



**HAL**  
open science

## A photogrammetry of the past: a time to observe and a time to record.

Pierre Poveda, Laetitia Cavassa, Vincent Dumas, Giulia Boetto, Philippe Soubias

### ► To cite this version:

Pierre Poveda, Laetitia Cavassa, Vincent Dumas, Giulia Boetto, Philippe Soubias. A photogrammetry of the past: a time to observe and a time to record.: The example of the Madrague de Giens (1st BC). SHA 2023 Conference on Historical and Underwater Archaeology, The Society for Historical Archaeology; NOVA University of Lisbon, Jan 2023, Lisbonne, Portugal. halshs-04015814

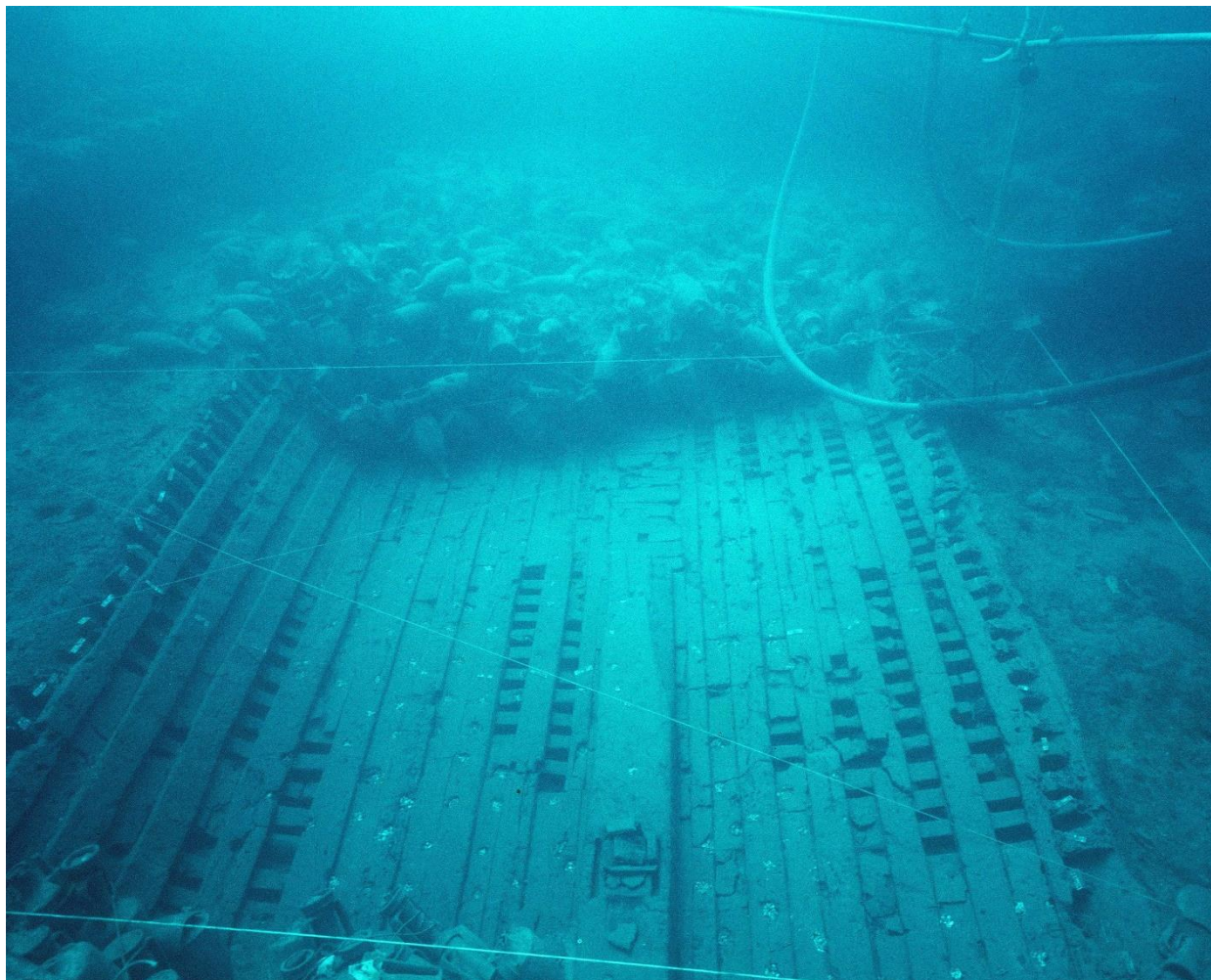
**HAL Id: halshs-04015814**

**<https://shs.hal.science/halshs-04015814>**

Submitted on 6 Mar 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



# A Photogrammetry from the Past:

A time to **Observe** and a time to **Record**  
The example of the **Madrague de Giens** (1st BC)

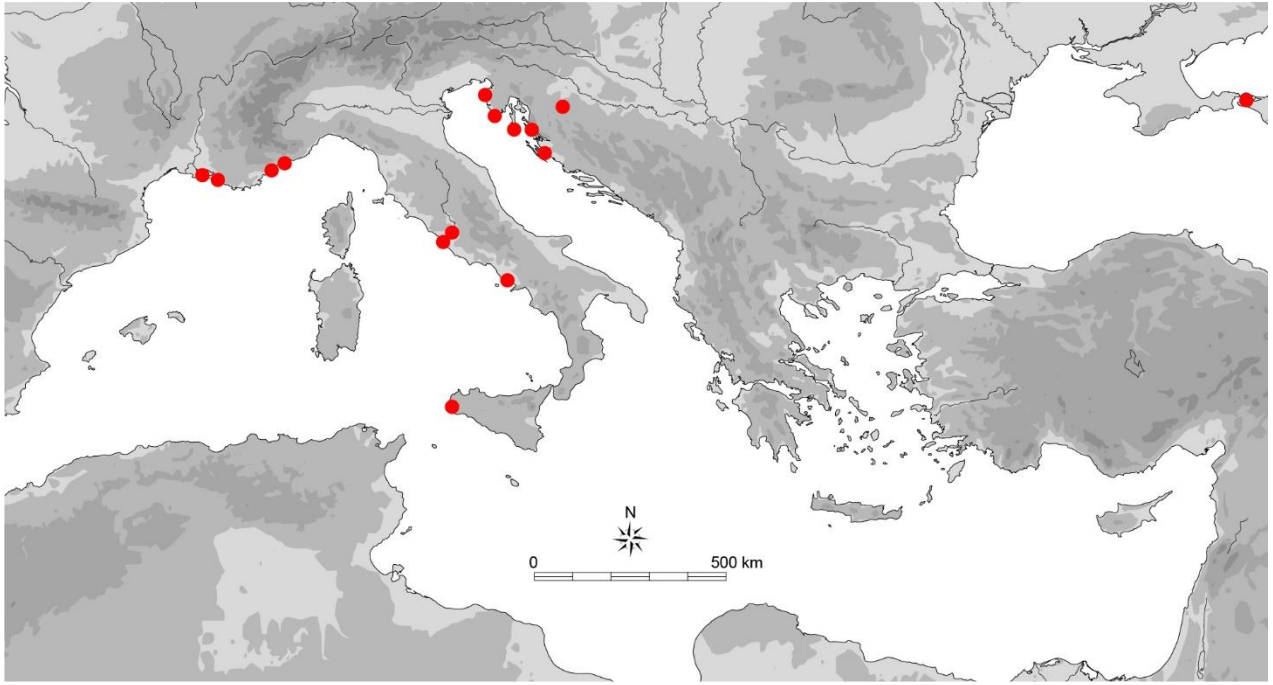
Pierre **Poveda**  
Laetitia **Cavassa**  
Vincent **Dumas**  
Giulia **Boetto**  
&  
Philippe **Soubias**

Centre Camille Jullian  
CNRS & Aix-Marseille University

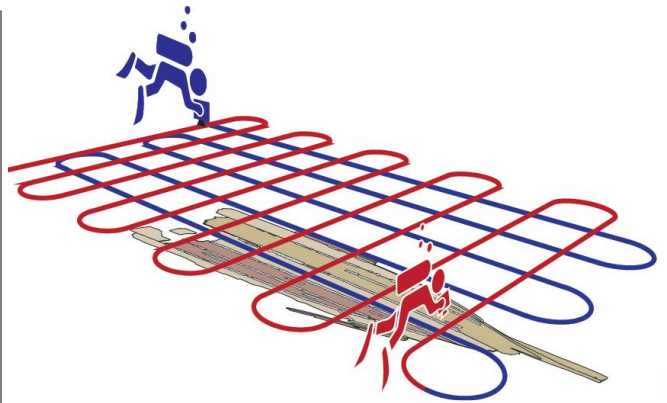
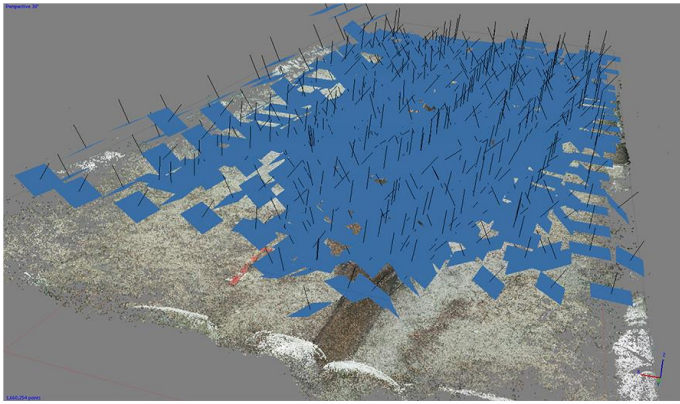




# The Madrague de Giens A photogrammetry from the past



Sites	Date	Country	Campaign(s)	n° of shipwrecks	On Land	Underwater
Pakostane	4th-5th c. CE	Croatia	2007-2008	1		1
Caska	1st-2nd c. CE		2009-2017	4		1
Zambratija	13th-10th c. BCE		2011-2013	1		1
Pula	2nd c. CE		2013	2	1	
Kamensko	1st-3rd c. CE		2015-2019	1		1
Debeljak	4th-5th c. CE		2017-2018	1		1
Ilovik	2nd c. BCE		2018-2022	1		1
Porec	To be determined		2020	1	1	
Tiboul de Maire	2nd c. CE	France	2017	1		1
Antibes	2nd-3rd c. CE		2012	1	1	
Laurons 2	3rd c. CE		2022	1		1
Fort-Royal 1	2nd c. BCE		2021-2022	1		1
Isola Sacra	3rd c. CE	Italy	2011	2	1	
Napoli	2nd c. BCE - 3rd c. CE		2014	3	1	
Fiumicino	1st-5th c. CE		2019	3	1	
Marsala	3rd c. BCE		2018-2019	1	1	
Phanagoria	2nd c. BCE	Russia	2012-2019	1		1
				<b>26</b>	<b>7</b>	<b>10</b>

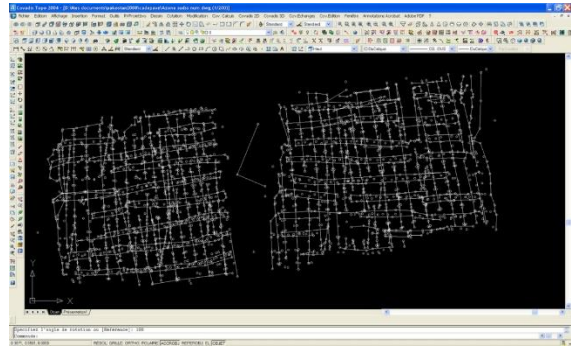
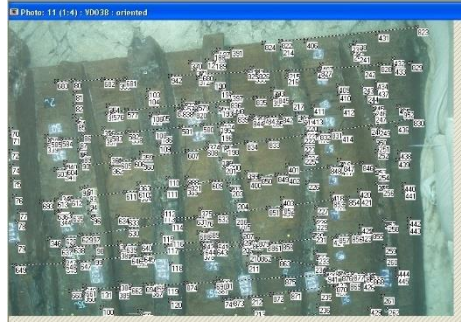




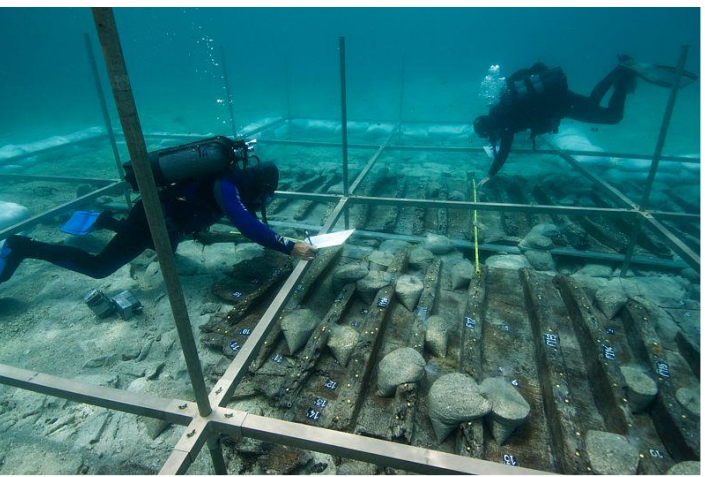


# Pakostane

(IV°-V° c. CE, Croatia, 2008)



Photogrammetry



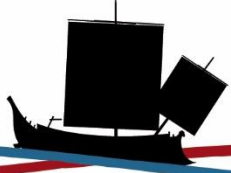
Classic manual documentation



Légende  
■ vaigrage  
■ plaquettes de plombs de réparation



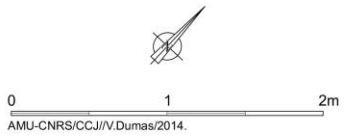
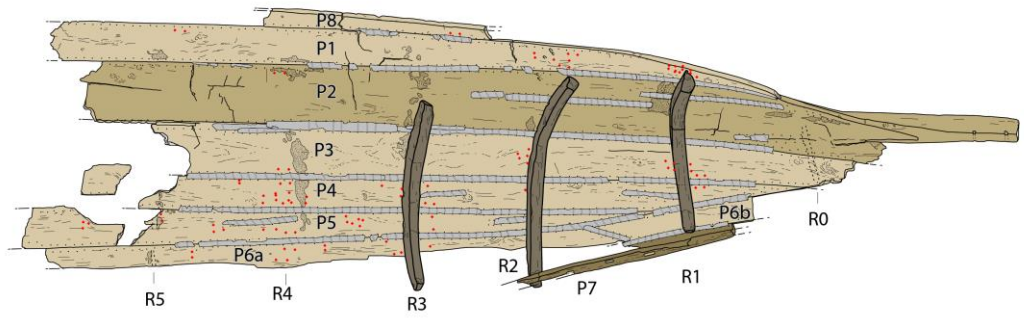
Centre Camille Jullian/CNRS/2008/ Relevés : M. Rival, V. Dumas / DAO : V. Dumas

