Interacting with specific artifacts: the vault rib stones

Marco Callieri, ISTI-CNR

nd-claveaux3D

Environnement de visualisation des données RTI et 3D des claveaux de Notre-Dame de Paris.

Web3D 2022, 2-4 November, Evry, France
The 27th International Conference on 3D Web Technology

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Marco Callieri, senior researcher, PhD in computer science, mostly work on digital technologies for CH

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Visual Computing Lab, a small group (around 20 people), working on 2D/3D Computer Graphics

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Institute of Science and Technologies of Information (ISTI)

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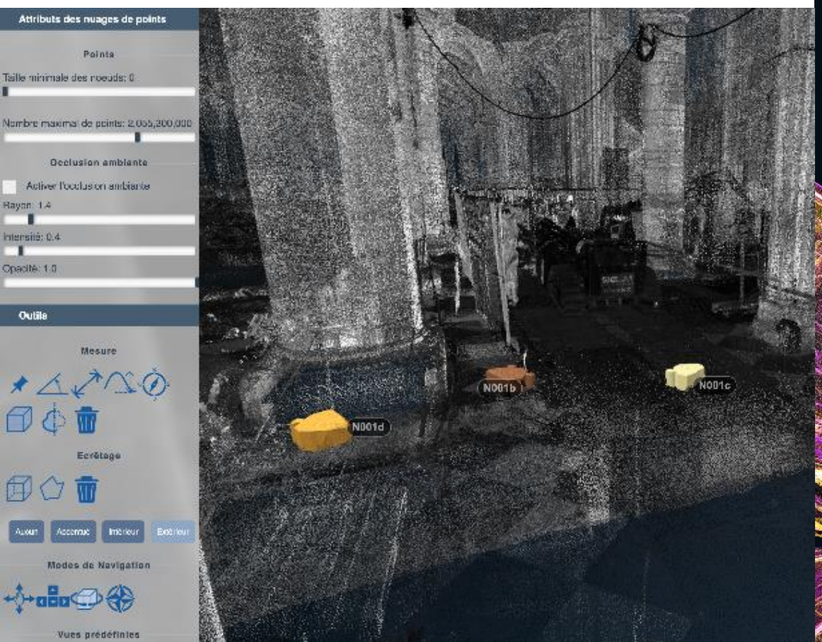
Italian National Research Council (CNR)

