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Material shifts in praxis:
Projections of digital humanities embodied within space and place.

Taylor, A., Unver, E.,Benincasa-Sharman, C.

Stonehenge Stone Circle Access: August, 2009 6-7 am. Stone circle access granted by English Heritage.
Field Research & Photography by Andrew Taylor & Jo Harris

Title of Project:
Editable Artefact: Stonehenge Megalithic Puzzle

Background

The project

3D modelling and Virtual Reality in the context of heritage sites and archaeology is a very active field. Photogrammetric and Geomatic data gathering mean that 3D models of sites can be created with ever increasing accuracy to the benefit of generic data sources which can be used for a variety of modelling purposes including lighting, animating, non-destructive testing.

There is a great deal of interest in 3D VR of archaeological sites for education and promotion. In simple ways it allows the public who pay for the archaeological to experience the heritage site without the negative effects of visitor footfall. The intention is to draw attention to the capabilities of digital 3D tools to extract and reconstruct data from the archaeological record. This project will offer several opportunities to learn about the capabilities of software and 3D methodologies. The vehicle for this process is the workflow of design and the production of a scale model puzzle of Stonehenge.

The model

The model is intended to be accurate enough to be archaeologically interesting and useful. (e.g. for testing theories.)

Background

Stonehenge is a stone Age megalithic construction that evokes wonder and curiosity in all who come to know it. Built on a site that has signs of use some over 10,000 years, the Stone Age monument was begun around 3000 years BC and was in use until the Bronze Age when cremations and other burials were erected. Within the ditch enclosure are remains of cremations and burials.

The limited current dates were built 2000 years later or the same time as the three henges in Ireland mentioned. The largest stones are in the horseshoe and circle are sarsen stones. Sarsen is a silicon based sandstone. It is very dense, hard, and impervious. Its hardness is the reason it survived so well.

The circles were further reconfigured during this phase so the site axis was aligned to the east. The avenue is oriented towards sunrise on the summer solstice. The Heel Stone was once part of a pair forming a gateway, from the centre of the circle you could look through the entrance and see the sunrise frames.)

The real puzzle is what was it built for?

Many theories have been put forward. Geoffrey of Monmouth, a Britons chief. There are many theories. The monument represents an incomplete proposition; the site compelled to try and complete it's embedded narrative. The puzzle designed aims to engage with people in a way of focusing attention onto the monument's significance in the landscape.

The design focus was to make a puzzle that doesn't necessarily spell out the answer, but which leaves room for the mind to experiment and speculate. The puzzle is a tactile, visual, and cognitive puzzle. The puzzle is to connect to the primal curiosity that the monument inspires.

Process

The Geomatic scan data (Laser scans) of the stones came from a recent survey by English Heritage and hand drawn images of 1920's and sourced from the English Heritage archive. The Scans are point clouds which have no surface or volume data. Each stone has up to 4 clouds associated with it. The clouds are then meshed and edges filled. Unwanted artefacts are filled. The products of the wrapping process are files containing surface polymesh and, 2.5, meshes. The Meshes were imported into Maya (3DSMAX would also be usable) for layout and design. Meshes we re reduced in polygon count for handleability. These stylized 2.5, meshes were Output from Maya using a script and tested by using solidworks diagnostics.

A solid modelling package was used to make manufacture parts of the puzzle. The dimension driven nature of the software made it useful for scale registration. Elements were exported to polygon modellers and vector drawing software for design purposes.

Conclusions

Drawing on a broad skill set and experience in including Product design, Sculpture, Renaissance Digital modelling and Fine arts, the case of Stonehenge acted as a vehicle to explore the potential usages of 3D digital design and fabrication tools.

Within this exploratory process some of the practices adopted were experimental and there was a deliberate use of software in ways that P wasn't intended for. The problems generated by this, or rather the solutions developed have greatly extended understanding of the relationship of 3D modelling methodologies and the manufacturing output devices.

