

## University of Southampton Research Repository

Copyright © and Moral Rights for this thesis and, where applicable, any accompanying data are retained by the author and/or other copyright owners. A copy can be downloaded for personal non-commercial research or study, without prior permission or charge. This thesis and the accompanying data cannot be reproduced or quoted extensively from without first obtaining permission in writing from the copyright holder/s. The content of the thesis and accompanying research data (where applicable) must not be changed in any way or sold commercially in any format or medium without the formal permission of the copyright holder/s.

When referring to this thesis and any accompanying data, full bibliographic details must be given, e.g.

Thesis: Author (Year of Submission) "Full thesis title", University of Southampton, name of the University Faculty or School or Department, PhD Thesis, pagination.

Data: Author (Year) Title. URI [dataset]





**University of Southampton**

FACULTY OF ARTS AND HUMANITIES

ARCHAEOLOGY

**POST-MEDIEVAL SEAFARING IN THE WESTERN BLACK SEA: ARCHAEOLOGICAL AND  
ICONOGRAPHIC EVIDENCE FOR THE RIG  
APPENDICES**

Volume 2 of 2

By

**Zdravka Hristova Georgieva**

ORCID ID [0000-0001-5842-5085](https://orcid.org/0000-0001-5842-5085)

Thesis for the degree of Doctor of Philosophy

June 2025



# University of Southampton

## Abstract

FACULTY OF ARTS AND HUMANITIES

ARCHAEOLOGY

DOCTOR OF PHILOSOPHY

### **POST-MEDIEVAL SEAFARING IN THE WESTERN BLACK SEA: ARCHAEOLOGICAL AND ICONOGRAPHIC EVIDENCE FOR THE RIG**

by

Zdravka Hristova Georgieva

This thesis aims to research the wide topic of post-medieval Western Black Sea seafaring, particularly focusing on the rig. Two main datasets collected in the last eight years form the core of this dissertation, and provide the nautical data of the research. The first consists of several late medieval shipwrecks with extremely well-preserved upper structures, including rigging elements, discovered on the bottom of the Bulgarian Black Sea during the three field seasons of the M.A.P. Black Sea – the first high-tech archaeological project ever undertaken in the world. However, the rigging remains are used mainly as a comparative material in supporting the follow up analysis of the second dataset – a group of post-medieval ship graffiti carved in four medieval churches in Nessebar, Bulgaria. A thorough analysis of the shipwrecks' remains is due to be published by their principal researcher – Professor Kroum Batchvarov. The corpus of nearly 340 ship graffiti was recorded non-destructively using advanced photographic methods during a three-season project which I coordinated. All of the ship graffiti are included in the catalogue which constitutes Appendix A of the current thesis. For the purposes of analysis and interpretation of the two datasets, complementary sources of information on rigging such as other regional-based iconographic examples, travellers' accounts, published historical evidence, marine art's illustrations, and ship's modellers works were used.

The research presented in the current thesis is one of the few studies of Western Black Sea seafaring which uses the maritime archaeology approach. The theoretical framework of the thesis follows traditional, processualist, and post-processualist ideas. It uses historical contextualisation to better understand the events that impacted the life of local maritime communities, and the inevitable technological changes. Three main tools were used in the analysis of the two datasets – comparison, interpretation, and reconstruction.

The analysis of the two datasets provided two different, complementary results: the archaeological remains revealed details about individual rigging elements, while the iconography

illustrated overall rigging silhouettes and the variety of ship types that sailed in the region in the post-medieval period.

# Table of Contents

<b>Table of Contents .....</b>	<b>i</b>
<b>Research Thesis: Declaration of Authorship .....</b>	<b>v</b>
<b>Acknowledgements .....</b>	<b>vii</b>
<b>Appendix A Catalogue of post-medieval ship graffiti from Nessebar .....</b>	<b>9</b>
A.1 RTI captures and graphic illustrations of ship graffiti in the Church of St. Spas (Christ Holly Saviour church) .....	9
A.1.1 Panel 1 NW Ship graffiti SP_001 – SP_004 .....	9
A.1.2 Panel 2 NW Ship graffiti SP_005 .....	12
A.1.3 Panel 3 NW Ship graffiti SP_006 – SP_013 .....	14
A.1.4 Panel 4 NW Ship graffiti SP_014 – SP_016 .....	19
A.1.5 Panel 5 NW Ship graffiti SP_017 – SP_021 .....	21
A.1.6 Panel 6 NW Ship graffiti SP_022 – SP_033 .....	26
A.1.7 Panel 7 NW Ship graffiti SP_034 – SP_046 .....	33
A.1.8 Panel 8 NW Ship graffiti SP_047 – SP_065 .....	41
A.1.9 Panel 9 NW Ship graffiti SP_066 – SP_079 .....	51
A.1.10 Panel 10 NW Ship graffiti SP_080 – SP_091 .....	59
A.1.11 Panel 11 NW Ship graffiti SP_092 – SP_101 .....	66
A.1.12 Panel 1 SW Ship graffiti SP_103 – SP_106 .....	72
A.1.13 Panel 2 SW Ship graffiti SP_107 – SP_109 .....	75
A.1.14 Panel 3 SW Ship graffiti SP_110 – SP_111 .....	78
A.1.15 Panel 4 SW Ship graffiti SP_112 – SP_149 .....	80
A.1.16 Panel 5 SW Ship graffiti SP_151 – SP_161 .....	99
A.1.17 Panel 6 SW Ship graffiti SP_164 – SP_167 .....	105
A.1.18 Panel 7 SW Ship graffiti SP_168 – SP_176 .....	108
A.1.19 Panel 8 SW Ship graffiti SP_177 .....	115
A.1.20 Panel 9 SW Ship graffiti SP_178 – SP_182 .....	116
A.2 RTI captures and graphic illustrations of ship graffiti in the Church of St. Stephen .....	120
A.2.1 Panel 1 Ship graffiti ST_001 – ST_010 .....	120
A.2.2 Panel 2 Ship graffiti ST_011 – ST_012 .....	126

## Table of Contents

A.2.3 Panel 3 Ship graffiti ST_013 – ST_023.....	129
A.2.4 Panel 4 Ship graffiti ST_024 – ST_031.....	135
A.2.5 Panel 5 Ship graffiti ST_032 – ST_041.....	140
A.2.6 Panel 6 Ship graffiti ST_042 – ST_050.....	146
A.2.7 Panel 7 Ship graffiti ST_051 – ST_054.....	151
A.2.8 Panel 8 Ship graffiti ST_055 – ST_058.....	154
A.2.9 Panel 9 Ship graffiti ST_059 – ST_065.....	157
A.2.10 Panel 10 Ship graffiti ST_066 – ST_071.....	162
A.2.11 Panel 11 Ship graffiti ST_072 – ST_077.....	166
A.2.12 Panel 12 Ship graffiti ST_078 – ST_080.....	170
A.2.13 Panel 13 Ship graffiti ST_081 – ST_083.....	172
A.2.14 Panel 14 Ship graffiti ST_084 – ST_085.....	175
A.2.15 Panel 16 Ship graffiti ST_086.....	176
A.2.16 Panel 17 Ship graffiti ST_087 – ST_088.....	178
A.2.17 Panel 18 Ship graffiti ST_089 – ST_094.....	181
A.2.18 Panel 19 Ship graffiti ST_095 – ST_096.....	185
A.2.19 Panel 20 Ship graffiti ST_097 – ST_098.....	187
A.2.20 Panel 20-1 Ship graffiti ST_099.....	189
A.2.21 Panel 21 Ship graffiti ST_100 – ST_101.....	189
A.2.22 Panel 22 Ship graffiti ST_145 – ST_146.....	191
A.2.23 Panel 23 Ship graffiti ST_102.....	193
A.2.24 Panel 24 Ship graffiti ST_104.....	194
A.2.25 Panel 25 Ship graffiti ST_105.....	195
A.2.26 Panel 26 Ship graffiti ST_106.....	196
A.2.27 Panel 27 Ship graffiti ST_107 – ST_110.....	197
A.2.28 Panel 28 Ship graffiti ST_111.....	199
A.2.29 Panel 34 Ship graffiti ST_117 – ST_122.....	200
A.2.30 Panel 36 Ship graffiti ST_123 – ST_124.....	203
A.2.31 Panel 10 Narthex Ship graffiti ST_125 – ST_126.....	204
A.2.32 Panel 15 Narthex Ship graffiti ST_127 – ST_129.....	205
A.2.33 Panel 16 Narthex Ship graffiti ST_130 – ST_134.....	208
A.2.34 Panel 18 Narthex Ship graffiti ST_135 – ST_139.....	210
A.2.35 Panel 19 Narthex Ship graffiti ST_140 – ST_144.....	213

A.2.36 Panel 43 Narthex Ship graffiti ST_147 – ST_148 .....	216
A.2.37 Panel Exterior 1 Ship graffiti ST_149.....	218
A.2.38 Panel Exterior 1 Ship graffiti ST_150 – ST_153 .....	220
A.2.39 Panel Exterior Ship graffiti ST_154 – ST_155 .....	223
A.2.40 Panel Exterior 2 Ship graffiti ST_156 – ST_163 .....	225
A.3 Photogrammetry models of ship graffiti on the façades of the Church of St. John Alitourgetos .....	231
A.3.1 Ship graffiti JA_01 wall .....	231
A.3.2 Ship graffiti JA_02 East wall .....	231
A.3.3 Ship graffiti JA_03 North wall.....	232
A.4 Photographs of ship graffiti on the façades of Church of St. Todor .....	233
A.4.1 Ship graffiti T_001 South wall .....	233
A.4.2 Ship graffiti T_002 South wall .....	234
A.4.3 Ship graffiti T_003 East wall.....	235
<b>Appendix B Publications produced during the PhD research phase.....</b>	<b>237</b>
B.1 Georgieva, Z., Prahov, N. and Dimitrov, K., 2018. Non-destructive survey of graffiti of St. Spas and St. Todor churches in the town of Nessebar, <i>Archaeological discoveries and excavation</i> , 682–685.....	238
B.2 Georgieva, Z., Prahov, N. and Dimitrov, K., 2019. Non-destructive survey and documentation of graffiti of St. Stephen medieval church in Nessebar. <i>Archaeological discoveries and excavation</i> , 140–144.....	243
B.3 Georgieva, Z. and Prahov, N., 2020. Non-destructive survey and recording of graffiti of medieval churches St. Stephen and St. John Alitourgetos in Nessebar. <i>Archaeological discoveries and excavation</i> , 1, 80–84.....	248
B.4 Georgieva, Z., Prahov, N., Raykovska, M., Jones, K. and Lea-Seaton, K., 2022. Advanced photographic methods in studying ship graffiti from medieval churches in Nessebar. <i>Interdisciplinary Studies</i> , 27, 21–42. ....	254





## Research Thesis: Declaration of Authorship

Print name: Zdravka Hristova Georgieva

Title of thesis: Post-medieval Seafaring in the Western Black Sea: archaeological and iconographic evidence for the rig

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. Parts of this work have been published as:

Georgieva, Z. and Prahov, N., 2020. Non-destructive survey and recording of graffiti of medieval churches St. Stephen and St. John Alitourgetos in Nessebar. *Archaeological discoveries and excavation*, 1, 80–84.

Georgieva, Z., Prahov, N. and Dimitrov, K., 2018. Non-destructive survey of graffiti of St. Spas and St. Todor churches in the town of Nessebar, *Archaeological discoveries and excavation*, 682–685.

Georgieva, Z., Prahov, N. and Dimitrov, K., 2019. Non-destructive survey and documentation of graffiti of St. Stephen medieval church in Nessebar. *Archaeological discoveries and excavation*, 140–144.

## Research Thesis: Declaration of Authorship

Georgieva, Z., Prahov, N., Raykovska, M., Jones, K. and Lea-Seaton, K., 2022. Advanced photographic methods in studying ship graffiti from medieval churches in Nessebar. *Interdisciplinary Studies*, 27, 21–42.

Signature: .....Date:.....

## Acknowledgements

My vocabulary is too poor to express my utmost gratitude to my main supervisor Professor Jonathan Adams, first for inviting me as a team member in the M.A.P. Black Sea and giving me the chance to 'dive' in the depths of a completely new to me area of research – the broad topic of post-medieval Western Black Sea seafaring. I thank him also for his positive attitude towards me during all of these years working together, and for being such a great personal and professional example for me. I am equally grateful to the late Hristina Angelova, and to Dr. Dragomir Garbov for giving me the chance to fulfil one of my dreams – that of working with the Centre for Underwater Archaeology, Sozopol (CUA), - and for their subsequent support in building myself as a maritime archaeologist. I cannot express how grateful I am to Dr. Dragomir Garbov for his infectiously motivating and inspiring professionalism. I am also grateful for his constructive criticism. I thank Dr. Nayden Prahov for his support, advice and encouragement during the project for recording the corpus of ship graffiti, and during all the other projects of the CUA in which we worked together. I am thankful to all other colleagues who worked and are currently working in the CUA. I am extremely grateful to my supervisor Dr. Helen Farr who supported and encouraged me during one of the most difficult periods in my research - the final stage. I am grateful to Todor Marvakov, the current director of Museum Ancient Nessebar, for providing me with access to study the graffiti, and for assisting me with everything necessary for my project. I also thank the colleagues working in the museum for their assistance and positive attitude during the three seasons of fieldwork. I thank Dr. Kalin Dimitrov for his support, assistance, advice and encouragement when the project was still in its infancy. I express my thanks to everyone who took part in the ship graffiti recording process – Dr. Miglena Raykovska, Kristen Jones, Kristy Lee-Seaton, Ivelina Petkova and Galina Stoyanova, and all Balkan Heritage Foundation students. Last but not least, I thank very much Stefania Klayn, who helped me with one of the most important stages of the research – the editing of the text.



## Appendix A Catalogue of post-medieval ship graffiti from Nessebar

This appendix includes all graffiti of ships (about 340) carved in four medieval churches in Nessebar, Bulgaria, which were recorded non-destructively using advanced photographic methods during a three-season project (2018-2020) which I coordinated. The group of post-medieval ship graffiti is dated between the 17<sup>th</sup> and 19th centuries and resembles the largest one from the period in Bulgaria. Reflectance Transformation Imaging (RTI) was used as the principal method for documentation because it appeared to be the most advantageous method with minimal limitations. RTI models with accompanying digital drawings were built during the post-processing phase and are presented in this catalogue.

### A.1 RTI captures and graphic illustrations of ship graffiti in the Church of St. Spas (Christ Holly Saviour church)

#### A.1.1 Panel 1 NW Ship graffiti SP\_001 – SP\_004

**Ship graffiti №** SP\_001

**Panel №** 1 North wall

**Ship graffiti № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall of the nave, looking from east to west

**Ship graffiti appearance:** the graffiti is barely visible, the contour lines were incised very lightly. The style of performance can be defined as simple.

**Ship type:** can be categorised as both **a boat and a ship**, but due to its simplicity, its type is uncertain and no additional information of it could be extracted.

**Rigging type:** unknown

**Masts:** single mast with two lines presenting fore and- back stays

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** triangular pointing to the west

**Other elements:**

**Notes:**

**Ship graffito № SP\_002**

**Panel № 1** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall of the nave, looking from east to west

**Ship graffito appearance:** the contour lines are incised very lightly but still visible enough to receive full picture of the graffito

**Ship type:** single-masted ship (the type cannot be defined)

**Rigging type:** 12 lines representing the standing rigging (fore and- back stays); square-rigged

**Masts:** mainmast and a bowsprit

**Yards:** 2

**Sails:** furled square topsail and a topgallant sail

**Steering system:** stern rudder that is incised in a very simple manner

**Flags:** 1 on the topmast. Its shape is not definitive.

**Other elements:**

**Notes:**

**Ship graffito № SP\_003**

**Panel № 1** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall of the nave, looking from east to west

**Ship graffito appearance:** the contour lines are incised very lightly but still visible enough to receive full picture of the graffito

**Ship type:** N/A

**Rigging type:** N/A

**Masts:** 1 main mast

**Yards:** No

**Sails:** No

**Steering system:** No

**Flags:** No

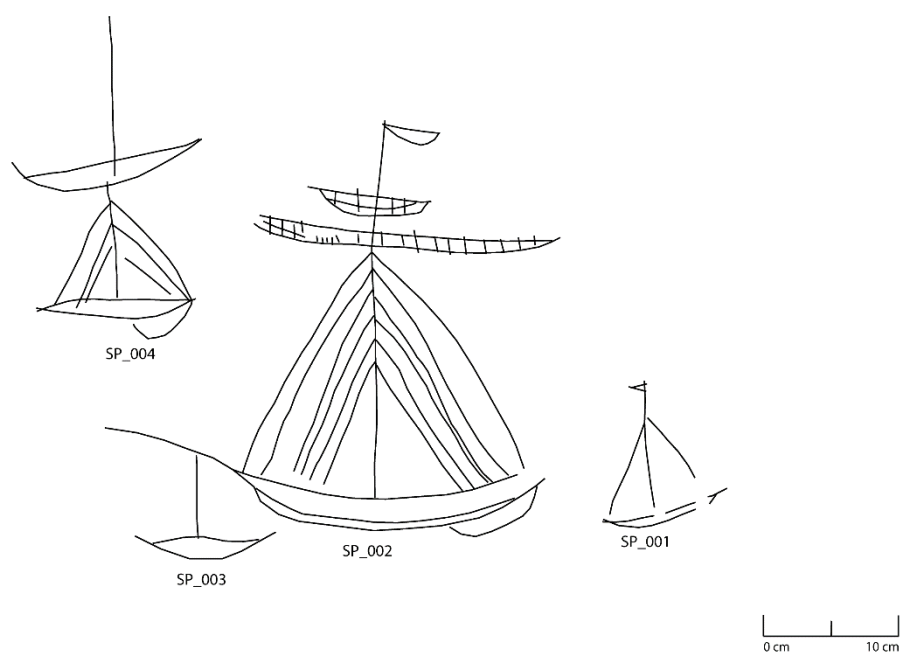
**Other elements:**

**Notes:**

**Ship graffito № SP\_004**

**Panel № 1 North wall****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall of the nave, looking from east to west**Ship graffito appearance:** the contour lines are incised very lightly but still visible enough to receive full picture of the graffito**Ship type:** N/A**Rigging type:** 6 lines presented part of the standing rigging**Masts:** 1 mainmast and a topmast**Yards:** 1**Sails:** N/A**Steering system:** stern rudder incised in a simple manner**Flags:****Other elements:**

**Notes:** We should look with precaution on this graffito. There is a doubt whether it presents a single graffito or there are two, when taking into account that the carving above SP\_004 (the element which I categorised as furled sail and the vertical line as a topmast) might appeared to be a schematic depiction of a single masted boat (it is not included as individual graffito in the catalogue, there is no PIN).





#### **A.1.2 Panel 2 NW Ship graffito SP\_005**

**Ship graffito № SP\_005**

**Panel № 2 North wall**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Spas (St. Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough and still well visible today. Elements from the hull and rigging are distinctive and clear. Schematic to elaborate performance.

**Ship type:** N/A

**Rigging type:** overall 20 lines fore and-back stays present part of the standing rigging

**Masts:** 1 mainmast and 1 bowsprit crossed by vertical line (boom)

**Yards:** 2

**Sails:** 1 topsail and 1 topgallant sail (the shape is unclear)

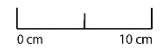
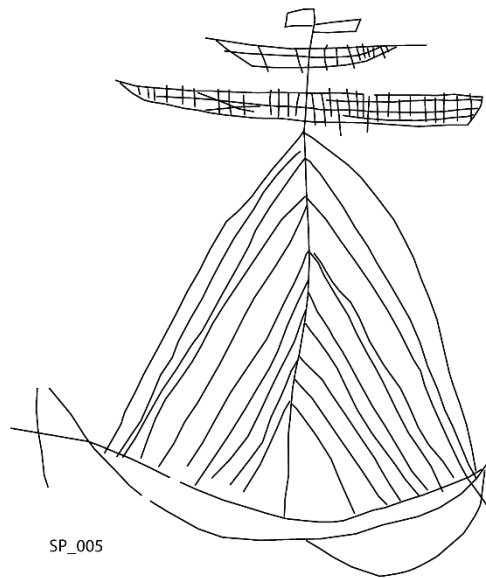
**Steering system:** stern rudder

**Flags:** two rectangular flags; 1 pointing to west, 1 pointing to east

**Other elements:**

**Notes:**





### **A.1.3 Panel 3 NW Ship graffiti SP\_006 – SP\_013**

#### **Ship graffiti № SP\_006**

**Panel № 3** North wall

**Ship graffiti № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffiti appearance:** the ship is with the keel at vertical position, with the rigging pointing west. Its appearance is quite confusing due to its position and the appearance of another carving below (close to the bow) that might be either a boat's hull or the bowsprit. The depiction is incised in very schematic manner, but the contour lines are visible, therefore, yet there are distinctive elements

**Ship type:** N/A

**Rigging type:** it is presented obscured, it might present either one or two masts, and a topmast with two yards; the rest 7 horizontal lines could be interpreted as either yards or ratlines.

**Masts:** controversial

**Yards:** controversial

**Sails:** information cannot be extracted

**Steering system:** stern rudder

**Flags:** No

**Other elements:** close to bow – could be a boat's hull or a bowsprit

**Notes:** There are examples from the churches in Nessebar of other depictions of ships with the boat roped on the bow.

#### **Ship graffiti № SP\_007**

**Panel № 3** North wall

**Ship graffiti № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffiti appearance:** the contour lines are incised clear enough

**Ship type:** a boat's hull (cannot be said what the artist had meant)

**Rigging type:** N/A

**Masts:** No

**Yards:** No

**Sails:** No

**Steering system:** No

**Flags:** No

**Other elements:** No

**Notes:**

#### **Ship graffiti № SP\_008**

**Panel № 3 North wall****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffito appearance:** the contour lines are incised clear and deep enough**Ship type:** a boat's hull**Rigging type:** N/A**Masts:** No**Yards:** No**Sails:** No**Steering system:** No**Flags:** No**Other elements:** No**Notes:****Ship graffito № SP\_009****Panel № 3 North wall****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffito appearance:** the contour lines of the hull are incised deep, seem that the artist stressed on it, while the lines of the rigging are depicted shallower. The graffito is depicted in schematic manner.**Ship type:** ship**Rigging type:** cannot be categorised**Masts:** 1 mainmast and a bowsprit with vertical line (yard)**Yards:** 3**Sails:** these are not presented but there is one unclear triangular carving above the rigging system which looks as part of the depiction and might resembles a sail**Steering system:** No**Flags:** No**Other elements:** a line aft below the keel pointing east (anchor, a rope of a boat?)**Notes:****Ship graffito № SP\_010****Panel № 3 North wall****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffito appearance:** the contour lines of the hull are depicted bolder and quite clear while the ones from the rigging are almost faint and at confusing positions, causing issue with their type recognition

**Ship type:** unknown

**Rigging type:** information cannot be extracted (see ship graffito appearance)

**Masts:** 1 mainmast, 2 vertical lines at both ends – masts?

**Yards:** No

**Sails:** due to mixture of faint lines, information about sails type cannot be extracted

**Steering system:** No

**Flags:** No

**Other elements:**

**Notes:** Due to mixture of faint and randomly spread lines, many elements from this graffito are unclear

**Ship graffito № SP\_011**

**Panel № 3** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffito appearance:** the contour lines are depicted deep enough for the extraction of consistent information about some of the graffito's elements

**Ship type:** ship

**Rigging type:** 8 lines presented the standing rigging,

**Masts:** 1 mainmast

**Yards:** 2 or 3? horizontal

**Sails:** Unknown

**Steering system:** No

**Flags:** the line on the top pointing west could be considered as a flag, but yet it is unclear

**Other elements:**

**Notes:**

**Ship graffito № SP\_012**

**Panel № 3** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffito appearance:** The ship is keeled at one side, the rigging system pointing to west. The contour lines are incised deep enough but the depiction is very schematic and not informative.

**Ship type:** ship

**Rigging type:** lines from the standing rigging are presented but its type cannot be categorised

**Masts:** it cannot be estimated how many masts are presented

**Yards:** No

**Sails:** information cannot be extracted

**Steering system:** No

**Flags:** No

**Other elements:**

**Notes:**

**Ship graffito № SP\_013**

**Panel № 3 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffito appearance:** the contour lines are presented deep enough. The depiction is schematic and not that informative.

**Ship type:** ship

**Rigging type:** no elements of the rigging

**Masts:** 1 mainmast

**Yards:** No

**Sails:** No

**Steering system:** No

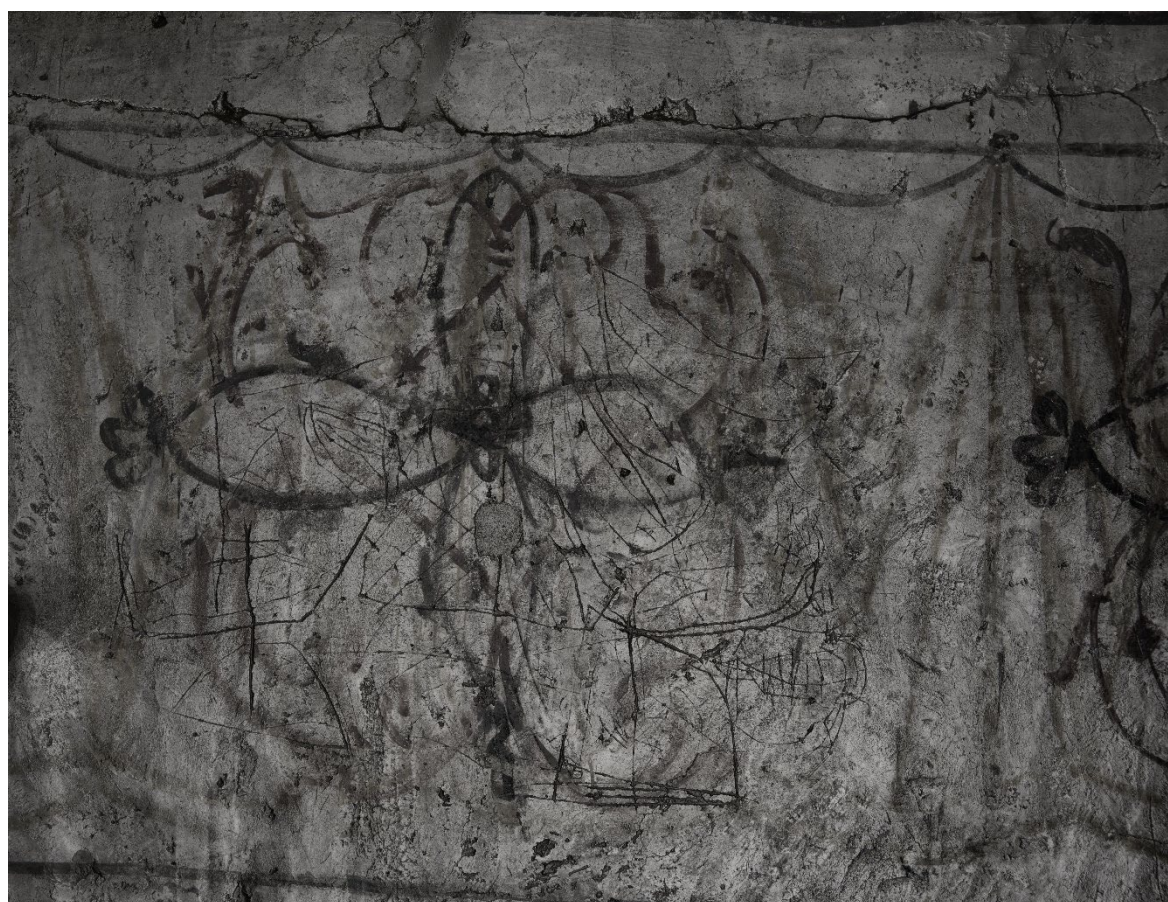
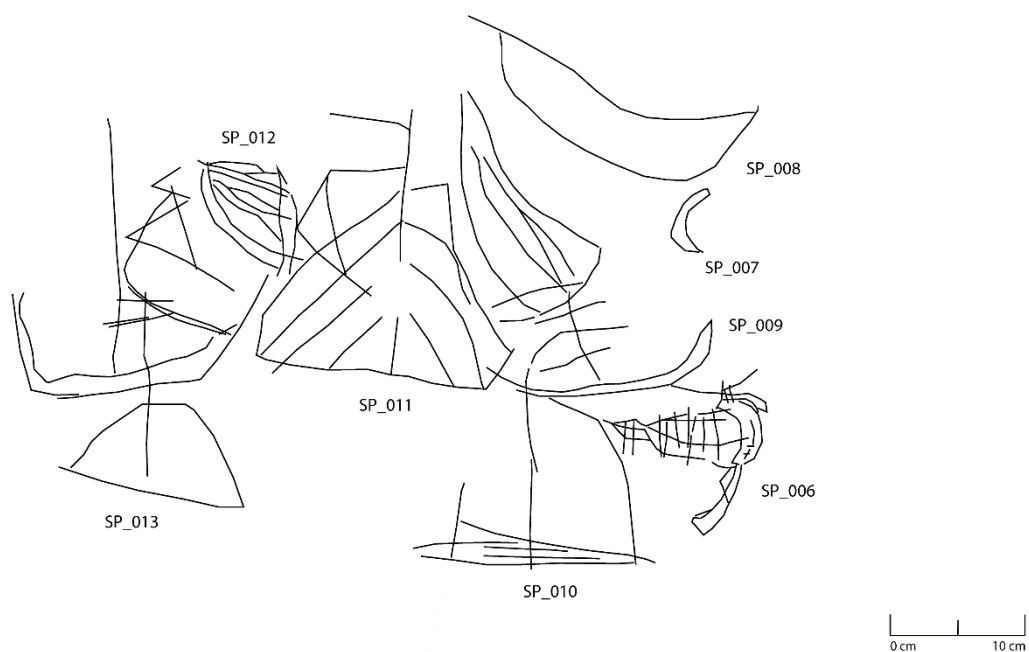
**Flags:** No

**Other elements:**

**Notes:** bow and stern are highly pronounced

**N.B.** All depictions of Panel 3 north wall are incised in very schematic manner, and loads of lines are interlaced between each other, causing issues in recognising exact elements from a graffito. The information that these graffiti give us is most likely misleading and will not be considered as leading examples in the analysis of iconographic sources in the current dissertation.





**A.1.4 Panel 4 NW Ship graffiti SP\_014 – SP\_016****Ship graffiti № SP\_014****Panel № 4 North wall****Ship graffiti № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffiti appearance:** consists only from randomly distributed unclear lines which form not logical depictions**Ship type:** N/A**Rigging type:** N/A**Masts:** N/A**Yards:** N/A**Sails:** N/A**Steering system:** N/A**Flags:** N/A**Other elements:****Notes:** unclear doodling, however I included it in the catalogue as a vessel presented with the stern appeared in the front**Ship graffiti № SP\_015****Panel № 4 North wall****Ship graffiti № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffiti appearance:** the contour lines are incised deep and clear enough. The depiction is schematic**Ship type:** ship**Rigging type:** 6 lines presented the standing rigging, fore and- back stays**Masts:** 1 mainmast and 1 bowsprit with vertical line (yard)**Yards:** 2 horizontal yards (for square sails)**Sails:** square**Steering system:** Not presented**Flags:** No**Other elements:****Notes:****Ship graffiti № SP\_016****Panel № 4 North wall****Ship graffiti № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

## Appendix A

**Ship graffiti appearance:** the contour lines are presented deep and clear enough. The depiction is schematic to elaborate

**Ship type:** ship towards east

**Rigging type:** 18 lines presented part of the standing rigging, fore and- back stays

**Masts:** 1 mainmast and a bowsprit pointing east

**Yards:** 2

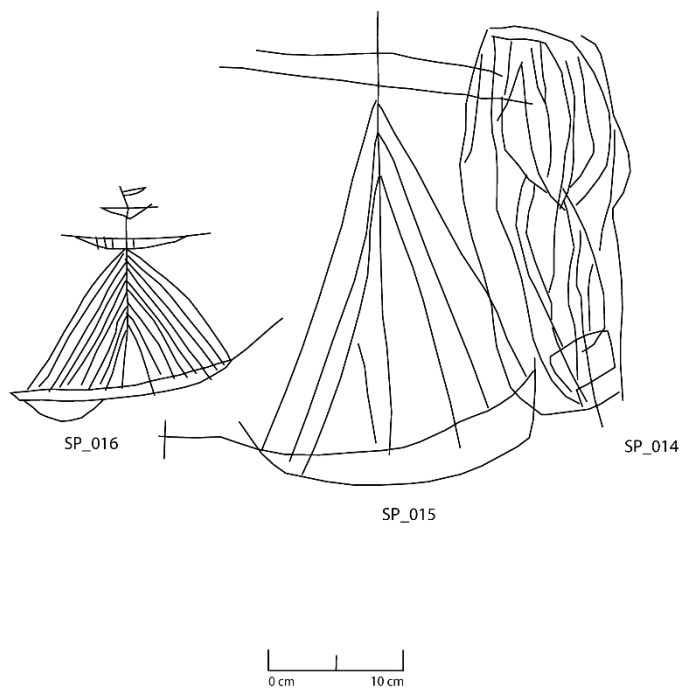
**Sails:** furled square sails

**Steering system:** stern rudder

**Flags:** 1 triangular pointing east

**Other elements:**

**Notes:**







#### A.1.5 Panel 5 NW Ship graffiti SP\_017 – SP\_021

**Ship graffiti № SP\_017**

**Panel № 5** North wall

**Ship graffiti № (in Ovcharov's catalog): 112**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffiti appearance:** the contour lines are incised deep and clear enough. The depiction is schematic.

**Ship type:** ship

**Rigging type:** N/A

**Masts:** 1 mainmast

**Yards:** 1

## Appendix A

**Sails:** N/A

**Steering system:** No

**Flags:** No

**Other elements:**

**Notes:**

**Ship graffito № SP\_18**

**Panel № 5 North wall**

**Ship graffito № (in Ovcharov's catalog): 111**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The depiction is schematic. The ship's hull is keeled slightly at one side.

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 1

**Yards:** 2 spars

**Sails:** furled main sprit sails

**Steering system:** No

**Flags:** No

**Other elements:**

**Notes:**

**Ship graffito № SP\_019**

**Panel № 5 North wall**

**Ship graffito № (in Ovcharov's catalog): 110**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church

**Ship graffito appearance:** the contour lines are incised deep and clear enough but in very schematic manner

**Ship type:** boat/ ship?

**Rigging type:** fore-and-aft

**Masts:** 1

**Yards:** 1

**Sails:** lateen (?)

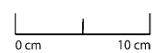
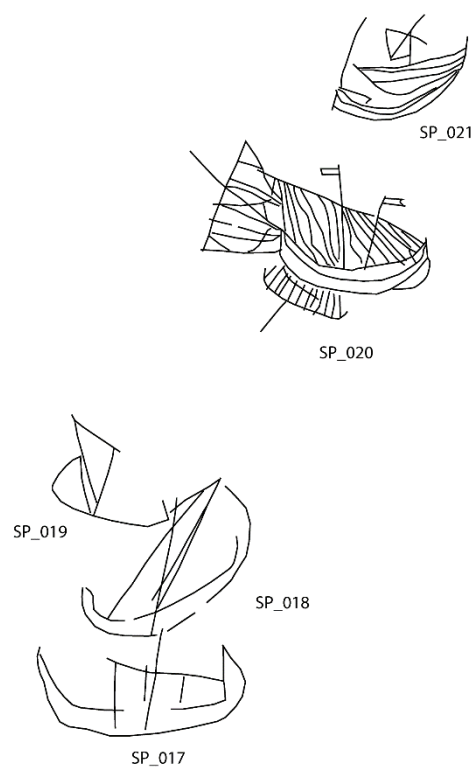
**Steering system:** No

**Flags:** No

**Other elements:** One raked line close to the mast ending at the stern/ bow

**Notes:**

**Ship graffito № SP\_020****Panel № 5** North wall**Ship graffito № (in Ovcharov's catalog):** 109**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffito appearance:** the contour lines are presented deep and clear enough. The depiction is schematic to elaborate.**Ship type:** ship pointing west**Rigging type:** fore-and-aft, lateen**Masts:** 2 masts: main and mizzen, 1 bowsprit**Yards:** 2**Sails:** 2 unfurled lateens, 1 unfurled bowsprit spritsail**Steering system:** stern rudder, below the keel – oars (?), however these should be considered as such with precaution.**Flags:** 2: on the mainmast – rectangular pointing west, on the mizzen – rectangular pointing east**Other elements:** oars? below the keel**Notes:****Ship graffito № SP\_021****Panel № 5** North wall**Ship graffito № (in Ovcharov's catalog):** 108**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church**Ship graffito appearance:** the contour lines are incised deep enough but in very schematic manner, which formed inconsistent depiction.**Ship type:** ship/ boat?**Rigging type:** unknown**Masts:** unclear**Yards:** unclear**Sails:** unclear**Steering system:** unclear**Flags:** No**Other elements:****Notes:** The depiction is unclear and no information can be extracted from it.







**A.1.6 Panel 6 NW Ship graffiti SP\_022 – SP\_033**

**Ship graffito № SP\_022**

**Panel № 6** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough, however due to daub erosion at some spots, the ship graffito lines look random, thus the shape of the ship does not look logical

**Ship type:** information cannot be extracted

**Rigging type:** N/A

**Masts:**

**Yards:**

**Sails:**

**Steering system:**

**Flags:**

**Other elements:**

**Notes:** contour lines are disturbed by daub erosion, therefore no elements from the ship/ boat's hull and rigging are recognisable. A long line (rope) extending to the stern of ship graffito SP\_026.

**Ship graffito № SP\_023**

**Panel № 6** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough but in quite schematic manner, which gives the feeling that this had been the artist's exercise in carving a ship. The hull is drawn only with one line, the only elaborate drawing appeared to be the stern.

**Ship type:** ship

**Rigging type:** fore-and-aft/ sprit

**Masts:** 2, the fore mast looks raked forward, main mast

**Yards:** 2 sprit yards

**Sails:** unfurled main sprit sails

**Steering system:** Not visible

**Flags:** No

**Other elements:** The long horizontal line above the sails might be interpreted as a rope

**Notes:** Due to the quite schematic appearance of the graffito, its interpretation is difficult and might be misleading

**Ship graffito № SP\_024**

**Panel № 6 North wall****Ship graffito № (in Ovcharov's catalog): 107**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. It looks that only one line represents the hull but it is quite eroded and unclear. The depiction is schematic and not much information could be extracted. The ship graffito is connected through a line (rope) with SP\_026, which gives the impression of interconnection between the both.

**Ship type:** ship

**Rigging type:** fore-and-aft/sprit

**Masts:** 2

**Yards:** not distinguishable

**Sails:** N/A

**Steering system:** Not visible

**Flags:** No

**Other elements:**

**Notes:** SP\_023, SP\_024, SP\_025 and SP\_026 look interconnected through lines (ropes). Besides, the three ship graffiti and SP\_023 share similar rigging system.

**Ship graffito № SP\_025****Panel № 6 North wall****Ship graffito № (in Ovcharov's catalog): 106**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and precise enough. The hull and rigging are represented clearly. The depiction can be categorized as schematic to elaborate as enough information could be extracted from it.

**Ship type:** ship

**Rigging type:** fore-and-aft/ sprit sail

**Masts:** 2: foremast slightly raked aft, mainmast

**Yards:** 1

**Sails:** unfurled sprit sail

**Steering system:** Not visible

**Flags:** No

**Other elements:** a short line (rope) attached to the bow of ship graffito SP\_026

**Notes:** Similar ship type as ship graffiti SP\_023, SP\_024, SP\_026. It looks that through the depiction of the lines (ropes) between these ship graffiti, the artist aimed at showing that these are interconnected and all form one scene.

**Ship graffito № SP\_026**



**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): 106**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and precise enough. The hull and rigging are represented clearly. The depiction can be categorised as schematic to elaborate as enough information could be extracted from it.

**Ship type:** ship pointing west

**Rigging type:** fore-and-aft/ sprit sails

**Masts:** 2: foremast slightly raked aft, mainmast

**Yards:** 2 sprit yards

**Sails:** 2 unfurled sprit sails

**Steering system:** No

**Flags:** No

**Other elements:**

**Notes:** SP\_022, SP\_023, SP\_024, SP\_025, SP\_026 are all interconnected through lines. These ship graffiti should be studied altogether as all share similar hull and rigging. It looks that the artist intended at showing the public ships in tow. Usually, this is the practice when a ship is battered after a battle. Also, here a perspective can be seen, where the SP\_023, which is depicted as the largest one, represents the upmost front ship.

**Ship graffito № SP\_027**

**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): 104**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough but the depiction is schematic and not much information could be extracted.

**Ship type:** cannot be categorised (only the hull and lines that seem to represent the stern are depicted)

**Rigging type:** no rigging is depicted

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** the depiction is not informative

**Ship graffito № SP\_028**



**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): 104**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. Hull and rigging is presented but in schematic manner, not enough informative

**Ship type:** ship

**Rigging type:** N/A

**Masts:** 1

**Yards:** 2

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_029**

**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): 105**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow and the graffito is barely visible. The lines are depicted randomly and the elements from the graffito are not recognisable. The line below seems to represent the hull and a vertical one the mast. The graffito is depicted in quite schematic manner

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** information cannot be extracted

**Sails:** information cannot be extracted

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** the depiction is not informative

**Ship graffito № SP\_030**

**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow and the graffito is barely visible. The depiction is schematic

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** 1 triangular pointing to west

**Other elements:**

**Notes:**

**Ship graffito № SP\_031**

**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): 102**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clearly enough. The depiction can be categorised as a simple.