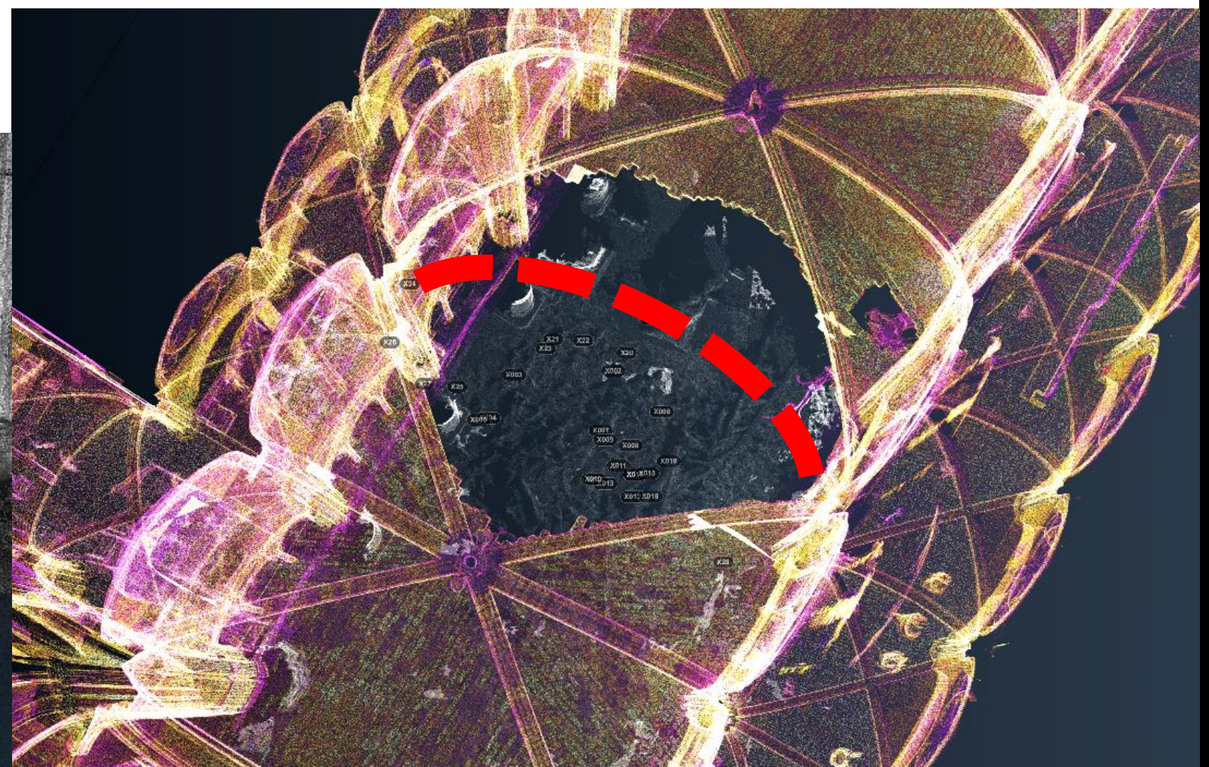
vcg.isti.cnr.it

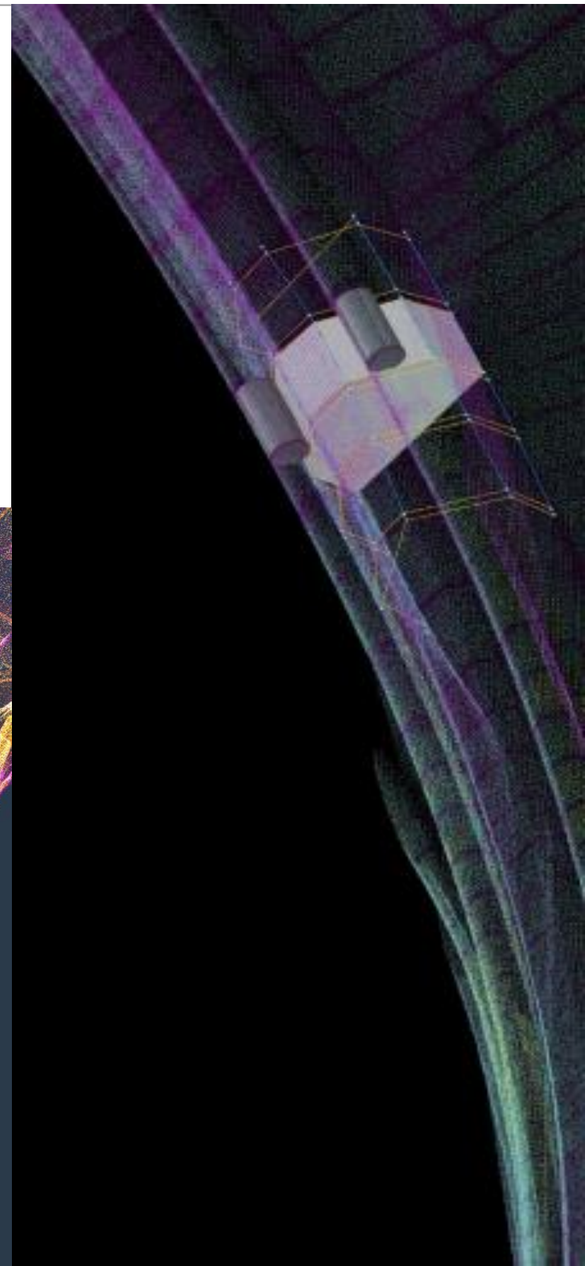
The task

Interactive, web-based visualization of the stones from the fallen vault rib

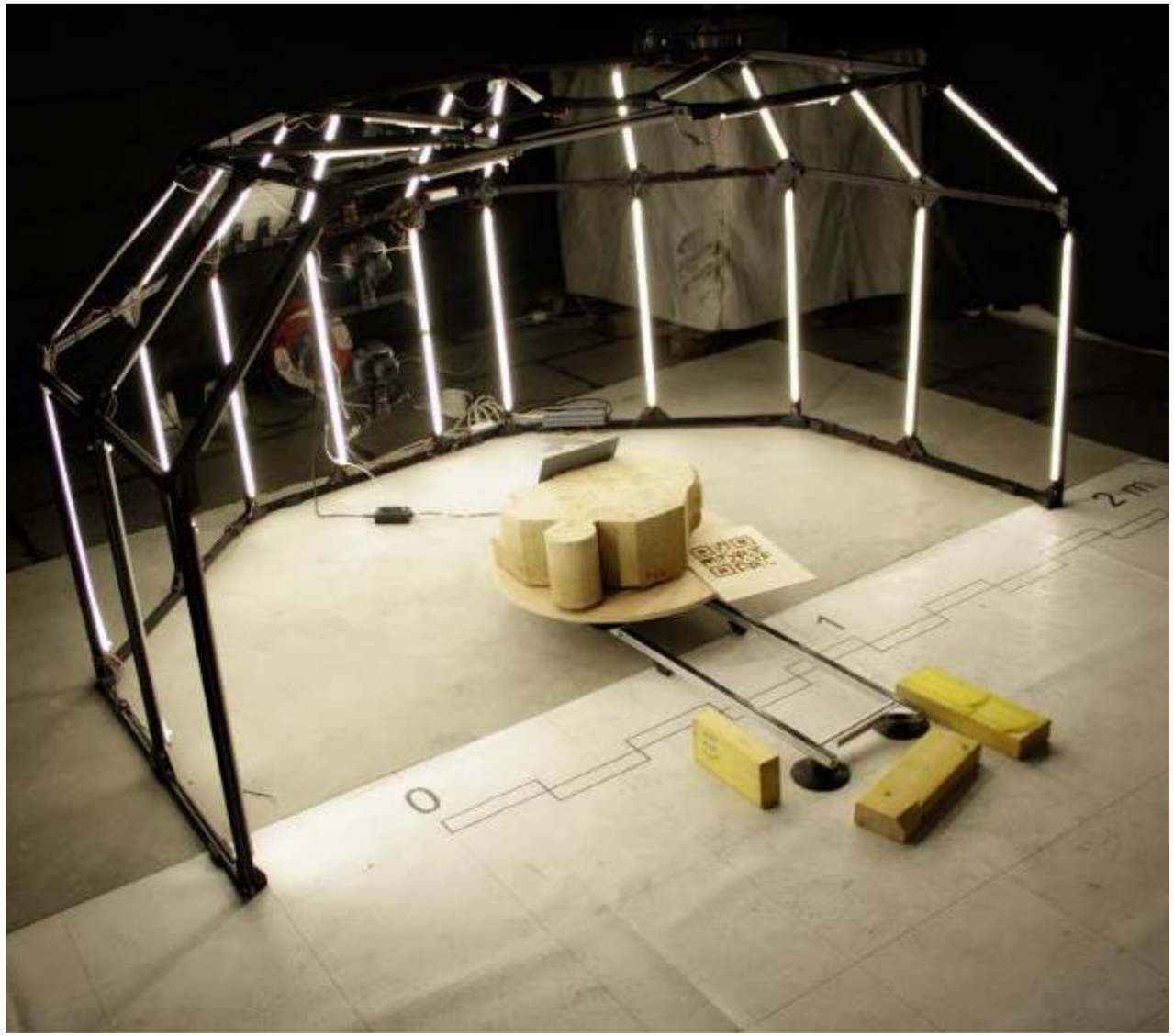
Detailed visualization/inspection, possibly with measurement and annotation tools.





