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3D as a Service for Cultural Heritage

Xavier Granier

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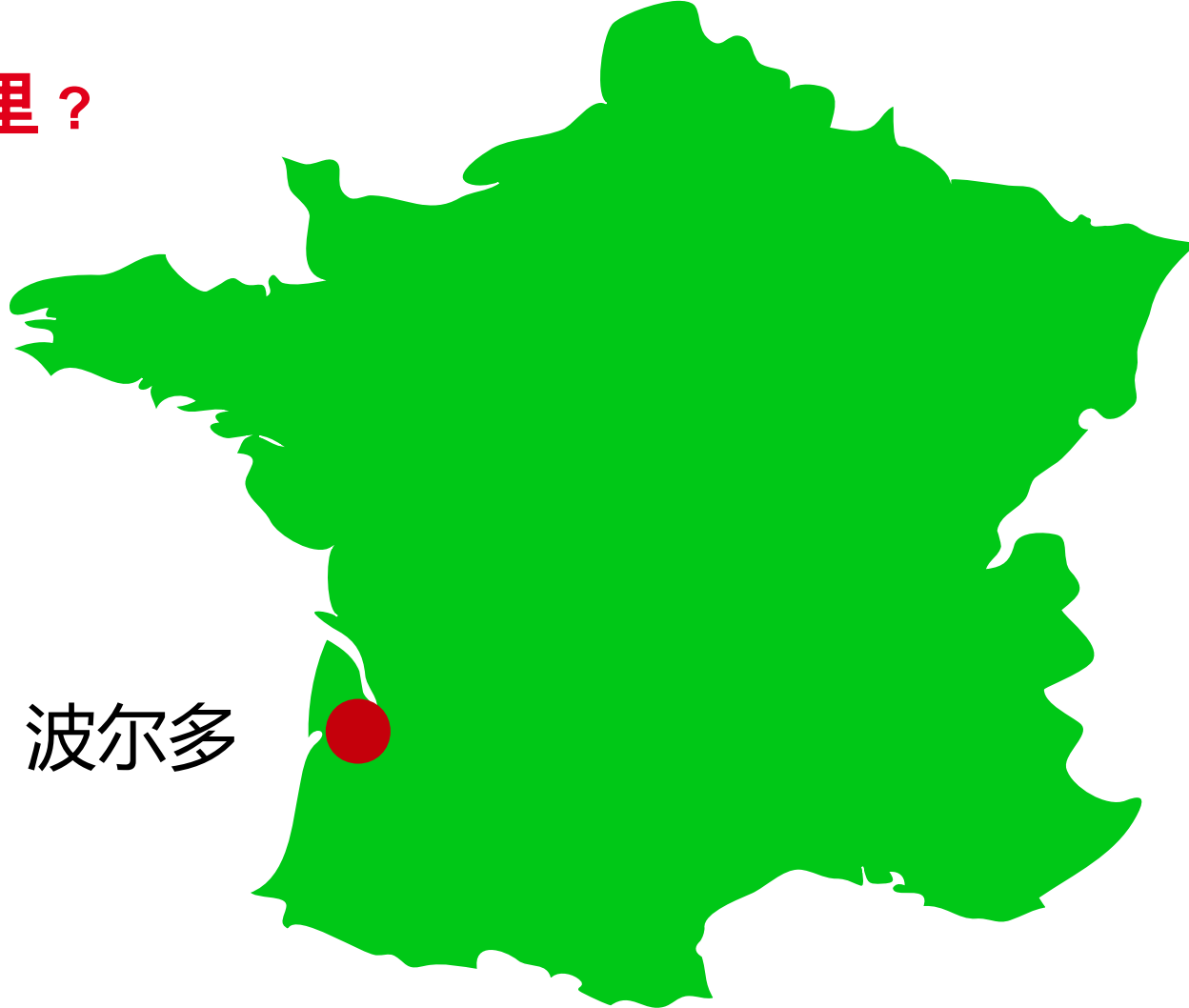
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3D as a Service for Cultural Heritage

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我们在哪里？



波尔多

法国

Scientific Context

- Optic
 - Professor @ IOGS
 - Member of LP2N
 - Since 2012
- Computer Graphics
 - Head of MANAO team
 - 2011 – 2018
- Archeology
 - Archeovision
 - Scientific Director
 - 3D Constortium
 - Coordinator
 - Since 2017