The sophisticated puzzle based on the stonehenge stone with a high degree of fidelity to the "original" stone forms has been designed and produced. Scale model. The 3D model components and the 2D graphical components produced by the process were then. translated to real world objects using a number of software. for. produce 3D Renders, 3D printing and laser cutter technologies. A number of file types were used and considerable attention was given to working around the incompatibilities in the standards.

The 3D modelling process is a labour intensive process, but it produces an editable artefact. The 3d files can exploded at multiple levels. This makes the uniqueness of a finished form a casual matter (detail)) a snapshot of the stone in a particular configuration.

Instances of the various file types uses were created at each level of design, translation, each with their own history. This means that the process by which the various outputs are made is traceable and editable and Can be interpreted for further exploration.

© Research team: Daniel Hughes, MA 3D Digital Design, Dr Eric Unver, 3D Design, Andrew Taylor, Textiles/Fashion Design, School of Art, Design and Architecture, University of Huddersfield

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In: University of Huddersfield Research Festival 2010, University of Huddersfield. 8-18 March 2010,

The team are interested in creating experimental multimedia archaeology artworks that provide a phenomenological exploration of archaeological sites. They set out to create an accurate digital replica of Stonehenge as it may have looked several thousand years ago. They d ree on Johnson's ideas of ecological understandings of perception, in which we perceive through a combined set of looking and listening, and thus want to produce works that have sonic content as well as visual imagery. Many archaeological reconstructions of Stonehenge have been made, but these have tended to focus on use generic music and sound. This work takes a different approach, illustrating the dramatic sound effects possible at Stonehenge.

Research has shown that Stonehenge has complex acoustic effects present. Aaron Watson's work with David Keating showed that the current site has complex acoustic effects, including standing waves and filtering. However this is only part of the story. Half of the stones at Stonehenge are missing or fallen. This project aimed to create an accurate digital model of what the last phase of Stonehenge looked like when all the stones were present. Digital modeling was also used to create an accurate acoustic model of the sound of the space.

THE FILM

The project adapted a number of people locations from Gustaffer Nils, where they watched the sun rising in Stonehenge. Walking up the avenue, to watch the sunset as we approached the stones, the sun slowly sinking behind the Heel Stone, the light changing, the mood, and one experience what may might have seen and felt at the appointed hour.

The light is dim as sunset approaches. It is the brightest day of the year. The sun has been falling away, the moon, the night, the darkness has been coming in the battle of the skies. Our today is a day of hope, a day marking the return of the sun (late Christmas) would mark the turn of the year. The sun is low in the sky, the light is golden, the shadows are long and the mood is one of the dance of day. As we ascended these stones became clearer, changing as we approached them.

Stonehenge comes into view up on the rise as we walk up the avenue, the ritual approach to the site. We walk to the heelstone, passing its lone energy arrows, before walking up to the ditch circle. Entering the circle the sound changes, the echoes, enclosed by a ring of Ditter. It is too early for the birds, the air is still, the light is golden. We walk to Hoar corner, leaving the inner circle to find marks the ritual approach to Heels.

We approach the Heels of the circle, and the sun spirit rises up into the sky signing another day dance. Finally we come back down to earth before leaving the site day come.

"This short 3D film tries to provide an immersive experience, in order to allow us to consider what it would have felt like to be at Stonehenge in prehistory."

The making of it

Stonehenge seems to be some the dreamers, the poet and the lyrics, and Wordsworth's research suggested that a reason ritual might involve trance, some kind of journey, a "Dance" to transcendental state, a state induced by music and dancing. This film is, with, concepts of Stonehenge as a site of dancing, music, again they have spirits in Stonehenge's sarsen stones.

We broke from stone circle build to the space that Stonehenge was often filled with the participants sound of music and dance. The Celtic Festival, Glastonbury, and Knap Rock traditional music, cultural Rituals music is often based on physical activities and work. that trance is a common in ancient Rituals. We think that echoes in the stones, the echoes of the dance, the echoes of music (Tilliard), in time with echoes, and the the space adds a dimension to the music, the echoes, the echoes of the ritual (ethnographic dancing at such a place ---- or Celtic Festival rates of a very similar speed, acting, entertainment and ritual, Knap Rock, Glastonbury, Stonehenge) We work with this echoes in the space (stone) and, so, carry too echoes of the dance, the echoes of the music (the echoes audio fact), and a sound like thunder, darkening that echoes and echoes and echoes and echoes. This is the echoes the archaeologist thunder and Sound in as many cultures, including that of those who carried his Neanderthal symbol on Stonehenge's sarsen stones.

