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

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

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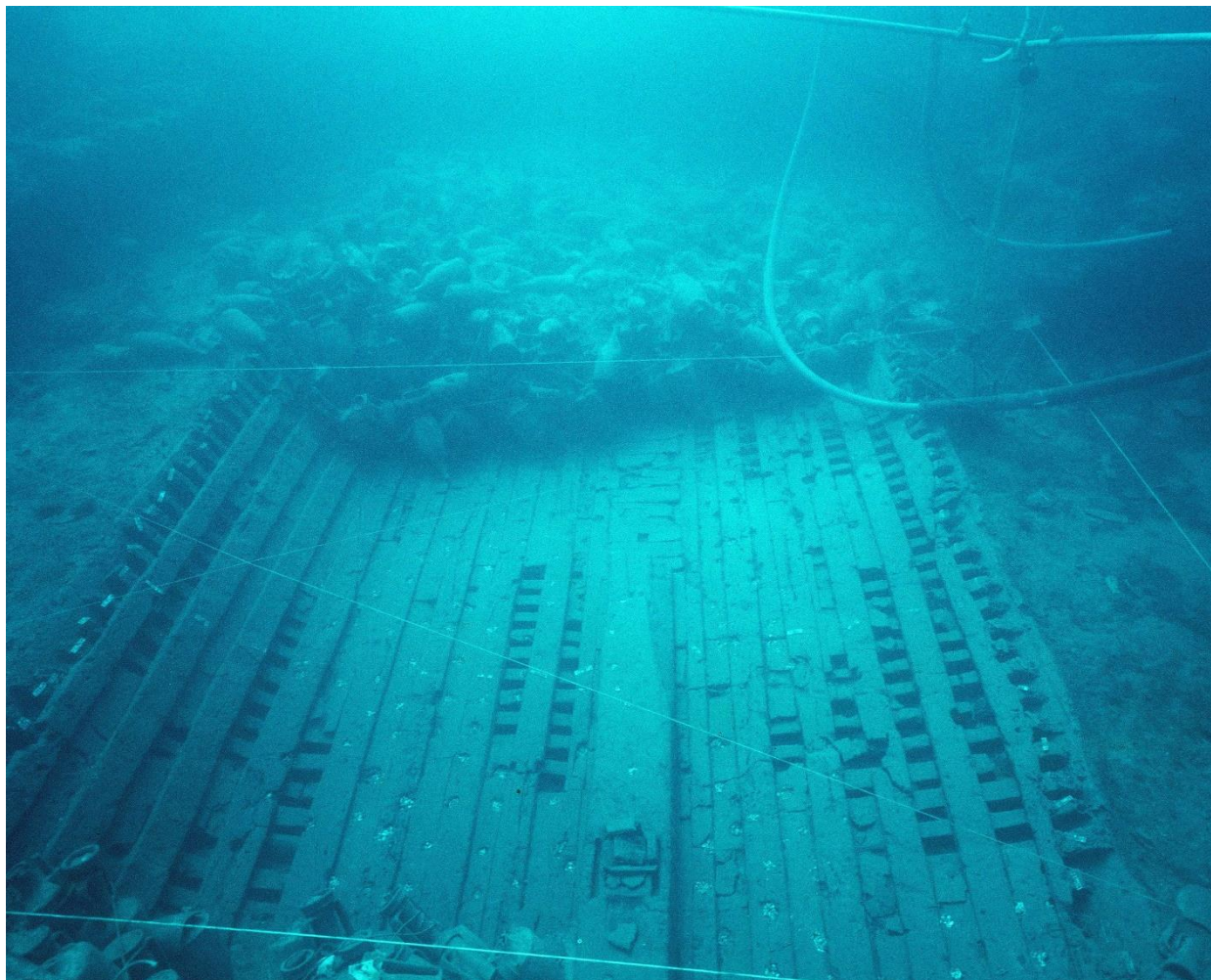
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Submitted on 6 Mar 2023

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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**

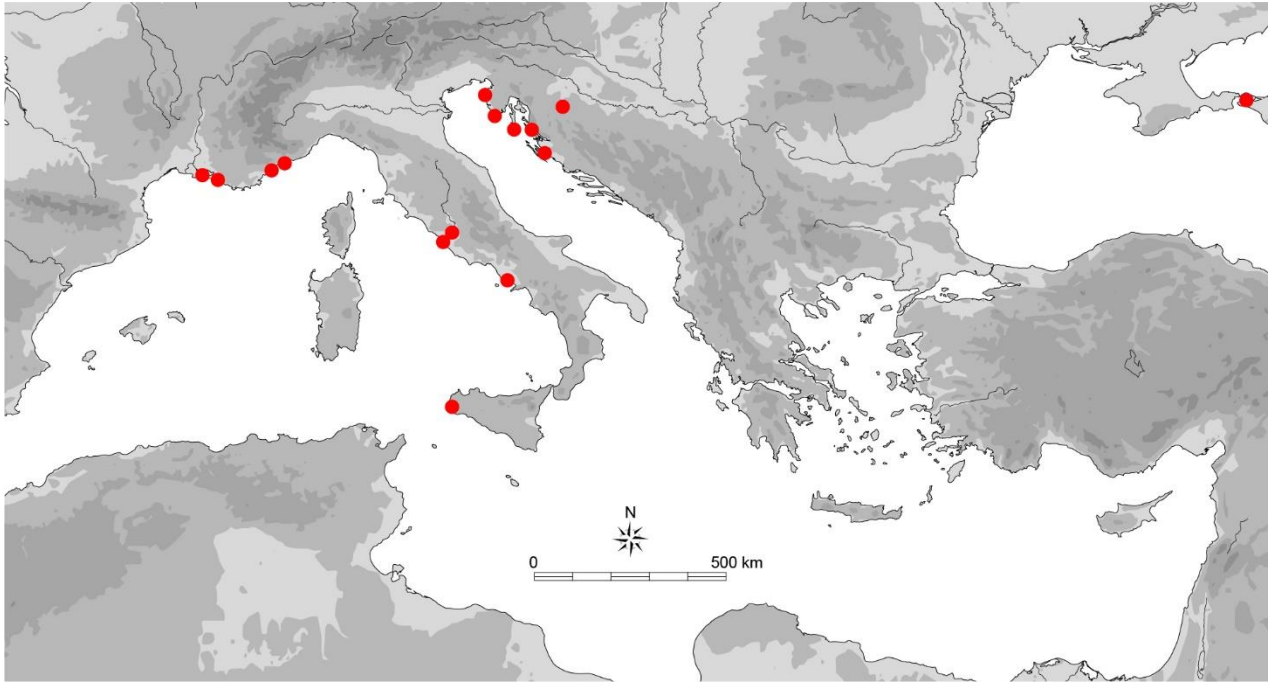
Centre Camille Jullian
CNRS & Aix-Marseille University



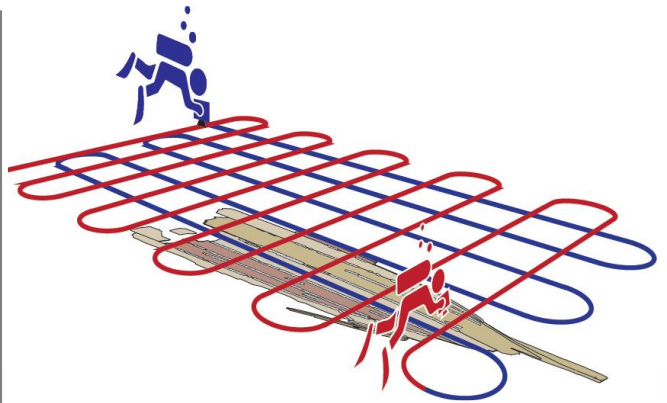
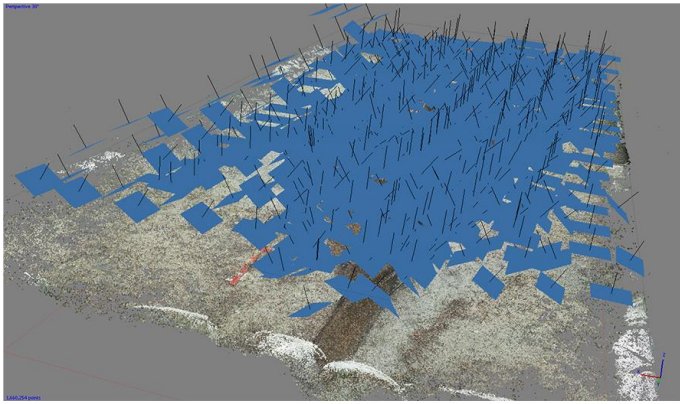
With the support of the
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The Madrague de Giens A photogrammetry from the past



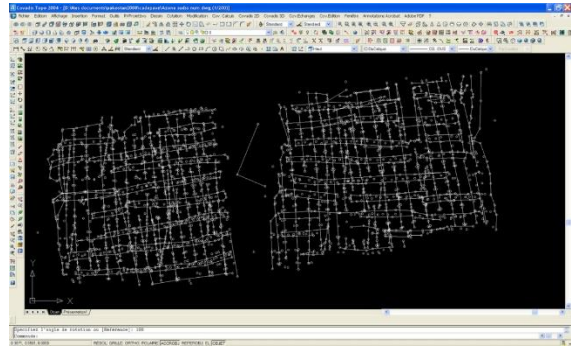
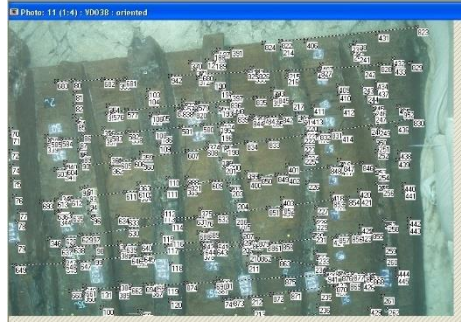
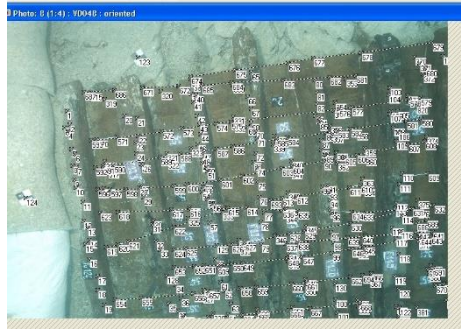
Sites	Date	Country	Campaign(s)	n° of shipwrecks	On Land	Underwater
Pakostane	4th-5th c. CE	Croatia	2007-2008	1		1
Caska	1st-2nd c. CE		2009-2017	4		1
Zambratija	13th-10th c. BCE		2011-2013	1		1
Pula	2nd c. CE		2013	2	1	
Kamensko	1st-3rd c. CE		2015-2019	1		1
Debeljak	4th-5th c. CE		2017-2018	1		1
Ilovik	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
				26	7	10



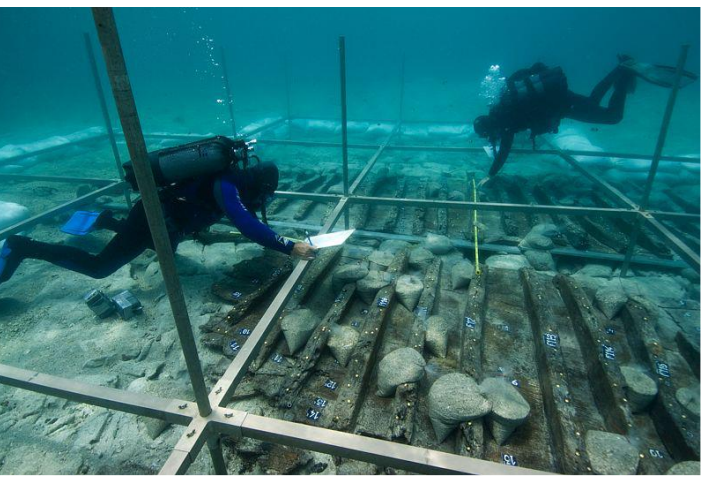


Pakostane

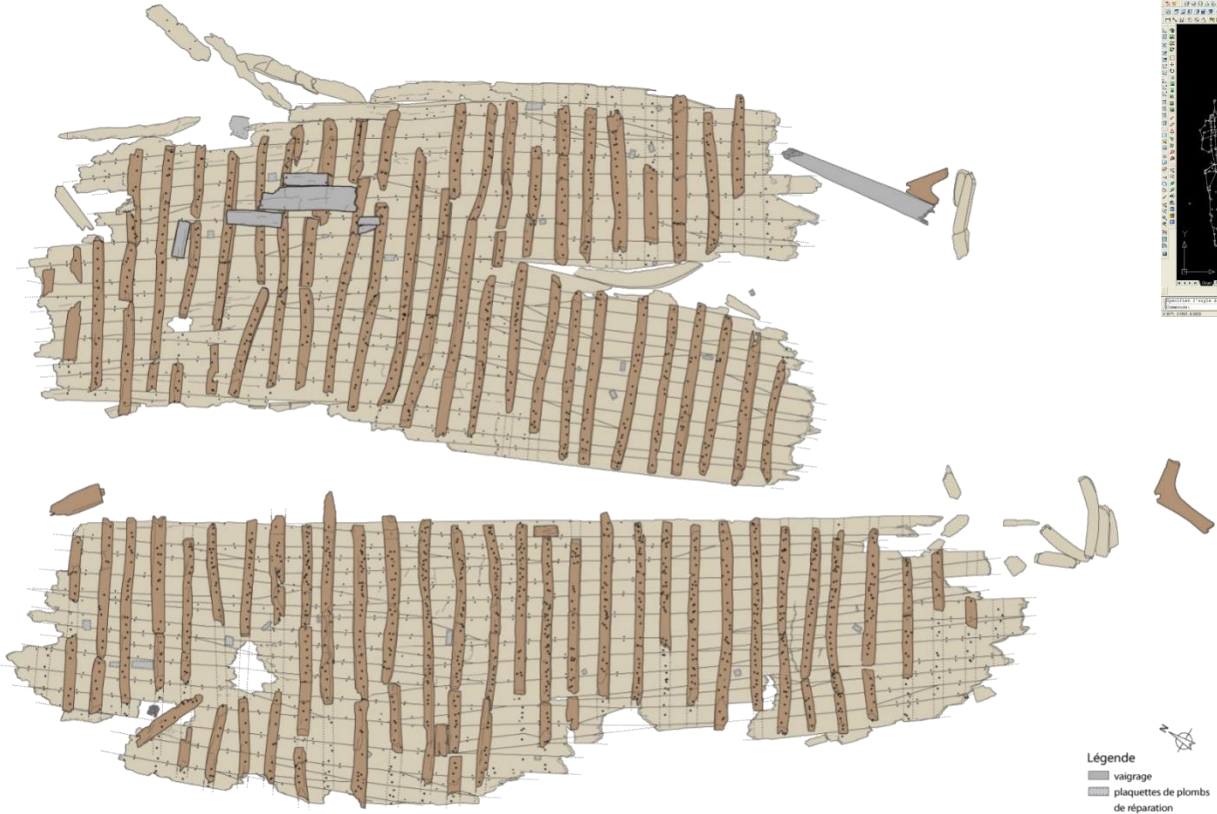
(IV°-V° c. CE, Croatia, 2008)



Photogrammetry



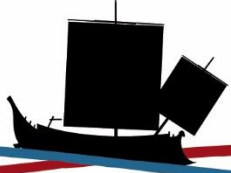
Classic manual documentation



Légende
■ vaigrage
■ plaquettes de plombs de réparation

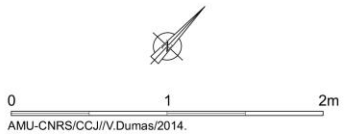
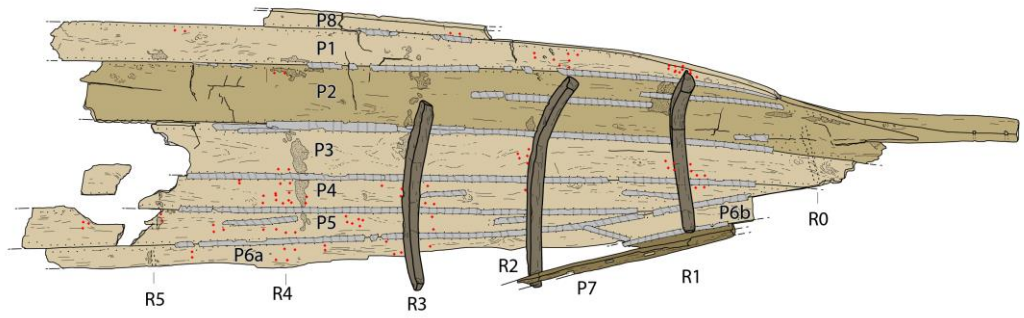
0 1 2 3 4 5 6 7 8 9 m

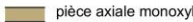


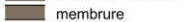





Centre Camille Jullian/CNRS/2008/ Relevés : M. Rival, V. Dumas / DAO : V. Dumas.