**Ship type:** ship

**Rigging type:** 12 lines represent probably the standing rigging but the type cannot be recognised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** 1 rectangular pointing west

**Other elements:**

**Notes:**

**Ship graffito № SP\_032**

**Panel № 6 North wall**

**Ship graffito № (in Ovcharov's catalog): 103**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough, however the depiction is very schematic and not very informative

**Ship type:** two boats in tow line

**Rigging type:** cannot be categorised

**Masts:** the left boat - 1 raking to east

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_033**

**Panel № 6** North wall

**Ship graffito № (in Ovcharov's catalog): 101**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. The depiction can be categorised as simple. Bow and stern are distinctive

**Ship type:** ship with bow pointing east

**Rigging type:** N/A

**Masts:** 1

**Yards:** 1

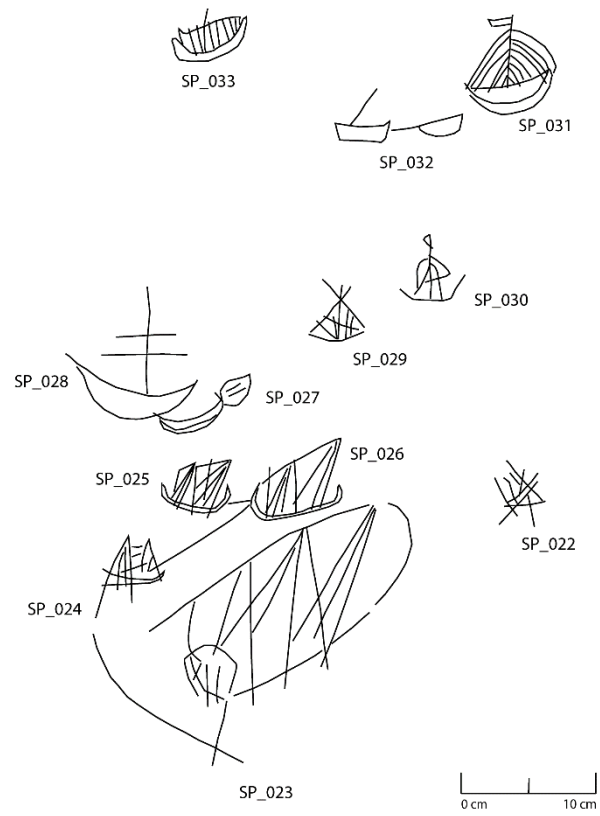
**Sails:** unfurled square main sail

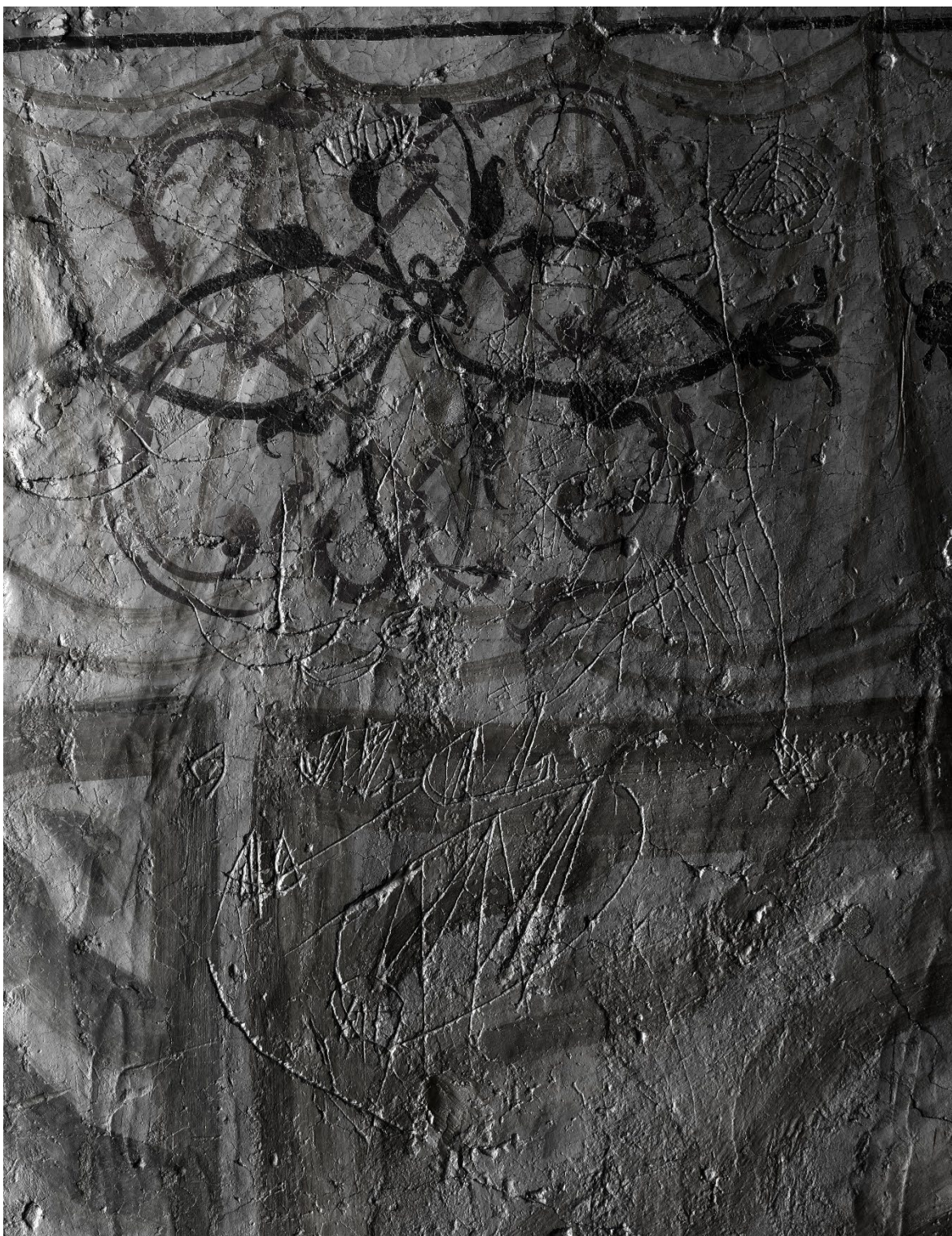
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





**A.1.7      Panel 7 NW      Ship graffiti SP\_034 – SP\_046**

**Ship graffito № SP\_034**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep but the graffito is very schematic and not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** cannot be categorised

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_035**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog): 99**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough but the graffito is quite schematic and not informative

**Ship type:** boat

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_036**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog): 100**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep but the graffito is depicted in quite schematic manner, yet the rigging system is distinguishable

**Ship type:** ship bow pointing east



**Rigging type:** fore-and-aft/ sprit sails

**Masts:** 2

**Yards:** 1 bowsprit, 2 sprit yards

**Sails:** sprit sails

**Steering system:** stern rudder

**Flags:** not visible

**Other elements:**

**Notes:**

**Ship graffito № SP\_037**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep but in quite schematic manner. The depiction is not informative.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** not visible

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_038**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog):** 98

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship

**Rigging type:** 8 lines presents the standing rigging, N/A

**Masts:** 1 mainmast and a bowsprit

**Yards:** 1

**Sails:**

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_039**

**Panel № 7** North wall

**Ship graffito № (in Ovcharov's catalog): 96**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship bow pointing to west

**Rigging type:** fore-and-aft/ lateen

**Masts:** 1

**Yards:** 2

**Sails:** furled lateen

**Steering system:** stern rudder

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_040**

**Panel № 7** North wall

**Ship graffito № (in Ovcharov's catalog): 95**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship bow pointing west

**Rigging type:** square rig and fore-and-aft

**Masts:** 1 or 2 (mizzen represented as raked long line afterwards?)

**Yards:** 2

**Sails:** furled square

**Steering system:** stern rudder

**Flags:** 1 triangular pointing east

**Other elements:**

**Notes:**



**Ship graffito № SP\_041****Panel № 7** North wall**Ship graffito № (in Ovcharov's catalog):** 94**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough**Ship type:** ship with bow pointing to west**Rigging type:** 6 lines presenting the standing rigging, cannot be categorised**Masts:** 2: foremast and mainmast**Yards:** No**Sails:** No**Steering system:** stern rudder**Flags:** 1 rectangular**Other elements:****Notes:****Ship graffito № SP\_042****Panel № 7** North wall**Ship graffito № (in Ovcharov's catalog):** 93**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is not quite informative**Ship type:** ship**Rigging type:** cannot be categorised with certainty,**Masts:** 1**Yards:** 1**Sails:** 5 short horizontal lines seemed to form headsails**Steering system:** not visible**Flags:** no**Other elements:****Notes:****Ship graffito № SP\_043****Panel № 7** North wall**Ship graffito № (in Ovcharov's catalog):** 97

## Appendix A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship with bow pointing west

**Rigging type:** 4 lines presenting the standing rigging, not certain

**Masts:** 1

**Yards:** 1

**Sails:** N/A

**Steering system:** stern rudder

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_044**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough but unclear, the graffito is depicted in a simple manner, it is not informative enough

**Ship type:** boat/ ship – cannot be categorized with certainty

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** No

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_045**

**Panel № 7 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough

**Ship type:** boat in tow

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** No

**Steering system:** no

**Flags:** no

**Other elements:** a rope attached to the boat

**Notes:** The boat is towed by a ship (SP\_046)

**Ship graffito № SP\_046**

**Panel № 7** North wall

**Ship graffito № (in Ovcharov's catalog):** 92

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship with bow pointing west

**Rigging type:** fore-and-aft

**Masts:** 1 mainmast, 1 bowsprit with a boom

**Yards:** 1

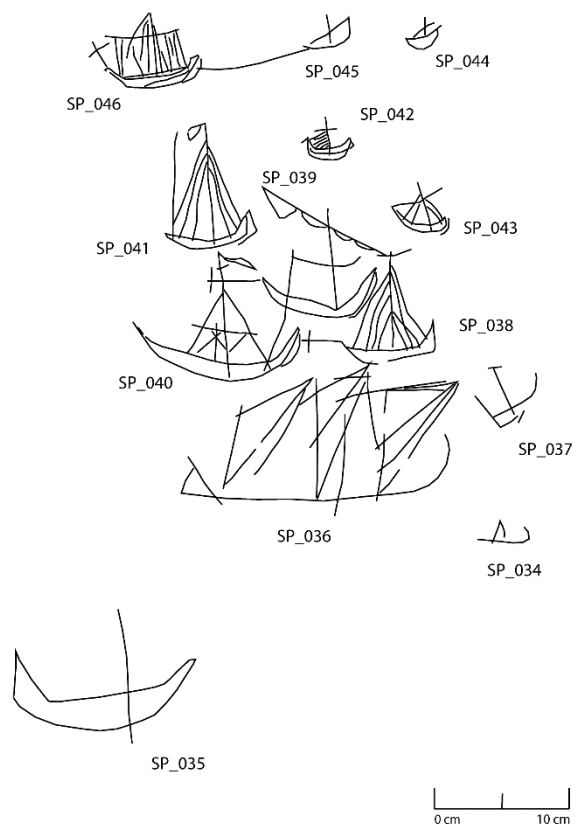
**Sails:** unfurled square main sail

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**





**A.1.8      Panel 8 NW      Ship graffiti SP\_047 – SP\_065**

**Ship graffito № SP\_047**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 91**



**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough but the daub around the graffito is eroded and its appearance is barely visible. The graffito is depicted in simple manner and is informative enough

**Ship type:** ship with bow pointing west

**Rigging type:** cannot be categorised

**Masts:** 1, 2 lines – fore and back stays, 1 bowsprit

**Yards:** 1

**Sails:** furled probably intended for main square sail, 1 sprit sail on the bowsprit

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_048**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised quite shallow and today are barely visible. The depiction is schematic and not informative. The hull is represented by one line.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** No information from this graffito could be extracted.

**Ship graffito № SP\_049**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised quite shallow and barely visible today. The depiction is simple and obscured information could be extracted

**Ship type:** ship

**Rigging type:** cannot be categorised, there are visible only 6 lines from the standing rigging and yard

**Masts:** not visible

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_050**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised quite shallow and in to schematic manner, and barely visible today. The graffito does not provide with much information. The hull is represented with one line.

**Ship type:** cannot be categorised with certainty

**Rigging type:** N/A

**Masts:** 1

**Yards:**

**Sails:** unfurled lateen

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_051**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog):** 87

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough but quite unclear especially in the rigging. The lines look more likely randomly carved and no logical picture could be seen.

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

## Appendix A

**Yards:** not clear

**Sails:** cannot be categorised

**Steering system:** not distinguishable

**Flags:** not visible

**Other elements:**

**Notes:** It looks that this ship graffito form a single scene with SP\_052, SP\_053, SP\_057

### **Ship graffito № SP\_052**

**Panel № 8** North wall

**Ship graffito № (in Ovcharov's catalog): 87**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough, however, only the hull is presented here

**Ship type:** cannot be categorised. Only the hull is presented

**Rigging type:** no rigging is presented

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

### **Ship graffito № SP\_053**

**Panel № 8** North wall

**Ship graffito № (in Ovcharov's catalog): 87**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in a quite schematic manner

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** not distinguishable

**Yards:** not distinguishable

**Sails:** not distinguishable

**Steering system:** no

**Flags:** no



**Other elements:****Notes:****Ship graffito № SP\_054****Panel № 8** North wall**Ship graffito № (in Ovcharov's catalog):** 85**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west**Ship graffito appearance:** the contour lines are incised quite deep and clear enough. The graffito is depicted in simple manner and is informative enough**Ship type:** ship with bow pointing to west**Rigging type:** 10 lines representing the standing rigging**Masts:** 1**Yards:** 2**Sails:****Steering system:** stern rudder**Flags:** no**Other elements:****Notes:****Ship graffito № SP\_055****Panel № 8** North wall**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west**Ship graffito appearance:** the contour lines are incised deep and clear but the depiction is quite schematic and not informative. The hull is presented only by one line**Ship type:** cannot be categorized, boat/ ship**Rigging type:** cannot be categorised, only mast supported by 4 lines from the standing rigging**Masts:** 1**Yards:** no**Sails:** no**Steering system:** no**Flags:** depicted as 1 line pointing to east**Other elements:****Notes:****Ship graffito № SP\_056**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 84**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. The only element that is presented from this graffito is the hull

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** the graffito seems interconnected with ship graffiti SP\_051, SP\_052, SP\_053, SP\_056, SP\_057

**Ship graffito № SP\_057**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 84**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The depiction is simple and informative

**Ship type:** ship with bow pointing west

**Rigging type:** 2 lines representing the standing rigging

**Masts:** 1 and 1 bowsprit

**Yards:** 2

**Sails:** N/A

**Steering system:** stern rudder

**Flags:** 1 triangular

**Other elements:**

**Notes:** This graffito seems interconnected with ship graffiti SP\_051, SP\_052, SP\_053, SP\_056, SP\_058

**Ship graffito № SP\_058**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough but today the graffito is half preserved – only the hull (one line) and couple of lines of the rigging. The upper part of the graffito is eroded. No information could be extracted.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_059**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 86**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough and clear. Today, some of the lines are erased and affect the full picture. The graffito is depicted in simple manner and information could be extracted

**Ship type:** ship with bow pointing west

**Rigging type:** N/A

**Masts:** 1 supported by 2 lines representing the standing rigging

**Yards:** 1

**Sails:** furled lateen

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_060**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 81**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The depiction is simple and informative

**Ship type:** ship with the bow pointing west

**Rigging type:** 6 lines representing the standing rigging

**Masts:** 1

**Yards:** 2

**Sails:** furled square

**Steering system:** stern rudder

**Flags:** 1 triangular pointing west

**Other elements:** attached to the bow is depicted the hull of a boat

**Notes:**

**Ship graffito № SP\_061**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 83**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner and it is informative. The left part of the graffito (mostly the lines from the forestay rigging) are erased with daub during conservation procedures

**Ship type:** ship

**Rigging type:** N/A

**Masts:** 1

**Yards:** 1

**Sails:** 1 furled square

**Steering system:** no

**Flags:** represented with 1 line pointing to west

**Other elements:**

**Notes:**

**Ship graffito № SP\_062**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 82**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner but it is not quite informative. The hull is slightly tilted at one side.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_063**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 82**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner

**Ship type:** ship tilted at one side

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_064**

**Panel № 8 North wall**

**Ship graffito № (in Ovcharov's catalog): 80**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner. In the bowsprit are randomly carved lines

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_065**

**Panel № 8** North wall

**Ship graffito № (in Ovcharov's catalog): 88**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallower than the rest of the ship graffiti in Panel 8. The graffito is depicted in simple to schematic manner but there are some lines that appeared to be unclear.

**Ship type:** ship with bow pointing to west

**Rigging type:** square rig

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2 on the mainmast, 3 booms for sprit sails on the bowsprit

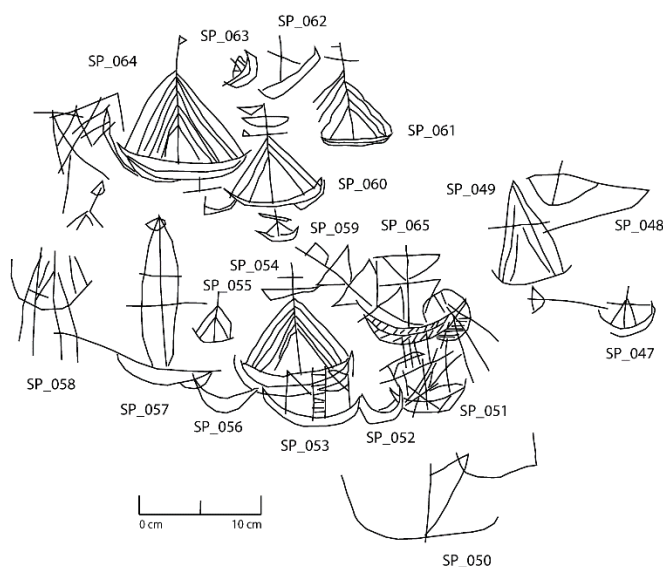
**Sails:** 2 unfurled sprit sails on the bowsprit, 2 unfurled square sails on the mainmast – 1 main course and a topsail

**Steering system:** stern rudder

**Flags:** no

**Other elements:** aft – covered cabin or aftercastle?

**Notes:** There are 8 long vertical lines below the hull, either representing anchors or oars.





#### A.1.9 Panel 9 NW Ship graffiti SP\_066 – SP\_079

**Ship graffito №** SP\_066

**Panel №** 9 North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** fore and backstays from the standing rigging, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled square (main course, topsail)

**Steering system:** no

**Flags:** represented by 1 line pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_067**

**Panel № 9** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough; however, the upper part of the graffito is erased by plaster from conservation procedures and only part of the hull is visible today

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_068**

**Panel № 9** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep, however, crossed by other lines that belong to an inscription. The ship graffito is located on the right top of this inscription and is difficult to trace details. The graffito is depicted in schematic manner, and it is not informative.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised with certainty

**Masts:** 1?

**Yards:** 1?

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



SP\_069 will be not included in the catalogue because it represents an inscription of a name in Greek

**Ship graffito № SP\_070**

**Panel № 9** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are barely visible and not informative

**Ship type:** cannot be categorised

**Rigging type:** no

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_071**

**Panel № 9** North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow and barely visible but still it is informative while the lines are carved consistently

**Ship type:** cannot be categorised with certainty whether it is a ship or a boat

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_072**

**Panel № 9** North wall

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative enough.

**Ship type:** ship with the bow pointing west

**Rigging type:** square rig, 2 lines present the fore and backstays

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 4

**Sails:** unfurled square main course, topsail, main topgallant; bowsprit; 2 unfurled sprit and top sprit sails

**Steering system:** stern rudder

**Flags:** represented by 1 line pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_073**

**Panel № 9 North wall**

**Ship graffito № (in Ovcharov's catalog): 79**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. The right half of the graffito is covered/erased by plaster during conservation procedures. Only details from the forward section of the ship graffito are available for analysis today. This part of the depiction is schematic and informative to some extent

**Ship type:** ship the bow pointing to west (due the presence of bowsprit)

**Rigging type:** cannot be categorised

**Masts:** not visible

**Yards:** not visible

**Sails:** not visible

**Steering system:** not visible

**Flags:** not visible

**Other elements:**

**Notes:**

**Ship graffito № SP\_074**

**Panel № 9 North wall**

**Ship graffito № (in Ovcharov's catalog): 78**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** 8 lines represent the forestay and backstay rigging, N/A

**Masts:** 1 mainmast, 1 bowsprit with a boom

**Yards:** 2, 1 boom

**Sails:** furled square topsail and topgallant

**Steering system:** stern rudder

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_075**

**Panel № 9 North wall**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough, however the midship section of the ship graffito is plastered during conservation procedures and no information can be extracted from there. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow pointing west

**Rigging type:** 11 lines represent the forestay and backstay, it is quite probable to share similar rigging details as SP\_074, however no other elements are preserved today.

**Masts:** only a bowsprit which is crossed by random lines that form a doodling and the bowsprit end is unclear

**Yards:** no

**Sails:** no

**Steering system:** stern rudder

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_076**

**Panel № 9 North wall**

**Ship graffito № (in Ovcharov's catalog):** 74

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow but clear and informative enough. The graffito is depicted in schematic to simple manner.

**Ship type:** ship,

**Rigging type:** 2 lines represent the forestay and backstay

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled main topsail and topgallant

**Steering system:** stern rudder

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_077**

**Panel № 9 North wall**

**Ship graffito № (in Ovcharov's catalog): 77**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow but are informative. The graffito is depicted in schematic manner

**Ship type:** ship with the bow to west

**Rigging type:** 2 lines represent the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled main topsail and topgallant

**Steering system:** stern rudder

**Flags:** no

**Other elements:** two short diagonal lines in the forward section with unclear purpose, one element at the aft which reminds of a cabin or sterncastle

**Notes:**

**Ship graffito № SP\_078**

**Panel № 9 North wall**

**Ship graffito № (in Ovcharov's catalog): 76**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow. The graffito is depicted in schematic to simple manner and it is informative

**Ship type:** ship

**Rigging type:** 5 lines represent shrouds from the standing rigging

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled main topsail and topgallant

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** SP\_079

**Panel №** 9 North wall

**Ship graffito № (in Ovcharov's catalog):** 75

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner and it is informative

**Ship type:** ship

**Rigging type:** square rig

**Masts:** 1 and 1 topmast supported by shrouds

**Yards:** 4

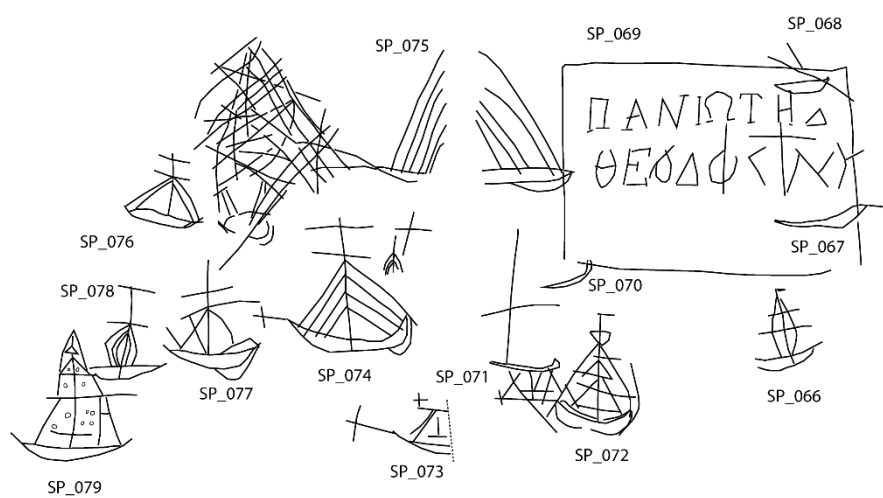
**Sails:** furled square main sail, main topsail, topgallant

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





#### A.1.10 Panel 10 NW Ship graffiti SP\_080 – SP\_091

**Ship graffito № SP\_080**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog): 73**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow and clear. The graffito is schematic.

**Ship type:** cannot be categorised whether resembles a boat or ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** furled sail – cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_081**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog): 72**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in schematic to simple manner, but the lines presenting the rigging are confusing and not much information could be extracted

**Ship type:** ship pointing with the bow towards west

**Rigging type:** N/A

**Masts:** 1, 1 bowsprit

**Yards:** 2

**Sails:** 2: unfurled main course and topsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_082**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog): 68**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough

**Ship type:** ship

**Rigging type:** 2 lines presents the forestay and backstay, N/A

**Masts:** 1

**Yards:** 2

**Sails:** furled square main topsail and topgallant

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_083**



**Panel № 10 North wall****Ship graffito № (in Ovcharov's catalog): 67**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough

**Ship type:** ship with the bow pointing to west

**Rigging type:** 4 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled square main topsail and topgallant

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_084****Panel № 10 North wall****Ship graffito № (in Ovcharov's catalog): 63**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised quite shallow and the graffito is barely visible. It is depicted in schematic to simple manner and it is informative

**Ship type:** ship with the bow pointing to west

**Rigging type:** 2 lines present shrouds, N/A

**Masts:** 1 mainmast, 1 bowsprit with a boom

**Yards:** 2

**Sails:** furled main topsail and topgallant

**Steering system:** no

**Flags:** 1 triangular pointing west

**Other elements:**

**Notes:**

**Ship graffito № SP\_085****Panel № 10 North wall****Ship graffito № (in Ovcharov's catalog): 65**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough

**Ship type:** ship with the bow pointing west

**Rigging type:** 8 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 furled main topsail and topgallant

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_086**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog): 66**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough

**Ship type:** ship with the bow pointing west

**Rigging type:** 6 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled main topsail and topgallant

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_087**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog): 69**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough. The hull is presented by 1 line.

**Ship type:** ship

**Rigging type:** 2 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** 1 furled topsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_088**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog):** 70

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough.

**Ship type:** ship with the bow pointing west

**Rigging type:** 6 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled square topsail and topgallant

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_089**

**Panel № 10** North wall

**Ship graffito № (in Ovcharov's catalog):** 71

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough.

**Ship type:** ship

**Rigging type:** 4 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 furled main topsail and topgallant

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** SP\_090

**Panel №** 10 North wall

**Ship graffito № (in Ovcharov's catalog):** 64

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to simple manner and it is informative enough.

**Ship type:** ship with the bow pointing west

**Rigging type:** 6 lines present the fore and backstays, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled main topsail and topgallant

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** SP\_091

**Panel №** 10 North wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the only coherent element depicted is the hull, the rest of the lines are randomly carved and reminds more on a doodling. No information could be extracted by this graffito

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** not distinguishable

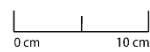
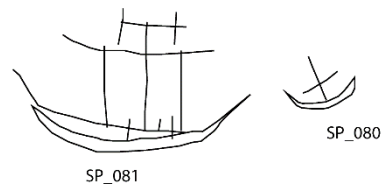
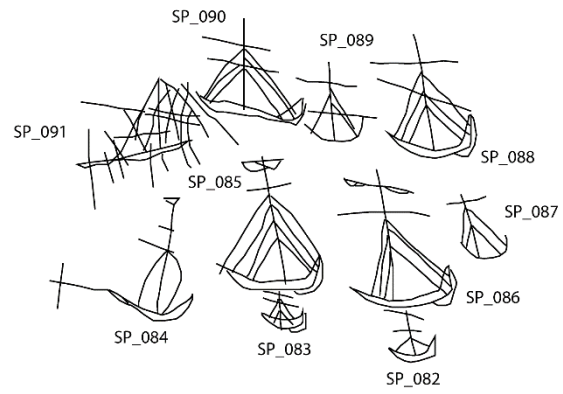
**Sails:** not distinguishable

**Steering system:**

**Flags:**

**Other elements:**

**Notes:**





**A.1.11 Panel 11 NW Ship graffiti SP\_092 – SP\_101**

**Ship graffiti № SP\_092**

**Panel № 11 North wall**

**Ship graffiti № (in Ovcharov's catalog): 62**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffiti appearance:** the contour lines are incised deep enough, only at the right end of the graffiti are not preserved well. The hull is presented by 1 line. The graffiti is depicted in a schematic manner and not much information could be extracted.

**Ship type:** cannot be categorised with certainty whether presents a boat or a ship

**Rigging type:** 4 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** it is uncertain if the lines at the right end of the graffito present a stern rudder or a different element

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_093**

**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog):** 61

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow and unclear. The graffito is depicted in schematic manner and it is not informative.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** not distinguishable

**Sails:** cannot be categorised

**Steering system:** not distinguishable

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_094**

**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog):** 60

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are deep and clear enough. The graffito is depicted in simple manner, and it is informative

**Ship type:** ship with the bow pointing west

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** unfurled main square

**Steering system:** stern rudder (curved)

**Flags:** 1 rectangular pointing to west



**Other elements:**

**Notes:**

**Ship graffito № SP\_095**

**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog): 58**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are deep and clear enough. The graffito is depicted in simple manner, and it is informative

**Ship type:** ship with the bow pointing to west

**Rigging type:** 10 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled square main sail and topsail

**Steering system:** stern rudder (curved)

**Flags:** 1 rectangular pointing to west

**Other elements:**

**Notes:**

**Ship graffito № SP\_096**

**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog): 59**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines at the hull section are incised deep enough and visible, however, the lines at the rigging are depicted shallow and unclear, today are barely visible

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** not visible

**Sails:** not visible

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_097**



**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog):** 57

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough. It is depicted in schematic to simple manner and its informative enough

**Ship type:** ship with the bow pointing west

**Rigging type:** 4 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast, 1 bowsprit with a boom

**Yards:** 1

**Sails:** furled topsail

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** SP\_098

**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog):** 56

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. It is depicted in schematic manner, and it is still informative enough

**Ship type:** ship

**Rigging type:** fore-and-aft lateen

**Masts:** 3, the foremast is raked aft

**Yards:** 3

**Sails:** 2 unfurled lateen sails (mainmast and mizzen)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** SP\_099

**Panel № 11** North wall

**Ship graffito № (in Ovcharov's catalog):** 55

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. It is depicted in schematic manner, and it is still informative enough

**Ship type:** ship with the bow pointing west

**Rigging type:** 6 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** furled topsail and topgallant

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_100**

**Panel № 11 North wall**

**Ship graffito № (in Ovcharov's catalog): 54**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep enough. It is depicted in schematic manner, and it is still informative enough

**Ship type:** ship with the bow pointing east

**Rigging type:** 10 lines present the forestay and backstay, N/A

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** not visible

**Sails:** not visible

**Steering system:** stern rudder (curved)

**Flags:** 1 rectangular pointing east

**Other elements:**

**Notes:**

**Ship graffito № SP\_101**

**Panel № 11 North wall**

**Ship graffito № (in Ovcharov's catalog): 53**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised shallow and the depiction is barely visible. The lines do not form coherent ship hull and rigging. It is quite schematic and not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1 visible mast (mainmast)

**Yards:** not certain

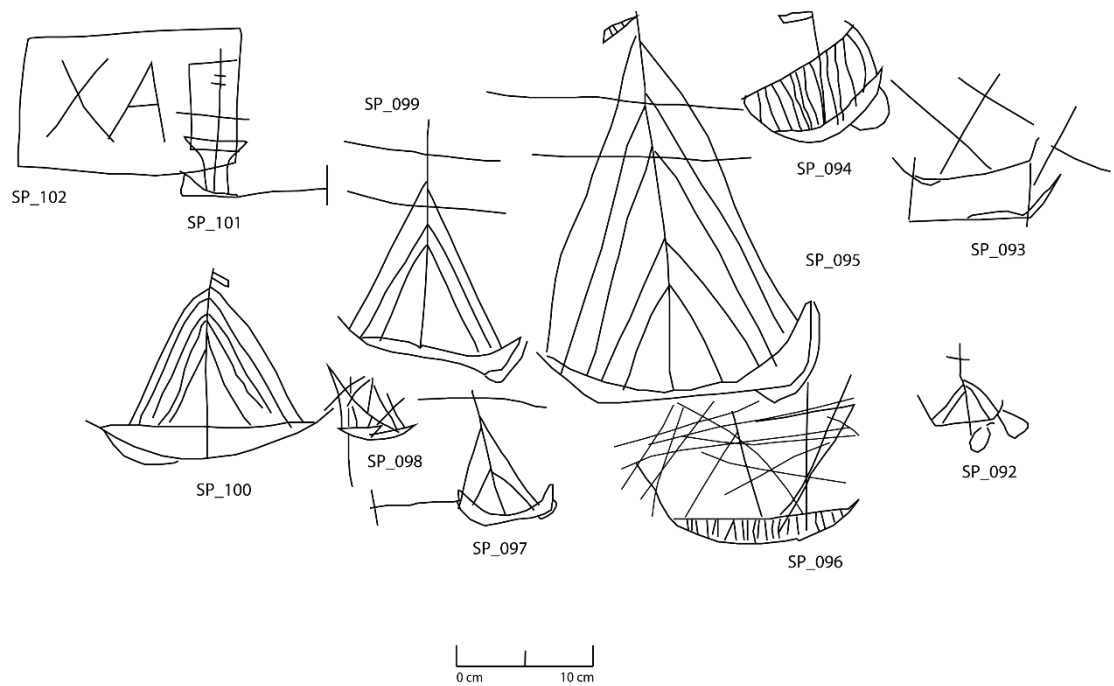
**Sails:** cannot be categorised

**Steering system:** no

**Flags:** not visible

**Other elements:**

**Notes:**





**A.1.12 Panel 1 SW Ship graffiti SP\_103 – SP\_106**

**Ship graffito № SP\_103**

**Panel № 1** South wall

**Ship graffito № (in Ovcharov's catalog): 113**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic to elaborate manner, and it is informative.

**Ship type:** ship with the bow to west (bombarda?)

**Rigging type:** square (?)

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** unfurled square main course and main topsail, 1 unfurled spanker or sprit sail

**Steering system:** not visible

**Flags: main mast** – 1 triangular pointing to west, on the aft end of the main course - 1 rectangular pointing to west

**Other elements:** transverse stern is visible on the stern

**Notes:** it is visible the direction of the wind coming from east

**Ship graffito № SP\_104****Panel № 1** South wall**Ship graffito № (in Ovcharov's catalog):** 114A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic to elaborate manner, and it is informative.**Ship type:** ship with the bow to west**Rigging type:** fore-and-aft/ lateen**Masts:** 2**Yards:** 2**Sails:** 2 unfurled lateen**Steering system:** stern rudder (curved)**Flags:** 5: fore corner of the sail: triangular pointing to east; on the main mast – triangular pointing to west, on the fore corner of the mizzen lateen – triangular pointing to east; on the mizzen – rectangular pointing east; on and additional pole aft of the mizzen – rectangular pointing to east**Other elements:** the stern is highly pronounced (sterncastle)**Notes:****Ship graffito № SP\_105****Panel № 1** South wall**Ship graffito № (in Ovcharov's catalog):** 114B**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner. It is informative to some extends, however, there are lines depicted randomly**Ship type:** ship**Rigging type:** fore-and-aft/ lateen**Masts:** 2 or 3 however it is not clear enough**Yards:** 3 or 4**Sails:** unfurled lateen, unclear how many sails are**Steering system:** not visible**Flags:** 4**Other elements:****Notes:** bow and stern are highly pronounced and straight

**Ship graffito № SP\_106**

**Panel № 1** South wall

**Ship graffito № (in Ovcharov's catalog): 114B**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner. It is informative to some extends, however, there are lines depicted randomly

**Ship type:** ship with the bow to east

**Rigging type:** cannot be recognised with certainty

**Masts:** 1 mainmast, bowsprit with unfurled sprit sail

**Yards:** 2 or 3

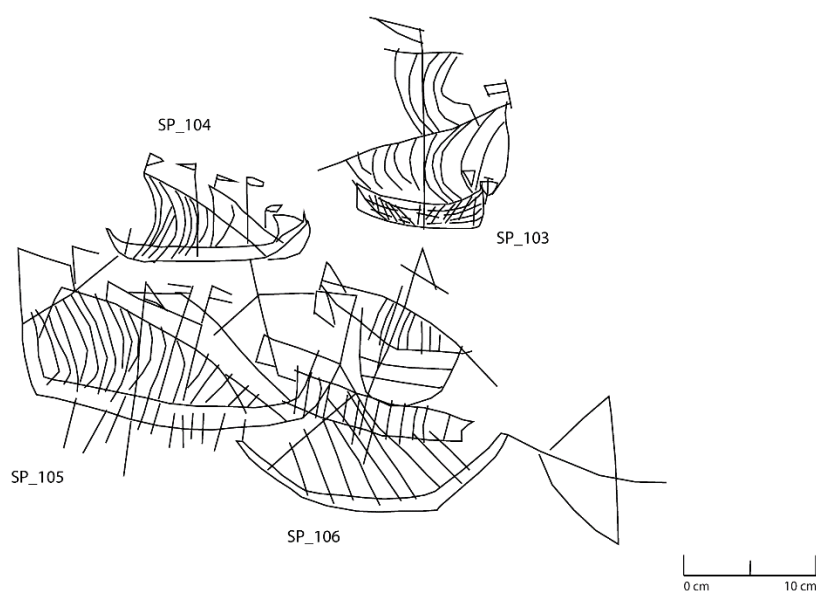
**Sails:** furled square main course, furled main topsail,

**Steering system:** no

**Flags:** on the main mast – 1 triangular pointing east

**Other elements:**

**Notes:**







#### **A.1.13      Panel 2 SW      Ship graffiti SP\_107 – SP\_109**

**Ship graffito № SP\_107**

**Panel № 2 South wall**

**Ship graffito № (in Ovcharov's catalog): 116**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is schematic.

**Ship type:** cannot be categorised with certainty, could be either boat/ ship

**Rigging type:** N/A

**Masts:** 2

**Yards:** 1

**Sails:** unfurled square main course (?)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_108**

**Panel № 2 South wall**

**Ship graffito № (in Ovcharov's catalog): 117**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is schematic

**Ship type:** cannot be categorised with certainty, could be either boat/ ship

**Rigging type:** square (?)

**Masts:** 1

**Yards:** 1

**Sails:** unfurled main course sail (?)

**Steering system:** no

**Flags:** 2: 1 line on the main mast representing a flag pointing to east; 1 triangular flag attached to the left top corner of the sail

**Other elements:**

**Notes:**

**Ship graffito № SP\_109**

**Panel № 2 South wall**

**Ship graffito № (in Ovcharov's catalog): 115**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised shallow but clear and still visible today. The graffito is schematic and informative enough. Only the rigging is not visible.

**Ship type:** ship with the bow to west

**Rigging type:** cannot be categorised

**Masts:** 1 foremast highly raked forward, a bowsprit

**Yards:** 1

**Sails:** no

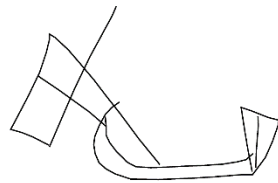
**Steering system:** no

**Flags:** no

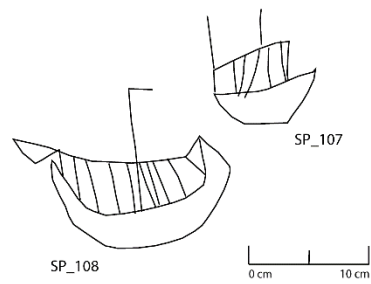
**Other elements:** transverse stern

**Notes:**





SP\_109



**A.1.14 Panel 3 SW Ship graffiti SP\_110 – SP\_111**

**Ship graffito № SP\_110**

**Panel № 3** South wall

**Ship graffito № (in Ovcharov's catalog):** 124

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough and still visible today. A right portion of the graffito is not preserved today and it cannot be seen how it ends due to erosion of the plaster. The graffito is depicted in schematic to elaborate manner and it is informative

**Ship type:** ship with bow pointing to east

**Rigging type:** mixture of fore-and-aft

**Masts:** 3

**Yards:** 3

**Sails:** 2 unfurled square sails, 1 unfurled lateen (mizzen)

**Steering system:** 1 stern rudder is visible, 12 oars

**Flags:** 2 triangular on the mainmast and on the foremast

**Other elements:**

**Notes:**

**Ship graffito № SP\_111**

**Panel № 3** South wall

**Ship graffito № (in Ovcharov's catalog):** 125

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough and still visible today. Plaster erosion on some spots causes disturbance in some of the lines. Still the complete appearance of the graffito is preserved. It is depicted in simple to schematic manner, it is not quite informative.

**Ship type:** ship

**Rigging type:** 5 lines represents the forestay and backstay, N/A

**Masts:** 1

**Yards:** no

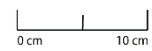
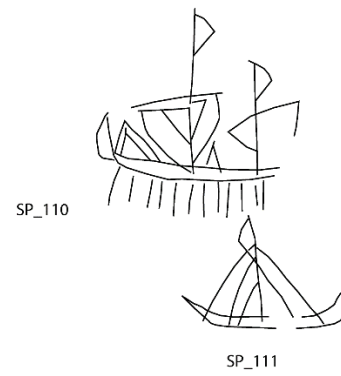
**Sails:** not visible

**Steering system:** no

**Flags:** 1 triangular pointing to west

**Other elements:**

**Notes:**



**A.1.15 Panel 4 SW Ship graffiti SP\_112 – SP\_149**

**Ship graffiti № SP\_112**

**Panel № 4** South wall

**Ship graffiti № (in Ovcharov's catalog):** 129

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the contour lines are incised deep and clear, however, it seems that the graffiti is not complete. The graffiti is depicted in simple to schematic manner, it is not informative enough

**Ship type:** ship with the bow to east

**Rigging type:** not depicted

**Masts:** 1 foremast

**Yards:** no

**Sails:** no

**Steering system:** two lines on the stern (?).

**Flags:** no

**Other elements:** transverse stern

**Notes:**

**Ship graffiti № SP\_113**

**Panel № 4** South wall

**Ship graffiti № (in Ovcharov's catalog):** 130

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the contour lines are incised deep and clear. The graffiti is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 2

**Sails:** 2 unfurled square main course and topsail

**Steering system:** no

**Flags:** 2: 1 line represents a flag on the main mast pointing to east; 1 inserted on an additional pole astern

**Other elements:**

**Notes:**

**Ship graffito № SP\_114****Panel № 4** South wall**Ship graffito № (in Ovcharov's catalog):** 126**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in simple to schematic manner and it is not quite informative**Ship type:** cannot be categorised as either a boat/ a ship**Rigging type:** cannot be categorised**Masts:** 1 mainmast**Yards:** 1**Sails:** no**Steering system:** no**Flags:** no**Other elements:** right from the graffito are depicted other lines which cannot be seen as logically related to SP\_114.**Notes:****Ship graffito № SP\_115****Panel № 4** South wall**Ship graffito № (in Ovcharov's catalog):** 127**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in schematic manner and it is informative. The right end of graffito is erased due to plaster erosion. Some lines of the rigging are erased by plaster erosion.**Ship type:** ship**Rigging type:** fore-and-aft/ sprit**Masts:** 2**Yards:** 2**Sails:** 2 unfurled sprit sails**Steering system:** no**Flags:** not visible**Other elements:****Notes:**

**Ship graffito № SP\_116**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 128

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** only the contour lines of the hull are visible today. These are incised deep, however, due to the lack of other elements the graffito is not informative

**Ship type:** cannot be categorised

**Rigging type:** no

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_117**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in simple to schematic manner but it is not informative as it consists only of a hull and a mast

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_118:** depiction of a human (dancing women).

**Ship graffito № SP\_119**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough but the graffito consists only from a hull tilted at one side and the keel at right

**Ship type:** cannot be categorised

**Rigging type:** no

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_120**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep but present only a hull and a mast. The graffito is schematic. It is turned upside down

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_121**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog): 131**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to west

**Rigging type:** cannot be categorised

**Masts:** 1 foremast and 1 mainmast, 1 bowsprit

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:** transverse stern

**Notes:**

**Ship graffito № SP\_122**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog): 132**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep but today these are not preserved well due to plaster erosion and the graffito is partially erased. It is depicted on schematic manner and it is informative enough

**Ship type:** ship with the bow to west

**Rigging type:** fore-and-aft/ lateen (?)

**Masts:** 3, 1 bowsprit

**Yards:** 1 jib boom, 3 lateen yards

**Sails:** 2 unfurled lateen (?) and jib stay sail

**Steering system:** no

**Flags:** 3 rectangular

**Other elements:**

**Notes:**



**Ship graffito № SP\_123****Panel № 4** South wall**Ship graffito № (in Ovcharov's catalog):** 133**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in elaborate manner and it is informative.**Ship type:** brig (with the bow to west)**Rigging type:** square**Masts:** 2: foremast and mainmast, 1 bowsprit with martingale**Yards:** 7**Sails:** unfurled square fore main course and main topsail, square main course and topsail with a spanker on the mainmast, 1 unfurled headsail**Steering system:** stern rudder**Flags:** no**Other elements:** shrouds, transverse stern**Notes:****Ship graffito № SP\_124****Panel № 4** South wall**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised shallow and today are barely visible. The graffito is not preserved well and incomplete, therefore not informative**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** 1 visible**Yards:** 1 visible**Sails:** unclear**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № SP\_125**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 137**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in elaborate manner and it is informative

**Ship type:** 4-masted clipper (with the bow to east)

**Rigging type:** square rigged

**Masts:** 4, 1 bowsprit

**Yards:** 12

**Sails:** unfurled square sails, 1 flying jib

**Steering system:** no

**Flags:** no

**Other elements:** 3 mast tops, 1 released anchor, below the bowsprit – 2 anchors/ ropes?

**Notes:**

**Ship graffito № SP\_126**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 152**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** fore-and-aft/ sprit

**Masts:** 1

**Yards:** 1

**Sails:** sprit

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_127**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 151**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** fore-and-aft/ sprit

**Masts:** 2

**Yards:** 2

**Sails:** sprit

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_128**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog): 150**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner, however, the upper part of the graffito is covered with plaster, thus the elements of the rigging are not visible

**Ship type:** cannot be categorised

**Rigging type:** not visible

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_129**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog): 149**

## Appendix A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner

**Ship type:** cannot be categorized. It could be either a boat or a ship

**Rigging type:** fore-and-aft (?)

**Masts:** 1

**Yards:** 1 lateen yard (?)

**Sails:** furled lateen (?)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_130**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 148**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner. It is tilted at one side, the keel is vertical and pointing to west

**Ship type:** ship

**Rigging type:** N/A

**Masts:** 1

**Yards:** 1

**Sails:** unfurled square main course/top sail

**Steering system:** no stern rudder, 5 oars?

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_131**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 141**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner.

**Ship type:** ship with the bow to west

**Rigging type:** N/A

**Masts:** 1

**Yards:** 2: 1 square, 1 lateen

**Sails:** 2 furled: 1 square, 1 lateen

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_132**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner. It is tilted at one side, so the keel is vertical

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised with certainty

**Masts:** 1

**Yards:** 1

**Sails:** cannot be categorised, it is not distinctive whether it presents square main course or lateen sail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № 133:** inscription

**Ship graffito № SP\_134**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 142

## Appendix A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised shallow. The graffito is incomplete and consists only from hull. It is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_135**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 144**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner.

