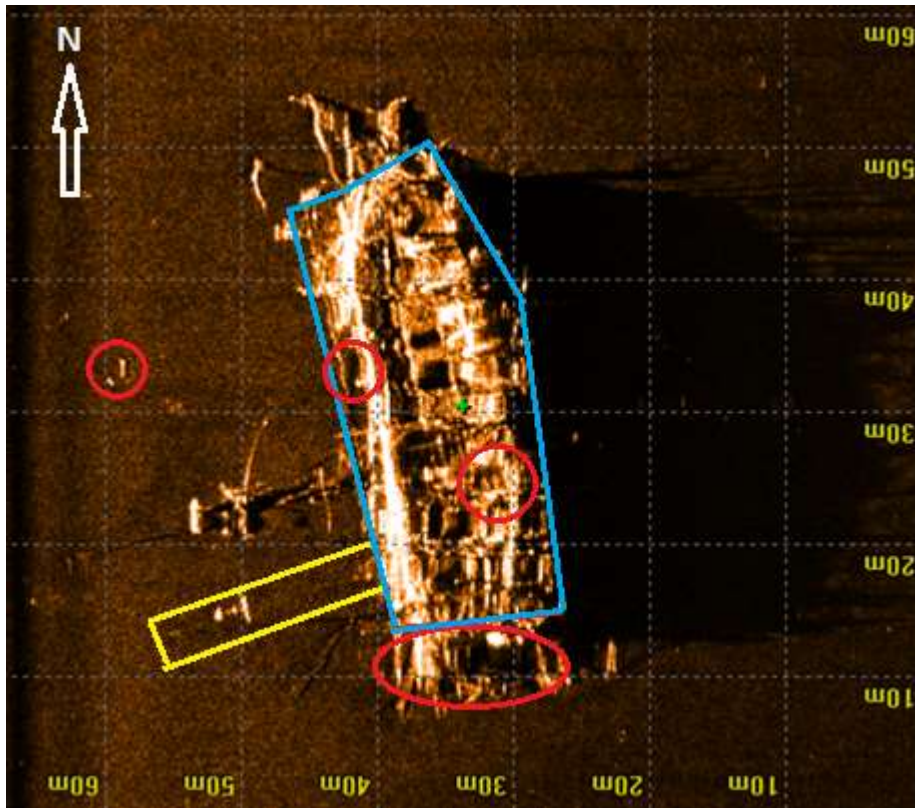


Fig. 3. Documentation areas. Red: Still images, Yellow: videography of the Mizzen mast, Blue: videography for 3D photogrammetry. Image: Immi Wallin

7.10.2017 A diving shot line was outside the middle wreck on starboard side.

Visibility was 0,5-2 meters.

Dive 1: Kari Hyttinen (camera), Pasi Lammi (light) and Immi Wallin (camera). Dive time: 2h 20 min

14.10.2017 The shot line was outside the wreck on starboard side near the bow. Visibility 1-2 meters.

Dive 1: Kari Hyttinen (camera), Toni Nevalainen (light) and Immi Wallin (camera). Dive time: 1h 30 min

29.4.2018 The shot line was outside the wreck on port side near the bow. Visibility 1-2 meters.

Dive 1: Sami Paakkari (still camera) and Jenni Westerlund (light). Dive time 2h 25min

Dive 2: Kari Hyttinen (camera) and Pasi Lammi (light). Dive time 2h 15min



30.4.2018 The shot line was outside the wreck on port side near the bow. Visibility 1-2 meters.

Dive 1: Kari Hyttinen (camera) and Pasi Lammi (light). Dive time 2h 10min



Fig. 4. Immi Wallin and Jenni Westerlund planning the documentation before the dive.  
Photo: Sami Paakkari

## Photogrammetry of the wreck site

On each dive 20-30 mins of HD-quality video was taken and 2 screen captures per second extracted with FrameShots program ([www.frame-shots.com](http://www.frame-shots.com)).

The equipment used is listed in the section "Technical equipment" These 2Mpix TIFF images were processed with RealityCapture <https://www.capturingreality.com> and Agisoft PhotoScan program ([www.agisoft.com](http://www.agisoft.com)).

The 3D model of the wreck that was created of the data captured in 2016, was added with the data captured in 2017 and 2018. The 3D model of the wreck still needs more data to finalise the model.

The resulting 3D model has also some geometrical distortions and therefore it is not possible to get reliable measurements from the model at this stage.

However, 3D model of the main deck could be made (Fig. 5.).