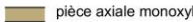


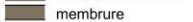







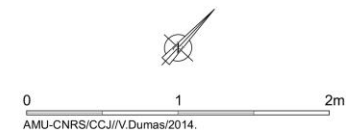
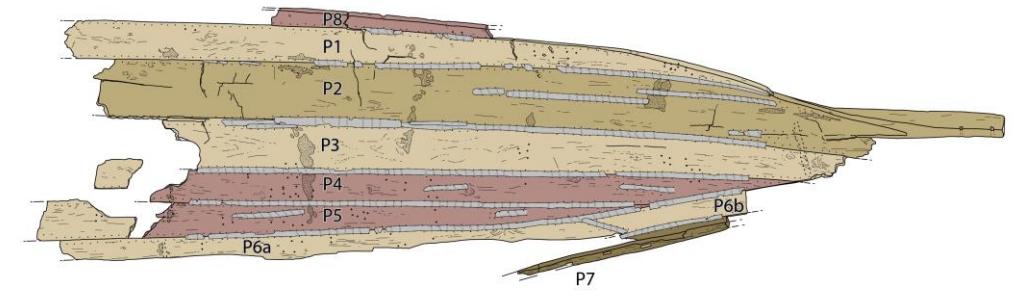


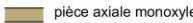
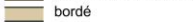







# Zambratija

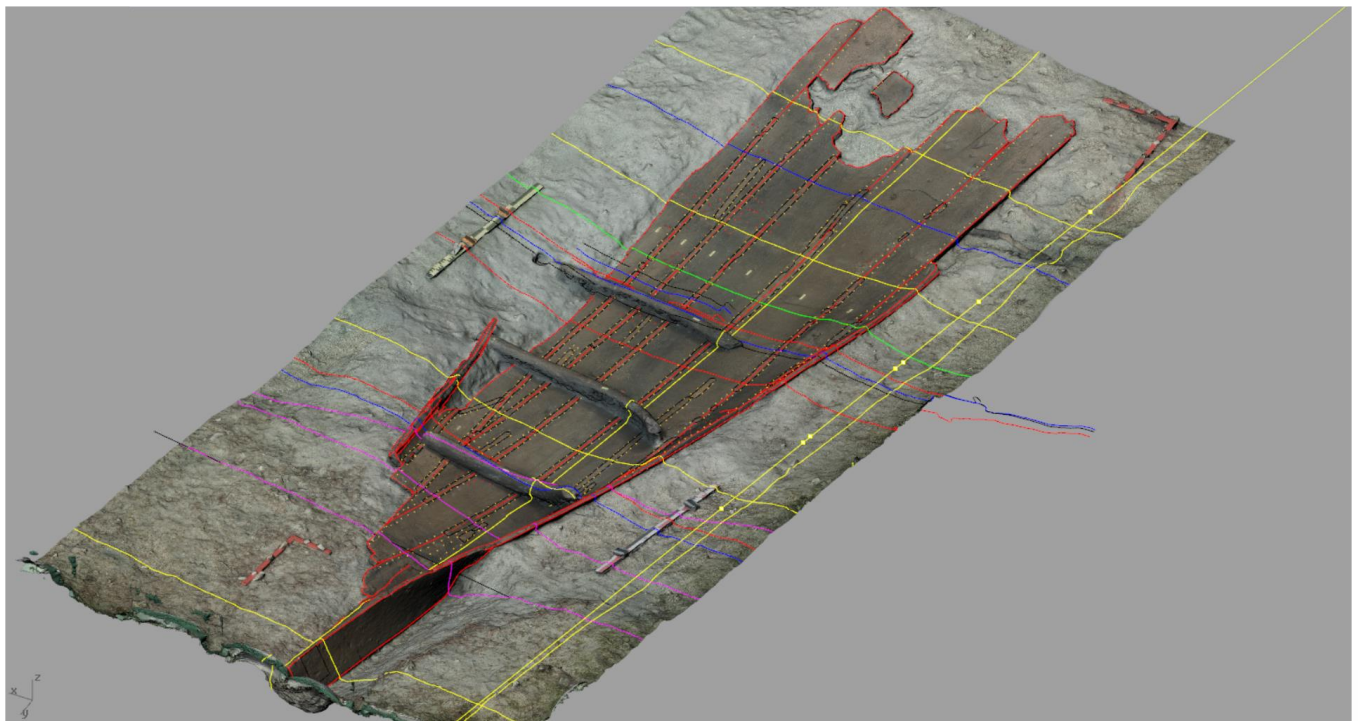
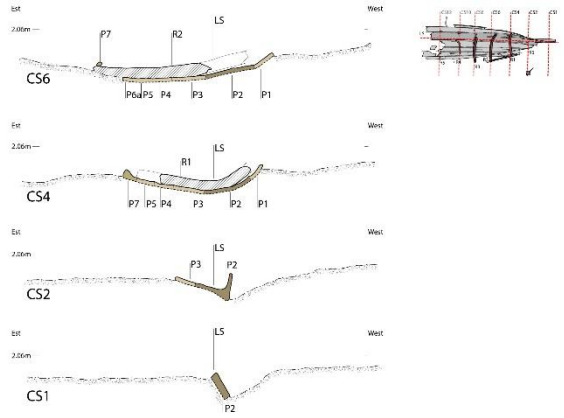
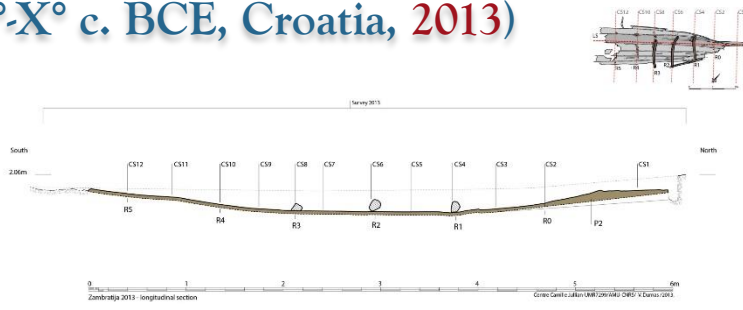
(XIII°-X° c. BCE, Croatia, 2013)



-  pièce axiale monoxyle
-  bordé
-  plat-bord monoxyle
-  membrure
-  latte
-  trace de ligature
-  cheville
-  assemblage membrure
-  poix



-  pièce axiale monoxyle
-  bordé
-  plat-bord monoxyle
-  joint perdu
-  latte
-  trace de ligature
-  cheville
-  assemblage membrure
-  poix

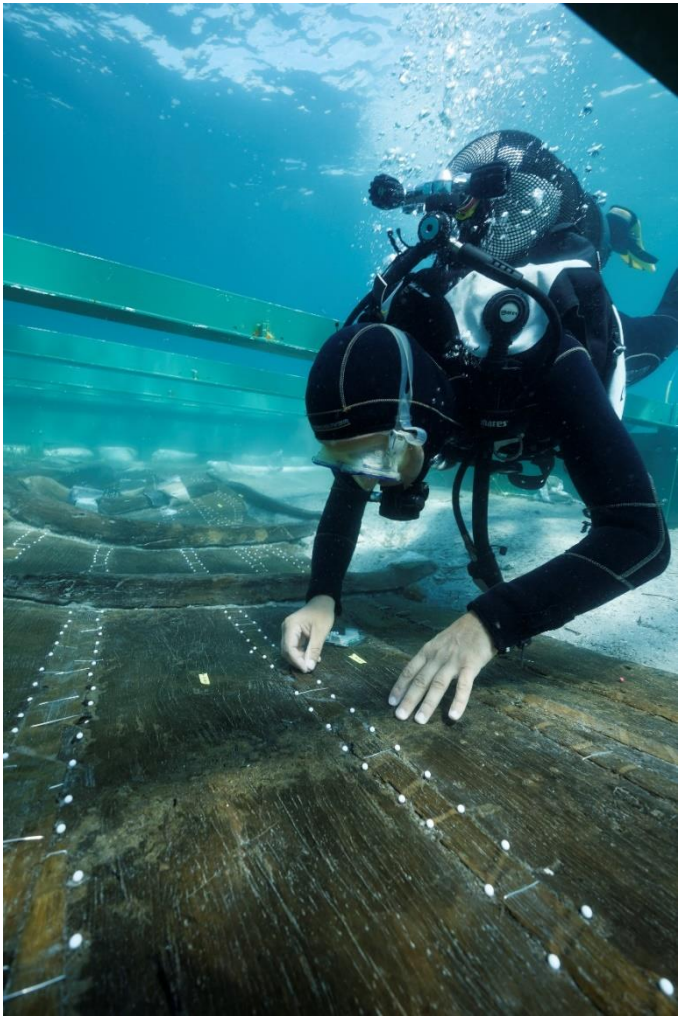




The Madrague de Giens — A photogrammetry from the past



Observe



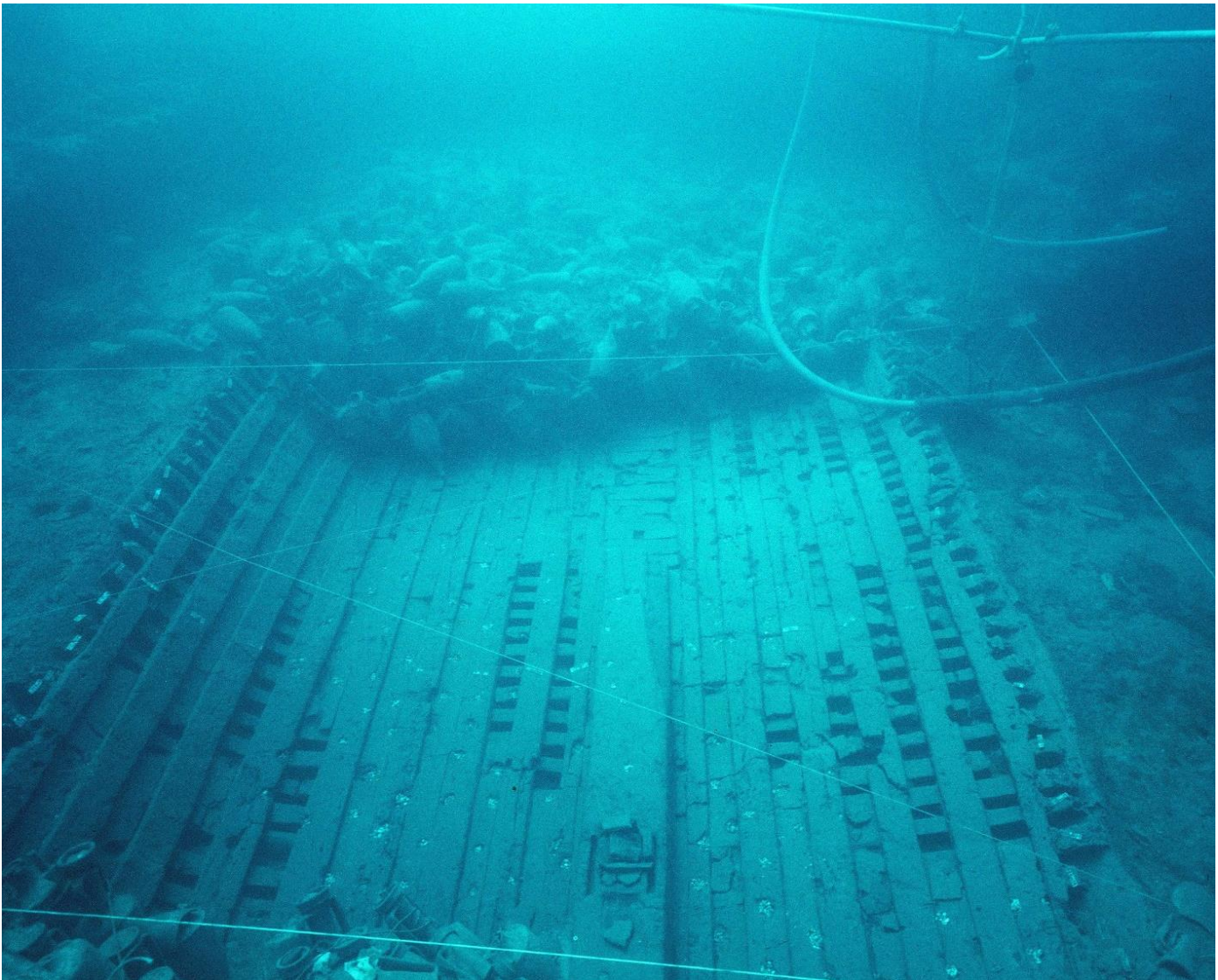
Mark



Measure







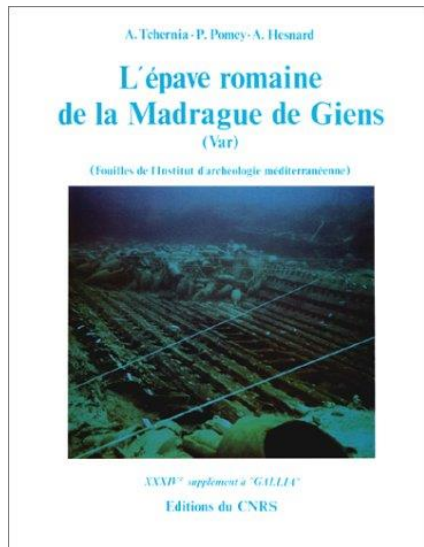
# Madrague de Giens (1st BC)



With the support of the  
**White Levy Program**  
for  
Archaeological Publications

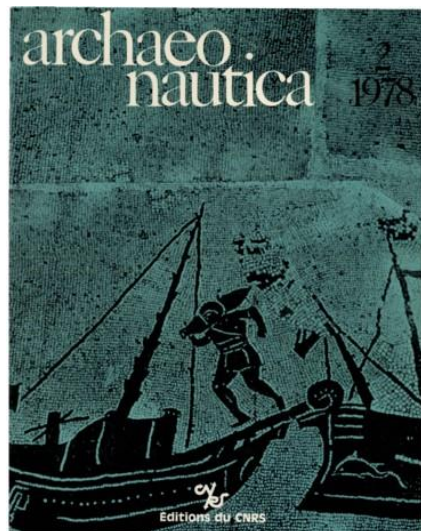


# The Madrague de Giens — A photogrammetry from the past



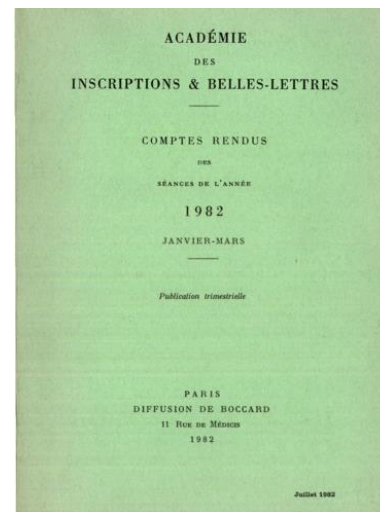
1978

Tchernia, André; P. Pomey; A. Hesnard (1978).  
*L'épave romaine de la Madrague de Giens, Var: campagnes 1972-1975 (XXXIV supplément à Gallia ed.)*



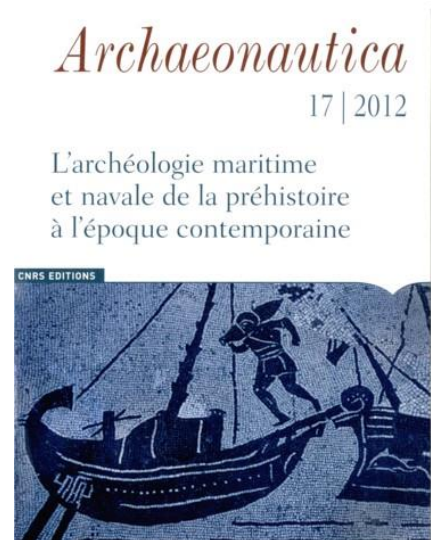
1978

Formenti Françoise, Hesnard Antoinette, Tchernia André. Note sur le contenu d'une amphore Lamboglia 2 de l'épave de la Madrague de Giens. In: *Archaeonautica*, 2, 1978. pp. 95-100



1982

Pomey, Patrice (1982). "Le Navire Romain de la Madrague de Giens". *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres*. 126 (1): 133–154.