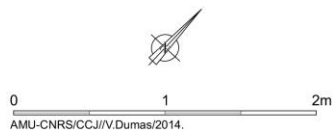
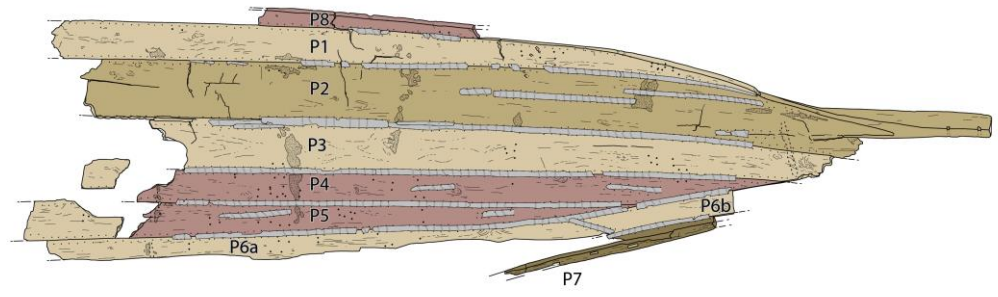


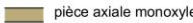
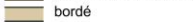







Zambratija

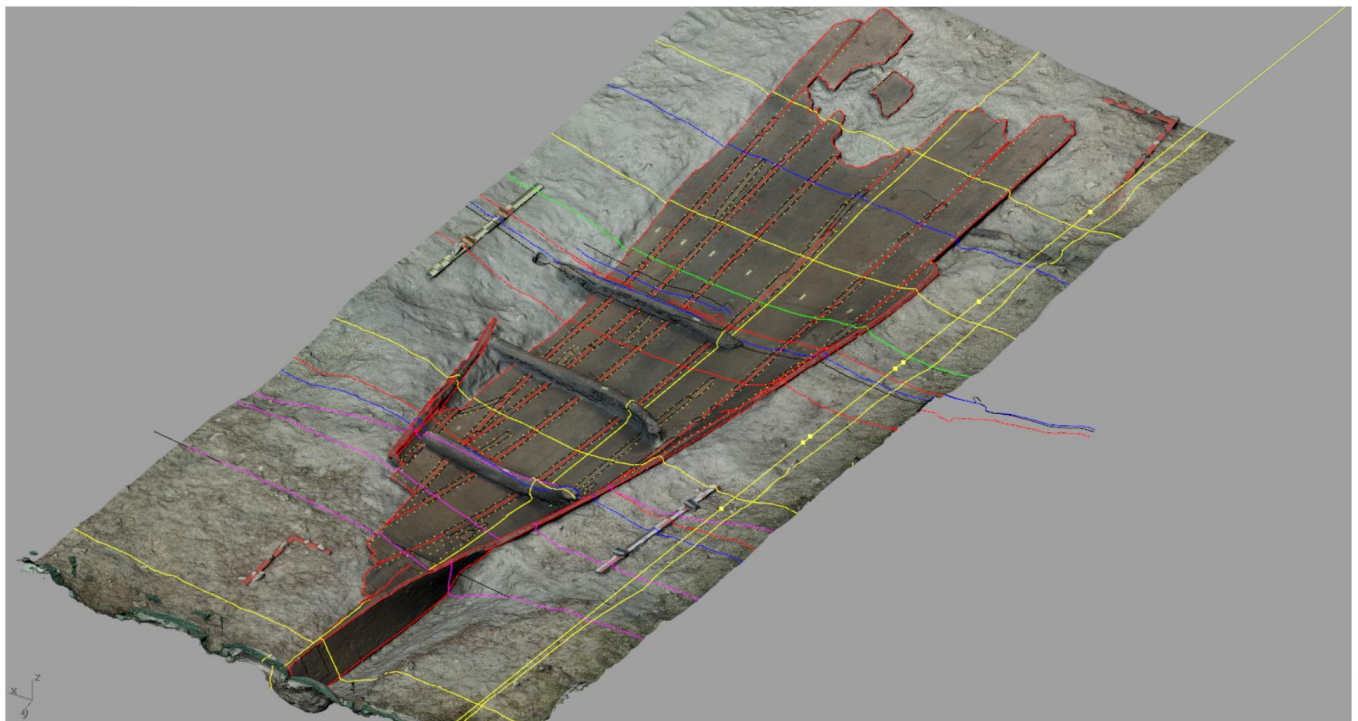
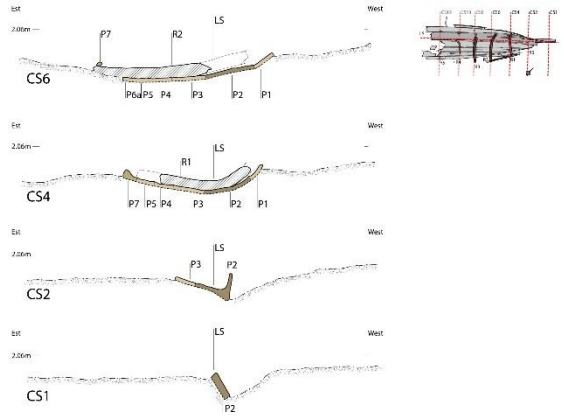
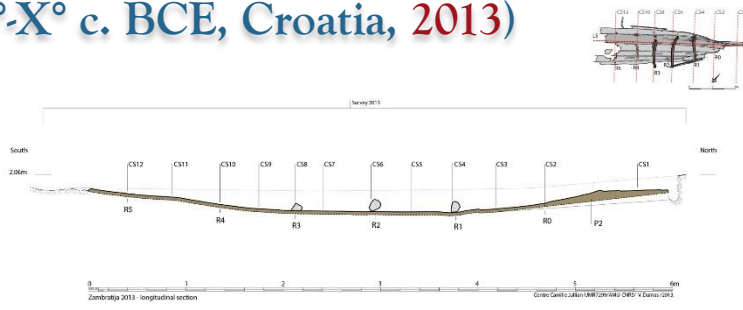
(XIII°-X° c. BCE, Croatia, 2013)



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



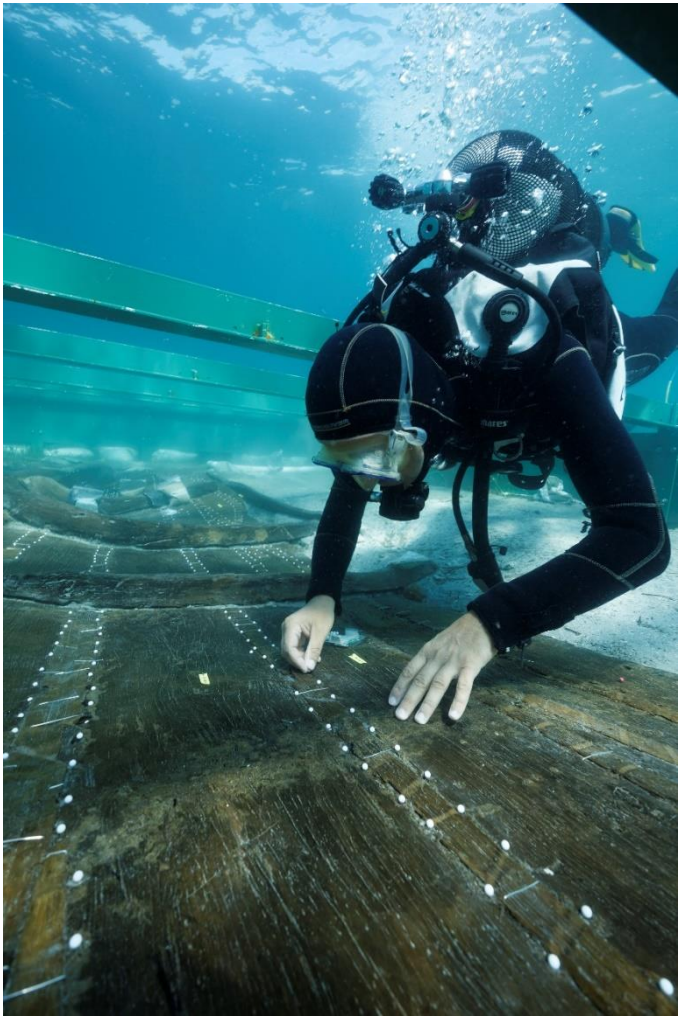
-  pièce axiale monoxylo
-  bordé
-  plat-bord monoxylo
-  joint perdu
-  latte
-  trace de ligature
-  cheville
-  assemblage membrure
-  poix



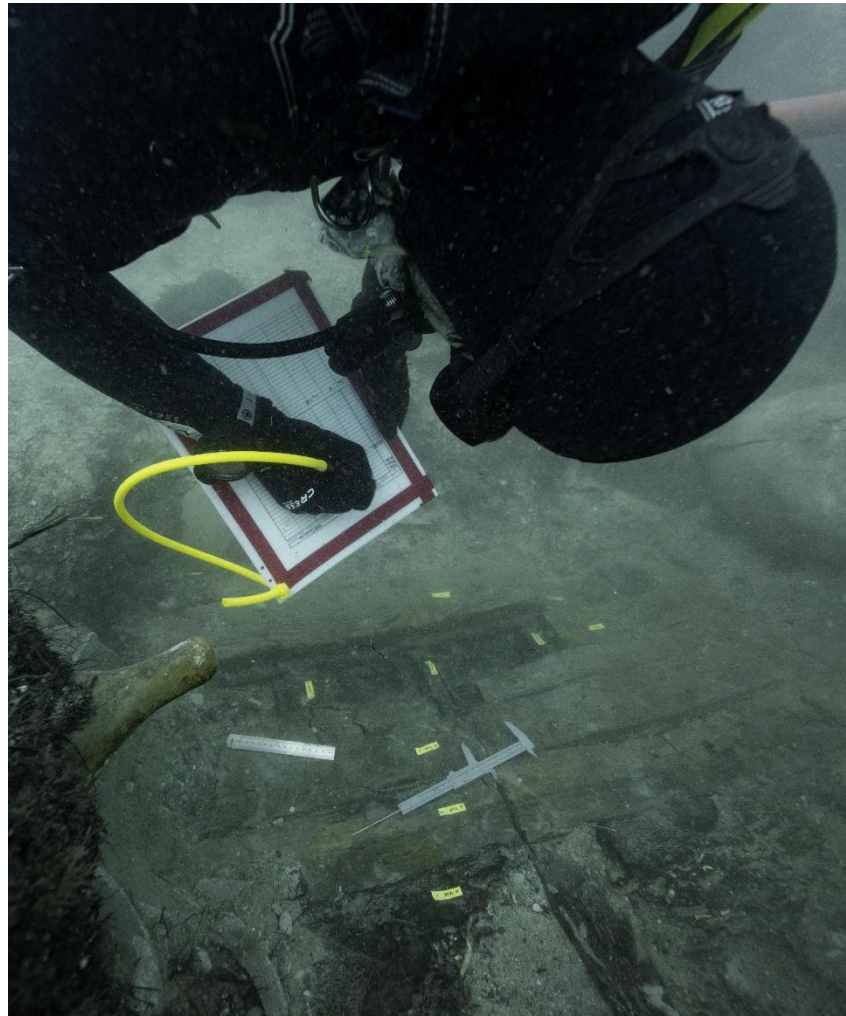
The Madrague de Giens — A photogrammetry from the past



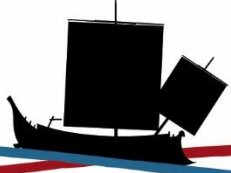
Observe

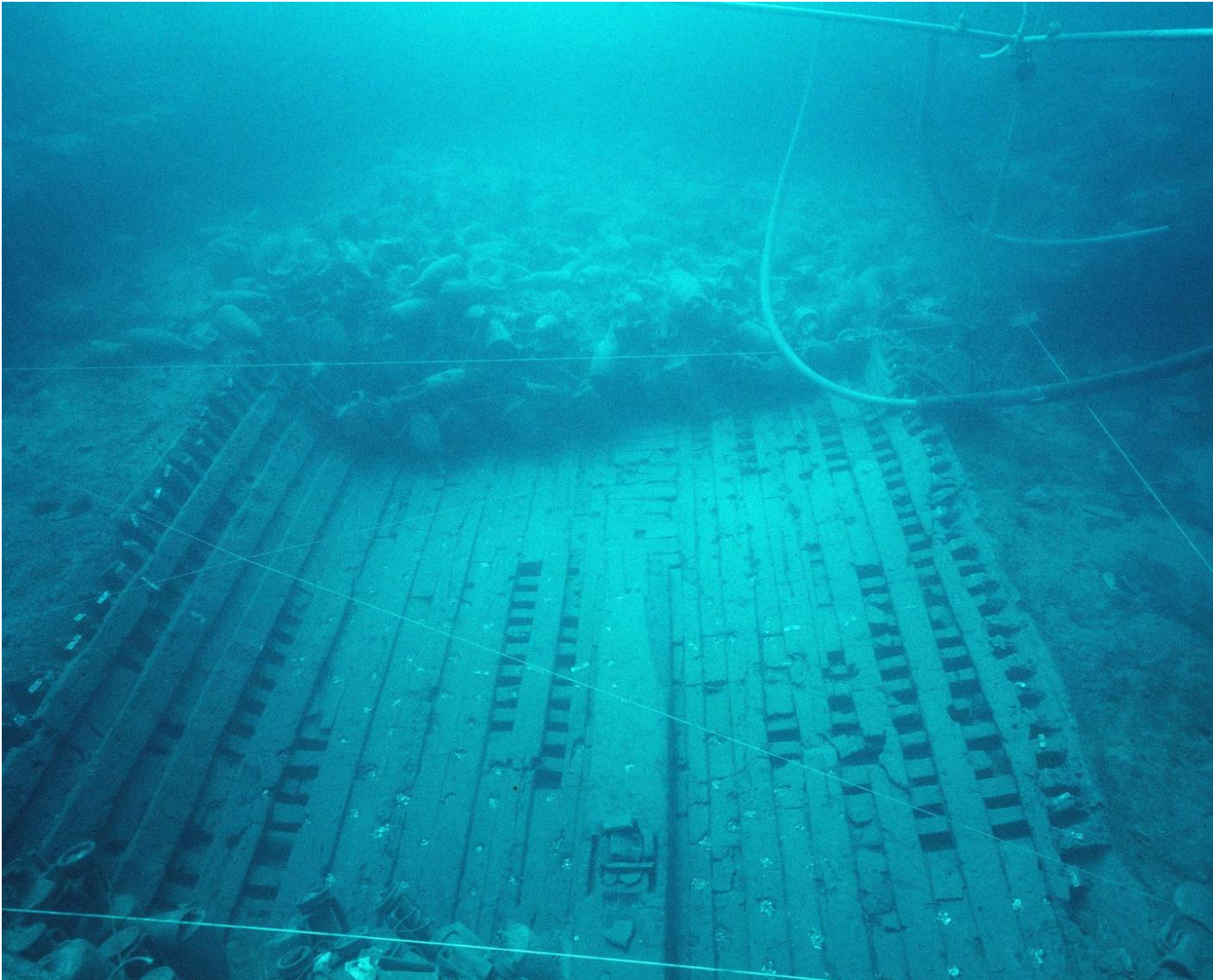


Mark



Measure





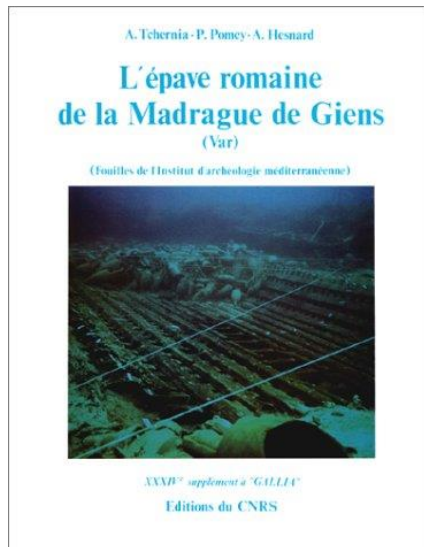
Madrague de Giens (1st BC)



