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Modelling Stonehenge: An interdisciplinary digital approach to 3D interactive storytelling

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TAG 2010

The Theoretical Archaeology Group,
2010 conference at the University of Bristol, UK

Modelling Stonehenge: an interdisciplinary digital approach to 3D interactive storytelling

- Andrew Taylor, Dr. Ertu Unver and Dr. Rupert Till
- School of Art Design & Architecture and School of Music, Humanities and Media
- University of Huddersfield



Taylor, A. Unver, E, Till, R. (2010) 3D CG Stonehenge model. Winter Solstice.



Abstract:

This presentation given at the The Theoretical Archaeology Group (TAG), 2010 conference at the University of Bristol, UK and discusses the advantages of an interdisciplinary Heritage, Art and Science approach to create virtual Stonehenge. The research draws together expertise from fields including 3D modelling, animation, digital video and music technology to visualise the changes on the site using digital archive data and 3D technologies specifically focused on creating a digital model of Stonehenge.

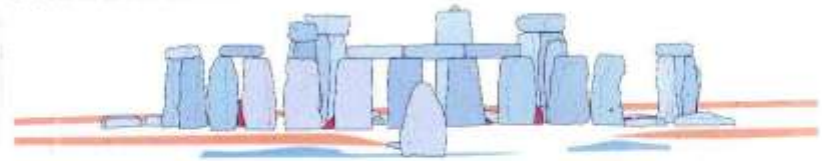


Taylor, A (2009) Sourced : Stonehenge. August

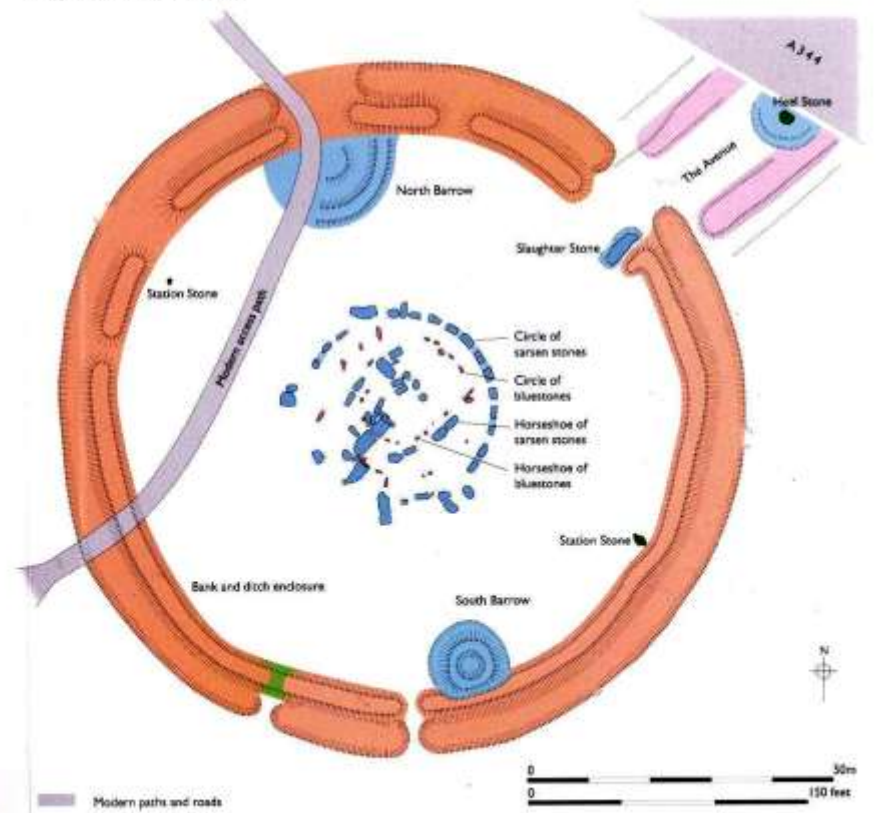


Taylor, A (2009) Sourced : Stonehenge. August

THE STONES VIEWED FROM THE AVENUE



PRESENT DAY STONEHENGE



English Heritage Guidebook (2005) Stonehenge.



Taylor, A (2009) Sourced at Stonehenge. August.

