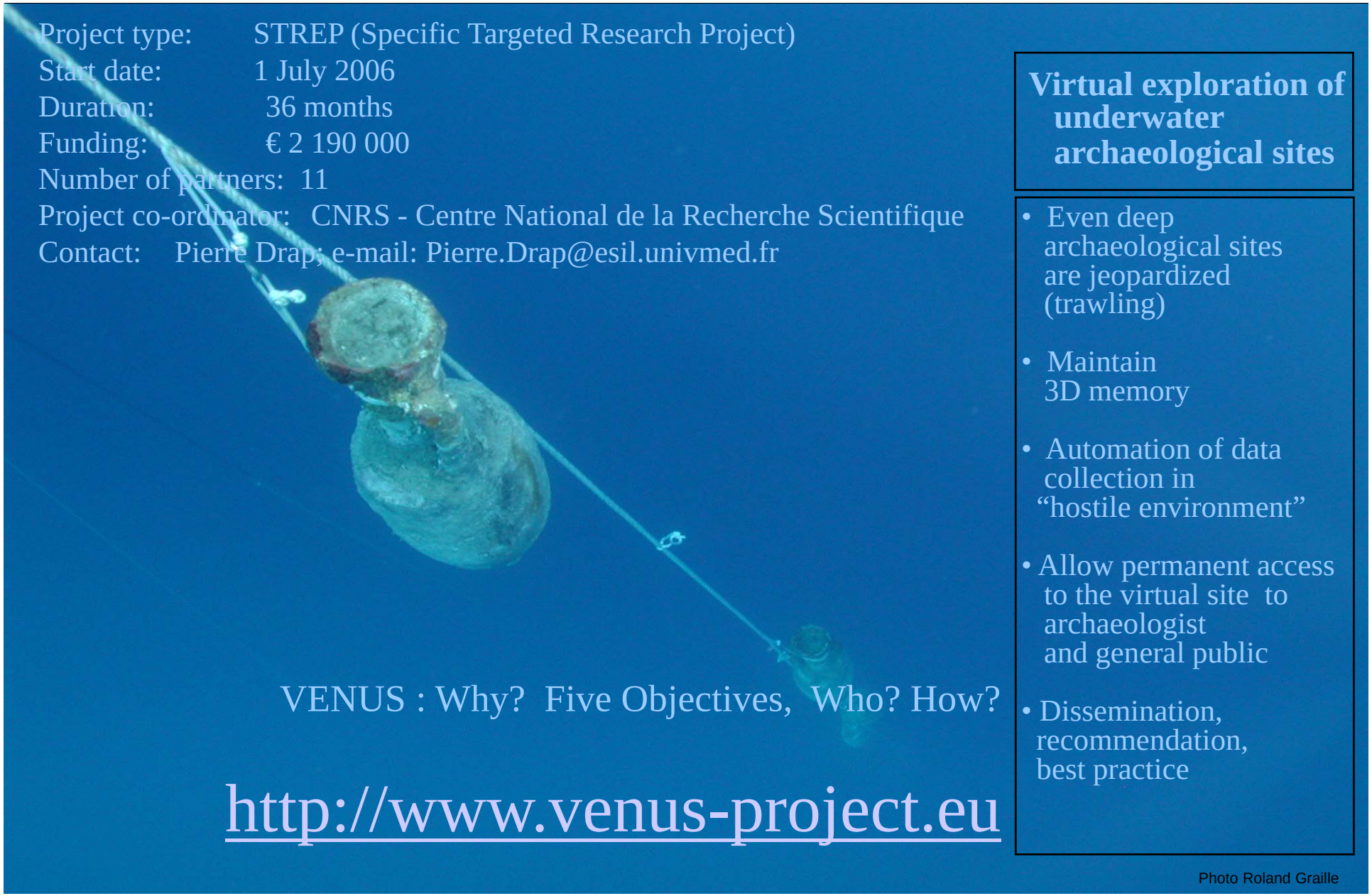
# VENUS,
## Virtual ExploratioN of Underwater Site

Project type: STREP (Specific Targeted Research Project)
Start date: 1 July 2006
Duration: 36 months
Funding: € 2 190 000
Number of partners: 11
Project co-ordinator: CNRS - Centre National de la Recherche Scientifique
Contact: Pierre Drap; e-mail: Pierre.Drap@esil.univmed.fr



VENUS : Why? Five Objectives, Who? How?

http://www.venus-project.eu

**Virtual exploration of underwater archaeological sites**

- Even deep archaeological sites are jeopardized (trawling)
- Maintain 3D memory
- Automation of data collection in "hostile environment"
- Allow permanent access to the virtual site to archaeologist and general public
- Dissemination, recommendation, best practice