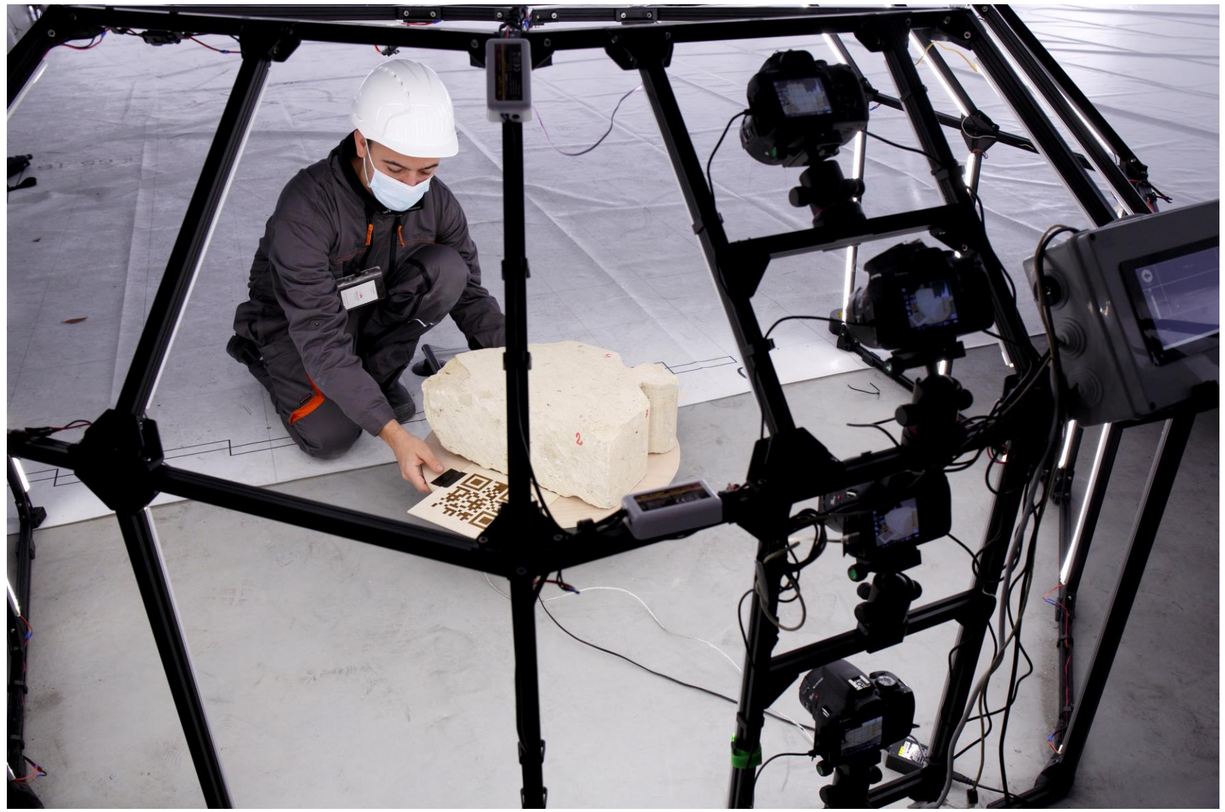


Data source



The stones were digitized using a custom photogrammetric rig

Eloi Gattet, Mercurio



Data source

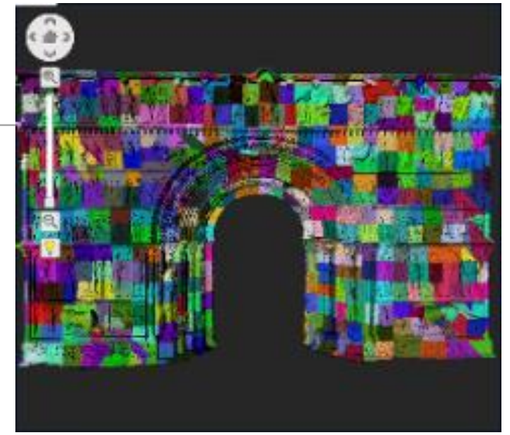
MeshLab, our open-source tool for mesh editing and visualization, was used in the data processing.

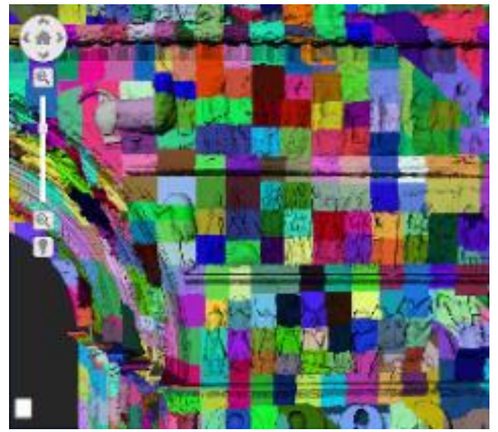
The result is a set of almost 70 3D models.

Models are between 4 and 6 millions of triangles, with per-vertex color mapping, all with a coherent orientation.

To view them online

3DHOP is a framework for creating web-based
3D visualization, focused on cultural heritage





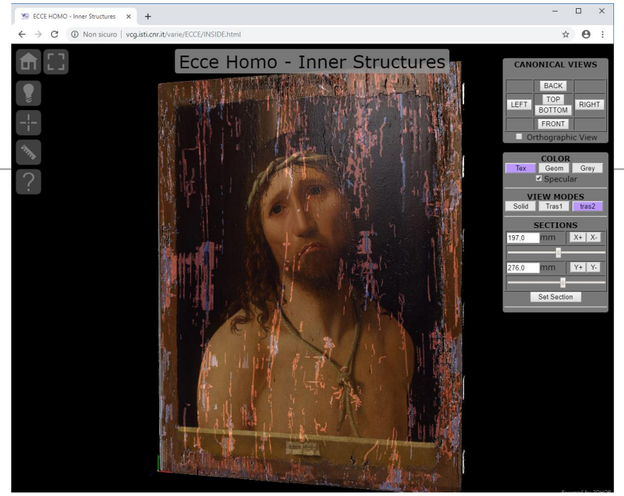
Open-source; JavaScript + HTML5 + WebGL; supported in all browsers and platforms.

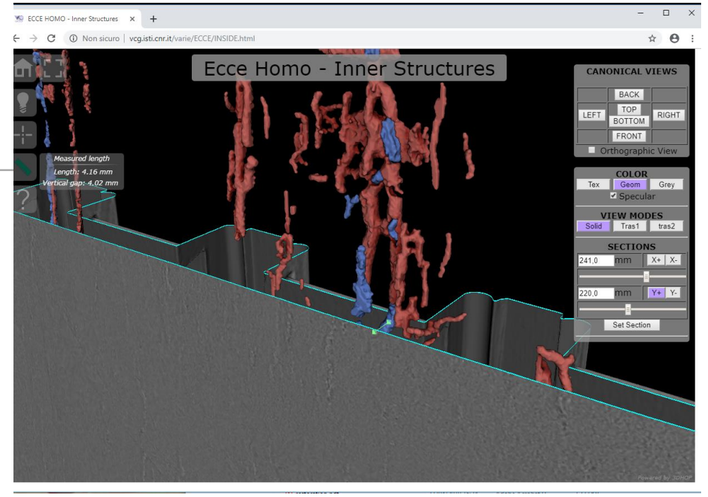
Thanks to multiresolution it can work with high-res geometry 10->100+ millions of triangles.
No problem in showing the stones in full resolution (even more than one element at a time, should it be needed).

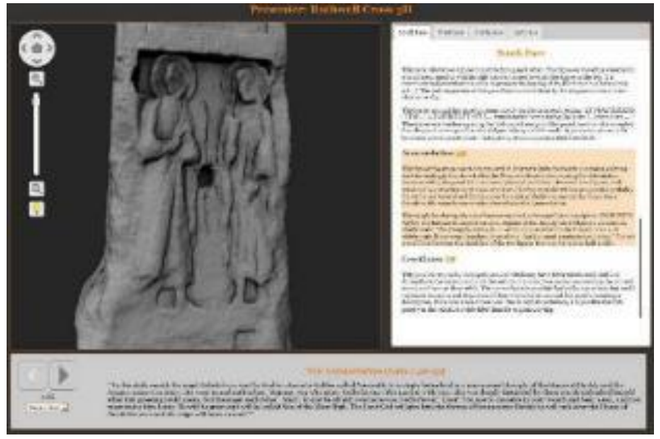
To view them online

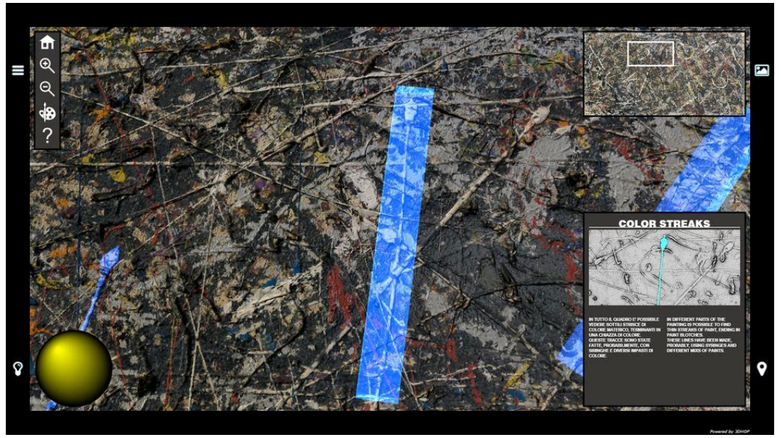
3DHOP can be customized to create specialized interfaces