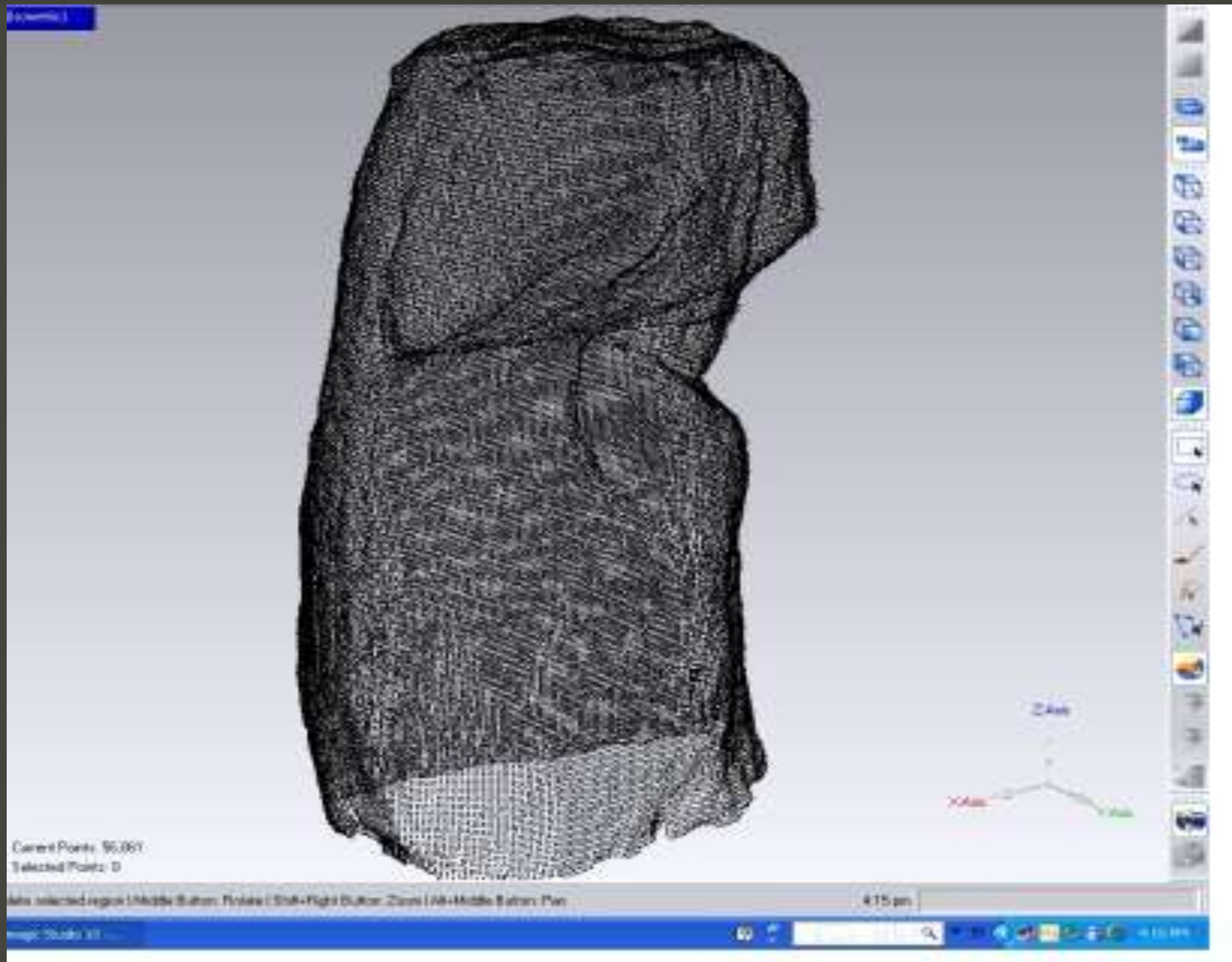
Taylor, A (2009) Sourced at Stonehenge. August



Taylor, A (2009) Sourced at Stonehenge. August.

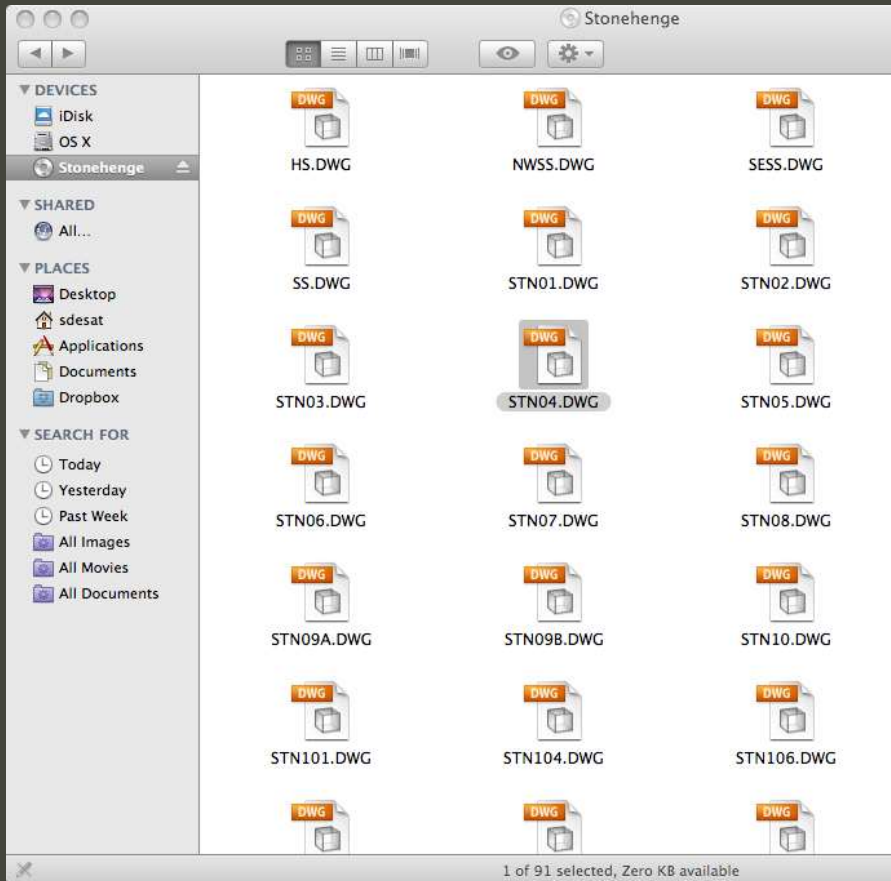


Taylor, A (2009) Sourced at Stonehenge. August.