Photo Roland Graille

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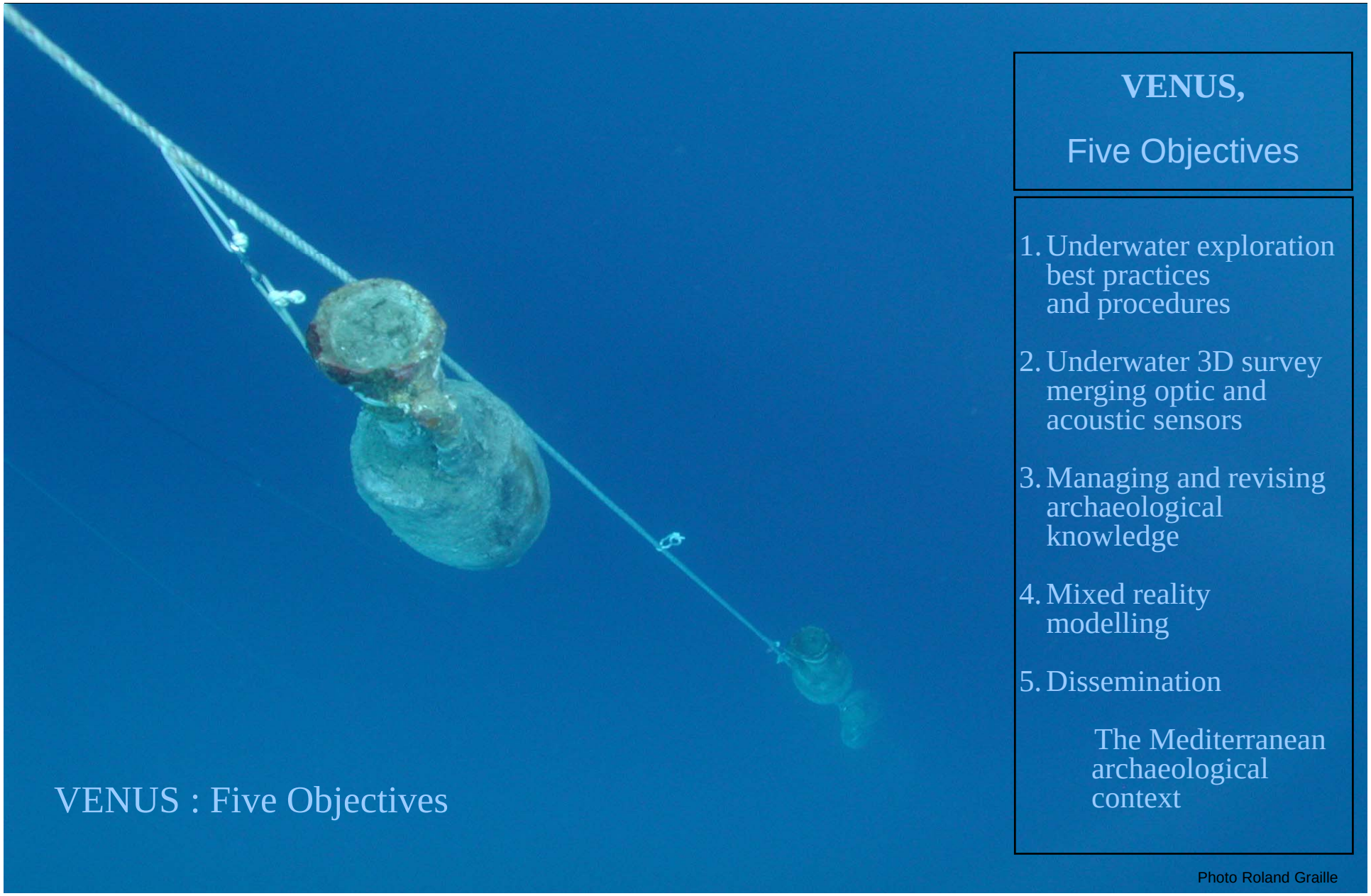

VENUS : Five Objectives

### VENUS,

### Five Objectives

1. Underwater exploration best practices and procedures
2. Underwater 3D survey merging optic and acoustic sensors
3. Managing and revising archaeological knowledge
4. Mixed reality modelling
5. Dissemination

   The Mediterranean archaeological context

Photo Roland Graille

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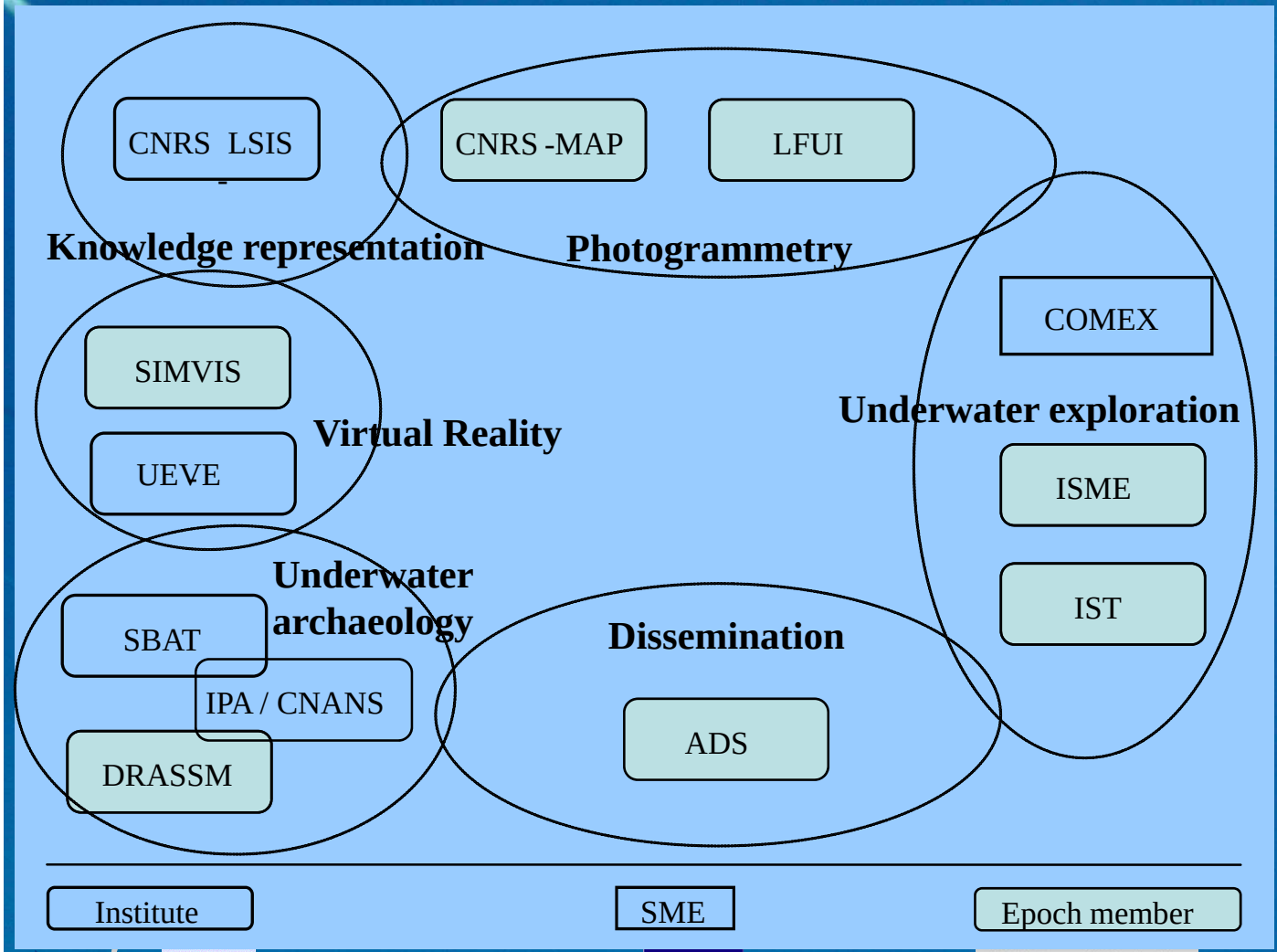