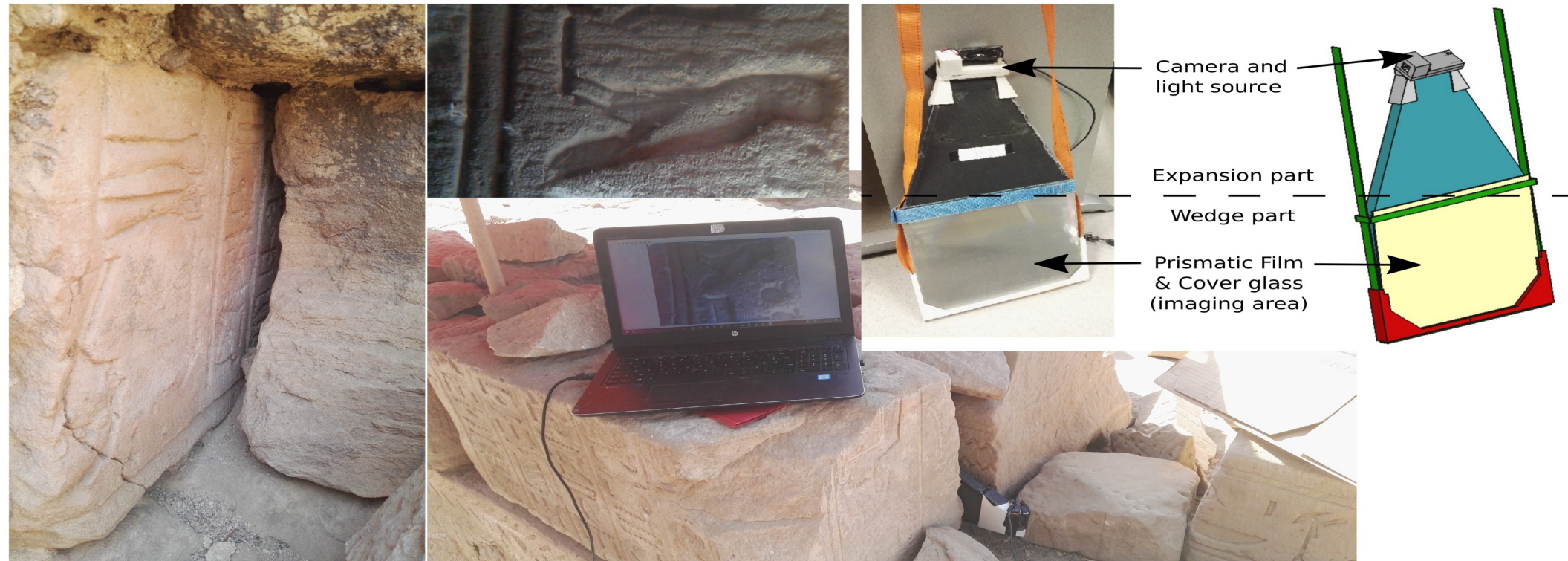
3D for Cultural Heritage

- How to acquire
 - Still some progresses for geometry
 - Challenges for Appearance
- How to analyze
 - Extract important structures
- How and What to visualize
 - Rendering styles
 - Tools for archaeologist
 - Tools for museum
- How and What to archive

1

Acquire

Unpublished – New device for acquisition



With IFAO – Imaging in cervices – Medamoud temple – Egypt

En cours – acquisition d'apparence

- Very Large collection
 - Clothes from Asia
 - XIXth century
- Difficulty to expose them
 - Too fragile
- Goal of the collaboration
 - Create an exhibition
 - Original or actual state



Robe - Fish skin - painted et sewn

Vietnam – Woman Cloth



MEB | MUSÉE D'ETHNOGRAPHIE
DE L'UNIVERSITÉ DE BORDEAUX



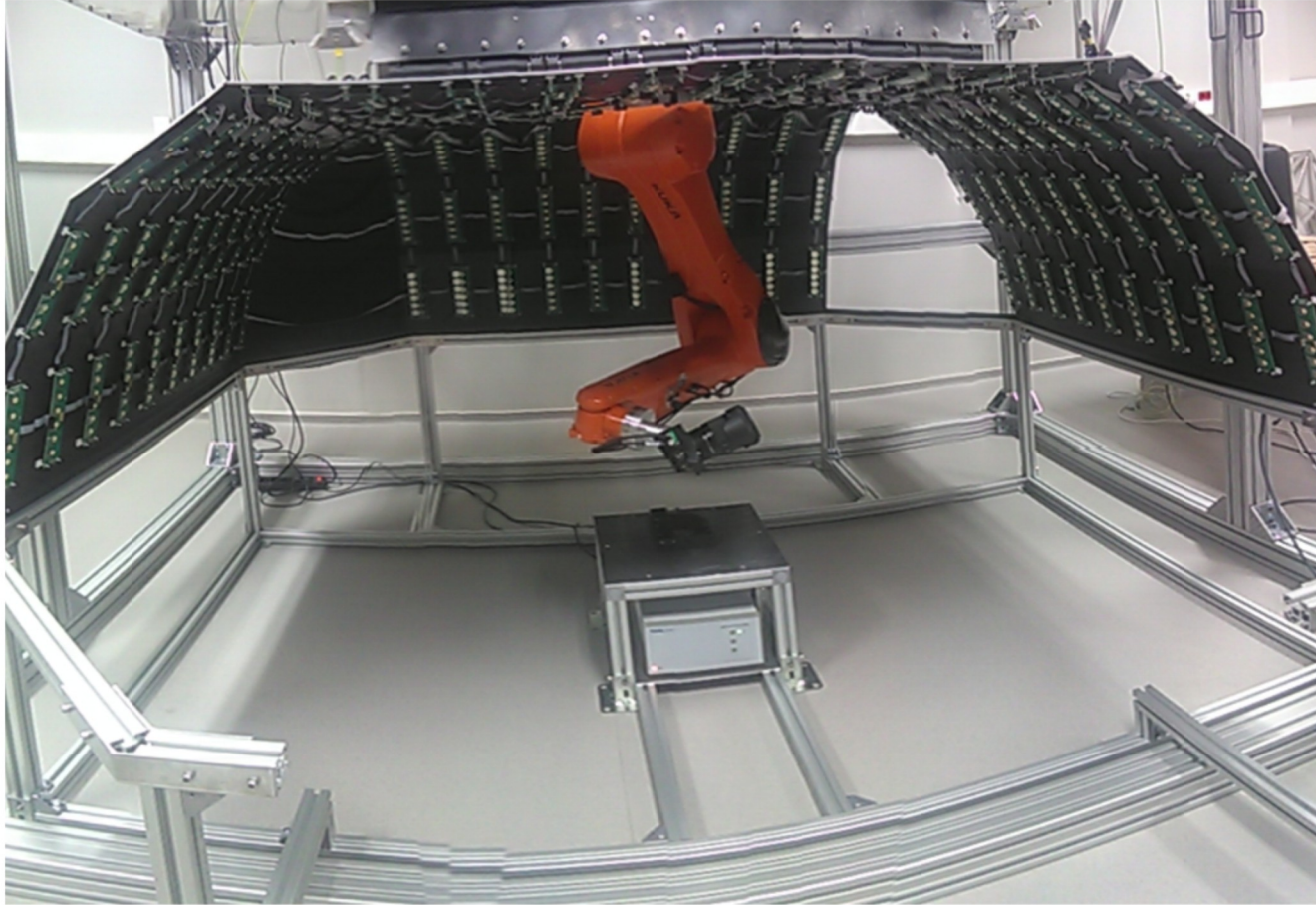
New acquisition platform

- Prev. : *Integrated High-Quality Acquisition of Geometry and Appearance for Cultural Heritage*
 - Schwartz, Weinmann, Ruiters, and Klein
 - VAST 2011
- Scan whole clothes
 - > 1000 LEDS
 - 3D Scanner
 - Robot arm