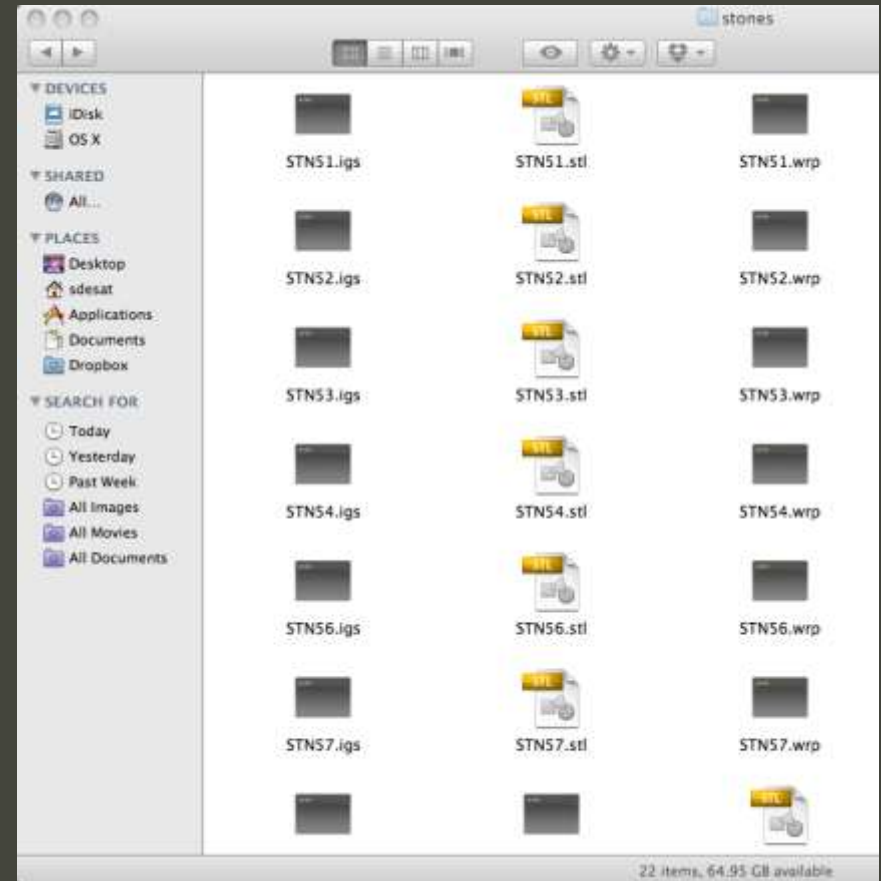


Point cloud data sourced from English Heritage National Monuments Record 2009

Categorizing the Stone scan files.



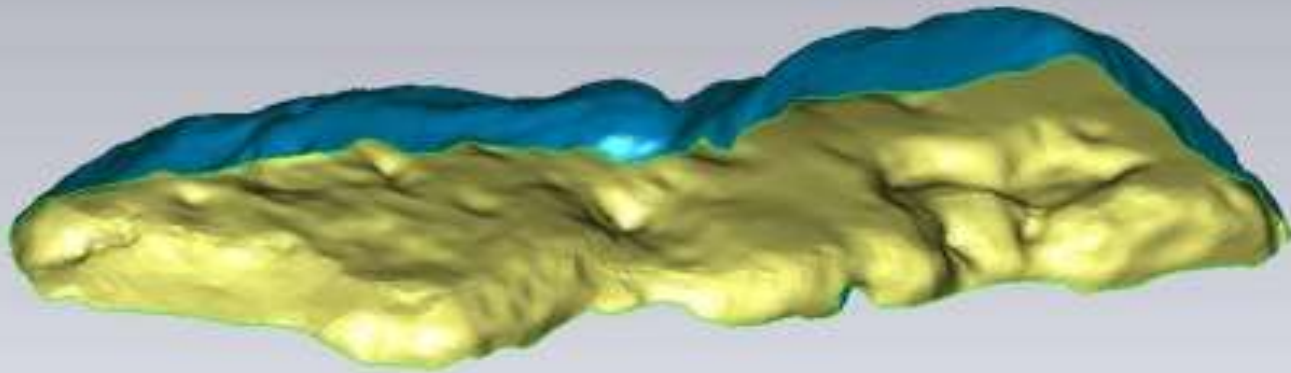
Testing conversion of stone scan files in different 3D software





Inverted image of 3D Point cloud scan data to provide detail

[Isometric]