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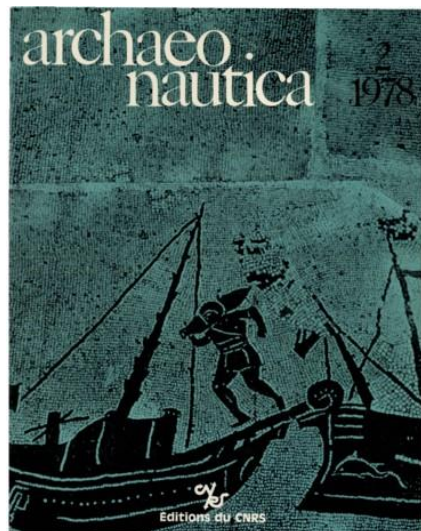


The Madrague de Giens — A photogrammetry from the past



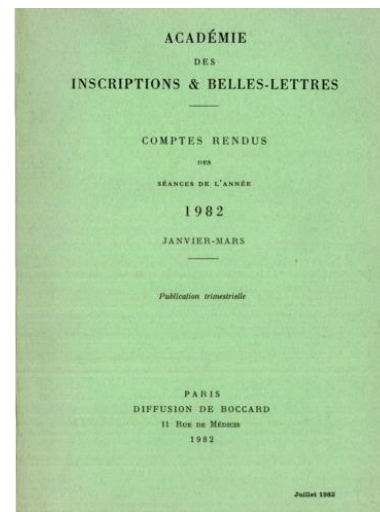
1978

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



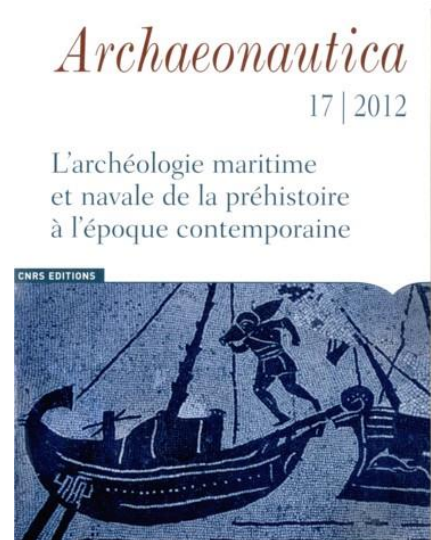
1978

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.

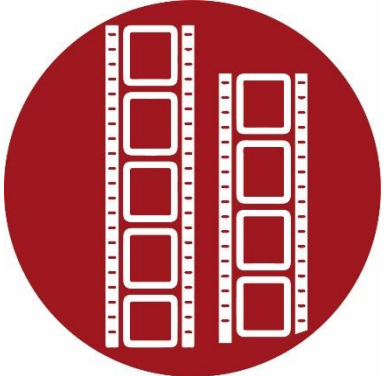




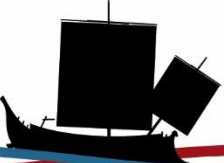
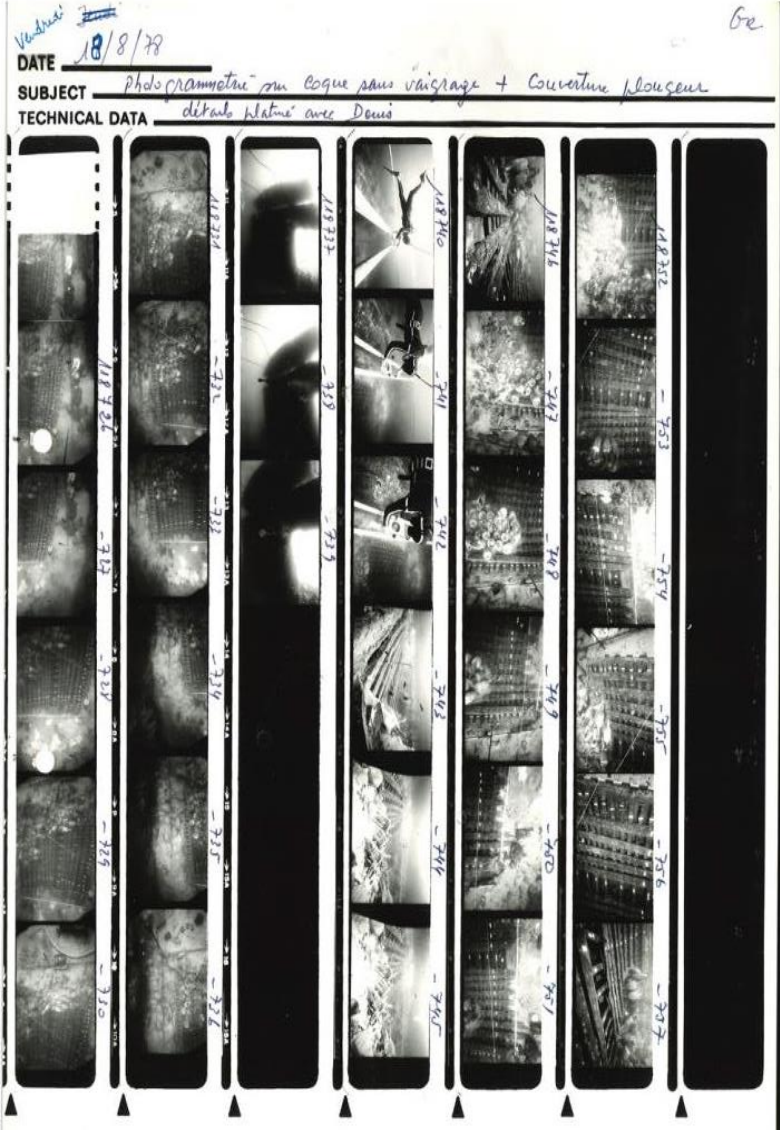
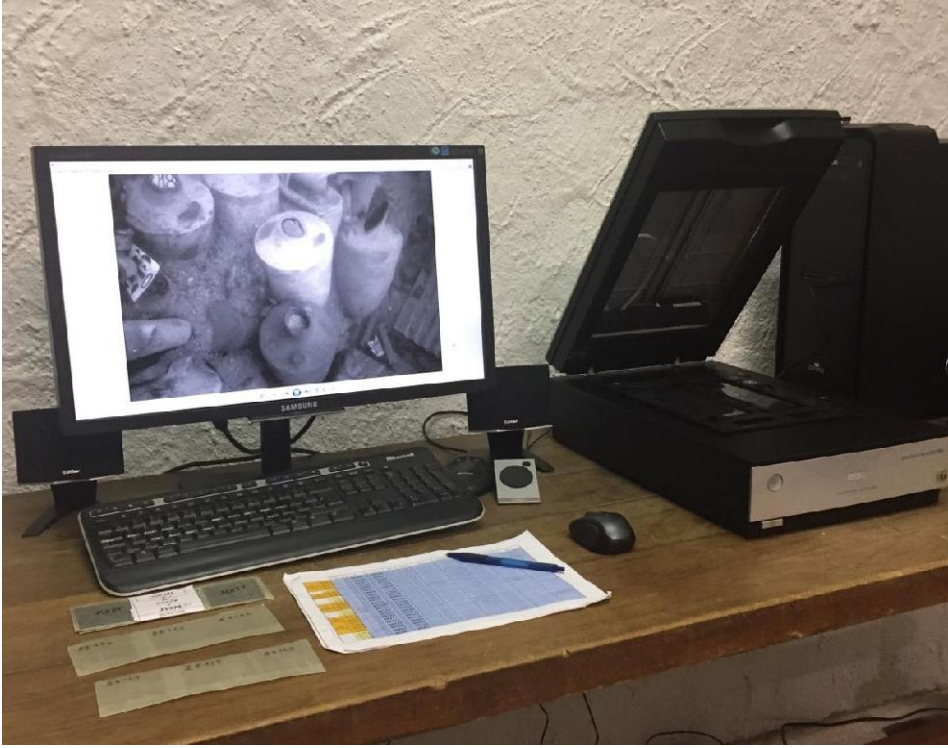
Ceramic Studies



The Madrague de Giens — A photogrammetry from the past



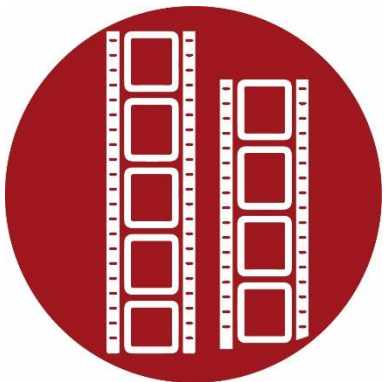
Photos digitizing



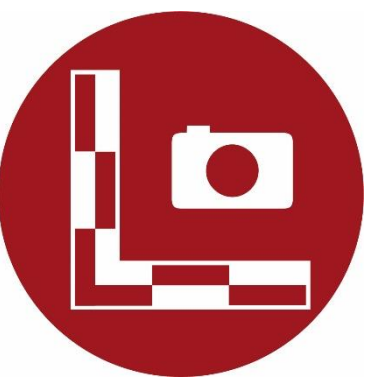
The Madrague de Giens — A photogrammetry from the past



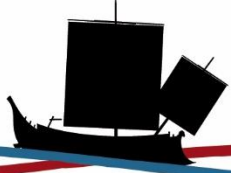
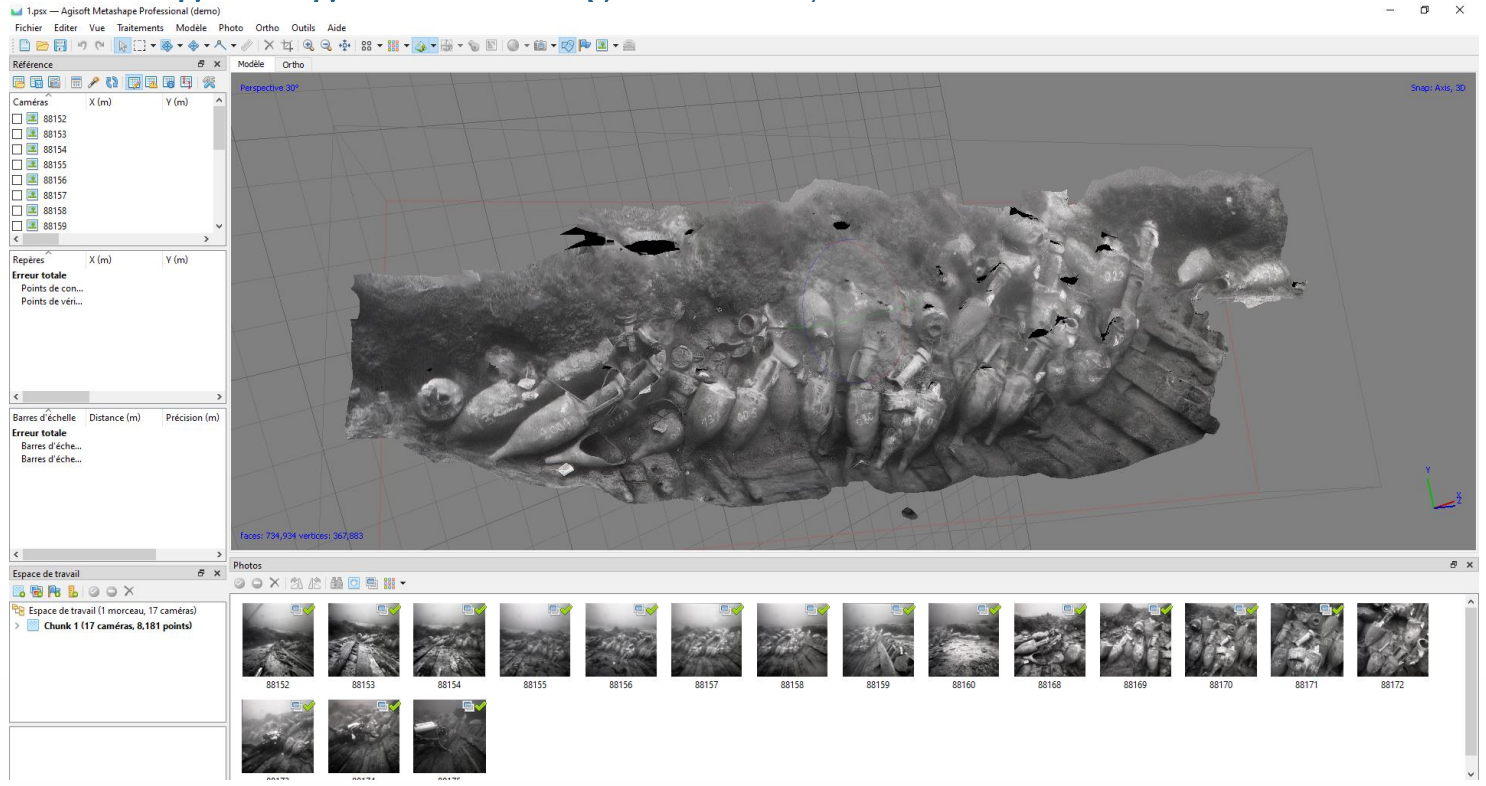
Ceramic Studies



Photos digitizing



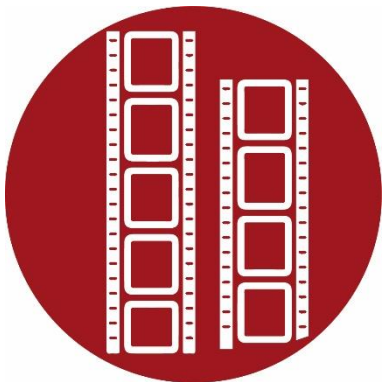
Photogrammetry



The Madrague de Giens — A photogrammetry from the past



Ceramic Studies



Photos digitizing



Photogrammetry

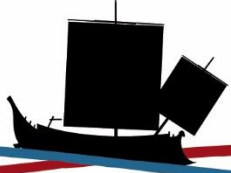
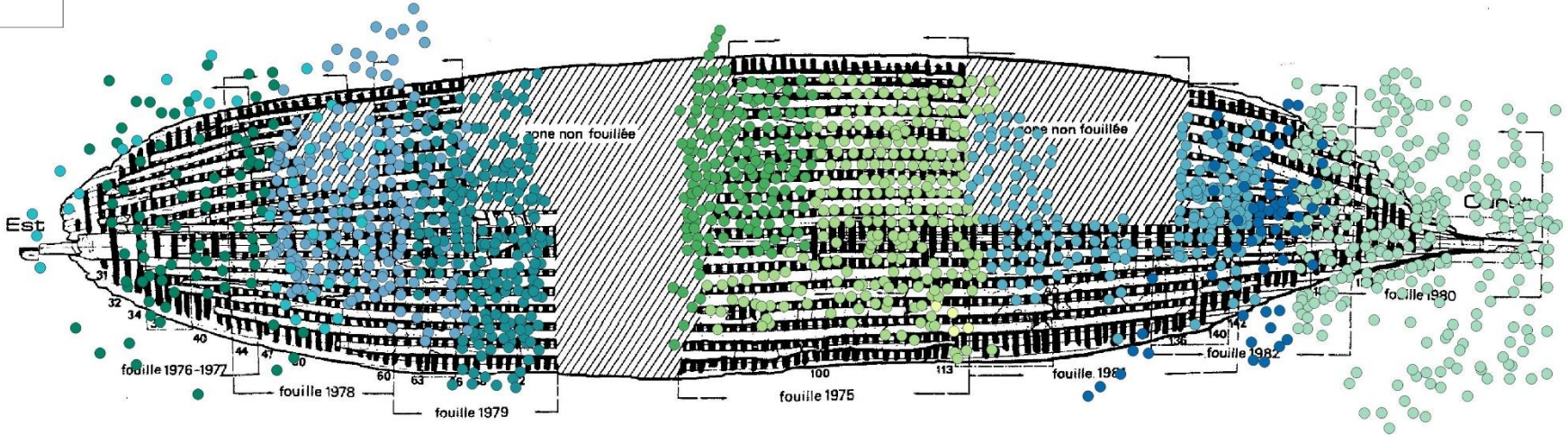


