

Reconstructing the Ancient Maya site of Cerros with Interactive 3d Graphics

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Problem / Question

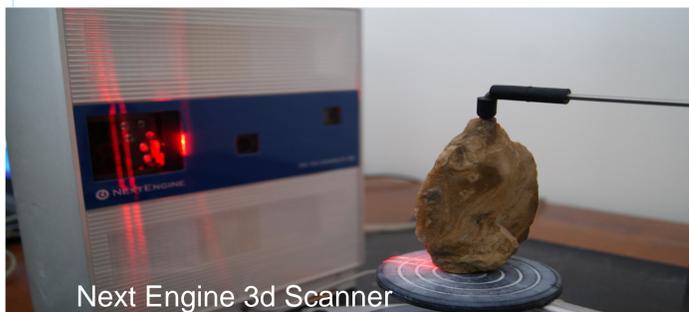
Conventional archaeological maps and diagrams compress data, reduce accuracy, and poorly represent the world of the ancient inhabitants at any archaeological site.

Hypothesis

- Virtual reconstructions and 3d scanning of artifacts can illuminate various facets of the ancient world and ancient life-ways that otherwise would not be possible using conventional methods of mapping or illustration.
- 3d reconstructions are also useful teaching tools and provide a lower barrier of entry for novice learners.

Materials

Materials (detailed list)	Quantity (be specific)
I7 Quad core Processor	1
16 Gb Ram	1
Radeon 7950 GPU	1
Oculus Rift VR Dev Kit	2
Next Engine 3d Scanner	1
Trimble Sketchup Pro	1
Crytek Cryengine 3d Graphics	1



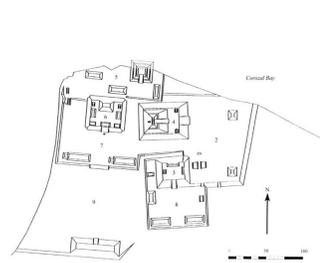
Radeon 7950



i7 Quadcore CPU

Procedure 1: Landscape

Step 1



Begin by tracing the original map to create 2d polygons. Each structural footprint must be detailed exactly as the original archaeological maps illustrate. The coastline is also added as a polygonal footprint.

Step 2



Raise 2d polygons into models. Render the basic details and structural geometries. This information is taken from the original excavator notes.

Step 3



Import into advanced 3d rendering program. At this stage, fine details like stucco, roofing, stairways, environmental lighting and landscape features are added

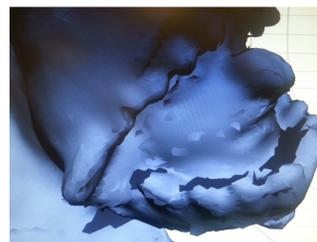
Procedure 2: Artifacts

Step 1



The Nextgen 3d scanner first gathers a set of 3d coordinates with its laser. It then assembles them into polygons which creates a 3d mesh.

Step 2



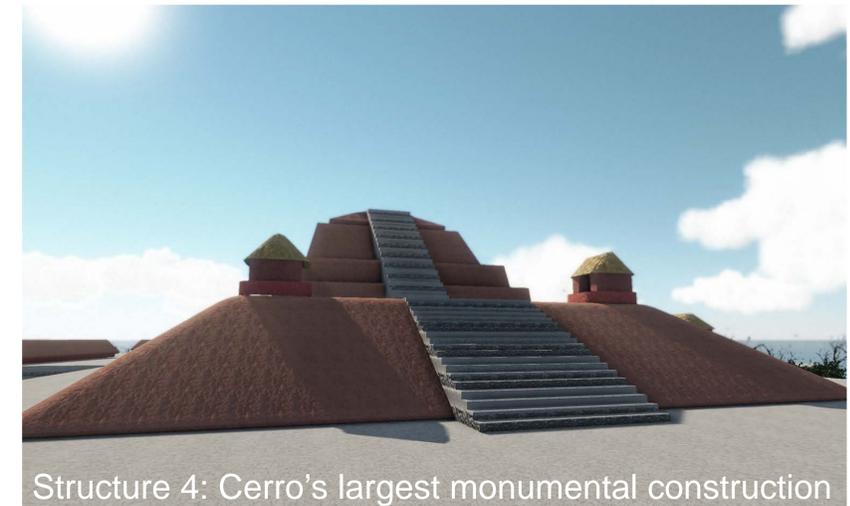
This mesh is then converted into an object that absorbs digital light. Shading is applied so that minute details of the artifact can easily be seen.

Step 3



The software then wraps photo imagery gathered by the scanner's camera around the model retaining it's shading and shape but providing realistic surface details.

Results



- The first monumental construction was built on platform used to view the solar zenith
- The site's largest structure would provided elites with a unique gathering point to view celestial events.
- To test the learning potential, the maps were provided online in UF's Development of World Civilizations class. Students were tasked to explore the ancient world and make their own discoveries.
- 3-D artifacts can be manipulated to study their forms and use or inserted in maps to show their original excavation context.

Conclusion

- Using 3-D interactive graphics helps visualize how over a period of 100 years, the landscape at Cerro dramatically changed. Public ritual spaces gained importance and were developed while becoming controlled by the burgeoning elite class.
- 3d interactive graphics are an exciting, easy-to-use, and successful interactive learning tool.

References

- Aveni, Anthony F., Anne S. Dowd, and Benjamin Vining 2003 Maya Calendar Reform? Evidence from Orientations of Specialized Architectural Assemblages. *Latin American Antiquity* 14(2): 159-178.
- Freidel, D. A. and L. Schele 1988a Symbol and power: a history of the Lowland Maya Cosmogram. In *Maya Iconography*, edited by Benson, E.P and G. Griffin. 44-93.
- Freidel, David A., and Linda Schele 1988b Kingship in the Late Preclassic Maya Lowlands: The Instruments and Places of Ritual Power. *American Anthropologist* 90(3), New Series: 547-567.
- Sketchup 2013 Trimble Navigation Limited 2013
- Cryengine 1 Crytek 2013 www.crytek.com

What's next?