**Ship type:** ship

**Rigging type:** fore-and-aft (?)

**Masts:** 1

**Yards:** 1

**Sails:** triangular (probably lateen)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_136**

**Panel № 4 South wall**

**Ship graffito № (in Ovcharov's catalog): 139**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner.

**Ship type:** ship with the bow to west

**Rigging type:** mixture of fore-and-aft and square?

**Masts:** 1

**Yards:** 2

**Sails:** 1 furled lateen, 1 furled topsail

**Steering system:** stern rudder (curved)

**Flags:** 1

**Other elements:**

**Notes:**

**Ship graffito № SP\_137**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 140

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner.

**Ship type:** ship with the bow to west

**Rigging type:** mixture of fore-and-aft and square

**Masts:** 1

**Yards:** 2

**Sails:** furled lateen, furled square

**Steering system:** not visible

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_138**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 147

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner.

**Ship type:** cannot be categorised whether it is a boat/ a ship

**Rigging type:** cannot be categorised with certainty

**Masts:** 1

**Yards:** 1

**Sails:** furled fore-and aft (probably lateen)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_139**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 146

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner.

**Ship type:** cannot be categorised whether a ship/ a boat

**Rigging type:** fore-and-aft/ lateen

**Masts:** 1

**Yards:** 1

**Sails:** furled lateen?

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_140**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 145

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner.

**Ship type:** cannot be categorised whether a ship/ a boat



**Rigging type:** fore-and-aft

**Masts:** 1

**Yards:** 1

**Sails:** furled lateen

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_141**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 143

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner.

**Ship type:** ship

**Rigging type:** 4 lines representing shrouds, square

**Masts:** 1

**Yards:** 1

**Sails:** furled square main course

**Steering system:** not visible

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_142**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 138

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic manner.

**Ship type:** ship with the bow to west

**Rigging type:** fore-and-aft

**Masts:** 1

**Yards:** 1

**Sails:** furled lateen

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_143**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 135

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to elaborate manner and it is informative

**Ship type:** brig (with the bow to west)

**Rigging type:** square

**Masts:** 2: foremast and mainmast, 1 bowsprit

**Yards:** 4

**Sails:** 1 unfurled flying jib, furled square main course, topsail, topgallant, a unfurled spanker

**Steering system:** not visible

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_144**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 136

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in schematic to elaborate manner and it is informative

**Ship type:** brig (with the bow to west)

**Rigging type:** square

**Masts:** 2, foremast and mainmast, 1 bowsprit

**Yards:** 7

**Sails:** unfurled flying jib, staysails on the bowsprit, foremast — unfurled square topsail and topgallant sail, mainmast - unfurled square topsail and topgallant and a furled spanker

**Steering system:** stern rudder (straight)

**Flags:** not visible

**Other elements:** transverse stern

**Notes: the ship towing a boat.** The only depicted element of the boat is its hull with a transverse stern.

**Ship graffito № SP\_145**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 153

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, a half of the graffito is not preserved. It is schematic and it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** not visible

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_146**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 153

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines of the hull are incised deeper rather than these of the rigging system resulted in the clearer appearance of the hull. The lines forming the sail are barely visible by naked eye, but still visible due to the application of RTI technique. The graffito itself is tiny and quite schematic but still informative.

**Ship type:** cannot be categorised with certainty whether it is a ship or a boat

**Rigging type:** cannot be categorised

## Appendix A

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** not visible

**Flags:** 1 rectangular pointing to west

**Other elements:**

**Notes:**

**Ship graffito № SP\_147**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** 154

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito presents completely different perspective of a vessel, compared with all other ship graffiti. In previous researches it is not studied, and its type was questioned. I define it as a rowing vessel seen from top. The contour lines are incised deep and it is depicted in schematic manner

**Ship type:** rowing boat (?)

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** oars

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_148**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however the graffito is depicted in simple to schematic manner and it is not informative. Many elements of the hull and rigging are omitted

**Ship type:** cannot be categorised

**Rigging type:** 2 lines presents elements from the forestay and backstay rigging, however it is not enough to deduce a type

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_149**

**Panel № 4** South wall

**Ship graffito № (in Ovcharov's catalog): 154**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito consists of only two lines – a arched line represents the hull and a straight line the mast. It is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

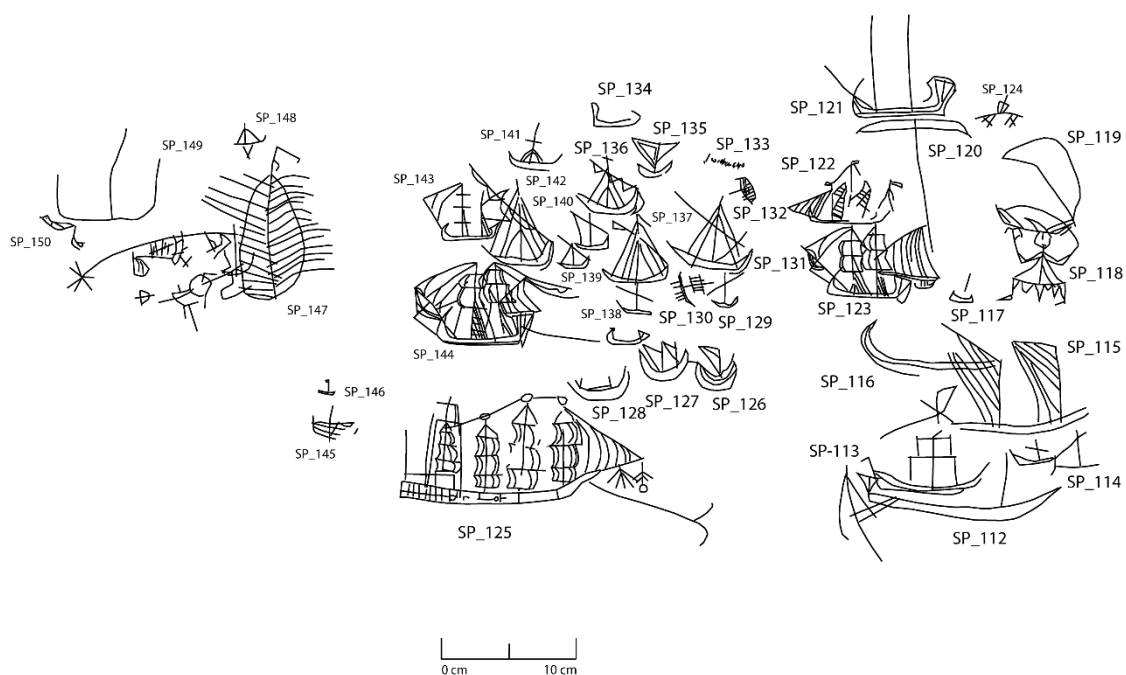
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_150** is a bird



**A.1.16 Panel 5 SW Ship graffiti SP\_151 – SP\_161****Ship graffito № SP\_151****Panel № 5** South wall**Ship graffito № (in Ovcharov's catalog):** 155**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep enough but due to the dark colour of the plaster, the graffito is not well visible. Even though, it is depicted in simple to schematic manner and it is not informative**Ship type:** cannot be categorized whether it represents a ship or a boat**Rigging type:** cannot be categorised**Masts:** 1**Yards:** 1**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № SP\_152****Panel № 5** South wall**Ship graffito № (in Ovcharov's catalog):** 156**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep enough and are well preserved today. Only the upper part of the rigging is erased by plaster erosion and details from the rig/ sail there are unclear. The graffito is depicted in schematic manner, and it is informative**Ship type:** ship**Rigging type:** square, 4 lines represent shrouds**Masts:** 1 mainmast, 1 bowsprit**Yards:** 1, 1 boom**Sails:** 1 unfurled square main course**Steering system:** stern rudder with not clear shape**Flags:** 1 triangular astern pointing to east**Other elements:****Notes:**

**Ship graffito № SP\_153**

**Panel № 5** South wall

**Ship graffito № (in Ovcharov's catalog): 157**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 1

**Yards:** 1

**Sails:** lateen

**Steering system:** stern rudder

**Flags:** 1

**Other elements:**

**Notes:**

**Ship graffito № SP\_154**

**Panel № 5** South wall

**Ship graffito № (in Ovcharov's catalog): 158**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough, however quite random, hence no logical picture of a vessel could be deduced. The only distinctive elements are from the rigging – mast, yards and a square main course sail. The hull is shapeless and no other details were carved

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast

**Yards:** 3 (?)

**Sails:** not clear

**Steering system:** no

**Flags:** not visible

**Other elements:**

**Notes:**



**Ship graffito № SP\_155****Panel № 5** South wall**Ship graffito № (in Ovcharov's catalog):** 159**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep, however due to plaster erosion at some spots, elements of the hull and rigging are not preserved today. The graffito is depicted in schematic manner and it is informative**Ship type:** ship with the bow to west**Rigging type:** fore-and-aft, taking into account the long lateen yard (?)**Masts:** 1 mainmast, 1 bowsprit which at its end is not preserved well and elements are obscured**Yards:** 1 lateen**Sails:** furled lateen**Steering system:** no**Flags:** 1 rectangular pointing to east**Other elements:****Notes:****Ship graffito № SP\_156****Panel № 5** South wall**Ship graffito № (in Ovcharov's catalog):** 161**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep enough but at some places are not preserved well due to plaster erosion, hence elements of the graffito are not visible. The graffito is depicted in simple to schematic manner. Due to poor preservation, today it is not informative**Ship type:** ship**Rigging type:** fore-and-aft (?)**Masts:** 1**Yards:** 1**Sails:** furled lateen**Steering system:** not visible**Flags:** no**Other elements:****Notes:**

**Ship graffito № SP\_157**

**Panel № 5** South wall

**Ship graffito № (in Ovcharov's catalog):** 160

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito consists only of a hull. It is not informative at all

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_158**

**Panel № 5** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito is depicted only with three lines representing the hull, the mast and the yard. It gives no information due to poor appearance

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_159****Panel № 5** South wall**Ship graffito № (in Ovcharov's catalog):** 162**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in simple to schematic manner, and it is informative enough**Ship type:** ship**Rigging type:** fore-and-aft**Masts:** 1**Yards:** 1 lateen yard**Sails:** 1 furled lateen**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № SP\_160****Panel № 5** South wall**Ship graffito № (in Ovcharov's catalog):** 163**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the graffito is depicted only with three lines representing the hull, the mast and the yard. It gives no information due to poor appearance**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** 1**Yards:** 1**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № SP\_161**

**Panel № 5 South wall**

**Ship graffito № (in Ovcharov's catalog): 164**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough, however, the graffito is depicted in quite simple manner and it is not informative enough

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** no

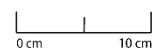
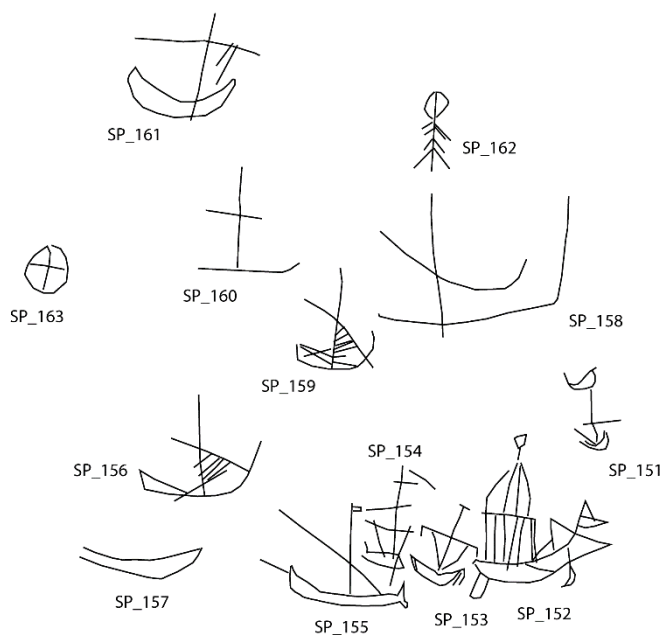
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffiti № 162, 163:** oval with a cross inside, human figure





**A.1.17      Panel 6 SW      Ship graffiti SP\_164 – SP\_167**

**Ship graffito № SP\_164**

**Panel № 6** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito presents only a hull. The contour lines are incised deep. The graffito is barely visible as the plaster on which it is incised is darker

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_165**

**Panel № 6** South wall

**Ship graffito № (in Ovcharov's catalog): 175**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep enough. The graffito is depicted in schematic manner and it is informative.

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 2

**Yards:** 2

**Sails:** 2 unfurled lateen

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_166**

**Panel № 6** South wall

**Ship graffito № (in Ovcharov's catalog): 176**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito is preserved only partially – parts of yards, upper portion of a sail and a mast with a flag. The rest of graffito is erased by plaster erosion.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1 visible

**Yards:** not clear

**Sails:** not clear

**Steering system:** no

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_167**

**Panel № 6** South wall

**Ship graffito № (in Ovcharov's catalog): 173**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 1

**Yards:** 1

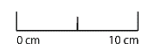
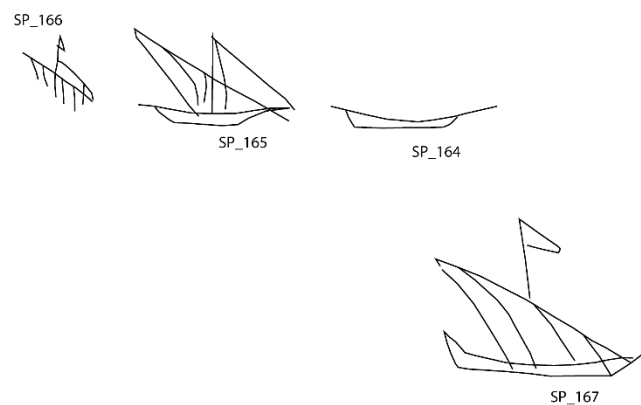
**Sails:** 1 unfurled lateen

**Steering system:** no

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**







#### A.1.18 Panel 7 SW Ship graffiti SP\_168 – SP\_176

**Ship graffito № SP\_168**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog): 170**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are thin and incised shallow but clear. The graffito is complete and it is depicted in schematic manner and it is informative. It is tilted and the graffito is oriented vertically

**Ship type:** ship

**Rigging type:** lines present the standing rigging, fore-and-aft

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** furled square

**Steering system:** no

**Flags:** no



**Other elements:****Notes:****Ship graffito № SP\_169****Panel № 7** South wall**Ship graffito № (in Ovcharov's catalog):** 172**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic to elaborate manner, and it is informative. Unfortunately, the right end (stern?) of the graffito is cut due to plaster erosion**Ship type:** oar-sail-powered ship**Rigging type:** fore-and-aft/ lateen**Masts:** 2**Yards:** 2**Sails:** 2 unfurled lateen sails, the slightly curved lines of the sails show the direction of the wind coming from west**Steering system:** 14 oars**Flags:** 1 triangular pointing to east**Other elements:****Notes:****Ship graffito № SP\_170****Panel № 7** South wall**Ship graffito № (in Ovcharov's catalog):** 171**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic to elaborate manner, and it is informative. Unfortunately, the right end (stern?) of the graffito is cut due to plaster erosion**Ship type:** oar-sail-powered ship**Rigging type:** fore-and-aft/ lateen**Masts:** 2**Yards:** 2**Sails:** 2 unfurled lateen sails, the slightly curved lines of the sails show the direction of the wind coming from west**Steering system:** 10 oars

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_171**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog): 169**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however today these are barely visible. The plaster around the graffito is fallen apart, resulted in erasing some of the elements. The graffito is depicted in schematic manner.

**Ship type:** ship

**Rigging type:** fore-and-aft/ lateen

**Masts:** 1

**Yards:** 1

**Sails:** unfurled lateen

**Steering system:** stern rudder (straight)

**Flags:** 2: on the mainmast 1 triangular pointing to east; astern on a pole – triangular pointing to west

**Other elements:**

**Notes:**

**Ship graffito № SP\_172**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog): 168**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however today these are barely visible. The plaster around the graffito is fallen apart, resulted in erasing some of the elements. The graffito is depicted in simple manner.

**Ship type:** boat

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_173**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog):** 167

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however today these are barely visible. The graffito is depicted in schematic manner.

**Ship type:** cannot be categorised with certainty whether it is boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled lateen (?)

**Steering system:** no

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № SP\_174**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito is barely visible and only the half of it is preserved today. Half of it is erased with the plaster erosion. The graffito is not clear, and an information cannot be extracted

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** not visible

**Yards:** not visible

**Sails:** not visible

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_175**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog): 166**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised shallow and barely visible today. The right end of the graffito is erased due to plaster erosion. The graffito is depicted in simple to schematic manner, however, it is not informative. The only visible elements are lines forming a sail and oars.

**Ship type:** cannot be categorised with certainty

**Rigging type:** square (?)

**Masts:** not distinctive

**Yards:** not distinctive

**Sails:** 1 unfurled square?

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_176**

**Panel № 7** South wall

**Ship graffito № (in Ovcharov's catalog): 165**

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, today are barely visible. The graffito is complete and depicted in schematic manner.

**Ship type:** oar-sailed-powered ship

**Rigging type:** fore-and-aft/ lateen

**Masts:** not visible, probably 1 and hidden by the unfurled lateen sail which appeared in front

**Yards:** 1

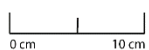
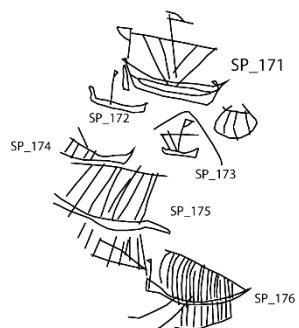
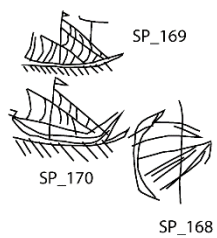
**Sails:** unfurled lateen, the curved lines of the sail showing that wind comes from east

**Steering system:** 2 longer lines – remind of quarter rudders; oars. This seems peculiar taking into account that the use of this type of steering ends around 15<sup>th</sup> c.

**Flags:** 1 astern on a pole – triangular pointing to west

**Other elements:**

**Notes:**



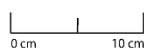






**A.1.19 Panel 8 SW Ship graffiti SP\_177****Ship graffito № SP\_177****Panel № 8** South wall**Ship graffito № (in Ovcharov's catalog): 174****Location:** Nessebar, Church St. Spas (St. Christ Saviour), south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative**Ship type:** oar-sail-powered ship**Rigging type:** fore-and-aft/ lateen**Masts:** 2: mainmast and mizzen**Yards:** 2**Sails:** 2 lateens**Steering system:** 10 oars**Flags:** on the mainmast – 1 triangular pointing to east**Other elements:****Notes:**

SP\_177





**A.1.20      Panel 9 SW      Ship graffiti SP\_178 – SP\_182**

**Ship graffito № SP\_178**

**Panel № 9** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), east wall of the south entrance in the south wall inside the nave of the church

**Ship graffito appearance:** the contour lines are incised deep, however, due to the dark colour of the plaster the graffito is barely visible. It is depicted in schematic to elaborate manner, and it is informative.

**Ship type:** oar-sail-powered ship

**Rigging type:** fore-and-aft

**Masts:** 2: foremast and mainmast, which is slightly abaft



**Yards:** 2

**Sails:** 2 mainsails lateen

**Steering system:** 9 oars

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_179**

**Panel № 9** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), east wall of the south entrance in the south wall inside the nave of the church

**Ship graffito appearance:** the graffito is barely visible and it is not informative. It consists only of a hull

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № SP\_180**

**Panel № 9** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), east wall of the south entrance in the south wall inside the nave of the church

**Ship graffito appearance:** the contour lines are incised deep, however, due to the dark colour of the plaster the graffito is barely visible. It is depicted in schematic to elaborate manner, and it is informative.

**Ship type:** ship with the bow to west

**Rigging type:** square rig

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2 square, 1 gaff yard

## Appendix A

**Sails:** 2 unfurled square main course sail and topsail

**Steering system:** stern rudder (curved)

**Flags:** 1 triangular pointing to east

**Other elements:** transverse stern

**Notes:**

**Ship graffito № SP\_181**

**Panel № 9** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), east wall of the south entrance in the south wall inside the nave of the church

**Ship graffito appearance:** the contour lines are incised deep, however, due to the dark colour of the plaster the graffito is barely visible. It is depicted in schematic to elaborate manner, and it is informative.

**Ship type:** oar-sail-powered ship

**Rigging type:** fore-and-aft

**Masts:** 2: mainmast and mizzen

**Yards:** 2

**Sails:** 2 unfurled lateen

**Steering system:** 10 oars and frame for stabilisation

**Flags:** no

**Other elements:** frame for stabilisation of the oars

**Notes:**

**Ship graffito № SP\_182**

**Panel № 9** South wall

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Spas (St. Christ Saviour), east wall of the south entrance in the south wall inside the nave of the church

**Ship graffito appearance:** only the upper section (shrouds of rigging) is preserved. The rest is erased due to plaster erosion, hence the graffito is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** no

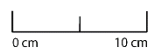
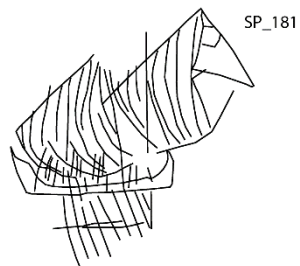
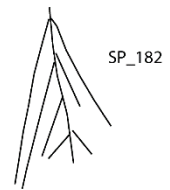
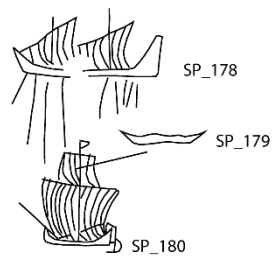
**Sails:** no

**Steering system:**

**Flags:**

**Other elements:**

**Notes:**





## A.2 RTI captures and graphic illustrations of ship graffiti in the Church of St. Stephen

### A.2.1 Panel 1 Ship graffiti ST\_001 – ST\_010

**Ship graffito № ST\_001**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog): 36 Б**

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is not quite informative

**Ship type:** cannot be categorised with certainty whether it is a ship or a boat

**Rigging type:** square, but it cannot be categorised with certainty/ 11 lines presents elements of the rigging

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_002**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog): 36 B**

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple style and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 unfurled square main course and a main topsail

**Steering system:** no

**Flags:** 1 rectangular pointing to east

**Other elements:**

**Notes:** Both stern and stem of the hull are highly pronounced

**Ship graffito № ST\_003**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog): 36 Г**

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner and it is informative

**Ship type:** ship with the bow to east (galley?)

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 3, 1 sprit yard on the bowsprit

**Sails:** 3 unfurled main course, main topsail and topgallant sail, 1 unfurled sprit sail on the bowsprit

**Steering system:** stern rudder (curved)

**Flags:** 1 rectangular on the main mast

**Other elements:**

**Notes:**

**Ship graffito № ST\_004**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog):** 36 A

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner and it is informative

**Ship type:** ship (galley?)

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 3

**Sails:** 3 unfurled square main course, main top sail, topgallant

**Steering system:** 11 oars

**Flags:** 1 rectangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № ST\_005**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog):** 36 Д

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 2

**Sails:** 2 unfurled main course and a topsail (half of it not preserved)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_006**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are barely and partially visible today due to plaster erosion and covering some elements with a plaster during previous conservation procedures

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1 partially visible

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_007**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog): 36 E**

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear enough. The graffito is depicted in simple manner and it is informative

**Ship type:** ship with the bow pointing to west

**Rigging type:** square

**Masts:** 1

**Yards:** 2

**Sails:** 2 unfurled square main course and a topsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_008**

**Panel № 1**

**Ship graffito № (in Ovcharov's catalog): 36 Ж**

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised shallower rather than the ones of the surrounding graffiti, however these are clearly visible. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship

**Rigging type:** square

**Masts:** 2, however cannot be distinct whether the one resembles a foremast or a mizzen

**Yards:** 4

**Sails:** 3 unfurled square sails and 1 furled

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_009

**Panel №** 1

**Ship graffito № (in Ovcharov's catalog):** 36 3

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative

**Ship type:** cannot be categorised with certainty whether it presents a ship or a boat

**Rigging type:** square

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled square

**Steering system:** no

**Flags:** 1 line represents the flag

**Other elements:**

**Notes:**

**Ship graffito №** ST\_010

**Panel №** 1

**Ship graffito № (in Ovcharov's catalog):** 36 И

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised shallow but clear and visible today. The graffito is depicted in simple manner and it is informative enough

**Ship type:** ship with the bow pointing west

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2, 1 boom



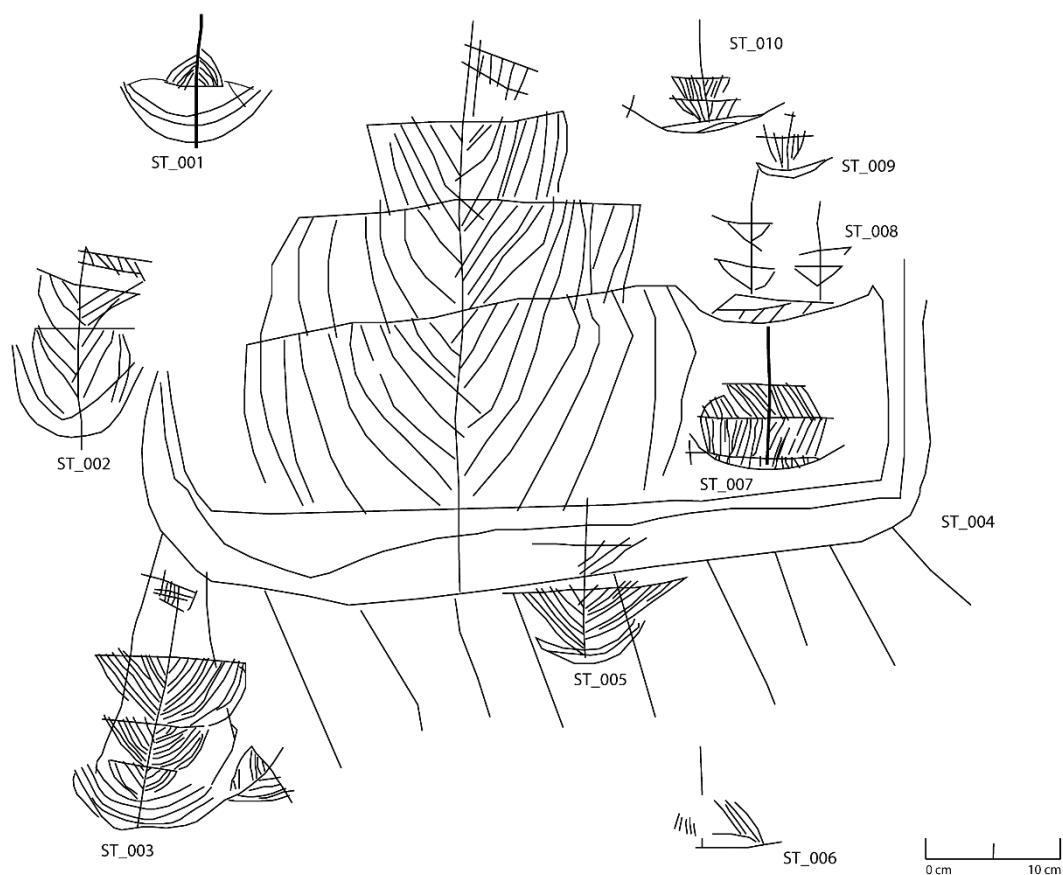
**Sails:** 2 unfurled main course and a topsail

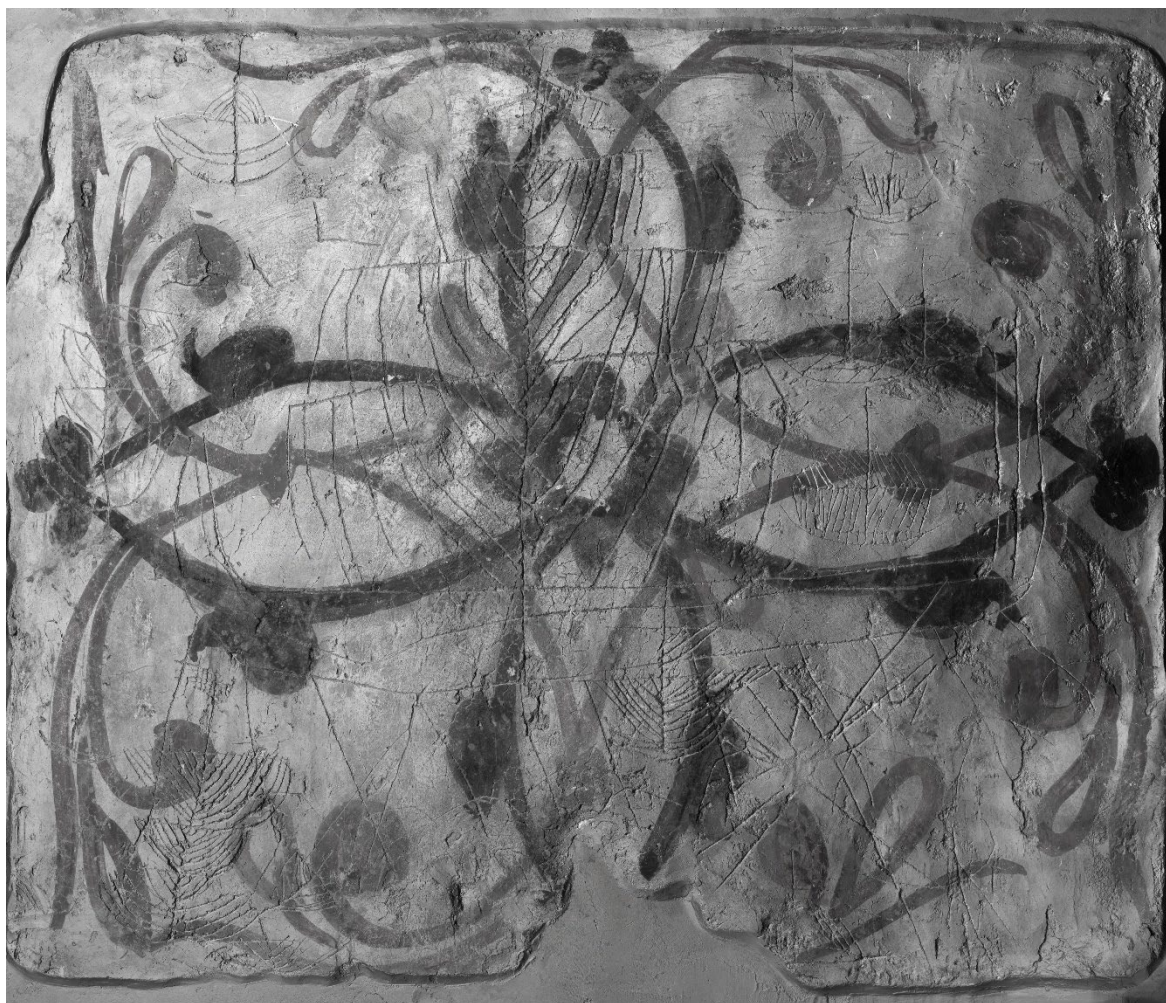
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





#### A.2.2 Panel 2 Ship graffiti ST\_011 – ST\_012

##### Ship graffiti № ST\_011

##### Panel № 2

##### Ship graffiti № (in Ovcharov's catalog): 35 A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the contour lines are incised deep and clear. The graffiti is depicted in schematic to elaborate manner and it is informative

**Ship type:** ship pointing with the bow to east (galley)

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 4, 1 bowsprit's sprit yard

**Sails:** bowsprit - 1 furled sprit sail; 4 unfurled square main course, topsail, topgallant, main royal sail

**Steering system:** no

**Flags:** no

**Other elements:** 8 anchors/ oars?

**Notes:**

**Ship graffito №** ST\_012

**Panel №** 2

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner. It is not quite informative. The graffito is positioned slightly tilted at one side

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 2

**Sails:** cannot be categorised

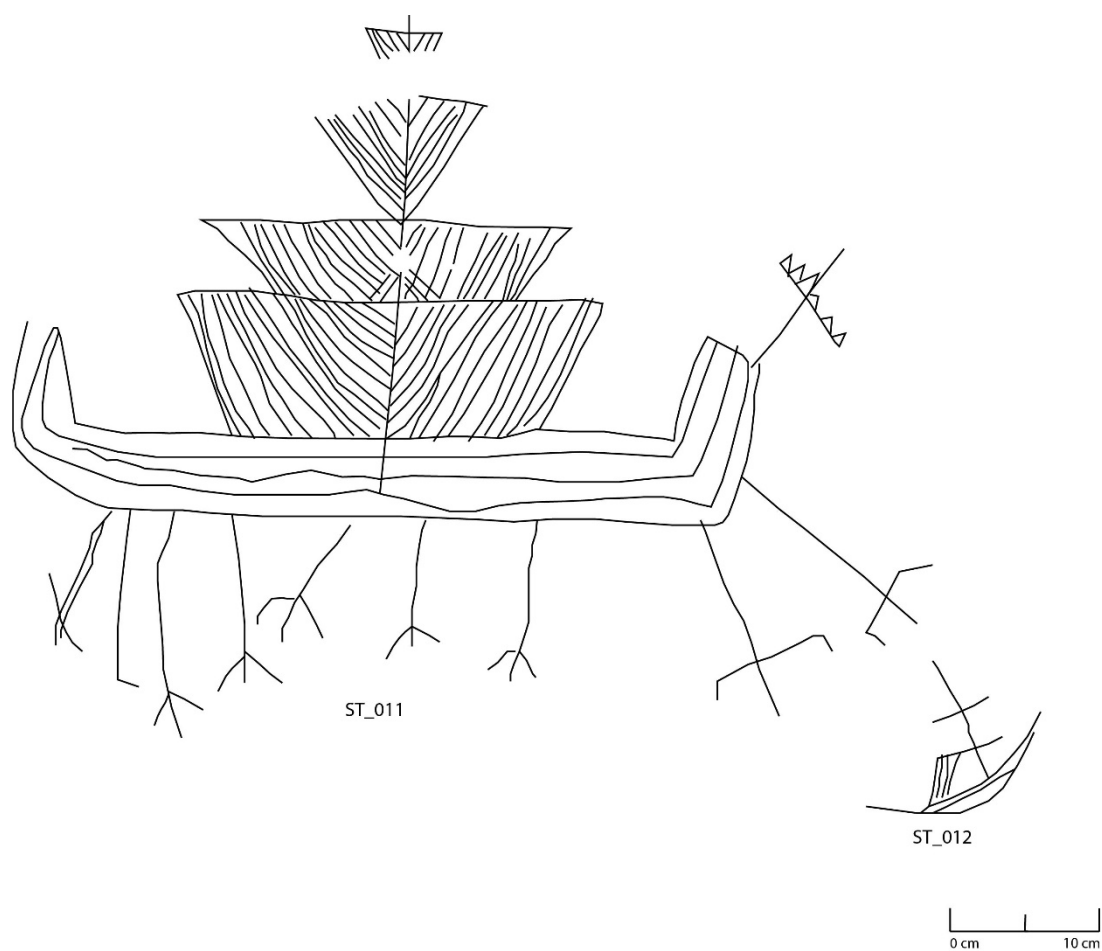
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





**A.2.3 Panel 3 Ship graffiti ST\_013 – ST\_023****Ship graffito № ST\_013****Panel № 3****Ship graffito № (in Ovcharov's catalog): 34**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however the graffito represents only a hull, hence it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** 1 straight line at right – stern rudder?

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_014****Panel № 3****Ship graffito № (in Ovcharov's catalog): 34**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito represents only a hull and unclear elements of rigging. The lines are incised deep, however, it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** uncertain

**Yards:** 2 visible

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_015****Panel № 3****Ship graffito № (in Ovcharov's catalog): 34**

## Appendix A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative enough

**Ship type:** ship with the bow to east

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2, 1 sprit yard

**Sails:** furled main course and a topsail, 1 furled sprit sail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_016**

**Panel № 3**

**Ship graffito № (in Ovcharov's catalog): 34**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner, and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled square mainsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_017**

**Panel № 3**

**Ship graffito № (in Ovcharov's catalog): 34**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito represents only a hull and it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_018**

**Panel № 3**

**Ship graffito № (in Ovcharov's catalog): 34**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. Elements of the topsail are not preserved but it is still clear and visible. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 unfurled square main course and a topsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_019**

**Panel № 3**

**Ship graffito № (in Ovcharov's catalog): 34**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner, and it is informative

**Ship type:** ship with the bow to east

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2, 1 sprit yard

**Sails:** 2 unfurled square main course and topsail, 1 unfurled sprit sail

**Steering system:** no

## Appendix A

**Flags:** no

**Other elements:** 5 anchors/ oars?

**Notes:**

**Ship graffito №** ST\_020

**Panel №** 3

**Ship graffito № (in Ovcharov's catalog):** 34

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito is quite tiny and not informative, even though the contour lines are incised deep and clear

**Ship type:** cannot be categorised with certainty but it reminds more of a boat

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_021

**Panel №** 3

**Ship graffito № (in Ovcharov's catalog):** 34

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** N/A

**Masts:** 2: 1 mainmast, shorter one – mizzen/ foremast?

**Yards:** no

**Sails:** N/A

**Steering system:** no

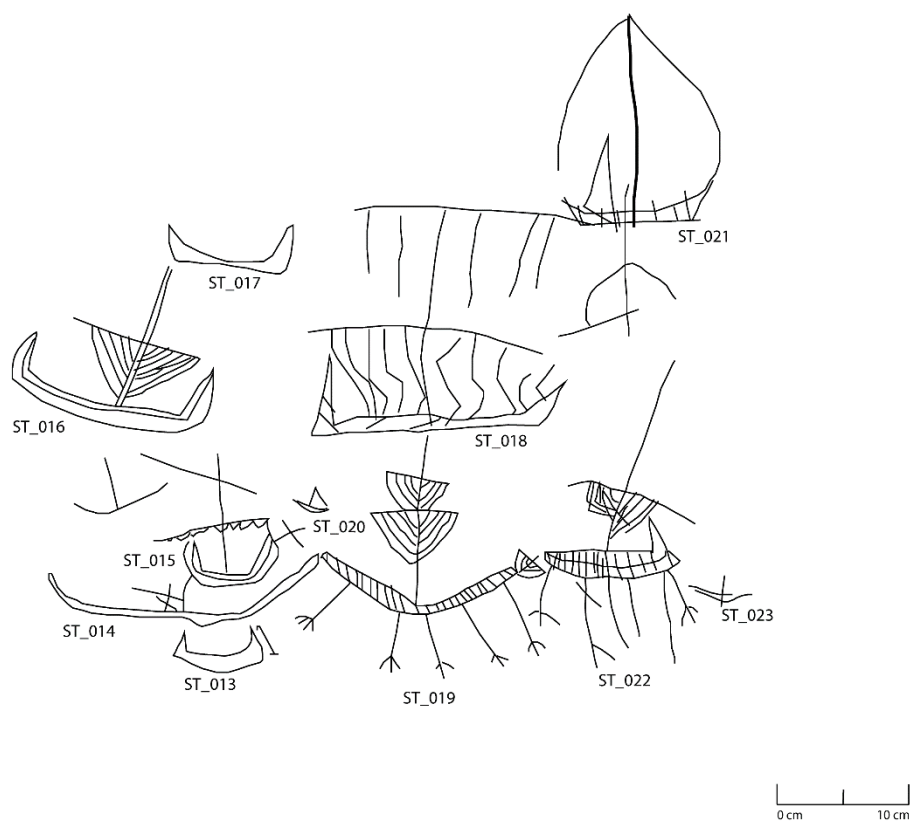
**Flags:** no

**Other elements:**

**Notes:**



**Ship graffito № ST\_022****Panel № 3****Ship graffito № (in Ovcharov's catalog): 34****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative**Ship type:** ship**Rigging type:** square**Masts:** 1 mainmast**Yards:** 1**Sails:** 1 unfurled square**Steering system:** no**Flags:** no**Other elements:** 6 anchors/ oars?**Notes:****Ship graffito № ST\_023****Panel № 3****Ship graffito № (in Ovcharov's catalog): 34****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised shallow and today the graffito is barely visible. It consists only from a hull and a mast, hence it is not informative enough**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** 1**Yards:** no**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:**



**A.2.4 Panel 4 Ship graffiti ST\_024 – ST\_031****Ship graffito № ST\_024****Panel № 4****Ship graffito № (in Ovcharov's catalog): 33****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep and clear. The upper portion of the main topsail is not preserved today due to plaster erosion. The graffito is depicted in schematic manner, and it is informative.**Ship type:** ship with the bow to east**Rigging type:** square**Masts:** 1 mainmast, 1 bowsprit**Yards:** 1, 1 sprit yard**Sails:** 2 square main course and a topsail (preserved only half), 1 unfurled sprit sail**Steering system:** no**Flags:** 1 on the left top corner of the main course sail**Other elements:****Notes:****Ship graffito № ST\_025****Panel № 4****Ship graffito № (in Ovcharov's catalog): 33****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep but randomly and the graffito appearance is unclear, hence not informative**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** cannot be categorised**Yards:** cannot be categorised**Sails:** cannot be categorised**Steering system:** not visible**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_026****Panel № 4****Ship graffito № (in Ovcharov's catalog): 33**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however some of the lines randomly. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to west

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 3

**Sails:** 3 unfurled square main sail, topsail and topgallant, 1 unfurled sprit sail

**Steering system:** no

**Flags:** 1 rectangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № ST\_027**

**Panel № 4**

**Ship graffito № (in Ovcharov's catalog): 33**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however some of the lines randomly. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled square mainsail

**Steering system:** no

**Flags:** 1 rectangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № ST\_028**

**Panel № 4**

**Ship graffito № (in Ovcharov's catalog): 33**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear, but it seems that the graffito is incomplete. It is depicted in simple manner, and it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_029**

**Panel № 4**

**Ship graffito № (in Ovcharov's catalog): 33**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 1

**Sails:** 1 square main sail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_030**

**Panel № 4**

**Ship graffito № (in Ovcharov's catalog): 33**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep but randomly, resulted in a not logical picture. None of the elements of the graffito are distinctive and informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** cannot be categorised

**Sails:** cannot be categorised

## Appendix A

**Steering system:** cannot be categorised

**Flags:** not distinctive

**Other elements:**

**Notes:**

**Ship graffito №** ST\_031

**Panel №** 4

**Ship graffito № (in Ovcharov's catalog):** 33

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner

**Ship type:** cannot be categorised with certainty whether it represents a ship or a boat

**Rigging type:** N/A

**Masts:** 1

**Yards:** 1

**Sails:** 1 furled square main sail?

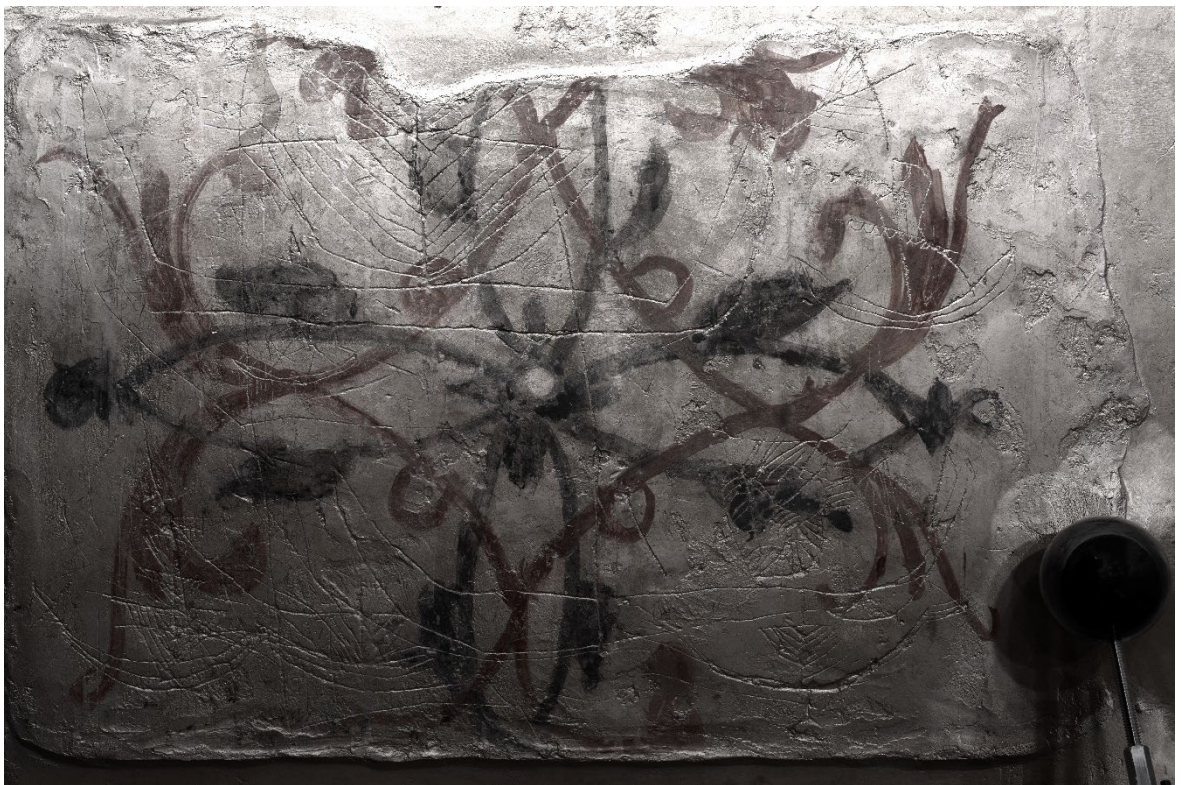
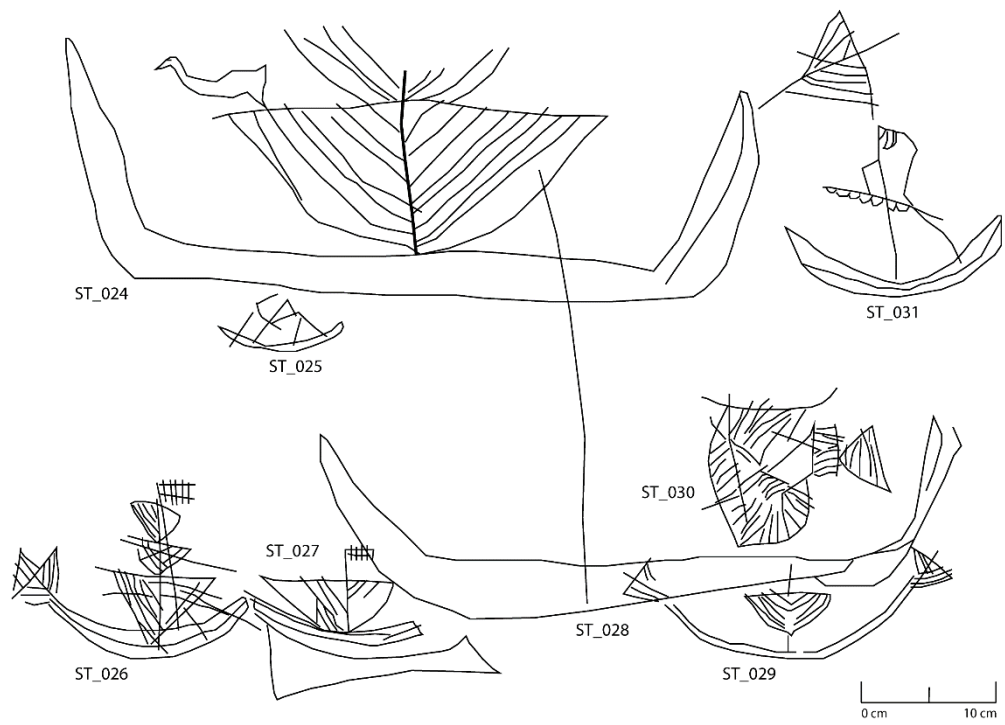
**Steering system:** no

**Flags:** not distinctive

**Other elements:**

**Notes:**





**A.2.5 Panel 5 Ship graffiti ST\_032 – ST\_041**

**Ship graffito № ST\_032**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 3

**Sails:** 2 unfurled square main course and a topsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_033**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised shallow and it barely visible today. The graffito represents only a hull and it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_034**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**



**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative, even though some of the lines are incised randomly

**Ship type:** ship with the bow to east

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 3

**Sails:** 3 unfurled square main sail, topsail and topgallant, 1 unfurled sprit sail

**Steering system:** no

**Flags:** 1 rectangular pointing to west

**Other elements:** above the left end (stern) of the graffito, a bird is depicted; vertical lines below the keel might represent anchors or oars, however these are carved randomly and their number cannot be extracted

**Notes:**

**Ship graffito № ST\_035**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep but randomly, hence the most elements of the graffito are not distinctive and informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** cannot be categorised

**Sails:** cannot be categorised

**Steering system:** not distinctive

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_036**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are barely visible by a naked eye. Thanks to the application of the RTI technique it is possible to trace the ship graffito. It is depicted in schematic manner and it is informative

**Ship type:** cannot be categorised with certainty whether it represents a ship or a boat

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** 1 unfurled sail (square?)