2012

Hesnard Antoinette. L'épave la *Madrague de Giens* (Var) et la plaine de Fondi (Latium). Producteurs des vins, des amphores Dr. 1b et commerçants. In: *Archaeonautica*, 17, 2012. pp. 71-93.



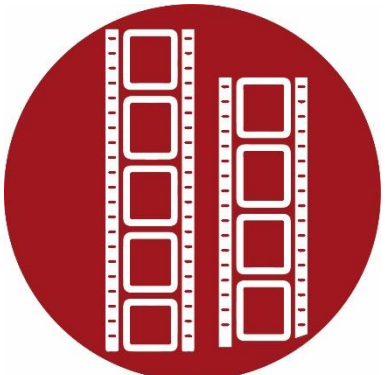




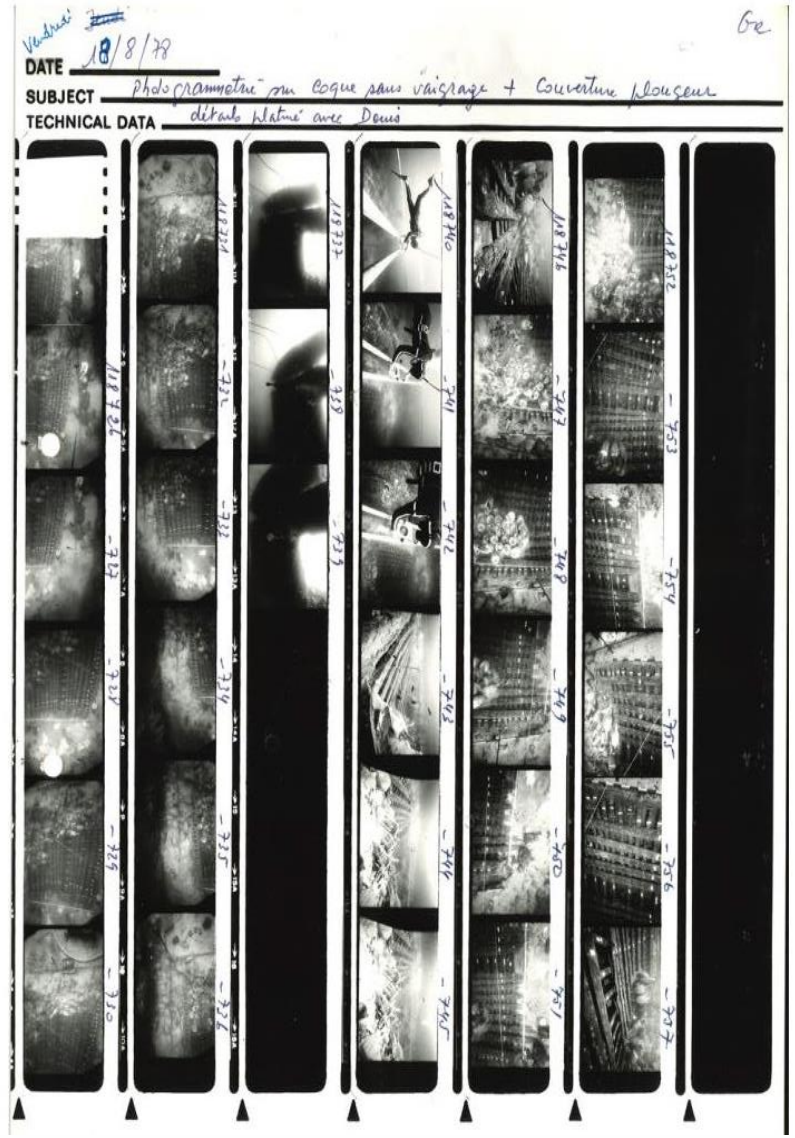
Ceramic Studies



# The Madrague de Giens --- A photogrammetry from the past



Photos digitizing

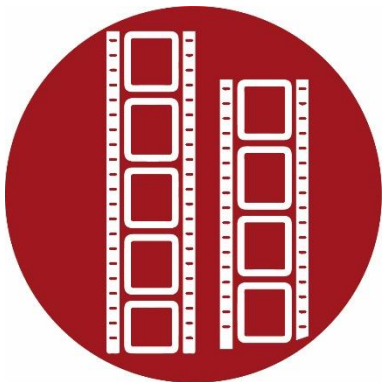




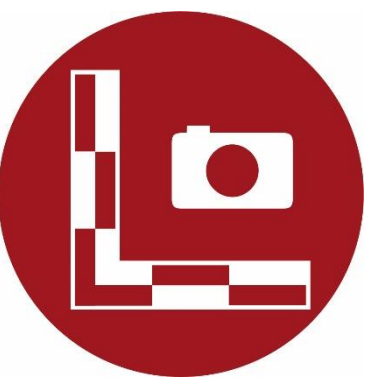
# The Madrague de Giens A photogrammetry from the past



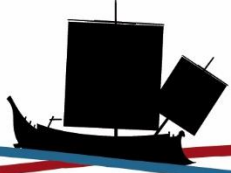
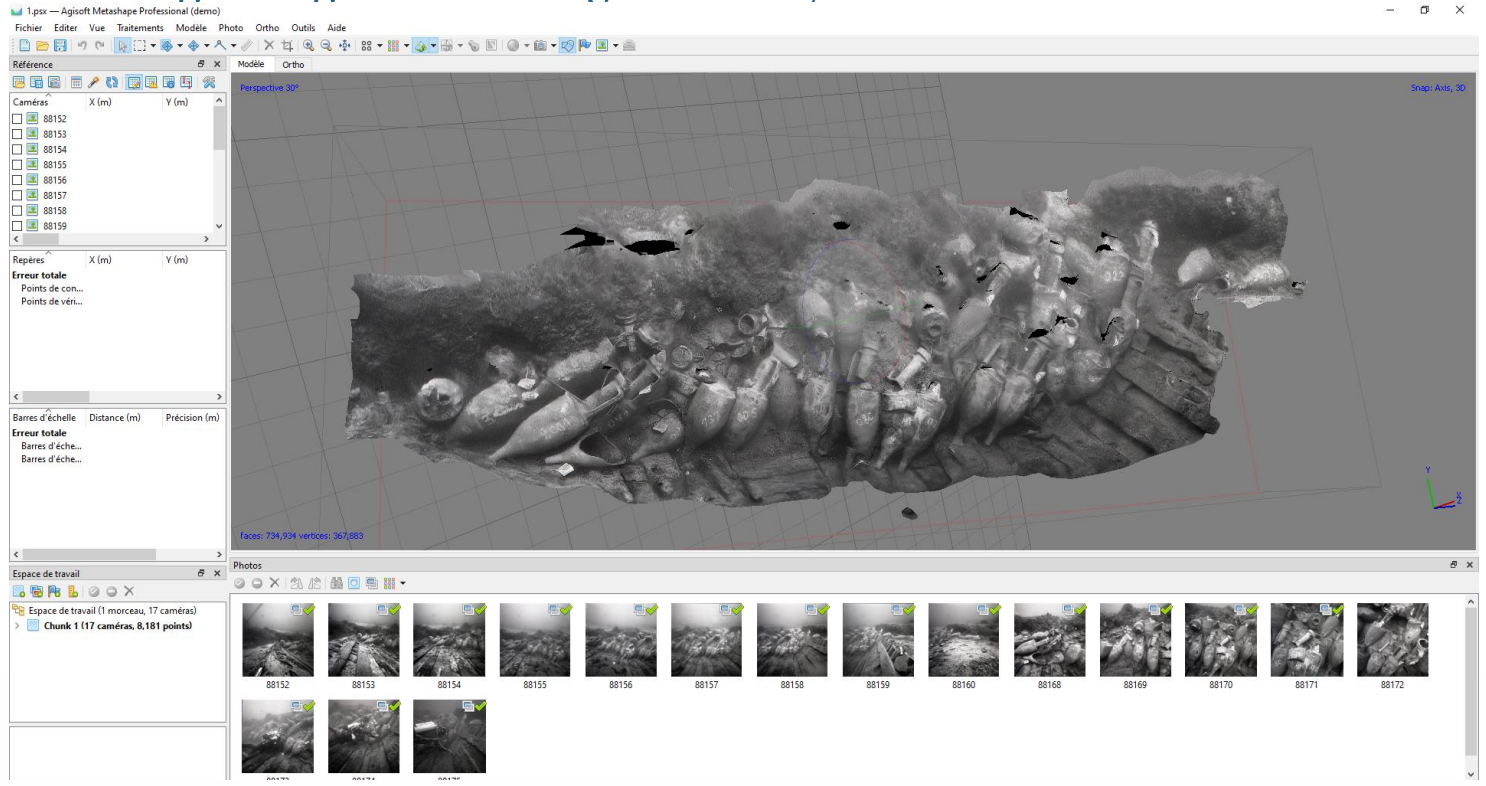
Ceramic Studies



Photos digitizing



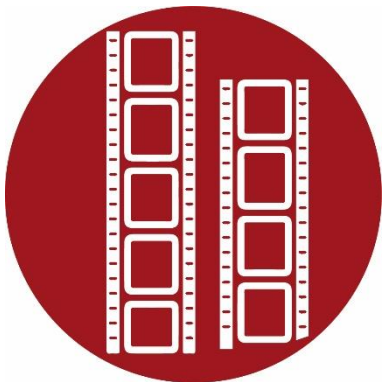
Photogrammetry



The Madrague de Giens — A photogrammetry from the past



Ceramic Studies



Photos digitizing



Photogrammetry

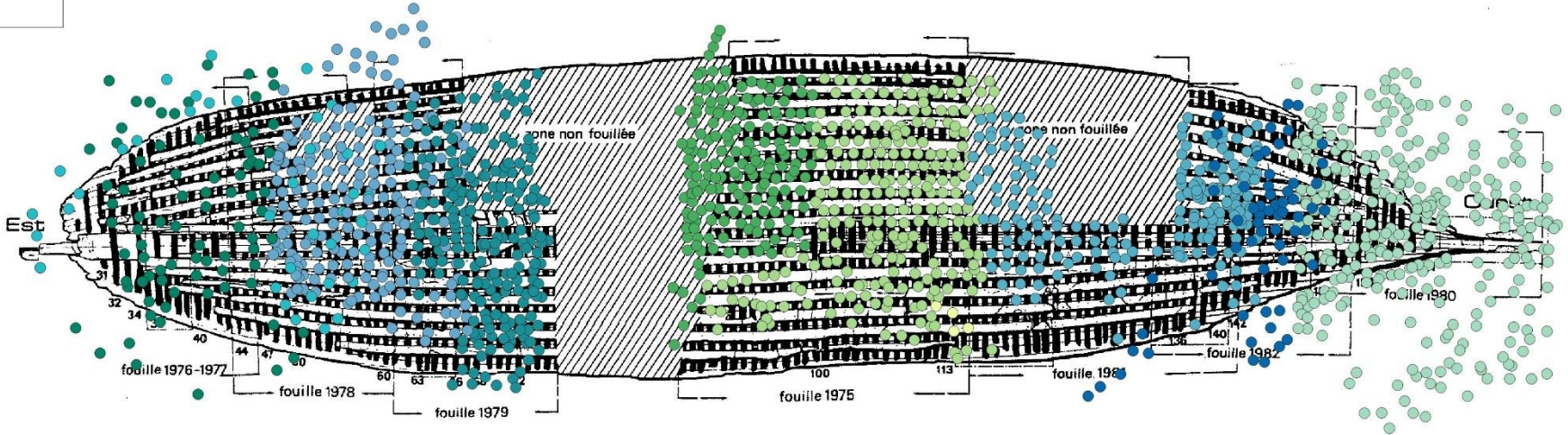


GIS



Géoréférencement de la cargaison  
État au 15 décembre 2021

Avant	Centre	Arrière
● 1982	● 1973	● 1976
● 1981	● 1974	● 1977
● 1980	● 1975	● 1978
		● 1979