**Eleven partners**

1. CNRS, France
2. IST, Portugal
3. ISME, Italy
4. SIMVIS, UK
5. UEVE, France
6. LFUI, Austria
7. COMEX, France
8. DRASSM, France
9. SBAT, Italy
10. ADS, UK
11. IPA/CNAN, Portugal

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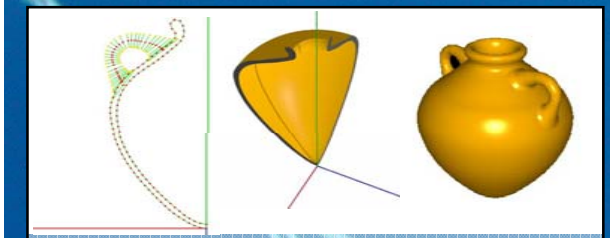


- Archaeological needs
- Ontology elaboration
- Model elaboration
- Link Geometry / Knowledge
- IHM specification
- Database specification
- Knowledge update and revision

The Deep aquarium in Hull

Good practice Web publication

General public and experts access to simulators

Ensure digital preservation

Virtual Reality Demonstrator
Immersive and non-immersive

Virtual Reality formalism

Archaeological Database

Merging 3D Data

DTM from acoustic sensors

3D data from Optical sensor
DTM, Mapping
+
Artifact survey & database access

France

Portugal

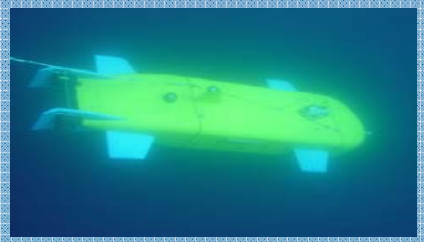
Tuscany

Three missions, one each year to test the experimental procedures and improve them at each stage.

Underwater Data Gathering

Both Acoustic and Optical Survey
Technical and software
Interoperability among partners





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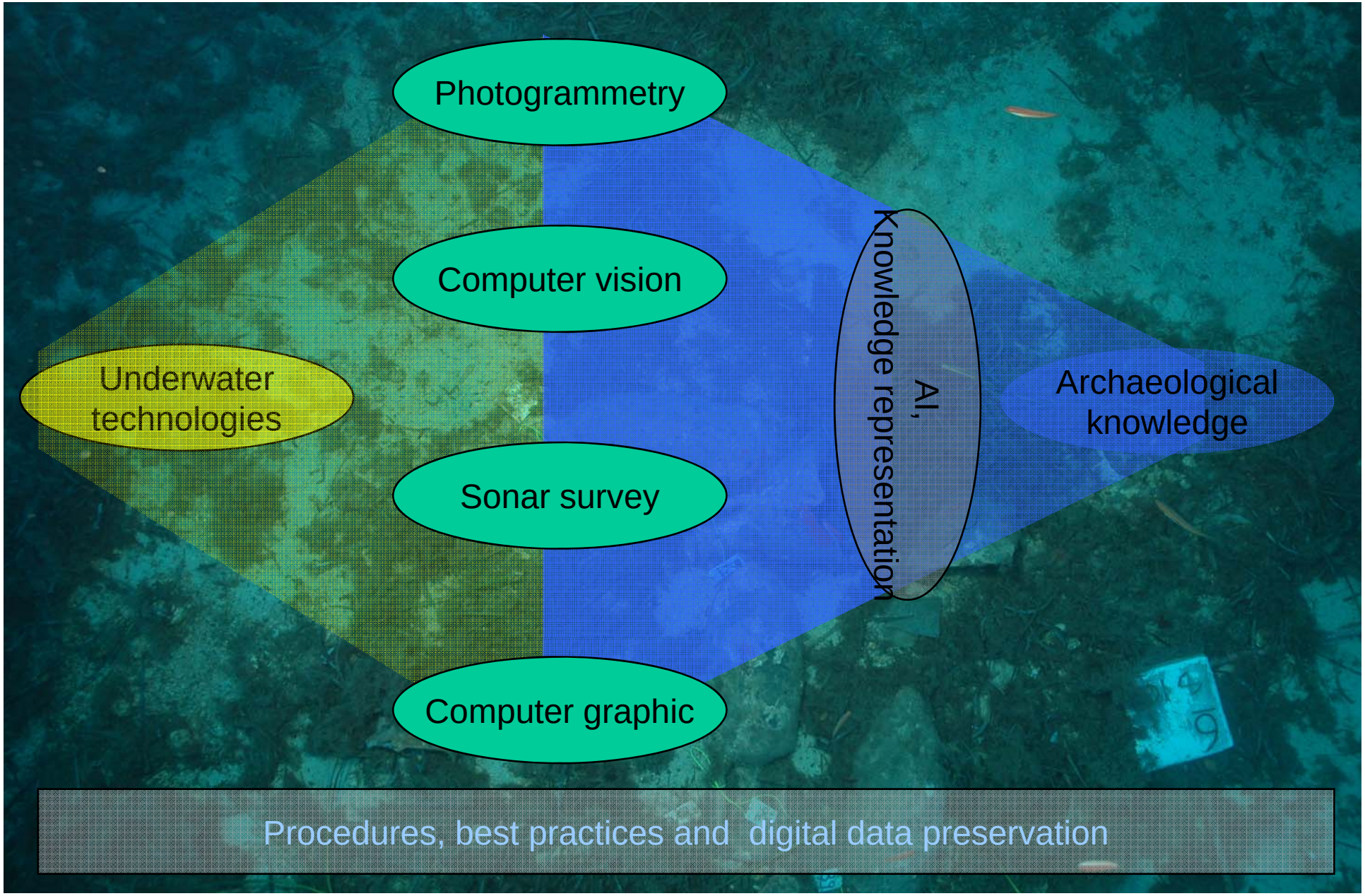