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_037**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in simple manner, and it is not informative

**Ship type:** cannot be categorized whether it represents a boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** no

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_038**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to east

**Rigging type:** square (2 lines represent the forestays and backstay)

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1

**Sails:** 1 unfurled square mainsail

**Steering system:** stern rudder (straight)

**Flags:** 1 pointing to west

**Other elements:** 2 anchors

**Notes:**

**Ship graffito № ST\_039**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito consists only of couple of lines which are not informative, e.g. the hull is represented by one line

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** cannot be categorised

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_040**

**Panel № 5**

**Ship graffito № (in Ovcharov's catalog): 32**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is depicted in simple manner and it is not informative

**Ship type:** cannot be categorised whether it represents a ship or a boat

**Rigging type:** 4 lines represent the forestay and backstay, but it cannot be categorised with certain

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** one line seems to represent a straight stern rudder

## Appendix A

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_041

**Panel №** 5

**Ship graffito № (in Ovcharov's catalog):** 32

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 2

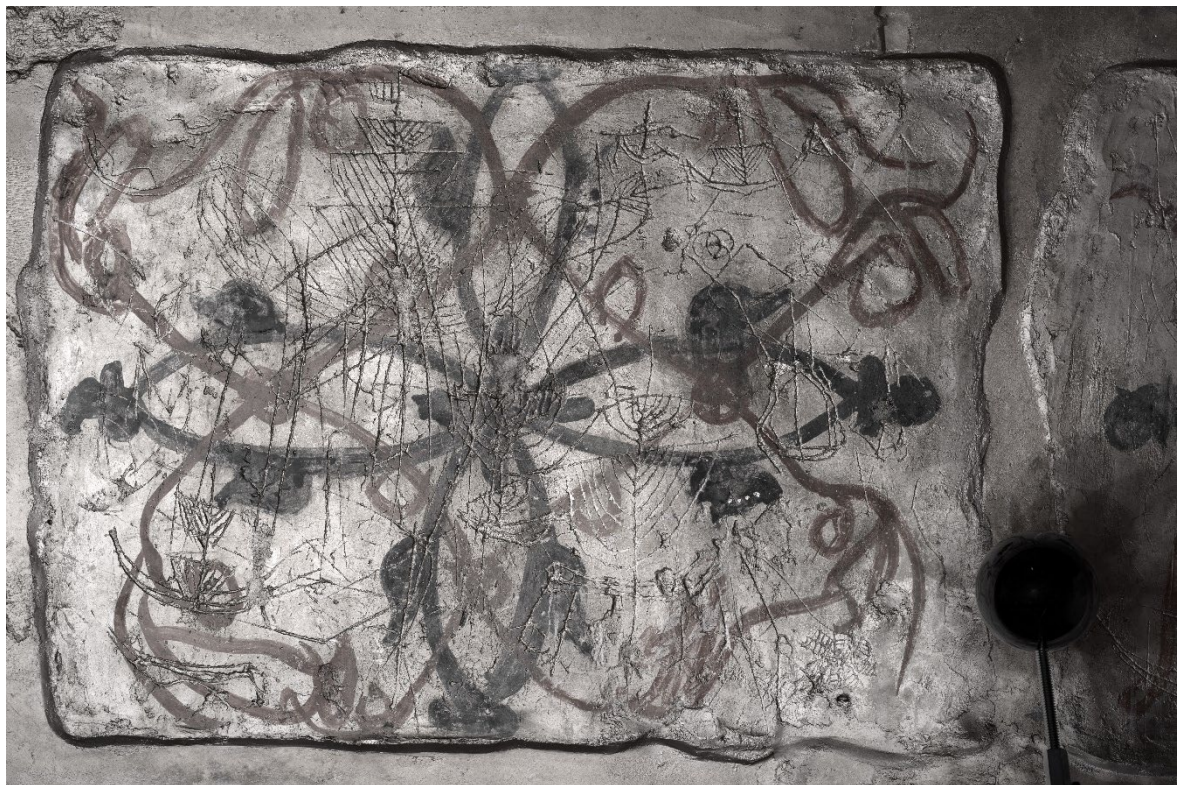
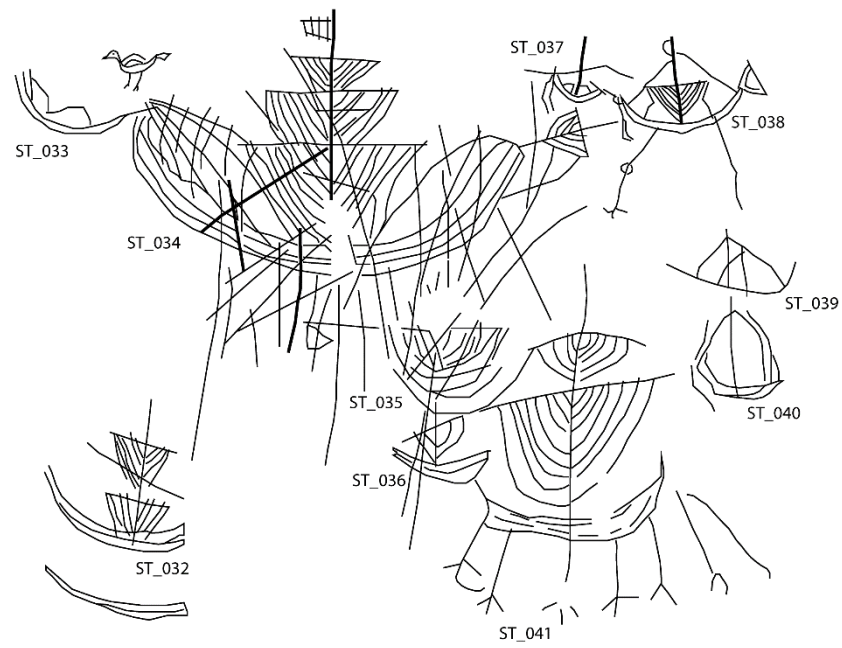
**Sails:** 2 unfurled square main sail and a topsail

**Steering system:** not visible

**Flags:** no

**Other elements:** 7 anchors/ oars?

**Notes:**



**A.2.6 Panel 6 Ship graffiti ST\_042 – ST\_050**

**Ship graffito № ST\_042**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner, and it is informative

**Ship type:** ship

**Rigging type:** 4 lines represent the standing rigging, however, because of the lack of other rigging elements, it cannot be deduced what type it resembles

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:** 2 anchors/ oars?

**Notes:**

**Ship graffito № ST\_043**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner, however, there are elements from the hull which are randomly carved, and cannot be categorized

**Ship type:** ship

**Rigging type:** fore-and-aft/ lateen

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** 1 unfurled lateen sail

**Steering system:** not distinctive

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_044**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito is tiny and barely visible. It is depicted in simple manner and it is not informative.

**Ship type:** cannot be categorised

**Rigging type:** 3 lines represents elements of the standing rigging, however, it cannot be suggested what type it is

**Masts:** 1

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_045**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in schematic manner and it is informative to some extend

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** furled, the type is unknown

**Steering system:** not distinctive

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_046**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to west

**Rigging type:** square (2 lines represent shrouds or braces)

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 3

**Sails:** square main course, main topsail, topgallant

**Steering system:** no

**Flags:** 1 triangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № ST\_047**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner.

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** 8 lines represent the forestay and backstay, and there are no other elements of the rigging

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_048**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, but there are some randomly carved lines that form not coherent elements

**Ship type:** ship with the bow to east (due to the highly pronounced stern)

**Rigging type:** square



**Masts:** 1 mainmast

**Yards:** 3

**Sails:** 2 unfurled square sails

**Steering system:** not distinctive

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_049**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to west

**Rigging type:** square (5 lines represent the fore and backstay)

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1, 1 sprit yard

**Sails:** furled square?

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_050**

**Panel № 6**

**Ship graffito № (in Ovcharov's catalog): 31**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is schematic. It is tilted at one side and the hull is vertically positioned. It is not quite informative

**Ship type:** cannot be categorised with certainty

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** furled square?

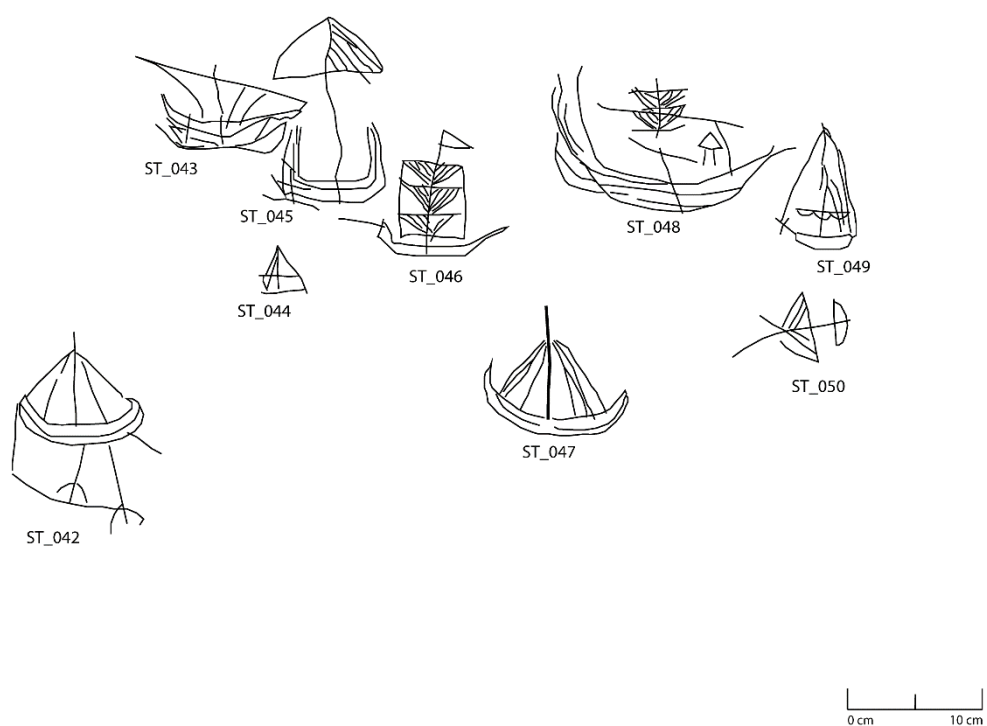
**Steering system:** no

## Appendix A

**Flags:** no

**Other elements:**

**Notes:**





#### A.2.7 Panel 7 Ship graffiti ST\_051 – ST\_054

**Ship graffiti № ST\_051**

**Panel № 7**

**Ship graffiti № (in Ovcharov's catalog): 30**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the contour lines are incised deep. The graffiti is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to west

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1, 1 sprit yard

**Sails:** unfurled square main course sail, 1 unfurled sprit sail on the bow

**Steering system:** no

**Flags:** no

**Other elements:** 5 lines represent anchors/ oars?

**Notes:** there are letters in Greek above and below the graffiti. These are not deciphered.

**Ship graffiti № ST\_052**

**Panel № 7**

**Ship graffito № (in Ovcharov's catalog): 30**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito seems incomplete and not informative. It is not coherent and cannot be categorized as neither a boat, nor a ship.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** 2/3 that reminds of lateen sails but due to their simplistic style, it cannot be deduced with certainty

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_053**

**Panel № 7**

**Ship graffito № (in Ovcharov's catalog): 30**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 unfurled square mainsail and topsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** there are letters in Greek above and below the graffito. These are not deciphered.

**Ship graffito № ST\_054**

**Panel № 7**

**Ship graffito № (in Ovcharov's catalog): 30**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 2: mainmast, either mizzen or foremast?

**Yards:** 2

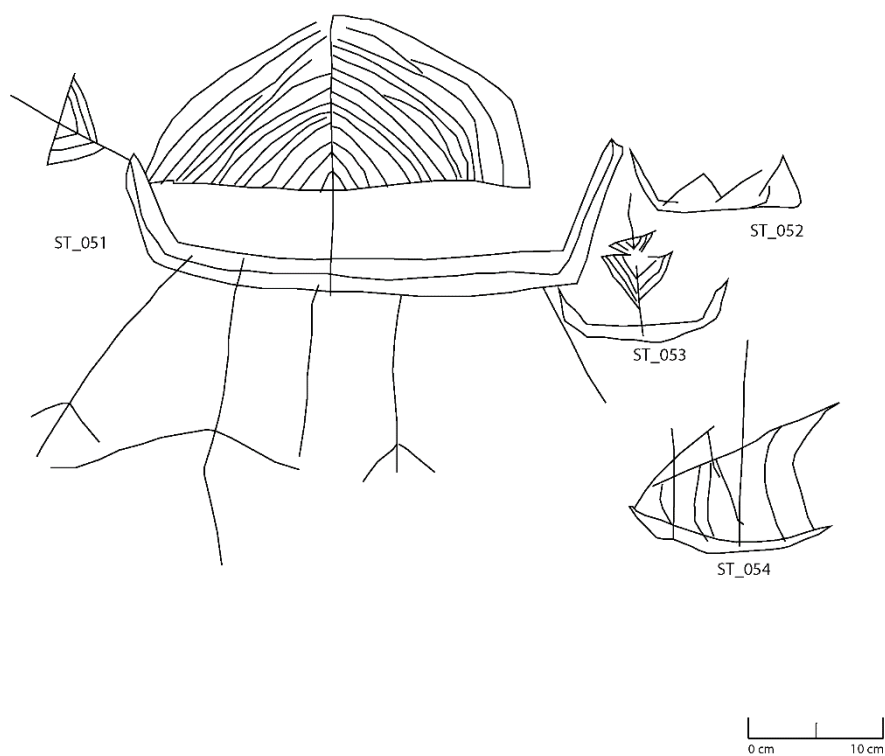
**Sails:** 2 unfurled square main course and gaff or lateen mizzen?

**Steering system:** no

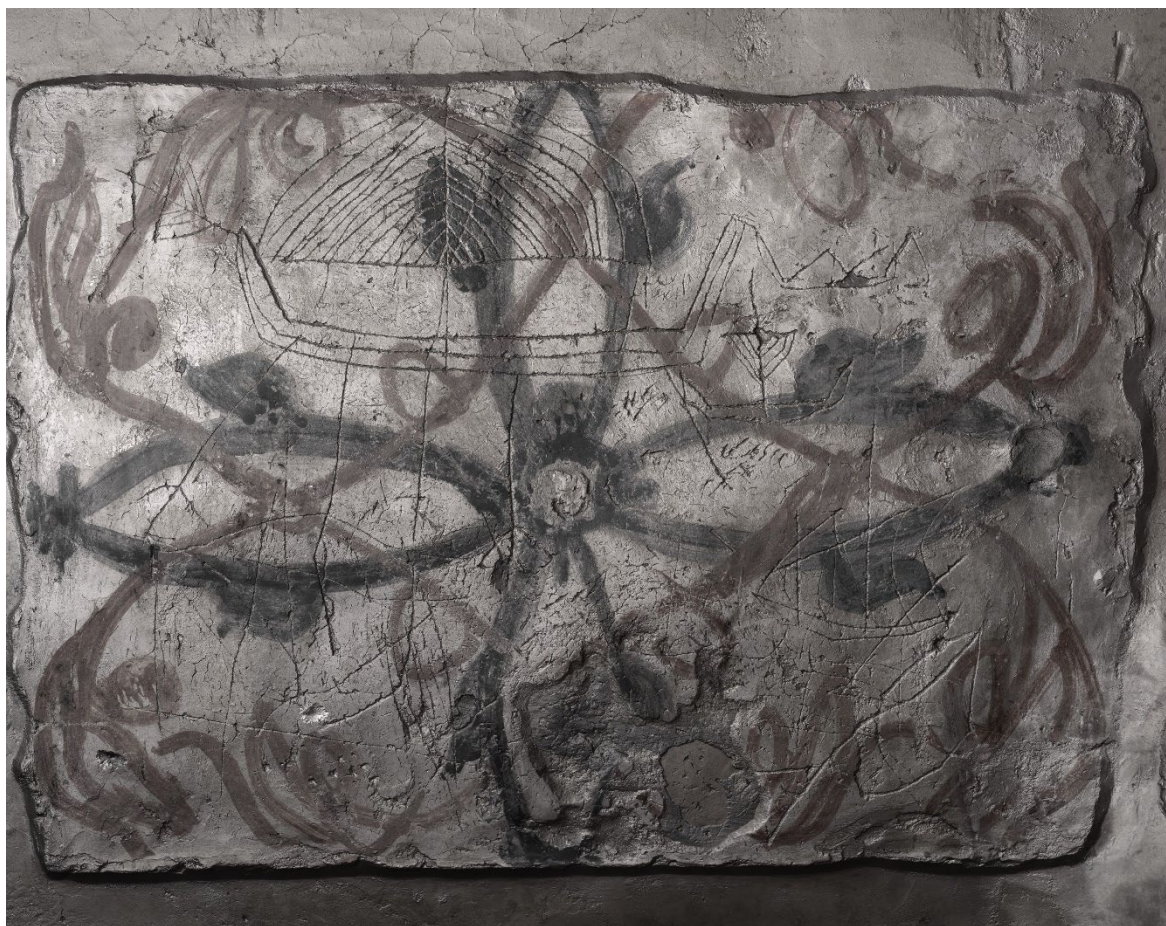
**Flags:** no

**Other elements:**

**Notes:**







**A.2.8 Panel 8 Ship graffiti ST\_055 – ST\_058**

**Ship graffito № ST\_055**

**Panel № 8**

**Ship graffito № (in Ovcharov's catalog): 29**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled square mainsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** on the right of the graffito there are letters in Greek

**Ship graffito № ST\_056****Panel № 8****Ship graffito № (in Ovcharov's catalog): 29****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines do not form a coherent appearance of a ship/ a boat. It is not informative**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** 1**Yards:** 1**Sails:** not distinctive/ clear**Steering system:** not visible**Flags:** not visible**Other elements:****Notes:****Ship graffito № ST\_057****Panel № 8****Ship graffito № (in Ovcharov's catalog): 29****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative**Ship type:** ship**Rigging type:** square**Masts:** 1 mainmast**Yards:** 1**Sails:** 1 half-furled square mainsail**Steering system:** no**Flags:** 1 rectangular pointing to east**Other elements:****Notes:** there are Greek letters on the left end of the graffito. These are not deciphered.**Ship graffito № ST\_058****Panel № 8****Ship graffito № (in Ovcharov's catalog): 29**

## Appendix A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** cannot be categorised with certainty whether it is a boat or a ship

**Rigging type:** square (?)

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1

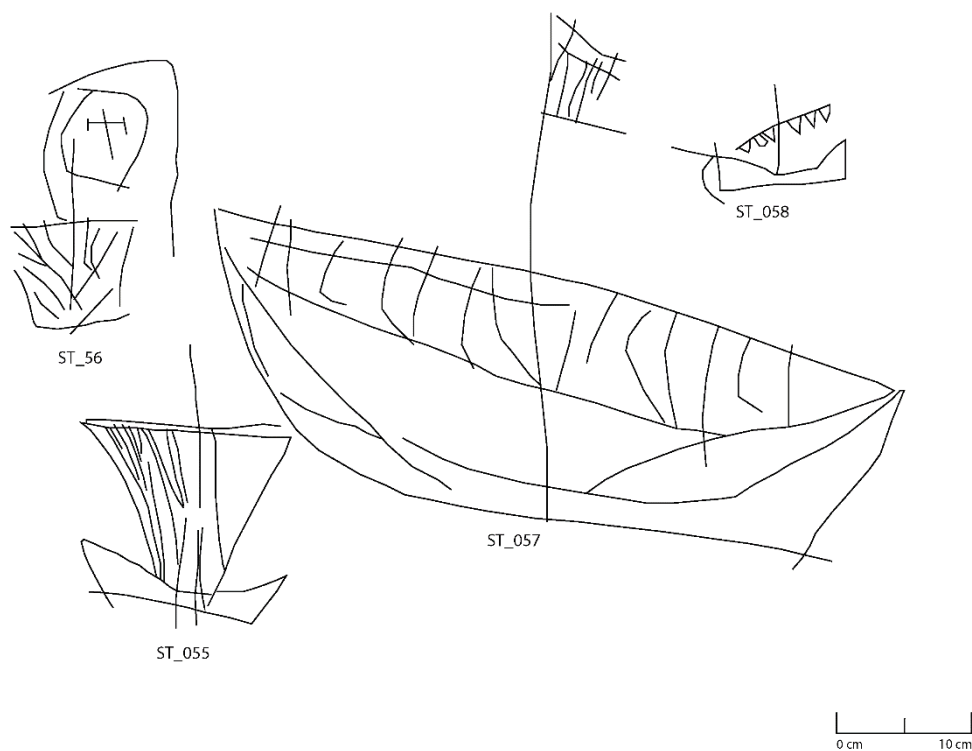
**Sails:** 1 furled square mainsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**







### A.2.9 Panel 9 Ship graffiti ST\_059 – ST\_065

**Ship graffito № ST\_059**

**Panel № 9**

**Ship graffito № (in Ovcharov's catalog): 28**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to west

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 4, 1 sprit yard

**Sails:** unfurled square main course, topsail, topgallant, main royal, 1 unfurled sprit sail

**Steering system:** stern rudder (curved)

**Flags:** 1 rectangular pointing to west

**Other elements:** 3 anchors, the ship is towing 2 boats, there are random vertical lines below the hull with uncertain purpose. On the right corner of the topsail - a human figure, probably of a saint?

**Notes:**

**Ship graffito № ST\_060**

**Panel № 9**

**Ship graffito № (in Ovcharov's catalog): 28**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is not informative as it only consists of a hull, a mast, a yard.

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_61**

**Panel № 9**

**Ship graffito № (in Ovcharov's catalog): 28**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines of the hull are incised deep, however, the ones which represent elements of the rigging are not well visible today, probably because these were incised shallow. The graffito is depicted in simple manner and it is not informative

**Ship type:** cannot be categorised whether it is a boat or a ship

**Rigging type:**

**Masts:**

**Yards:**

**Sails:**

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_062**

**Panel № 9**

**Ship graffito № (in Ovcharov's catalog): 28**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised shallow, and today the graffito is not well visible, taking into account its small size as well. It is depicted in simple manner, and it is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_063**

**Panel № 9**

**Ship graffito № (in Ovcharov's catalog): 28**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are deep, however these present only a hull, a mast, a yard. It is simple and does not provide information

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_064**

**Panel № 9**

**Ship graffito № (in Ovcharov's catalog): 28**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The hull is carved in quite schematic and unrealistic style.

**Ship type:** ship with the bow to west (the presence of bowsprit)

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1, 1 sprit yard

**Sails:** 1 unfurled square mainsail

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_065

**Panel №** 9

**Ship graffito № (in Ovcharov's catalog):** 28

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are deep, however these present only a hull, a mast, a yard. It is simple and does not provide information

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** cannot be categorised. It could be suggested fore-and-aft rig due to the presence of long raked yard (maybe lateen)

**Masts:** 1 mainmast

**Yards:** 1

**Sails:** no

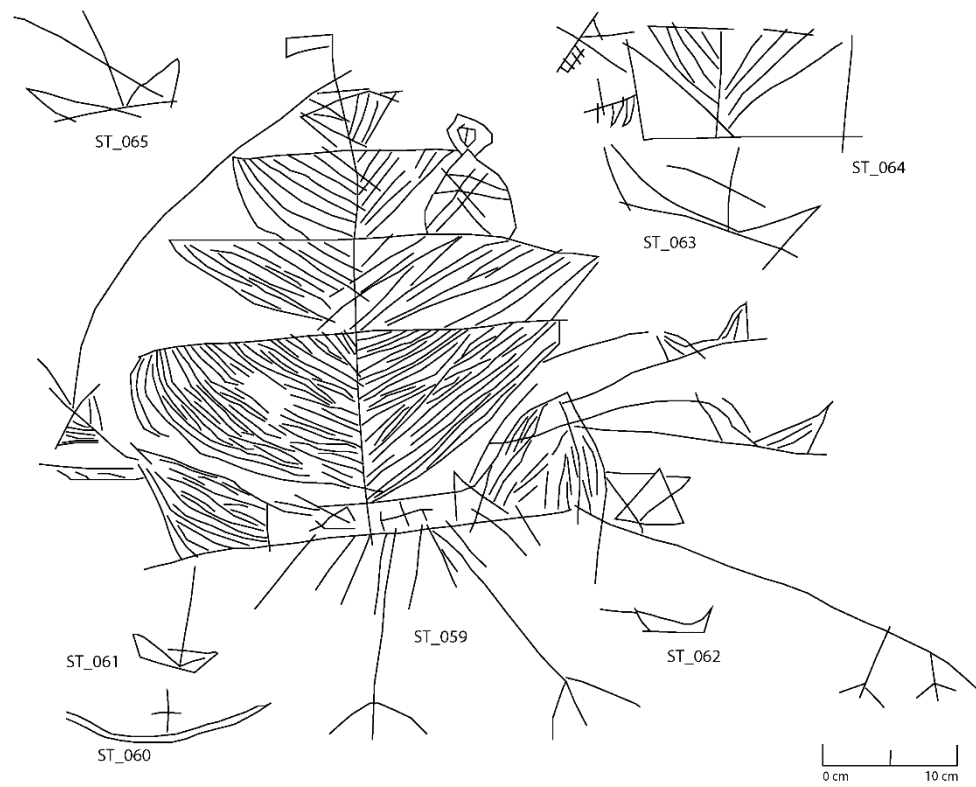
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





**A.2.10 Panel 10 Ship graffiti ST\_066 – ST\_071**

**Ship graffiti № ST\_066**

**Panel № 10**

**Ship graffiti № (in Ovcharov's catalog): 27 E**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the graffiti is unclear because there are random lines carved around and on the graffiti itself, and the contour lines that form ST\_066 look not coherent, therefore it resulted in not informative picture

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 2

**Yards:** 1

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:** 2 lines below the hull – not certain what represent

**Notes:**

**Ship graffiti № ST\_067**

**Panel № 10**

**Ship graffiti № (in Ovcharov's catalog): 27 A**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the contour lines are incised deep. The graffiti is depicted in schematic manner and it is informative. However, there are random lines with unclear purpose and some of the elements cannot be categorised

**Ship type:** ship

**Rigging type:** square

**Masts:** 3: mainmast, foremast and mizzen, 1 bowsprit

**Yards:** 4, 1 sprit yard

**Sails:** 2 square main course and topsail, 2 lateen

**Steering system:** not distinctive

**Flags:** not distinctive

**Other elements:**

**Notes:**

**Ship graffiti № ST\_068**

**Panel № 10****Ship graffito № (in Ovcharov's catalog): 27 Д**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, there are random lines crossing the graffito, resulted in the complete visibility of important elements

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** cannot be categorised due to the crossing by other random lines

**Masts:** 1, however it is uncertain

**Yards:** not certain

**Sails:** not visible

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_069****Panel № 10****Ship graffito № (in Ovcharov's catalog): 27 Г**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship

**Rigging type:** cannot be recognised

**Masts:** 2: mainmast and raked abaft mizzen?

**Yards:** 2

**Sails:** 2 unfurled lateen sails

**Steering system:** not distinctive

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_070****Panel № 10****Ship graffito № (in Ovcharov's catalog): 27 В**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in simple manner and it is not quite informative. The hull consists only of one line.

**Ship type:** cannot be categorised with certainty

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 unfurled square mainsail and topgallant

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_071

**Panel №** 10

**Ship graffito № (in Ovcharov's catalog):** 27 Б

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in simple manner and it is not quite informative

**Ship type:** ship

**Rigging type:** square

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2, 1 sprit yard

**Sails:** 2 unfurled square main course and main topsail, foresail (lateen?), mizzen sail (lateen?)

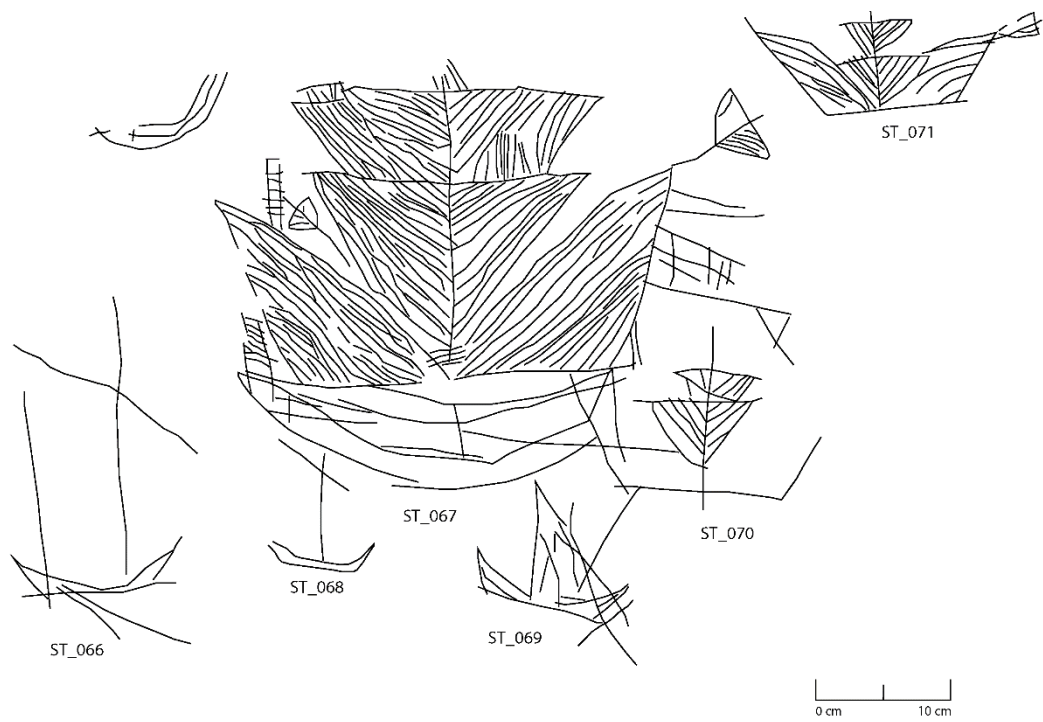
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** similar to ST\_067





**A.2.11 Panel 11 Ship graffiti ST\_072 – ST\_077**

**Ship graffito № ST\_072**

**Panel № 11**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is depicted in simple manner, and it looks that it is incomplete. The elements are not quite informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 2

**Yards:** cannot be categorised

**Sails:** furled unknown type

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_073**

**Panel № 11**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is depicted in simple manner. The elements are not quite informative. The right section of the hull is almost eroded and barely visible today.

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 3

**Yards:** 3

**Sails:** unfurled lateen or sprit sails

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_074**

**Panel № 11**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, some details of the graffito are barely visible today. Due to this, the graffito appeared to be less informative

**Ship type:** ship

**Rigging type:** cannot be categorised with certainty

**Masts:** unclear

**Yards:** unclear

**Sails:** unclear

**Steering system:** no

**Flags:** 2 lines represent flags which pointing to west

**Other elements:**

**Notes:**

**Ship graffito № ST\_075**

**Panel № 11**

**Ship graffito № (in Ovcharov's catalog): 24**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is depicted in simple manner. The elements are not quite informative.

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** not certain

**Yards:** not certain

**Sails:** not certain

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_076**

**Panel № 11**

**Ship graffito № (in Ovcharov's catalog): 23**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito represents two vessels in tow. It seems that these are in connection with ST\_075. Their contour lines are incised deep.

## Appendix A

**Ship type:** cannot be categorised with certainty whether these represent boats or ship, or a ship and a boat?

**Rigging type:** the two vessels have 2 lines representing the forestay and backstay but cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_077

**Panel №** 11

**Ship graffito № (in Ovcharov's catalog):** 25-26

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the graffito represents two vessels in tow. Their contour lines are incised deep and the graffito is depicted in schematic manner.

**Ship type:** ships

**Rigging type:** cannot be categorised

**Masts:** the smaller graffito – 2; the larger -3

**Yards:** the smaller graffito – 3; the larger – 2?

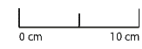
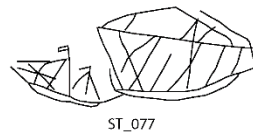
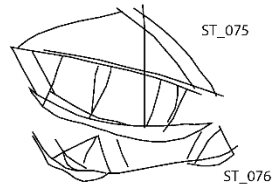
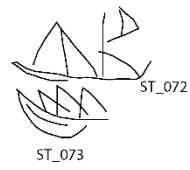
**Sails:** the smaller graffito – 2 unfurled sails; the larger – 2 which type cannot be categorised

**Steering system:** no

**Flags:** the smaller graffito – 2 rectangular pointing to west

**Other elements:**

**Notes:**



**A.2.12 Panel 12 Ship graffiti ST\_078 – ST\_080**

**Ship graffito № ST\_078**

**Panel № 12**

**Ship graffito № (in Ovcharov's catalog): 19**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner. Even though, it is not quite informative

**Ship type:** cannot be categorised with certainty whether it represents a boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast

**Yards:** not distinctive

**Sails:** not certain

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_079**

**Panel № 12**

**Ship graffito № (in Ovcharov's catalog): 20**

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in simple manner, and it is not quite informative

**Ship type:** cannot be categorised with certainty whether it represents a boat or a ship

**Rigging type:** not certain (only 2 lines represent the forestay and backstay)

**Masts:** 1 mainmast

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_080**

**Panel № 12**

**Ship graffito № (in Ovcharov's catalog): 21**



**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner, and it is not quite informative

**Ship type:** ship with the bow to east

**Rigging type:** not certain (6 lines represent the forestay and backstay)

**Masts:** 1 mainmast

**Yards:** 1

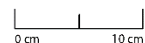
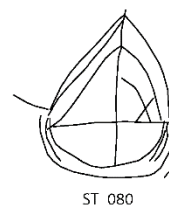
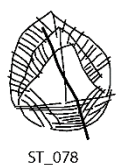
**Sails:** no

**Steering system:** stern rudder (curved)

**Flags:** no

**Other elements:**

**Notes:**





#### A.2.13 Panel 13 Ship graffiti ST\_081 – ST\_083

##### Ship graffiti № ST\_081

##### Panel № 13

##### Ship graffiti № (in Ovcharov's catalog): 20

**Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east

**Ship graffiti appearance:** the contour lines are incised deep. The graffiti is depicted in simple manner and it is not quite informative

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

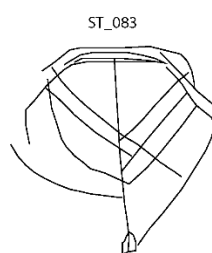
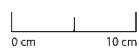
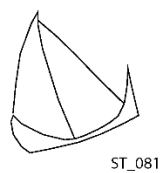
**Other elements:**

**Notes:**



**Ship graffito № ST\_082****Panel № 13****Ship graffito № (in Ovcharov's catalog): 22****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the contour lines are incised deep, however the upper section of the graffito is missing due to plaster erosion. It is not quite informative today**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** only the half of the mainmast is preserved today**Yards:** no**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_083****Panel № 13****Ship graffito № (in Ovcharov's catalog): 22****Location:** Nessebar, Church St. Stephen, south wall in the nave of the church looking from west to east**Ship graffito appearance:** the graffito is depicted upside down with the keel up. The contour lines are incised deep, however, the graffito is not quite informative**Ship type:** ship**Rigging type:** not certain (8 lines represent the forestay and backstay)**Masts:** 1 mainmast**Yards:** not distinctive**Sails:** no**Steering system:** not visible**Flags:** 1**Other elements:****Notes:**

## Appendix A



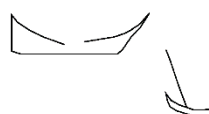
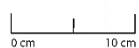
**A.2.14 Panel 14 Ship graffiti ST\_084 – ST\_085****Ship graffito № ST\_084****Panel № 14****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west wall of the south entrance in the nave of the church**Ship graffito appearance:** the graffito is barely visible by a naked eye. The applied RTI technique revealed deeply incised contour lines. The graffito is depicted in simple manner and it is not quite informative**Ship type:** cannot be categorised with certainty whether it introduces a boat or a ship**Rigging type:** N/A**Masts:** 1 mainmast, 1 foremast or mizzen highly raked**Yards:** 1**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_085****Panel № 14****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west wall of the south entrance in the nave of the church**Ship graffito appearance:** the graffito is barely visible and unclear due to plaster erosion. It was possible to be registered due to the application of RTI technique**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** uncertain**Yards:** uncertain**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:**



ST\_084



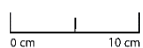
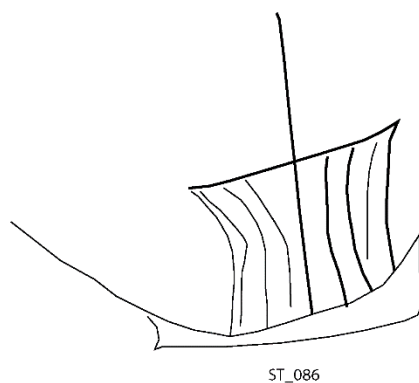
ST\_085



**A.2.15 Panel 16 Ship graffito ST\_086**

**Ship graffito № ST\_086**



**Panel № 16****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church**Ship graffito appearance:** the contour lines are incised quite deep. The graffito is depicted in schematic manner and it is informative**Ship type:** ship with the bow to west**Rigging type:** square**Masts:** 1 mainmast, 1 bowsprit**Yards:** 1**Sails:** 1 unfurled square main course sail**Steering system:** no**Flags:** no**Other elements:****Notes:**



**A.2.16 Panel 17 Ship graffiti ST\_087 – ST\_088**

**Ship graffito № ST\_087**

**Panel № 17**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church – north section

**Ship graffito appearance:** the contour lines are incised shallow, and today the graffito's elements are barely visible. It is not informative

**Ship type:** ship with the bow to east

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast forward, 1 bowsprit

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_088**

**Panel № 17**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church – north section

**Ship graffito appearance:** the contour lines are incised shallow, and today the graffito's elements are barely visible. Only the hull is visible. It is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

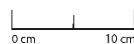
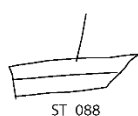
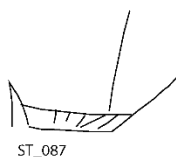
**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**









**A.2.17 Panel 18 Ship graffiti ST\_089 – ST\_094****Ship graffito № ST\_089****Panel № 18****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church, north section**Ship graffito appearance:** the contour lines are incised quite shallow and are barely visible today. It is turned with the bow downwards. The graffito is depicted in schematic manner, even though it is not quite informative**Ship type:** ship with the bow downwards**Rigging type:** 3 lines between the foremast and the bowsprit (forestays), cannot be categorised**Masts:** 2: 1 mainmast positioned forward, 1 mizzen, 1 bowsprit**Yards:** 2**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_090****Panel № 18****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church, north section**Ship graffito appearance:** the contour lines are incised quite shallow and it is barely visible today. There are elements from the left half of the graffito that are not preserved today**Ship type:** cannot be categorised**Rigging type:** 4 lines represent elements of the standing rigging, however, it could not be categorised**Masts:** 1**Yards:** 3**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_091****Panel № 18****Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church, north section

**Ship graffito appearance:** the contour lines are barely visible today, even though with the application of RTI technique, some are missing due to plaster erosion. The graffito is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** uncertain

**Yards:** uncertain

**Sails:** cannot be categorised with certainty

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_092

**Panel №** 18

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church, north section

**Ship graffito appearance:** the contour lines are barely visible today, however, still there are elements of the graffito visible enough that form coherent and distinctive features