We therefore created a percussive sound playing inside Stonehenge, and illustrated how this sound would change as one approached the space using modeled acoustic effects. The sound was created using percussion, bones, and a bone whistle, based on the Neanderthal bone whistle found in Slovenia by archaeologist Simon Hoare. This substitute Flint cobble clay drum replicas, as Stonehenge we found that these small hand drums Andrew +++ accounts of the space bed. Other percussive sounds: ocipes, breathing, footsteps, a cow horn, bullroarer and a replica of the Willsford bone flute also feature.

This sound was integrated with a digital 3D model of Stonehenge that had been made using 3d laser scans from English Heritage archives, we used existing stones to replace the fallen and missing ones, raising fallen stones and creating a realistic digital 3D model of the original Stonehenge site. High quality recitations from Stonehenge were made using a Neumann TLM 103 microphone, Focusrite Saffire Pro 24 DSP audio interface, and Logic Pro 9 software. These were then edited in Logic, LEXR serial laser scan data, so that during animation of the model, the ground contours are accurate. A digital film was then generated, putting together sound and image.

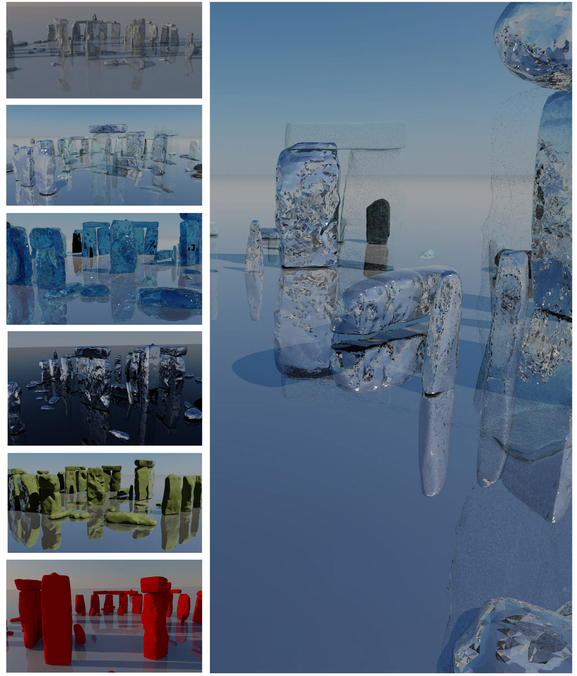
Till, Rupert.,Taylor, Andrew., and Unver, Ertu (2011). Stonehenge Ritual Sound.
In: Palaeophonics: a live multimedia performance event, George Square Theatre, Edinburgh. 27 May 2011

HYPER NATURALISM & SIMULACRA IN STONEHENGE ART

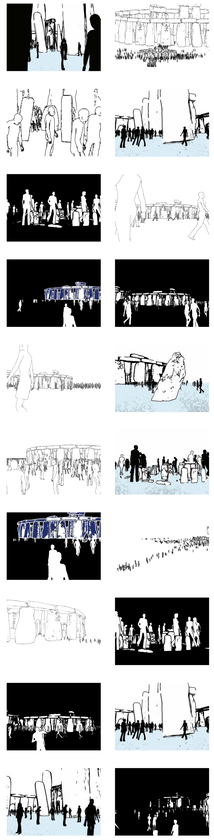
Unver and Taylor have explored digitally a methodology that has interrated makers and observers for decades. In the 1930's Walter Benjamin in his seminal discussion of Art in the Age of Mechanical Reproduction worried about the destruction of authenticity and aura that reproductions of the real created for the viewer, whilst acknowledging that this reproduction allowed artefacts to be dislocated from their original ritual purposes and therefore making the once scared more accessible.