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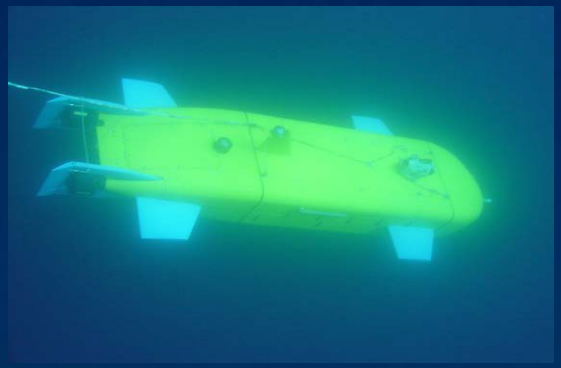
Splitted in 3 WP :

IST : Technological and software Interoperability
CNRS
LFUI : Underwater photogrammetry calibration
ISME : Automatic guidance and preliminary testing


**Objective One**

Procedures
and best practices
for collecting data
in an
**efficient**,
**economic** and
**safe** way

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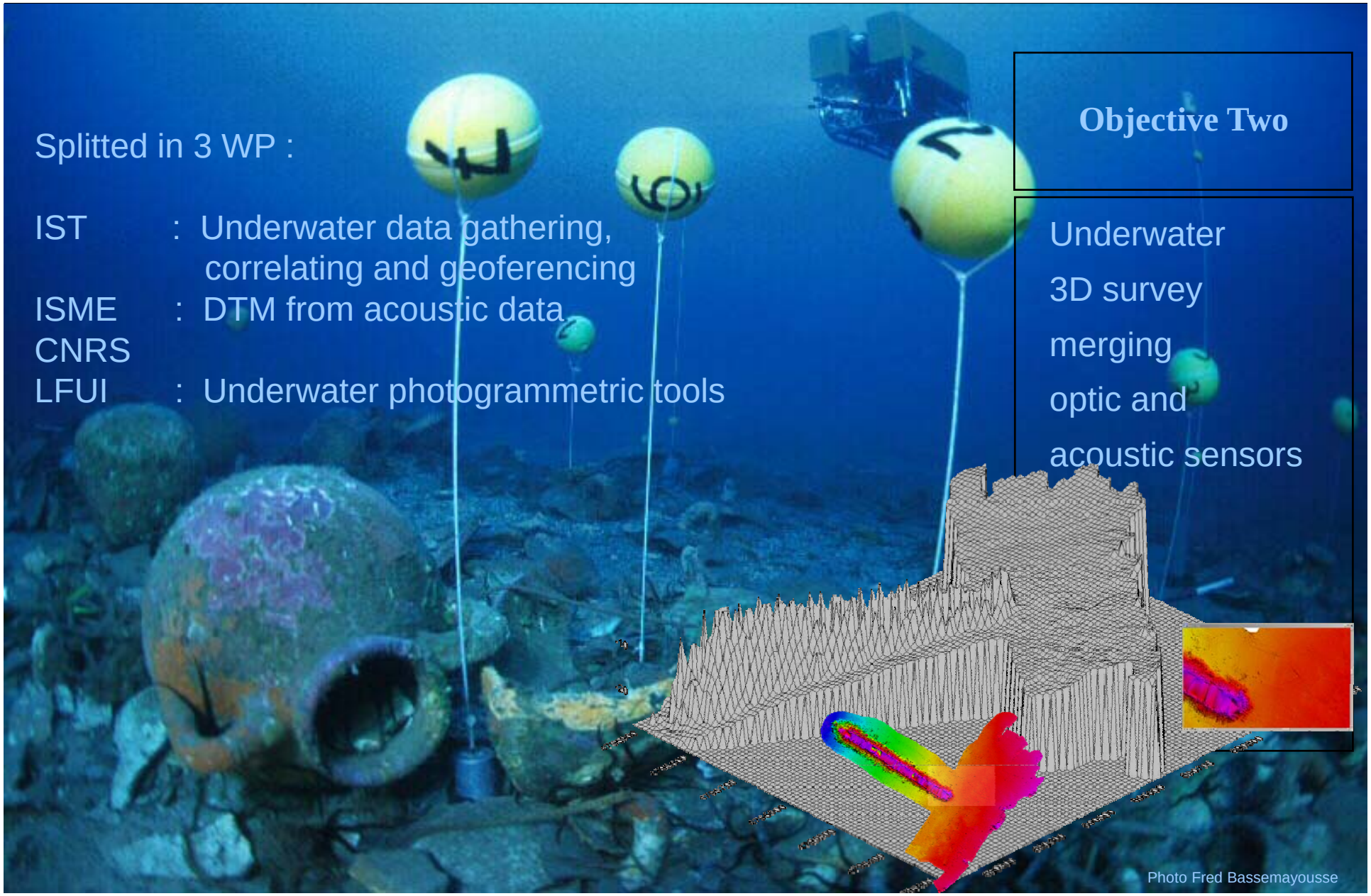


Splitted in 3 WP :

IST : Underwater data gathering, correlating and geoferencing

ISME : DTM from acoustic data

CNRS

LFUI : Underwater photogrammetric tools

**Objective Two**

Underwater 3D survey merging optic and acoustic sensors

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Splitted in 3 WP :

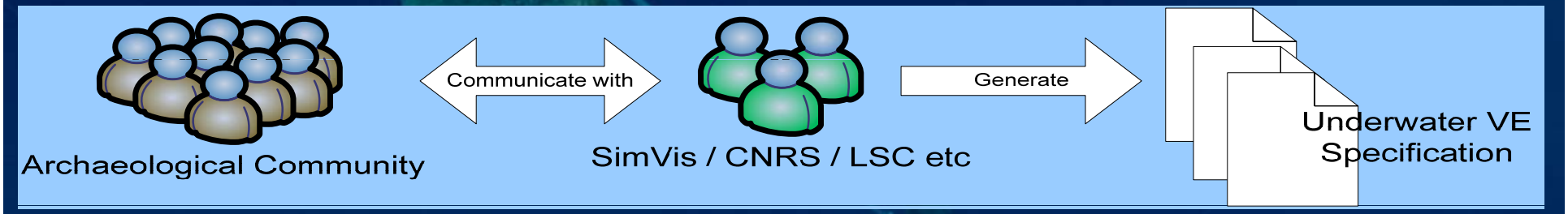
SIMVIS : Archaeological activities and knowledge analysis