**Ship type:** ship

**Rigging type:** fore-and-aft

**Masts:** 2

**Yards:** 2

**Sails:** 2 unfurled lateen sails

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_093

**Panel №** 18

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church, north section

**Ship graffito appearance:** the contour lines are barely visible today, even though with the application of RTI technique, some are missing due to plaster erosion. The graffito is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** unclear

**Yards:** unclear

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_094**

**Panel № 18**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, central apse in the altar of the church, north section

**Ship graffito appearance:** the contour lines are barely visible today, even though with the application of RTI technique, some are missing due to plaster erosion. The graffito is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** cannot be categorised

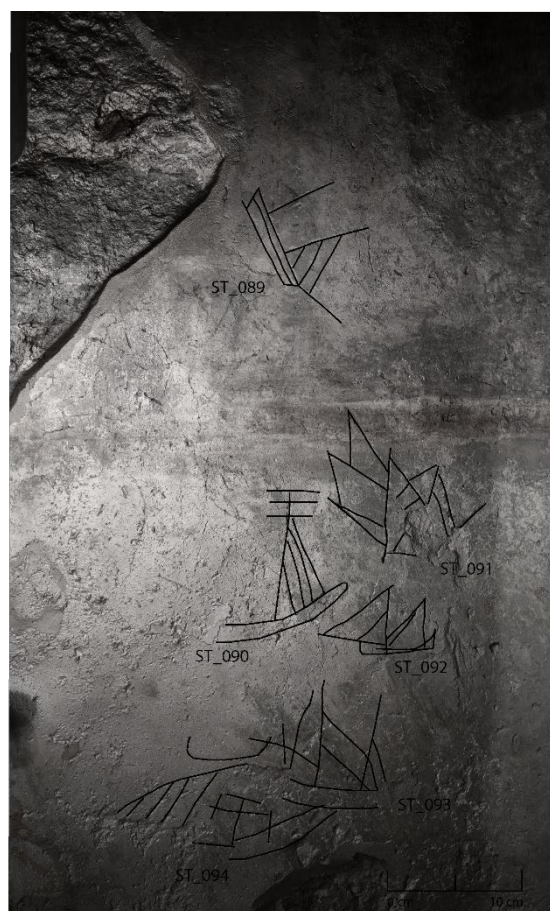
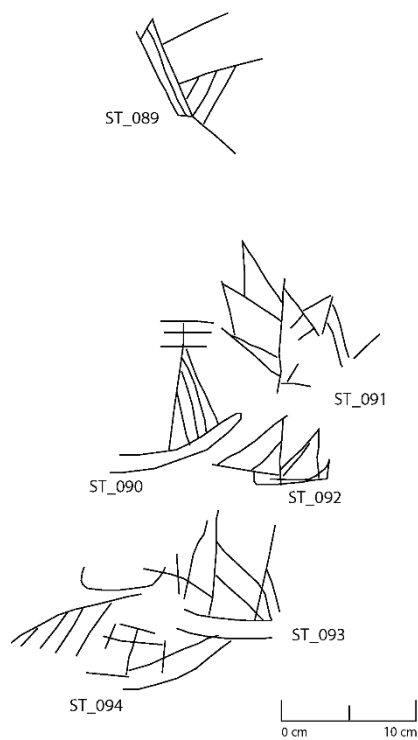
**Sails:** no

**Steering system:** no

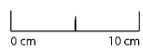
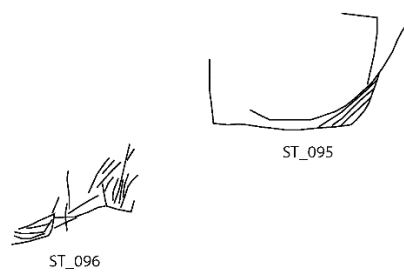
**Flags:** no

**Other elements:**

**Notes:**

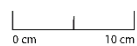
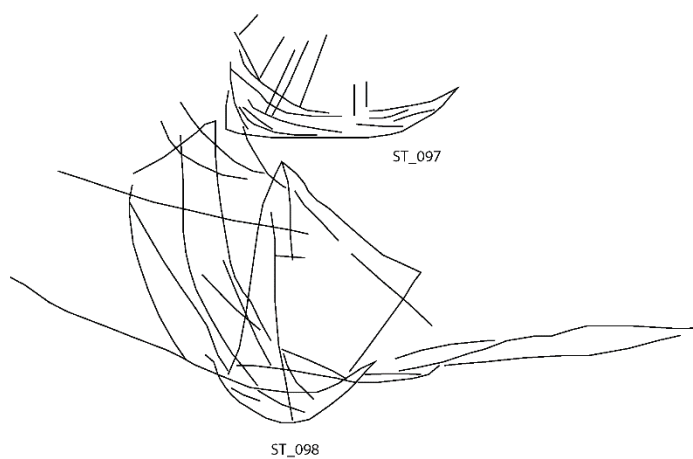


**A.2.18 Panel 19 Ship graffiti ST\_095 – ST\_096****Ship graffito № ST\_095****Panel № 19****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, east wall of the north entrance in the nave of the church**Ship graffito appearance:** the contour lines are incised deep. Some elements are covered with plaster during conservation procedures, others are missing due to plaster erosion. Besides, the graffito is depicted in simple manner, hence it is not informative.**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** uncertain how many masts are**Yards:** no**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_096****Panel № 19****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, east wall of the north entrance in the nave of the church**Ship graffito appearance:** the left section of the graffito is missing due to plaster erosion. On the right, the graffito represents a vessel in tow. It is quite unclear and not informative. The left depiction is yet unclear**Ship type:** two vessels in tow, which cannot be categorised**Rigging type:** cannot be categorised**Masts:** the right graffito – 1 mainmast; the left - unclear**Yards:** no**Sails:** cannot be categorised**Steering system:** no**Flags:** no**Other elements:****Notes:**



**A.2.19 Panel 20 Ship graffiti ST\_097 – 098****Ship graffito № ST\_097****Panel № 20****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west wall of the north entrance in the nave of the church**Ship graffito appearance:** the upper part of the graffito is missing due to plaster erosion, only the hull and some elements (lines) of the standing rigging are preserved today. The contour lines are incised deep, however due to the lack of the half of its features, the graffito is not informative**Ship type:** ship**Rigging type:** cannot be categorised**Masts:** no**Yards:** no**Sails:** no**Steering system:** stern rudder (straight)**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_098****Panel № 20****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west wall of the north entrance in the nave of the church**Ship graffito appearance:** the contour lines seem randomly depicted, and its features are not quite distinctive, hence the graffito is not informative**Ship type:** ship**Rigging type:** cannot be categorised**Masts:** cannot be categorized**Yards:** not distinctive**Sails:** not distinctive**Steering system:** no**Flags:** no**Other elements:****Notes:**





**A.2.20 Panel 20-1 Ship graffito ST\_099****Ship graffito №** ST\_099**Panel №** 20-1**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west wall of the north entrance in the nave of the church**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is depicted in quite simple manner with net-like technique applied to the entire depiction. It is not informative**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** no**Yards:** no**Sails:** not distinctive**Steering system:** no**Flags:** no**Other elements:****Notes:****A.2.21 Panel 21 Ship graffiti ST\_100 – ST\_101****Ship graffito №** ST\_100**Panel №** 21**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised deep and clear enough, however, the graffito is depicted in simple manner and it is not quite informative. The hull consists only from one line

**Ship type:** cannot be categorised

**Rigging type:** only 6 lines of the standing rigging are depicted, therefore it cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:** The vessel is towing boats?

**Ship graffito №** ST\_101

**Panel №** 21

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, north wall in the nave of the church looking from east to west

**Ship graffito appearance:** the contour lines are incised randomly and unclear, therefore, the features of the graffito are not distinctive nor informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** not distinctive

**Yards:** not distinctive

**Sails:** not distinctive

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





#### A.2.22 Panel 22 Ship graffiti ST\_145 – ST\_146

**Ship graffito № ST\_145**

**Panel № 22** narthex

**Ship graffito № (in Ovcharov's catalog):**

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is barely visible because it is covered and surrounded by other graffiti lines and inscriptions, and some of the elements are covered by plaster during conservation procedures. The graffito itself seems incomplete

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 2

**Yards:** no

**Sails:** not visible

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_146**

**Panel №** 22 narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep, however, barely visible today. Some of the elements are erased due to plaster erosion and are unclear

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 2

**Yards:** 2

**Sails:** 2 unfurled sails

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





### A.2.23 Panel 23 Ship graffito ST\_102

Ship graffito № ST\_102

Panel № 23

Ship graffito № (in Ovcharov's catalog): N/A



## Appendix A

**Location:** Nessebar, Church St. Stephen, west wall in the nave of the church looking from north to south

**Ship graffito appearance:** the contour lines are incised shallow, today are barely visible. The graffito is depicted in simple manner and it is not quite informative

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast

**Yards:** 1

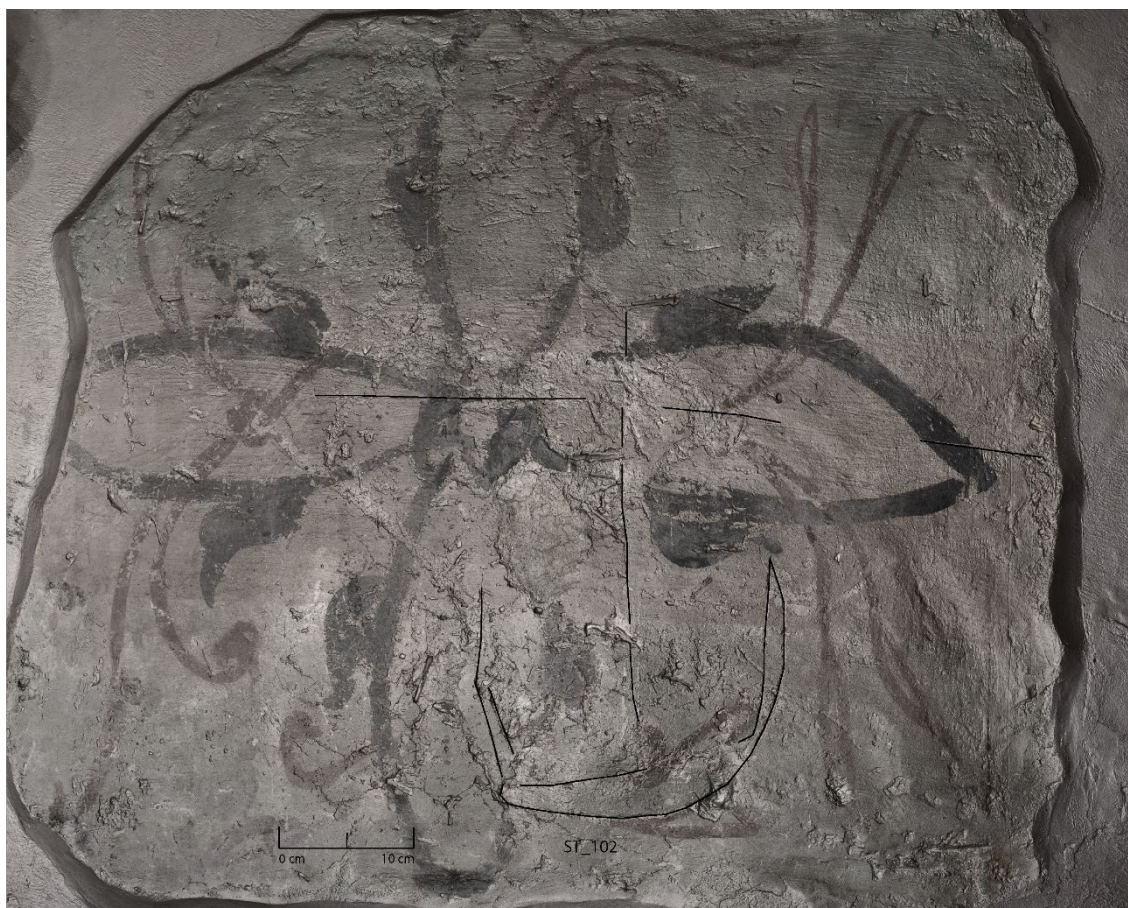
**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



### A.2.24 Panel 24 Ship graffito ST\_104

Ship graffito № ST\_104

Panel № 24

Ship graffito № (in Ovcharov's catalog): N/A



**Location:** Nessebar, Church St. Stephen, north wall of the west entrance in the nave of the church

**Ship graffito appearance:** the contour lines are incised deep, however, the graffito is depicted in simple manner and it seems incomplete. It is not quite informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 2

**Yards:** uncertain

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



#### A.2.25 Panel 25 Ship graffito ST\_105

**Ship graffito № ST\_105**

**Panel № 25**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, south wall of the west entrance in the nave of the church

**Ship graffito appearance:** the graffito consists only of random lines, hence there are no distinctive elements and features

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** not distinctive

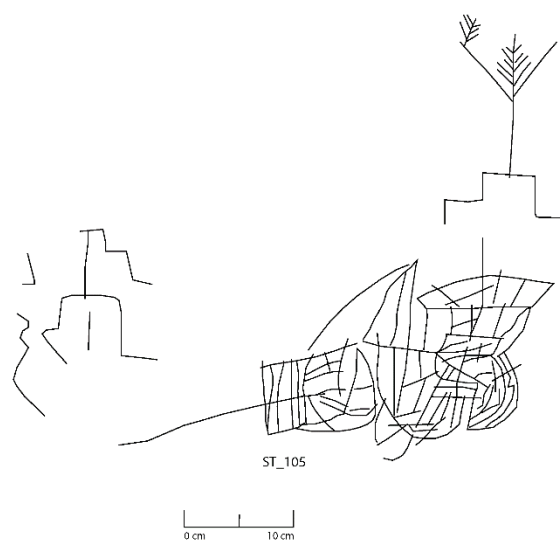
**Sails:** not distinctive

**Steering system:** not distinctive

**Flags:** no

**Other elements:**

**Notes:**



#### **A.2.26 Panel 26 Ship graffito ST\_106**

**Ship graffito № ST\_106**

**Panel № 26**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, north wall of the southern column in the nave of the church

**Ship graffito appearance:** the contour lines are incised shallow with quite thin sharp tool, however today it is preserved very well. The graffito is depicted in schematic manner, and it is informative

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** cannot be categorised

**Yards:** no

**Sails:** no

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:**

**Notes:**



#### **A.2.27 Panel 27 Ship graffiti ST\_107 – ST\_110**

**Ship graffiti № ST\_107**

**Panel № 27**

**Ship graffiti № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the south column in the nave of the church

**Ship graffiti appearance:** the contour lines are incised deep, however, the graffiti is depicted in simple manner, and it is not informative. The graffiti is unclear

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1?

**Yards:** 2?

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_108**

**Panel № 27**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the south column in the nave of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in simple manner and it is not informative enough

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled sail (unknown type)

**Steering system:** no

**Flags:** 1 triangular pointing to west

**Other elements:**

**Notes:**

**Ship graffito № ST\_109**

**Panel № 27**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the south column in the nave of the church

**Ship graffito appearance:** the graffito is partially preserved. Elements of the hull are missing and some of the rigging as well, due to plaster erosion. However, the contour lines are incised deep. The graffito is depicted in simple manner and it is not quite informative

**Ship type:** ship

**Rigging type:** square fore and mainmasts; forestays; fore-and-aft mizzen

**Masts:** 2, 1 bowsprit

**Yards:** 5 square rig yards, 1 lateen

**Sails:** 4 unfurled square sails; 1 unfurled mizzen lateen

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_110**

**Panel № 27**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the south column in the nave of the church

**Ship graffito appearance:** the graffito is not preserved well due to plaster erosion. It is unclear and no information can be extracted

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** unclear

**Yards:** unclear

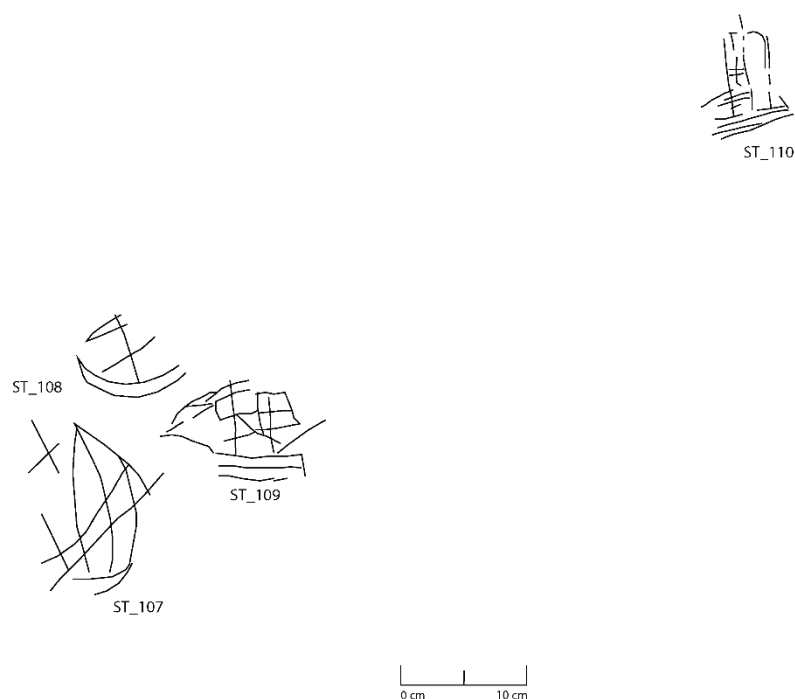
**Sails:** unclear

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



#### A.2.28 Panel 28 Ship graffito ST\_111

**Ship graffito № ST\_111**

**Panel № 28**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, south wall of the south column in the nave of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in simple to schematic manner, and it is informative enough

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

**Sails:** 1 unfurled (not certain about the type)

**Steering system:** no

**Flags:** no

**Other elements:** transom stern

**Notes:**



#### A.2.29 Panel 34 Ship graffiti ST\_117 – ST\_122

**Ship graffiti №** ST\_117

**Panel №** 34

**Ship graffiti № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, north wall of the apse in the north nave of the church

**Ship graffiti appearance:** only the hull of the vessel is preserved today, the upper part is covered by letters in Greek. The graffiti is not informative

**Ship type:** cannot be categorised



**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_118**

**Panel № 34**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, north wall of the apse in the north nave of the church

**Ship graffito appearance:** only the hull of the vessel is preserved today, the upper part is covered by the year 1800. The graffito is not informative

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_121**

**Panel № 34**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, north wall of the apse in the north nave of the church

**Ship graffito appearance:** the graffito is barely visible due to the dark color of the plaster and its small size. The contour lines are incised deep. The graffito is simple and not quite informative.

**Ship type:** ship

**Rigging type:** square

**Masts:** 1 mainmast

**Yards:** 2

**Sails:** 2 unfurled square mainsail and topsail

**Steering system:** no

**Flags:** no



**Other elements:**

**Notes:**

**Ship graffito № ST\_122**

**Panel № 34**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Stephen, north wall of the apse in the north nave of the church

**Ship graffito appearance:** the contour lines are incised deep, however, today the graffito is barely visible because it is carved on a dark plaster. Also, its right end is missing due to plaster erosion

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** 1

**Sails:** no

**Steering system:** oars

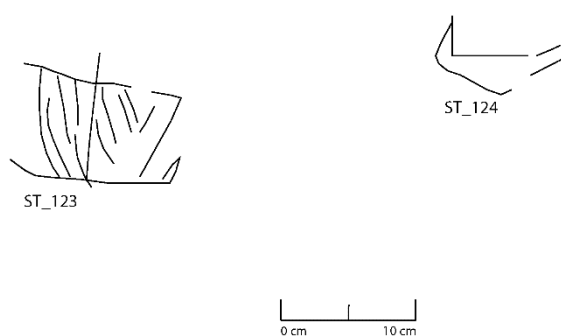
**Flags:** no

**Other elements:**

**Notes:**



**A.2.30 Panel 36 Ship graffiti ST\_123 – ST\_124****Ship graffito №** ST\_123**Panel №** 36**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, south wall of the apse in the north nave of the church**Ship graffito appearance:** the graffito is barely visible today. The hull consists only from 1 line. The graffito is not informative**Ship type:** cannot be categorised whether it represents a boat or a ship**Rigging type:** square?**Masts:** 1**Yards:** 1**Sails:** 1 unfurled mainsail (?)**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito №** ST\_124**Panel №** 36**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, south wall of the apse in the north nave of the church**Ship graffito appearance:** the graffito consists only of an incomplete hull, hence it is not informative**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** no**Yards:** no**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:**



#### A.2.31 Panel 10 Narthex Ship graffiti ST\_125 – ST\_126

**Ship graffito №** ST\_125

**Panel №** 10 narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from north to south

**Ship graffito appearance:** the graffito is barely visible and partially erased, the upper section of it is missing due to plaster erosion and covered by plaster during conservation procedures of the murals

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** unclear

**Yards:** no

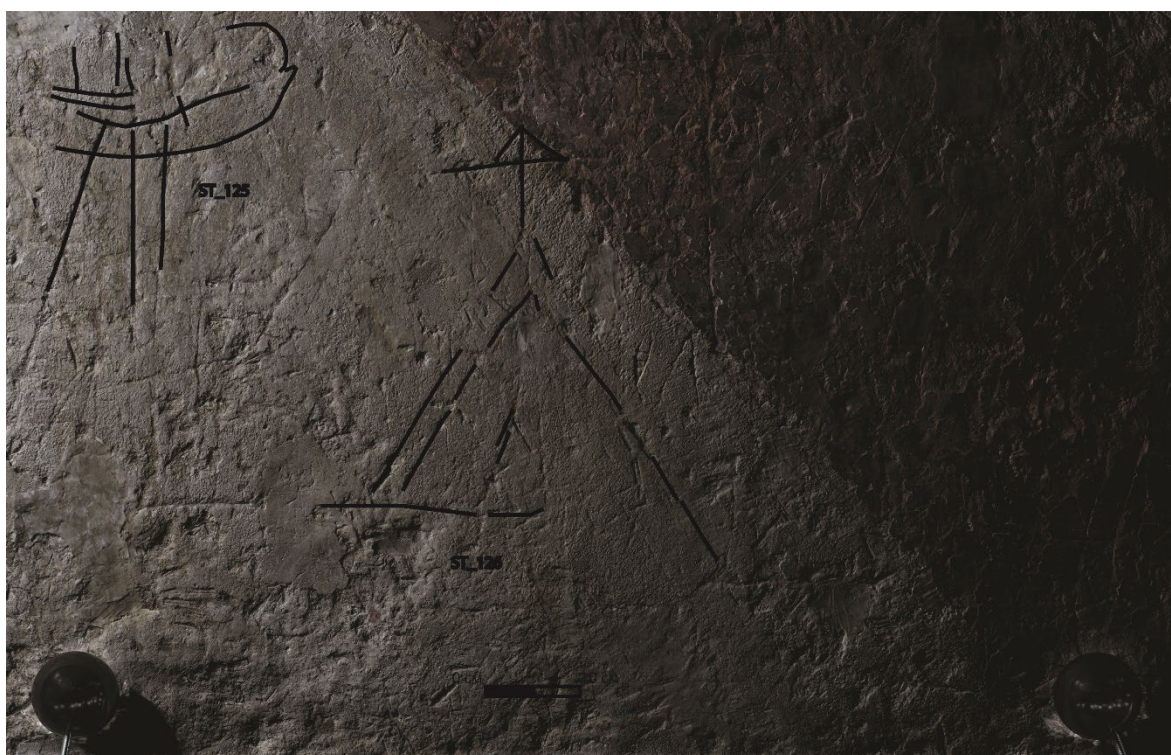
**Sails:** no

**Steering system:** 3 vertical lines below the hull representing oars

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_126****Panel № 10** narthex**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from north to south**Ship graffito appearance:** the contour lines are barely visible. The graffito is not informative**Ship type:** cannot be categorised**Rigging type:** 3 lines representing elements of the standing rigging, however, it cannot be categorised**Masts:** 1 visible**Yards:** 1**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****A.2.32      Panel 15 Narthex      Ship graffiti ST\_127 – ST\_129****Ship graffito № ST\_127****Panel № 15** narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, the east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic to elaborate manner and it is informative. There are some elements of the graffito that are not preserved today, either from plaster erosion or cover with plaster during conservation procedures

**Ship type:** brig (with the bow to west)

**Rigging type:** square

**Masts:** 3: foremast with square topsail and topgallant, mainmast with square topsail, mizzen full rigged, small mizzen at stern; 4 jibs

**Yards:** 7: 2 fore square yards, 1 main square, 1 lateen yard;

**Sails:** 4 jibs, 2 furled topsail and topgallant, 1 main topgallant sail, 1 lateen

**Steering system:** 2 quarter rudders, stern rudder, 5 oars

**Flags:** no

**Other elements:**

**Notes:** Use of both quarter rudder and stern rudder start from the end of 14 c., continues through the 15 c. and 16 c.

**Ship graffito №** ST\_128

**Panel №** 15 narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, the east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep, however, some elements of the graffito are unclearly depicted. It is not quite informative

**Ship type:** ship

**Rigging type:** cannot be categorised

**Masts:** 3

**Yards:** 5

**Sails:** uncertain

**Steering system:** unclear

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_129

**Panel №** 15 narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, the east wall in the narthex of the church, looking from south to north

**Ship graffiti appearance:** almost all contour lines are erased due to plaster erosion, and unfortunately not much information can be extracted

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** unclear

**Yards:** unclear

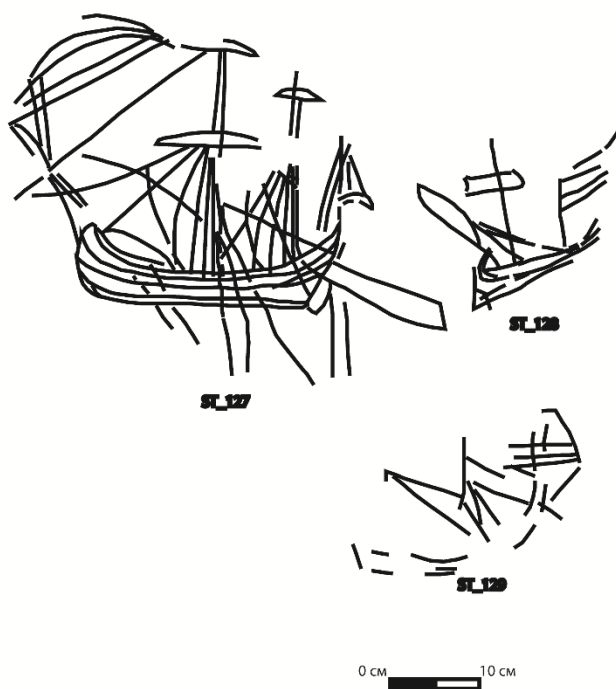
**Sails:** unclear

**Steering system:** unclear

**Flags:** unclear

**Other elements:**

**Notes:**







#### **A.2.33      Panel 16 Narthex      Ship graffiti ST\_130 – ST\_134**

**Ship graffito № ST\_130**

**Panel № 16 narthex**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to east

**Ship graffito appearance:** the contour lines are barely visible, from one hand due to the dark color of the background (plaster), on the other hand because of the random doodling of other countless lines surrounded and crossed the graffito. It is difficult to distinct which lines belong to the graffito

**Ship type:** cannot be categorized

**Rigging type:** cannot be categorized

**Masts:** no

**Yards:** no

**Sails:** 4 lines forming 2 triangular shapes, however, it is difficult to categorise these as sails

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



**Ship graffito № ST\_132****Panel № 16** narthex**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to east**Ship graffito appearance:** the contour lines are barely visible, from one hand due to the dark color of the background (plaster), on the other hand because of the random doodling of other countless lines surrounded and crossed the graffito. It is difficult to distinct which lines belong to the graffito. It consists only of hull, and it is not informative**Ship type:** cannot be categorised**Rigging type:** no rigging**Masts:** no**Yards:** no**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_133****Panel № 16** narthex**Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to east**Ship graffito appearance:** the contour lines are barely visible, from one hand due to the dark color of the background (plaster), on the other hand because of the random doodling of other countless lines surrounded and crossed the graffito. It is difficult to distinct which lines belong to the graffito**Ship type:** cannot be categorised**Rigging type:** cannot be categorised**Masts:** 1**Yards:** unclear**Sails:** no**Steering system:** no**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_134****Panel № 16** narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to east

**Ship graffito appearance:** the contour lines are barely visible, from one hand due to the dark color of the background (plaster), on the other hand because of the random doodling of other countless lines surrounded and crossed the graffito

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** 1

**Yards:** no

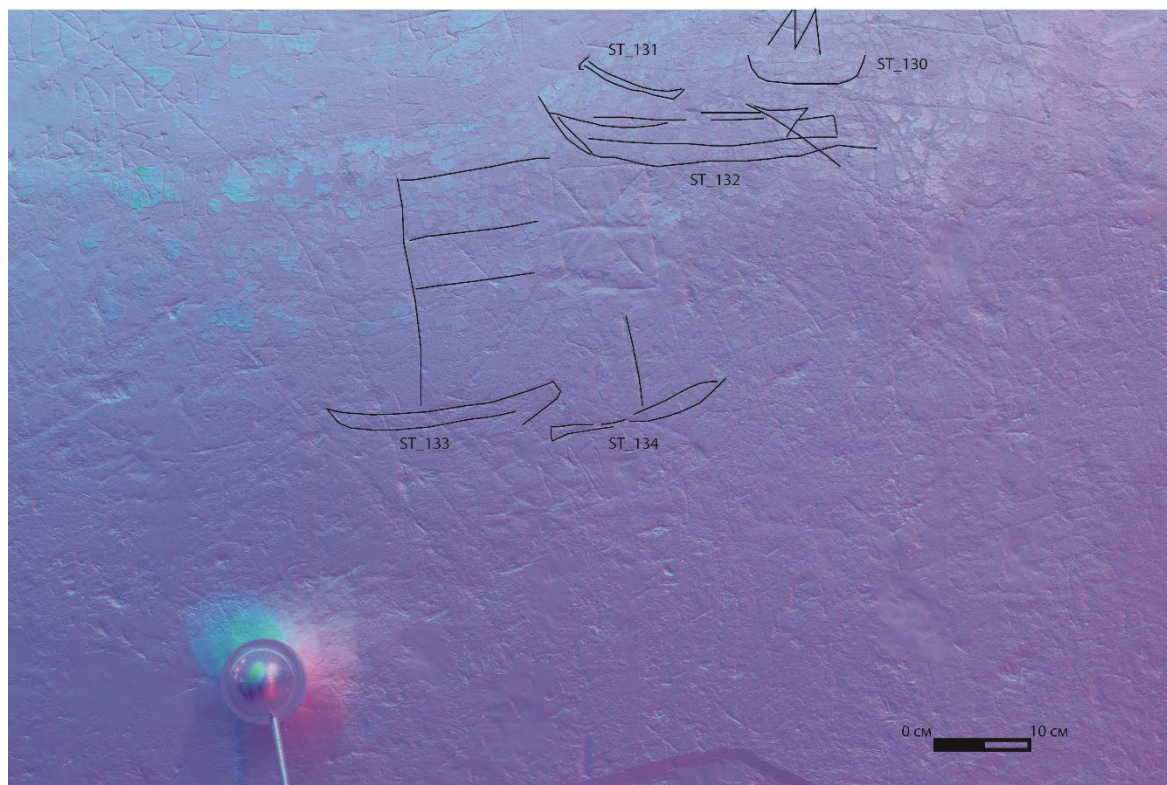
**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



**A.2.34 Panel 18 Narthex Ship graffiti ST\_135 – ST\_139**

**Ship graffito №** ST\_135

**Panel №** 18 narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the narthex in the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep. The upper part of the graffito is missing due to plaster erosion.

**Ship type:** sail-oar-powered boat with long hull

**Rigging type:** cannot be categorised, the upper section is missing

**Masts:** unclear

**Yards:** no

**Sails:** no

**Steering system:** oars

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_136**

**Panel № 18 narthex**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the narthex in the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in simple manner, and it is not informative

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** square?

**Masts:** 1

**Yards:** 1

**Sails:** 1 unfurled square main course

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_137**

**Panel № 18 narthex**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the narthex in the church, looking from south to north

**Ship graffito appearance:** the graffito is barely visible, hence it is not informative enough

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

## Appendix A

**Masts:** 2

**Yards:** 2

**Sails:** unclear

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_138**

**Panel № 18** narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall of the narthex in the church, looking from south to north

**Ship graffito appearance:** it consists only of a half hull and vertical lines (oars), the right section of the graffito is missing due to plaster erosion

**Ship type:** cannot be categorised

**Rigging type:** cannot be categorised

**Masts:** no

**Yards:** no

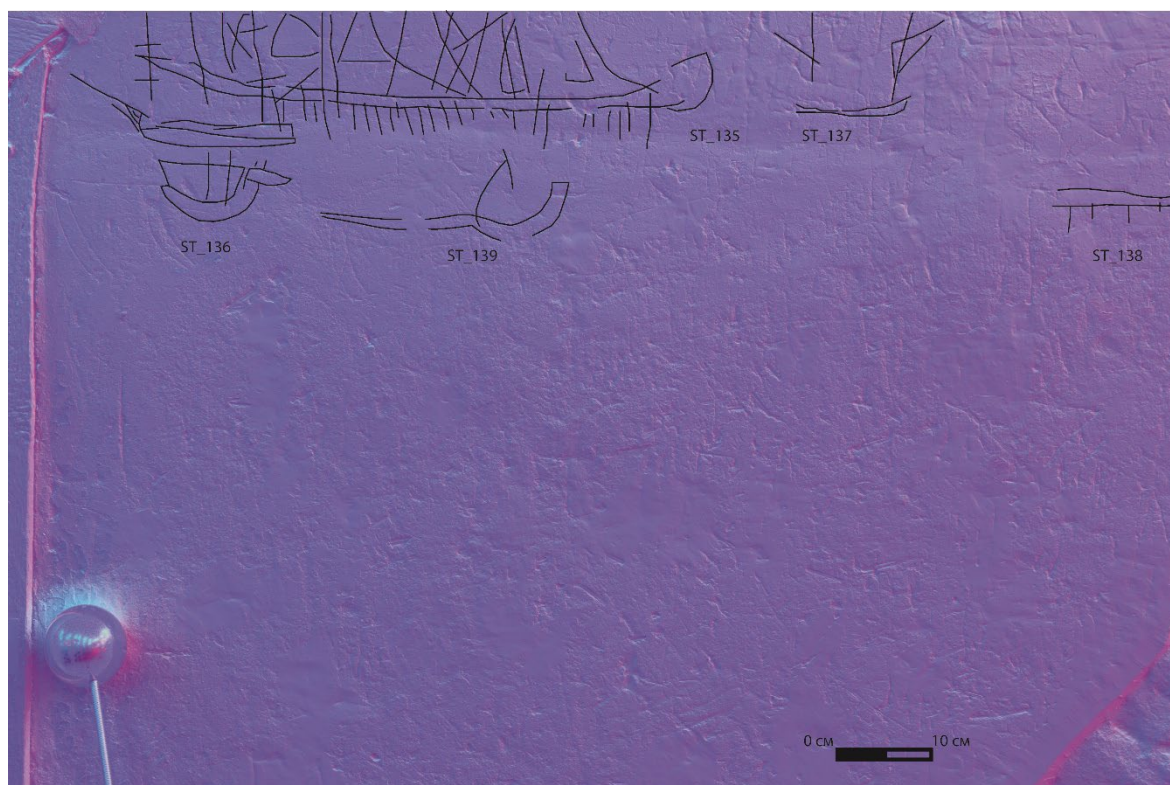
**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**



#### A.2.35 Panel 19 Narthex Ship graffiti ST\_140 – ST\_144

**Ship graffito № ST\_140**

**Panel №** 19-21 Big1

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep enough, however, it is difficult to trace all elements belong to the graffito as there are countless lines from other depictions, inscriptions, etc., which surrounded or crossed it

**Ship type:** ship with the bow to west, brig

**Rigging type:** square

**Masts:** 2: mainmast and mizzen, 1 bowsprit

**Yards:** their number is unclear

**Sails:** 1 main topsail, mizzen lateen and a topsail, 1 or 2 jibs

**Steering system:** not distinctive

**Flags:** 1 rectangular pointing to west

**Other elements:** transom stern

**Notes:**

**Ship graffito № ST\_141**

**Panel № 19-21 Big1**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north, the east wall and the frescoe painting are dated to the 16<sup>th</sup> c.

**Ship graffito appearance:** the contour lines are incised deep enough, however, it is difficult to trace all elements of the graffito as there are countless lines from other depictions, inscriptions, etc., which surrounded or crossed it

**Ship type:** brig (with the bow to west)

**Rigging type:** square

**Masts:** 3, 1 bowsprit

**Yards:** 6 square yards, 1 crossjack, 1 boom

**Sails:** 4 jibs, fore top and topgallant sails; main top and topgallant sails, mizzen top and topgallant sails and a spanker

**Steering system:** no

**Flags:** 2 pennants pointing to west

**Other elements:** Bowsprit with martingale (not visible well enough on the wall)

**Notes:** The graffito is surrounded by other graffiti of names and inscriptions in Greek, and the years – 1800. 1809, 1806, etc.

**Ship graffito № ST\_142**

**Panel № 19-21 Big1**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep enough, however, it is difficult to trace all elements belong to the graffito as there are countless lines from other depictions, inscriptions, etc., which surrounded or crossed it, as well as the background is dark

**Ship type:** ship with the bow to west

**Rigging type:** square-rigged foremast

**Masts:** 2: foremast, 1 bowsprit

**Yards:** 4

**Sails:** furled square?

**Steering system:** no

**Flags:** 1 rectangular pointing to east

**Other elements:**

**Notes:**

**Ship graffito № ST\_143**

**Panel № 19-21 Big1**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep enough, however, it is difficult to trace all elements belong to the graffito as there are countless lines from other depictions, inscriptions, etc., which surrounded or crossed it. In the central section of the graffito the year 1809 is inscribed

**Ship type:** cannot be categorised whether it represents a boat or a ship

**Rigging type:** only two lines represent the lines from the standing rigging

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_144**

**Panel № 19-21 Big1**

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep enough, however, it is difficult to trace all elements belong to the graffito as there are countless lines from other depictions, inscriptions, etc., which surrounded or crossed it, as well as some of the lines are covered with plaster during conservation procedures

**Ship type:** ship with the bow to west

**Rigging type:** cannot be categorised

**Masts:** 2: mainmast and mizzen

**Yards:** 2 on the mizzen

**Sails:** no

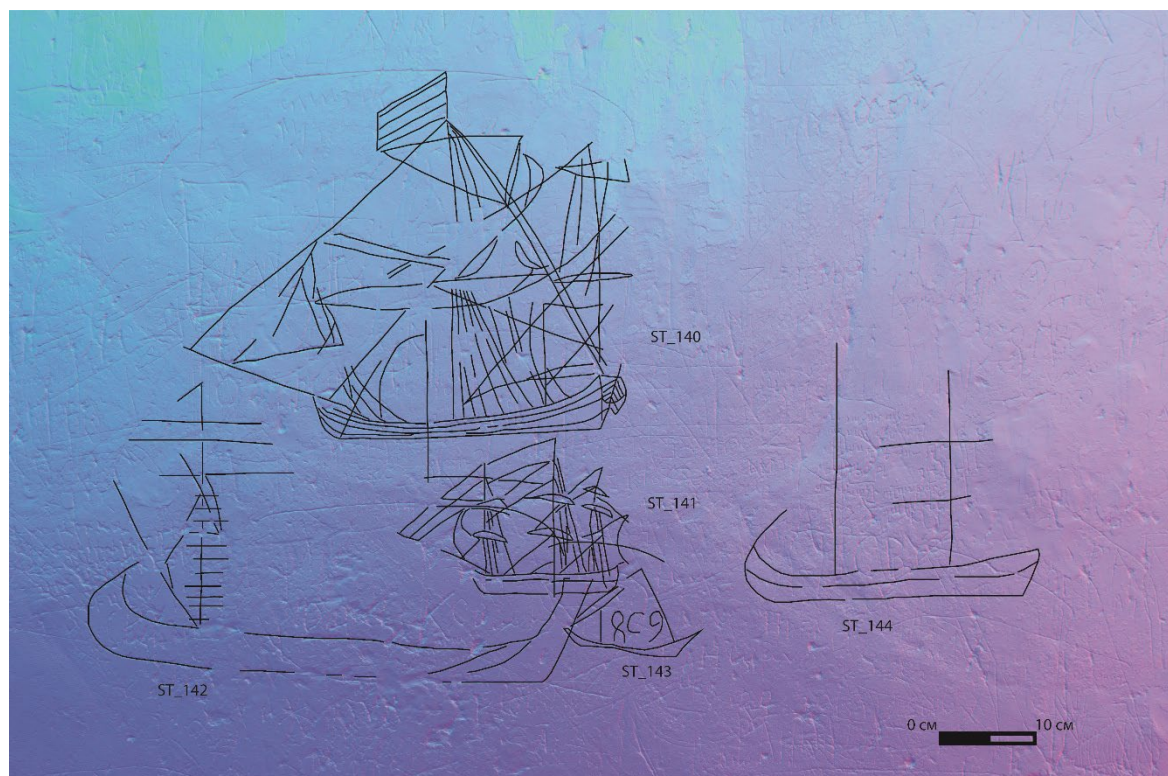
**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**





#### A.2.36 Panel 43 Narthex Ship graffiti ST\_147 – ST\_148

**Ship graffito № ST\_147**

**Panel № 43 narthex**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep and well visible today. The graffito is depicted in simple to elaborate manner and it is informative

**Ship type:** brig, Ottoman-Greek brig or Turkish *gagali* (with the bow to west)

**Rigging type:** square

**Masts:** 2, 1 bowsprit

**Yards:** 1 lower fore sail yard, 1 fore topsail yard, 1 fore topgallant yard; 1 main topgallant, 1 topsail yard, 1 boom, 1 gaff

**Sails:** 2 unfurled jibs, 4 unfurled square sails, 1 furled spanker

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:** transom stern

**Notes:**

**Ship graffito № ST\_148**

**Panel № 43** narthex

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, east wall in the narthex of the church, looking from south to north

**Ship graffito appearance:** the contour lines are incised deep and well visible today. The graffito is depicted in simple to elaborate manner and it is informative

**Ship type:** *Çekeleve (Sacoleva)/ Çektirme*; Western Anatolian Black Sea coaster (with the bow to west)

**Rigging type:** fore-and-aft

**Masts:** 2: foremast slightly raked forward, mainmast with sprit sail, 1 bowsprit, jibs

**Yards:** 1 sprit yard

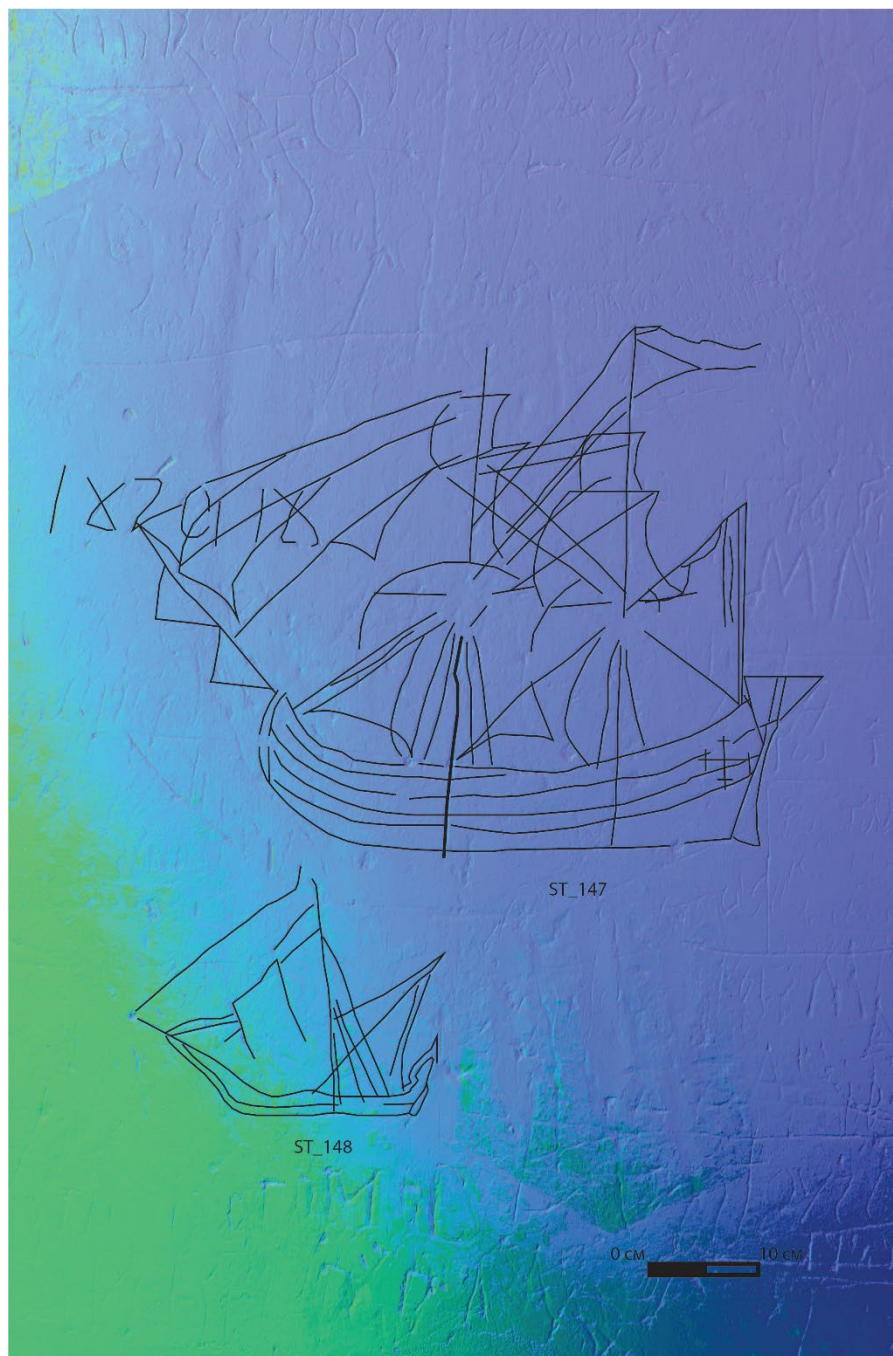
**Sails:** spritsail

**Steering system:** stern rudder

**Flags:** no

**Other elements:**

**Notes:**



#### A.2.37 Panel Exterior 1 Ship graffito ST\_149

**Ship graffito №** ST\_149

**Panel №** StStefan\_Exterior1

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in elaborate manner and it is informative. Each of the elements is depicted in detail. The upper part

of the graffito (upper part of the mast and standing rigging) is not preserved due to plaster erosion

**Ship type:** chebec/ lateener

**Rigging type:** fore-and-aft lateen

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 2

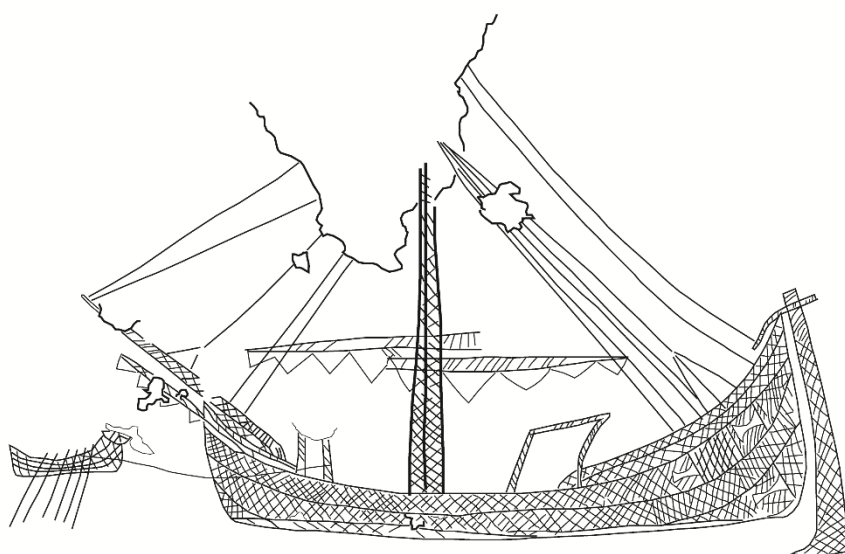
**Sails:** 2 lowered lateen sails, 1 spritsail on bowsprit

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:** fore bitts, aft bitts

**Notes:** the ship is towing by piloting boat with transom stern and 6 oars



0 cm 10 cm





#### **A.2.38 Panel Exterior 1 Ship graffiti ST\_150 – ST\_153**

**Ship graffiti №** ST\_150

**Panel №** StStefan\_Exterior1

**Ship graffiti № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down

**Ship graffiti appearance:** the contour lines are incised deep. The graffiti is depicted in schematic manner and it is informative. On the right half some elements of the graffiti are partially erased due to plaster erosion

**Ship type:** ship with the bow to west towing a boat

**Rigging type:** fore-and-aft

**Masts:** 1 mainmast with a topmast, 1 bowsprit

**Yards:** 1

**Sails:** 1 reefed lateen, 1 unfurled sprit sail on the bowsprit

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:** a boat without rig

**Notes:**

**Ship graffiti №** ST\_151

**Panel № StStefan\_Exterior1****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative. Some elements of the graffito are partially erased due to plaster erosion**Ship type:** it is identical to ST\_150. Ship with the bow to west towing a boat**Rigging type:** fore-and-aft**Masts:** 1 mainmast with a top mast, 1 bowsprit**Yards:** 1**Sails:** 1 reefed lateen**Steering system:** stern rudder (straight)**Flags:** no**Other elements:** two vertical lines below the keel – anchors?**Notes:** above the boat is unclear depiction, throwing anchors**Ship graffito № ST\_152****Panel № StStefan\_Exterior1****Ship graffito № (in Ovcharov's catalog):** N/A**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down**Ship graffito appearance:** the graffito is one of the few which is not incised in the plaster but depicted with black color. The graffito is depicted in schematic manner and it is informative.**Ship type:** ship with the bow to west**Rigging type:** square**Masts:** 1 mainmast, 1 bowsprit**Yards:** 1, 1 boom on the bowsprit**Sails:** 1 unfurled square main course**Steering system:** stern rudder (straight) and the tiller**Flags:** no**Other elements:****Notes:****Ship graffito № ST\_153****Panel № StStefan\_Exterior1****Ship graffito № (in Ovcharov's catalog):** 44**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic to elaborate manner and it is informative.