GIS



Géoréférencement de la cargaison
État au 15 décembre 2021

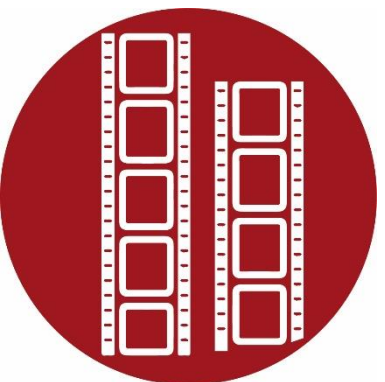
Avant	Centre	Arrière
● 1982	● 1973	● 1976
● 1981	● 1974	● 1977
● 1980	● 1975	● 1978
		● 1979



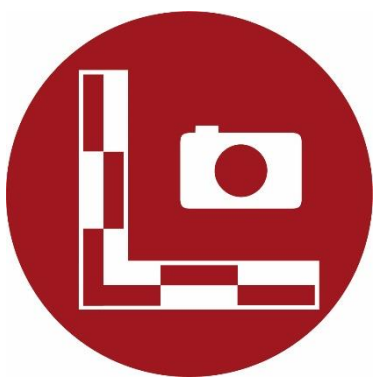
The Madrague de Giens  A photogrammetry from the past



Ceramic Studies



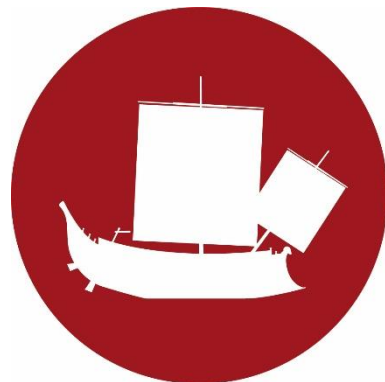
Photos digitizing



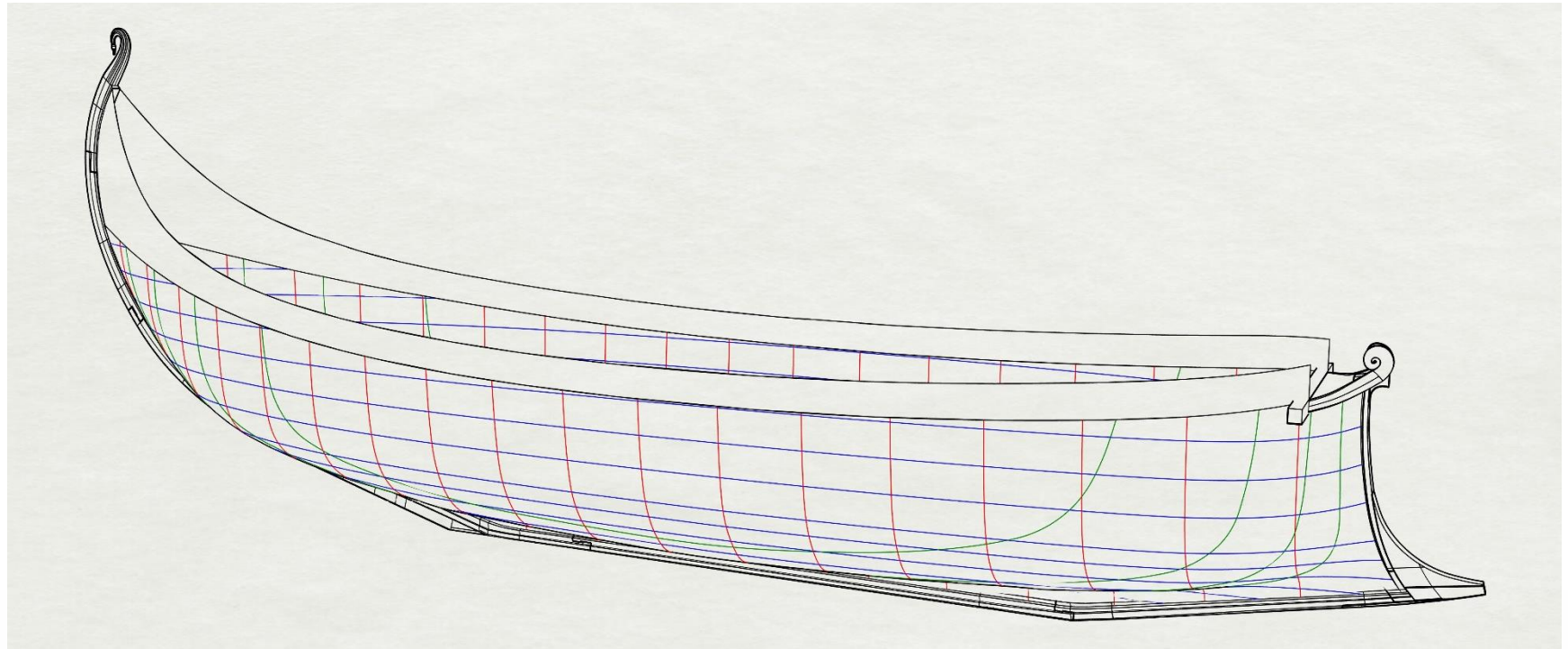
Photogrammetry



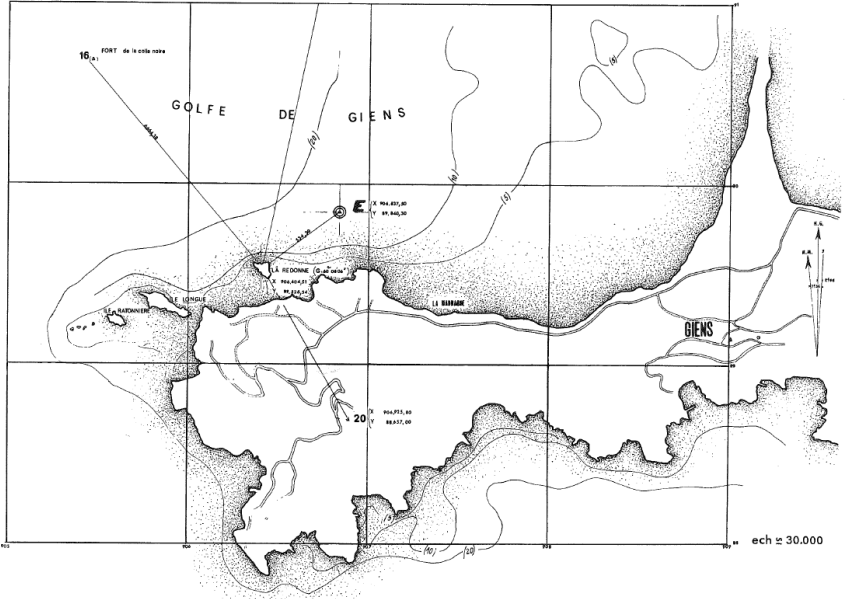
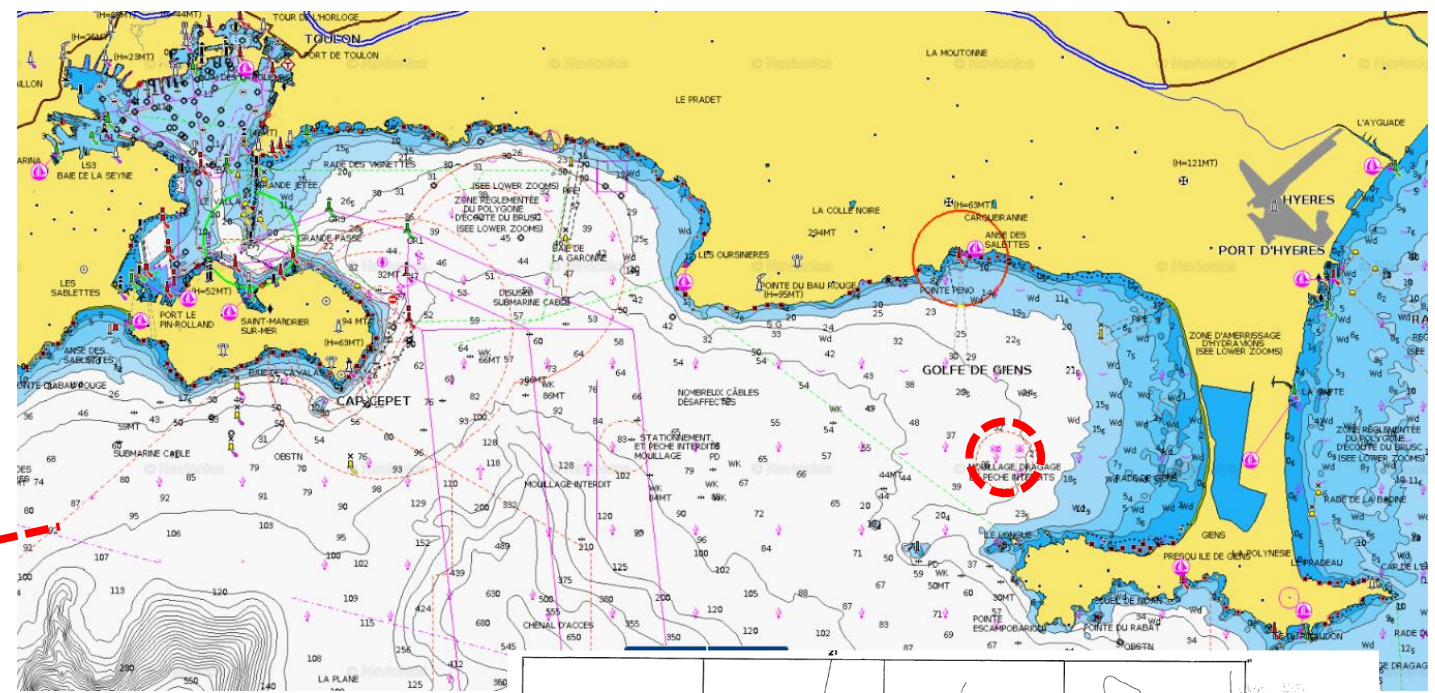
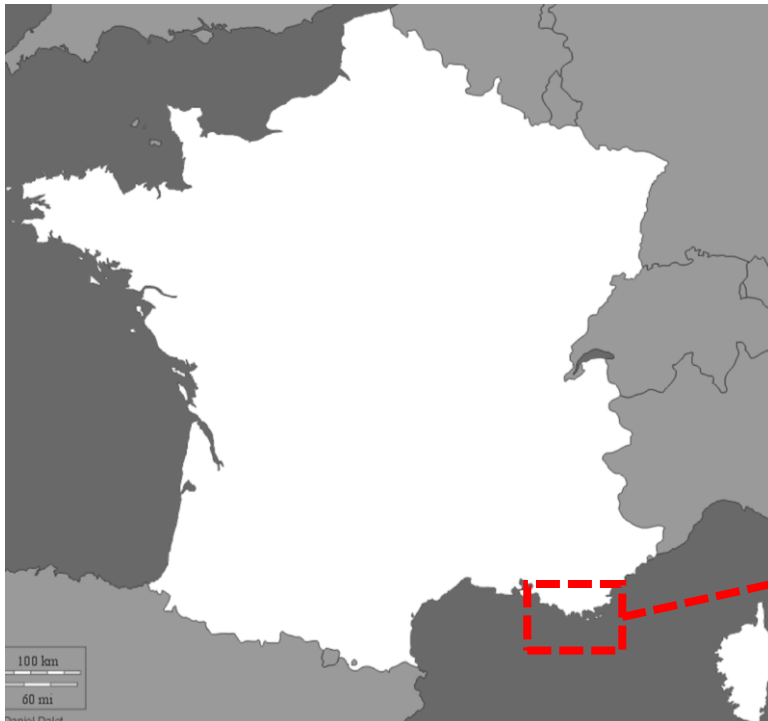
GIS



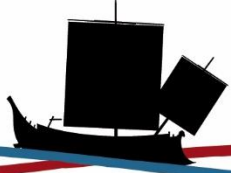
Reconstruction



The Madrague de Giens — A photogrammetry from the past



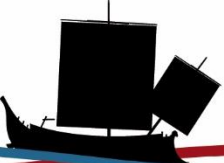
situation géographique de l'épave (E)