CNRS LSIS : Representing structured items of information and reasoning with them

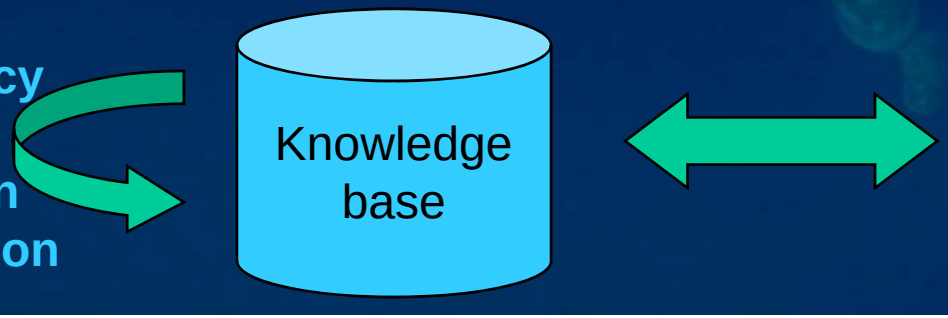
CNRS MAP : Measurement using archaeological knowledge

**Objective Three**

Representing and managing archaeological knowledge




**Consistency Check**
**Data fusion**
**Data revision**




Knowledge based photogrammetric tool

Survey driven by knowledge
Semantised geometry produced

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Splitted in 3 WP :

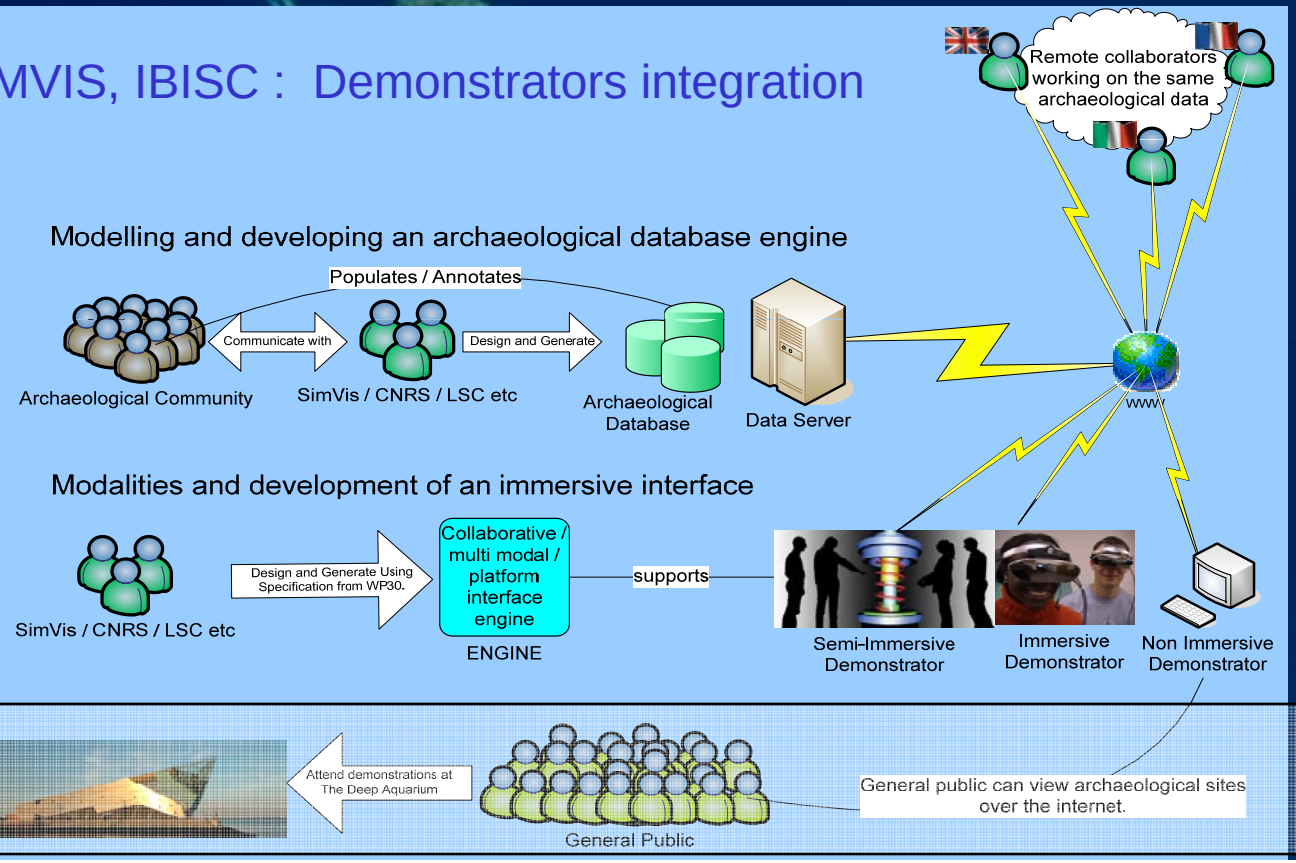
SIMVIS, IBISC : Modelling and developing an archaeological database engine

SIMVIS, IBISC : Modalities and development of an immersive interface

**Objective Four**

Mixed reality modeling

SIMVIS, IBISC : Demonstrators integration




Dissemination

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Splitted in 4 WP :

ADS : Digital Preservation and Dissemination of Good Practice
SIMVIS, CNRS : Online Dissemination of Research and Tools
SIMVIS, IBISC : Semi-Immersive Dissemination of Research to General Public
CNAN : Dissemination to general public

**Objective Five**

Dissemination

Dissemination to General public, Students, Experts…

The Deep aquarium in Hull
VR+stereo for general public

Web

Brochures, leaflets, posters and other interventions in schools

Conferences, workshop, CIPA, ISPRS, …

Supporting research through the delivery of high quality digital resources
http://ads.ahds.ac.uk/catalogue

Providing advice and promoting good practice in the use of digital data in archaeology
http://ads.ahds.ac.uk/guides/