<http://btf.cs.uni-bonn.de/viewer/>



Current status



2

Analyze

Illustrative Shading



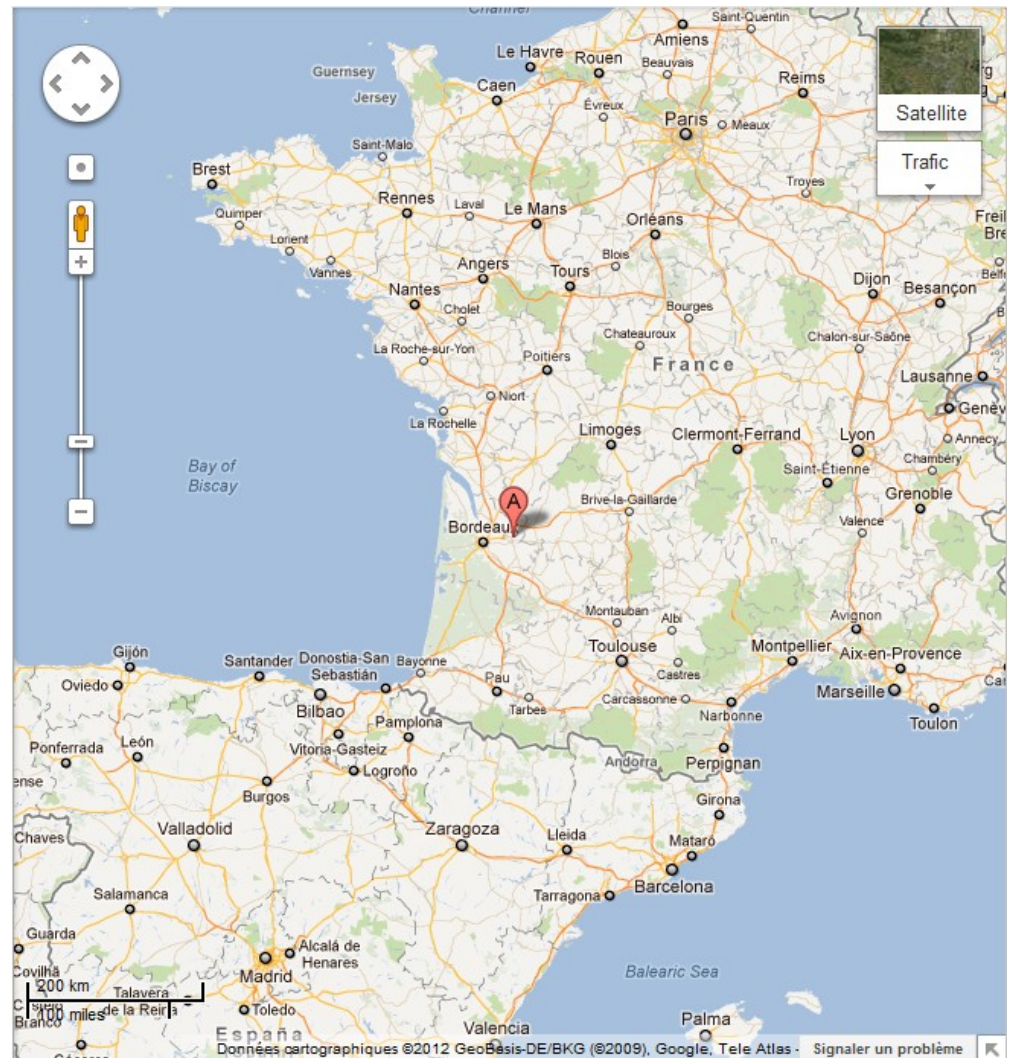
Classical Phong Shading



Illustrative Material

3D model of d'Isis (d'Alexandria Lighthouse)
Acquired by **CEAlex** & **Archéovision**

Epitaph of St. Emilion



Epitaph of St. Emilion

- Discovered between 1934 and 1951
- Oldest written trace of St Emilion relics ?



Frédéric Boutoulle (Univ. Bordeaux, CNRS)
Pascal Mora (Archéovision, Univ. Bordeaux, CNRS)
Romain Vergne (Inria, Univ. Bordeaux)

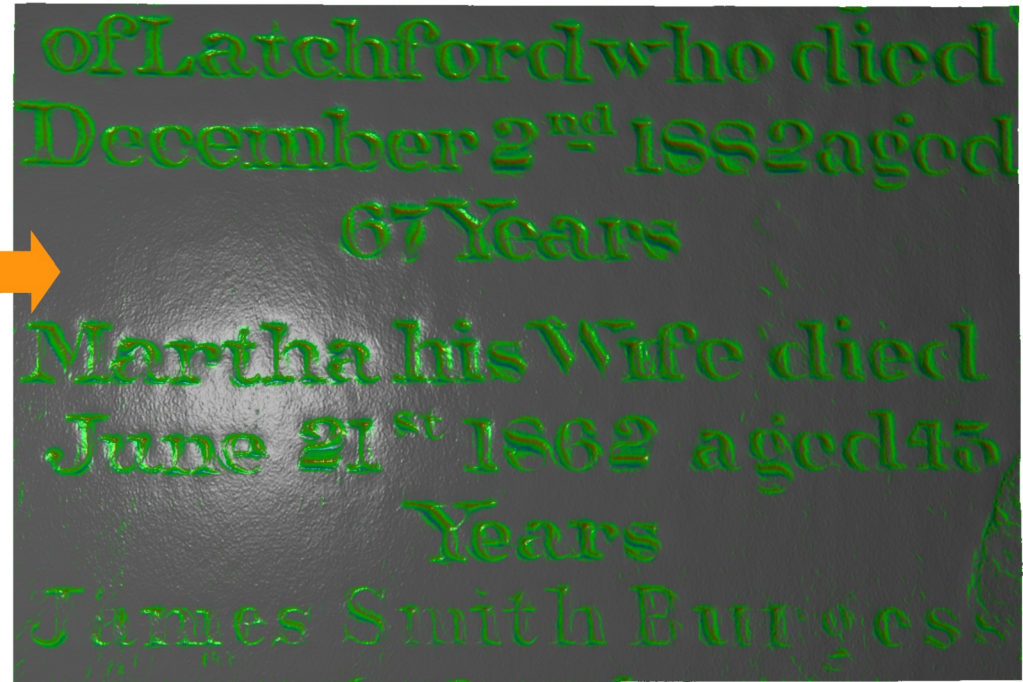
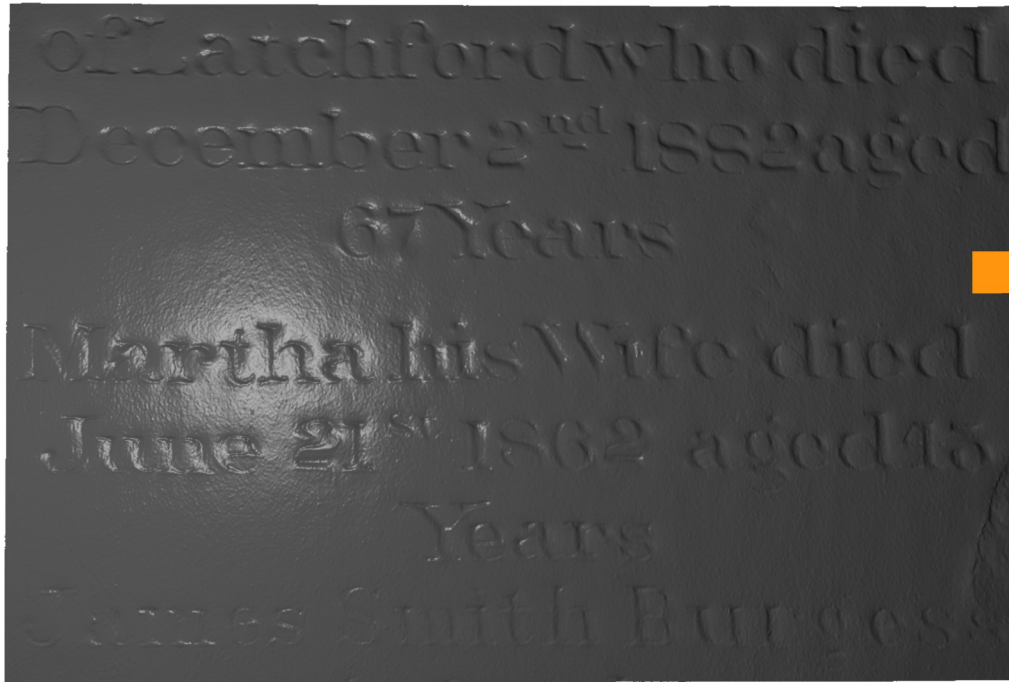


