FIRST DRAFT

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THE LONDON CHARTER

FOR THE USE OF 3-DIMENSIONAL VISUALISATION IN THE RESEARCH AND COMMUNICATION OF CULTURAL HERITAGE

PREAMBLE

While 3-dimensional visualisation methods are now employed in a wide range of contexts to assist in the research and communication of cultural heritage, it is now recognized that, to ensure that such work is intellectually and technically rigorous, and for its potential in this domain to be realised, there is a need both to establish standards responsive to the particular properties of 3d visualisation, and to identify those that it should share with other methods.

Numerous articles, documents, including the AHDS Guides to Good Practice for CAD (2002) and Virtual Reality (2002) and initiatives, including the Virtual Archaeology Special Interest Group (VASIG) and the Cultural Virtual Reality Organisation (CVRO) [et al.] have underlined the importance of ensuring both that 3d visualisation methods are applied with scholarly rigour, and that visualisation-inclusive research should accurately convey to users distinctions between evidence and hypothesis, and between different levels of probability.

This Charter aims to define the basic objectives and principles of the use of 3d visualisation methods in relation to intellectual integrity, reliability, transparency, documentation, standards, sustainability and accessibility.

It recognises that the range of available 3d visualisation methods is constantly increasing, and that these methods can be applied to address an equally expanding range of research aims. The Charter therefore does not seek to prescribe specific aims or methods, but rather seeks to establish those broad principles for the use, in research and communication of cultural heritage, of 3d visualisation upon which the intellectual integrity of such methods and outcomes depend.

Although the objectives and principles of this Charter may equally apply to the use of 3d visualisation in other contexts, such as in the creation of mass entertainment products, its main focus is upon research into cultural heritage and the communication of such research.

The Charter seeks to enhance the rigour with which 3d visualisation methods and outcomes are used and evaluated in the research and communication of cultural heritage, thereby promoting understanding of such methods and outcomes and enabling them to contribute more fully and authoritatively to this domain.

OBJECTIVES

The London Charter seeks to establish principles for the use of 3d visualisation methods and outcomes in the research and communication of cultural heritage in order to:

Provide a benchmark having widespread recognition among stakeholders.

Promote intellectual and technical rigour in such uses.

Enable appropriate evaluative criteria and methods to be determined and applied.

Stimulate debate on methodological issues.

Offer a robust foundation upon which specialist subject communities can build detailed standards and guides.

Ensure appropriate accessibility and sustainability strategies to be determined and applied.

Enable 3d visualisation authoritatively to contribute to the study, interpretation and management of cultural heritage assets.

PRINCIPLES

Principle 1: Subject Communities

The aims and objectives of this Charter are valid across all domains in which 3d visualisation can be applied to cultural heritage. Related specialist subject areas should therefore adopt and build upon the principles established by this Charter.

1.1 Specialist subject communities will need to develop more detailed principles, standards, recommendations and guidelines to ensure that use of 3d visualisation coheres with the aims, objectives and methods of their domain.

1.2 The adoption of and compliance with the principles of this Charter, across related specialist subject domains, will ensure that its broadly shared aims and objectives can be met.

Principle 2: Aims and Methods

Numerous types of 3d visualisation methods and outcomes exist, and can be used to address a wide range of research and communication aims. A 3d visualisation method should normally only be used to address an aim when it is the most appropriate available method for that purpose.

2.1 It should not be assumed that 3d visualisation is the most appropriate method of addressing all research or communication aims. Varied research and communication aims may demand the adoption of a variety of methods, including a variety of types of visualisation. 3d visualisation should not normally be used when other methods would be more appropriate or effective.

2.2 A systematic evaluation of the suitability of methods to each aim should be made, in order to determine whether some form of 3d visualisation is the most appropriate method.

2.3 A variety of available 3d visualisation methods should be carefully evaluated to identify which is the most likely to address each given aim. Consideration should be given as to whether the outcomes should be photo-realistic or schematic; high or low in detail; representations of hypotheses or only of the available evidence; static or interactive; "impressionistic" or "accurate". It is important to note that none of these options is inherently "good" or "bad"; rather, each proposed method should be assessed as to whether it is fit for the intended purpose.

2.4 It is recognised that, particularly in innovative or complex research contexts, it may not always be possible to determine, *a priori,* the most appropriate research method. However, the choice of method should be made carefully, based on the best available knowledge and experience, and be reviewed periodically, resources permitting, as the research process progresses.

2.5 The rationale for the choice of research method should be recorded in project documentation.

Principle 3: Sources

In order to ensure the intellectual integrity of 3d visualisation methods and outcomes, relevant sources should be identified and evaluated in a structured way.

3.1. Sources are defined as all information, digital and non-digital, considered during, or directly influencing, the creation of the 3d visualisation outcomes.