**Ship type:** chebeck/ lateener

**Rigging type:** fore-and-aft (lateen/settee)

**Masts:** 1 bowsprit 1 mainmast, 1 mizzen

**Yards:** 1 lateen yard on main mast, 1 mizzen lateen yard, 1 boom (on the bowsprit), 1 bumpkin at stern (?)

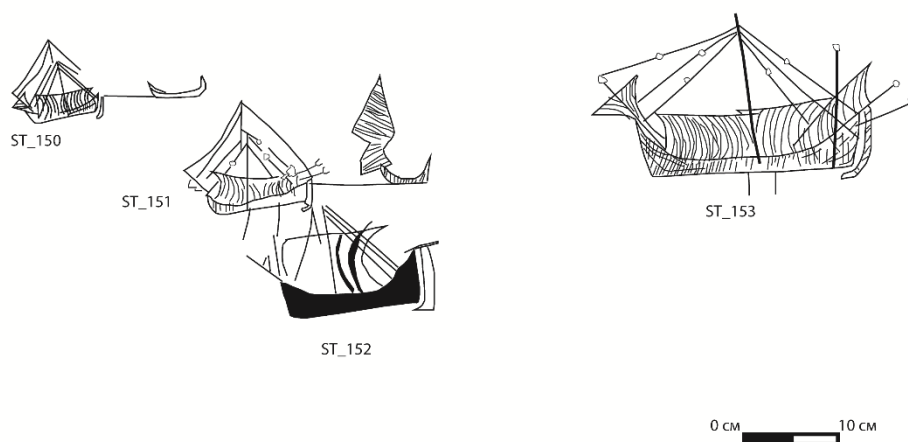
**Sails:** 1 reefed lateen sail on the main mast, 1 raised mizzen lateen, 1 unfurled spritsail (on the bowsprit)

**Steering system:** stern rudder (straight)

**Flags:** no

**Other elements:** 2 vertical short lines below the keel – anchors?; 2 lines with unclear purpose on the stern

**Notes:** there are oval elements on the standing and running rigging and some at the top of the masts, which at first glance look like random incisions, however, these might be interpreted as tackles. It is very probable to form a common scene with vessel entering and leaving anchorage. At stern, probably anchors throwing.







#### A.2.39 Panel Exterior Ship graffiti ST\_154 – ST\_155

**Ship graffito № ST\_154**

**Panel №** StStefan\_Exterior1

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down

**Ship graffito appearance:** the contour lines are incised deep, however, today these appeared to be faint and not well preserved. There are elements which look unclear. The graffito is depicted in schematic manner

**Ship type:** ship with the bow to west

**Rigging type:** cannot be categorised

**Masts:** 1 mainmast, 1 bowsprit

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** not visible

**Flags:** there is a feature on the top of the main mast which looks like a flag, however due to its poor preservation it is difficult to be certainly categorized as such

**Other elements:**

**Notes:**

**Ship graffito № ST\_155**

**Panel №** StStefan\_Exterior1

**Ship graffito № (in Ovcharov's catalog):** N/A

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church, looking from up to down

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative

**Ship type:** ship with the bow to east

**Rigging type:** fore-and-aft

**Masts:** 1 mainmast, 1 mizzen, 1 bowsprit

**Yards:** no

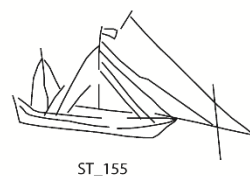
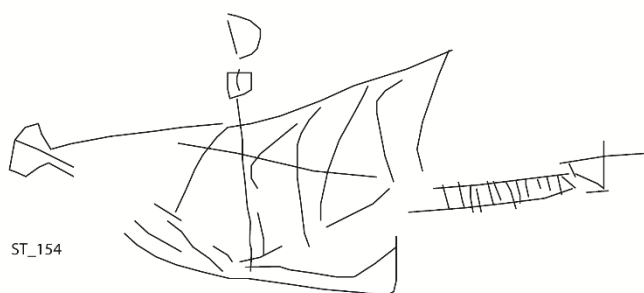
**Sails:** furled and unknown type (square?)

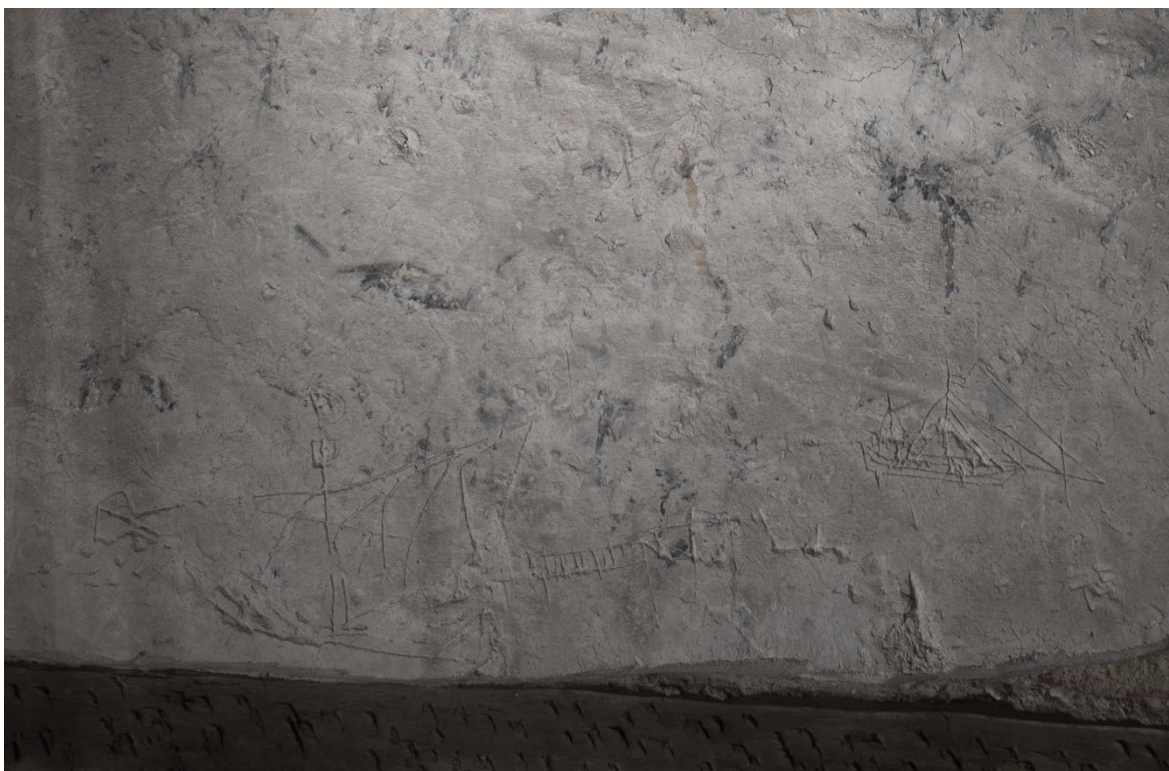
**Steering system:** no

**Flags:** 1 rectangular flag on the top of the main mast pointing to east

**Other elements:**

**Notes:**





#### A.2.40 Panel Exterior 2 Ship graffiti ST\_156 – ST\_163

**Ship graffiti №** ST\_156

**Panel №** StStefan\_Exterior2

**Ship graffiti № (in Ovcharov's catalog):** 39

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffiti appearance:** the contour lines are incised deep and clear. The graffiti is depicted in elaborate manner and is one of the most representative. Unfortunately, the bow, the fore part and the top of the graffiti is not preserved due to plaster erosion. The top area, where the topmast was depicted is covered by a wooden support for the roof of the space, hence the full topmast is not visible

**Ship type:** chebec/ lateener

**Rigging type:** fore-and-aft lateen sail

**Masts:** 1 main mast, 1 main topmast; 1 mizzen

**Yards:** 2 lateen

**Sails:** 2 lateen/settee

**Steering system:** stern rudder (straight), tiller

**Flags:** no

**Other elements:** forward of the mainmast- 2 bitts and a hand-operated capstan, bitts ahead the mizzen, 1 hand-operated capstan on the raised deck at stern

**Notes:**

**Ship graffito № ST\_157**

**Panel №** StStefan\_Exterior2

**Ship graffito № (in Ovcharov's catalog):** 40

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner. Even though it is not informative enough

**Ship type:** ship

**Rigging type:** cannot be categorised with certainty

**Masts:** 2: 1 mainmast, 1 either fore mast or mizzen?

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_158**

**Panel №** StStefan\_Exterior2

**Ship graffito № (in Ovcharov's catalog):** 41

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner, even though it is not informative enough. The left part of the graffito is not preserved due to plaster erosion

**Ship type:** ship

**Rigging type:** N/A

**Masts:** 3: fore mast, mainmast, mizzen

**Yards:** 6 square yards

**Sails:** 6 unfurled square sails?

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito № ST\_159**

**Panel №** StStefan\_Exterior2

**Ship graffito № (in Ovcharov's catalog):** 42

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative enough

**Ship type:** ship with the bow to west

**Rigging type:** cannot be categorised/ square?

**Masts:** 3

**Yards:** 3 yards

**Sails:** cannot be categorised, furled

**Steering system:** no

**Flags:** no

**Other elements:** transom stern

**Notes:**

**Ship graffito № ST\_160**

**Panel № StStefan\_Exterior2**

**Ship graffito № (in Ovcharov's catalog): 37**

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner, even though it is not informative enough. Some of the elements are not clear, especially the rigging

**Ship type:** ship with the bow to east

**Rigging type:** cannot be categorised, unclear

**Masts:** unclear, only 1 bowsprit

**Yards:** cannot be categorised

**Sails:** cannot be categorised with certainty, maybe pulling ropes while unfurling sails?

**Steering system:** no

**Flags:** no

**Other elements:** there are random depictions above deck which look like human figures, however due to the unclarity these cannot be categorised as such with certainty. Amidships, probably the triangular element depicts a hand-operated capstan, which mariners rotate through spars.

**Notes:** It should be not out of scope that this triangular element amidships may represent a sail, too.

**Ship graffito № ST\_161**

**Panel № StStefan\_Exterior2**

**Ship graffito № (in Ovcharov's catalog): N/A**

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner, even though it is not informative enough

**Ship type:** ship

**Rigging type:** cannot be categorised with certainty/ square?

**Masts:** 1 mainmast with a main topmast

**Yards:** 1

**Sails:** cannot be categorised

**Steering system:** no

**Flags:** no

**Other elements:**

**Notes:**

**Ship graffito №** ST\_162

**Panel №** StStefan\_Exterior2

**Ship graffito № (in Ovcharov's catalog):** 43

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards south in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep. The graffito is depicted in schematic manner and it is informative enough

**Ship type:** boat

**Rigging type:** no rigs

**Masts:** no

**Yards:** no

**Sails:** no

**Steering system:** no

**Flags:** no

**Other elements:** transom stern

**Notes:** the graffito might be unfinished

**Ship graffito №** ST\_163

**Panel №** StStefan\_Exterior2

**Ship graffito № (in Ovcharov's catalog):** 38

**Location:** Nessebar, Church St. Stephen, west exterior wall facing towards southeast in the yard of the church

**Ship graffito appearance:** the contour lines are incised deep and clear. The graffito is depicted in elaborate manner and it is informative.

**Ship type:** two masted square-rigger with the bow to west

**Rigging type:** square-rigged main mast and mizzen lateen

**Masts:** 1 bowsprit; 1 mainmast with a topmast, a topgallant mast, a royal, 1 mizzen with lateen

**Yards:** 4 square main yards, 1 lateen yard

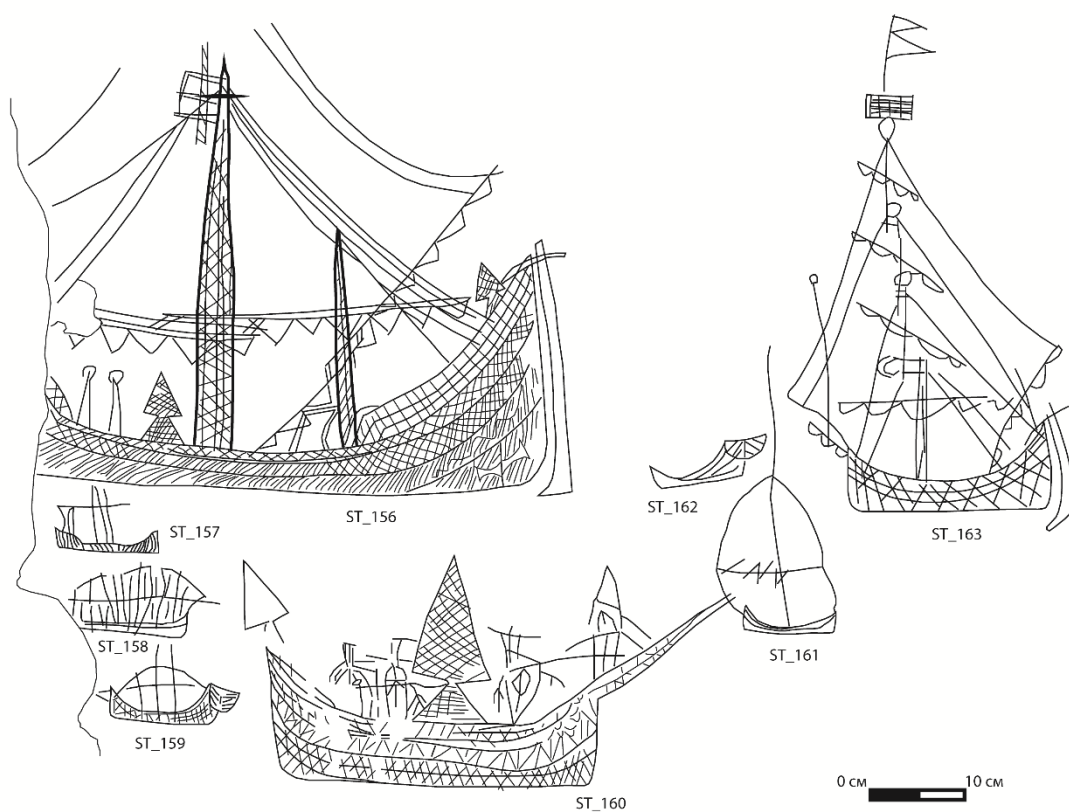
**Sails:** 2 furled jibs; furled 4 square main course, main topsail, main topgallant, main royal, 1 furled lateen

**Steering system:** stern rudder (straight) and tiller

**Flags:** 1 pennant pointing to east

**Other elements:** trestle trees mast tops, crow's nest (?)

**Notes:**

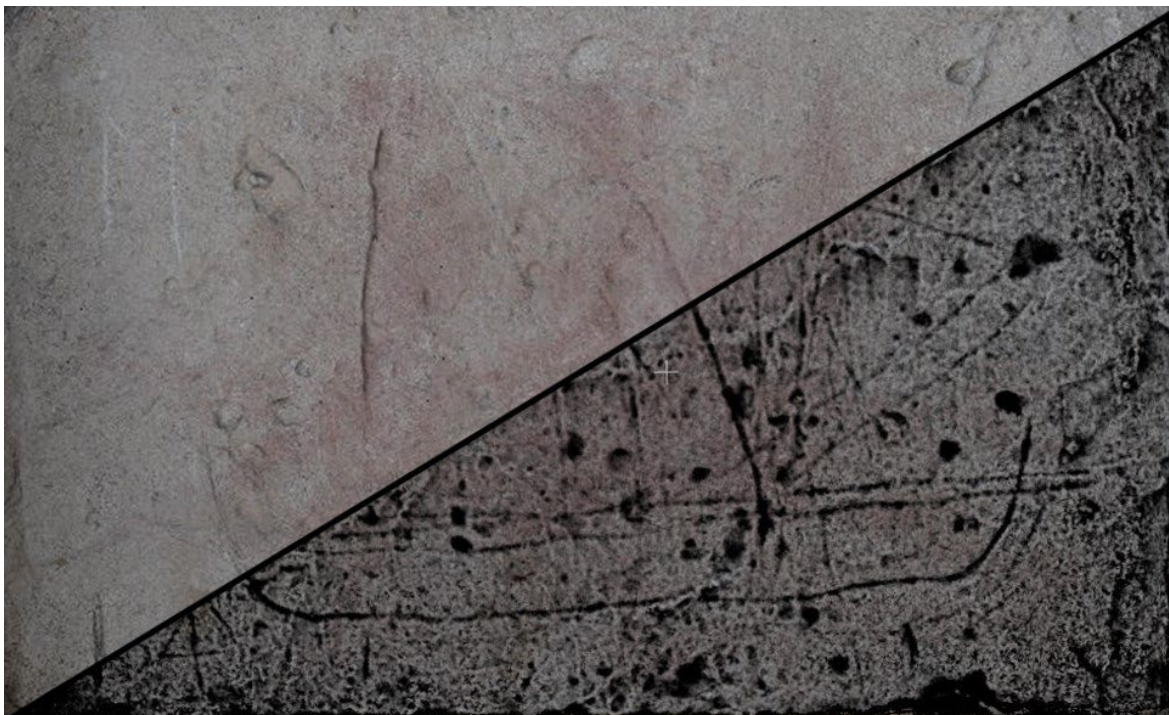




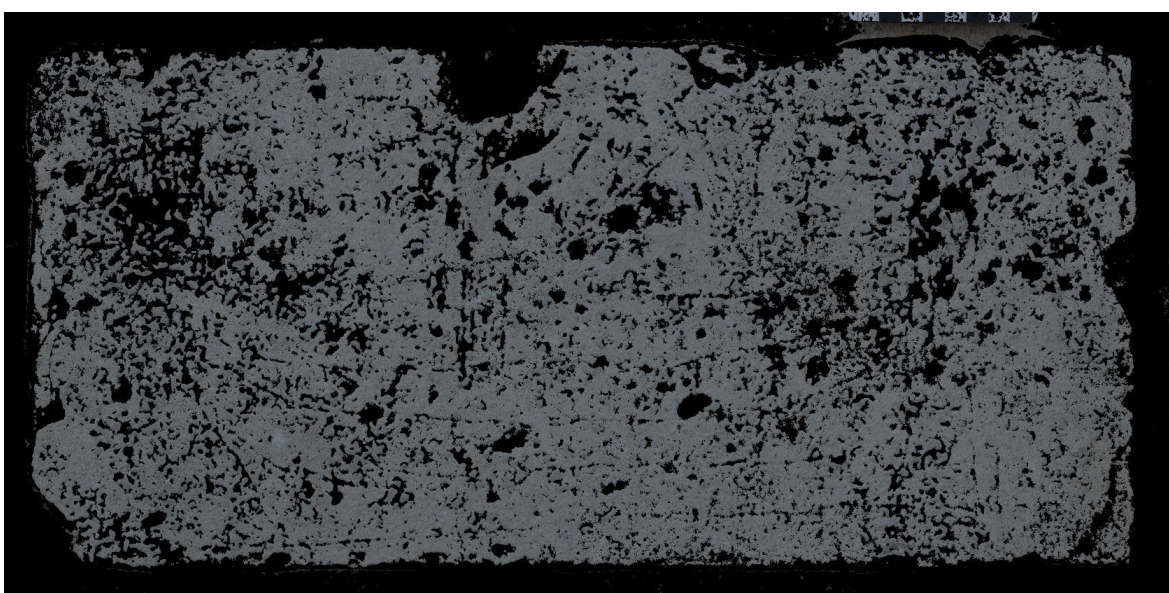


### A.3 Photogrammetry models of ship graffiti on the façades of the Church of St. John Alitourgetos

#### A.3.1 Ship graffito JA\_01 wall



#### A.3.2 Ship graffito JA\_02 East wall





A.3.3 Ship graffito JA\_03 North wall



## A.4 Photographs of ship graffiti on the façades of Church of St. Todor

### A.4.1 Ship graffito T\_001 South wall



T\_001

0 cm 10 cm



A.4.2 Ship graffito T\_002 South wall



T\_002

0 cm 10 cm



A.4.3 Ship graffito T\_003 East wall



T\_003

0 cm 10 cm





## **Appendix B      Publications produced during the PhD research phase**

The first three publications resemble the annual reports submitted in the journal of National Archaeological Institute with Museum at the Bulgarian Academy of Sciences (NAIM-BAS) 'Archaeological Discoveries and Excavation' and are due for every project conducted in the framework of an archaeological project to NAIM-BAS and financed by the Bulgarian Ministry of Culture. The fourth article presents the use of modern photographic methods and the results obtained during the project were also published as a separate article '*Advanced photographic methods in studying ship graffiti from medieval churches in Nessebar*' (Georgieva et al. 2022) in the journal *Interdisciplinary Studies* of NAIM-BAS.

- B.1 Georgieva, Z., Prahov, N. and Dimitrov, K., 2018. Non-destructive survey of graffiti of St. Spas and St. Todor churches in the town of Nessebar, *Archaeological discoveries and excavation*, 682–685.**

tion by type was: four single buildings; two fortresses (Fig. 3); 10 settlements and 20 mounds. Some of the mounds were grouped in mound necropoleis.

Chronologically, as expected, the sites contemporary to the Roman colony were predominant. In 10 of them there were materials related to the Roman period; in four of the sites, prehistoric habitation was established; in seven there were materials from Early and Late Iron Age; and nine of the sites were inhabited during Late Antiquity and the Middle Ages as well as during the previously mentioned periods. All the mounds have undefined chronology. All the sites mentioned are now registered in "Archaeological Map of Bulgaria".

### № 35. НЕДЕСТРУКТИВНО ПРОУЧВАНЕ И ДОКУМЕНТИРАНЕ НА ГРАФИТИ ОТ СРЕДНОВЕКОВНИТЕ ЦЪРКВИ „СВ. СПАС“ И „СВ. ТОДОР“ В НЕСЕБЪР

*Здравка Георгиева, Найдено Прахов, Калин Димитров*

Недеструктивното археологическо проучване и документиране на графити от църквите „Св. Спас“ и „Св. Тодор“ е част от проект на Центъра за подводна археология (ЦПА) за проучване, документиране и обнародване на историческите графити от църкви в Несебър. Тези малко познати и недооценени, но много важни културно-исторически паметници, са врязани върху вътрешните и външните фасади на четири несебърски църкви – „Св. Йоан Алитургетос“, „Св. Стефан“ (Новата митрополия), „Св. Спас“ и „Св. Тодор“. Няколкостотинте графита попадат в хронологическите граници XIV – XIX в., но основната група са от XVII – XIX в. (Овчаров 1992). Повечето от тях са изображения на кораби и представляват важен извор за корабоплаването, корабостроенето, презморските контакти, поминъка и светогледа на населението по Западното черноморско крайбрежие, което е и причината за иниципирането на проекта от ЦПА. Целта на проучването през 2018 г. беше заснемането на графити в църквата „Св. Спас“ посредством съвременни фотографски техники за археологическо изследване и документация, създаването на дигитален архив и подготвянето на публикуването им. Друга задача

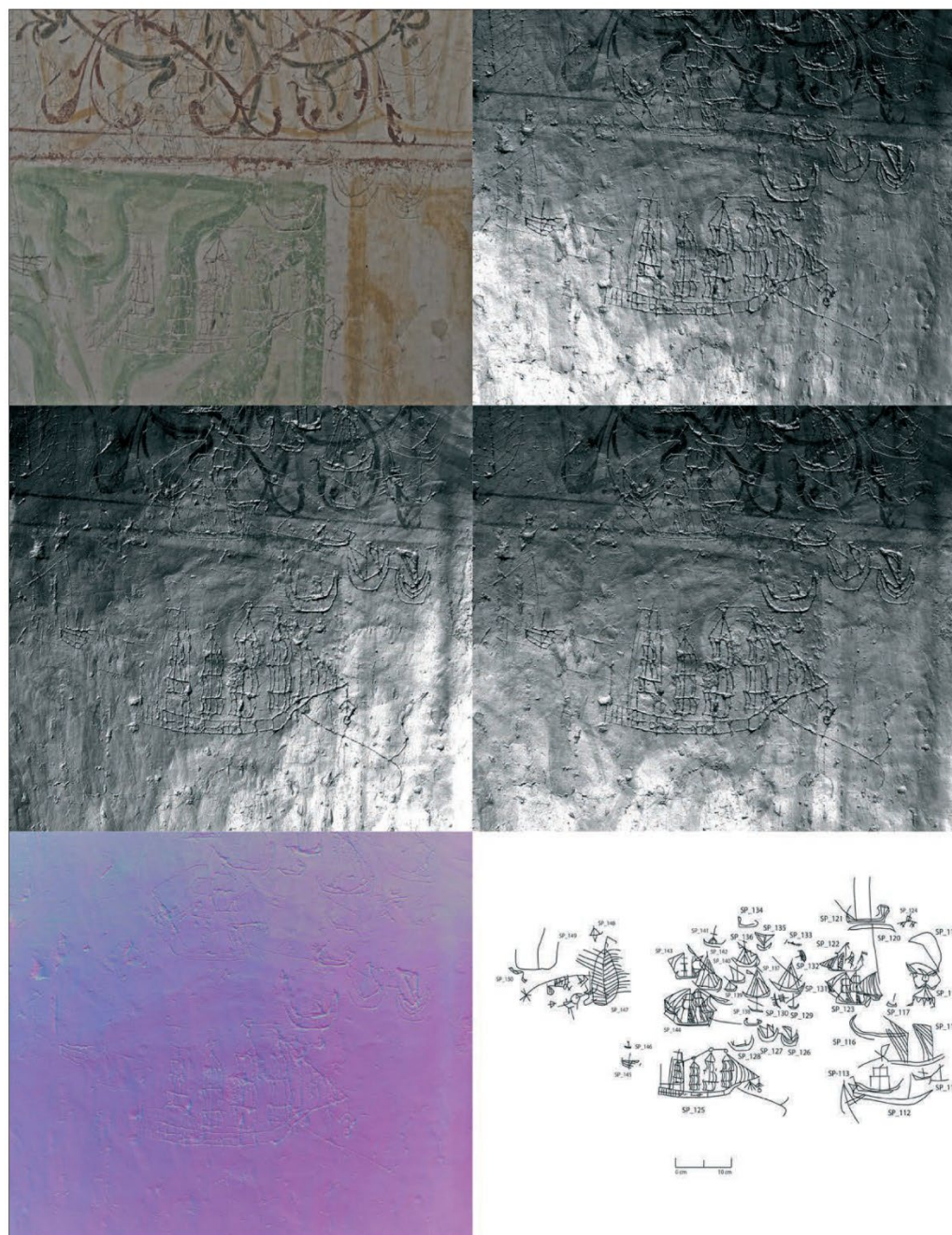
беше първоначалното изследване на графитите в църквата „Св. Тодор“, които до момента не са проучвани и обнародвани. Проектът беше подкрепен от Министерството на културата и фондация „Балканско наследство“.

Водещият метод на документиране беше рефлексно-преобразователната фотография (Reflectance Transformation Imaging – RTI) (обр. 1). Техниката използва серия от поне 60 стандартни снимки на даден обект, заснети със стационарна камера и насочена светлина от различен ъгъл. Специализиран софтуер обединява кадрите в модел, съхраняващ и представящ подробен документален архив на повърхностната морфология на обекта. Моделът позволява обектът да бъде



Обр. 1. RTI заснемане на графити в долния регистър на южната стена в „Св. Спас“ (автор З. Георгиева)

Fig. 1. RTI processing of graffiti on the lower level of the South wall in the "St. Spas" church (author Z. Georgieva)



Обр. 2. RTI кадри след обработка и графично изобразяване на графити от Панел 4, южна стена  
(автор З. Георгиева)

Fig. 2. RTI visualization of graffiti after postprocessing and graphic illustration, Panel 4, south wall (author Z. Georgieva)

разглеждан в желано от изследователя увеличение и различен ъгъл на осветление, като изображението може да бъде експортирано в графичен файл. Техниката дава възможност за изследване, документиране и визуализиране на детайли от повърхността, невидими за невъоръжено око.

Пробно беше приложен още един метод на документиране – сканиране с 3D скенер *Artec Eva*. Той използва фотограметрична техника, която обединява голям брой снимки, които скенерът прави, съчетани с прецизни метрични измервания, като създава детайлен триизмерен модел на обекта



с разделителна способност около 0,1 мм. Сравнителният анализ на двата метода даде превес на RTI, чийто модели възпроизвеждат по-прецизно детайлите на графитите (обр. 2). Освен тези техники, бе приложена и традиционна дигитална фотография.

Църква „Св. Спас“ („Св. Възнесение Христово“). Представлява еднокорабна едноабсидна постройка с размери 11,7 м на 5,7 м, построена през 1609 г. Графитите са изрисувани върху стенописите. Основната група графити представляват кораби, обединени в композиции от няколко кораба. Повечето са разположени по северната и южната фасада, върху декоративния цокъл на църквата, представляващ стенописен фриз от цветни правоъгълни пана, имитиращи мраморните пана на константинополските църкви. Те създават своеобразни рамки, върху които са групирани графитите. Отделни изображения на кораби попадат и върху втория декоративен фриз, зает от флорални елементи. Втората група графити представляват надписи на гръцки език, основно имена и години. Те са разположени върху третия декоративен пояс на църквата, заемайки образи на светци в цял ръст. Досега тази група не е изследвана и обнародвана. Документирането на първата група графити беше съобразено с групирането им върху декоративните пана, които бяха заснети поотделно. Посредством RTI върху северната стена на църквата бяха заснети девет панела, а върху южната – 11. Със скенера бяха документирани пет панела от южната фасада и седем от северната. Започна документирането и на втората група графити, като беше заснета северозападната част на третия декоративен пояс.

След първичната обработка на теренната документация бе установено, че първата група графити включват 178 изображения на плавателни съдове, три на човешки фигури и едно на птица. След сравнителния анализ с публикациите им (Овчаров 1992) беше установено, наличието на няколко необнародвани графита на кораби, както и на детайли, пропуснати при досегашните публикации. Констатирано е, че няколко графита на кораби са частично унищожени, вследствие на деградирането на стенописите и консервационната намеса.

Църква „Св. Тодор“. В края на 2017 г. във връзка с планирането на работния проект за документиране на графити от средновековни църкви в гр. Несебър, бяха обходени и детайлно разгледани повечето църкви. Върху външната фасада на „Св. Тодор“ бяха открити над 20 графита на кораби, постройки, години и надписи на гръцки език, необнародвани до момента. Църквата е построена през XIII в. Тя е еднокорабна, едноабсидна църква с притвор, с размери 11 x 5,15 м. Разширена на юг по време на Късното средновековие. По-ранният градеж е от редуващи се редове от бели варовикови блокове и от тухли, а достроената част – от ломени камъни. Графитите са разположени на отделни блокове и камъни върху външната фасада. Идентифицирани са пет графита на кораби, два на постройки, а останалите са години и гръцки букви. Три от графитите на кораби (два от южната и един от източната страна) са обърнати с кила нагоре, което подсказва, че са върху камъни, преизползвани при ремонтните дейности на църквата. Повечето графити са документирани с традиционна дигитална фотография, а при два е направено фотограметрично документиране.

Основната цел на проекта е пълното документиране на графитите от несебърските църкви и обнародването им в каталози според съвременните изисквания и стандарти. Към момента екипът работи върху подготовката на публикациите на графитите от църквите „Св. Спас“ и „Св. Тодор“.

### Литература

**Овчаров 1992:** Н. Овчаров, Корабоплаването по българското черноморско крайбрежие XIV – XIX век, София, 1992.

### NON-DESTRUCTIVE SURVEY OF GRAFFITI OF “ST. SPAS” AND “ST. TODOR” CHURCHES IN NESSEBAR TOWN

*Zdravka Georgieva, Nayden Prahov, Kalin Dimitrov*

The non-destructive survey of graffiti of St. Spas and St. Todor churches was a part of a project of the Centre for Underwater Archaeology for study and publication of the graffiti from Nessebar churches. Most of them were of ships and were important source of information for maritime traditions along the Western Black Sea coast. They were cut on four churches including “St. John Aliturgetos” and “St. Stefan” and are dated between 14<sup>th</sup> – beginning of 19<sup>th</sup> c., mostly after 17<sup>th</sup> c.

The graffiti in “St. Spas” were recorded with RTI technique and with Eva Scan scanner (Fig. 1 – 2). They included 178 images of ships, three of humans and one of a bird and hundreds of inscriptions in Greek, mostly names and years. The comparison with the publications (Овчаров 1992) revealed several unpublished graffiti of ships and missing details. Several graffiti were destroyed due to the destruction of the murals and the conservation intervention.

The graffiti of “St. Todor” church have not been published so far. The survey revealed about 20 graffiti, including five of ships, two of buildings, inscriptions in Greek and years.

## ТЕРЕННИ ИЗДИРВАНИЯ ЗА ВЕРИФИКАЦИЯ НА РЕЗУЛТАТИ ОТ ВЪЗДУШНО ЛАЗЕРНО СКАНИРАНЕ (AIRBORNE LIDAR)

### AIRBORNE LIDAR-GUIDED FIELD SURVEYS

#### № 36. ТЕРЕННИ ИЗДИРВАНИЯ ЗА ВЕРИФИКАЦИЯ НА РЕЗУЛТАТИ ОТ ВЪЗДУШНО ЛАЗЕРНО СКАНИРАНЕ (AIRBORNE LIDAR) В ОКОЛНОСТИТЕ НА ПРАИСТОРИЧЕСКИ СОЛОДОБИВЕН И ГРАДСКИ ЦЕНТЪР ПРОВАДИЯ – СОЛНИЦАТА, ОБЩ. ПРОВАДИЯ

*Петър Лещаков, Галина Самичкова*

Акцент на настоящото изследване е близката околност на градски и солодобивен център Провадия – Солницата, където през пролетта на 2018 г. бе извършено заснемане с LiDAR<sup>1</sup>. Проучени са две зони – Провадия 1 и Провадия 2 с обща площ от 13,1 кв. км.

Първата от тях, обхваща непосредствената околност на праисторическия паметник в периметър от 1,5 км. Тя се характеризира с равнинен терен, през който в направление СЗ – ЮИ протича р. Провадийска, с изключение на СИ част, заета от ниски възвишения, представляващи периферия на Провадийското плато.

Втората площ е разположена на ок. 4 км ЮЗ от праисторическия паметник и обхваща височините Канарата и Чиплак тепе, представляващи част от Рояшкото плато.

В двете сканирани площи са налице данни за повече от 20 потенциални археологически обекта, чиято верификация чрез конвенционални методи – теренно издирване, бе цел на настоящото проучване.

Теренното издирване се проведе в периода 11 – 20.11.2018 г. от екип с ръководители П. Лещаков (НАИМ – БАН) и докторант Г. Самичкова (НАИМ – БАН), чл. кор. В. Николов – научен консултант и археолозите от ИМ – Провадия – Н. Христов, С. Трифонов и С. Жечева.

Чрез метода на тотално археологическо издирване е обходена площ от 1,81 кв. км, като са посетени и отделни аномалии с цел потвърждаване на техния древен антропогенен произход.

Площ Провадия 1. Регистрирани са седем нови археологически обекта, включващи надгробни могили и обект с неопределена функция (обр. 1). Надгробните могили са организирани в две групи (обекти 147 – 148 и 149 – 151), разположени на ок. 170 м една от друга, вероятно част от един некропол. Освен тях в СЗ посока от некропола, извън сканираната с LiDAR площ, е локализирана още една единична могила (обект 152), попадаща в трудно достъпен, плътно обрасъл с храсти терен, което не изключва принадлежността ѝ към нелокализирана група от могили. Могилите са с малки размери – диаметър 12 – 34 м и височина до 2 м. Повърхността на повечето от тях се обработва и са нарушени от

<sup>1</sup> Изследването е финансирано по проект на БАН „Археологическа карта на България“.



- B.2 Georgieva, Z., Prahov, N. and Dimitrov, K., 2019. Non-destructive survey and documentation of graffiti of St. Stephen medieval church in Nessebar. *Archaeological discoveries and excavation*, 140–144.**

## № 47. НЕДЕСТРУКТИВНО ПРОУЧВАНЕ И ДОКУМЕНТИРАНЕ НА ГРАФИТИ ОТ СРЕДНОВЕКОВНА ЦЪРКВА „СВ. СТЕФАН“ (НОВАТА МИТРОПОЛИЯ) В НЕСЕБЪР

*Здравка Георгиева, Найдено Прахов*

През 2019 г. бе проведено документиране на графити, намиращи се във вътрешното пространство на църква „Св. Стефан“ (Новата Митрополия) в гр. Несебър, чрез рефлексно-преобразователна фотография. Това е част от по-мощен проект за проучване, документиране и обнародване на историческите графити от църкви в Несебър. Графитите са малко познати, но много важни културно-исторически паметници. Врязани са върху вътрешните и външните фасади на четири несебърски църкви: „Св. Йоан Алитургетос“, „Св. Стефан“, „Св. Спас“ и „Св. Тодор“. Те попадат в хронологическите граници XIV – XIX в., но основната група са от XVII – XIX в. (Овчаров 1992; Георгиева и др. 2019). Повечето от тях са изображения на кораби и представляват важен извор за корабоплаването, корабостроенето, презморските контакти, поминъка и светогледа на населението по Западното черноморско

крайбрежие. Проектът е изпълнен от Музей „Старинен Несебър“, с финансиране от Министерството на културата и техническата подкрепа на фондация „Балканско наследство“. Ръководител на проекта е З. Георгиева, а заместник-ръководител – Н. Прахов. В теренната работа взе участие М. Райковска, специалист по дигитално документиране на културни паметници.

Целта на проекта е заснемането епиграфските паметници със съвременни фотографски техники за изследване и документиране, както и създаване на дигитален архив на графитите. През 2018 г. е проведено първото подобно документиране на графити от църквите „Св. Спас“ и „Св. Тодор“ (Георгиева и др. 2019). Тогава бяха регистрирани и документиран общо 202 графита.