Epitaph of St. Emilion



Taking into account scale + filtering

For Digital Squeeze



Taking into account scale + filtering

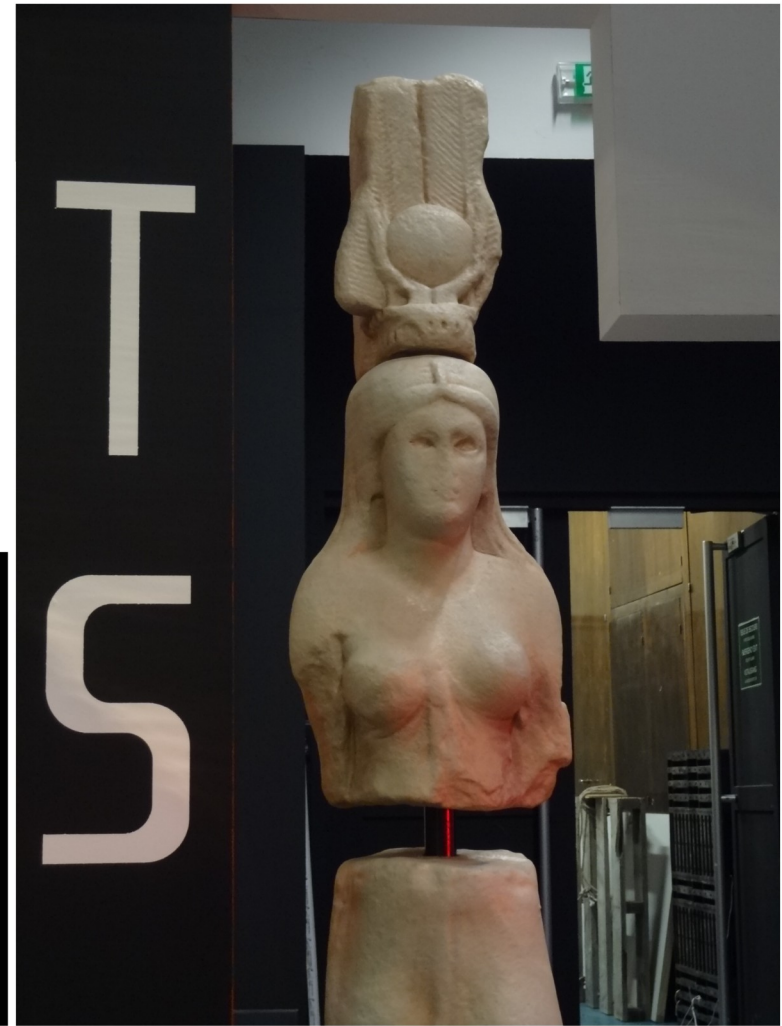
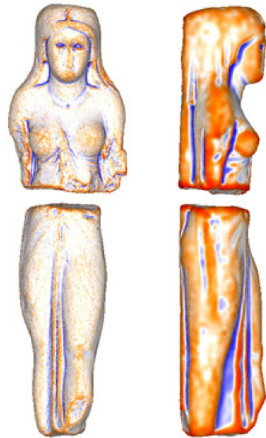
L. Amman, P. Barla, G. Guennebaud, X. Granier & P. Reuter
CGF 2012



3

Visualize

Ex : Maritime museum (Paris)