The Madrague de Giens — A photogrammetry from the past

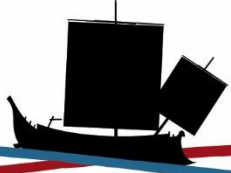


1972 - 1982

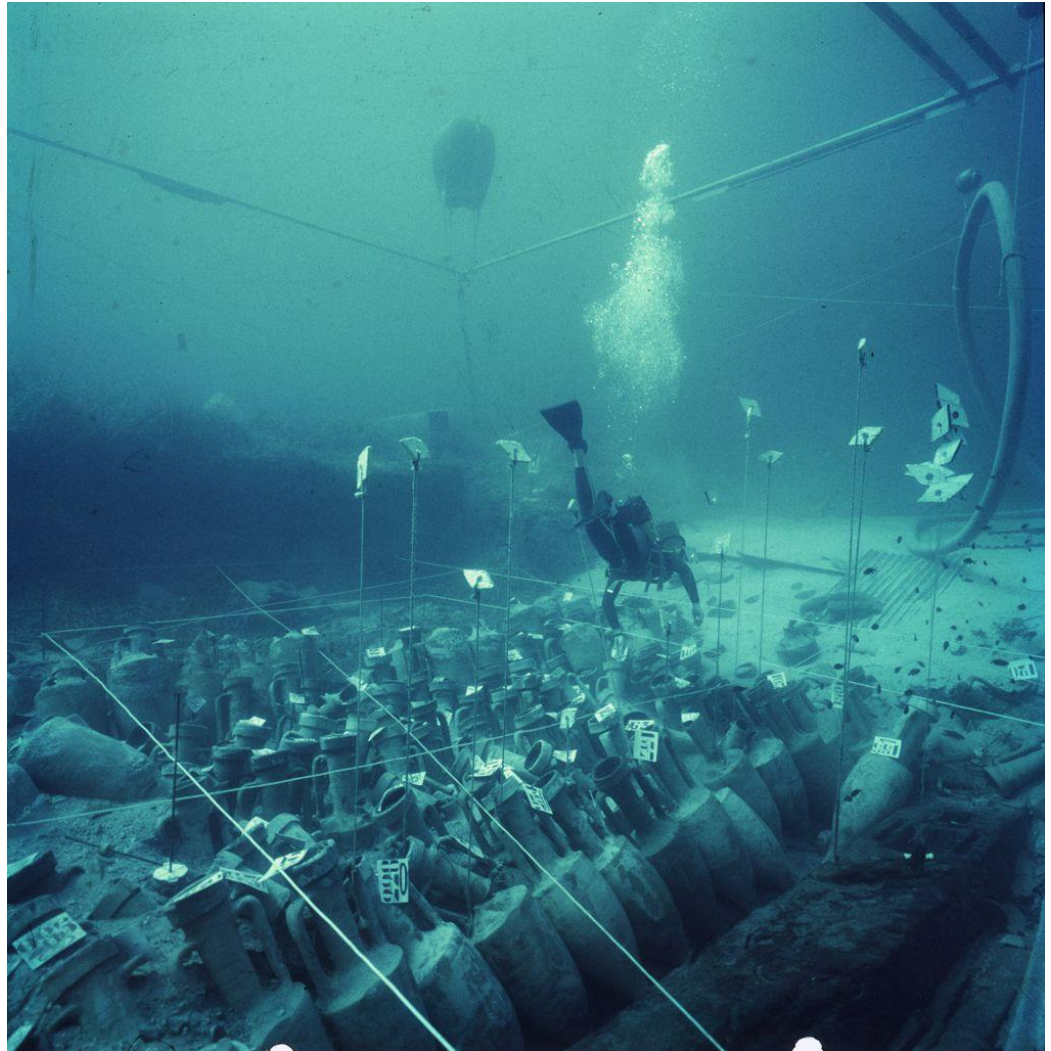


Epave de la Madrague de Giens

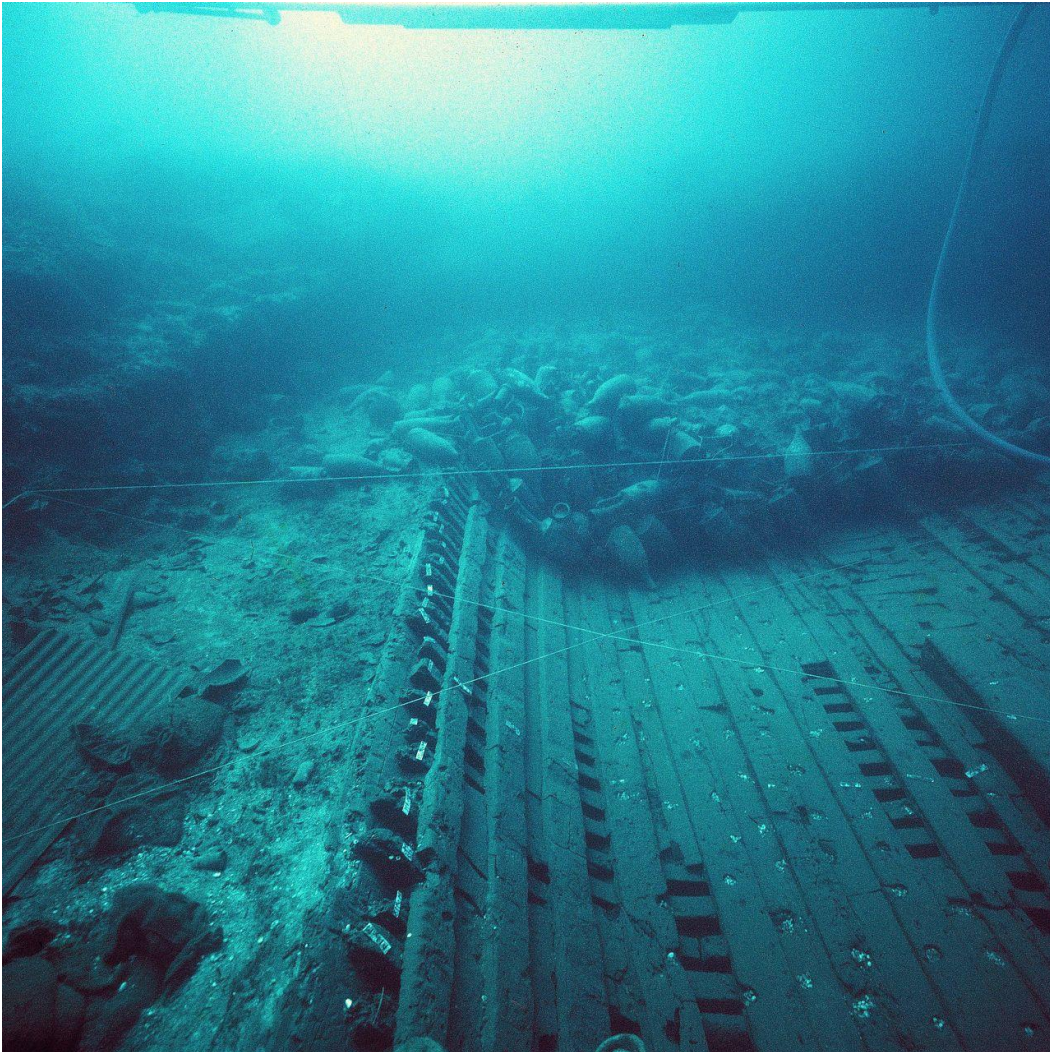
Plan de situation



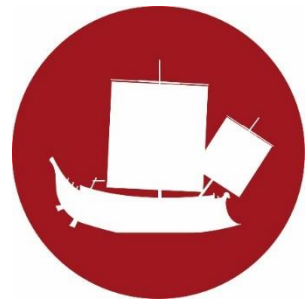
The Madrague de Giens — A photogrammetry from the past



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^{ème}, 3^{ème} et 4^{ème} séries

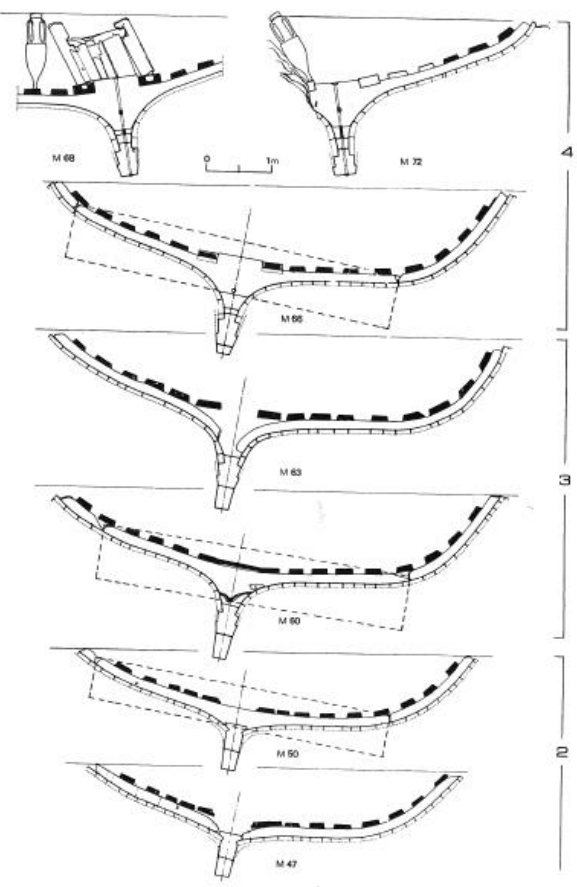


Planche 61

Epave de la Madrague de Giens
Profil évolutif des débits de membrures
1^{ère} et 2^{ème} séries

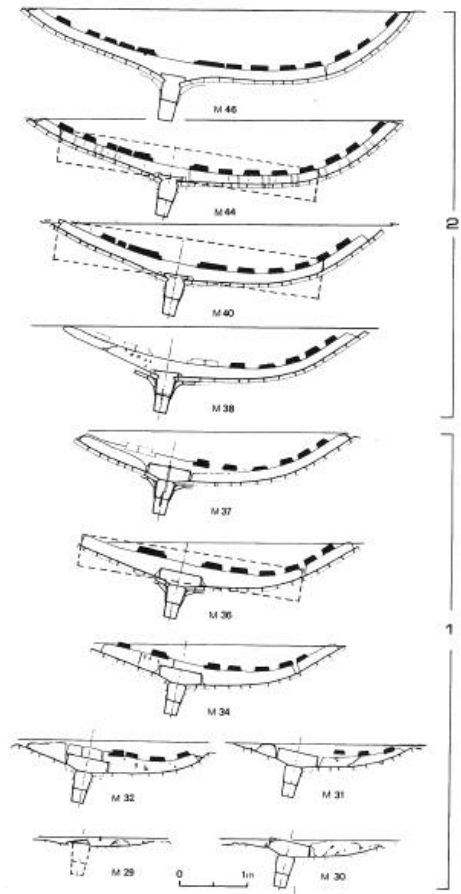


Planche 60

Epave de la Madrague de Giens

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

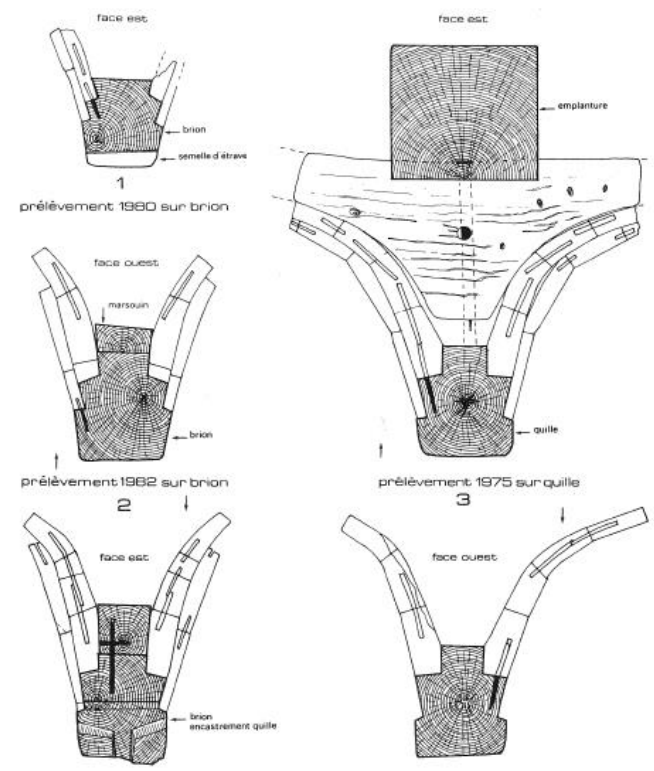
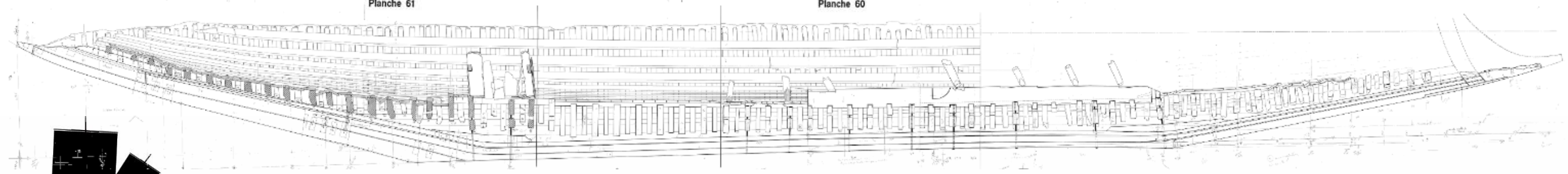
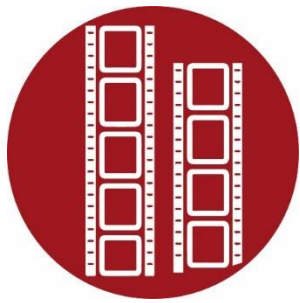


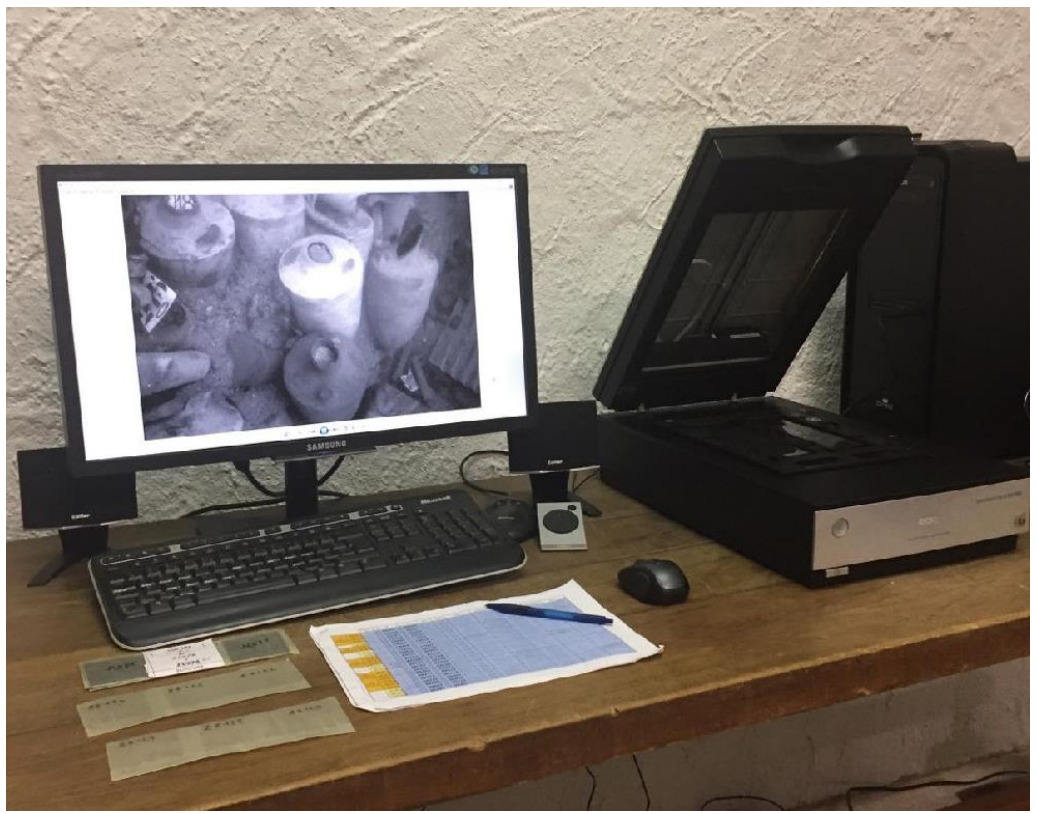
Planche 29



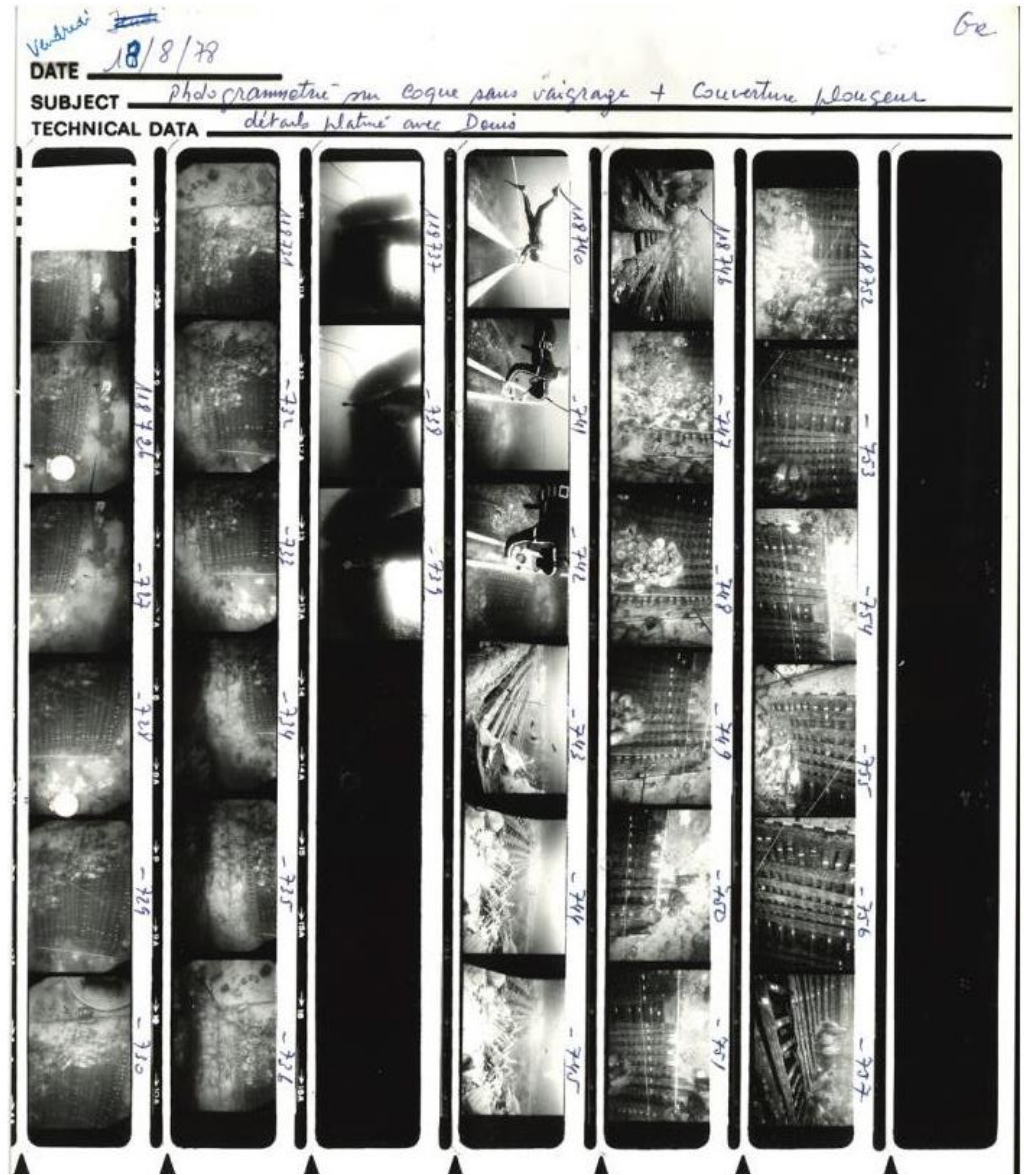
The Madrague de Giens --- A photogrammetry from the past



