Scanning of the Winged Victory of Samothrace

Louvre Museum- Paris

Q & A

- ✓ Why did the Louvre decide to scan the Victory of Samothrace?
- ✓ Why *Art Graphique & Patrimoine*'s expertise?
- ✓ Process and steps
- ✓ Learnings

Victory of Samothrace's key dates:

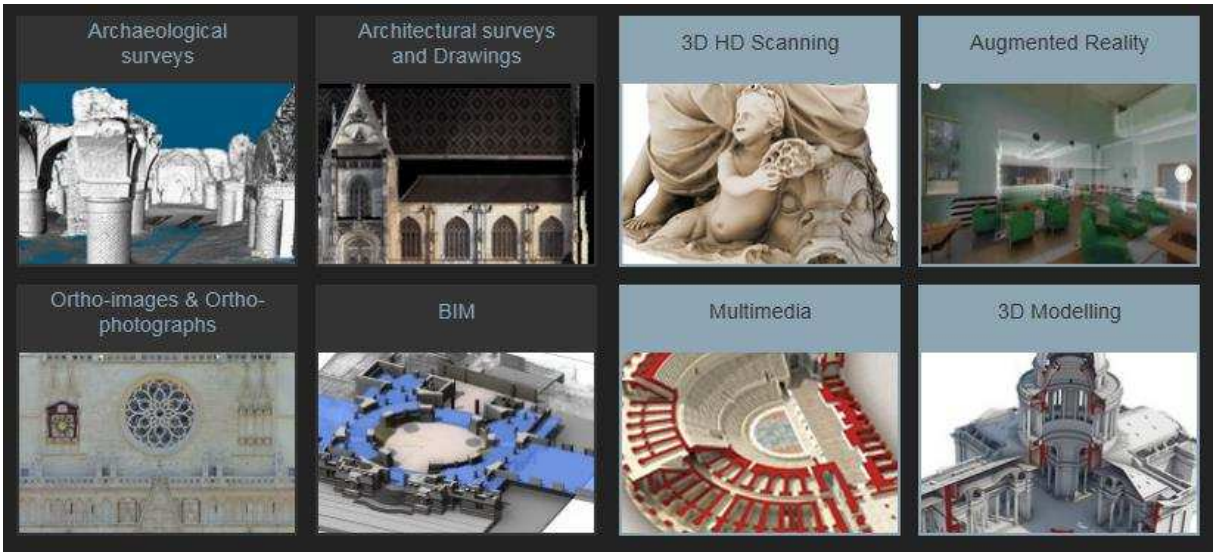
▪ circa 190 BC	Approx. Winged Victory's «date of birth»
▪ 1863	Charles Champoiseau discovered fragments of the Victory on the Samothrace island
▪ 1864	The Victory is sent to the Louvre Museum (Paris) to be renovated
▪ 1875	Additional fragments (including the Victory's vessel) are extracted and sent to the Louvre (1879).
▪ 1932 –1934	Initial restoration campaigns
▪ 2013 – 2014	Recent restoration campaign: ✓ 10 month program + 20 fulltime dedicated international specialists ✓ Investment envelop = 4 M€

A reconstitution try by Ravaisson Mollien in 1879

Try of restitution of the bow during the 1932-1934 restoration campaign and addition of the intermediate cement block

Why was AGP's expertise selected?

AGP is one of French leaders in the use of 2D & 3D digital technologies to the benefit of promotion of cultural heritage



Why was AGP's expertise selected?

Some of our recent projects

The Louvre museum The Etruscan Spouses Sarcophagus – 3D modeling

Mont Saint Michel Complete survey of the Wonder (partially performed from the sky by helicopter)

Philharmonie Paris Scanning of an old instrument

- A long trustworthy relationship with French Cultural and Heritage institutions:
  - Bestiary exhibition for Louvre Lens (2013 - digitalization)
  - Digitalization of the entire Louvre Lens collection (> 200 art pieces)
  - The Sarcophagus of the Spouses digitalization (Louvre Paris)

- AGP's team expertise include heritage restoration, stonecutting and Art History.