Spatial Augmented Reality

- From Prototype to museum
 - Real world as display support



Spatial Augmented Reality

- From Prototype to museum
 - Real world as display support

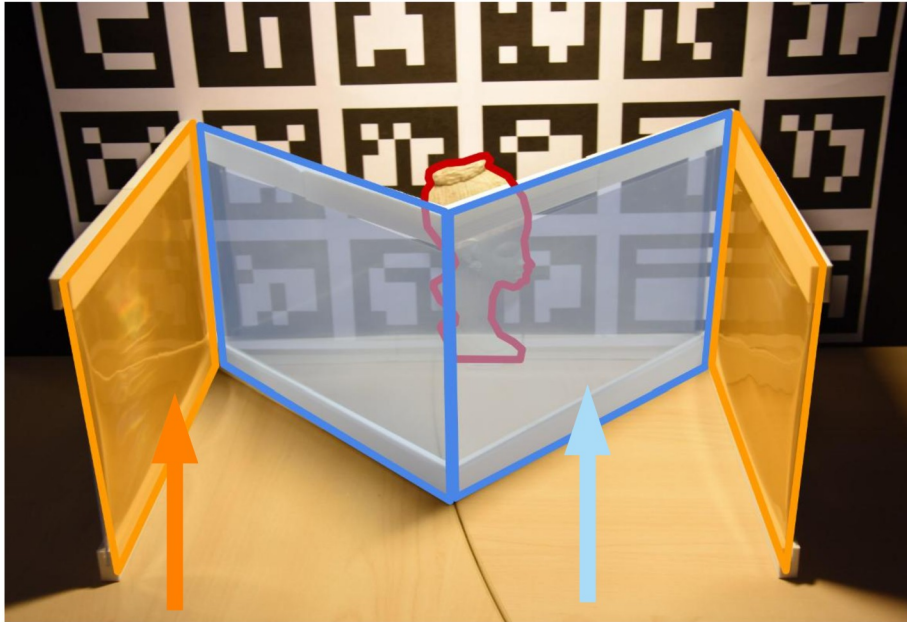


**Mercati di Traiano
Museo dei Fori Imperiali**



ACM JOCCH 2014

EgoSAR : Spatial Augmented Reality for Multiple Users

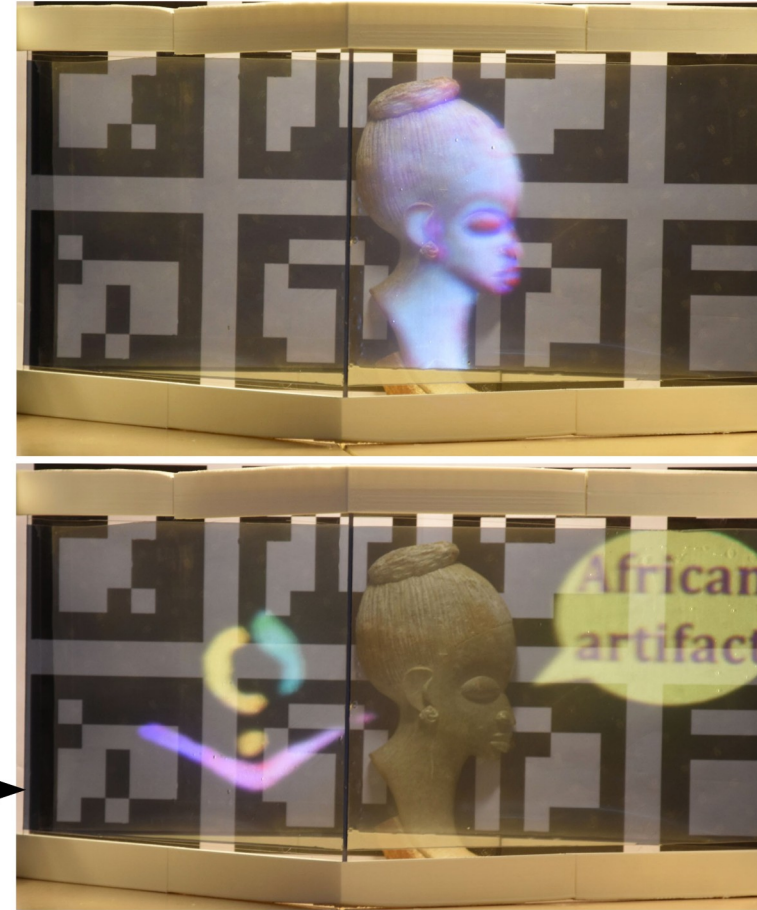


Retroreflection

Beam splitter

Personalized & view-
dependant augmentation

IEEE ISMAR 2016



4

Archiving



archéovision



Archeo**transfert**



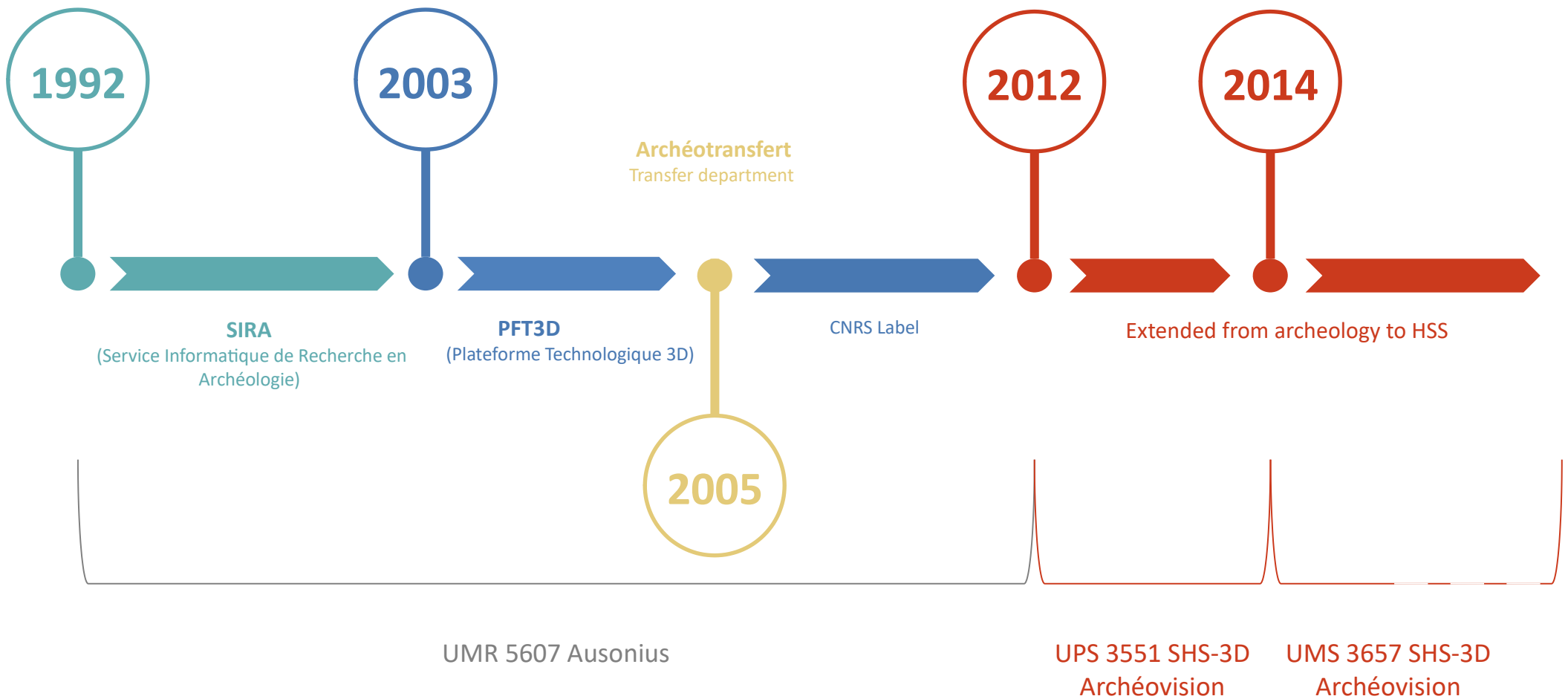
UMS SHS-3D 3657

Cellule de transfert d'Archéovision



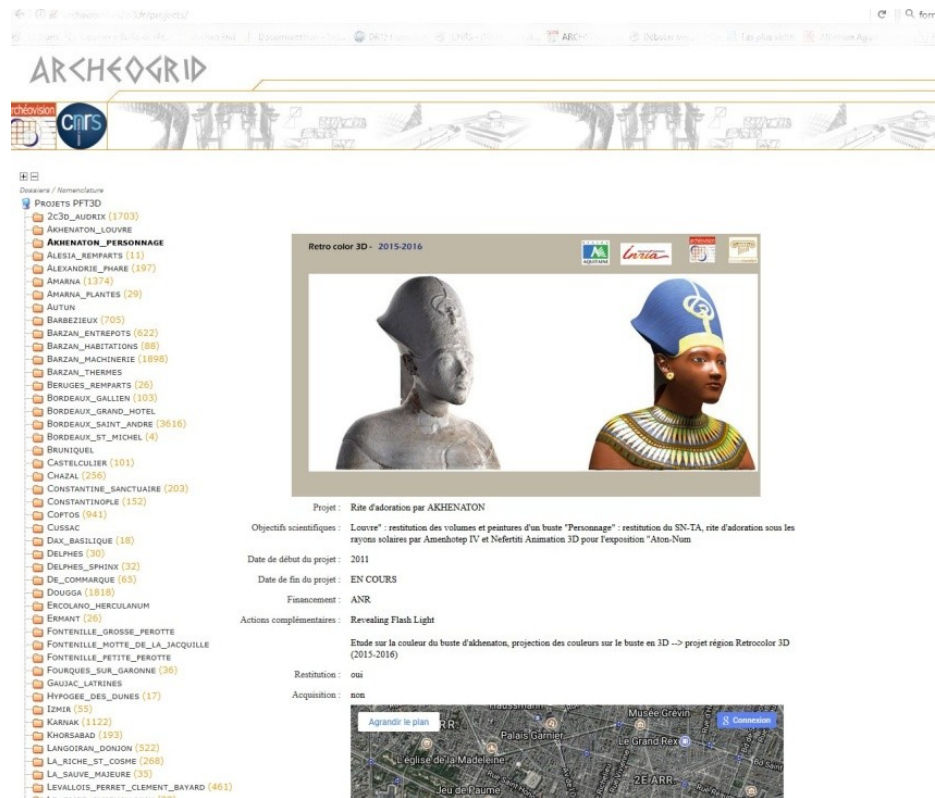
université
de **BORDEAUX**

25 years of experience



Archeogrid : more than 15 years of data organization

- Organize data from the team
- Data management
- Metadata enrichment
- Collaborative work with partners



The screenshot shows the Archeogrid website interface. At the top, the logo 'ARCHEOGRID' is displayed next to the CNRS logo. Below the header is a navigation menu and a list of projects. The 'AKHENATON_PERSONNAGE' project is highlighted. To the right, a 3D model of an Akhenaton bust is shown, with a 'Retro color 3D - 2015-2016' label. Below the model, project details are provided, including scientific objectives, dates, financing, and complementary actions. A map at the bottom right shows the location of the project in Paris.