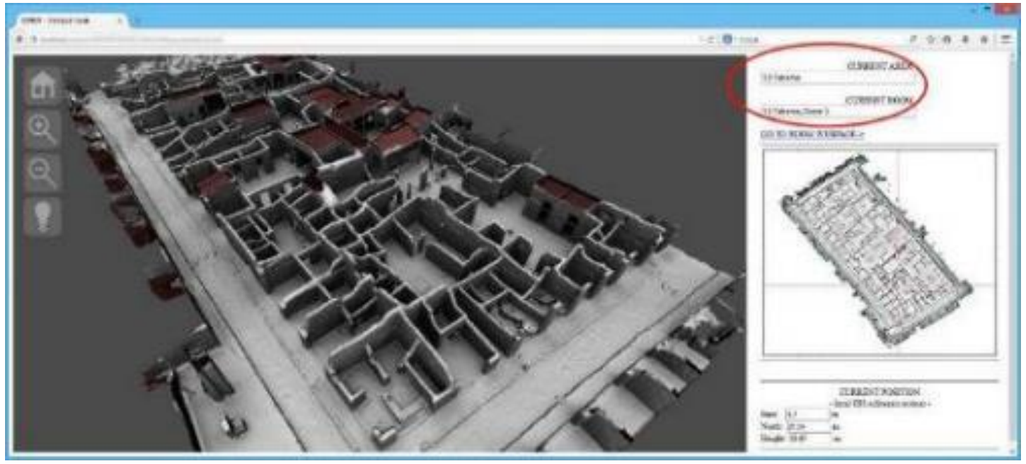
Easy to define a custom interaction scheme and add new functionalities