- AGP's technical solution was proved to win the Louvre Museum trust in AGP's capacity to lead this highly sensitive project
  - AGP's position as a 3D modelling from point clouds expert
  - Solution with adequate accuracy
  - Joined solutions to solve some of the project specifics (heavy tripod with extensive arm amplitude).

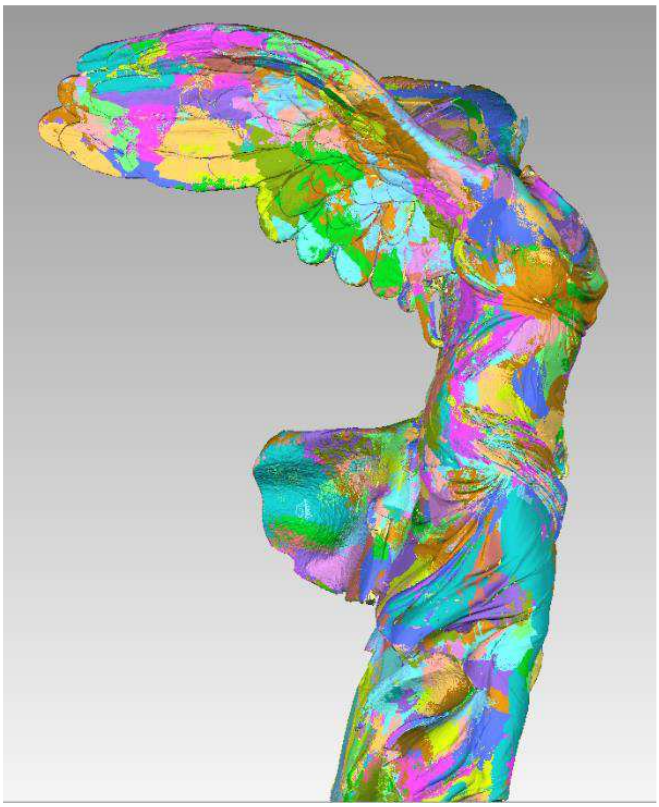
Steps and process:

- On-field work

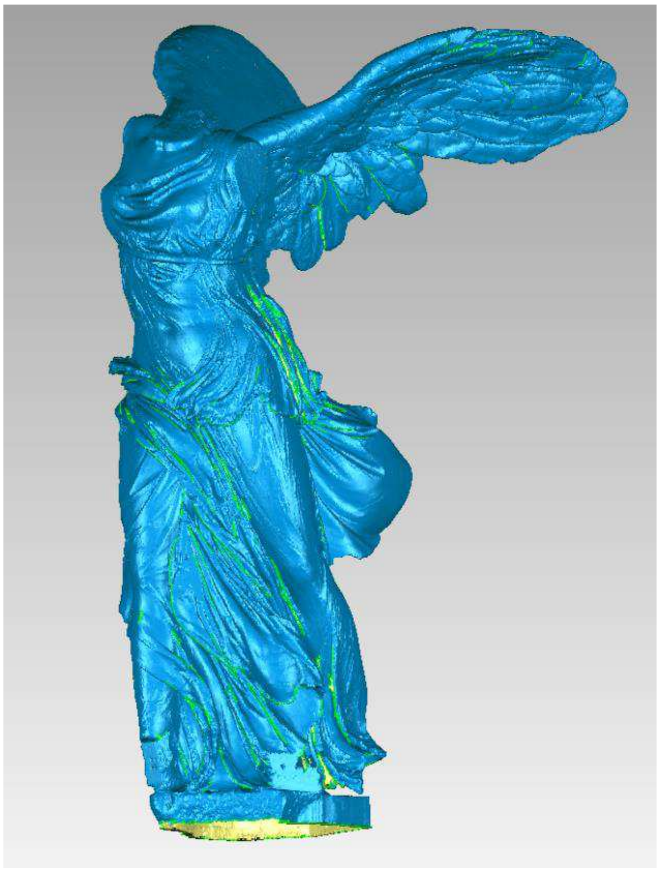
- How could accuracy be maintained at a 4m height: heavy duty stand (tripod) + edge arm amplitude.