ARCHEOGRID

PROJETS PFT3D

- 2C30_AUDREX (1703)
- AKHENATON_LOUVRE
- AKHENATON_PERSONNAGE**
- ALESSIA_REMPARTS (11)
- ALEXANDRIE_PHARE (1497)
- AMARNA (1374)
- AMARNA_PLANTES (29)
- AUTUN
- BARBEZIEUX (705)
- BARZAN_ENTREPOTS (622)
- BARZAN_HABITATIONS (88)
- BARZAN_MACHINERIE (1898)
- BARZAN_THERMES
- BERUGES_REMPARTS (26)
- BORDEAUX_GALLIEN (103)
- BORDEAUX_GRAND_HOTEL
- BORDEAUX_SAINTE ANDRE (3616)
- BORDEAUX_ST_MICHEL (4)
- BRUNIQUEL
- CASTELCULIER (101)
- CHAZAL (255)
- CONSTANTINE_SANCTUAIRE (203)
- CONSTANTINOPLE (152)
- COPTOS (941)
- CUSSAC
- DIAX_BASILIQUE (18)
- DELPHES (30)
- DELPHES_SPHINK (32)
- DIJON_COMMARQUE (65)
- DOUGGA (1818)
- ERCOLANO_HERCULANUM
- ERMANT (26)
- HYPOGEE_DES_DUNES (17)
- IDRIS (55)
- KARNAK (1122)
- KHORSABAD (193)
- LANGOSRAN_DONJON (522)
- LA_RICHE_ST_COSME (268)
- LA_SAUVE_MAJEURE (35)
- LEVALLOIS_PERRIT_CLEMENT_BAYARD (461)

Rite d'adoration par AKHENATON

Objectifs scientifiques : Louvre : restitution des volumes et peintures d'un buste "Personnage" : restitution du SN-TA, site d'adoration sous les rayons solaires par Amenhotep IV et Nefertiti Animation 3D pour l'exposition "Atou-Num"