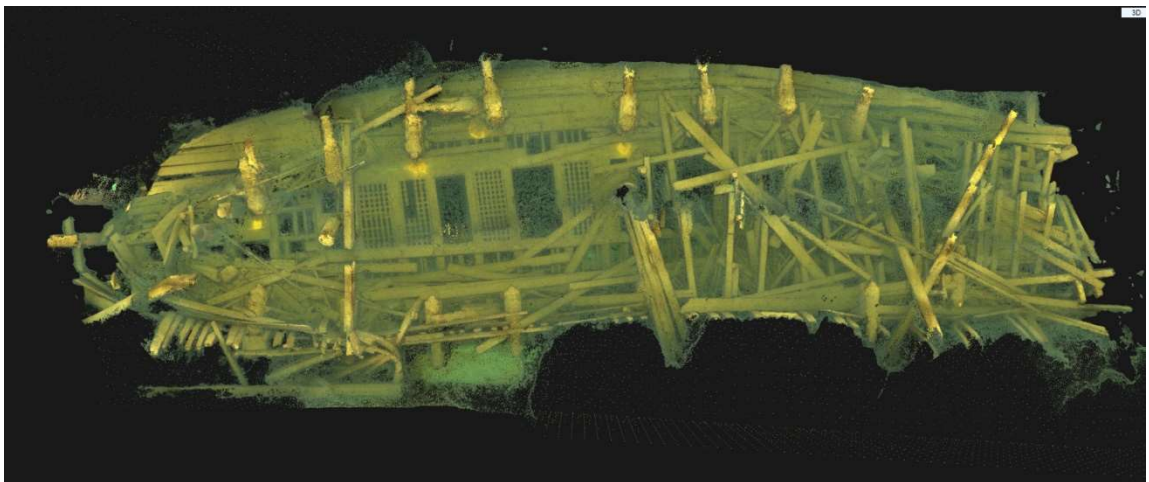


Fig. 5. Image of 3D model of the main deck. Image: Kari Hyttinen.

## Video and photo documentation of the wreck site

The mizzen mast that has fallen to the port side of the wreck, was documented by videography. The whole mast with two parts is attached on each other's and the cross trees are intact. The attachment of the mizzen mast and the mizzen top mast is also intact and shows the technique of the joint (Fig.6-10).



Fig. 6. Mizzen top mast with crosstrees and mastcap. Frame capture from video by Immi Wallin.



Fig. 7. Mizzen mastcap. Frame capture from video by Immi Wallin.



Fig. 8. Mizzen topmast crosstrees. Frame capture from video by Immi Wallin.



Fig. 9. Mizzen crosstrees and lower end of topmast. Frame capture from video by Immi Wallin.





Fig. 10. Mizzen crosstrees and topmast. The chock that prevents the topmast to fall down thru the crosstrees, is also visible in the middle of the image. Frame capture from video by Immi Wallin.

A single anomaly on the port side of the wreck in front of the fallen mainmast was photographed and identified. The anomaly appeared to most probably be the front topmast crosstree (fig. 11).