Рефлексно-преобразователната фотография (Reflectance Transformation Imaging – RTI) (обр. 1) е техника, използваща серия от поне 60 стандартни снимки на даден обект, заснети със стационарна камера и насочена светлина от различен ъгъл. Специализиран софтуер обединява кадрите в модел, съхраняващ и представящ подробен документален архив на повърхностната морфология на обекта. Моделът дава възможност обектът да бъде разглеждан в желано от изследвателя увеличение и различен ъгъл на осветяване, като изображе-



Обр. 1. Процес на RTI заснемане на панел от югозападния пиласٹر.  
Снимка – З. Георгиева

Fig. 1. RTI capturing of a pane located in the southwestern pilaster.  
Photo – Z. Georgieva

нието може да бъде експортирано в графичен файл. Техниката дава възможност за изследване, документиране и визуализиране на детайли от повърхността, невидими за невъоръжено око.

Църквата „Св. Стефан“ (Новата Митрополия) (обр. 2) е трикорабна базилика с размери 12,10 м дължина и 9,50 м ширина (обр. 3). Централният кораб се отделя от страничните с четири пиластър и две мраморни колоши, чиито бази представляват обрнати късни коринтски капители. Олтарът има три части: презвитерий, протезис и дяконикон, които завършват с кръгли апсиди. Те са отделени една от друга с 80 см дебели зидове (Рашенов 2006, 14 – 15). Предполага се, че най-ранната част на църквата се отнася към X – XI в. Преустроена е по времето на несебърския митрополит Христофор, което се разбира от запазен над входа на южната стена надпис на гръцки език от 1599 г. Оттогава са и стенописите във вътрешността на църквата (Рашенов 2006, 17).

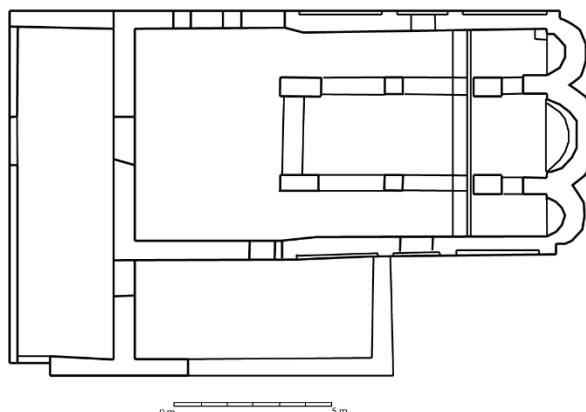
Графитите от „Св. Стефан“ са разположени както вътре – в наоса и олтара, така и по външната фасада на сградата. През 2019 г. проучването беше фокусирано върху графитите, намиращи се в олтарното пространство и в наоса. Теренната работа бе проведена в периода от 21 – 31 октомври със заснемане на графитните изображения чрез RTI техника. Беше използван дигитален огледално-рефлексен фотоапарат NIKON D810 с 60 мм макро обектив NIKKOR, поставен на статив и управляван чрез безжично предавателно устройство (Cam Ranger), свързано към смартфон за по-голяма стабилност и бързина на процеса. Като източник на светлина се използваха външни светкавичи NIKON Speedlight SB-800 и Godox, синхронизирани към фотоапарата. Рефлекторна черна сфера с полирана повърхност, прикрепена към статив, беше използвана за генерирането на информация относно промяната на позициите на насочената светлина при всеки нов кадър. Позиционирането на фотоапарата беше съобразено с площта на композициите от графити и разстоянието до обекта варираше между 1 и 2 м. За целта на заснемането отделните графити бяха обединени в панели, които бяха номерирани според последователността на документирането им. Бяха заснети 36 панела, които включват 124 графита (обр. 4).

Теренната работа продължи с обработване на изображенията и генериране на модели. Отделните панели заснети чрез RTI фотография бяха обработени с програма RTI Builder, в която множеството кадри се обединяват в едно интерактивно изображение, съдържащо информацията от всички останали. Впоследствие моделите се разглеждат с програма RTI



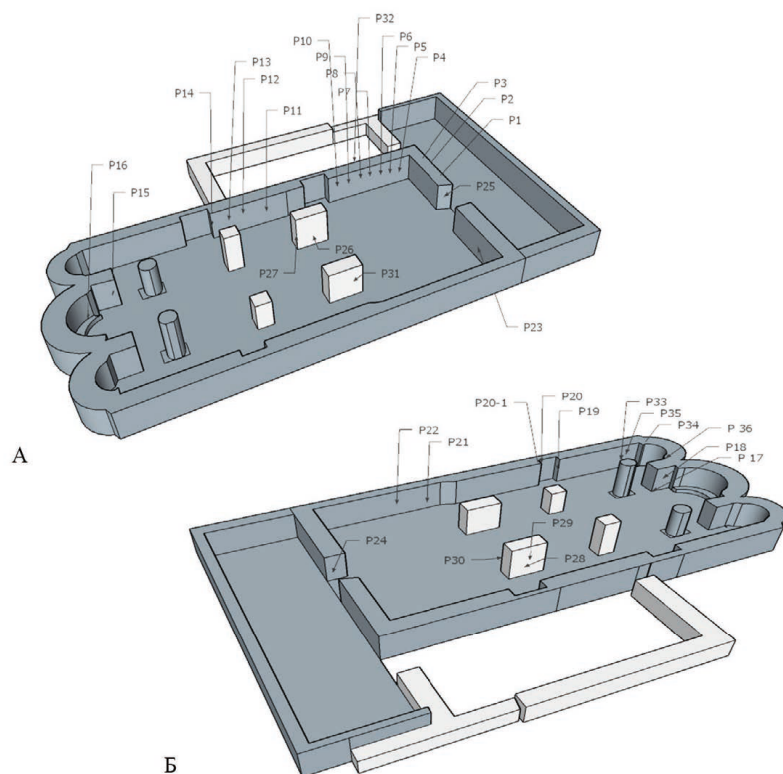
Обр. 2. Църква Св. Стефан, поглед към южната стена и апсидата.  
Снимка – Т. Марваков

Fig. 2. St. Stefan church, look towards south wall and the apse.  
Photo – T. Marvakov



Обр. 3. План на църква Св. Стефан. Изработил – З. Георгиева

Fig. 3. Plan of the St. Stefan church. Z. Georgieva



Обр. 4. Разположение на заснетите панели във вътрешното пространство на църква Св. Стефан: А. Изглед от север на юг – южна, западна стена, пиласстри, част от олтарното пространство; Б. Изглед от юг на север – северна, западна стена, пиласстри, олтарно пространство. Изработил – З. Георгиева

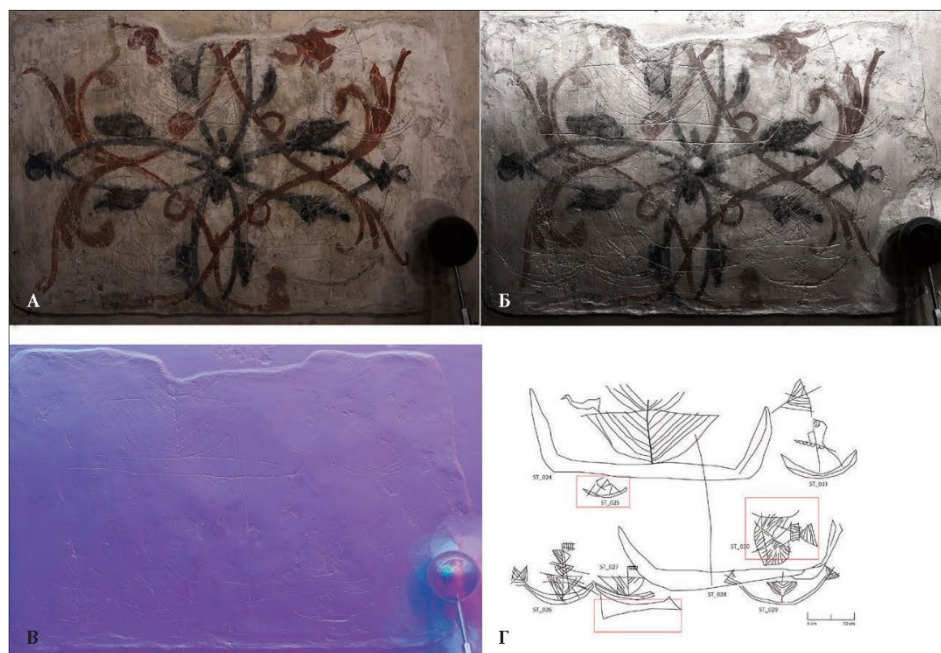
Fig. 4. Location of recorded panels in the interior of St. Stefan's church: A. Look from north to south – south, west walls, pilasters, a sector of the altar; B. Look from south to north – north, west walls, pilasters, altar. Z. Georgieva

Viewer с необходимото увеличение и различен ъгъл на осветление. Последва графично илюстриране на заснетите графити (обр. 5).

По-голямата част от графитите представят плавателни съдове (114). Единици са с изобразени детайлни картини на лодки или кораби. Многобройни са схематизираните, недовършените или полузачернените графити. Друга част от графитите изобразяват животни (един на козел, пет на птици, два на коне). Третата група графити са надписи на гръцки език – основно имена и години. Повечето от тях са лошо запазени и нечетливи.

Графитите са разположени основно в ниския регистър на северната и южната стена на наоса, както и в олтарното пространство по стените на презвитерия, протезиса и дяконикона. Повечето сякаш спазват композиционната схема на стенописите, но част от тях, главно в горния регистър, са издълбани върху стенописите без да бъдат съобразени с композиционна им подредба.





Обр. 5. Етапи от обработката на заснетите панели. Примерен RTI модел на панел 4: А. Генериран модел с цвят по подразбиране; Б. Модел в монохромни цветове (Specular Enhancement filter); В. Модел с изключване на цветовете (Normals Visual filter); Г. Графично изображение генерирано от модела с монохромни цветове. В червено са заградени новорегистрираните графити. Изработил – З. Георгиева

Fig. 5. Stages from the RTI processing of the panels. An example of RTI model of panel 4: A. RTI model by default colour; Б. RTI model in Specular Enhancement mode; В. RTI model in Normals Visuals mode; Г. Graphic illustration of RTI model in Specular Enhancement mode. In red are traced the newly registered graffiti. Z. Georgieva

### Литература

- Георгиева и др. 2019:** З. Георгиева, Н. Прахов, К. Димитров. Недеструктивно проучване и документиране на графити от средновековните църкви „Св. Спас“ и „Св. Тодор“ в Несебър. – Археологически открития и разкопки през 2018 г. София, 2019, 682 – 685.
- Овчаров 1992:** Н. Овчаров. Корабоплаването по българското черноморско крайбрежие през XIV – XIX век. София, 1992.
- Рашенов 2006:** А. Рашенов. Месемврийски църкви. Музей Старинен Несебър, 2006.

# NON-DESTRUCTIVE SURVEY AND DOCUMENTATION OF GRAFFITI OF ST. STEFAN MEDIEVAL CHURCH IN NESEBAR

*Zdravka Georgieva, Nayden Prahov*

## SUMMARY

The survey of graffiti of the St. Stefan's church is a part of a larger project aiming to record, study and disseminate all graffiti inscribed in medieval churches in Nessebar (fig. 1). Most of them represent ships and are an important source of information for maritime traditions along the Western Black Sea coast. They are cut on four churches – St. Spas, St. Todor, St. John Aliturgetos and St. Stefan and are dated between the 14<sup>th</sup> – the beginning of 19<sup>th</sup> c., mostly after the 17<sup>th</sup> c. In 2018, overall 202 graffiti were recorded from the churches St. Spas and St. Todor.

St. Stefan's church (fig. 2) is a three-nave basilica built on a rectangular space measuring 12.10 m in length and 9.50 m in width (fig. 3). The earliest part of the church is supposed to date back to the 10<sup>th</sup>–11<sup>th</sup> c. The murals in the interior of the church have been dated in 1599.

Fieldwork in 2019 was focused primarily on the RTI capture of all graffiti located in the altar space and interior walls of the southern and northern nave. For the purpose of the capturing process, individual graffiti are combined into panels. During this phase, a total of 36 panels were captured (fig. 4). Fieldwork was followed by processing the acquired photographic data, generating RTI models and graphically illustrating them (fig. 5).

In the interior of the church 124 graffiti were registered, recorded and illustrated in total. The majority are vessels – 114 graffiti. There are numerous sketched, unfinished or half-erased graffiti of vessels. Very few of the surviving graffiti depict a detailed picture of boats or ships. Another part of the graffiti depicts animals (one graffiti of a goat, five of birds, and two of horses). The third group consists of inscriptions (mainly names with Greek letters) and years. The majority are poorly preserved and illegible.

*Zdravka Georgieva, Museum Ancient Nessebar, 2a Mesembriya Str., 8231 Staria Grad, Nessebar, zdravka.h.georgieva@gmail.com  
Nayden Prahov, National Archaeological Institute with Museum – Bulgarian Academy of Sciences, 2 Savorna Str., 1000 Sofia, naydenprahov@gmail.com*

## № 48. НЕДЕСТРУКТИВНО АРХЕОЛОГИЧЕСКО ПРОУЧВАНЕ НА СЕЛИЩЕ ОТ XV – XIX В. В М. ТУРСКО КОНУШ, С. КОНУШ, ОБЩ. АСЕНОВГРАД

*Чавдар Кирилов*

Теренното проучване се проведе между 16.09. и 30.09.2019 г. То бе предхождано от многомесечна кабинетна работа, при която бяха извлечени всички налични към момента данни от писмени извори, от старинен и съвременен картен материал, както и от сателитни изображения, с помощта на които бяха уточнени точното местоположение на селището, някои негови характеристики и връзката му с местната и надрегионалната пътна инфраструктура.

То се разполага на значителна площ между днешните села Конуш и Богданица. Част от него се намира в м. Турско Конуш в землището на първото, а останалата – в м. Джамията в землището на второто. Двете землища се делат от широк коларски път с трошенокаменна настилка, разполовяващ обекта (обр. 1).

Селището възниква, съгласно писмените данни, в първата третина на XV в., когато на това място се заселват колонисти-татари от Мала Азия, предвождани от Миннет бей. Неговият син, Миннетоглу Мехмед бей, се радва на завидна кариера през третата четвърт на XV в., играе значителна роля в османското завоевание на Западните Балкани и става последователно санджакбей на Смедерево и Босна. Родното си място той ще да превръща в значим резиденциален комплекс, изграждайки в него импозантни сгради (джамиа, кървансарай, баня и т. н.). Наред с това провежда целенасочена колонизационна политика, заселвайки тук вкл. християнско население от Босна. През първата половина на XVI в. около резиденцията, за издръжката на която е учреден вакъф, вече има четири

## B.3 Georgieva, Z. and Prahov, N., 2020. Non-destructive survey and recording of graffiti of medieval churches St. Stephen and St. John

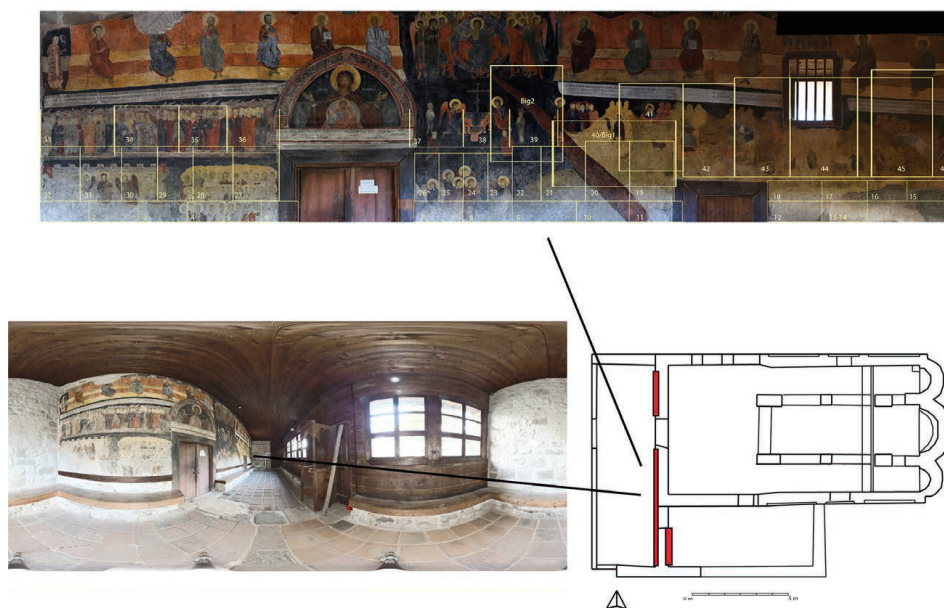


**Alitourgetos in Nessebar. *Archaeological discoveries and excavation*,  
1, 80–84.**

## № 28. НЕДЕСТРУКТИВНИ ПРОУЧВАНИЯ И ДОКУМЕНТИРАНЕ НА ГРАФИТИ ОТ СРЕДНОВЕКОВНИ ЦЪРКВИ „СВ. СТЕФАН“ И „СВ. ЙОАН АЛИТУРГЕТОС“ В НЕСЕБЪР

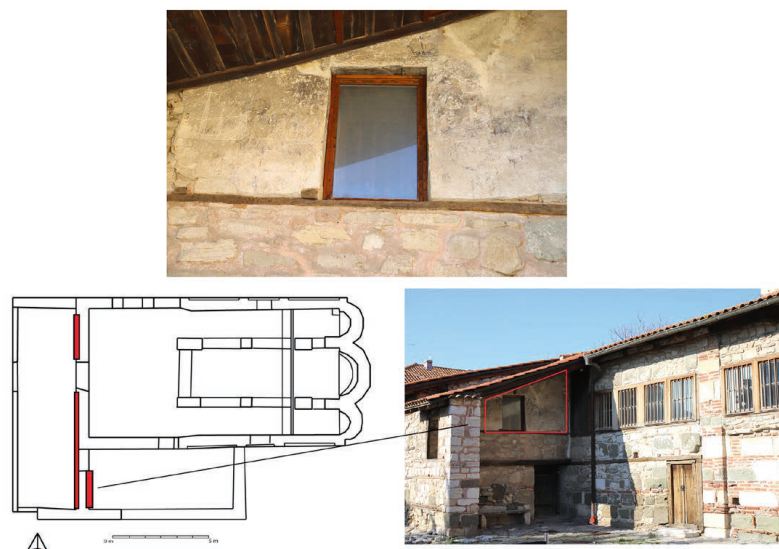
*Здравка Георгиева, Найденов Прахов*

През октомври 2020 г. бе проведено документиране на графити в нартекса (обр. 1) и външното пространство (западна стена) на църква „Св. Стефан“ (обр. 2) и по фасадите на църква „Св. Йоан Алитургетос“ (обр. 3). Използвани бяха съвременни фотографски техники – рефлексно-преобразователна фотография (RTI), фотограмметрия и гигапикселова панорамна фотография. Графитите са врязани върху вътрешните и външни фасади на четири несебърски църкви: „Св. Йоан Алитургетос“, „Св. Стефан“, „Св. Спас“ и „Св. Тодор“. Повечето от графитите са изображения на кораби и представляват важен извор за корабоплаването, корабостроенето, презморските контакти, поминъка и светогледа на населението по Западното черноморско крайбрежие. Те попадат в хронологическите граници XIV – XIX в. (Овчаров 1992). Стенописите в църква „Св. Стефан“, върху които са врязани графитите, са консервирани неколkokратно, което обаче не е спряло разрушителните процеси и заличаването на някои от графитите и/или части от тях (Георгиева и др. 2019, 684). Поради постоянното излагане на външни атмосферни условия интензитетът на заличаване на графити по външните фасади на църквите „Св. Стефан“ и „Св. Йоан Алитургетос“ е висок. Настоящият етап на документиране е част от по-машабна програма за недекструктивно проучване и документиране със съвременни фотографски техники на графитите в средновековните несебърски църкви. Основна ѝ цел е, чрез заснемането им с модерни фотографски способности, те да бъдат включени в дигитален архив с каталог, придружаван от богат фотографски и илюстративен материал. По този начин графитите ще бъдат дигитално съхранени, ще бъдат публикувани по съвременен и общодостъпен начин.



Обр. 1. Графити, разположени върху източната стена в нартекса на църква „Св. Стефан“, изготвил З. Георгиева

Fig. 1. Graffiti on the eastern wall in the narthex of the church St. Stephen, prepared by Z. Georgeiva

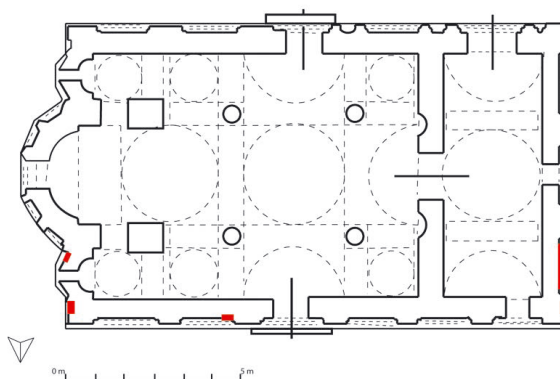


Обр. 2. Графити, разположени върху западната стена на по-късна (XVIII – XIX в.) пристройка, долепена към южната стена църква „Св. Стефан“ (днес, т. нар. „външно пространство“), изготвил З. Георгиева

Fig. 2. Graffiti on the western wall once belonged to a building (18<sup>th</sup> – 19<sup>th</sup> c.) attached to the southern wall of church St. Stephen, prepared by Z. Georgieva

Проектът през 2020 г. е изпълнен от Музей „Старинен Несебър“ и от Министерството на културата, подкрепен технически от фондация „Балканско наследство“. Ръководител на проекта е Здравка Георгиева, а заместник-ръководител е д-р Найден Прахов. Член на екипа е д-р Миглена Райковска – специалист по графична и фотодокументация. Тази година в екипа се включиха Галина Стоянова – археолог в Музей „Старинен Несебър“, като стажант, Кристи-Лий Сийтън и Кристен Джоунс – специалисти по дигитализиране на културно-исторически паметници, като доброволци.

Рефлексно-преобразувателната фотография (Reflectance Transformation Imaging – RTI) е основно използваният метод при документирането. Тя е техника, използваща серия от около 60 стандартни кадри на даден обект, заснети с помощта на стационарна камера и насочен светлинен поток от различен ъгъл и еднакво разстояние. Специализиран софтуер обединява кадрите в модел, съхраняващ и представящ подробен документален архив на повърхностната морфология. Техниката дава възможност за документиране и визуализиране на детайли от повърхността, невидими за невъоръжено око.



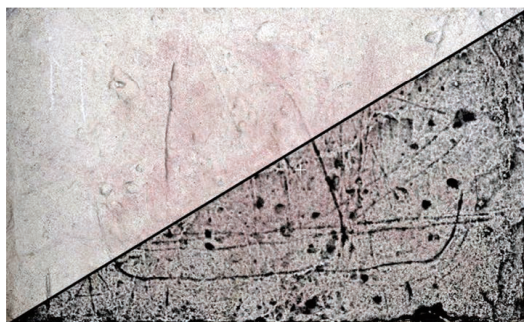
Обр. 3. План на църквата „Св. Йоан Алитургетос“ с разположението на графити по нейните източна, северна и западна фасади – обект на документиране през сезон 2020, изготвил З. Георгиева

Fig. 3. Top plan of the church St. John Alitourgetos with the location of graffiti on its east, north and west facade – recorded during season 2020, prepared by Z. Georgieva



Обр. 4. Заснемане на най-високо разположените графити във „външното пространство“ на църква „Св. Стефан“ посредством платформа, снимка Кристи-Лий Сийтън

Fig. 4. Capturing of the most greatly located graffiti in the yard of church St. Stephen with the use of scaffolding, photo Kristy-Lee Seaton



Обр. 5. Графит на кораб от източната фасада на църква „Св. Йоан Алитургетос“, преди и след компютърна обработка в Cloud Compare, изготвил Кристен Джоунс

Fig. 5. Ship graffiti on the eastern facade of the church St. John Alitourgetos, before and after digital workflow in Cloud Compare, prepared by Kristen Jones

Църквата „Св. Стефан“ е трикорабна базилика построена върху правоъгълно пространство с размери 12,10 м дължина и 9,50 м ширина. Състои се от олтар и същинска църква. Олтарът има три части: пресбитерий, протезис и диаконикон, които завършват на изток с кръгли апсиди. (Рашенов, Карайотов 2006, 14 – 15). На запад и изток са правени по-късни пристройки. Южната стена е изместена по на юг и образува отделение, в което е била стълбата за галерията, направена над първата пристройка долепяща се на запад до църквата (Рашенов, Карайотов 2006, 17). Предполага се, че най-ранната част на църквата се отнася към X – XI в.

Графитите в църква „Св. Стефан“ са разположени във вътрешното и външното пространство (западната стена), която през XVIII – XIX в. е принадлежала на пристройка, долепена до южната стена на църквата. Точно в тази част на църквата се намират най-високо разположените и най-представителни графити на кораби, които са обект на проучване през 2020 г. Графитите от този участък бяха заснети с RTI и фотограмметрия, а тези от нартекса – само чрез RTI. При заснемането бяха използвани дигитален огледално-рефлексен фотоапарат Nikon D810 и Nikon D500 съответно с 60 mm и 105 mm макро-обективи Nikkor, поставени на статив и управлявани чрез безжично предавателно устройство Cam Ranger за осигуряване на по-голяма стабилност. За източник на светлина се използваха външни светкавици, синхронизирани към фотоапаратите и снабдени със специални филтри, щадящи стенописите. Рефлекторна черна сфера с полирана повърхност прикрепена към статив беше използвана за генерирането на информация относно промяната на позициите на насочената светлина при всеки нов кадър. Позиционирането на фотоапарата беше съобразено с площта на композициите и разстоянието варираше между 1 – 2 м. Поради твърде високото разположение на някои графити в църквите „Св. Стефан“ и „Св. Йоан Алитургетос“ тази година се използва платформата, върху която бе позиционирана и стабилизирана фотографската техника (обр. 4). За целта на проучването отделните графити бяха обединени в панели, а някои по-детайлни се документираха самостоятелно чрез RTI и фотограмметрия. Генерирането на точен триизмерен модел от множество презастъпващи се кадри позволява тяхното последващо обективно анализиране.

не и дългосрочно използване. В нартекса на църква „Св. Стефан“, поради наличието на огромен брой графити (основно надписи и отделни букви и цифри), които, освен че се припокриват и застъпват, са и полу-заличени и едва забележими заради консервационни намеси и ерозиране, композирането на отделни панели бе затруднено. В нартекса с КТИ бяха генерирани общо 46 панела. За рефериране на тяхното местоположение цялата източна стена на нартекса бе заснета с панорамна 360-градусова фотография. Гигапиксела панорамна 360-градусова фотография също бе направена във вътрешното пространство на църква „Св. Стефан“ с цел по-нататъшното ѝ използване при рефериране на местоположението на графити и включването им във виртуален тур пред широка публика<sup>1</sup>.

Броят на графитите на кораби от нартекса в църква „Св. Стефан“ е 24, много по-голям изглежда е броят на останалите графити изобразяващи цифри, букви на гръцки и други неопределени издрасквания. Броят им не е установен, тъй като цялата източна стена в нартекса е покрита с презастъпващи се, на места много протрити графити, с неясни начало и край. Много от тях лежат върху надписи принадлежащи на слоя със стенописите. Броят на графитите от западната стена в двора на църквата е 15 и всички представляват изображения на кораби. Два от графитите са изобразени с черна боя – нетипични, напълно различаващи се от стандартно издълбаните с остър предмет графити. Едно от предположенията е, че те са били част от композиция от някогашния стенопис. Въпреки това, днес ги разглеждаме като отделни графитни изображения на кораби. Като добавим броя на графитите към документираните през сезон 2019 от вътрешното пространство на църква „Св. Стефан“, общият брой графити в църквата до момента е 163.

Църква „Св. Йоан Алитургетос“ (Неосветений) е построена през XIV в. – период, който се характеризира със забележителен разцвет на средновековното архитектурно строителство в града (Гълъбов 1961, 76). Църквата е кръстополна, четиристълбна, с квадратен наос и триделен олтар. Дълга е 18,82 м и е широка 10,34 м (Гълъбов 1961, 77; Киянкина 2007, 31; Теоклиева-Стойчева 2015, 167). Фасадите са богато орнаментирани от съчетания на камъни, тухли и розетки с пластични форми и многоцветни елементи с растителни и животински мотиви. Вътрешността на църквата е била покрита със стенописи, които днес не са запазени.

Графитите по фасадата на църква „Св. Йоан Алитургетос“ бяха документирани чрез фотограмметрия. За целта бе използван пълнокадров 24-мегапикселов огледално-рефлексен фотоапарат Nikon D750 с 100 mm обектив Nikkor FX. Заснемането им бе съсредоточено по източната, северната и западната фасада. Не са известни оцелели графити от вътрешното пространство на църквата. Особено току е, че всички графити са изобразени върху отделните каменни блокове, подобно на тези по фасадите на църква „Св. Тодор“ (Георгиева и др. 2019). Най-високо разположеният графит и единственият върху северната фасада е на кораб, който според формата на корпуса е датиран най-рано – XIV в. (Овчаров 1992). Той е и най-добре запазеният графит в църквата. Три графита на кораби, почти заличени, са документирани по източната фасада. Благодарение на съвременни софтуерни програми, в случая Cloud Compare, беше възможно да се очертаят по-добре едва забележими линии от корпуса на един от изключително лошо запазените графити на кораби по източната фасада (обр. 5). Върху отделни каменни блокове се различават надписи с гръцки и латински букви; години и един герб, който според предходни изследвания се предполага, че е хералдичен знак на граф Амадей VI Савойски, направен по време на един от неговите източни походи през 1366 – 1367 г. (Пюзелев 1972, 62; Овчаров 1992, 7). Към днешна дата каменните блокове от западната фасада на църквата са най-ерозиралите, което от своя страна е довело до лошото състояние на повечето графити, намиращи се там. Общият брой на графити от източната, северната и западната фасада на църква „Св. Йоан Алитургетос“ е 14 – четири графита на плавателни съдове, един герб, седем надписа и два на години.

### Литература

**Георгиева и др. 2019:** З. Георгиева, Н. Црахов, К. Димитров. Недеструктивно проучване и документиране на графити от средновековни църкви „Св. Спас“ и „Св. Тодор“ в Несебър. – Археологически открития и разкопки през 2018 г. София, 2019, 682 – 685.

**Гълъбов 1961:** И. Гълъбов. Несебър и неговите паметници – пътеводител. София, 1961.

**Пюзелев 1972:** В. Пюзелев. Очерк върху историята на град Несебър в периода 1352 – 1453 г. – Годишник на Софийския университет. Философско-исторически факултет, 64, 3, 55 – 98.

<sup>1</sup> <https://360.gigascan.bg/360/GigaScan/VRTours/StStephen.html>



**Кияшкина 2007:** И. Кияшкина. Несебър – хилядолетният град. Славна. Варна, 2007.

**Овчаров 1992:** Н. Овчаров. Корабоплаването по българското черноморско крайбрежие от XIV – XIX век (по данни от рисунките-графити в църквите на Несебър). София, 1992.

**Рашенов, Карайотов 2006:** А. Рашенов, И. Карайотов. Месемврийски църкви. Несебър, 2006.

**Теоклиева-Стойчева 2015:** Е. Теоклиева-Стойчева. Златната книга на Несебър. Бургас, 2015.

#### NON-DESTRUCTIVE SURVEY AND RECORDING OF GRAFFITI OF MEDIEVAL CHURCHES ST. STEPHEN AND ST. JOHN ALITOURGETOS IN NESEBAR

*Zdravka Georgieva, Nayden Prahov*

##### SUMMARY

The survey of graffiti in the churches St. Stephen and St. John Alitourgetos is part of a larger project aiming to record and study all graffiti inscribed in the medieval churches in Nesebar. Most of the graffiti represent ships and are an important source of information about maritime traditions along the Western Black Sea coast. They are cut on four churches – St. Spas, St. Todor, St. John Alitourgetos and St. Stefan and are dated between the 14<sup>th</sup> and the 19<sup>th</sup> c.

St. Stephen's church is a three nave basilica built on a rectangular space measuring 12.10 m in length and 9.50 m in width. The earliest part of the church is supposed to date back to the 10<sup>th</sup> – 11<sup>th</sup> c. The murals in the interior of the church have been dated in 1599. St. John Alitourgetos is a domed cruciform church with three altar apses and a *narthex*. It is 18.82 m long and 10.34 m wide. The church was built in the 14<sup>th</sup> c.

Field work in 2020 was focused on recording graffiti from the *narthex* (fig. 1) and the western wall of St. Stephen's yard (fig. 2), as well as on recording of graffiti located on the facades of St. John Alitourgetos (fig. 3). The graffiti were recorded with reflectance transformation imaging (RTI) (fig. 4), photogrammetry and gigapixel 360-degree photography. In 2020, 46 RTI panels were captured in the *narthex* of St. Stephen and two from the western wall in the yard. The estimated number of ship graffiti captured this year in St. Stephen is 38.

The graffiti from the eastern, northern and western exterior facades of the church St. John Alitourgetos were recorded with photogrammetry. Individual graffiti are inscribed on separate stone blocks. The graffiti preservation is very poor (fig. 5), especially the ones located on the western wall, where the stone blocks are the most eroded. During this fieldwork 14 graffiti were recorded – four of ships, one of a heraldic symbol, seven inscriptions and two years.

*Zdravka Georgieva, Museum Ancient Nesebar, 2a Mesembriya Str., 8231 Staria Grad, Nesebar, zdravka.h.georgieva@gmail.com*  
*Nayden Prahov, National Archaeological Institute with Museum - Bulgarian Academy of Sciences, 2 Sabornu Str., 1000 Sofia, Centre for Underwater Archaeology, 1 Apollonia Str., 8130 Sozopol, naydenprahov@yahoo.com*

## ПОДВОДНИ ПРОУЧВАНИЯ

### № 29. НЕДЕСТРУКТИВНИ ПРОУЧВАНИЯ В АКВАТОРИЯТА НА КАВАРНА И НОС ШАБЛА

*Найден Прахов, Асен Салкин, Ивелина Петкова*

През 2020 г. Център за подводна археология (ЦПА) към Министерство на културата (МК) възобнови редовните подводни археологически проучвания по Северното Черноморие с финансиране от МК по ежегодната програма за теренни археологически проучвания и теренна консервация. Научен ръководител е Н. Прахов (ЦПА и НАИМ – БАН), заместник-ръководител – И. Петкова (ЦПА), а консултант – А. Салкин. Теренната работа се състоя от 1 до 15 септември и обхваща части от аквато-

**B.4 Georgieva, Z., Prahov, N., Raykovska, M., Jones, K. and Lea-Seaton, K., 2022. Advanced photographic methods in studying ship graffiti**



from medieval churches in Nessebar. *Interdisciplinary Studies*, 27, 21–42.

## Advanced photographic methods in studying ship graffiti from medieval churches in Nessebar

Zdravka Georgieva<sup>a</sup>, Nayden Prahov<sup>b</sup>, Miglena Raykovska<sup>c</sup>, Kristen Jones<sup>d</sup>,  
Kristy Lee-Seaton<sup>e</sup>

<sup>a</sup> PhD Student at the Centre for Maritime Archaeology, University of Southampton, UK;  
[zdravka.h.georgieva@gmail.com](mailto:zdravka.h.georgieva@gmail.com)

<sup>b</sup> Bulgarian Center for Underwater Archaeology; Archaeological Institute with Museum – Bulgarian Academy of Sciences, 2 Saborna Str., 1000 Sofia, Bulgaria; [naydenprahov@gmail.com](mailto:naydenprahov@gmail.com)

<sup>c</sup> Gigascan Bulgaria Ltd.; Institute of Information and Communication Technologies – Bulgarian Academy of Science, 2 Saborna Str., 1000 Sofia, Bulgaria; [miglena.raykovska@gmail.com](mailto:miglena.raykovska@gmail.com)

<sup>d</sup> PhD Student at the Department of Geography & Planning at Queen's University, Canada;  
[kristenjones.mail@gmail.com](mailto:kristenjones.mail@gmail.com)

<sup>e</sup> Gigascan Bulgaria Ltd., 83 Ralevitsa Str., 1618 Sofia, Bulgaria; [klseat1@gmail.com](mailto:klseat1@gmail.com)

### ABSTRACT

This article discusses the application of advanced computational photographic techniques in recording and surveying graffiti from medieval and post-medieval churches in the historical town of Nessebar on the Bulgarian Black Sea coast. Reflectance Transformation Imaging (RTI), Close-range photogrammetry, and Gigapixel panorama photography were used in a project for the documentation and research of historical graffiti in four churches in Nessebar. The project aims to create a complete record and database of these important historical monuments according to modern standards making the most of advanced technical opportunities for scientific documentation. The authors demonstrate the advantages of these techniques in the recording and the study of the graffiti in greater detail than was possible before, as well as in the assessment of their state of preservation and the opportunities for their publication and presentation at high standards. In order to evaluate the performance of the methods during the analysis process, the novel dataset of ship graffiti was compared to earlier research studies.

**Keywords:** ship graffiti, Reflectance Transformation Imaging (RTI), Close-range Photogrammetry, Gigapixel panorama photography, medieval churches, Nessebar

### INTRODUCTION

Since 2018, a team of archaeologists from the Bulgarian Center for Underwater Archaeology (CUA), the Archaeological Museum in Nessebar, the National Archaeological Institute with Museum at the Bulgarian Academy of Sciences (NAIM – BAS) and the Balkan Heritage Foundation (BHF) have undertaken a project aimed at recording historical graffiti, mostly of ships, from four medieval and post-medieval churches in Nessebar, a UNESCO World Heritage town on the Bulgarian Black Sea coast (Fig. 1). The project has been financially and technically supported by the Ministry of Culture, the BHF, and the CUA. Its ultimate aims are:

- to create a complete record and database of these important historical monuments according to modern standards and advanced technical capabilities for scientific documentation.



**Fig. 1.** The map of Nessebar showing the locations of the churches with the number of documented ship graffiti in each of them

- to assess the graffiti's state of preservation and conservation.
- to generate the graffiti's presentation and communication with the public through publications, exhibitions, and an online database, accessible free of charge.
- to offer broader and more objective perspectives in studying a relatively understudied discipline, namely seafaring and shipbuilding in the western Black Sea during the post-medieval period.

The advanced computational photographic techniques used so far are Reflectance Transformation Imaging (RTI), Photogrammetry, and Gigapixel Panorama Photography. They facilitate capturing small-scale details of the graffiti and the visualization of elements barely visible by a naked eye. In addition, the precise documentation supports the scientific analysis of the monuments and gives various opportunities for their visualization and presentation.

## MATERIALS AND METHODS

### *The Graffiti in Nessebar Churches*

Several hundred historical graffiti have been registered in four medieval and post-medieval churches in Nessebar. These are St. Spas (Church of the Holy Saviour/The Holy Ascension of the Lord, 17<sup>th</sup> century), St. Stephen (built in the 11<sup>th</sup> century and reconstructed in the 13<sup>th</sup>, 16<sup>th</sup>, and 18<sup>th</sup> centuries), St. Todor (built in the 13<sup>th</sup>, and reconstructed in the 18<sup>th</sup> century), and St. John Alitourgetos (13<sup>th</sup> – 14<sup>th</sup> century) (Fig. 2). The biggest group of ship graffiti numbers over 300 and it is also the most studied (Villain-Gandossi 1979; Овчаров Н. и др. 2019; Georgieva,



**Fig. 2** Nessebar medieval churches where ship graffiti were documented with advanced photographic methods in the current study

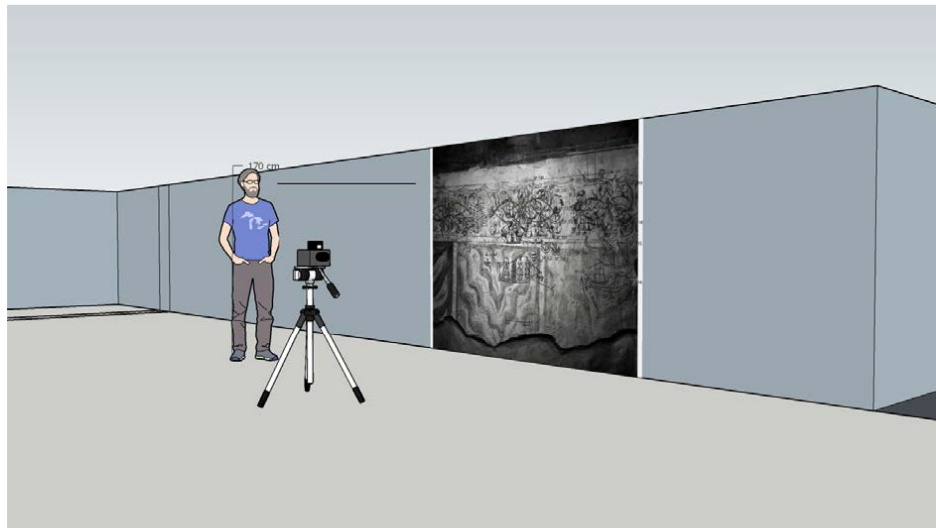
Prahov 2020). Another group represents personal names and years, but so far, these graffiti have not been studied at all. According to the depicted years, they can be dated mainly to the 19<sup>th</sup> century. There are also single graffiti of heraldic symbols on St. John Alitourgetos church, dated by early researchers to the 14<sup>th</sup> century (Обчаров Н. 1992). Several graffiti of animals (horses, birds, a goat) in St. Spas and St. Stephen churches, graffiti of buildings in St. Todor, as well as schematic anthropomorphic images in St. Stephen church could be associated chronologically with the larger group of ship graffiti. The graffiti were notched on various places on the inner and outer façades of the buildings, on murals (St. Spas and St. Stephen) or on separate stones (St. Todor, St. John Alitourgetos). Most of the ship graffiti were incised on the decorative rectangular frames (panels) of the low murals level in St. Spas and St. Stephen churches (imitation of the semi-precious stone plates decorating the luxurious late antique churches) and in the second level with floral decorative elements which are at human head height (1.6 – 2 m). This level is still quite suitable for notching the images. Most of these panels are carved with several ship images, which are sometimes organized in logical compositions. Many of the ship graffiti, and almost all graffiti of names and years, are depicted on the upper murals level with the figural images of saints and scenes from the New Testament. Many of these overlap one another, as is the case with the eastern wall of St. Stephen's narthex where several dozens of ship graffiti are densely covered with later notched names, years and still unidentified incisions. The high-

est incised graffiti are those of names and years, some of them at more than 3 meters in height, which is an obstacle for their documentation. In general, the ship graffiti are located at a height between 1 and 3 m, most of them between 1 and 1.8 meters (Fig. 3). The graffiti of names and years are located at a height between 1.5 and 4 m, with most found between 1.8 and 3 m. This shows a somewhat topological chronology of earlier – lower level, and later – higher level graffiti. An exception is a group of precisely incised ship graffiti on St. Stephen church's exterior façade that is located at 3 – 4 m height on the east-facing wall, now under the roof, which once belonged to the western wall of an upper floor that resembled a gallery (Рашинов 2006, 17). These are some of the most representative and largest depictions of this group.

So far, the research has focused only on the group of ship graffiti since they represent an important historical source of information for seafaring, shipbuilding traditions, and the world-view of the population in Nessebar and that of the Western Black Sea coast in the post-medieval period. The ship graffiti were dated by N. Ovcharov (Овчаров Н. 1992), on the basis of their typological characteristics and the information for the building, reconstruction, and wall-painting of the churches, between the 17<sup>th</sup> and 19<sup>th</sup> centuries. This was a period when the Western Black Sea coast and most of the Balkan Peninsula were part of the Ottoman Empire. Only the graffiti from St. John Alitourgetos could be dated to an earlier period (13<sup>th</sup> – 14<sup>th</sup> century).

Depiction of ship graffiti in holy places, such as churches and monasteries (buildings or rock cut temples), mosques, shrines, and sanctuaries, is a widespread phenomenon in the Mediterranean and its hinterland (Artzy 1999; Champion 2015; Demesticha et al. 2017; Meinardus 1972; Michail 2015).

In Bulgaria, late medieval or post-medieval ship graffiti are also known from inland, *e.g.* from the church of Holy Forty Martyrs in Veliko Tarnovo (Dermendjiev, Koseva (Дерменджиев, Косева 2000), the church St. George in Kyustendil (Mitov 2018), Imaret Mosque in Plovdiv (M. Champion (Овчаров Н. 1987), and Aladzha rock cut monastery near Varna (Todorov 1981).