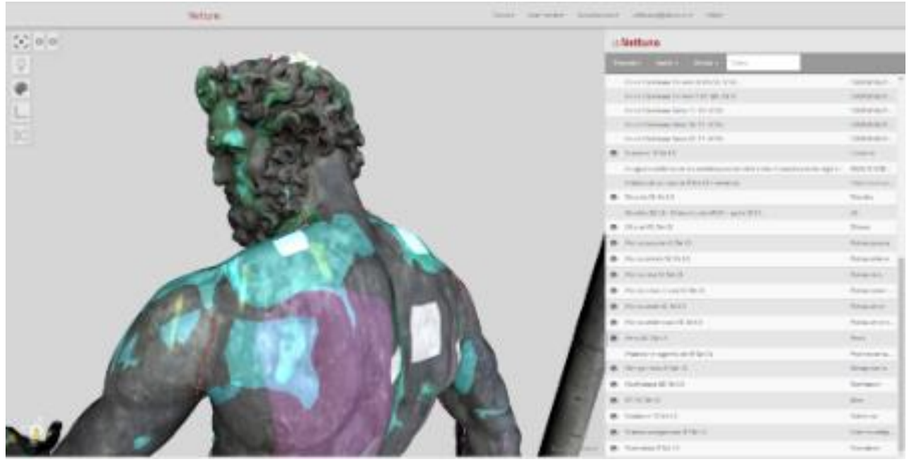




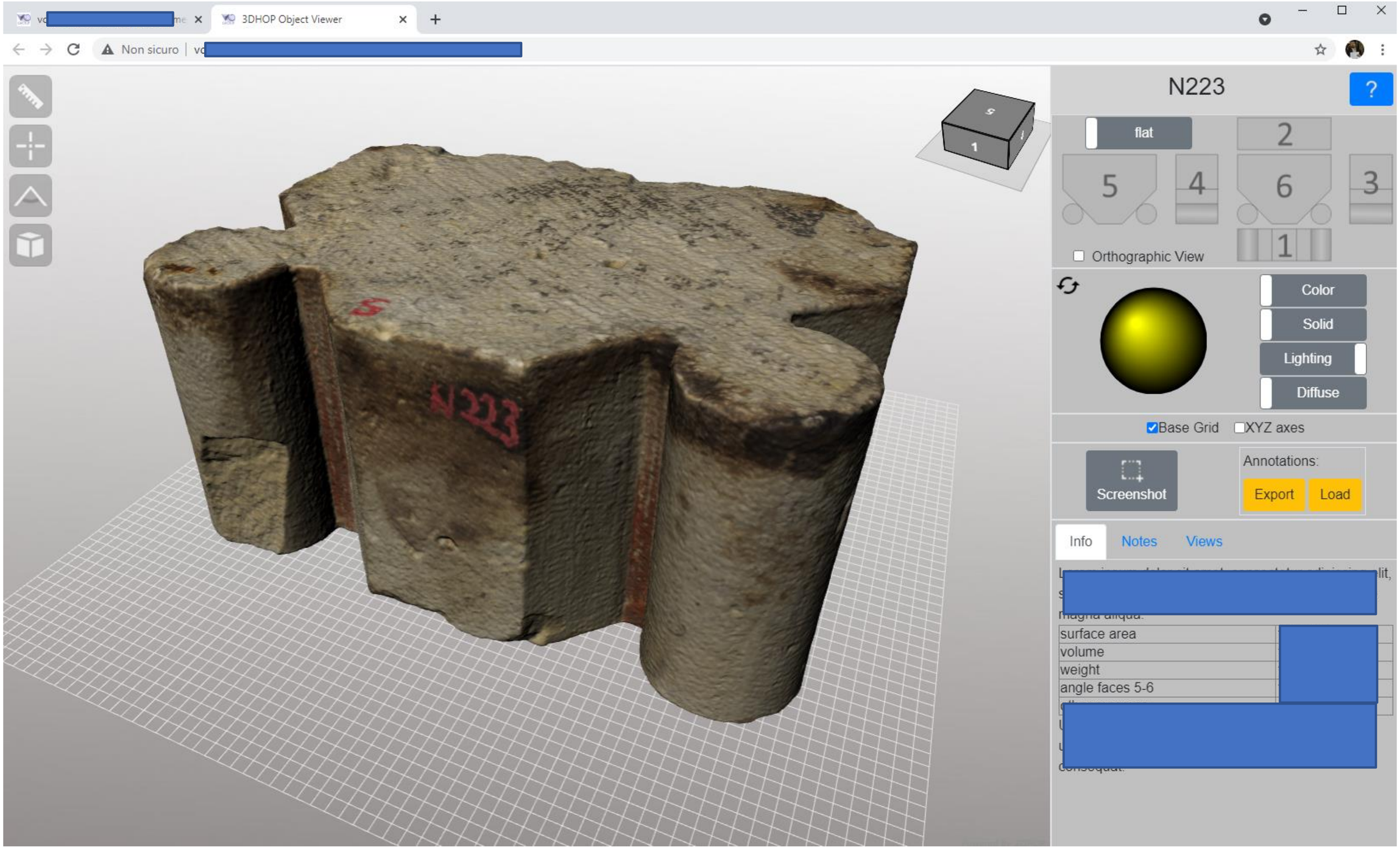






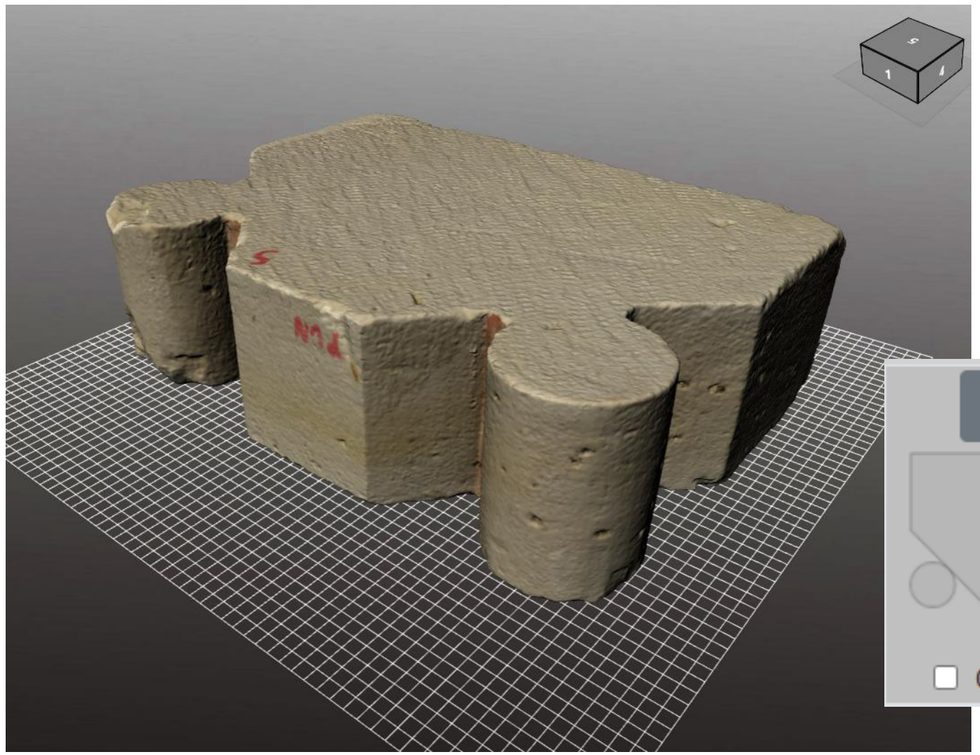


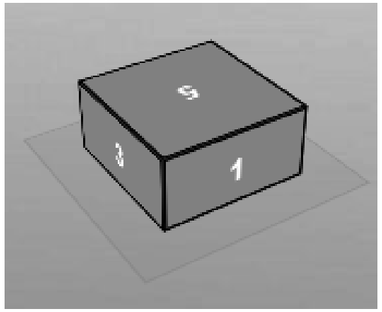

Non sicuro
nd-claveaux3D
Environnement de visualisation des données RTI et 3D des claveaux de Notre-Dame de Paris.
N1A
N1B
N1C
N1D
N12
N16A
N16B
N17
N28
N31
N33
N34
N51
N53

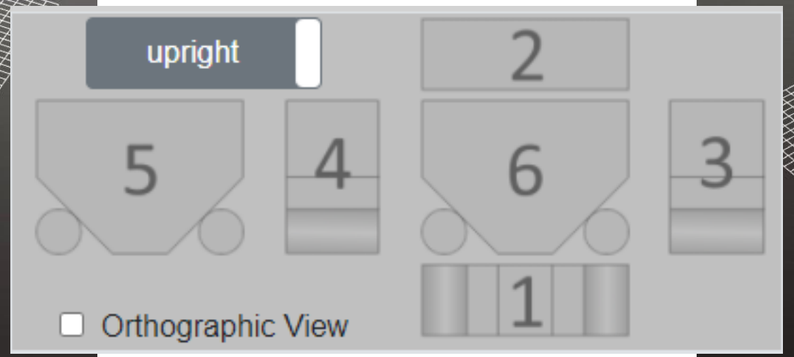

3DHOP Object Viewer
Non sicuro
N223
?
flat
2
5
4
6
3
1
Orthographic View
Color
Solid
Lighting
Diffuse
Base Grid
XYZ axes
Screenshot
Annotations:
Export
Load
Info
Notes
Views
surface area
volume
weight
angle faces 5-6

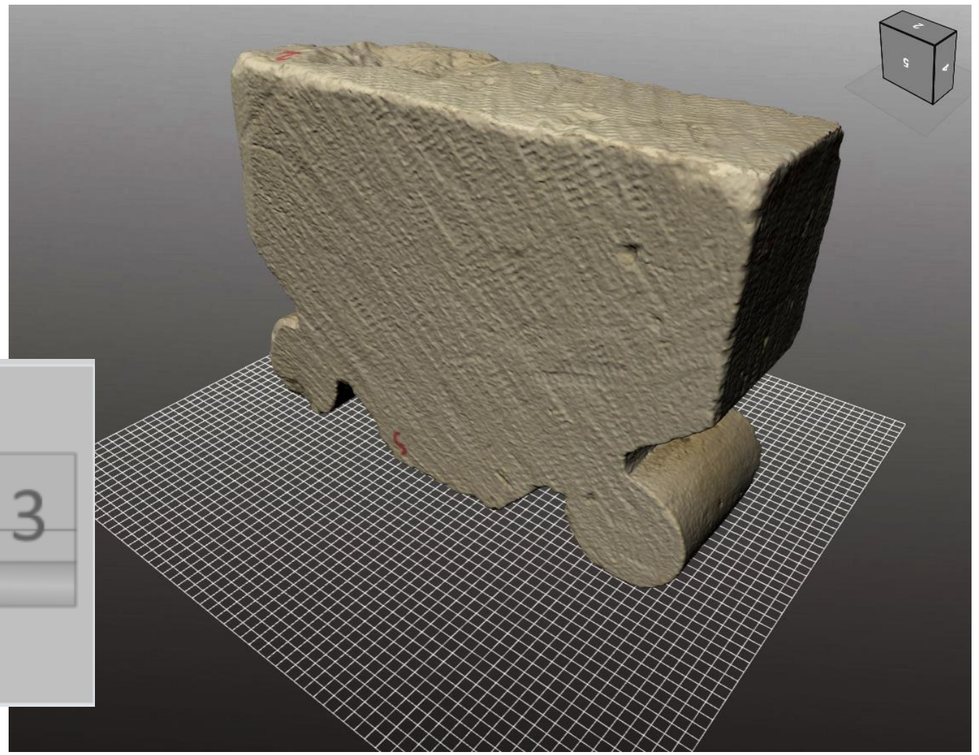
Navigation

- Simplified navigation (turntable: 2axis+zoom+pan)
- Two poses: flat (like the object is normally stored), upright (vertical pose, akin to original placement)
- Snap-to-faces interface
- Orientation/pose reference gizmo