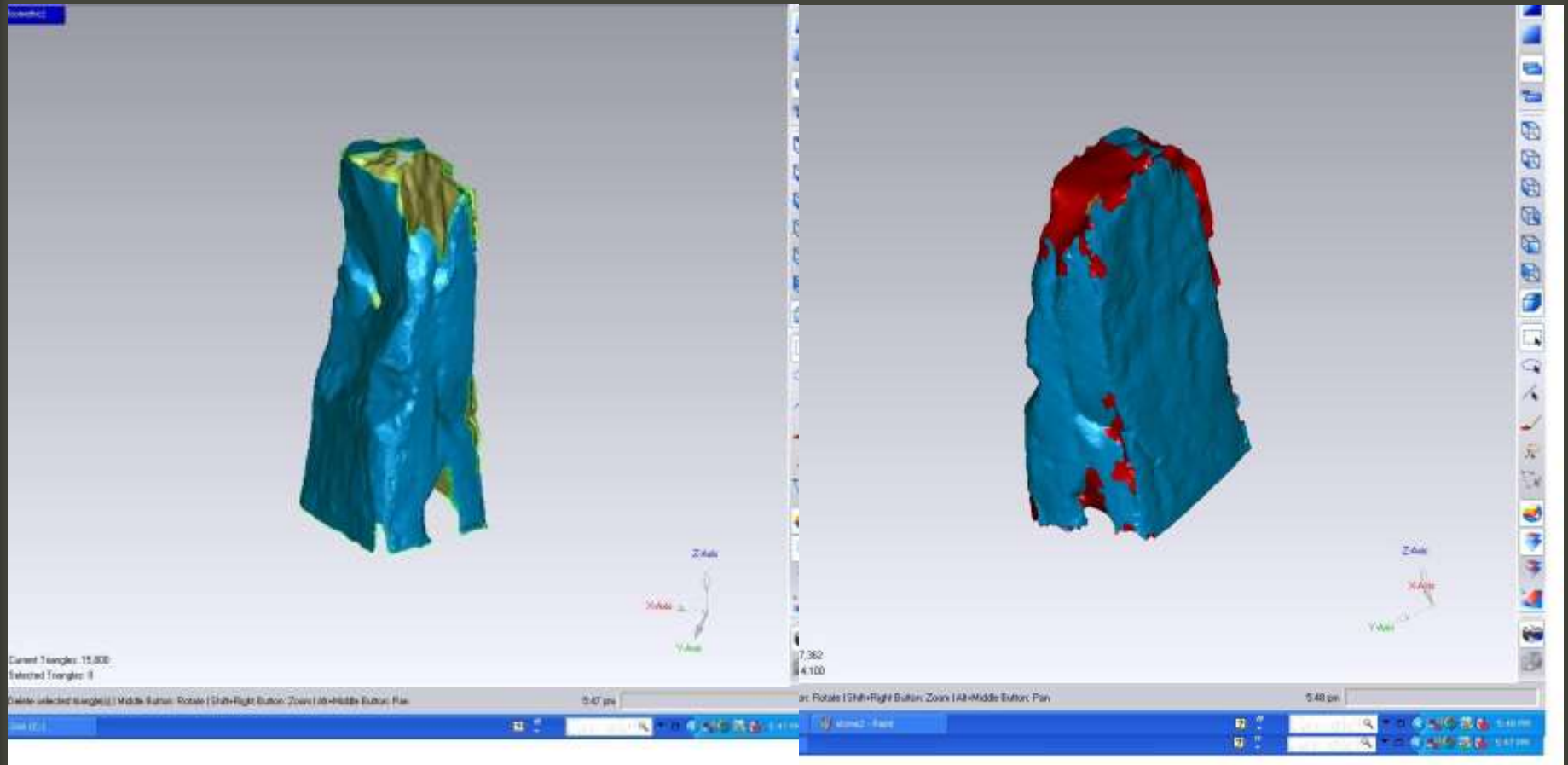


Current Triangles: 51,853
Selected Triangles: 0

Delete selected triangle(s) | Middle Button: Rotate | Shift+Right Button: Zoom | Alt+Middle Button: Pan

3.44 rev

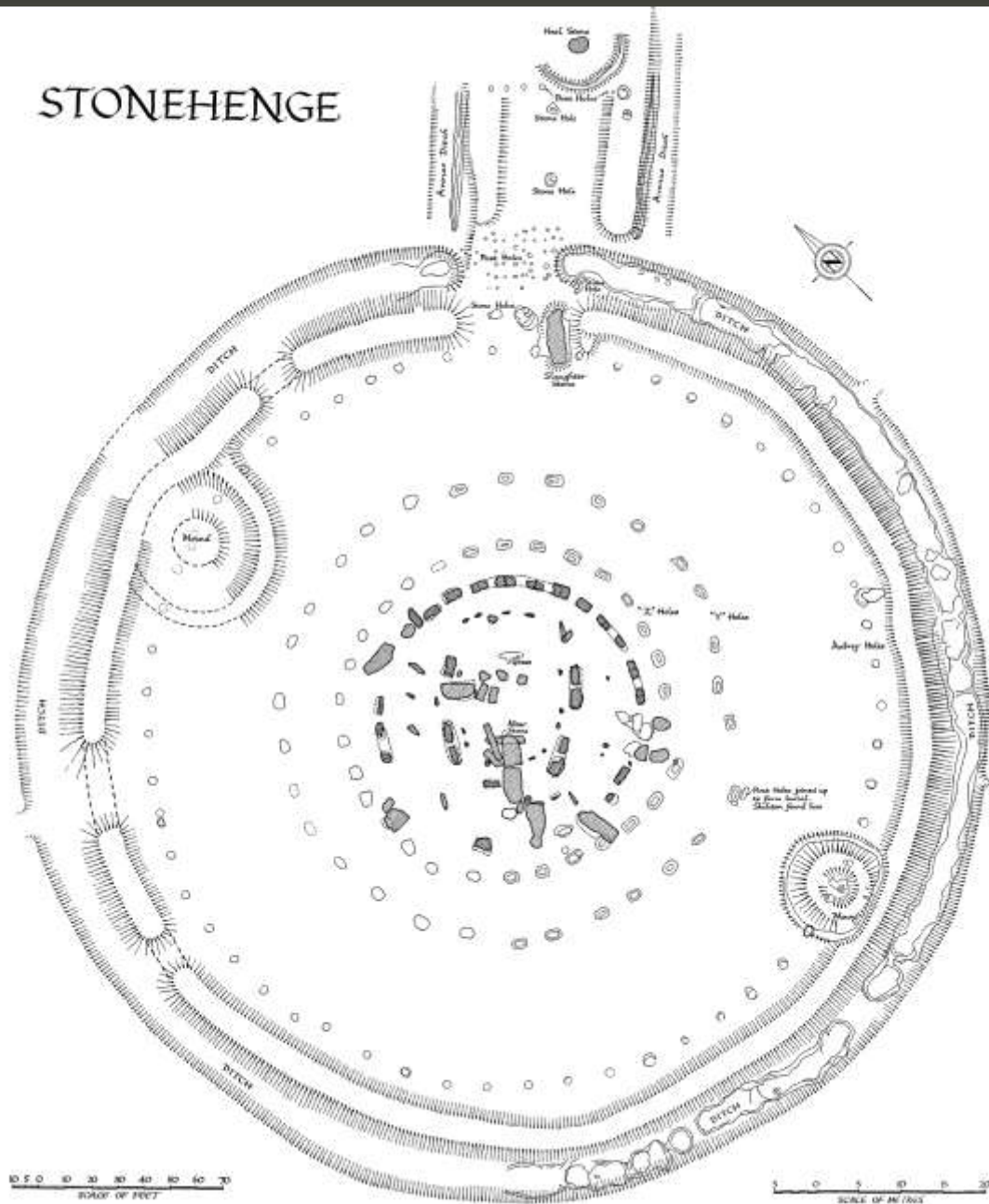
Converted 3D cloud data as a surface in 3D Scanning software .
Surfacing, rebuilding (filling) and merging scan data surfaces to prepare for import into 3D modeling