**Fig. 3.** *The most common location of ship graffiti in the interior of the churches is at human eye level*

A separate group of ship graffiti are the medieval ones discovered in the medieval Bulgarian capital cities of Pliska and Preslav, and the ones in Nikopol on the Danube which were dated to the 10<sup>th</sup> century (Ovcharov D. 1977; Овчаров Д. 1981).

The origin and reasons for incising ships in various, mostly sacred, places are still not conclusively known. The most plausible and widely accepted hypothesis considers them 'ex-voto' representations (Artzy 1999; Demesticha et al. 2017; Michail 2015). Champion 2015 suggests that these carvings were left by medieval religious mariners inside the holy temples, and compares this practice with the British tradition known as 'church ships', according to which wooden ship models were left hanging from the churches' roofs as votive offerings for safe return from a voyage (Champion 2015, 345). Such practice was also common in other countries. In his work N. Ovcharov (Ovcharov N. 1993, 8 – 9) interprets ship graffiti as 'snapshots or photographic pictures of the things that had excited the people's minds, as well as representation of objects (i.e. ships) that were 'worshipped by seamen and fishermen' (Овчаров Н. 1992, 8 – 9).

It is not clear if the graffiti in Nessebar had been notched in the period when the churches were still functioning or after their abandonment. However, the quantity of the graffiti, seriously damaging the wall paintings, suggests the latter. The tradition of notching objects or names in churches contradicts the canons of the Church and would not have been tolerated by the clergy.

The ship depictions in Nessebar are a schematic but often accurate and correct representation of a ship's or a boat's hull and its rigging system. The details and the shapes of the hulls, masts, sails, riggings, anchors, their position, and other specific details show that they were notched by people whose life was closely connected with the sea, and who knew the seafarer's craft.

The ship graffiti in Nessebar are an important source of historical and anthropological information about shipbuilding, seafaring, and the life and worldview of the marine communities along the Western Black Sea coast. They complement the relatively poor data from the written historical sources and the archaeological record for the region from the 17<sup>th</sup> – 19<sup>th</sup> century. Despite the importance of Nessebar's graffiti as cultural heritage monuments, they have not yet been comprehensively documented and published nor studied; consequently, they have not been the subject of research. C. Villain-Gandossi (1981) analyzed and published 64 ship graffiti from St. Stephen and four from St. John Alitourgetos, along with photographs and technical drawings of some of them (Villain-Gandossi 1981, 405 – 420). N. Ovcharov (Овчаров Н. 1992) published more than 200 drawings (imprints) of single ships or compositions of several ships along with drawings (imprints) of them in his monograph dedicated to seafaring along the Western Black Sea coast from the 14<sup>th</sup> – 19<sup>th</sup> century. His fieldwork for copying the graffiti covered three of the churches. These were St. Spas, St. Stephen and St. John Alitourgetos (Овчаров Н. 1992). The graffiti in St. Todor church were only recently discovered (Georgieva et al. 2019).

Today, the technological advances in the methods for cultural heritage documentation gives wider and more objective perspectives for the presentation, communication, study, and interpretation of graffiti. Their publication and presentation according to the modern standards and technical opportunities will encourage further studies of the barely known discipline of seafaring in the western Black Sea during the post-medieval period.

### *Computational Photography Methods*

In the field documentation of the graffiti from Nessebar several photographic methods were used. These were as follows: Reflectance Transformation Imaging (RTI), Close-range Photogrammetry, and Gigapixel panorama photography. Several software products were rou-



tinely used to process the generated images (models), including Adobe Creative Cloud package, Cloud Compare, Agisoft Metashape, RTI Builder and Viewer, ImageJ, and D-stretch plugin.

### Reflectance Transformation Imaging (RTI)

Recording with RTI was the principal method applied in this project. RTI is a computational photographic method for documentation, exploration, and visualization of the surfaces of various cultural heritage monuments. The technique makes it possible to examine, document, and visualize surface details, even those invisible to the naked eye (Mudge et al. 2006; Palma et al. 2010). This method uses a series of photographs (best practice suggests approximately 60 images) of an object taken with a stationary camera and flashlight, pointed from different angles and at the same distance. Specialized software called RTI Builder combines the images through the Polynomial Texture Mapping (PTM) or Hemispherical Harmonics (HSH) fitting algorithms. The resulting output is a single RTI file that presents the detailed surface morphology of the object in an interactive manner. The model, manipulated via the RTI Viewer software, allows the object to be viewed by the researcher from a different angle of illumination, *i. e.* through shading enhancement methods and at the desired magnification. The software also offers other options for viewing and presentation, thus producing ‘increased photorealism’ of an object (Caine and Magen 2011; Malzbender et al. 2001) (Figs. 4 a, b, c, d, e, f). A processed image with a clear enough visualization of all details in the frame can then be further edited and exported for graphical illustration (Fig. 4f).

RTI is a widely available technique since the software package RTI Builder and the associated RTI Viewer are open-source developed and provided by Cultural Heritage Imaging (CHI, NG, USA) along with manuals and instructions for their use (<http://culturalheritageimaging.org/Technologies/RTI/>). The necessary equipment is a camera, lens, tripod, external flash



*Fig. 4a. RTI shot of a panel from the south wall of the church St. Spas without enhancement. Here the fresco is also visible, which can sometimes confuse the researcher during analysis of small-scale details*

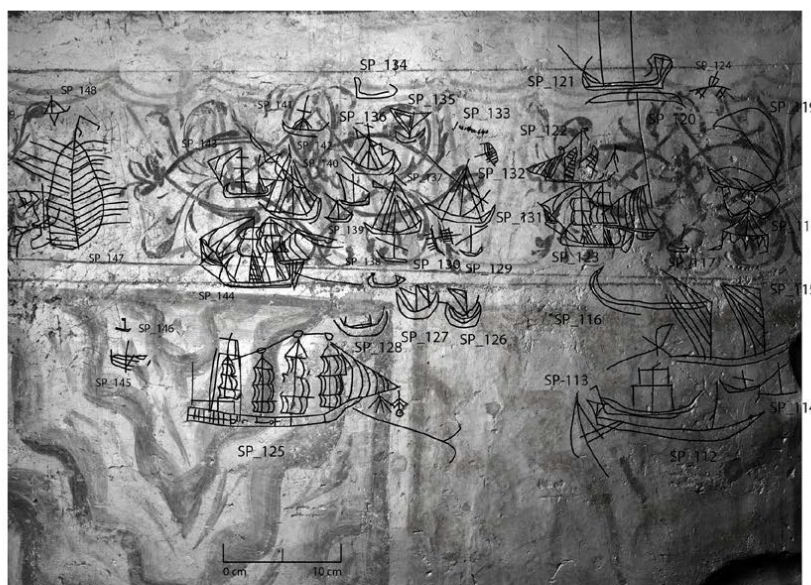


*Fig. 4b, 4c, 4d. RTI models of a panel from the south wall of the church St. Spas with the use of 'Specular enhancement' method. Some areas of the shots are quite illuminated, which could prevent the researcher from presenting evenly the small-scale details of the picture. This is the most common limitation of RTI*





**Fig. 4e.** RTI model of a panel from the south wall of the church St. Spas with the use of 'Normals visualization' method. Here the texture of the fresco is excluded in order to facilitate analysis of the small-scale details. In order to achieve better results in this case, the high-resolution setting is very important. The method works quite well when the object's surface has high relief

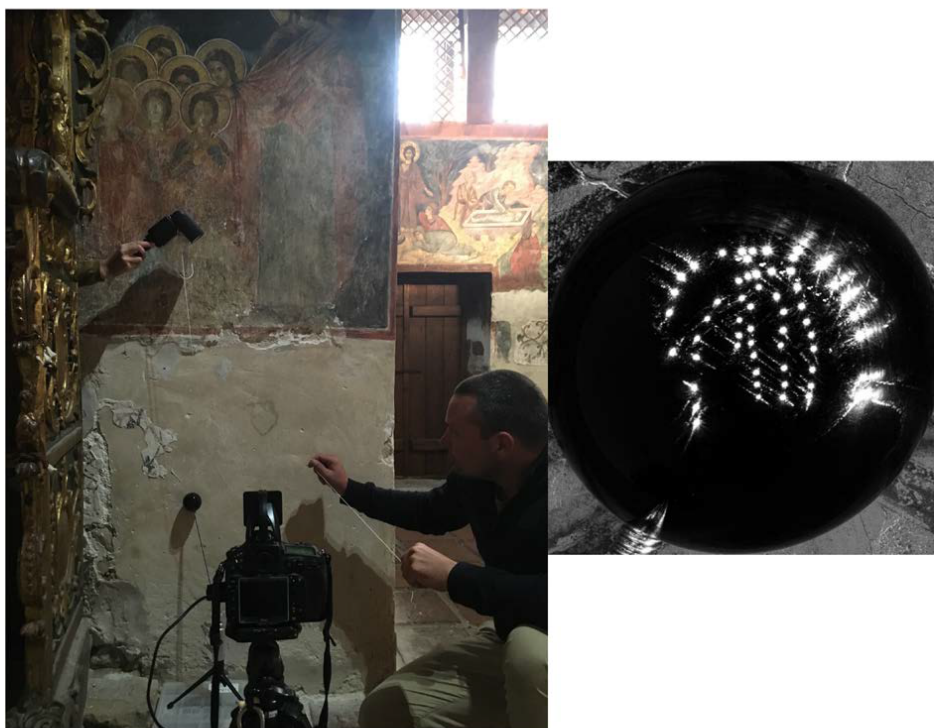


**Fig. 4f.** A RTI model of a panel from the south wall of the church St. Spas is used as a background in the creation of a technical drawing, thus allowing the researcher to present all details of the scene precisely and correctly

with a remote transmitter, computer, and a black sphere with a polished surface. The sphere is placed next to the artifact or monument within the image frame. The reflection of the flash on the sphere, recorded on any picture, provides RTI Builder with the necessary information about the location of the flash, which is then used in the construction of the model (Fig. 5).

Numerous RTI projects have been implemented for documentation and exploration of various monuments and artifacts in numismatics, epigraphy, rock art, fine arts, wood carving, metal, ceramics, paper art and craft, architecture and more (Caine and Magen 2011; Earl et al. 2010; Mudge et al. 2006).

In the course of graffiti RTI recording in the Nessebar's churches, the two DSLR cameras and lenses used were Nikon D750 and Nikon D500 with 60 mm and 105 mm macro NIKKOR lenses. They were mounted on a tripod and controlled by a wireless transmitter for greater stability. The cameras were synchronized with the external flashes – either “Nikon Speedlight SB-800” or “Godox”. The shooting distance varied between 1 – 2 m, thus providing sufficient detail and resolution of the images. The positioning of the camera and the composition of image frames was in accordance with the graffiti compositions on the walls (Fig. 6). The single graffiti and some more representative and important ones were recorded separately. When several graffiti were incised close to one another, the composition of the pictures aimed to include the entire group of epigraphic monuments. If this was impossible, the graffiti were combined in several groups. The biggest challenge was to compose the shooting frames on the wall areas



*Fig. 5. Black polished sphere used in capturing a scene compiles all reflected flash lights*

with high concentrations of graffiti of ships or names and years, some of them overlapping one another (e.g. the narthex of St. Stephen church with numerous graffiti of ships, names and years, and the upper wall painting register in St. Spas and St. Stephen churches with a concentration of graffiti of names and years as well as some ships). At this stage of fieldwork, priority in the documentation was given to the ship graffiti. The recording of complex scenes of several interconnected graffiti of ships, boats, ropes, and anchors depicted over larger areas on the walls presented another challenge. In these cases, we attempted to include all interrelated graffiti when possible, given the size of these complex compositions. If necessary, the camera distance was increased, but this reduced the image resolution. RTI recording of graffiti in the corners of the churches or in some niches or window holes was also quite difficult due to obstacles with the positioning of the camera and the flash at the necessary distance and with the illumination of the graffiti from each side. Another serious challenge was to record the highest graffiti on the walls. In these cases, the camera tripods were set on platforms, and the flash was fitted on a long telescopic monopod. For the documentation of the exterior ship graffiti located under the roof of St. Stephen church, a stable metal scaffolding was used (Fig. 7). When graffiti were incised too high on the church walls or in some small niches, the application of the RTI technique was unsuitable due to technical restrictions. In these cases the documentation was replicated using close-range photogrammetry.



**Fig. 6.** *Precise framing of a panel from the south wall inside the church St. Spas. Positioning of the camera at an accurate distance of 1.50 m in accordance with the size of the scene*





*Fig. 7. Capturing of the highest located graffiti in the yard of church St. Stephen with the use of scaffolding*

### Photogrammetry

With its wide range of applications and techniques, photogrammetry has become commonplace in cultural heritage documentation over the past decade. Photogrammetry is a useful tool for the documentation of small features such as graffiti through the extraction of line drawings to scale from the 3D models. However, the dense 3D models can also be used for detailed analysis and interpretation. Like RTI, photogrammetry is a non-invasive recording method that can be executed quickly and accurately in the field, with further processing to enhance the details done off-site.

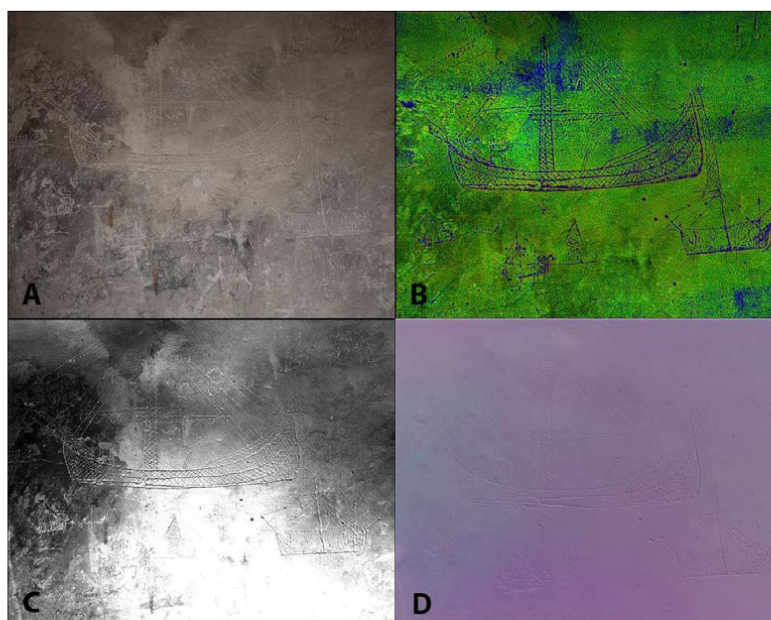
During the 2020 season of this project, close-range photogrammetry was done on one of the exterior graffiti of the church of St. Stephen and on five panels on the exterior of the church of St. John Alitourgetos. This included three on the east wall and one each on the north and west walls. The on-site photography was done using a Nikon D750 24 megapixel full-frame DSLR camera and a Nikkor 100mm FX lens. The photos were taken from a distance of about 1 m, which provided a ground sample distance of  $0.05 \times 0.05$  mm. Therefore, one pixel in the image represents  $0.5 \times 0.5$  mm in space. The estimated *a priori* accuracy of 0.3 mm provides the limit of detail which can be seen and detected in the models. The models were built in Agisoft Metashape (v1.5.4) and scaled using a scale card visible in the images. On average, the panels of St. John were between 30 and 50 sq cm, and the resulting point clouds had on average 5 million vertices.

Numerous post-processing methods can be used to enhance 3D models to visualize and enhance graffiti. A common method in the literature is to import the models into mesh analysis software such as MeshLab (Prada & Wordsworth 2018; Lopez et al. 2019) or 3D Studio





**Fig. 8.** Results of photogrammetric processing of an exterior panel on the west wall of the church of St. John Alitourgetos before and after the algorithms were applied



**Fig. 9.** Comparison of results from photogrammetry and RTI processing on an exterior panel at the church of St. Stephen: (A) RGB orthophoto; (B) photogrammetric results; (C) RTI results; (D) normal map

Max (Bertocci et al. 2018), where an artificial raking light can be introduced to the model that mimics the effect of RTI using the normal maps. Other methods include the use of computer algorithms such as the Multivariate Alteration Detection (MAD) algorithm, which is used to highlight changes in surfaces (Abate et al. 2019).

For this project, the models were exported as .obj files and then imported into Cloud Compare (v2.7.0), an open-source 3D point cloud program, for further processing. The .obj files

were opened in Cloud Compare and two algorithms were run on the point clouds. These were PCV (ambient occlusion) (Tarini et al. 2003) and Poisson Surface Reconstruction developed by Kazhdan et al. (2006). PCV uses the normals of the point cloud to compute the illumination from a theoretical sphere of light at each point of the cloud. The resulting scalar field is applied to the point cloud and can be modified to increase contrast to enhance features. Poisson Surface Reconstruction generates a triangulated mesh from a point cloud with normals. Similarly to PCV, the resulting scalar field can be adjusted to refine the visibility of features (Fig. 8). In this way, models of both methods, photogrammetry and RTI, used to document the large panel on the exterior of the Church of St. Stephen, were compared in post-processing (Fig. 9).

### 360-degree Photography and Gigapixel Panorama

Virtual tours and virtual reality experiences are quickly becoming a common marketing trend in heritage. An increased number of museums, galleries, and historical sites are presenting themselves to the world through these new media. The experience of being able to explore, wonder, and play in these online environments while learning, conveys innovative power and an opportunity to provide unrestricted access to these museums and sites without putting the heritage at risk. The Smithsonian Museum in the United States has a virtual tour of the past and present exhibits available on their website, and this allows the public to view these important artifacts of the past even after exhibits have ended. The British Museum offers virtual tours through Google Street View as well as having an online catalog. Archaeological and heritage sites themselves have not been left out of this movement. Some more notable examples include the virtual tour of Stonehenge by English Heritage (2017), the Acropolis virtual tour by the Acropolis Restoration Service (2014), and the virtual tours of five Egyptian sites, including tombs not open to the public by Harvard University (2020). Around the world, it is becoming a necessity to have an online presence.

A 360° virtual tour of the St. Stephen church was completed during the 2020 season to promote this important monument and create a virtual visualization that can be used by researchers and the public from all over the world. In total, nine 360° panoramas were created, each with a 500-megapixel resolution (Fig. 10). This corresponds to six panoramas in the *naos* and three panoramas in the *narthex*. The panoramas have been combined into a virtual tour



**Fig. 10.** 360-degree panorama of the naos in the church St. Stephen



**Fig. 11.** Gigapixel panorama on the narthex of St. Stephen church which serves as a map of the graffiti models

which can be accessed at: <https://360.gigascan.bg/360/360GigaScan/VRTours/StStephen.html>. The tour includes all of the panoramas taken, and when the tour is online, it can be used to promote the museum and encourage more visitors to the site itself. The next goal concerning the public communication and presentation of the graffiti is their incorporation in the virtual tours for the distance tourists and the researchers.

Moreover, such data is a digital archive, which preserves the knowledge and conditions of the site at a certain point in time, such as in the museum setting. It can also be used as a research tool by academics who are unable to access the site physically. In this way, researchers can, for example, track any regress at the site in order to make plans for conservation and reconstruction. In addition to the 360° virtual tour, a Gigapixel panorama was created of the entire eastern wall of the narthex in the church of St. Stephen, where the graffiti were documented (Fig. 11). This high-resolution image serves as a map to locate all the RTI panels. Due to its high detail, this is an excellent archival document containing information on the condition of the frescoes at this specific point in time.

Gigapixel images have a resolution equal to or greater than 1,000 megapixels. To properly stitch a panoramic image (both for 360° and gigapixel images), the camera and lens have to rotate around a no-parallax point, which corresponds to the entrance pupil of the lens. Rotation around this point eliminates the effect of parallax, which is the movement of two distant objects relative to one another when viewed from different angles. In this project, we employed two devices from Dr. Clauss Bild- und Datentechnik GmbH. These were the Rodeon piXplorer for the gigapixel panorama and the piXplorer 500 for the 360° photography. A Nikon D500 camera with a 105 mm lens was attached to the Rodeon piXplorer.

#### **Color Decorrelation Stretching (D-Stretch plugin)**

Colors are generally represented in digital imaging by a three-component vector, such as the commonly used Red, Green and Blue components of the RGB, which is the default of most digital imaging systems. Color Decorrelation Stretching is a technique for enhancing contrast in non-standard color spaces, such as XYZ and LAB. Since the 1980s, this technique has been increasingly applied to terrestrial sites and is recognized as one of the most important tools for documenting rock art (Brady, Gunn 2012, 629). With the creation of the D-Stretch plugin for ImageJ, a scientific image processing toolkit developed by the US National Institutes of Health, these complex algorithms can now be easily manipulated by non-specialist users. Color Decorrelation, and D-Stretch in particular, has yielded spectacular results in the digital reconstruction of degraded, faded, and damaged wall paintings at Angkor Wat in Cambodia (Tan et al. 2014), but it also gave great results in the survey of the frescoes in Balsha in 2015 (Bevan et al. 2015, 146).



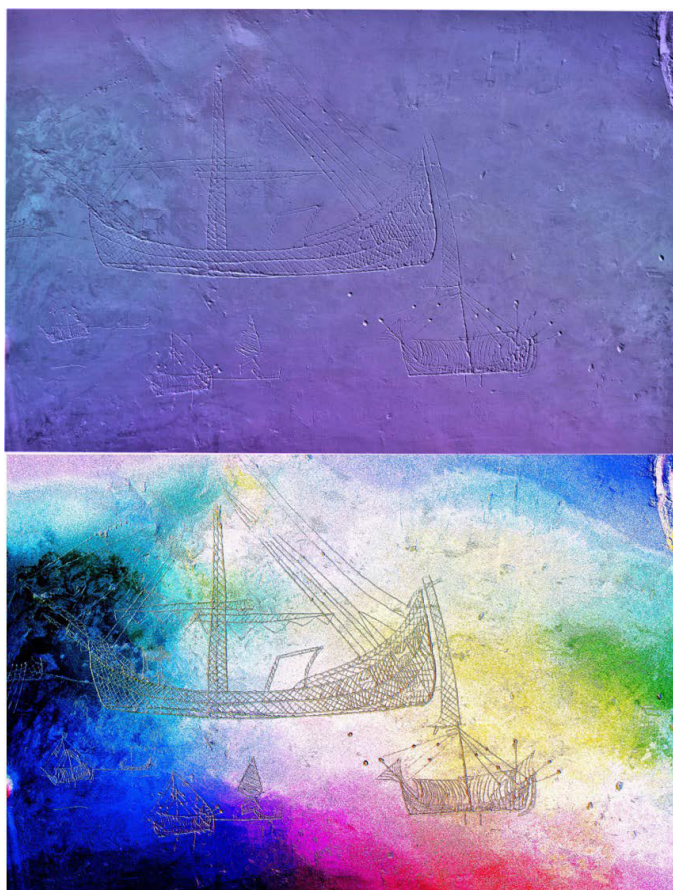
D-Stretch takes similar colors that are perceptually hard to distinguish with a naked eye and redistributes them evenly throughout the entire color space. The algorithm performs an inverse transformation to bring these stretched colors back to the original, native RGB space, but with different hue variances (Harman 2008). This new decorrelated representation of the original colors, though does not restore the original pigments. The new image may be technicolored in quite an artificial way (Fig. 12) (Bevan et al. 2015, 146).

## RESULTS

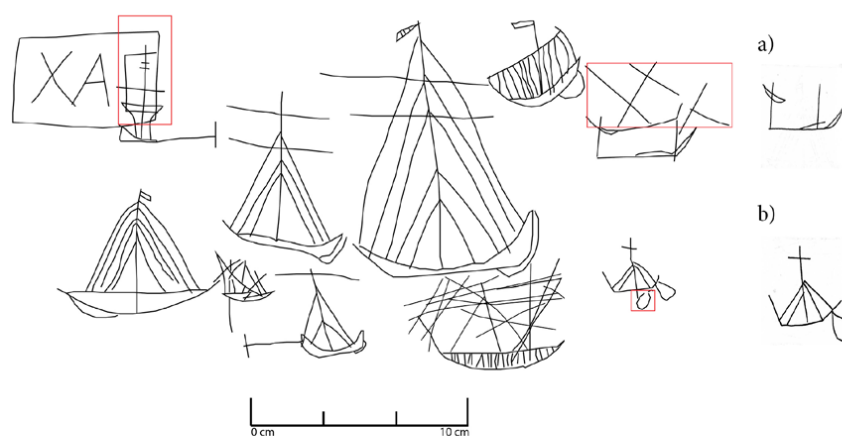
The advanced photographic techniques (mostly RTI) made it possible to capture the graffiti in Nessebar's churches in great detail and visualize subtle relief elements, some invisible to the unaided eye, to uncover previously unknown graffiti or parts of them.

### *Graffiti from the church St. Spas*

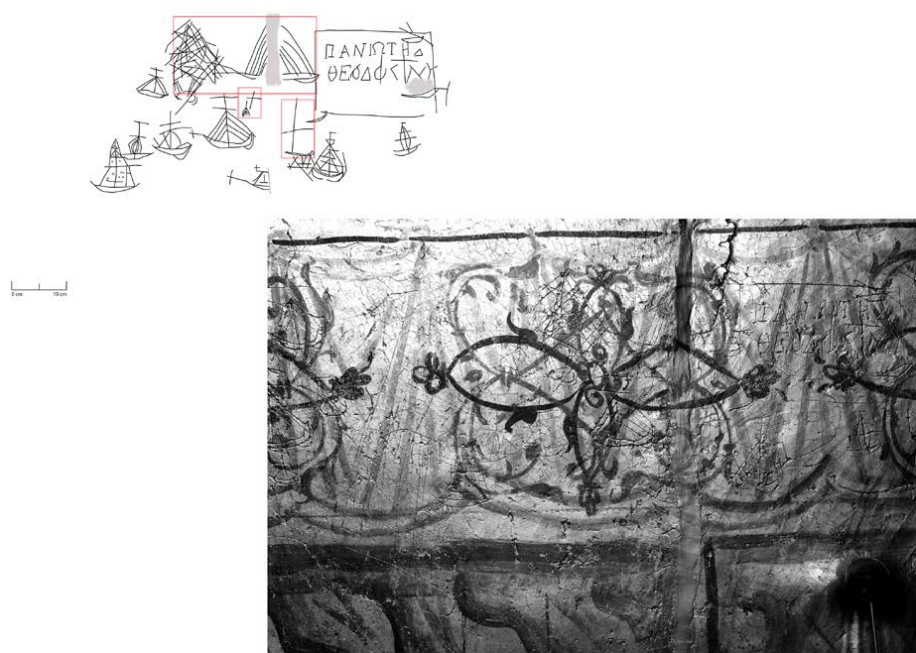
In the nave of the church St. Spas, a total of 174 ship graffiti were recorded with RTI. After applying the technique and analysis of the images with various surface enhancement



*Fig. 12. Representation of a ship graffiti from St. Stephen church with Normals Visualization effect (up) and with DStretch Plugin (down)*



**Fig. 13.** New elements of some ship graffiti were found (framed in red) during comparative analysis with the technical drawings from N. Ovcharov's catalogue (1992): a) ship graffiti No 61; b) ship graffiti No 62



**Fig. 14.** Some elements of the graffiti have been erased with paint during conservation of the murals in the past. This is a sign that these monuments have been neglected at the time. Framed in red are elements registered during the current project

methods, we registered previously undocumented details of some of the graffiti (Fig. 13), as well as 35 ship graffiti that are not included in the publications from the second half of the 20<sup>th</sup> century. Several ship graffiti have been partially covered and even filled in with paint in previously undertaken conservation procedures against the constant erosion of the murals inside the church (Fig. 14). In his catalog accompanying the monograph, N. Ovcharov presented 139 ship graffiti from the church St. Spas (Овчаров Н. 1992).

During the current survey, 10 of these ship graffiti were not discovered. Five of them seem to have been presented on the sides of the south entrance but are lost today. Ship graffiti from the north wall of the nave presented in N. Ovcharov's catalog under the numbers 50, 51, 52, 89 were not discovered in the course of our work. A graffito under the number 134 in his catalog from the south wall was also not found.

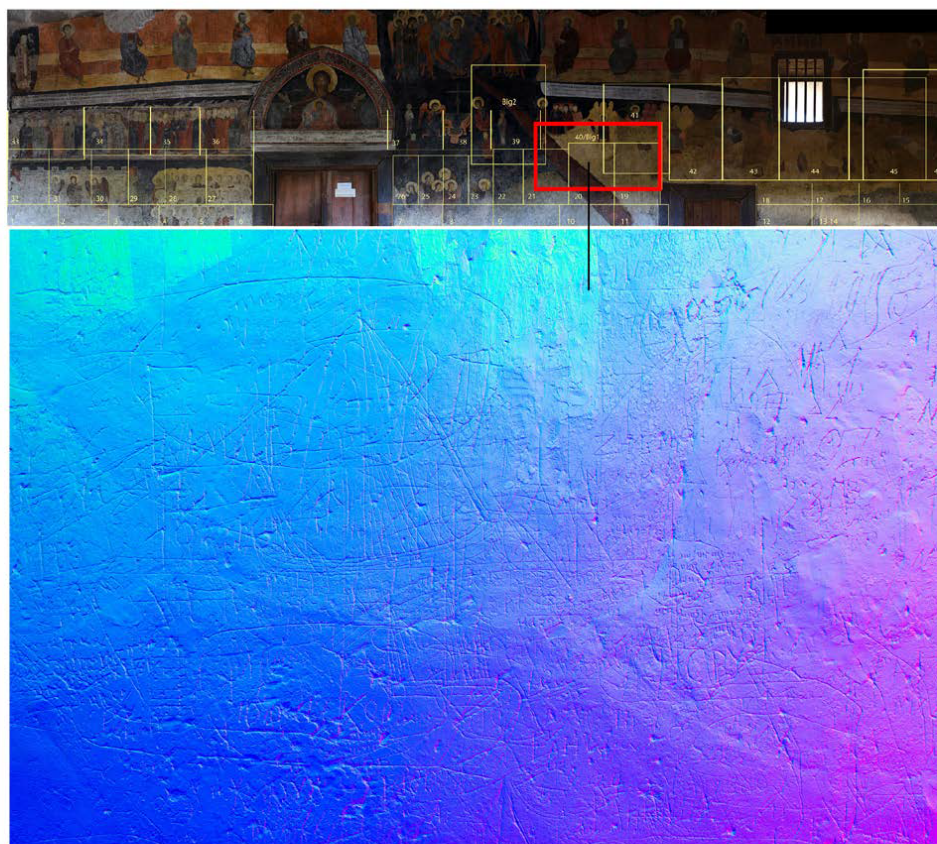
#### *Graffiti from the church St. Stephen*

We recorded 153 ship graffiti overall in the church St. Stephen using RTI, 114 in the nave and altar, 24 in the narthex, and 15 on the western wall outside. Many of the graffiti are somewhat schematic representations of ships with fewer details. Some seem half-erased or incomplete. Only a few of the surviving graffiti resemble depictions of both ships and boats in detail. These are mostly the graffiti of ships on the western wall outside the church, where preservation is good. However, their future preservation may be endangered due to their constant exposure to various weather forces. The application of the RTI method in the *narthex* of the church was considered successful to a certain extent. The whole eastern wall, which today is covered with a roof, was incised with hundreds of graffiti of all types, consisting mainly of inscriptions of names and years, as well as some vessels. Most graffiti seem to have been incised very lightly on the plaster and are at present almost erased and illegible. Most graffiti at this location were covered with paint during the conservation of the wall paintings. It is not inconceivable that some graffiti were completely filled in with paint, which demonstrates that the cultural heritage value of these monuments has been neglected until now. The overlapping of numerous graffiti and the large area covered made it problematic to compose and position the frame for the RTI recording (Fig. 15). For this reason, the whole wall was recorded in 46 separate, overlapping RTI models. The compositional arrangement of the camera was aligned with the identified ship graffiti, although it is possible that we missed some parts of graffiti during the setting of the camera's position.

#### *Graffiti from the church St. Todor*

The graffiti on the outer façade of the church St. Todor were registered and documented for the first time during season 2018. In total, 20 graffiti were registered and documented. There were three from the south wall, two from the east, nine from the north, and six from the west. They are located on individual stones, and most of them are in a very poor state of preservation. The graffiti are eroded, with the main details of the drawing either barely noticeable or completely erased. Five graffiti are of ships, two of buildings, and the rest are years and Greek letters. Three of the ship graffiti (two from the south and one from the east walls) are turned upside down, suggesting they are not in their original position (Fig. 16). This assumption is supported by the fact that the southern and eastern walls were rebuilt in the 18<sup>th</sup> – 19<sup>th</sup> centuries, probably reusing the stones with graffiti originating elsewhere.





**Fig. 15.** The overlapping of graffiti on large areas on the church of St. Stephen's narthex is an overwhelming challenge for framing

#### *Graffiti from the church St. John Alitourgetos*

Four graffiti of ships, six different inscriptions, and one heraldic symbol in total were documented with photogrammetry on the façades of church St. John Alitourgetos. The graffiti are under the same environmental risks as those on St. Stephen exterior walls, and deterioration of the incisions is already visible as a result of stone erosion processes. The high-resolution photogrammetric models of the most eroded graffiti (a ship graffito from the east wall and inscriptions from the west wall) show that even the most advanced methods are incapable of recovering details that have been irreversibly lost over the centuries.

#### DISCUSSION

The application of the computational photographic techniques allowed the research team to document the ship graffiti according to the modern technical capabilities and standards for cultural heritage documentation work, as well as to uncover new, previously undocumented graffiti or part of them.



*Fig. 16. Standard photographic shots of graffiti on St. Todor church which show that three of the ship graffiti are positioned upside-down*

The current results demonstrate that RTI is a method that can be used for both analysis of small-scale details and the dissemination of high resolution photographs for academia and the public. The availability of such materials allows their further analysis and enhances their use by scholars. Compared with the photogrammetric method, we consider RTI enhancement tools more suitable for analyzing the ship graffiti's complexity, as they contain multiple shading positions. This is a necessity for the visualization of details from any angle. In this respect, it is a unique two-dimensional method that has many characteristics of a three-dimensional one. However, an uneven distribution of light, causing shadowing of some details across an image, can be considered a limitation, especially when the image is intended for wide dissemination.

This limitation could be minimized with the use of some graphical enhancement tools as well as with the *Normals Visualisation* algorithm. Nevertheless, while RTI can provide more information than the photogrammetric workflow for detecting small incisions in the stone, the photogrammetry is more compact, as well as being time and cost-efficient. We propose that the photogrammetric workflow can be used to highlight areas of interest that require further investigation, specifically when RTI is unsuitable for use, such as in areas where accessibility is a constraint.

## CONCLUSION

Between 2018 and 2020, most of the historical graffiti in Nessebar were documented and a digital archive of these monuments was submitted to the National Institute for Immovable Cultural Heritage, "Ancient Nessebar" Museum, the Centre for Underwater Archaeology at the Bulgarian Ministry of Culture and to the National Archeological Institute with Museum at the Bulgarian Academy of Sciences. The availability of the archive will also allow graffiti's further analyses and use by scholars.

## ACKNOWLEDGEMENTS

We would like to thank Todor Marvakov, director of the Ancient Nessebar Archaeological Museum for the access and support during all phases of the project. We are grateful to all colleagues from the Museum in Nessebar for their kind hospitality and support.

## REFERENCES

- Георгиева и др. 2019: З. Георгиева, Н. Прахов, К. Димитров. Недеструктивно проучване и документиране на графити от средновековните църкви „Св. Спас“ и „Св. Тодор“ в Несебър. – Археологически открития и разкопки през 2018 г. София, 2019, 682 – 685.
- Георгиева, Прахов 2020: З. Георгиева, Н. Прахов. Недеструктивно проучване и документиране на графити от средновековна църква „Св. Стефан“ (Новата митрополия) в Несебър. – Археологически открития и разкопки през 2019 г. Книга I. София, 2020, 140 – 144.
- Дерменджиев, Косева 2000: Е. Дерменджиев, Д. Косева. Графитни рисунки върху стенописния календар от притвора на търновската църква „Св. 40 мъченици“. – *Palaeobulgarica*/Старобългаристика 24, 4, 2000, 84 – 96.
- Овчаров 1981: Д. Овчаров. Раннесредновековные изображения кораблей (граффиты) из гг. Плиска и Преслав. – *Byzantinobulgarica* VII, Nessebre, 1981, 399 – 404.
- Овчаров 1987: Н. Овчаров. Рисунките-графити от „Имарет Джамия“ в Пловдив като извор за историята на Средиземноморието през XV век. – Разкопки и проучвания 18, София, 1987.
- Овчаров 1992: Н. Овчаров. Корабоплаването по българското Черноморско крайбрежие от



XIV – XIX век (по данни от рисунките-графити в църквите на Несебър). София, 1992.

**Рашенов 2006:** А. Рашенов. Месемврийски църкви. 2006 (Фототипно издание, 1932), Музей „Старинен Несебър“.

**Abate, Trentin 2019:** D. Abate, M. Trentin. Hidden Graffiti Identification on Marble Surfaces Through Photogrammetry and Remote Sensing Techniques. – International Archives of the Photogrammetry, Remote Sensing & Spatial Information Sciences XLII-2/W15, 1 – 8, <https://doi.org/10.5194/isprs-archives-XLII-2-W15-1>, 2019.

**Artzy 1999:** M. Artzy. Carved Ship Graffiti – an Ancient Ritual? – In: H. Tzalas (ed.). Proceedings of the 5<sup>th</sup> International Symposium on Ship Construction in Antiquity 5, Nauplia, 1999, 21 – 30.

**Bertocci et al. 2018:** S. Bertocci, G. Verdiani, M. Sevetoglu. Graffiti photogrammetry, extracting the signs from the walls of the Kyrenia Castle. – In: Proceedings of the 23<sup>rd</sup> International Conference on Cultural Heritage and New Technologies, Vienna. CHNT 23, 2018, 2019.

**Bevan et al. 2015:** G. Bevan, M. Raykovska, I. Vasilev. Integration of different computational photographic modalities in high-accuracy 3D building models: the case of the church of St. Petka, Bulgaria. – In: ВИРТУАЛНА АРХЕОЛОГИЯ (ефективност на методите), 2015, 139 – 157.

**Brady, Gunn 2012:** L. Brady, R. Gunn. Digital enhancement of deteriorated and superimposed pigment art: methods and case studies. – In: J. McDonald, P. Veth (eds.). A Companion to Rock Art, 2012, Chichester: John Wiley & Sons, 625 – 643.

**Caine, Magen 2011:** M. Caine, M. Magen. Pixels and Parchment: – The Application of RTI and Infrared Imaging to the Dead Sea Scrolls. EVA London, 2011.

**Champion 2015:** M. Champion. Medieval Ship Graffiti in English Churches: Interpretation and function. – The Mariner's Mirror 101 (3), 2015, 343 – 350.

**Demesticha et al. 2017:** S. Demesticha, K. Delouca, M. Trentin, N. Bakirtzis, A. Neophytou. Seamen on Land? A Preliminary Analysis of Medieval Ship Graffiti on Cyprus. – International Journal of Nautical Archaeology 46(2), 2017, 346 – 381.

**Earl et al. 2010:** G. Earl, G. Beale, K. Martinez, H. Pagi and others. Polynomial texture mapping and related imaging technologies for the recording, analysis and presentation of archaeological materials. International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences 38, 2010.

**Harman 2008:** J. Harman. Using Decorrelation Stretch to Enhance Rock Art Images. 2008. Available: <http://www.dstretch.com/AlgorithmDescription.html>. Accessed 28 January 2021.

**Kazhdan et al. 2006:** M. Kazhdan, M. Bolitho, H. Hoppe, H. Poisson surface reconstruction. – In: Proceedings of the fourth Eurographics symposium on Geometry processing, 7, 2006.

**Lopez et al. 2019:** J. López, C. Hoyer, A. Rebentisch, A. Roesch, K. Herkert, N. Huber, H. Floss. Tool mark analyses for the identification of palaeolithic art and modern graffiti. The case of Grottes d'Agneux in Rully (Saône-et-Loire, France). Digital Applications in Archaeology and Cultural Heritage, 2019.

**Malzbender et al. 2001:** T. Malzbender, D. Gelb, H. Wolters. Polynomial texture maps. Proceedings of the 28<sup>th</sup> annual conference on Computer graphics and interactive techniques. New York, USA: Association for Computing Machinery, 2001, 519 – 528.

**Meinardus 1972:** O. F. A. Meinardus. Medieval Navigation according to Akidographemata in Byzantine Churches and Monasteries. – Δελτίον Χριστιανικής Αρχαιολογικής Εταιρείας, 6 (1970 – 1972), 1972, 29 – 52.

**Michail 2015:** M. Michail. Ship graffiti in context: a preliminary study of Cypriot patterns. paper presented at the Cypriot cultural details. – Proceedings of the 10<sup>th</sup> Post Graduate Cypriot Archaeology Conference, Oxford, Philadelphia, Oxbow Books, 2015, 41 – 64.

**Mitov 2018:** Y. Mitov. Pictorial graffiti – a source about the medieval culture. An example from the church St. George in Kyustendil. – In: The Bulgarian Kingdom. Collection commemorating the 60<sup>th</sup> anniversary of Assoc. Prof. Georgi N. Nikolov. Responsible ed. Assoc. Prof. Angel Nikolov. Sofia, Uni-

versity Publishing House “St. Kliment Ohridski”, 2018, 845.

**Mudge et al. 2006:** M. Mudge, T. Malzbender, C. Schroer, M. Lum. New Reflection Transformation Imaging Methods for Rock Art and Multiple-Viewpoint Display. VAST. Citeseer, 2006, 195 – 202.

**Ovcharov 1977:** D. Ovcharov. Ship graffiti from medieval Bulgaria. – International Journal of Nautical Archaeology 6 (1), 1977, 59 – 61.

**Ovcharov 1993:** N. Ovcharov. Ships and Shipping in the Black Sea, 14<sup>th</sup> – 19<sup>th</sup> centuries. Sofia, 1993, St. Kliment Ohridski University Press. [English translation]

**Palma et al. 2010:** G. Palma, M. Corsini, P. Cignoni, R. Scopigno, M. Mudge. Dynamic shading enhancement for reflectance transformation imaging. – Journal on Computing and Cultural Heritage 3 (2), 2010, 1 – 20.

**Prada, Wordsworth 2018:** L. Prada, P. D. Wordsworth. Evolving Epigraphic Standards in the Field: Documenting Late Period and Graeco-Roman Egyptian Graffiti through Photogrammetry at Elkab. – In: The Materiality of Texts from Ancient Egypt, 2018, 76 – 93.

**Tan et al. 2014:** N. H. Tan, I. Sokrithy, H. Than, K. Chan. The hidden paintings of Angkor Wat, – Antiquity 88 (340), 2014, 549 – 565.

**Tarini et al. 2003:** M. Tarini, P. Cignoni, R. Scopigno. Visibility based methods and assessment for detail-recovery. – In: IEEE Visualization, 2003. VIS 2003, 457 – 464. IEEE.

**Todorov 1981:** I. Todorov. Bulgarian ships. Sofia, 1981, State publisher “Technique”.

**Villain-Gandossi 1981:** C. Villain-Gandossi. Graffiti de bateaux a Nesebar. – Byzantinobulgarica VII, Nessebre, 1981, 405 – 420.

## Модерни фотографски методи за изучаване на графитни изображения на кораби от средновековни църкви в Несебър

*Здравка Георгиева, Найден Прахов, Миглена Райковска, Кристен Джон,  
Кристи Лий-Сийтън*

### РЕЗЮМЕ

Статията е посветена на прилагането на модерни фотографски техники при документиране на графити от средновековни църкви в град Несебър. Рефлексно-преобразователна фотография, фотограмметрия и гигапикселова панорамна фотография бяха използвани при документиране на графитни изображения на кораби в църквите „Св. Спас“, „Св. Стефан“, „Св. Йоан Алитургетос“ и „Св. Тодор“. Целта на проекта е за тези важни исторически паметници да се създаде архив и цялостна база данни, отговарящи на съвременните стандарти и технически възможности за научна документация. Авторите демонстрират предимствата на тези техники при подробното проучване на графитите, при оценката на тяхното физическо състояние и възможностите за публикуването и представянето им според съвременните стандарти. За да се оцени ефективността на модерните методи, беше направен сравнителен анализ с графити на кораби, документиран при изследвания от XX век.

**Ключови думи:** графитни изображения на кораби; Reflectance Transformation Imaging (RTI); Close-range Photogrammetry; Gigapixel panorama photography; средновековни църкви; Несебър