- (Unspoken objective) Level of accuracy: sufficient to distinguish original tooling traces on the sculpture

- Point cloud computations

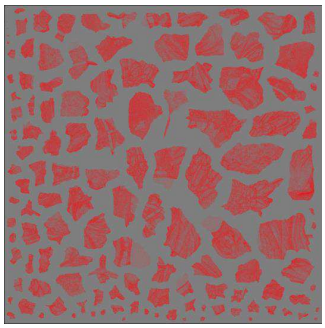


250 Patches for 150 000 000 pts Patches are assembled thanks to geolocalization software within the arm / tripod / bestfit.



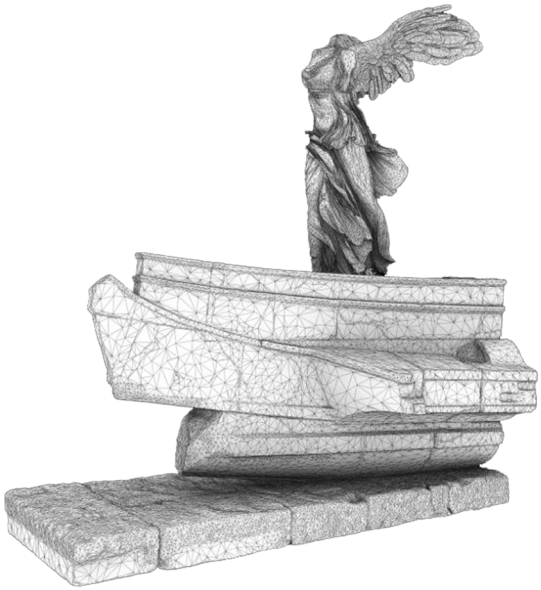
40 000 000 polygons Untextured digital model

- Texturing

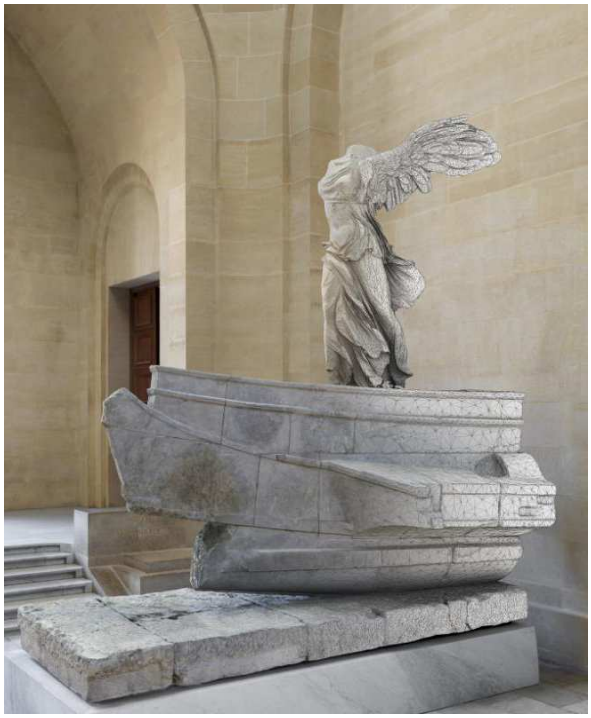


- Final textured digital model -

- In a nut-shell



STEP 1:
Scanning
(Faro Edge ScanArm HD +
Geomagic software)



STEP 2:
Texturing

STEP 3:
Final 3D digital model

Learnings

Why a 3D digital model requested?