3D Scanning software used for converting cloud data.

Rebuilding, filling and merging to generate a 3D surface to be imported into 3D modeling & animation software

STONEHENGE



Stonehenge Survey engraving c.1740 Source: English Heritage National Monument Record Archive 2009

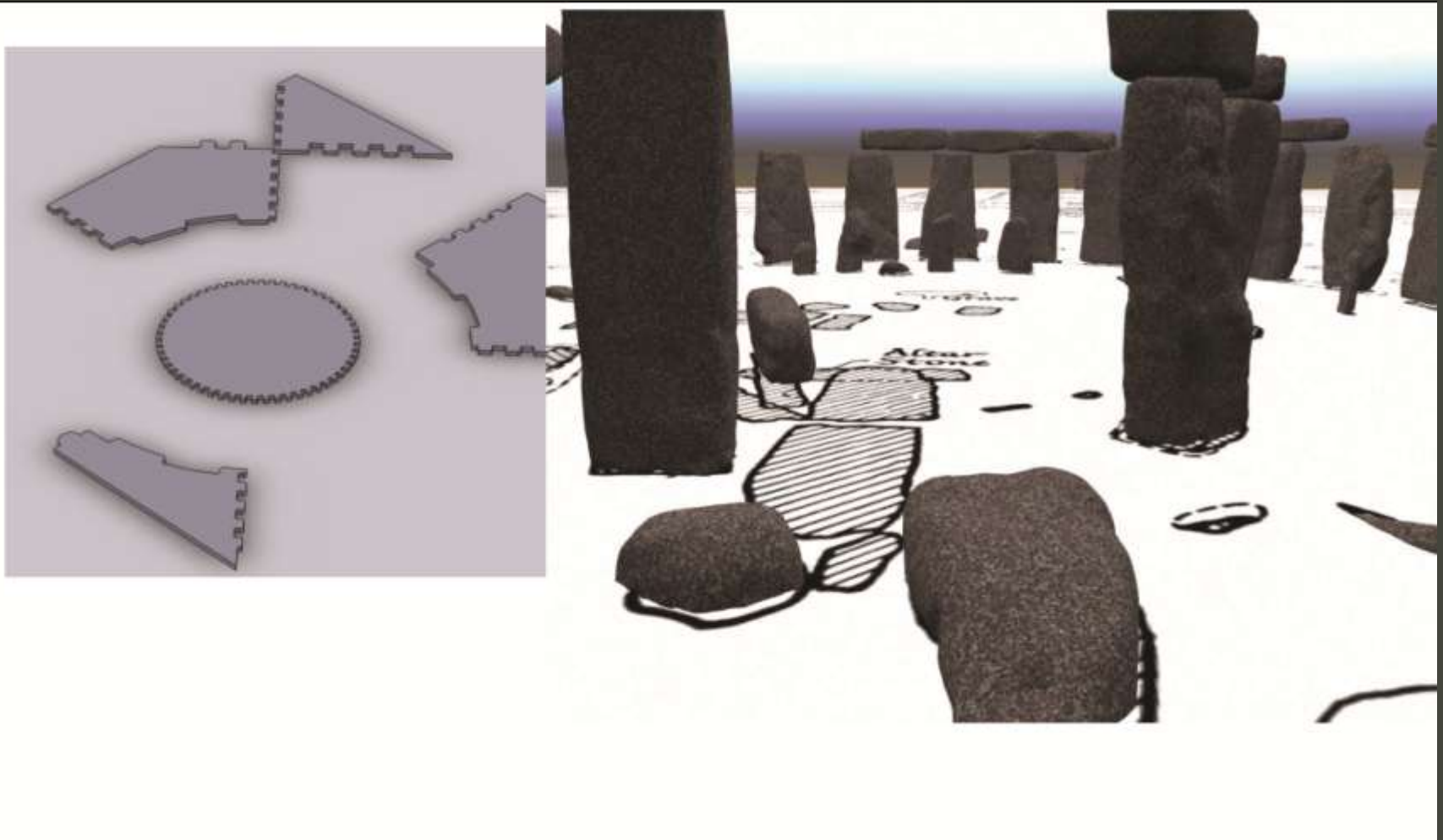


MA 3D Digital Design course, Design Puzzle Project (See *).