In 1977 Roland Barthes liberated the emphasis of construction and understanding of knowledge from the makers to the spectator by proposing that the author (in the case of Stonehenge this is a point for discussion) was no longer the "god" that should be sought out to explain the works on offer. In fact, once the understanding of a text is placed with the viewer he suggested that to try to impose a final reading of an object is ineffective. Baudrillard believed that when a reader seeks out an image of the real (at the Stonehenge monument there is a physical barrier in place between the tourist and the object) the more vast the schism between a lived experience. Unver and Taylor, have helped to reinstate an immersive experience through the Stonehenge Virtual Reconstruction research. Up for debate is whether their output really is another example of "technological inertia" or whether, because digital life and real life are now so closely interthined they have enabled new spectators to get up close and personal with these stones.

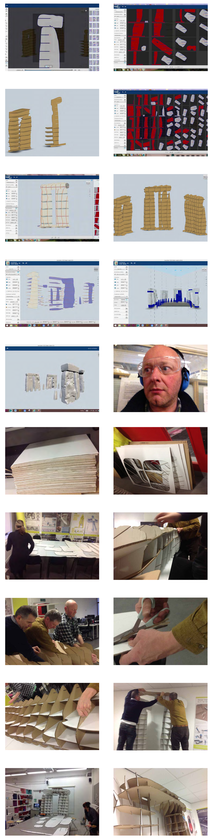
[1] Roland Barthes. Image Music Text [1978]. [2] Jean Baudrillard. The Consumer Society [1970]



Taylor, Andrew., Unver, Ertu., Benincasa-Sharman, Caterina. (2012). Hyper naturalism and simulacra in Stonehenge art.
In: 4th International Euro-Mediterranean Conference (EuroMed 2012), Cyprus, 29 October - 3 November 2012.



POPULATION



FABRICATION

INSTALLATION

History has shown that, by their actions, people can manifest and model monumental architecture by physically sculpting extraordinary materials. These people have sculpted and fabricated worlds that remain powerful and compelling experiences even in modern times.

People have created ritual spaces in structures like Stonehenge for millennia and these places have contributed to shaping of our interconnected global societies, our material culture and our wider human environments.

Stonehenge was an immense act of communication and collaboration – social, political, and religious collaboration. It was imagined as a ritual instrument; for hosting performances or rituals and designed as a place where collectively people came together to transform ideas, perceptions and behaviour of those who chose to populate and experience ritual sites.

The research presented in the poster for the Materials Transition Exhibition at Transition conference explores tools and technologies for material transformation and transcendence in Textiles and Surfaces. Having previously collaborated on an AHRC/ESPRC funded Stonehenge 3D digital acoustic modelling and visualisation project.

The researchers from the School of Art, Design & Architecture continued to experiement with the 3D data from the heritage site in Wiltshire, England, as the setting for these new experiments in teaching and learning to further explore digital fabrication, space and place theories and physical installation.

The researchers tested various software, free fabrication apps and 3D character animation tools to explore digital fabrication using cardboard to compose and construct 2D and 3D simulations of this well-known built environment. By using dedicated spaces, fabricated physical models integrate with 3D visual projection a new combination of art and technology was tested live with students.

The 2D and 3D simulations that the team envisioned facilitate a more Kinaesthetic experience of learning where students are able to walk around, draw upon and interact with theoretical concepts and card-board stones.

This evolving research demonstrates that these animations and fabrications have the potential to be used together as a catalyst to explore a number of place identity and cultural built environment concepts for art, design and architecture students at undergraduate and postgraduate level.

COLLABORATORS AND CONTRIBUTORS:

Credits for co-support and contributions in each phase.

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Primary investigator for AHRC/EPSRC joint funded science and heritage programme research cluster, acoustics and music of british prehistory research network. soundsofstonehenge.wordpress.com

English Heritage: The Historic Buildings and Monuments Commission.
Point cloud data, Survey Maps, Historic data, Plan drawings, Illustrations.

Geomatics Group: Environment Agency, National operations. Arerial LIDAR (Light detection and Ranging) data.
www.geomatics-group.co.uk

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