Providing teaching resources to support on-line learning environments
http://ads.ahds.ac.uk/learning

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Splitted in 3 WP :

**Year 1 : SBAT** : Archaeological site of Pianosa, Tuscany, Italy

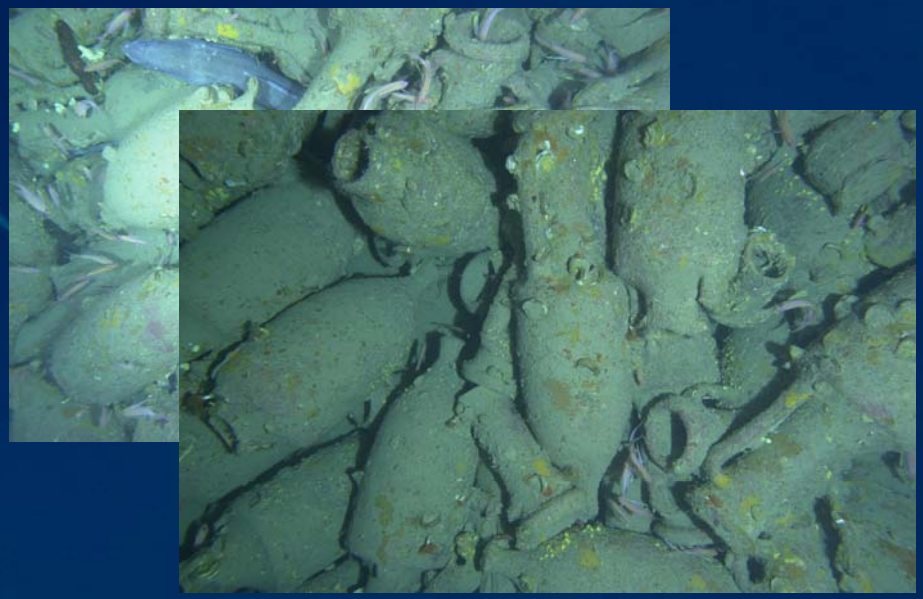
**Year 2 : IPA / CNANS** : Missions on Roman sites, Portuguese coast,

**Year 3 : DRASSM** : The wreck : La calanque de Port-Miou, Marseille, France

**Case Study**

The archaeological context

Pianosa, Italy



Port-Miou, France

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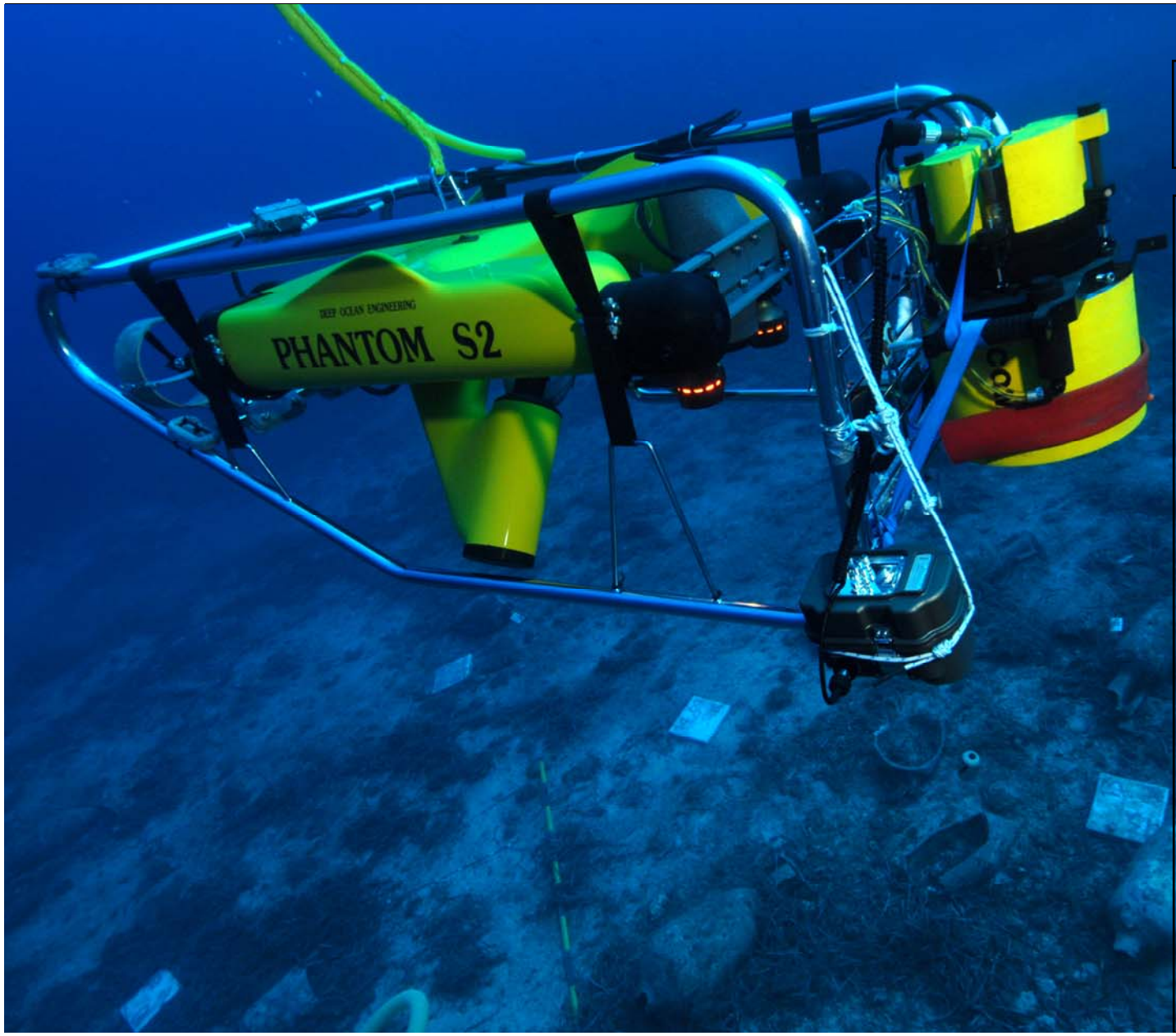