Source : www.hud.ac.uk & www.huddersfield3d.co.uk

3D Modeling in Autodesk Maya. Laser cutter to hatch the map on the base and cut the placement holes for the stones

* Unver, Ertu, Taylor, Andrew and Hughes, Daniel (2010) *Poster Paper: Editable Artefact: Stonehenge Megalithic Puzzle Project*. In: University of Huddersfield Research Festival 2010 , 8-18 March 2010, University of Huddersfield



3D Modeling in Autodesk Maya. Laser cutter to hatch the map on base and cut the fittings for stones. Source: www.hud.ac.uk & www.huddersfield3d.co.uk

Quick Find :



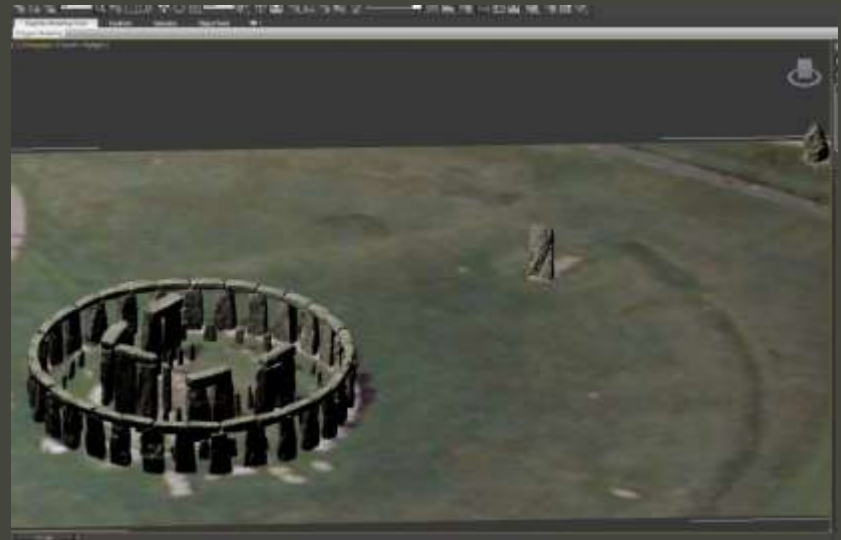
Google Map measuring tools used to select area for LIDAR Data



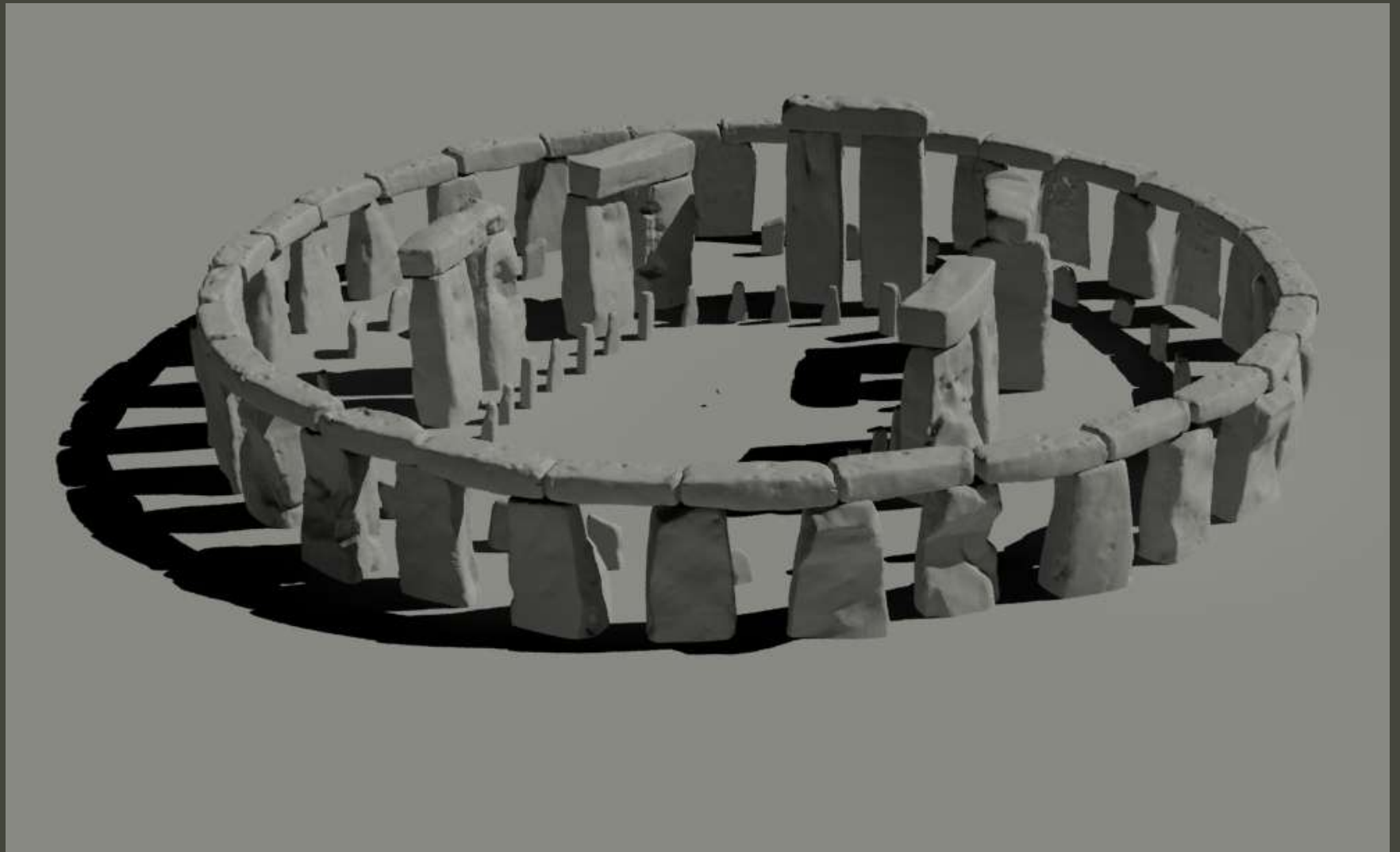
Stonehenge LIDAR data:

Source: Geomatics

Scaling and Positioning



Google Map Satellite data is used to visually evaluate and estimate the scale of the model and the location of each stones



Untextured 3D CG model of Stonehenge phase 3c created by the Huddersfield 3D team

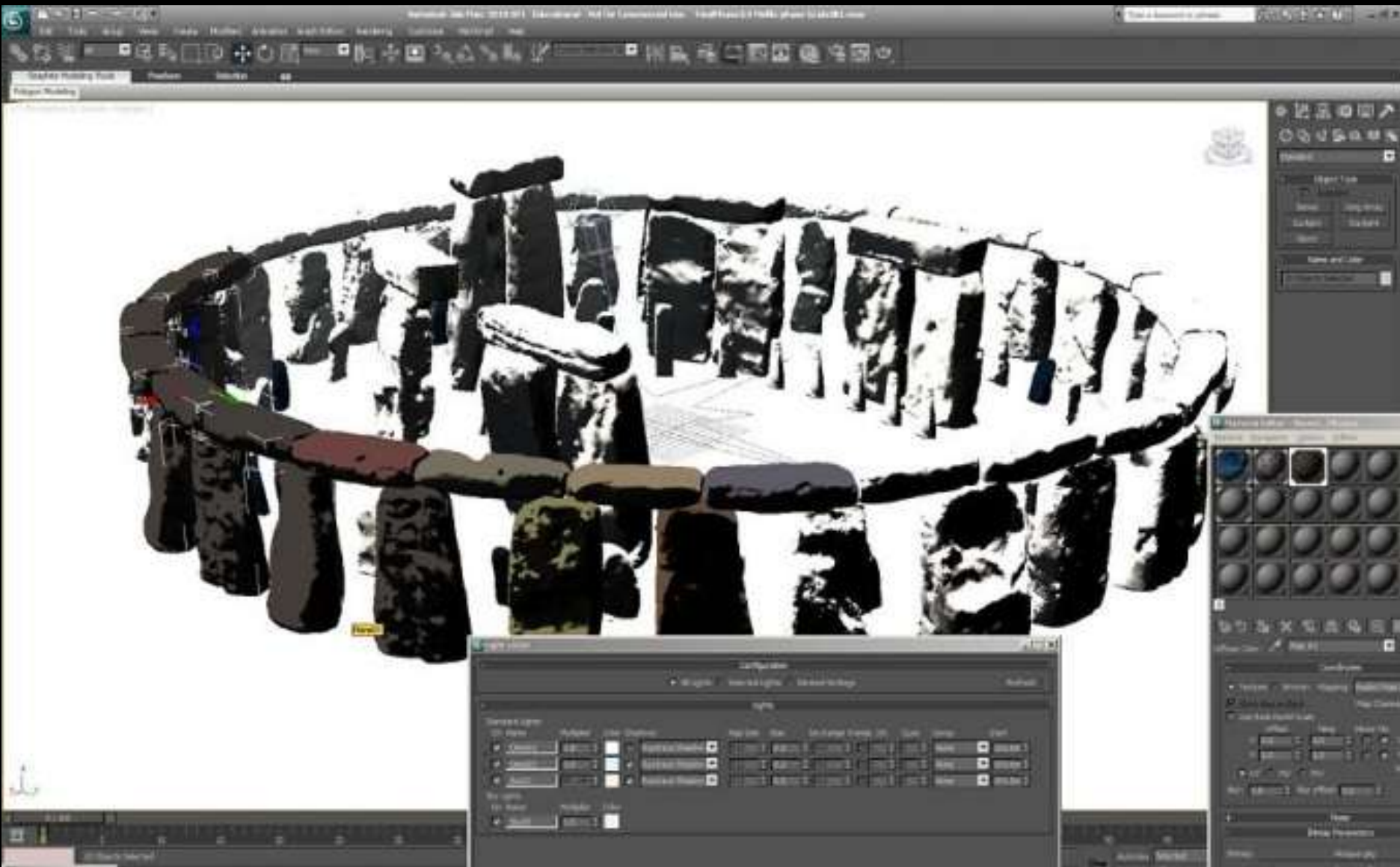


Initial renderings of 3D CG model of Stonehenge



3D CG model of Stonehenge with character test

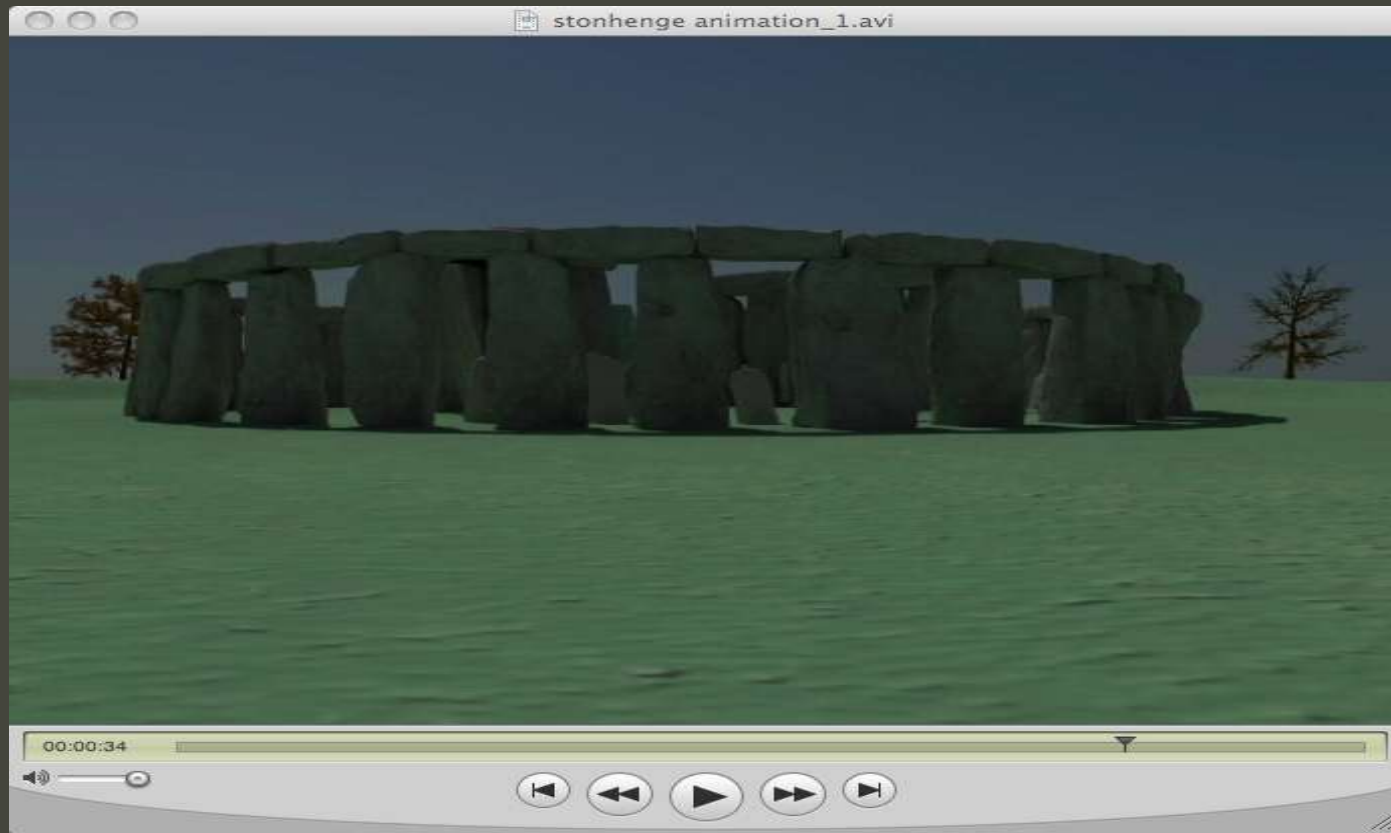
<http://www.youtube.com/watch?v=yqRcgcmWPV4&feature=fvw>



Texturing process of 3D CG model of Stonehenge



Digital photographic images taken during site visit of stones selected & cropped for 3D texture mapping



Animations of Stonehenge phase 3c

<http://www.youtube.com/watch?v=VvE8WUw6-VM>

<http://www.youtube.com/watch?v=uhFn2RTIWQI>

<http://www.youtube.com/watch?v=byCtWcj3ECI>

The advantages of the collaborative relationship between professionals from 3D Product, Textiles / Fashion and Music technology has enabled new discussion within a Archeological theoretical framework, proposing that an interdisciplinary approach to experimental multimedia archaeology is vital for cultural changes in Heritage visitor attractions in the 21st century.

The accuracy of the project has been achieved by using 3D scan surface data of each individual stone sourced from the English Heritage National Monuments Record Archive. The individual stone data were processed; surfaces merged, textured. In a 3D Animation software the sun system including shadows allowed the team to test solstice equinoxes and seasonal/ environmental lighting conditions.

Pre-testing of acoustic actualisations, immersive interactive environments and high-resolution digital video exhibition experiences have been created.



3D Texture mapped Stonehenge model animation.

TAG stonehenge.mpg

3D Digital Stonehenge

University of Huddersfield



Animations of Stonehenge phase 3c visit YouTube:

<http://www.youtube.com/watch?v=VvE8WUw6-VM>

For further information work please see:

- [Poster Paper](#)
- [3D Acoustic Stonehenge Animation](#)

Presented in TAG 2010 Conference in University of Bristol, UK.