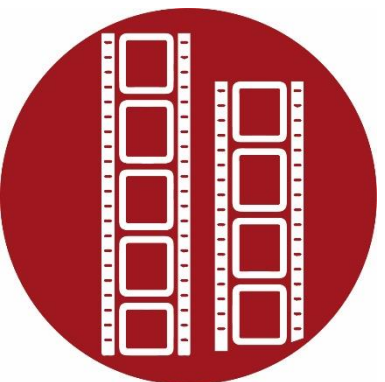




The Madrague de Giens  A photogrammetry from the past



Ceramic Studies



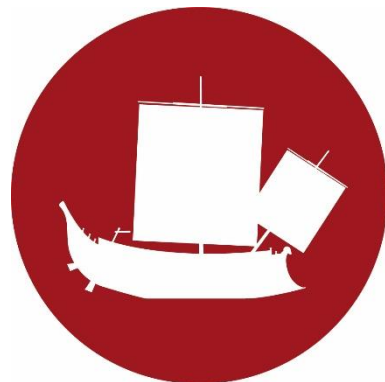
Photos digitizing



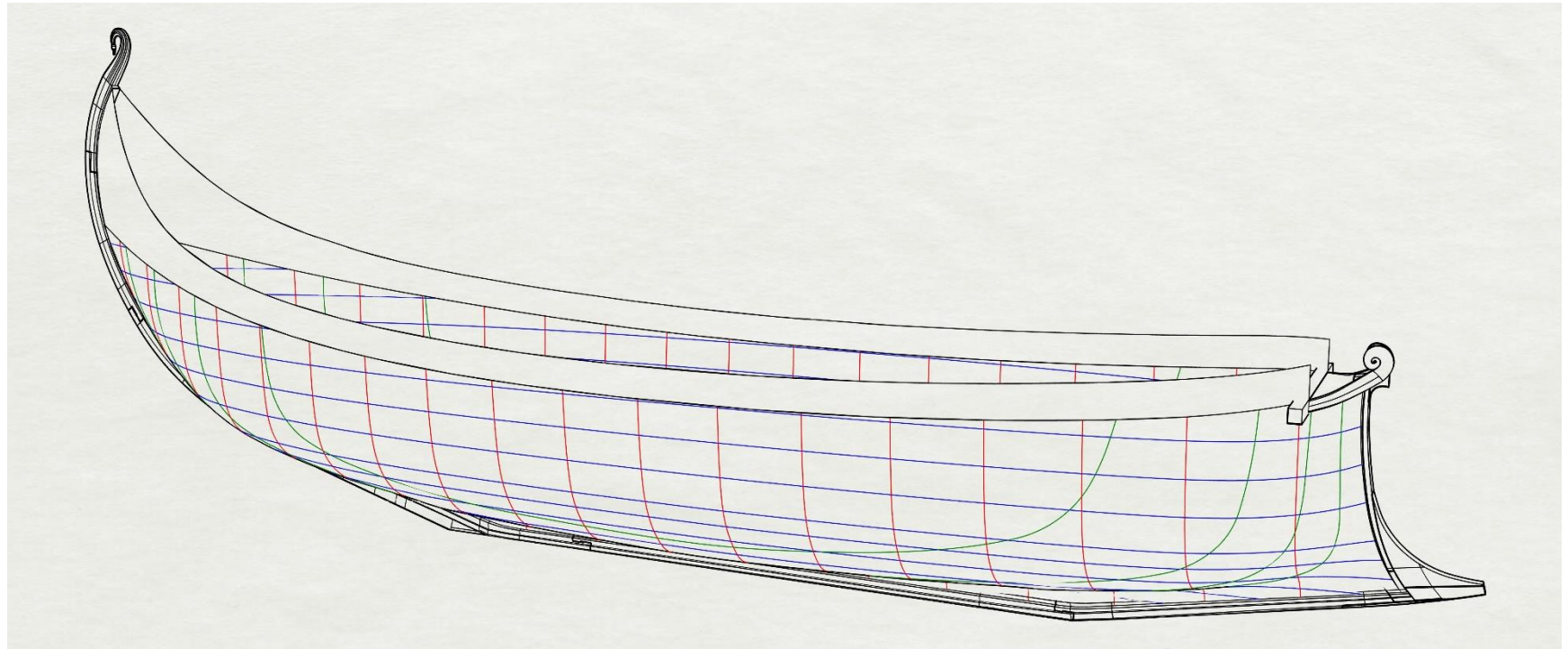
Photogrammetry



GIS



Reconstruction









The Madrague de Giens — A photogrammetry from the past



1972 - 1982



# The Madrague de Giens — A photogrammetry from the past

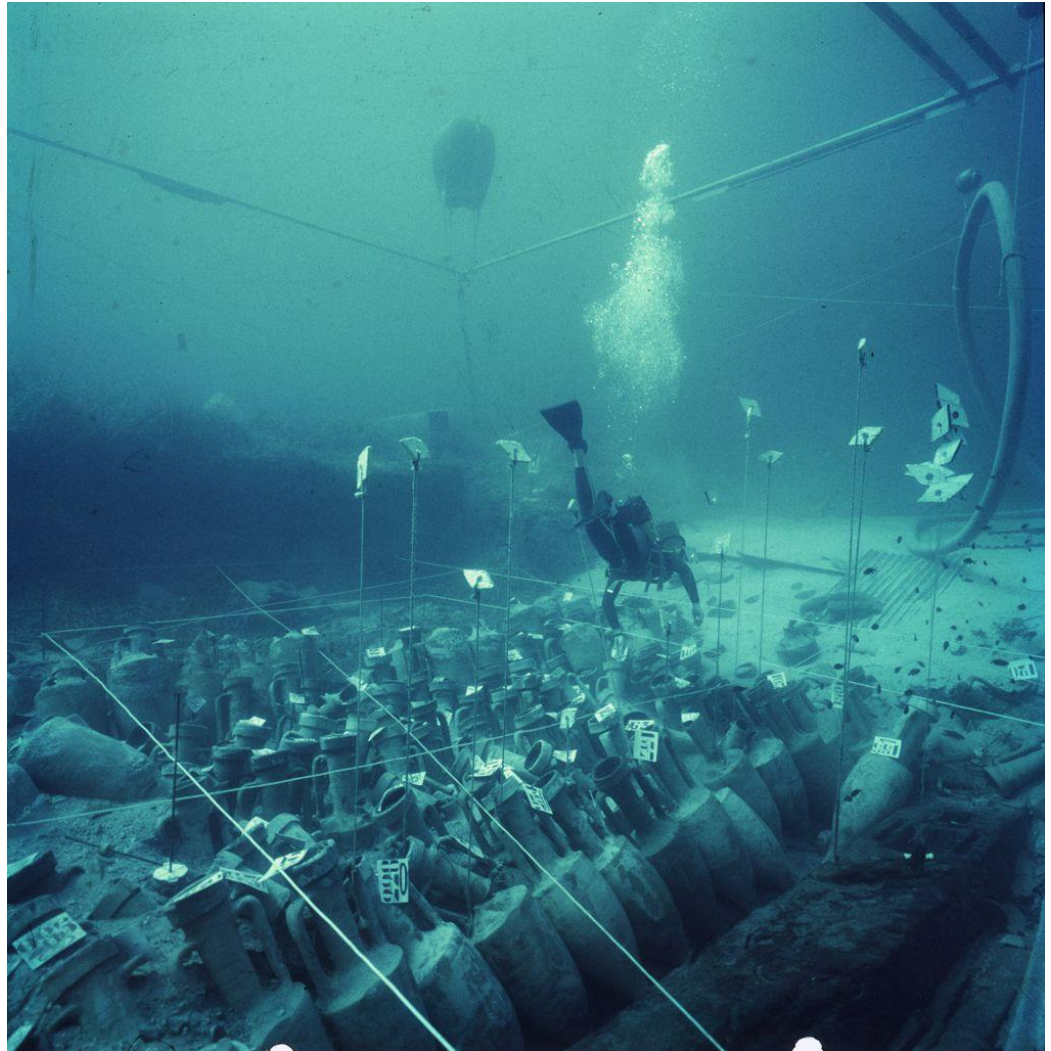
Epave de la Madrague de Giens  
Plan de situation

0 5m



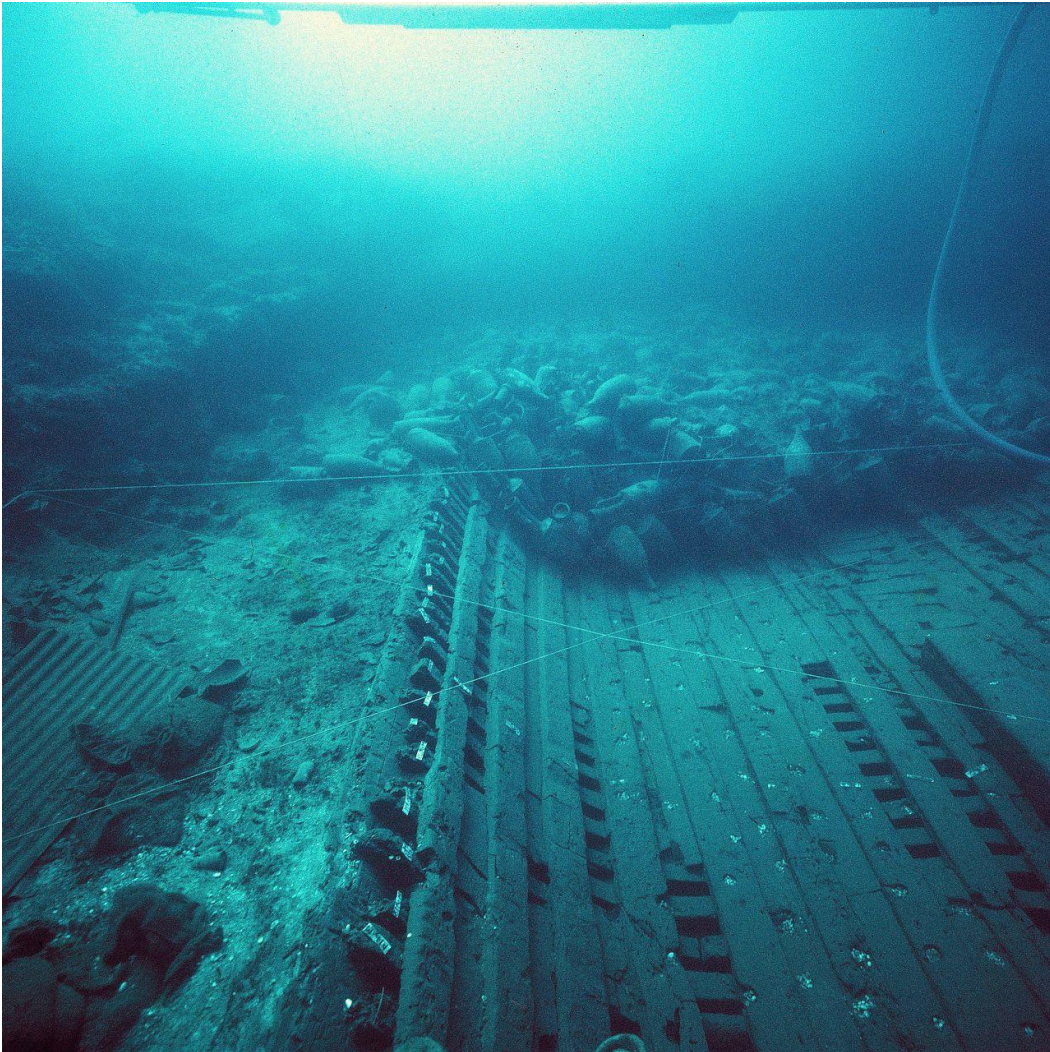


The Madrague de Giens — A photogrammetry from the past



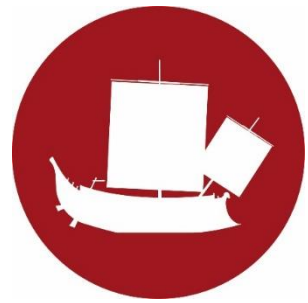


The Madrague de Giens — A photogrammetry from the past





# The Madrague de Giens — A photogrammetry from the past



Naval architecture

Epave de la Madrague de Giens  
Profil évolutif des débits de membrures  
2<sup>ème</sup>, 3<sup>ème</sup> et 4<sup>ème</sup> séries

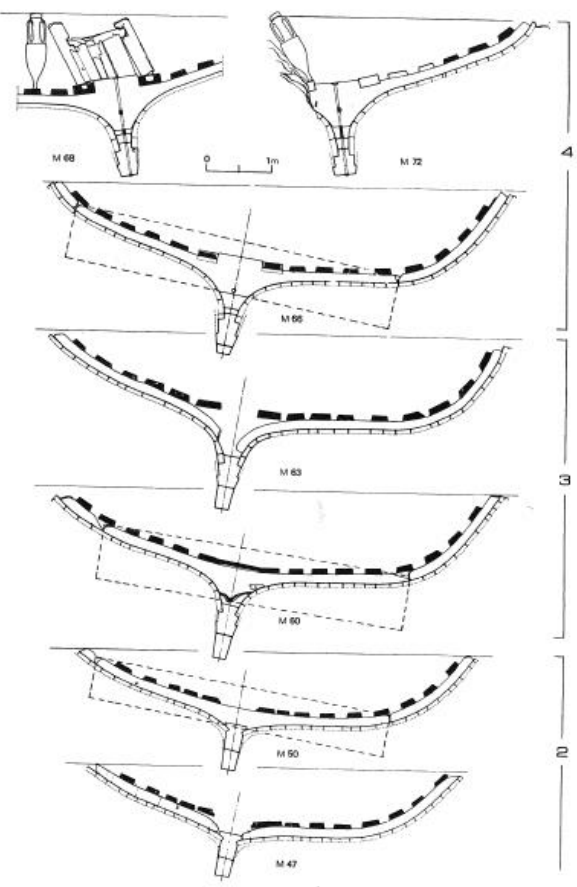


Planche 61

Epave de la Madrague de Giens  
Profil évolutif des débits de membrures  
1<sup>ère</sup> et 2<sup>ème</sup> séries

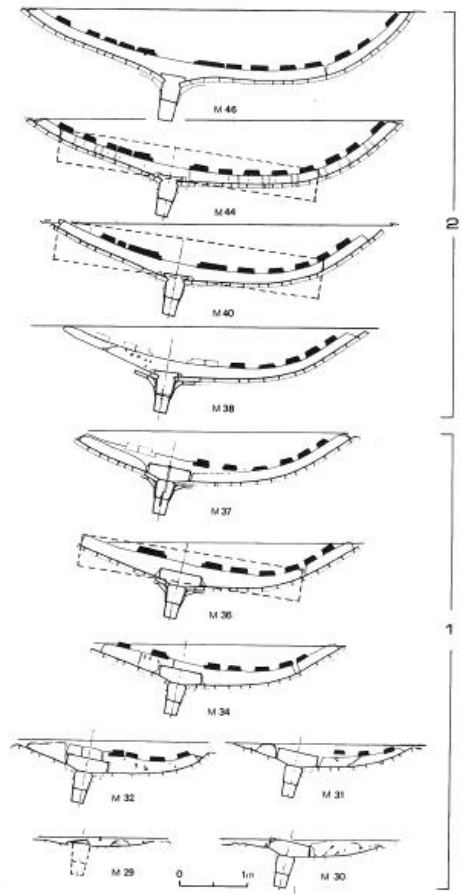


Planche 60

Epave de la Madrague de Giens

Position des coeurs des bois dans le dédit des pièces axiales du navire

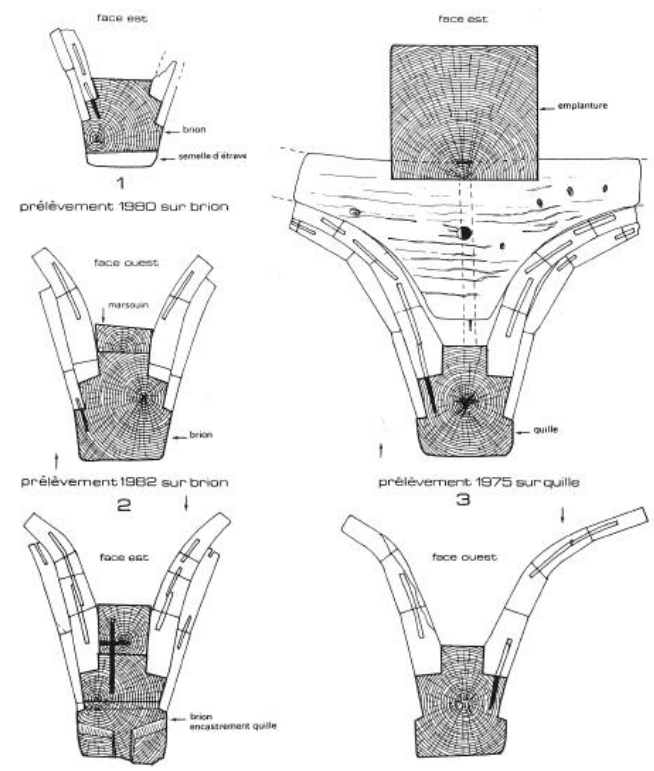
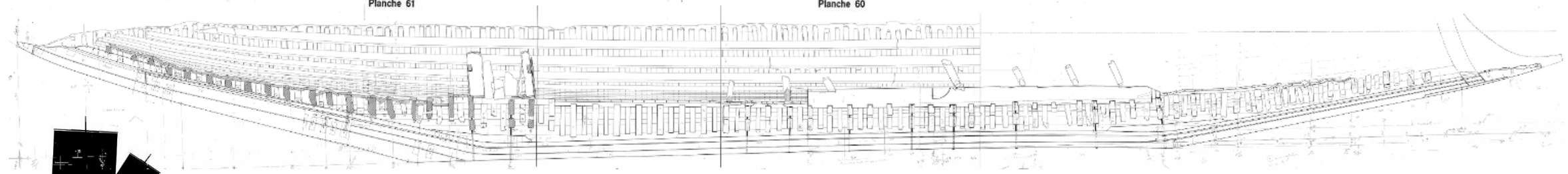
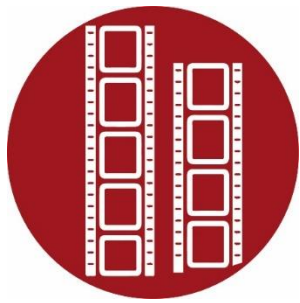