**Mission One**
**Pianosa island, Italy**

**Photogrammetry**

Camera orientation

Approximate

by ROV

navigation data

Both survey with

video camera

and NIKON D2Hs

Archaeological model

of amphorae

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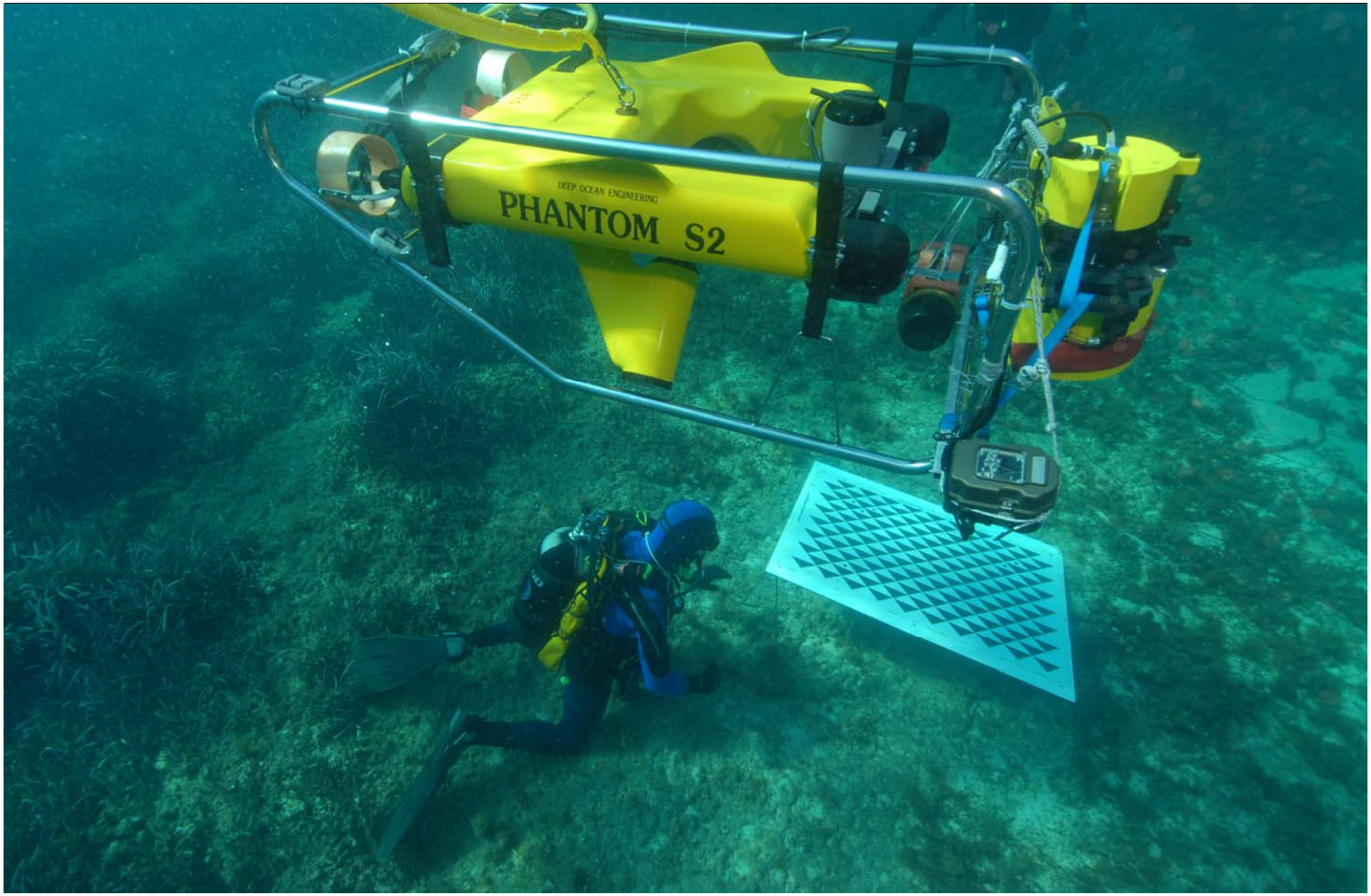

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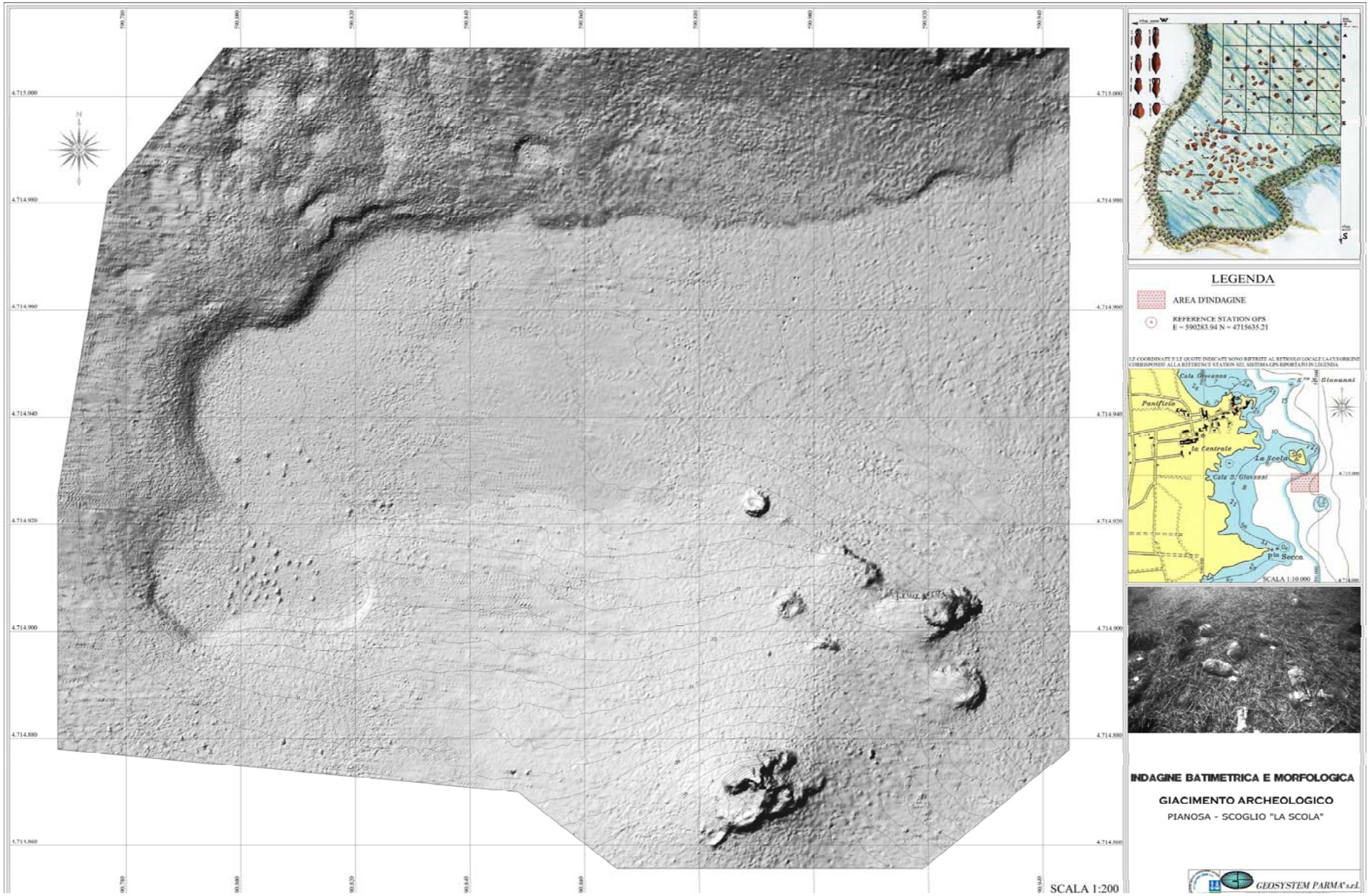