Date de début du projet : 2011

Date de fin du projet : EN COURS

Financement : ANR

Actions complémentaires : Revealing Flash Light

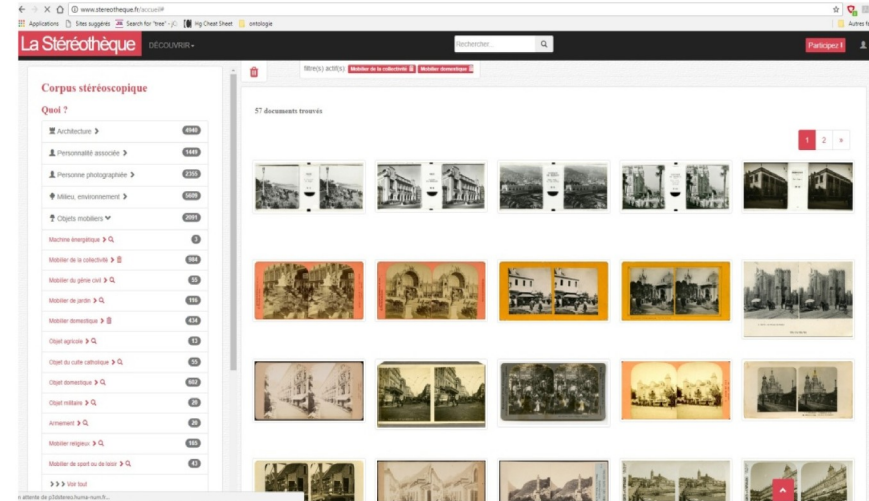
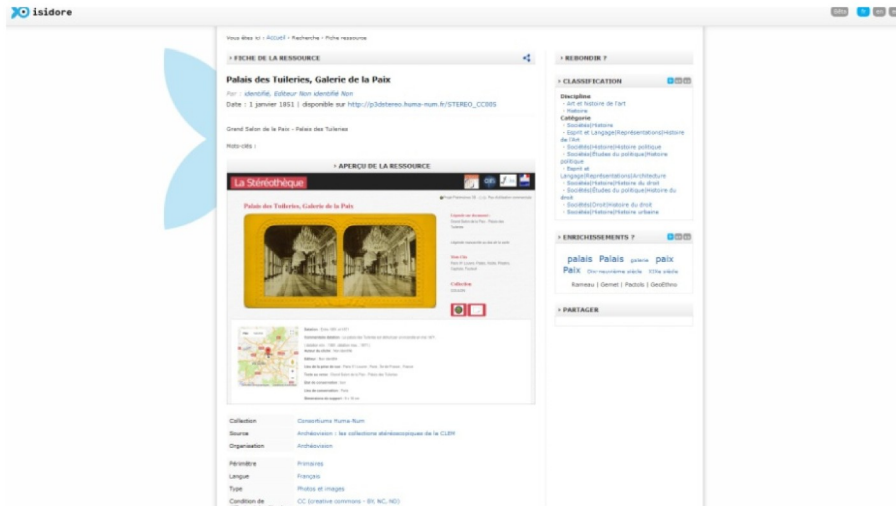
Etude sur le couleur du buste d'akhenaton, projection des couleurs sur le buste en 3D -> projet région Retrocolor 3D (2015-2016)

Restitution : oui

Acquisition : non

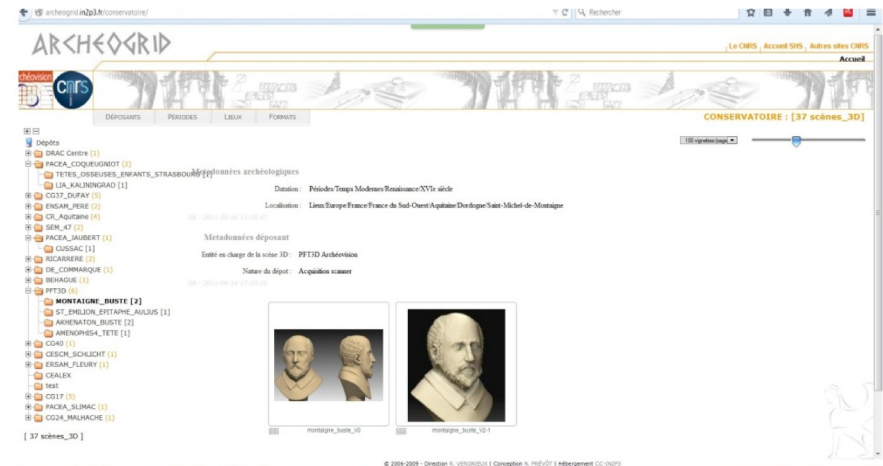
Archeogrid: 3D data diffusion

- Publication of Corpus for research and other public with the Stereotheque
- Gathering and managing metadata



Archeogrid: Data archiving

- Saving into Conservatory of 3D data for HSS, preparation to final archiving to CINES
- Servers from TGIR Huma-Num
 - National Digital Infrastructure for HSS



3D Consortium for Human & Social Sciences

3D for all HSS



Equipes membres du consortium 3D



<https://shs3d.hypotheses.org/>

Goals

Development & good use of 3D tools for HSS

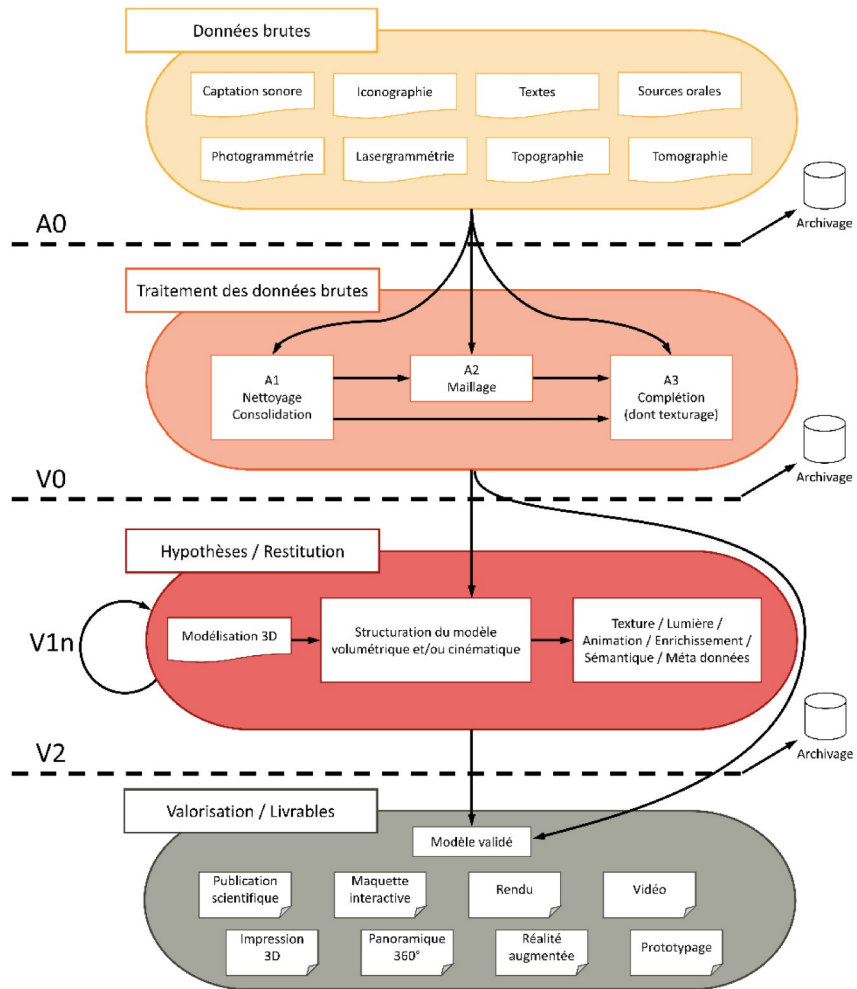
- 4 axes
 1. Technological review
 2. Elaboration and Transmission of Knowledge
 3. Life cycle, interoperability & archiving
 4. HSS meetings: exchanges of uses, communication & formation