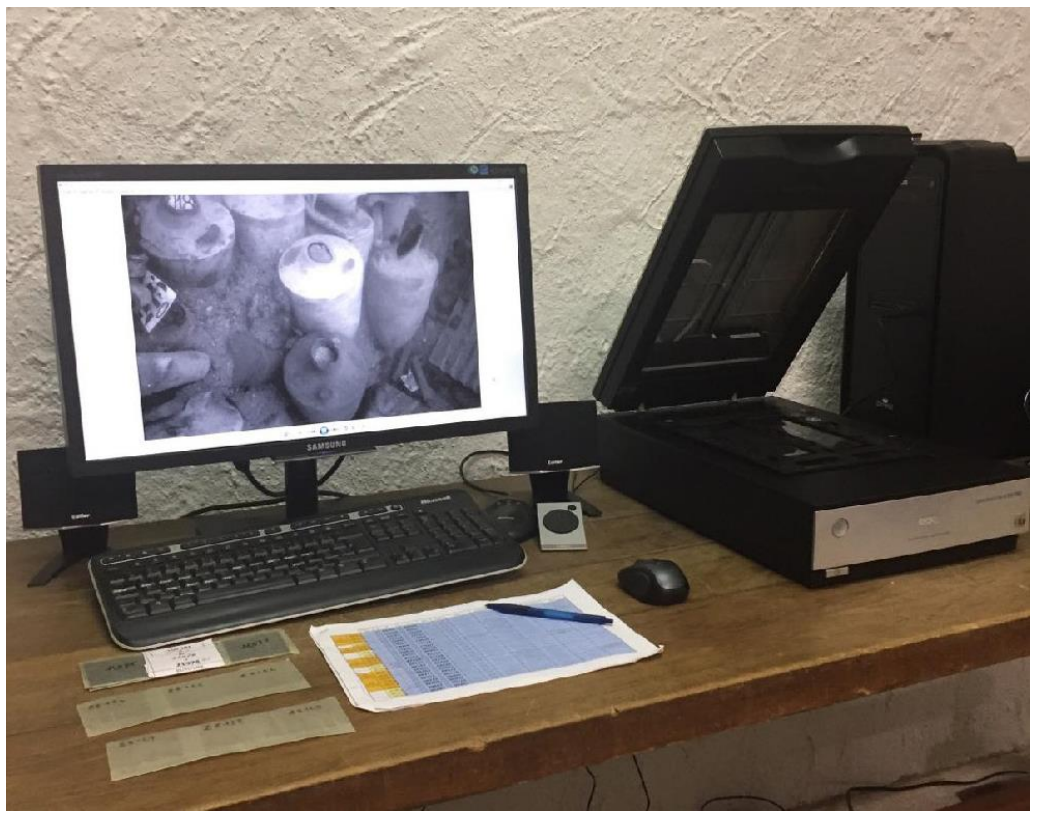
Planche 29



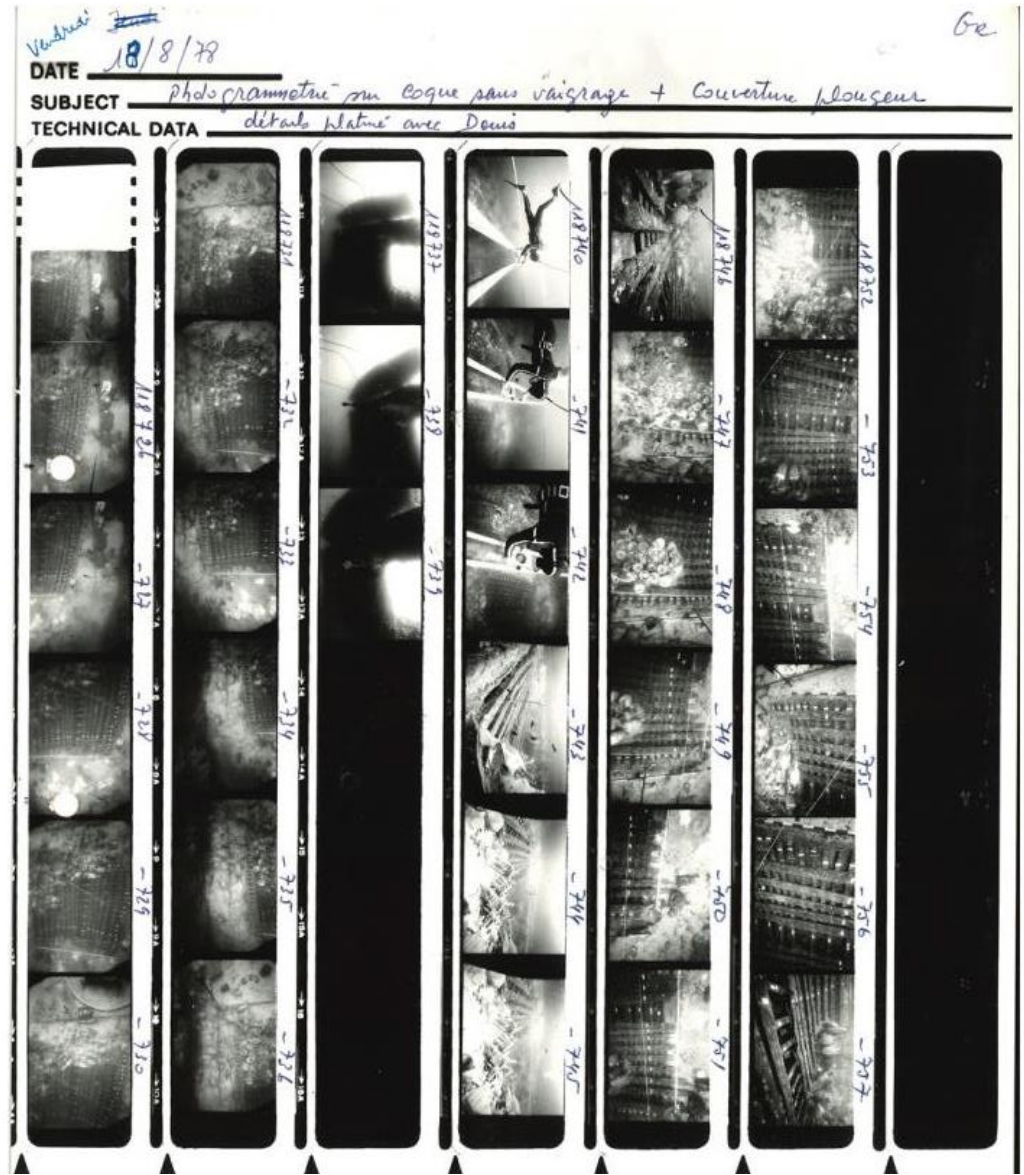
# The Madrague de Giens --- A photogrammetry from the past



Photos digitizing

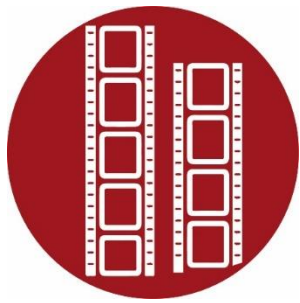


10'171 photo negatives digitized

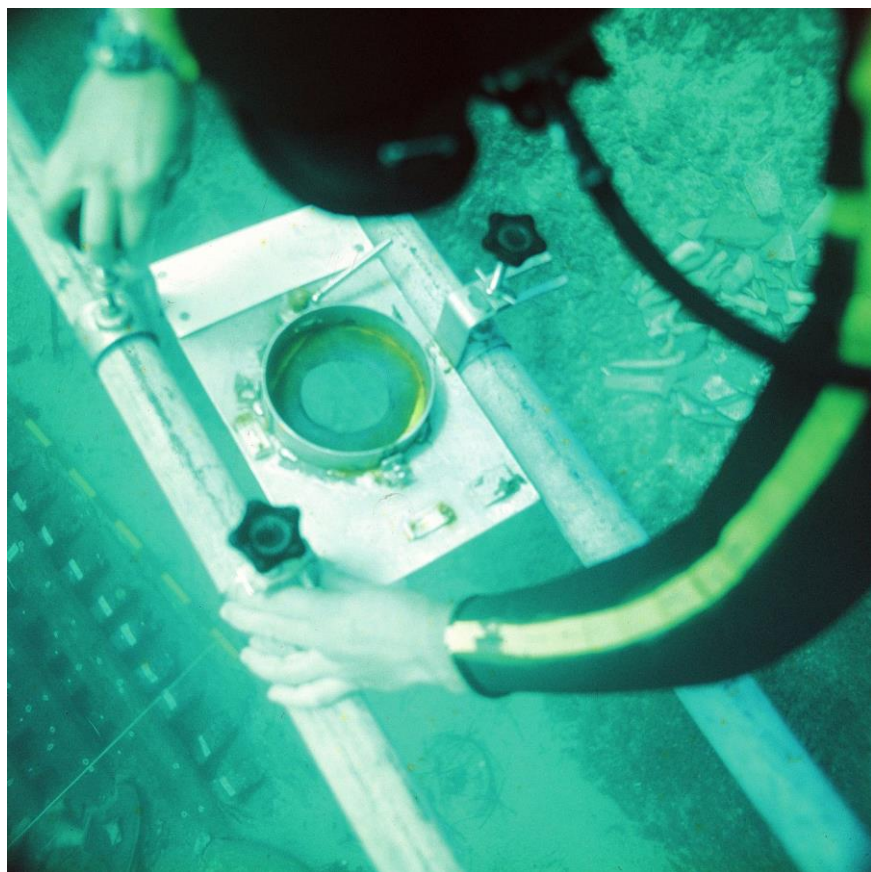
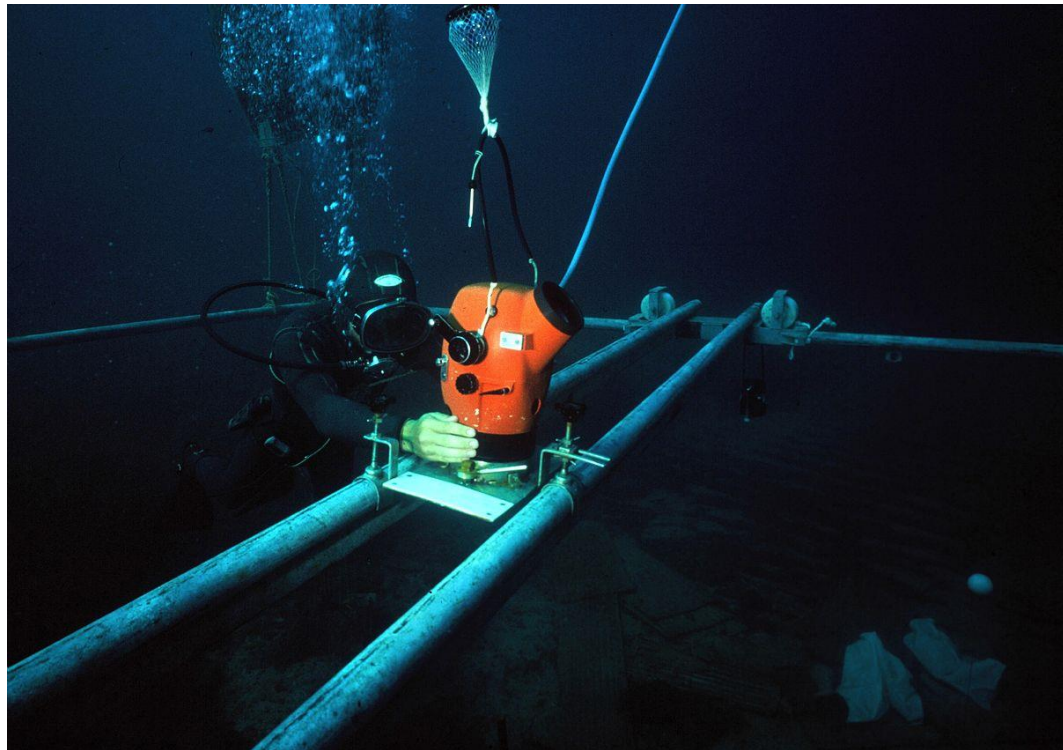




# The Madrague de Giens A photogrammetry from the past



Photos digitizing





# The Madrague de Giens A photogrammetry from the past



## Photogrammetry

Nom fichier Photogram	N° de Lot	Année prise de vue	Date de développement	Partie concernée	N° cliché début	N° cliché fin	N° clichés
<b>1974</b>	41	1974	20-sept	Partie centrale	84132	84146	15
<b>1975_1</b>	58	1975	10-sept	Amphores Plani	87956	87973	18
<b>1975_2</b>	60	1975	10-sept	Amphores Coupe	88152	88175	17
<b>1975_3</b>	71	1975	10-sept	Maitre-Couple	89016	89070	37
<b>1977</b>	112	1977	01-juil	Extrémité arrière	97525	97670	22
<b>1978</b>	129	1978	01-sept	arrière	118726	118757	18
<b>1979_1</b>	139	1979	01-sept	Puits de la pompe	122356	122384	26
<b>1979_2</b>	139	1979	01-sept	Puits de la pompe	122356	122384	26
<b>1979_3</b>	141	1979	01-sept	Pompe + vaigrage	122472	122492	18
<b>1979_4</b>	146	1979	01-sept	Puits de la pompe	123163	123194	29
<b>1980</b>	153	1980	15-sept	Avant (avec l'étrave)	126544	126667	44
<b>1981</b>	165	1981	01-janv	avant emplanture tribord	129955	129981	27
<b>1982</b>	168	1982	01-janv	Avant (sans l'étrave)	132488	132507	20
							<b>317</b>