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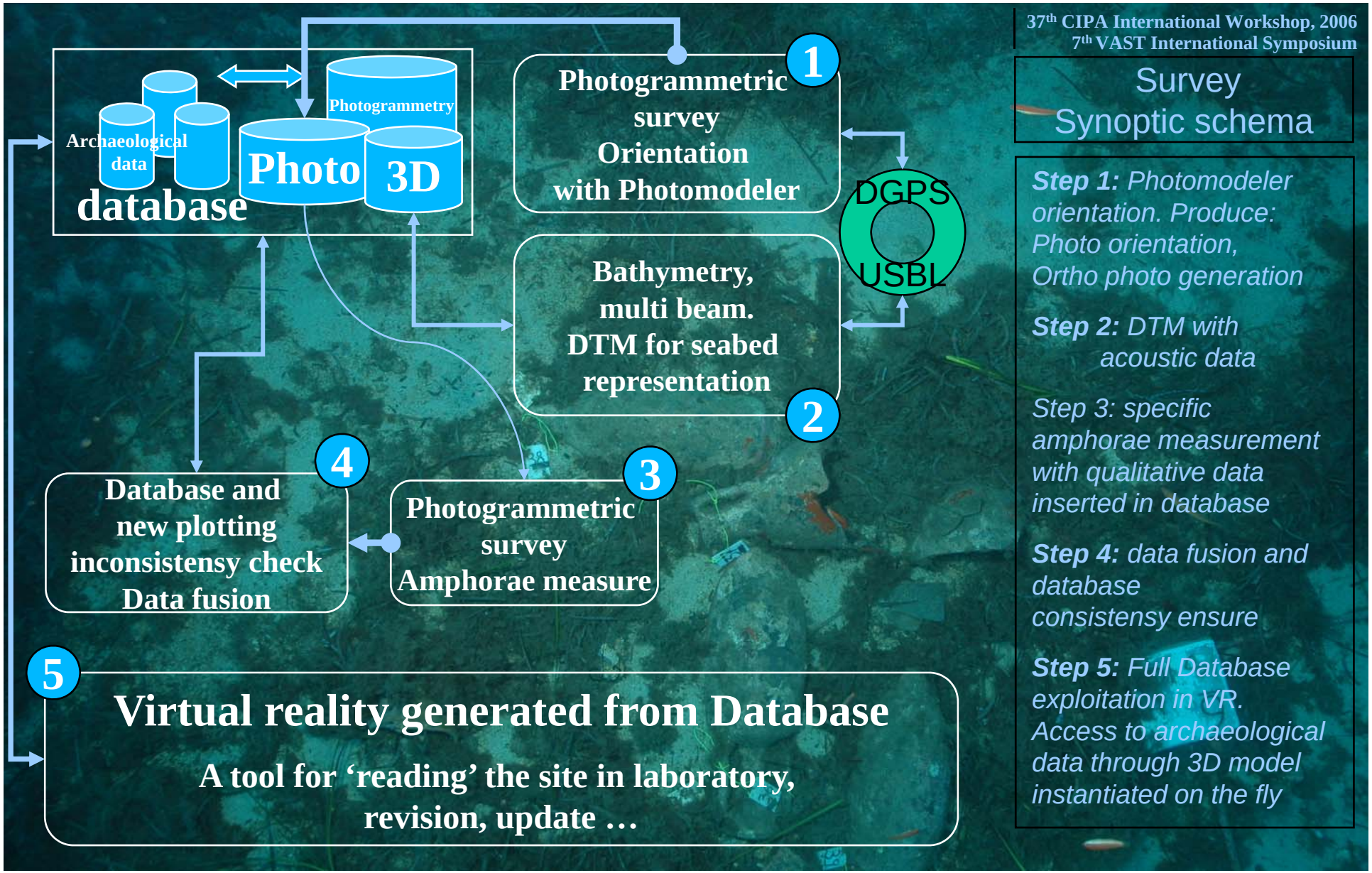
37th CIPA International Workshop, 2006
7th VAST International Symposium




## Survey Synoptic schema

***Step 1:*** *Photomodeler orientation. Produce: Photo orientation, Ortho photo generation*

***Step 2:*** *DTM with acoustic data*

*Step 3: specific amphorae measurement with qualitative data inserted in database*

***Step 4:*** *data fusion and database consistensy ensure*

***Step 5:*** *Full Database exploitation in VR. Access to archaeological data through 3D model instantiated on the fly*

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Photo Fred Bassemayousse, image CNRS-MAP