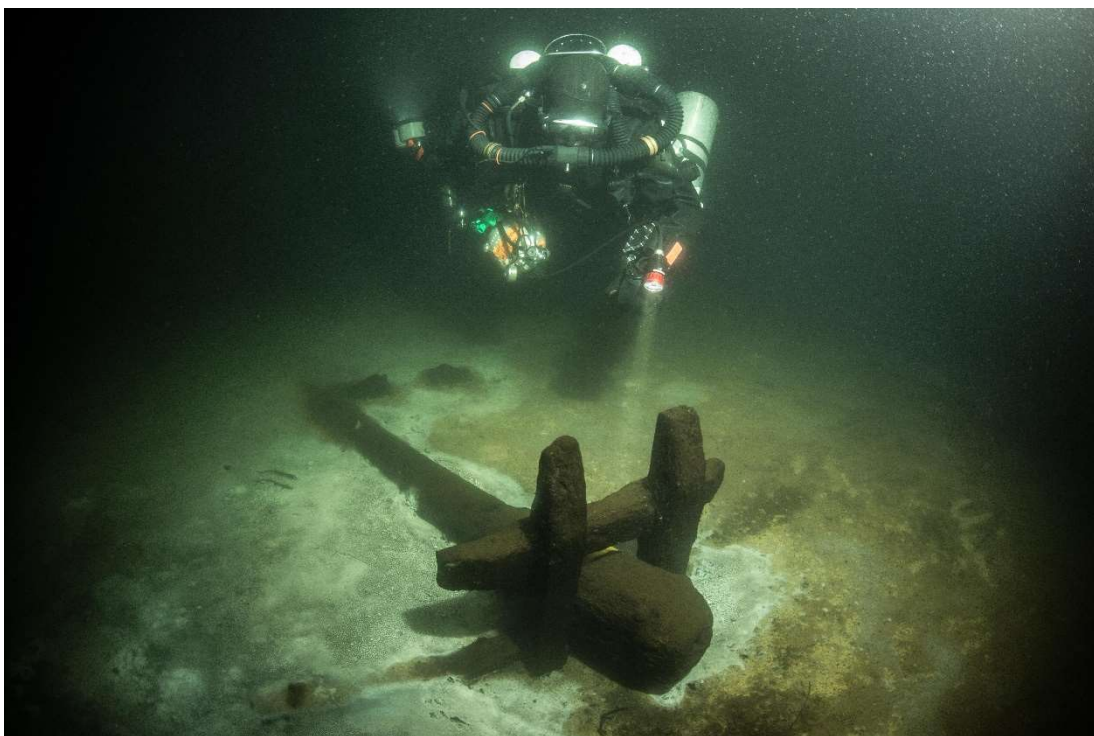


Fig. 11. The front topmast crosstree. Photo by Sami Paakkari.

The aft part of the wreck that lays on the sea bottom, was photographed and it seems that there are more ornaments and decorations, but mostly their back side is visible (fig. 12-14).



Fig. 12. Decorations on the sea bottom behind the aft of the wreck. Photo by Sami Paakkari.





Fig. 13. Ornaments (back side of them) on the sea bottom behind the aft of the wreck.  
Photo by Sami Paakkari.