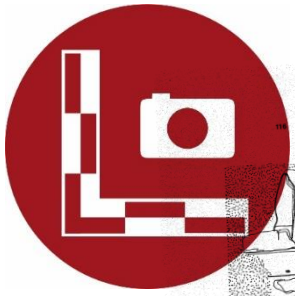


Set of 28 photos used for the reconstruction of the stern area  
(1977 campaign)

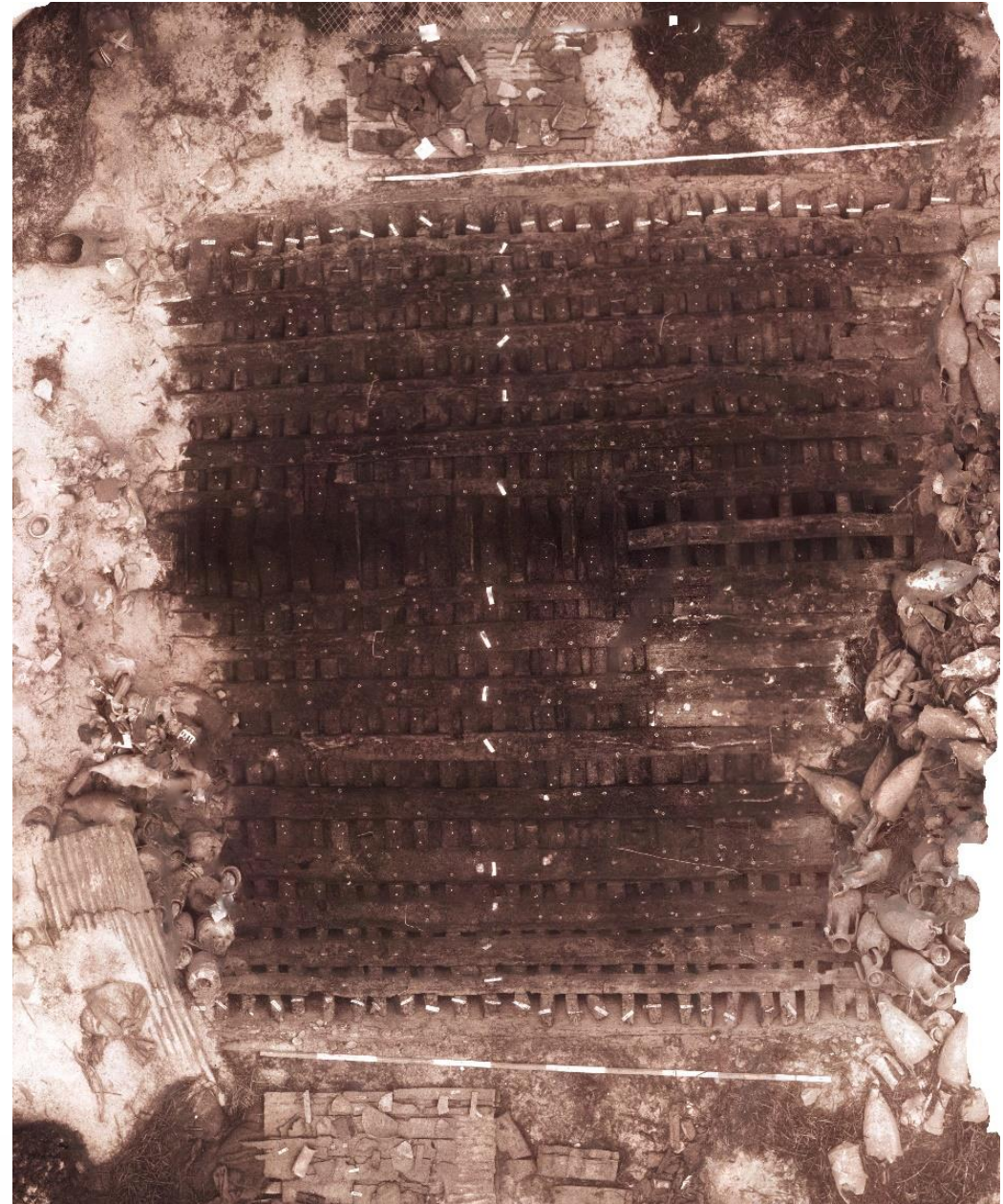
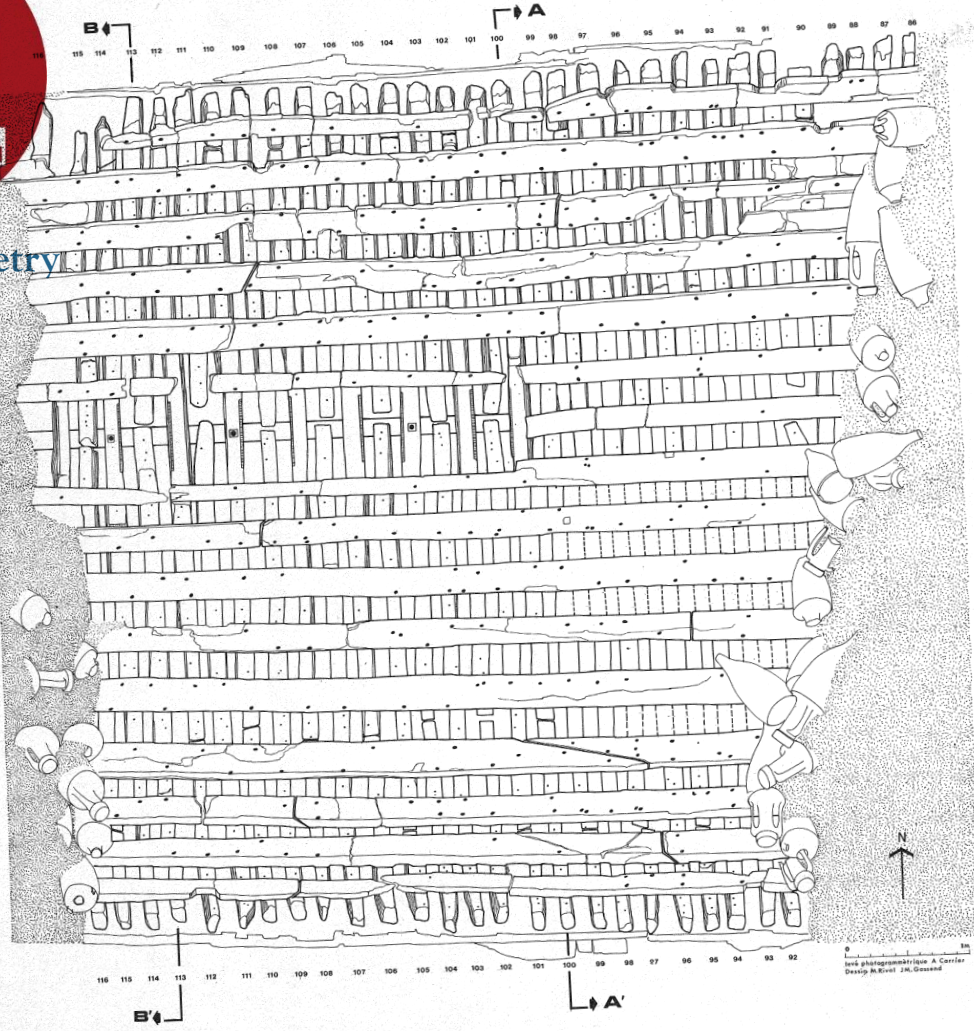




# The Madrague de Giens — A photogrammetry from the past

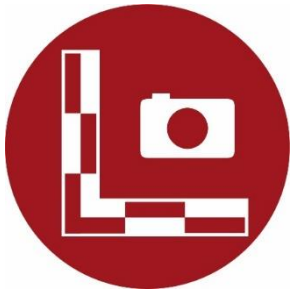


Photogrammetry

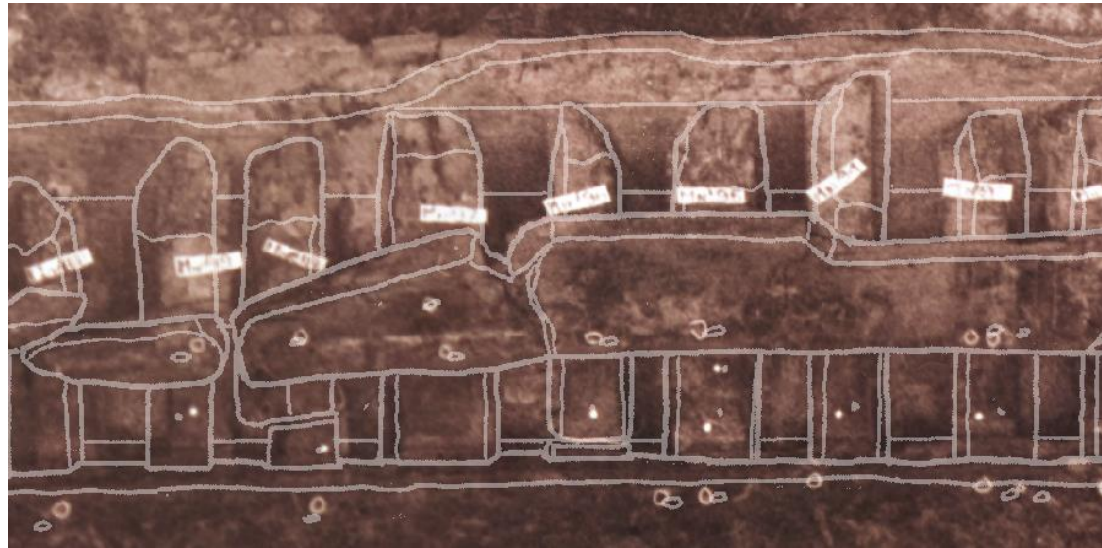




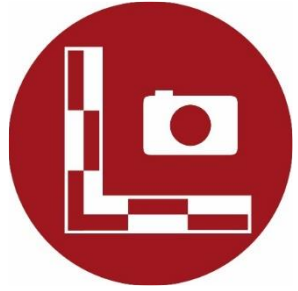
The Madrague de Giens — A photogrammetry from the past



Photogrammetry







Photogrammetry

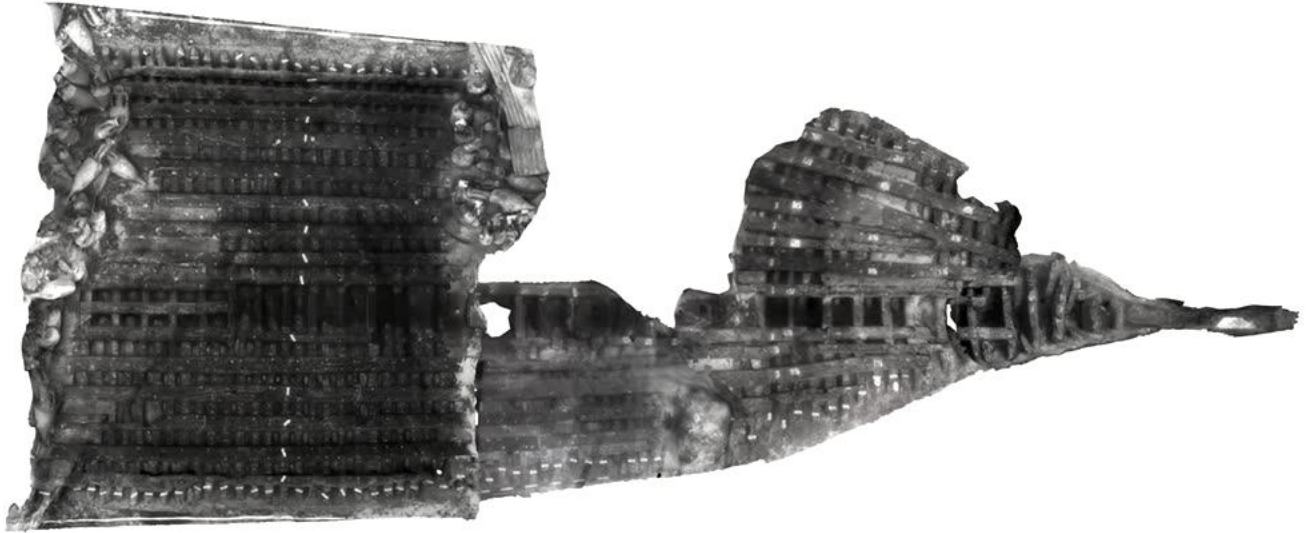
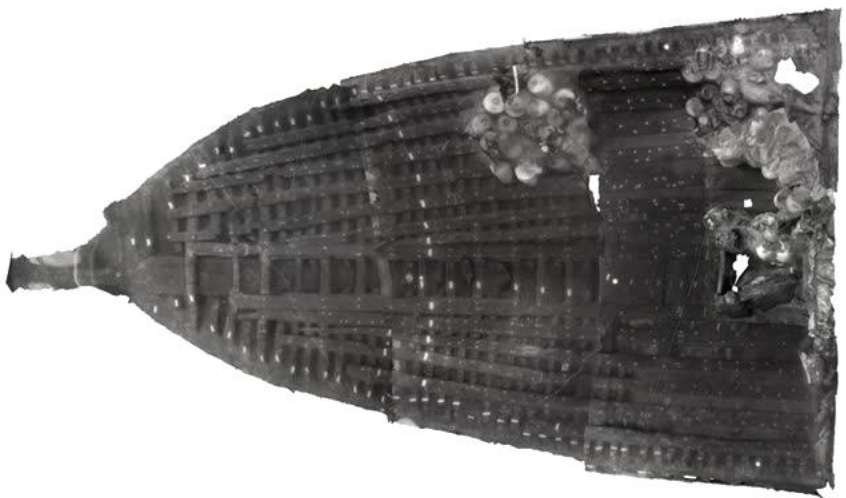