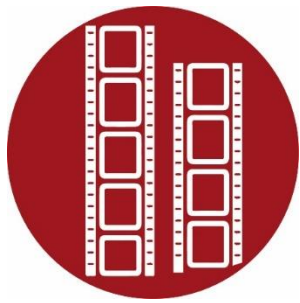
Photos digitizing



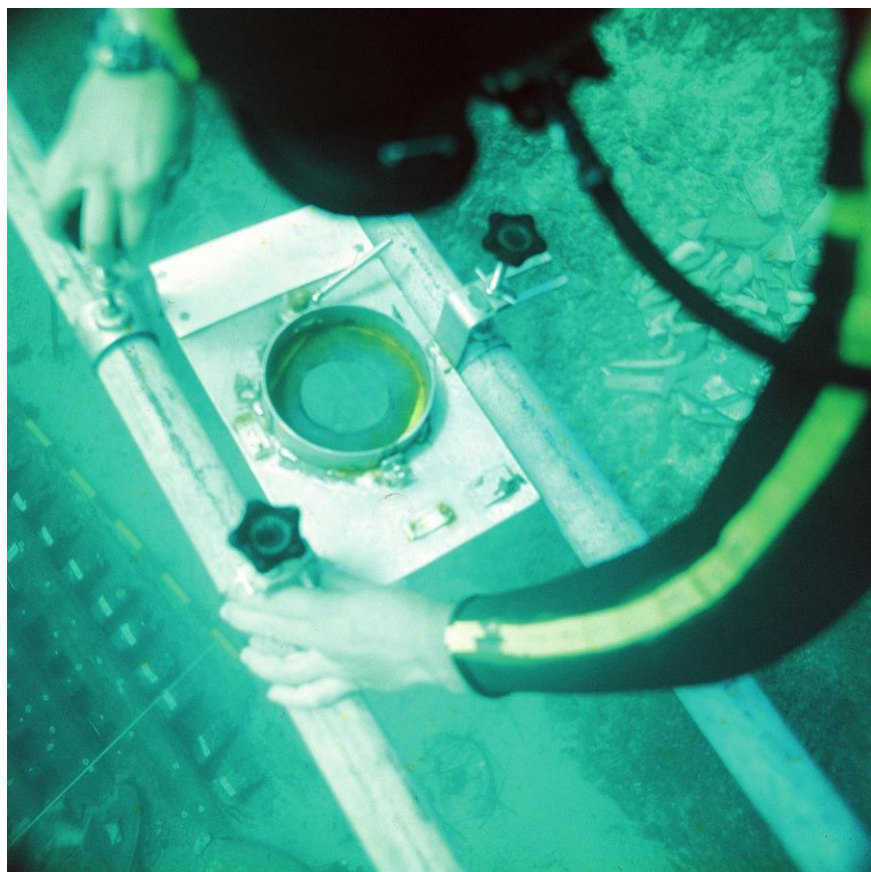
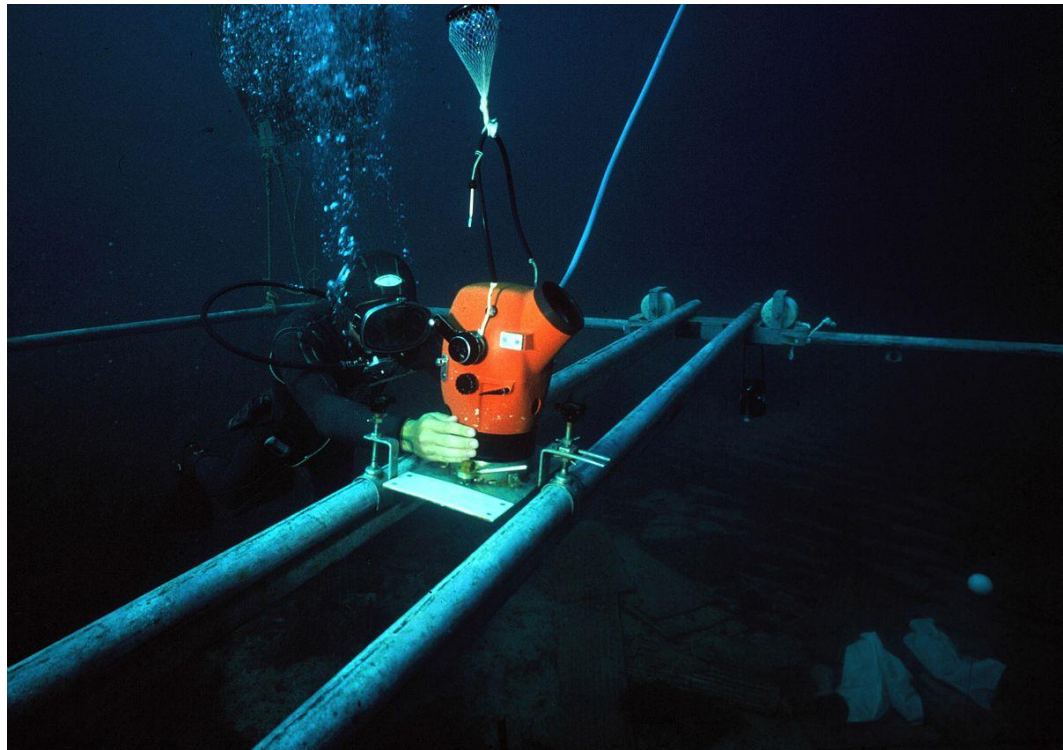
10'171 photo negatives digitized



The Madrague de Giens A photogrammetry from the past



Photos digitizing



The Madrague de Giens A photogrammetry from the past

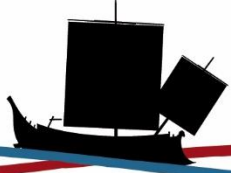


Photogrammetry

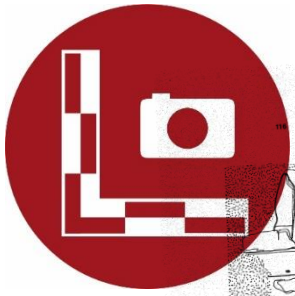
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1975_1	58	1975	10-sept	Amphores Plani	87956	87973	18
1975_2	60	1975	10-sept	Amphores Coupe	88152	88175	17
1975_3	71	1975	10-sept	Maitre-Couple	89016	89070	37
1977	112	1977	01-juil	Extrémité arrière	97525	97670	22
1978	129	1978	01-sept	arrière	118726	118757	18
1979_1	139	1979	01-sept	Puits de la pompe	122356	122384	26
1979_2	139	1979	01-sept	Puits de la pompe	122356	122384	26
1979_3	141	1979	01-sept	Pompe + vaigrage	122472	122492	18
1979_4	146	1979	01-sept	Puits de la pompe	123163	123194	29
1980	153	1980	15-sept	Avant (avec l'étrave)	126544	126667	44
1981	165	1981	01-janv	avant emplanture tribord	129955	129981	27
1982	168	1982	01-janv	Avant (sans l'étrave)	132488	132507	20
							317



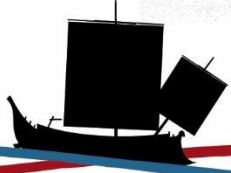
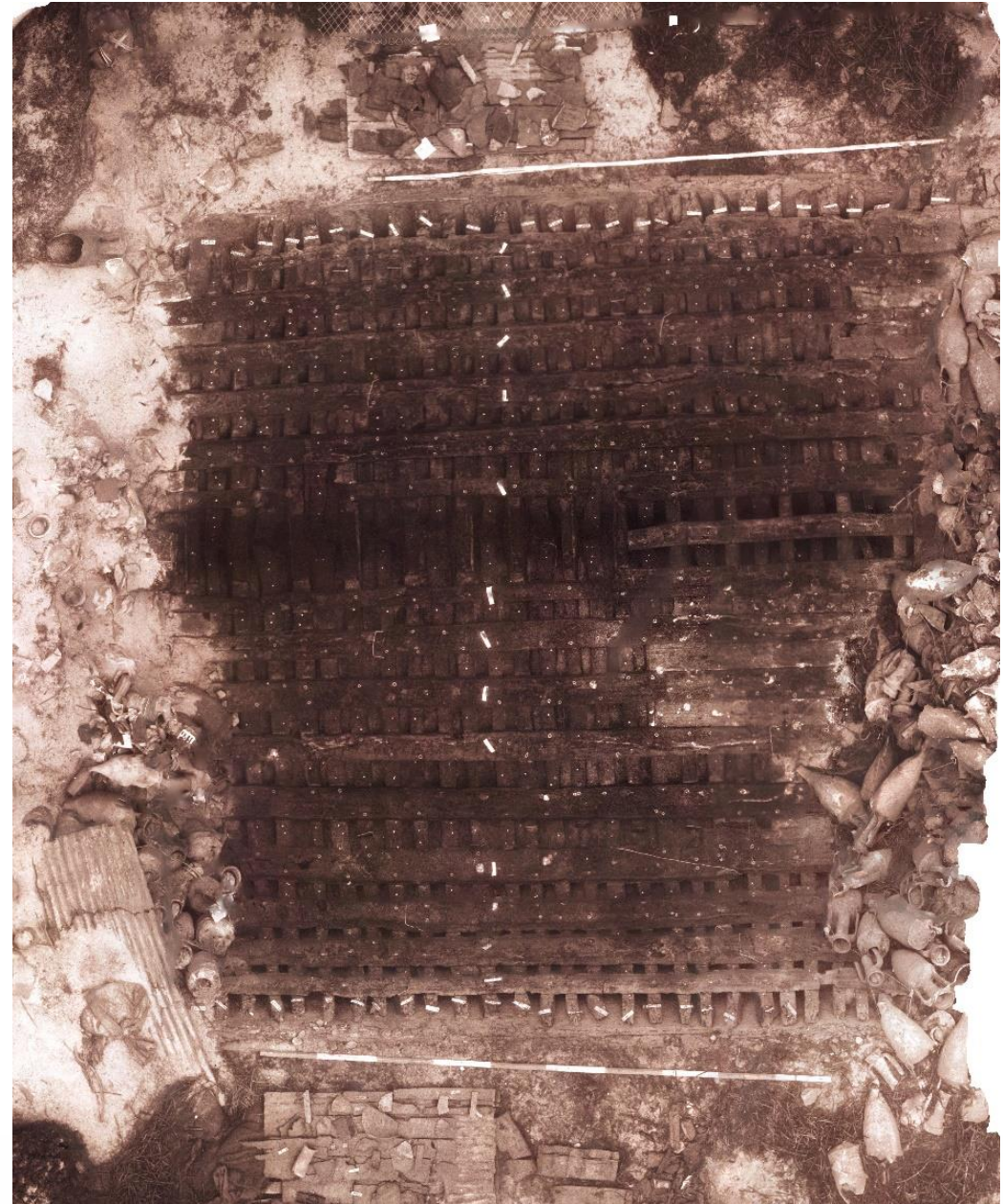
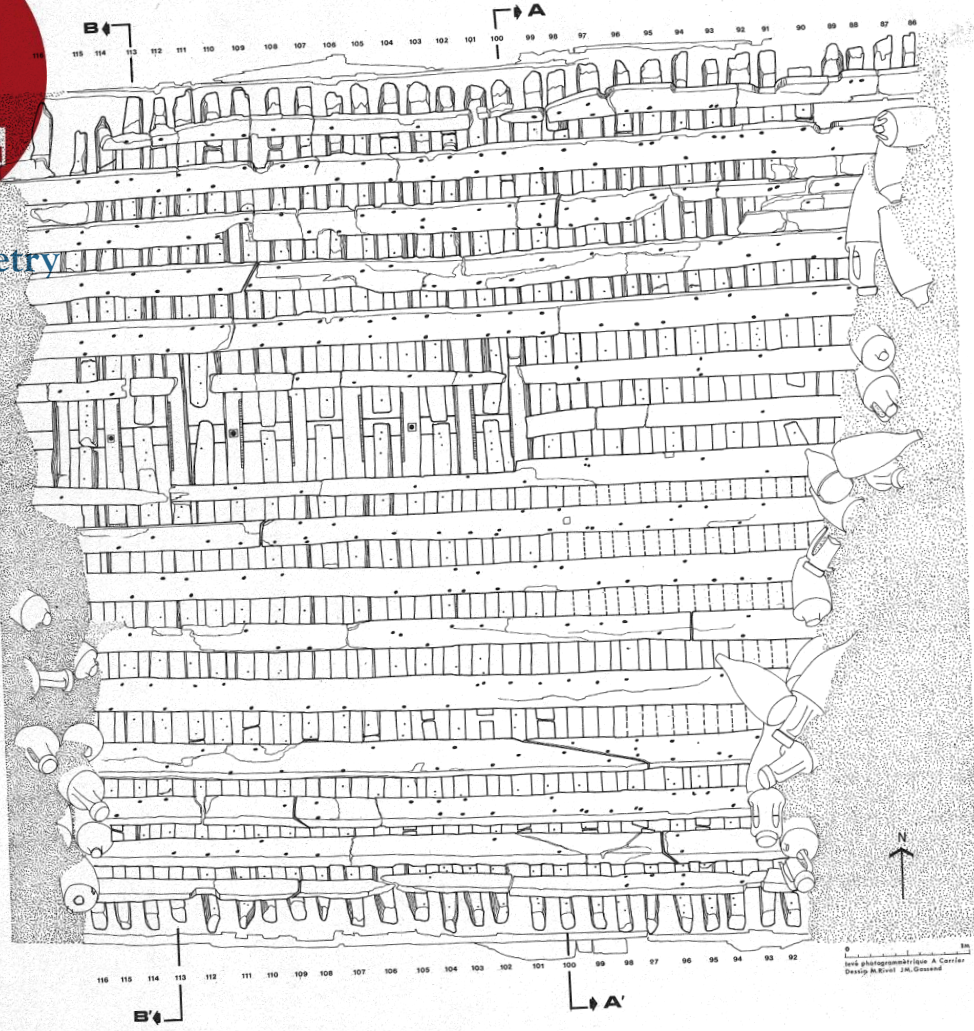
Set of 28 photos used for the reconstruction of the stern area
(1977 campaign)