consortium3d-coordination@services.cnrs.fr

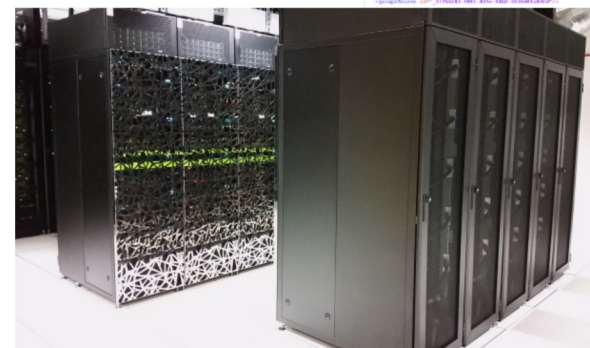
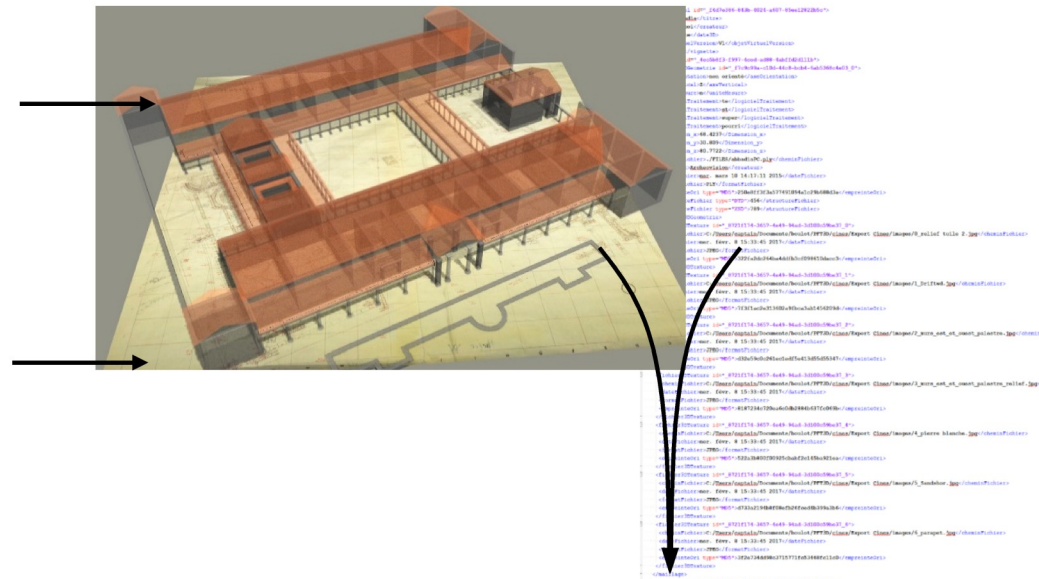




Graphe séquentiel de la production de données 3D



Archiving 3D data



3D Repository for HSS

- aLTAG 3D
 - Archiving software
 - Easy to create metadata
 - Packet creation
- Archiving @ CINES
 - Format ply / dae (COLLADA)
 - Currently in the process of finalisation

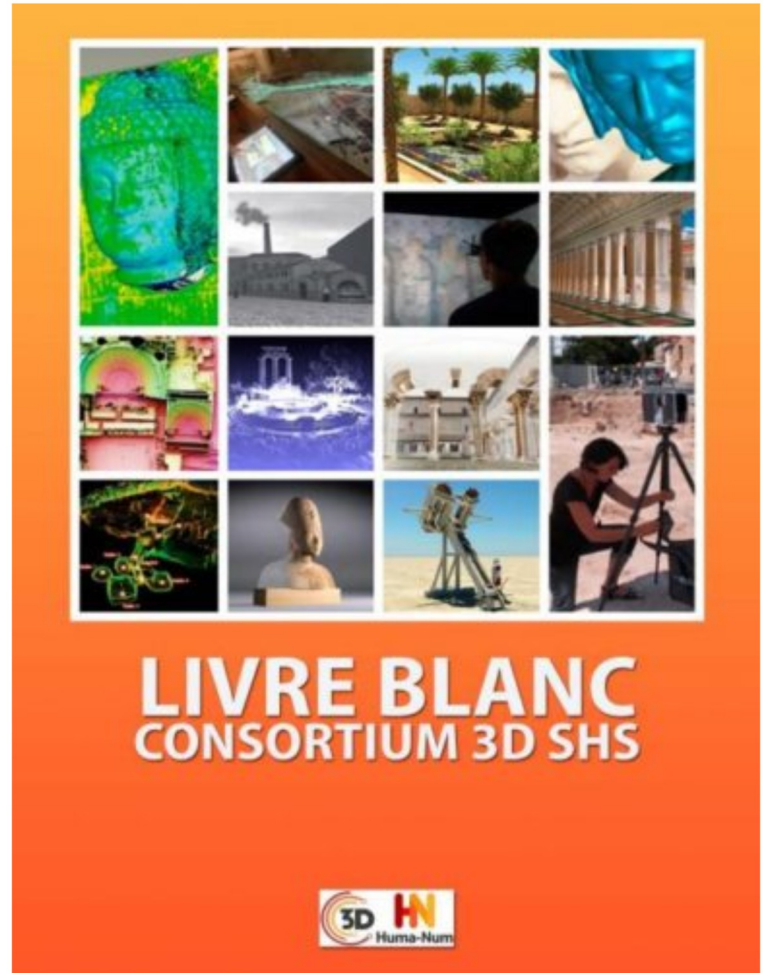


consortium3d-coordination@services.cnrs.fr

White Paper

- Tools &
- Good Practices

<https://hal.archives-ouvertes.fr/hal-01683842/>



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Open to Collaborate

We are open to collaborate

- Spreading the use of 3D for HSS
 - More international
 - What about a Chinese white paper ?
- Appearance Acquisition
 - New challenges
 - Development of tools for on-site acquisitions
- Visualization
 - New display systems
 - New HCI
- Archiving
 - Challenge: development of tools to explore the archived data
 - Semi-Automatic classification
 - Matching
 -

谢谢

<http://xgranier.free.fr>