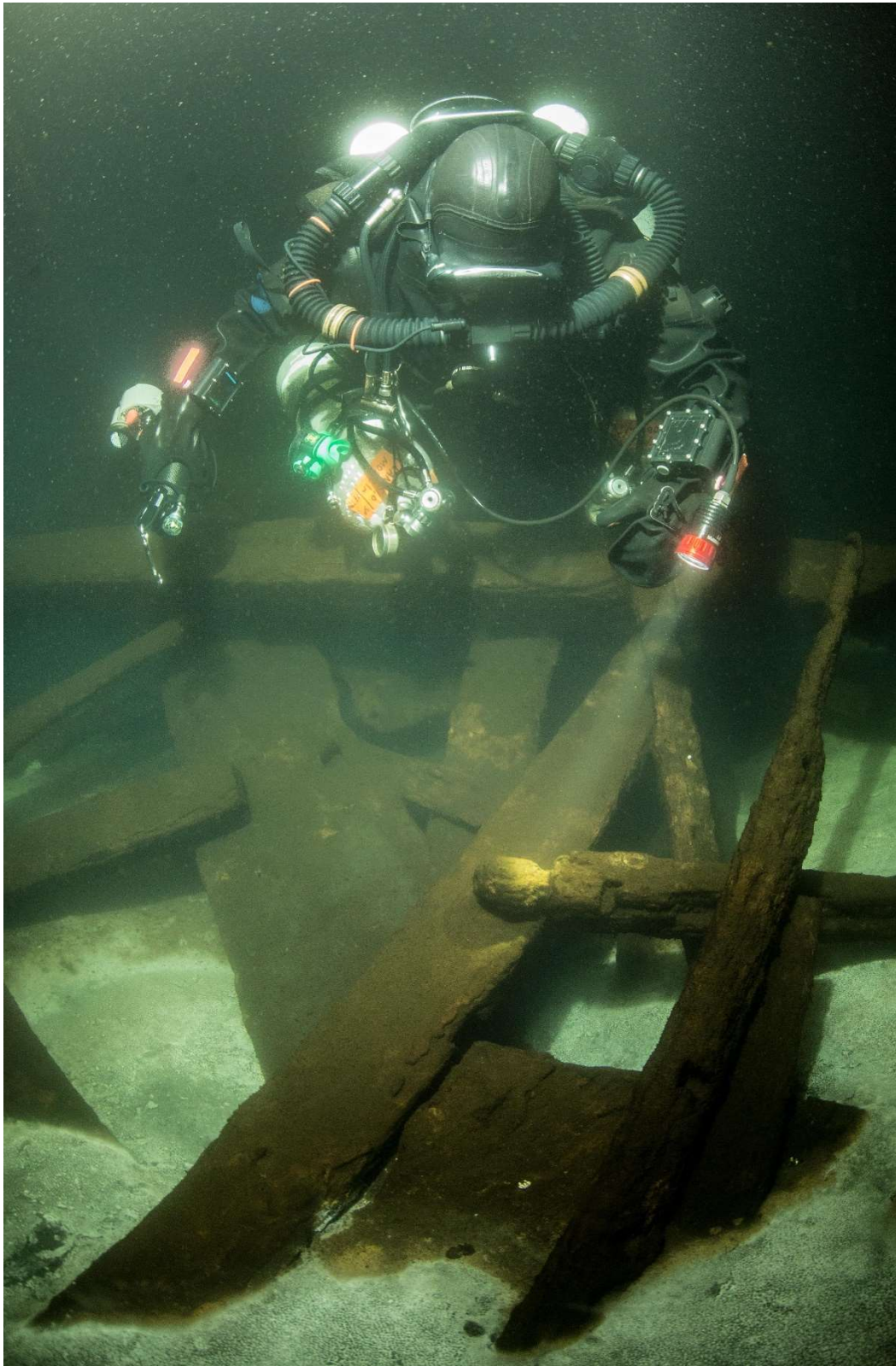


Fig. 14. Jenni Westerlund viewing parts of the aft castell that has fallen behind the aft of the wreck. Photo by Sami Paakkari.



The cannons on the starboard side on the main deck were photographed with a diver. These photographs are showing the scale and can be used for presentations and articles (Fig. 15-16).

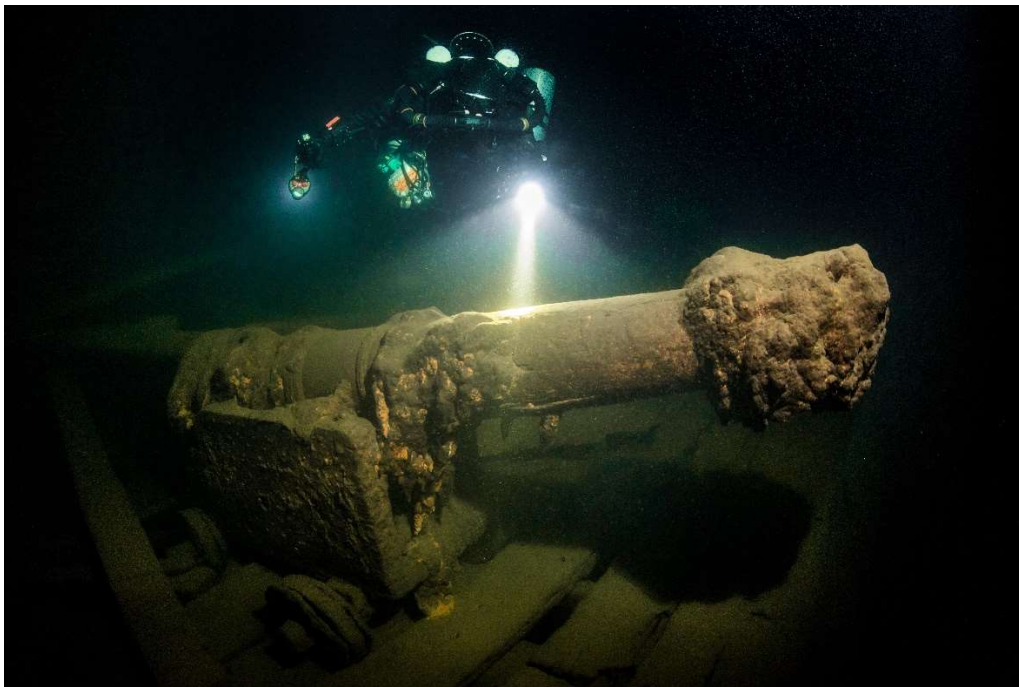


Fig. 15. Cannon and a diver on the main deck on starboard side. Photo by Sami Paakkari.



Fig. 16. Cannon and a diver on the main deck on starboard side. Photo by Sami Paakkari.

## Recommendation for future research

The wreck is partly buried in the seabed, which has provided excellent conditions for preservation. The visible structures are well preserved too. Therefore, most important is to continue to use non-destructive methods for research.

The main task is to continue with 3D documentation and collect the high-quality data: recording the entire shipwreck site, artefacts and interior of the wreck. Collected material will be useful for the wreck monitoring in the future.

The second task is to study the artefacts buried in the seabed using sub bottom profiler and the nature of the seabed and taking samples from the seabed.

## References

**Roio, Wallin, Hyttinen (SubZone Oy) 2016.** Maritime archaeological site survey Huis te Warmelo 1708-1715.