- To keep track of current restoration processes for future analyses (and future restorations)
- Communication interactive tool for the public (multimedia program within the Chimneys Room – the Louvre)
- For research purposes (including designing missing fragments)

- Some technical challenges encountered … and solved

- Winged Samothrace height: How could accuracy be maintained at a 4m height: heavy duty stand (tripod) + scanarm amplitude

- Implicit expertise needed in sculpture and stone cuttering (in order to contribute to assemble Winged Victory body and stone vessel in their primary state)

- (Unspoken objective) Level of accuracy: sufficient to distinguish original tooling traces on the scultpure

- «Physical» restoration had to be based on the 3D digital model (eg. additional feathers were designed from existing ones and adjusted based on the 3D digital model)

Technical solution during the project:

- FARO EDGE SCANARM ES
- Arm amplitude: 3,7m
- Accuracy : +/- 35 µm
- Scan rate : c. 45000 pt / s

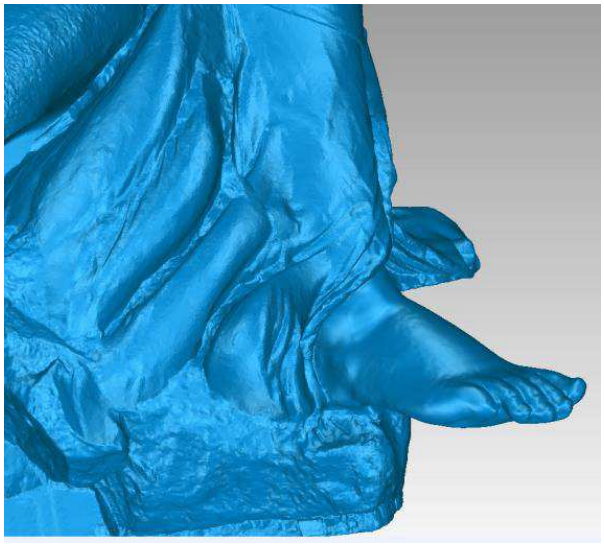
FARO's equipment AGP currently uses:

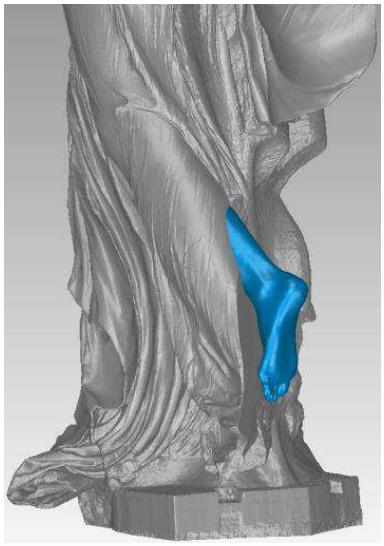
- FARO EDGE SCANARM HD
- Arm amplitude: 3,7m
- Accuracy : +/- 25 µm
- Scan rate : c. 560 000 pt / s

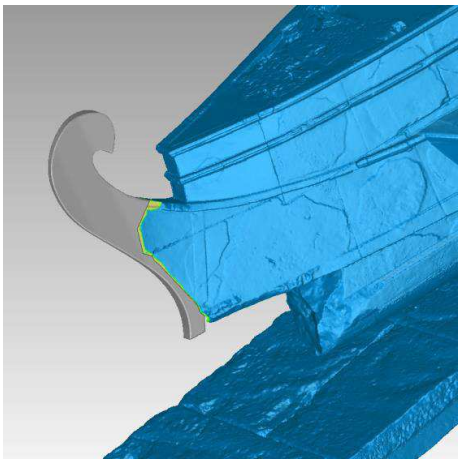
Designing missing fragments

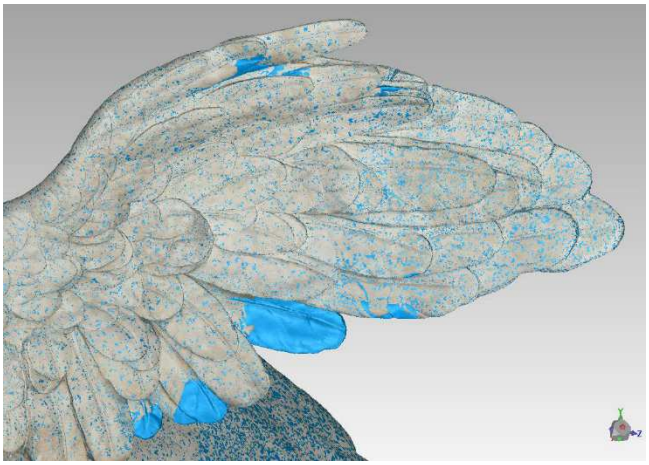
Sources for design:

- ✓ Scientific commitee and historical research
- ✓ Archeological diggings
- ✓ Historical comparisons (eg. Atropos from Large Altar - Pergamon Berlin …)





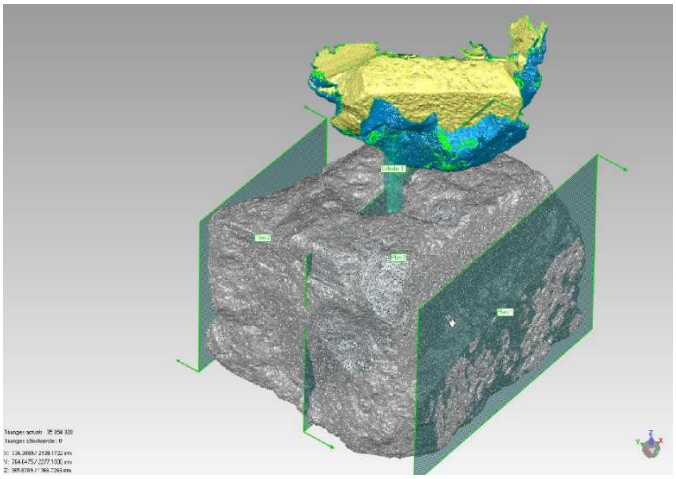




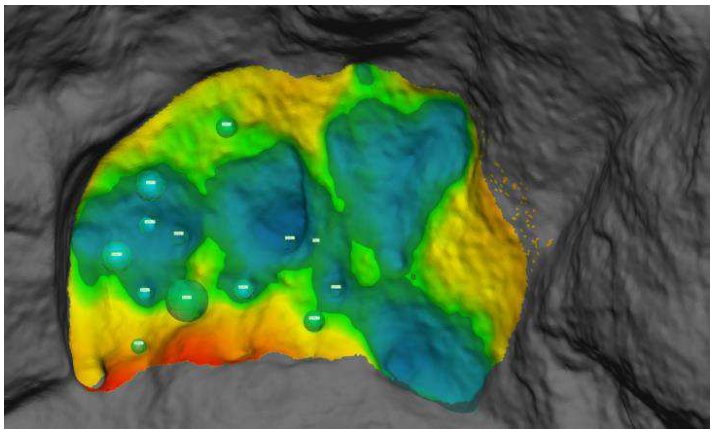
Original tooling tracks

1°

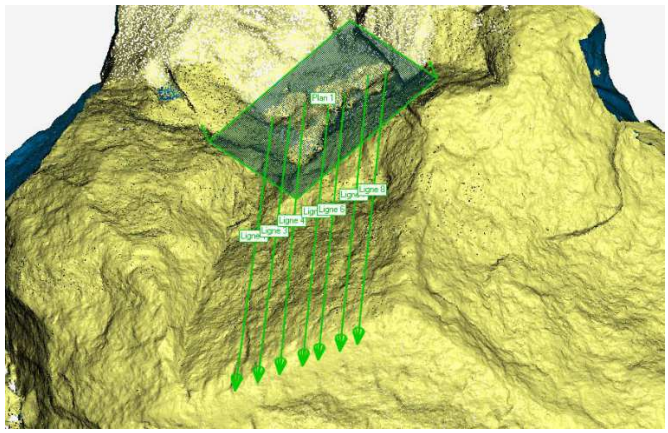
2°



3°



4°



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