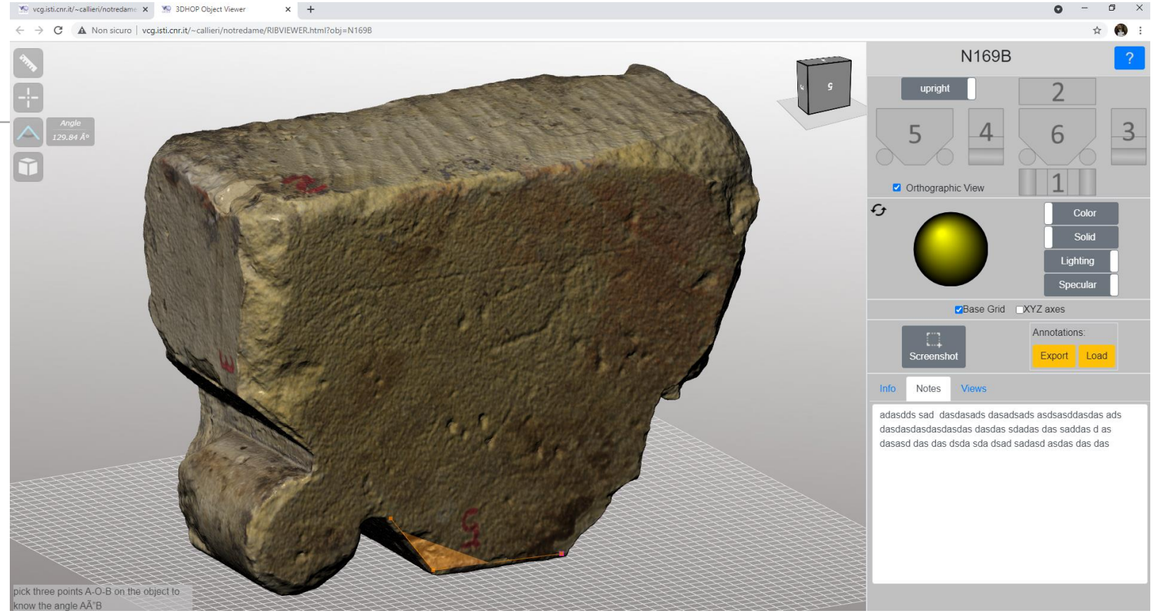


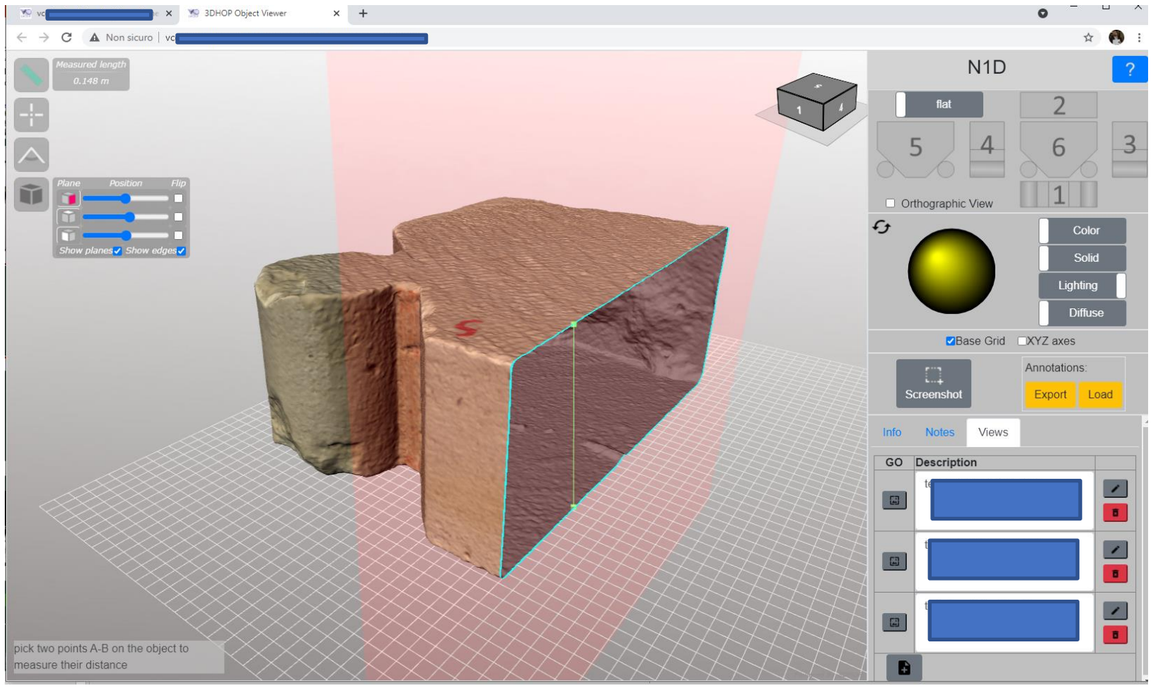




Tools

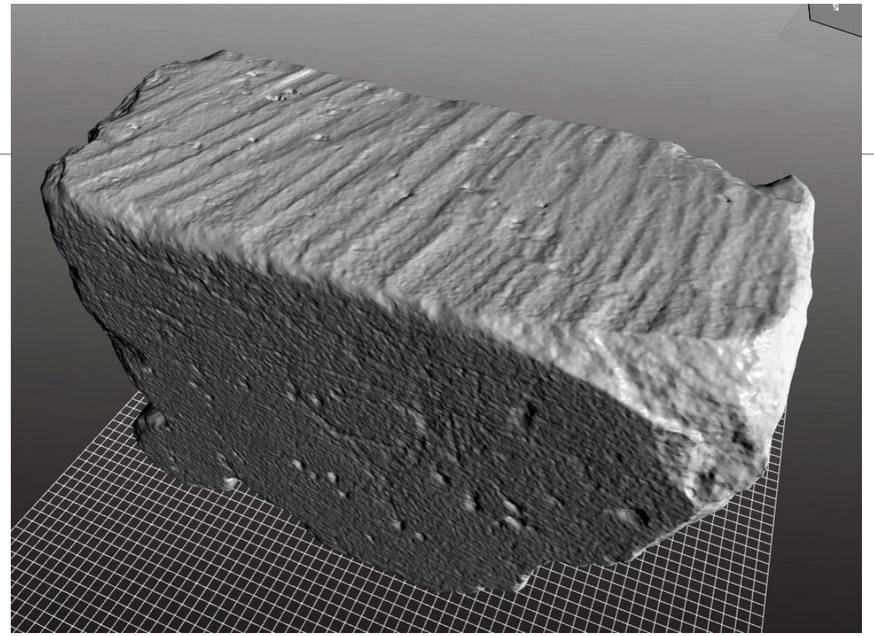
- Realtime cut-through sectioning
- Point-to-point measurement
- Angle measurement
- Reference metric grids
- Screenshot tool