3.2 The evaluation of sources should be attentive to potential historical factors that may have impacted on primary sources.

3.3 Careful consideration should be given to the aims and contexts for both visualisation creation and dissemination in order to determine whether, or to what extent, the sources considered and the rationale for their interpretation, should be published with the 3d visualisation outcomes. (See Principle 4.)

Principle 4: Transparency Requirements

Sufficient information should be provided to allow 3d visualisation methods and outcomes to be understood and evaluated appropriately in relation to the contexts in which they are used and disseminated.

4.1 It should be made clear what kind and status of information the 3d visualisation represents. The nature and degree of factual uncertainty of an hypothetical reconstruction, for instance, should be communicated.

4.2 The type and quantity of transparency information will vary depending on the aims and type of 3D visualisation method and outcome being used, as well as the type and level of knowledge, understanding and expectations of its anticipated users. Transparency information requirements may therefore differ from project to project, or at different phases within a project.

4.3 Transparency information should be provided using the most appropriate available means and media, including graphical, textual, video, audio, numerical or combinations of the above.

4.4 Unless 3d visualisation can be evaluated independently of the authority claims of its creators, its significance as a research method or outcome remains indeterminable. Frequent opacity regarding the relationship of sources to outcomes makes 3d visualisation anomalous among research methods, and may help to account for the lack of recognition of 3d visualisation as a valid research process or outcome in certain subject communities. 3d visualisations outcomes should therefore be disseminated with sufficient information to allow the relevant subject communities to understand and evaluate the choice and application of the method in relation to its aims.

4.5 The high occurrence of dependency relations (see Glossary) within 3d models means that, in order for the process and its outcomes satisfactorily to be evaluated, it may be necessary to disseminate documentation of the interpretative decisions made in the course of a 3D visualisation process and, as far as is practicable, the sources used.

4.6 The level of documentation required regarding 3d visualisation when used as a research method will vary depending on how widely and well that method is understood within the relevant communities; novel methods will require more explanation. In addition, different levels of “assumed knowledge” apply within subject communities. Consequently, transparency information requirements may change as levels and sophistication of understanding of particular 3D visualisation methods rise, and will vary from community to community.

Principle 5: Documentation

The process and outcomes of 3d visualisation creation should be sufficiently documented to enable the creation of accurate transparency records, potential reuse of the research conducted and its outcomes in new contexts, enhanced resource discovery and accessibility, and to promote understanding beyond the original subject community.

5.1 When determining the nature and detail of documentation it is appropriate to create, and whether it should be process or outcome-orientated, consideration should be given to the aims, sources, methods, and dissemination strategies of the 3d visualisation method and outcome, and to transparency requirements, and to the desirability of reuse, enhanced resource discovery, accessibility and knowledge transfer.

5.2 Consideration should also be given to the distinctive properties of 3d visualisation processes and outcomes, including that, whereas “conventional” research outcomes enable, indeed often require, explicit statements about methods, theoretical concerns and arguments from evidence, this information may easily remain implicit within 3d visualisation processes and outcomes, rendering the meaning and significance of such research unknowable.

5.3 In addition, the high instance of dependency relationships in 3d models means that users require a correspondingly higher degree of detail if they are to understand and evaluate 3d visualisation outcomes than is the case with conventional textual narratives.

5.4 Whereas conventional research and dissemination methods operate, by definition, within an economy of established and understood approaches which have typically evolved through long histories of explicit methodological and theoretical debate, 3d visualisation methods and outcomes, by contrast, lack such a history, or economy, and must more explicitly discuss the rationale for their methods. An additional layer of complexity accrues to the fact that 3d visualisation methods are frequently used in interdisciplinary contexts which, again, by definition, lack a common episteme or set of conventions that generally characterise subject communities. Interdisciplinary work therefore requires additional reflectivity, in which systematic documentation can play an important role, by articulating the relevant unspoken assumptions and different lexica of the different subject communities engaged in the common visualisation process.

5.5 Project documentation should normally include a complete list of sources used, records of their evaluation for the purposes of 3d visualisation, the rationale for the visualisation method used. Explanation of the visualisation method used should also be documented if it is not likely to be widely understood.

5.6 Documentation methods should use the most appropriate available medium or media, and should be designed with reference to current working practices within the visualisation process in order to ensure that the process

of documentation is sustainable in practice, and that it actively enhances the visualisation process by contributing to reflective practice.

5.7 Documentation should be durable and, where appropriate, compliant with appropriate established standards.

Principle 6: Standards

Appropriate standards and ontologies should be identified, at subject community level, systematically to document 3d visualisation methods and outcomes to be documented, to enable optimum inter- and intra-subject and domain interoperability and comparability.