The Madrague de Giens — A photogrammetry from the past

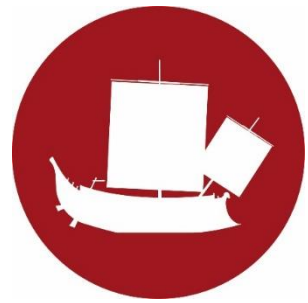


Photogrammetry

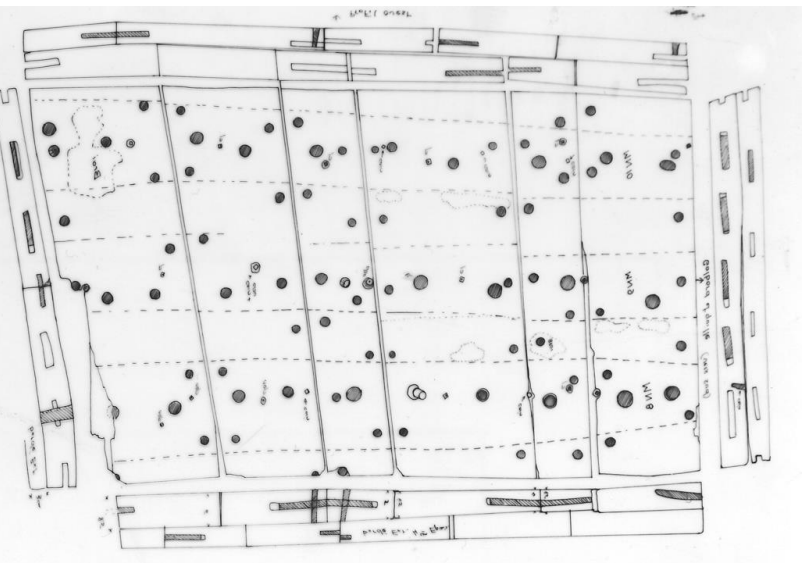




# The Madrague de Giens — A photogrammetry from the past

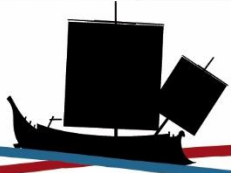
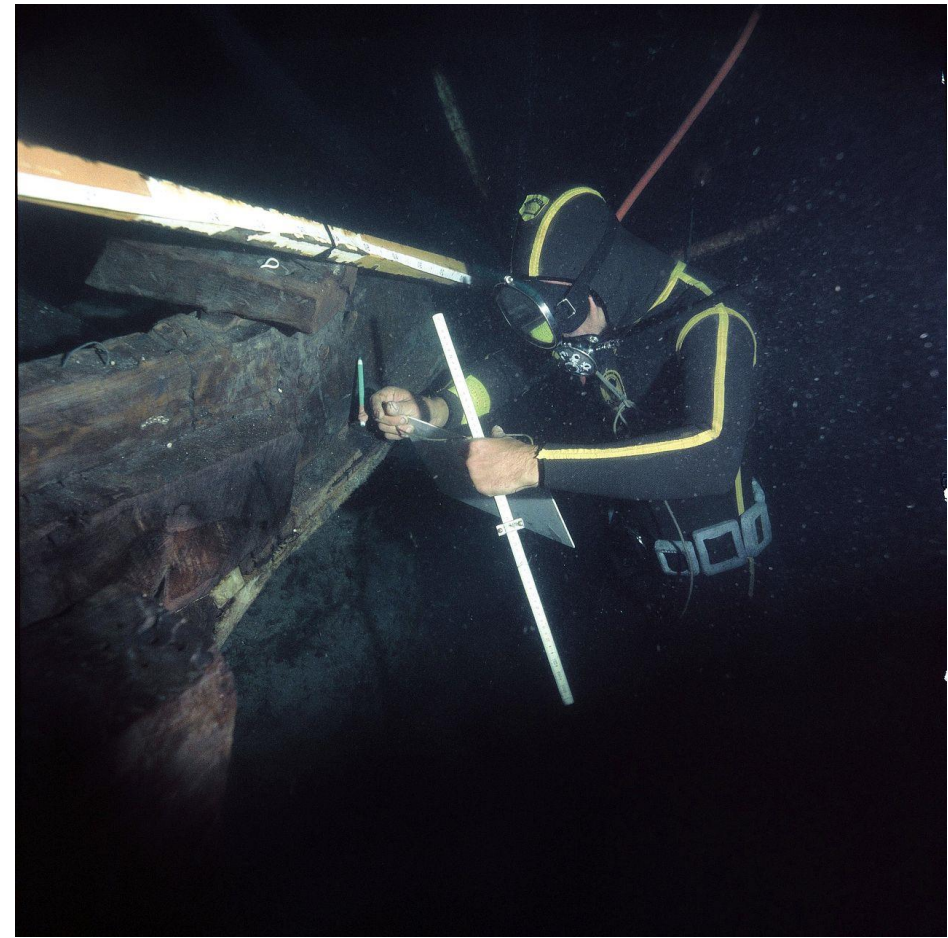


Naval architecture



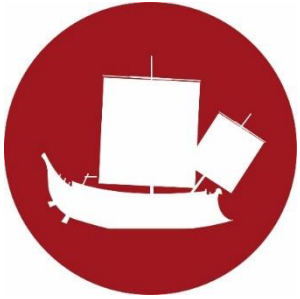
Série	Zone étudiée	N° d'ordre des varangues	Nbre de plateaux	Hauteur des plateaux	Envergure des varangues	Diamètre des grumes ébêtées	Chute inférieure	Chute supérieure	Total des chutes
1	de M.34 à M.36	34	1	0,45	2,80 m	0,80 m	/	/	/
		36	1	0,50	3,45 m	0,80 m	/	/	/
2	de M.38 à M.52 soit 8 varangues et 8 plateaux	38	1	0,55	Inconnue	0,90 m	36 %	26 %	62 %
		40	1	0,60	3,85 m	0,90 m	24 %	37 %	61 %
		42	1	0,60	3,85 m	0,90 m	/	/	/
		44	1	0,50	3,78 m	0,80 m	29 %	51 %	80 %
		46	1	0,60	3,78 m	0,90 m	/	/	/
		48	1	0,60	3,78 m	0,90 m	/	/	/
		50	1	0,65	4,50 m	1,05 m	35 %	31 %	66 %
52	1	0,70	4,50 m	1,10 m	/	/	/		
3	de M.54 à M.64 soit 6 varangues et 6 plateaux	54	1	0,70	Inconnue	1,00 m	/	/	/
		56	1	0,75	Inconnue	1,10 m	/	/	/
		58	1	0,80	Inconnue	1,10 m	/	/	/
		60	1	0,80	4,65 m	1,10 m	60 %	13 %	73 %
		62	1	0,85	4,65 m	1,20 m	/	/	/
64	1	0,85	4,65 m	1,20 m	/	/	/		
4	de M.66 à M.74 soit 4 varangues et 4 plateaux	66	1	0,85	5,00 m	1,20 m	46 %	33 %	79 %
		68	1	1,10	5,00 m	1,40 m	/	/	/
		72	1	0,95	5,00 m	1,40 m	/	/	/
		74	1	0,95	5,00 m	1,40 m	/	/	/
5	de M.76 à M.100 soit 13 varangues et 13 plateaux	76	1	0,85	Inconnue	1,20 m	/	/	/
		78	1	0,85	Inconnue	1,20 m	/	/	/
		80	1	0,85	Inconnue	1,20 m	/	/	/
		82	1	0,85	Inconnue	1,20 m	/	/	/
		84	1	0,80	Inconnue	1,10 m	/	/	/
		86	1	0,80	Inconnue	1,10 m	/	/	/
		88	1	0,80	Inconnue	1,10 m	/	/	/
		92	1	0,75	Inconnue	1,05 m	/	/	/
		94	1	0,75	Inconnue	1,05 m	/	/	/
		96	1	0,75	Inconnue	1,05 m	/	/	/
98	1	0,75	Inconnue	1,05 m	/	/	/		
100	1	0,75	4,67 m	1,05 m	50,7 %	12 %	71,7 %		
6	de M.102 à M.134 soit 17 varangues et 17 plateaux	102	17	0,75	Inconnue	1,05 m	/	/	/
		134							
7	de M.136 à M.146 soit 6 varangues et 6 plateaux	136	1	0,75	Inconnue	1,05 m	/	/	/
		138	1	0,75	Inconnue	1,05 m	/	/	/
		140	1	0,75	Inconnue	1,05 m	/	/	/
		142	1	0,80	Inconnue	1,10 m	/	/	/
		144	1	0,80	Inconnue	1,10 m	/	/	/
146	1	0,80	3,80 m	1,10 m	46 %	43 %	89 %		
<b>Total</b>			56						
			plateaux						

**Tableau 8 - Récapitulatif du nombre de plateaux nécessaires au débitage des varangues.**  
 1) Pour simplifier les opérations, nous avons ramené la hauteur des plateaux à une progression arithmétique de 0,05 m en 0,05 m.  
 2) L'épaisseur moyenne des varangues a été calculée à partir de la somme totale des épaisseurs mesurées divisée par leur nombre. La valeur de 0,14 m obtenue a été retenue pour calculer le nombre de défilages possibles de plateaux dans une grume de diamètre (pl. 63).  
 3) Nous n'avons pas pris en compte pour calculer le nombre des plateaux nécessaires au débitage des varangues les coupes suivantes : varangues antérie 30 et 32... les coupes avant 148, 150, 152, 154, 156, 158, 160, 161, à cause des données graphiques par trop insuffisantes.