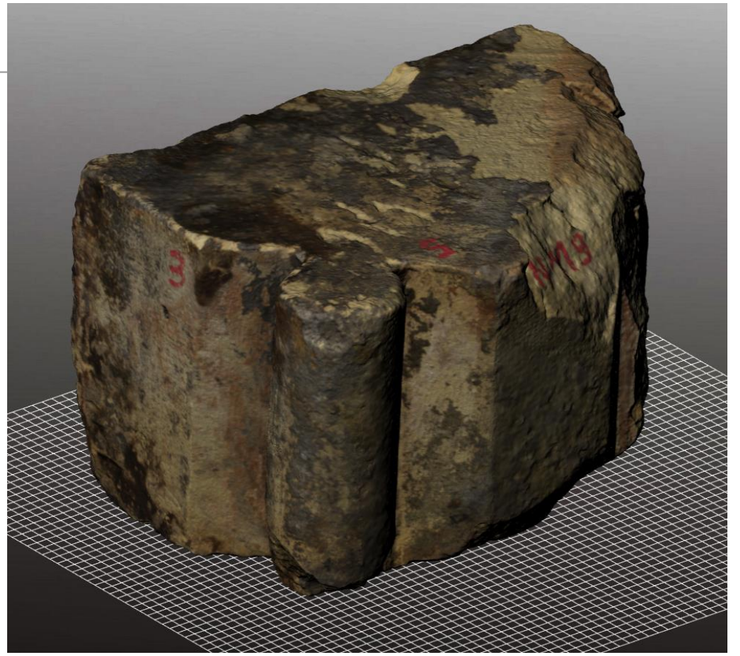


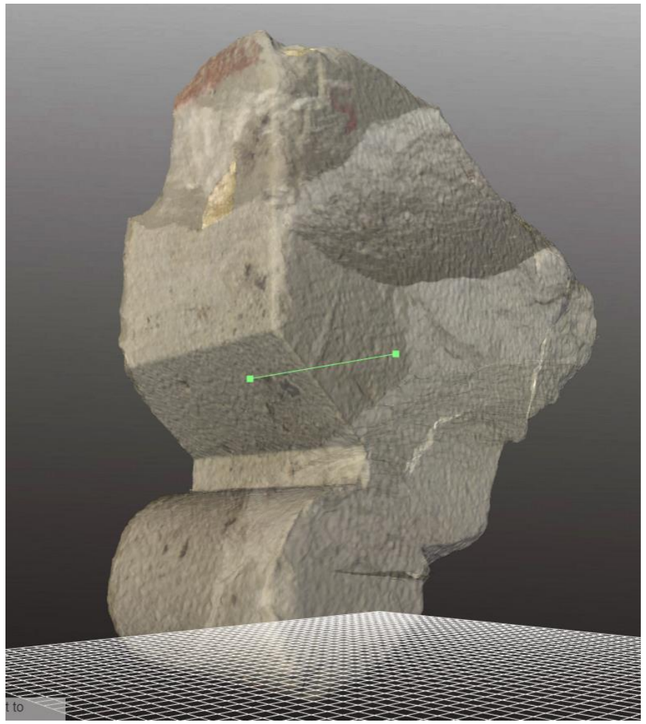


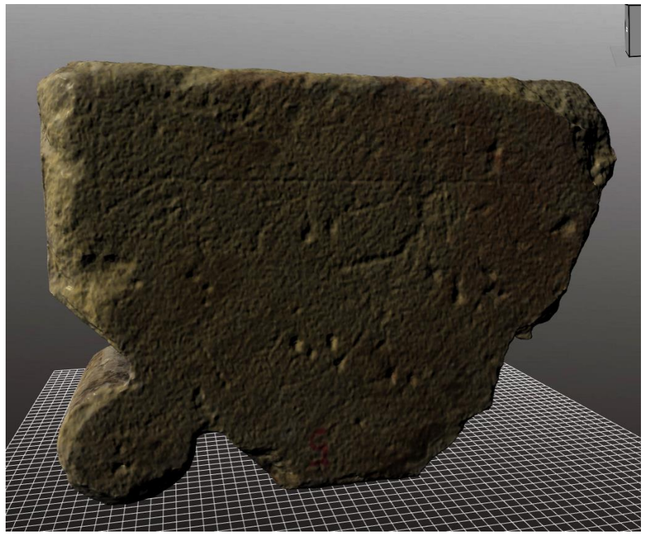
Rendering

- Perspective/orthographic camera
- Light direction
- Light on/off
- Transparency
- Color on/off
- Lambertian / Phong