Note: it was agreed at the London Seminar that it will be necessary to consider at subject community level which ontologies should be used to describe metadata and paradata (process-orientated transparency data).

However, we will only be able to begin to develop appropriate ontologies and choose appropriate standards as we improve our understanding of what it is we are doing when we use 3d visualisation methods and outcomes, and how we are doing it.

Initially, then, further research is required to help us understand and document 3D visualisation processes.

Principle 7: Sustainability

3d visualisation outcomes pertaining to cultural heritage and created in accordance with the principles established by this Charter, constitute, in themselves, a growing part of our intellectual, social, economic and cultural heritage. If this heritage is not to be squandered, strategies to ensure its long-term sustainability should be planned and implemented.

7.1 The most reliable and sustainable available form of archiving, appropriate to the 3d visualisation outcomes, should be identified and implemented.

7.2 It should be recognised that digital archiving may often not be the most reliable means of ensuring the long-term survival of 3d visualisation outcomes.

7.2 A partial, 2-dimensional record of a 3d visualisation output should be preferred to an absence of record. An assessment of the limitations of non-digital archival media (e.g. print and film) in capturing 3d visualisation outputs should therefore be balanced against the benefits of their relative longevity.

7.3 3d visualisation methods and outputs should not compromise their use of non-digitally archivable elements in order to facilitate recording for archival purposes. However, 3d visualisation methods should plan and implement a strategy to ensure that important information can be meaningfully evoked in archival media

Principle 8: Accessibility

Consideration should be given to the ways in which the outcomes of 3d visualisation work could contribute to the wider study, understanding, interpretation and management of cultural heritage assets.

8.1 Accessibility issues should be considered as part of the determination of aims, methods, source assessment and dissemination, standards, and sustainability of 3d visualisation work.

8.2 The roles that 3d visualisation has to play in enhancing access to cultural heritage not otherwise accessible for health and safety, disability, economic, political, or environmental reasons, or because the object of the visualisation is lost, endangered, dispersed, or has been restored or reconstructed, should be considered.

8.3 It should be recognised that 3d visualisation permits types and degrees of access not otherwise possible, including the study of change over time, magnification, modification, virtual object manipulation, multi-layered embedded data and information, instantaneous global distribution, with consequent expanded curatorial possibilities.

8.4 Appropriate stakeholders in cultural heritage domains should be consulted to ensure that maximum benefits are derived from 3d visualisation.

Appendix I – Glossary

The following definitions explain how terms are used within this document. They are not intended to be prescriptive beyond that function.

3d visualisation: The process of graphically representing information in three-dimensions.

3d visualisation method: The systematic application, usually in a research context, of 3d visualisation in order to address identified aims.

3d visualisation outcome: An outcome of 3d visualisation, including but not limited to models, still images and animations.

Cultural heritage: The Charter adopts a wide definition of this term, encompassing all domains of human activity which are concerned with the understanding of communication of the material and intellectual culture. Such domains include, but are not limited to, museums, art galleries, heritage sites, interpretative centres, cultural heritage research institutes, arts and humanities subjects within higher education institutions, the broader educational sector, and tourism.

Dependency relationship: A dependent relationship between the properties of elements within 3d models, such that a change in one property will necessitate change in the dependent properties. (For instance, a change in the height of a door will necessitate a corresponding change in the height of the doorframe.)

Paradata: The Charter defines "paradata" as information about human processes of understanding and interpretation of data objects. (Paradata is thus constantly being created, irrespective of whether they are systematically recorded or disseminated.) Example of paradata include a note recording method in a laboratory report, descriptions stored within a structured dataset of how evidence was used to interpret an artefact, or a comment on methodological premises within a research publication. It is closely related, but somewhat different in emphasis, to "contextual metadata".

Research: The Charter adopts the definition of research given in the British Arts and Humanities Research Council's *Research Funding Guide* (2005) which stipulates that research should: "address clearly-articulated **research questions or problems**, set in a clear **research context**, and using **appropriate research methods**." It stipulates, in addition, that the chosen research methods should constitute "the most appropriate means by which to answer the research questions." This definition therefore recognises that "the precise nature of the outputs of the research may vary considerably, and may include, for example, monographs, editions or articles; electronic data, including sound or images; performances, films or broadcasts; or exhibitions. Teaching

materials may also be an appropriate outcome from a research project provided that it fulfils the definition above."[1]

Sources: Sources are defined as all information, digital and non-digital, considered during, or directly influencing, the creation of the 3d visualisation outcomes.

Transparency: The provision of sufficient information, presented in any medium or format, to allow users to understand the "knowledge claim" made by a 3d visualisation outcome.

[1] Source: AHRC Research Funding Guide 2005, pp.15-16.
http://www.ahrc.ac.uk/ahrb/website/images/4_96278.pdf Accessed, 3 March 2006