The Madrague de Giens — A photogrammetry from the past



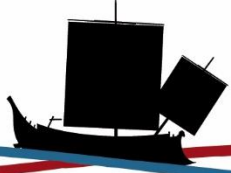
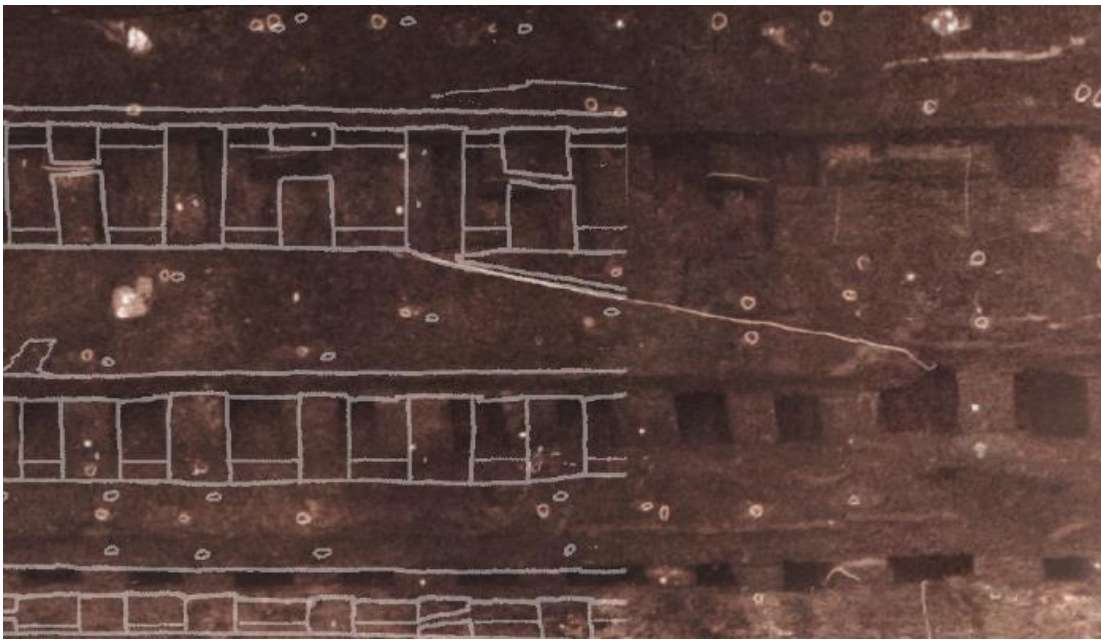
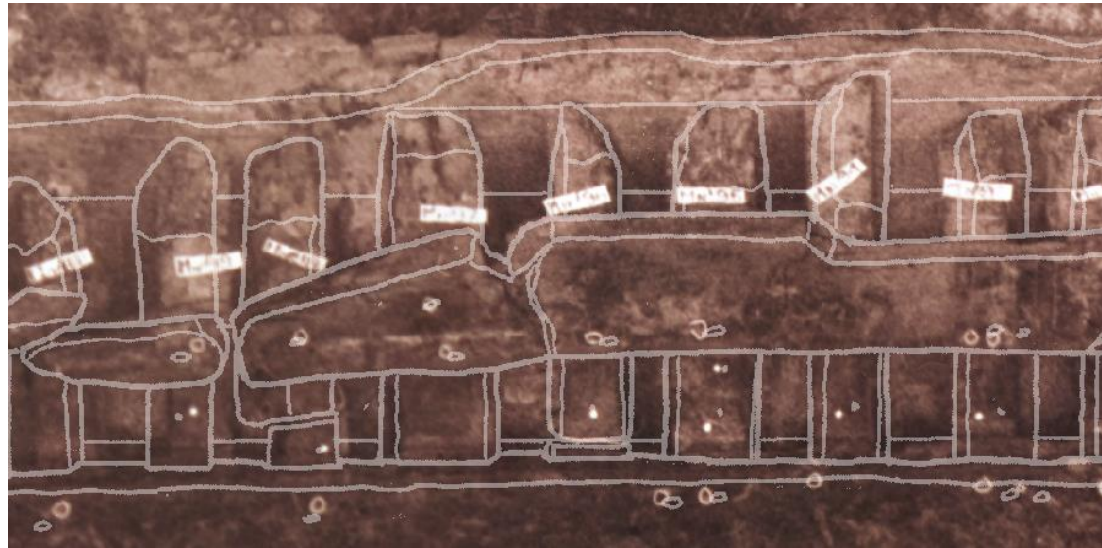
Photogrammetry

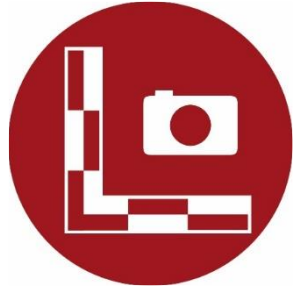


The Madrague de Giens — A photogrammetry from the past



Photogrammetry





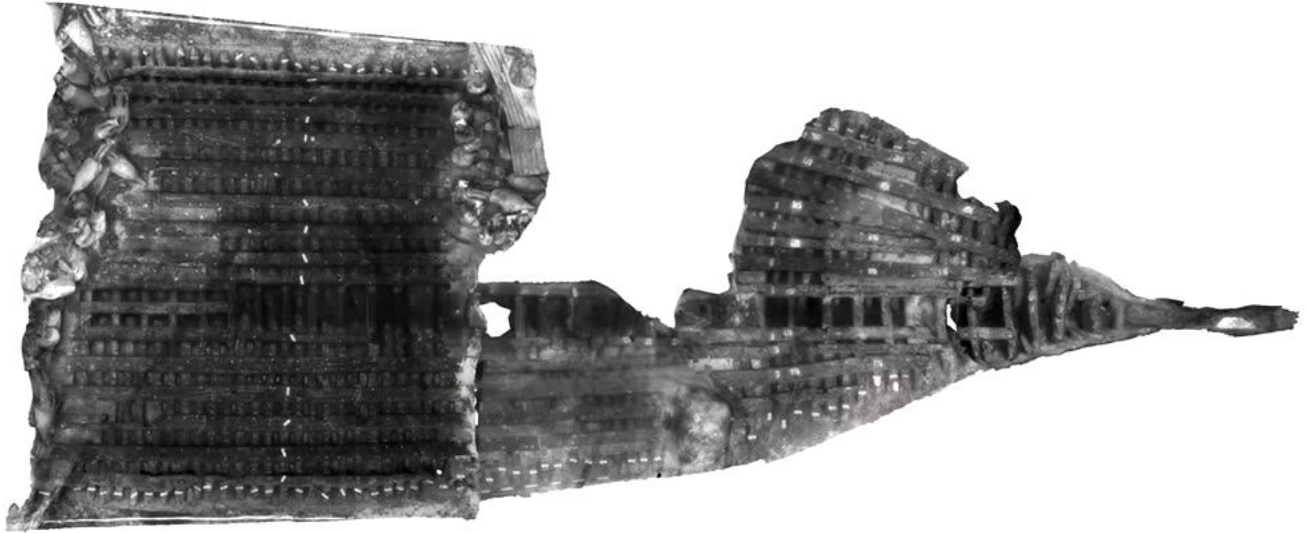
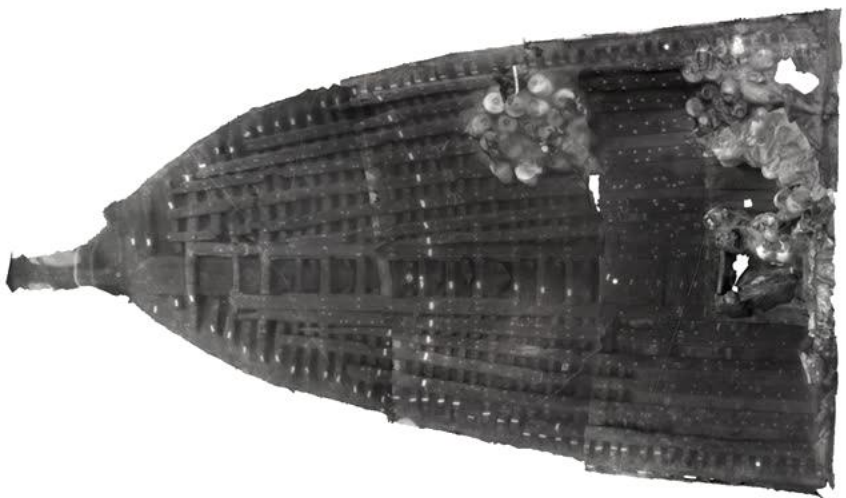
Photogrammetry



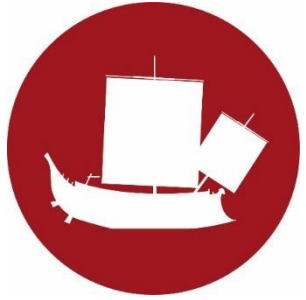
The Madrague de Giens — A photogrammetry from the past



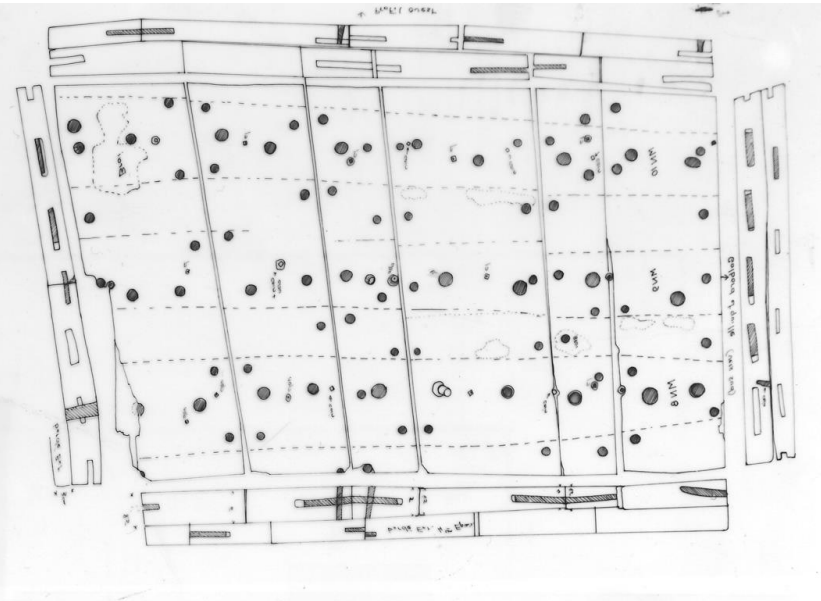
Photogrammetry



The Madrague de Giens A photogrammetry from the past



Naval architecture



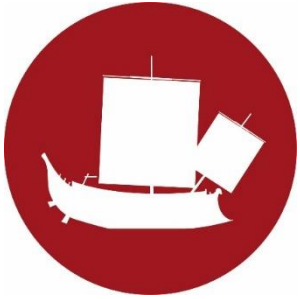
Série	Zone étudiée	N° d'ordre des varangues	Nbre de plateaux	Hauteur des plateaux	Envergure des varangues	Diamètre des grumes ébêtées	Chute inférieure	Chute supérieure	Total des chutes
1	de M.34 à M.36	34	1	0,45	2,80 m	0,80 m	/	/	/
		36		0,50	3,45 m	0,80 m	/	/	/
2	de M.38 à M.52 soit 8 varangues et 8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

Tableau 8 - Récapitulatif du nombre de plateaux nécessaires au débitage des varangues.

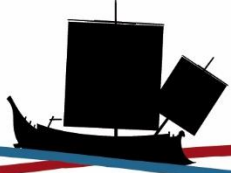
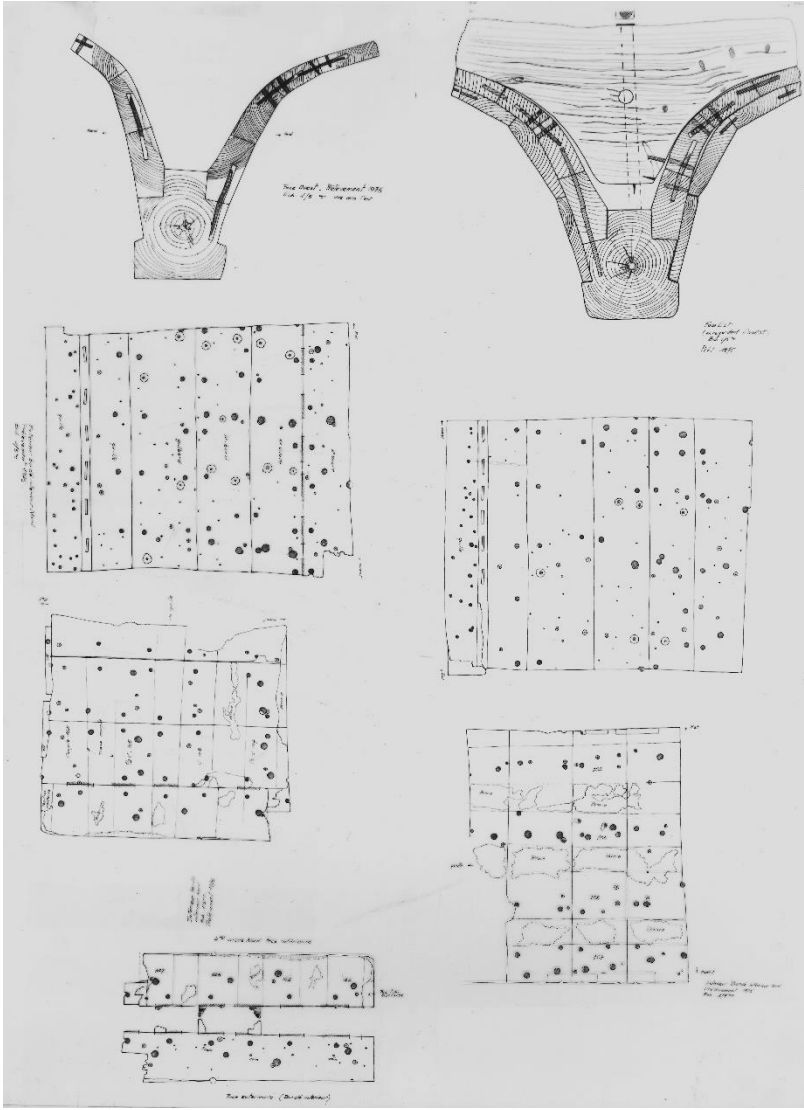
- 1) Pour simplifier les opérations, nous avons ramené la hauteur des plateaux à une progression arithmétique de 0,05 m en 0,05 m.
- 2) L'épaisseur moyenne des varangues a été calculée à partir de la somme totale des épaisseurs mesurées divisée par leur nombre. La valeur de 0,14 m obtenue a été retenue 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.



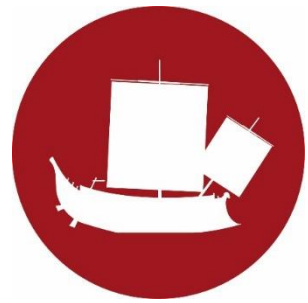
The Madrague de Giens — A photogrammetry from the past



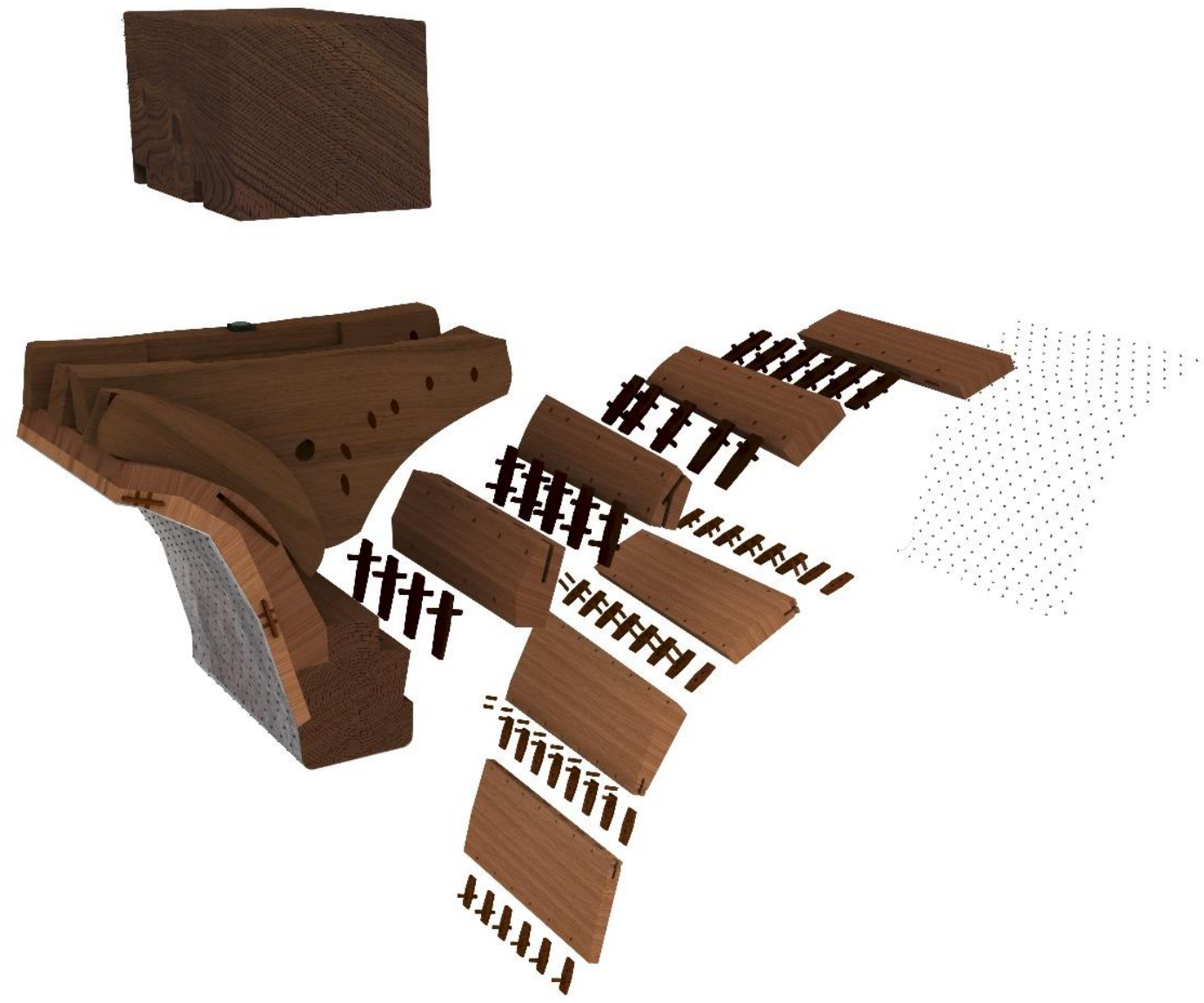
Naval architecture



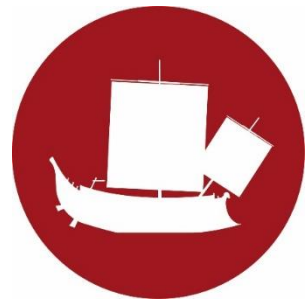
The Madrague de Giens — A photogrammetry from the past