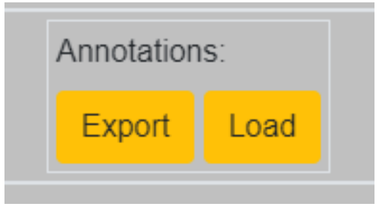


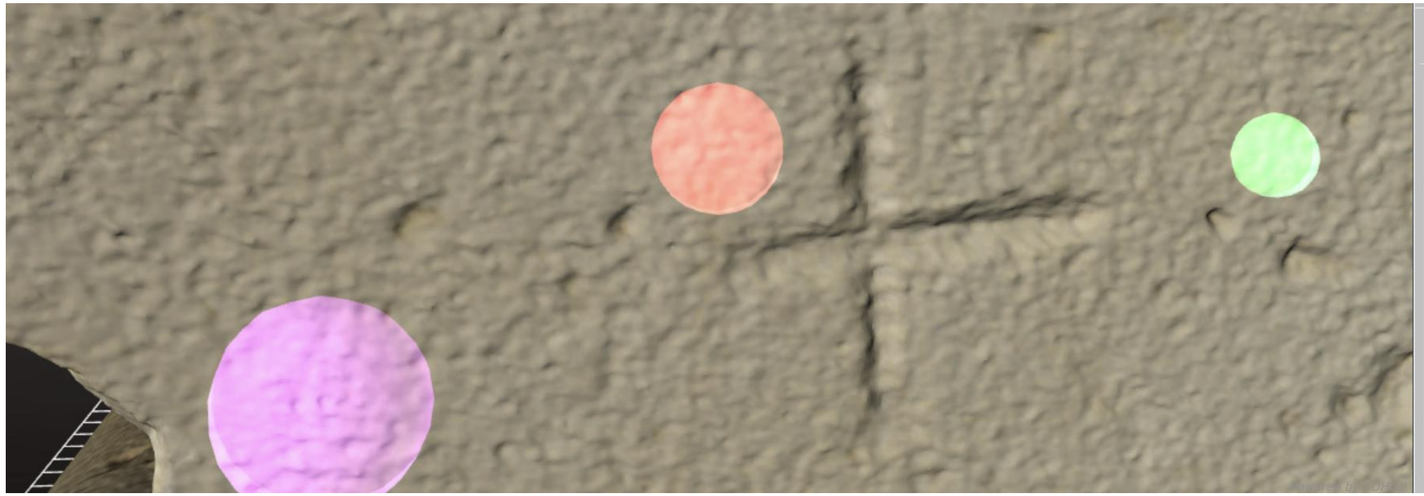
Annotations

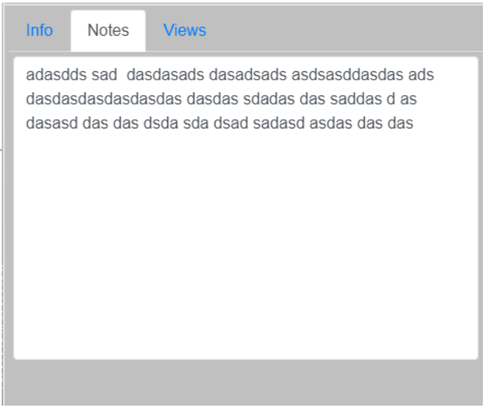
Users can enrich the viewer by annotating the stones

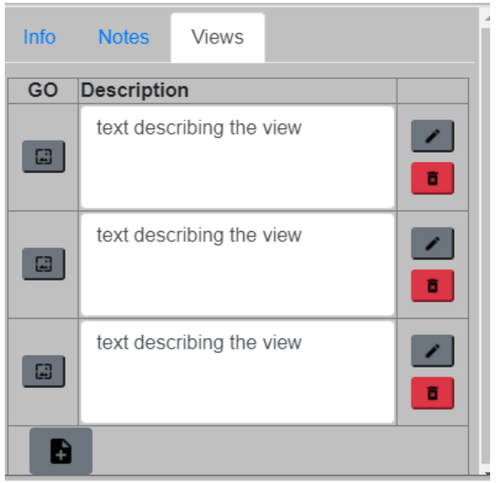
- notes about the whole object
- annotated “views” (viewpoints + rendering state) that act like bookmarks
- spot notes placed on the surface

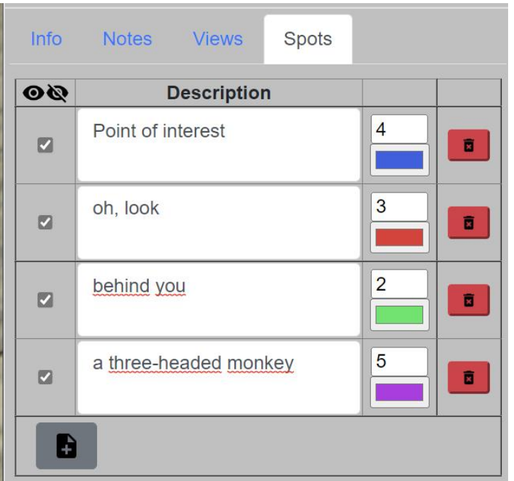
Notes, Views, and Spots may be saved, loaded and shared among colleagues







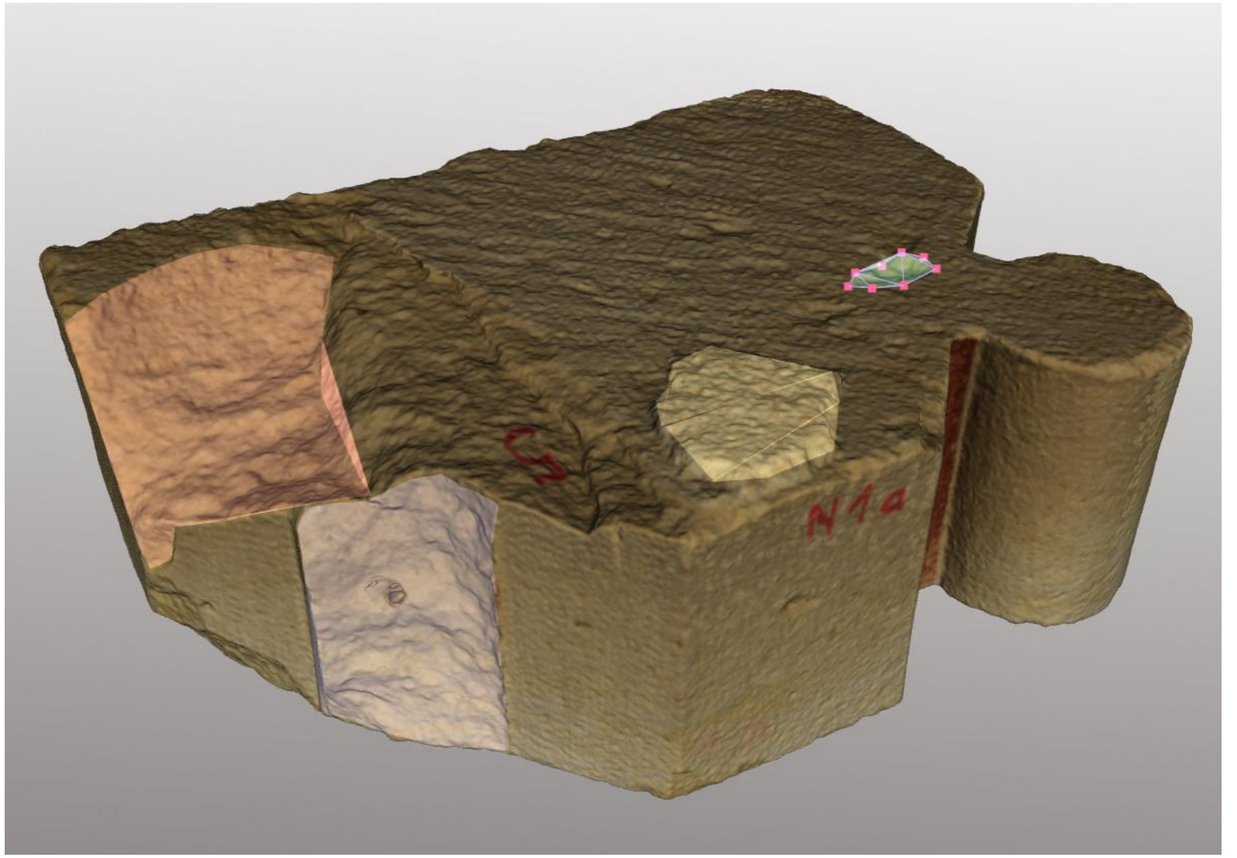




Todo

- More complex annotations: points, polylines, areas
- Adding a dimensioning interface
- More advanced shading, to enhance readability of chisel marks

- Multi-element viewer?



Thanks for your attention

QUESTIONS?