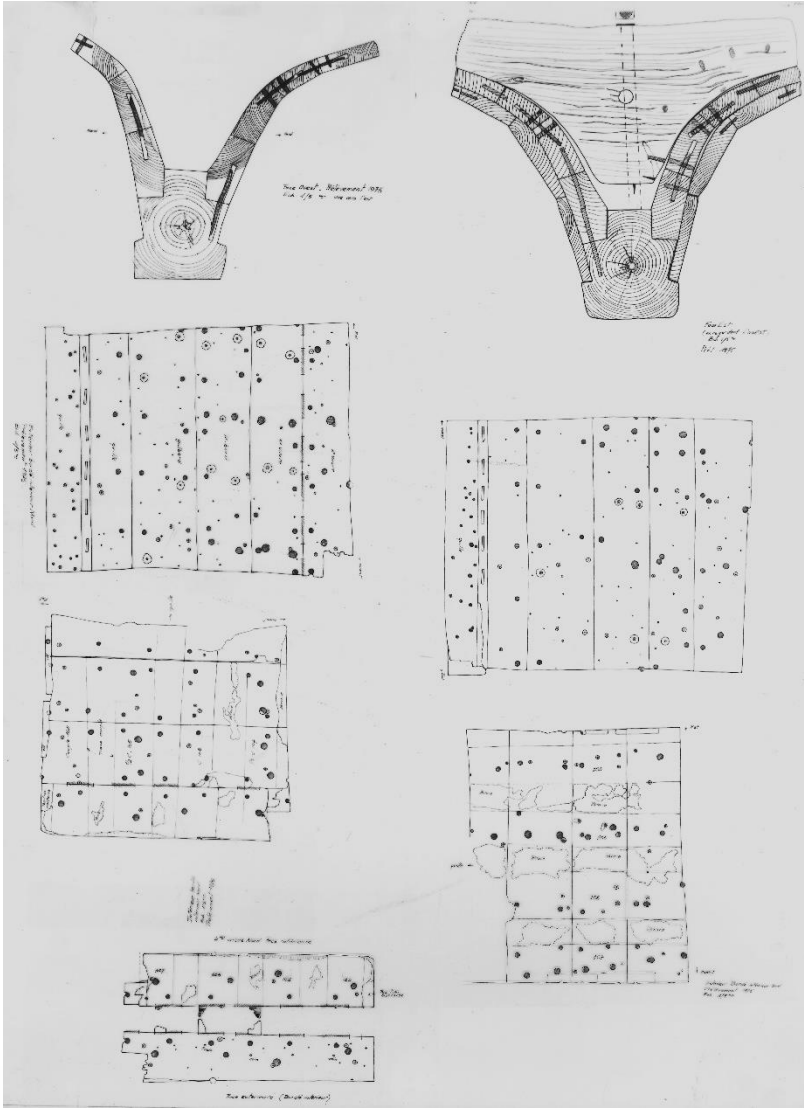




# The Madrague de Giens — A photogrammetry from the past

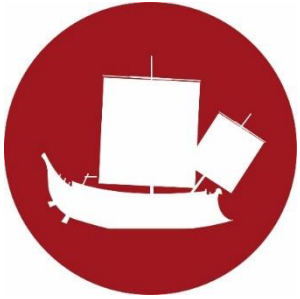


Naval architecture

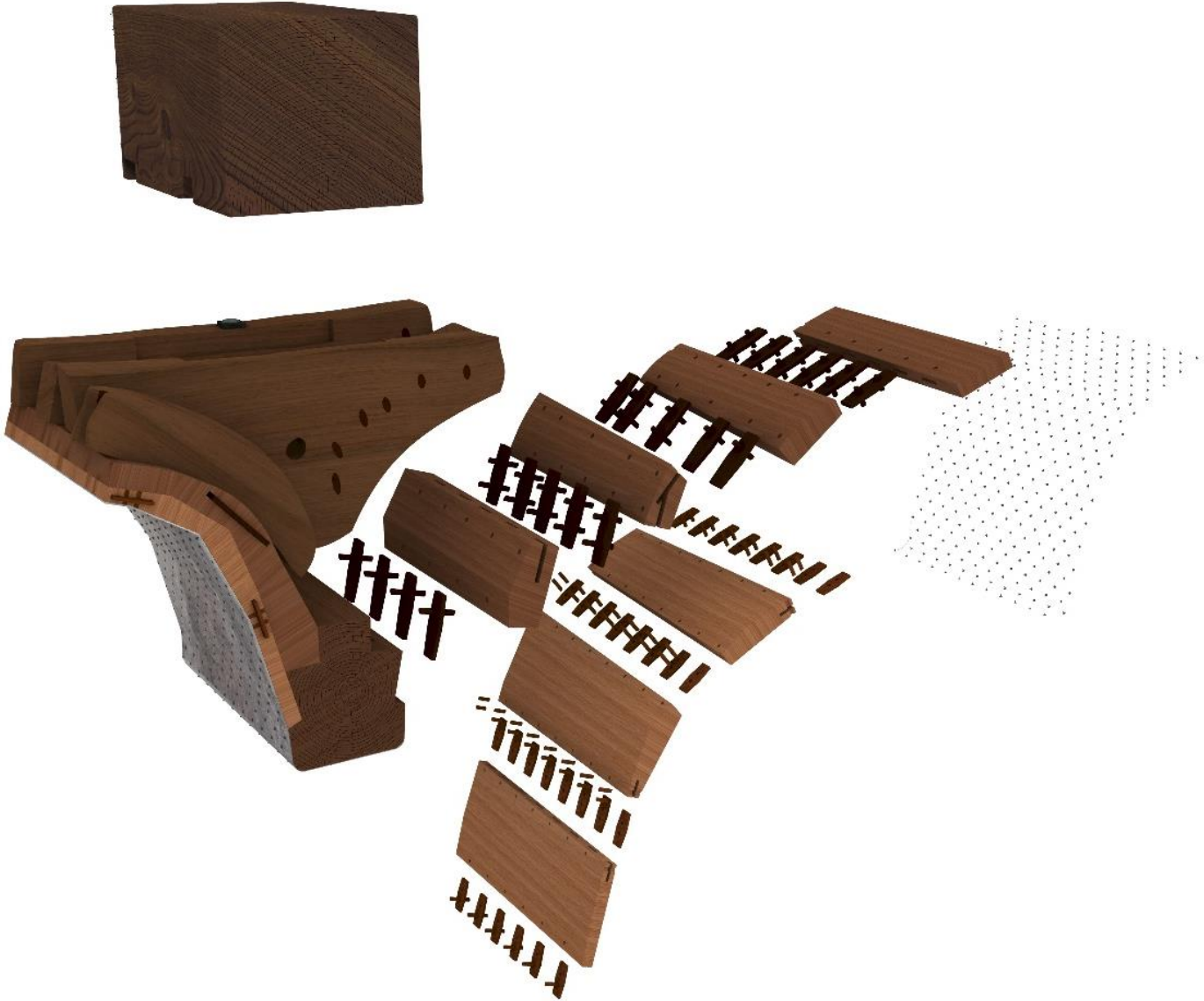




# The Madrague de Giens A photogrammetry from the past

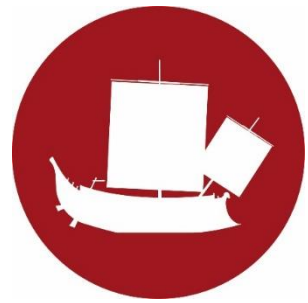


Naval architecture

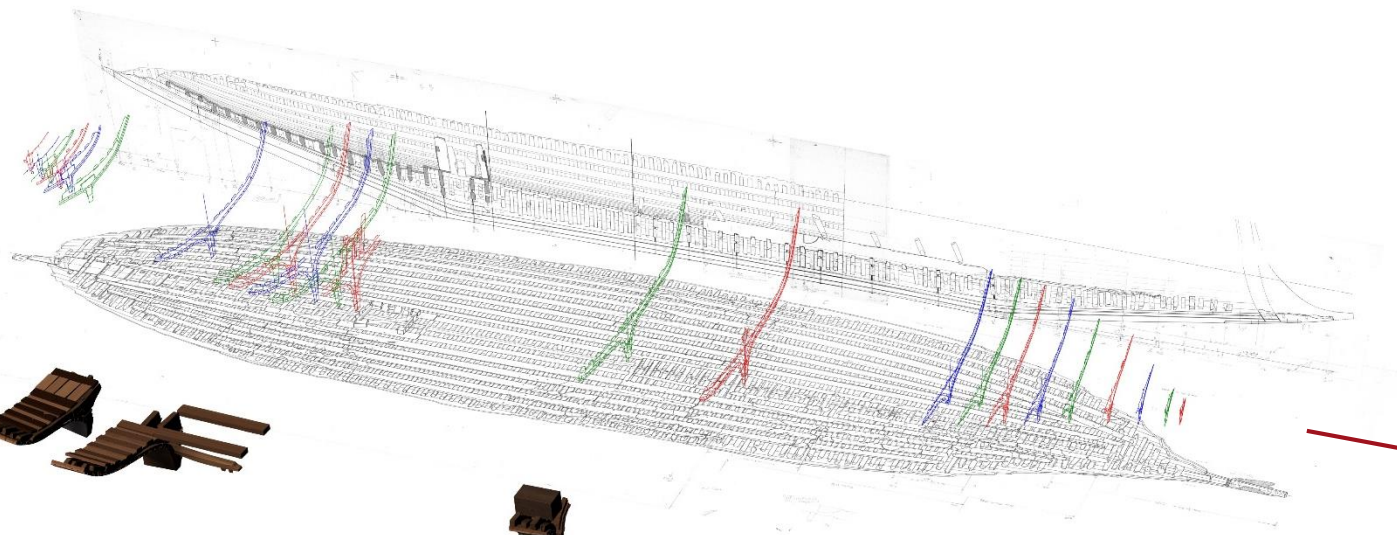




# The Madrague de Giens A photogrammetry from the past



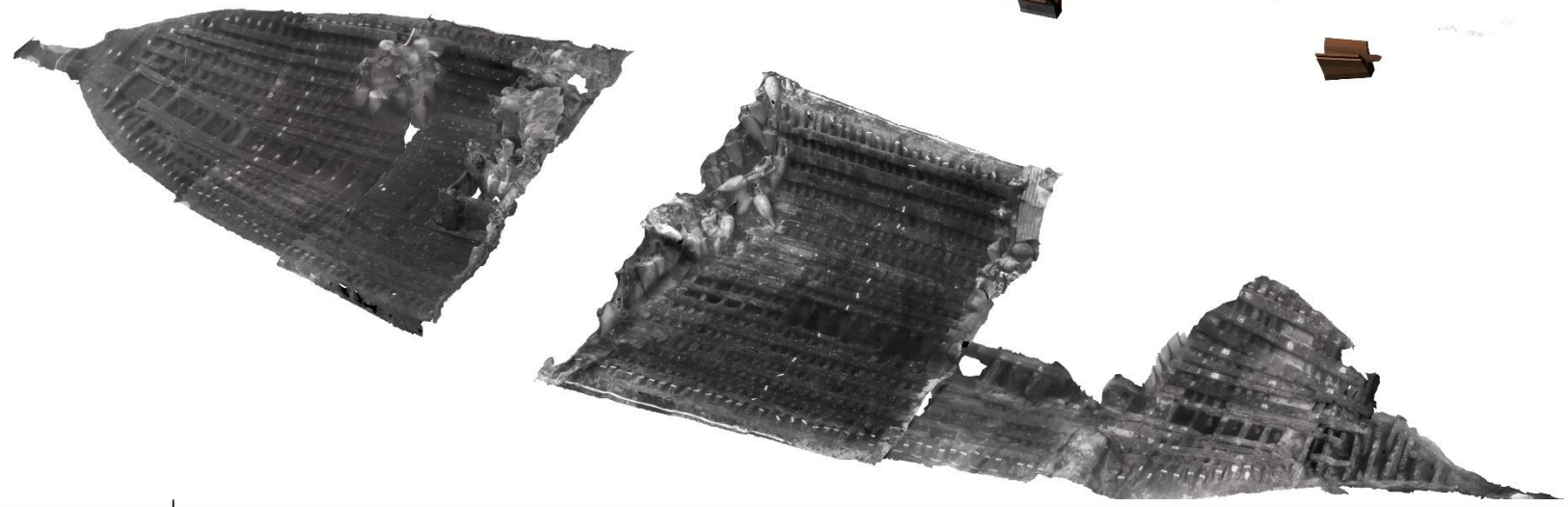
Naval architecture



Original 2D documentation



3D of samples

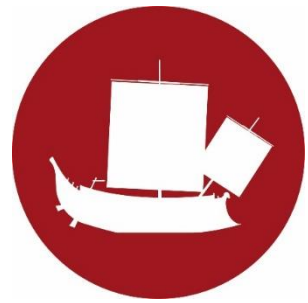


2021 Photogrammetry

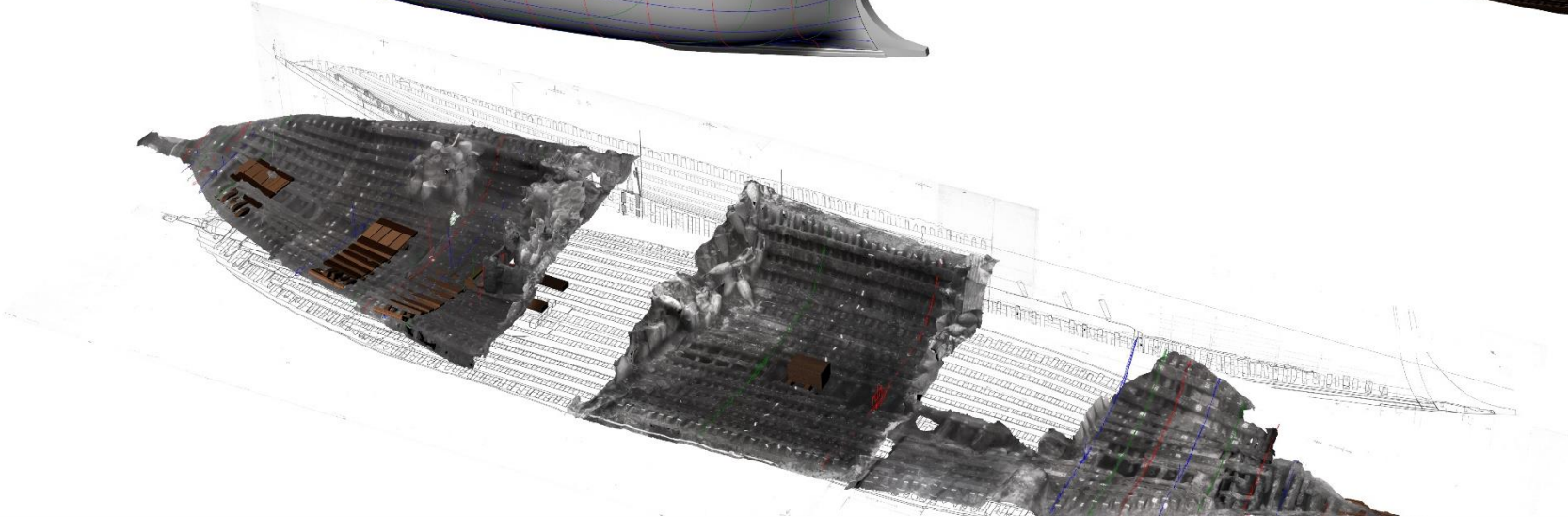
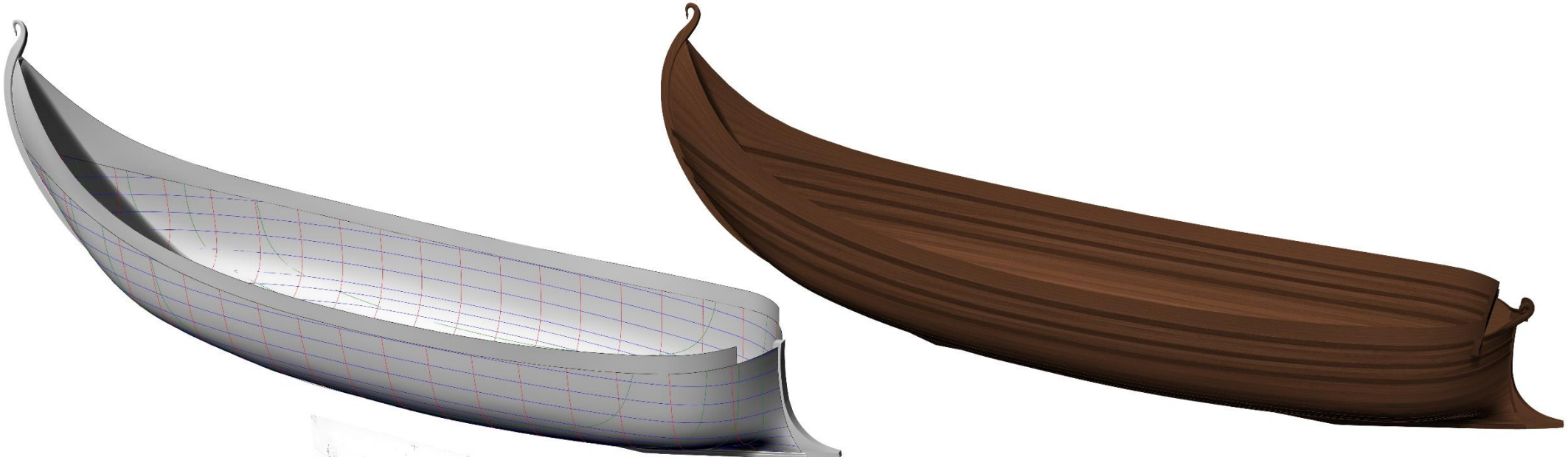




# The Madrague de Giens A photogrammetry from the past

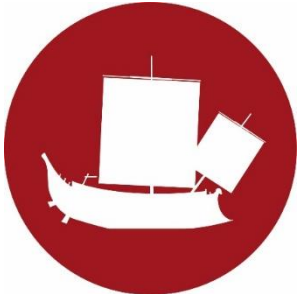


Reconstruction

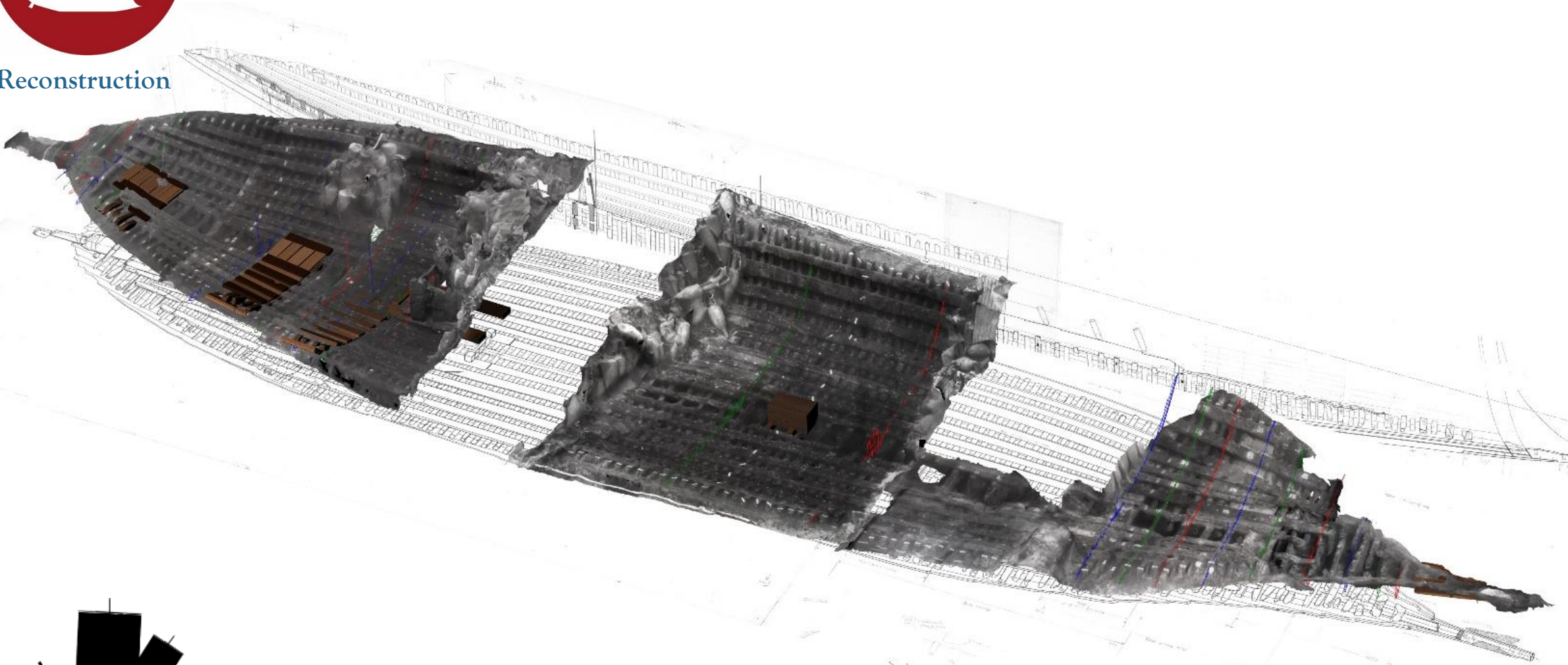




# The Madrague de Giens — A photogrammetry from the past



Reconstruction





In the Memory of  
**Patrice Pomey**  
1943 - 2021

# A Photogrammetry from the Past:

A time to **Observe** and a time to **Record**  
The example of the **Madrague de Giens** (1st BC)

Pierre Poveda  
Laetitia Cavassa  
Vincent Dumas  
Giulia Boetto  
&  
Philippe Soubias