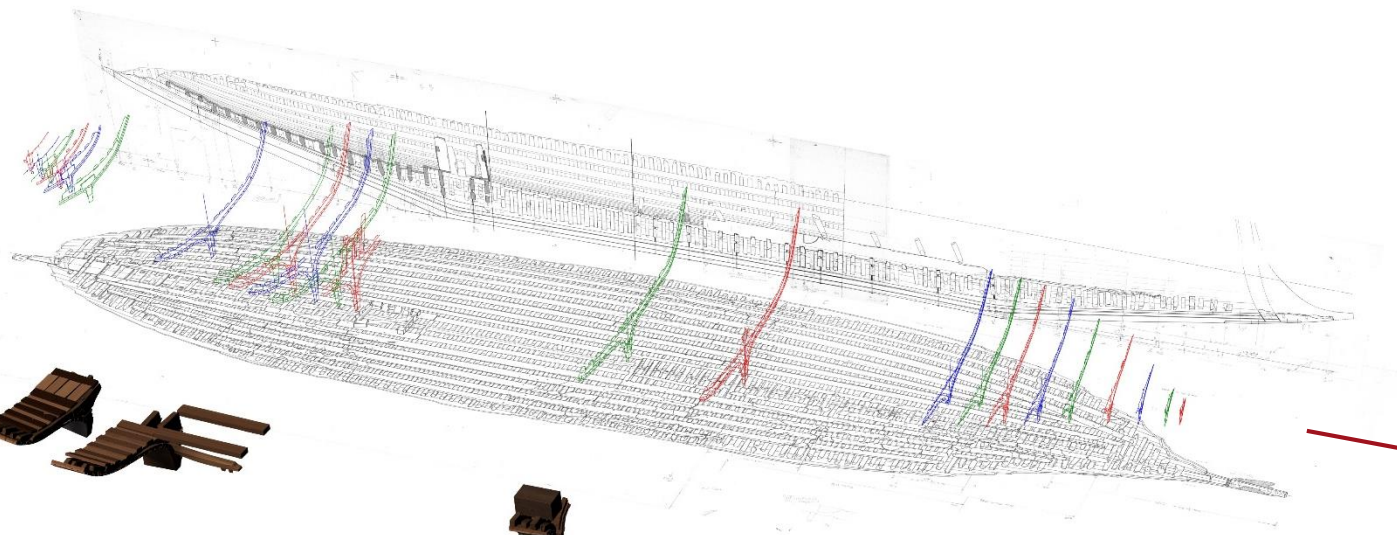
Naval architecture



The Madrague de Giens A photogrammetry from the past



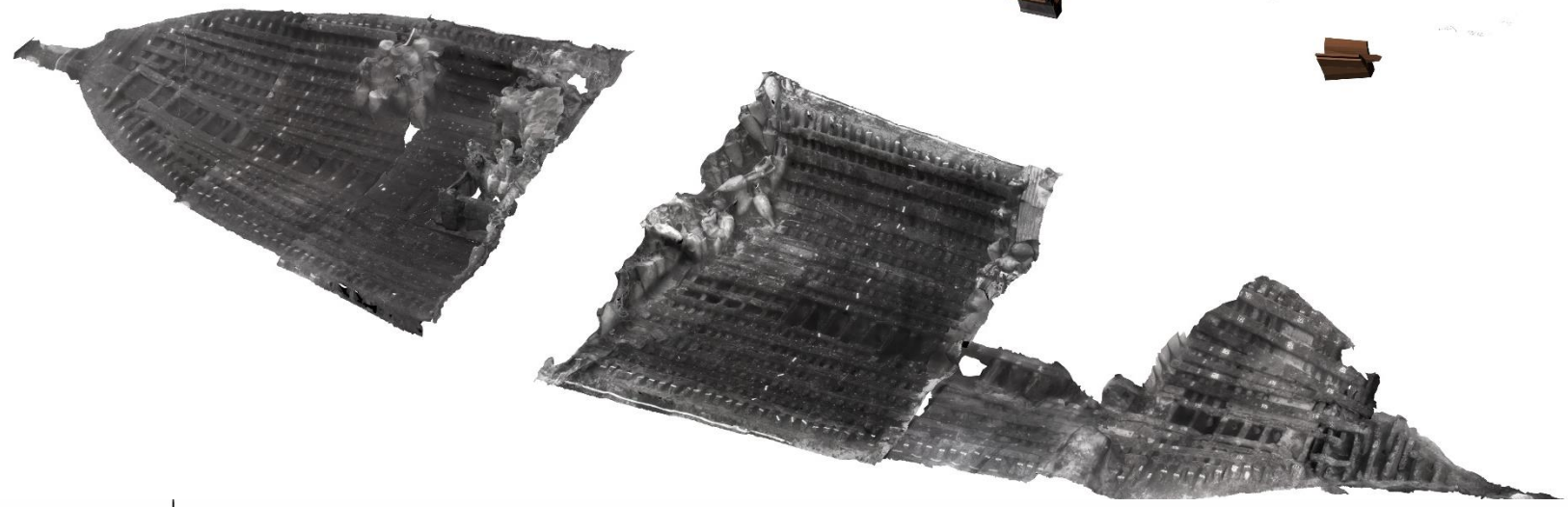
Naval architecture



Original 2D documentation



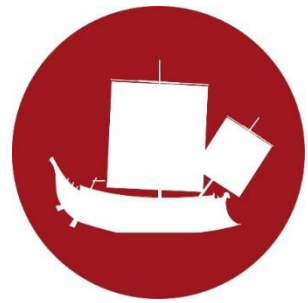
3D of samples



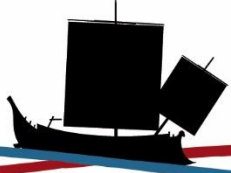
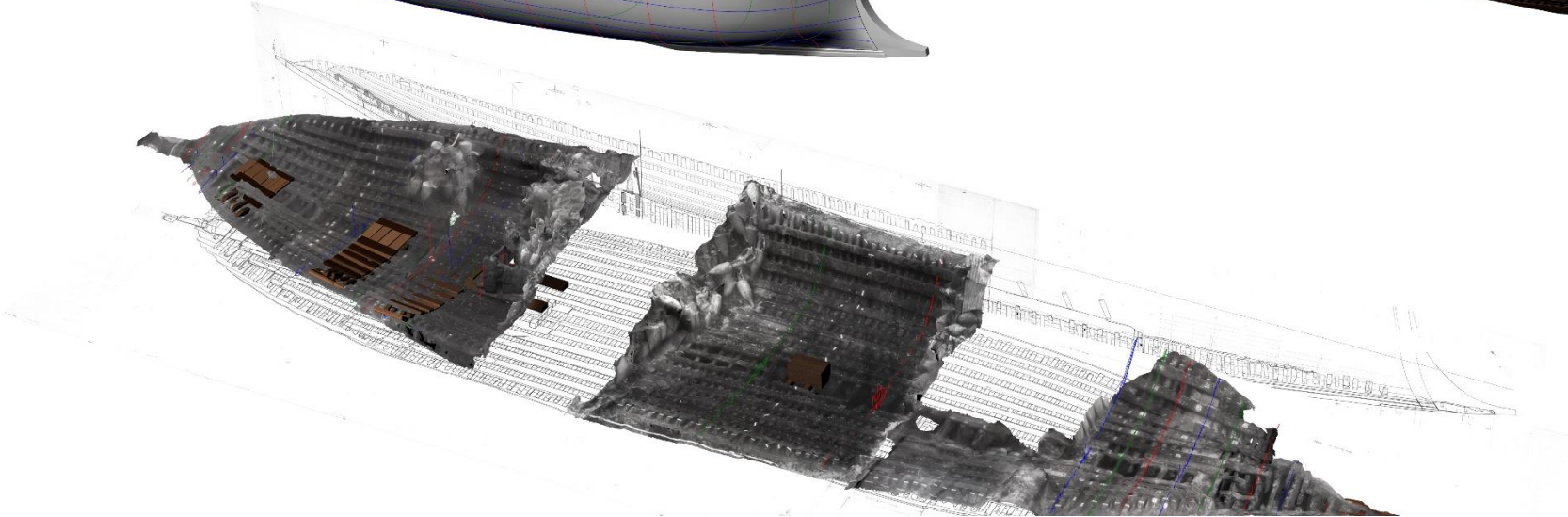
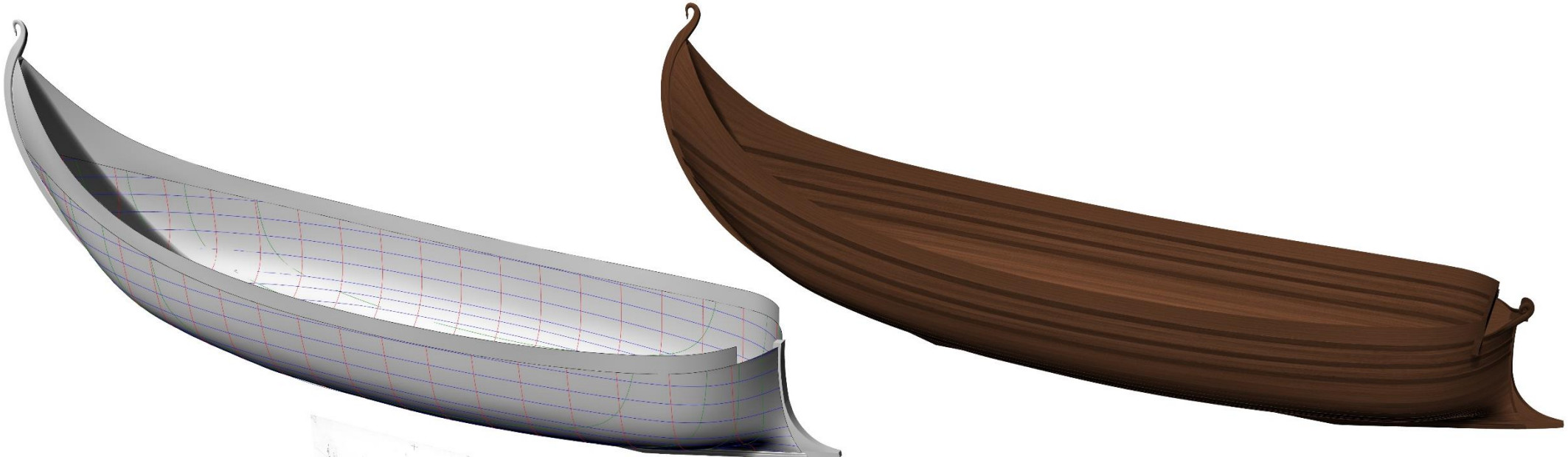
2021 Photogrammetry



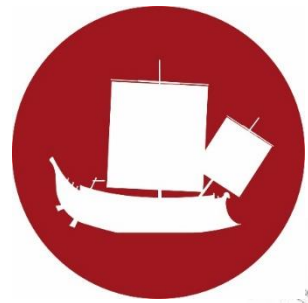
The Madrague de Giens — A photogrammetry from the past



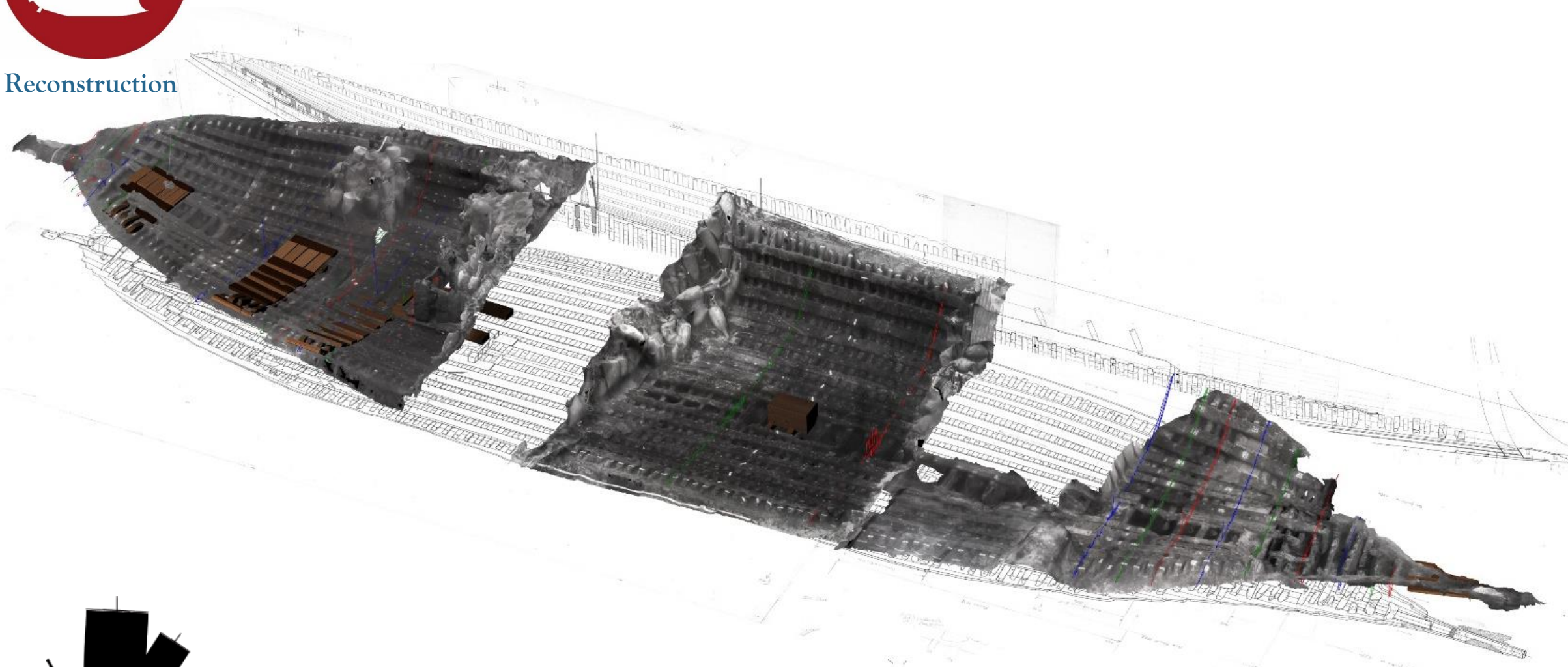
Reconstruction



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

