# Protocols for 3D Visualization as Alternative Mitigation and Public Interpretation

**Project # 14-733**

## Background:

New technologies for 3D recordation and visualization of cultural resources have expanded dramatically within the last 10 years, but guidance for their appropriate use has not kept pace. This has led to some confusion about the different technologies, what strengths and limitations they have, and when it may or may not be cost effective or appropriate to use these technologies. For example, thee dimensional laser scanning and photogrammetry are being used increasingly to record historic properties in great detail. These technologies can be especially effective for recording resources with very fine detail, such as intricate masonry carving, but can also be applied to properties that are very large. These approaches are also useful for recording resources that may be subject to erosion or other decay. They may be less appropriate for simple structures with little detail. Three dimensional modeling software like Autodesk Maya can allow for the reconstruction of historic features that are no longer extant, and so offer an opportunity to interpret historic sites or landscapes that may have been altered over time. Visualization software is now capable of producing photo-realistic results; so order to avoid presenting a kind of false realism, it is important in presenting such reconstructions to the public to be clear about what is actually known, and what is conjectural in the resulting image.

## Objective:

This project presents best practices for the use of 3D visualization in DoD cultural resources projects. These practices will help the DoD promote and interpret the cultural resources under its care, increasing the support for and effectiveness of associated conservation efforts. Examples illustrating the best practices were developed for historic interiors at Marine Corps Barracks, Washington, DC, and for the remains of 16th-century Santa Elena at MCRD Parris Island. Renderings of those models were prepared in still and interactive html formats that can be distributed via the internet or disk.

## Summary of Approach:

Protocols and best practices for the use of 3D digital visualization in historic preservation were developed that reflect guidance on cultural resources recordation, data curation, and the "London Charter for the use of 3-dimensional Visualisation in the Research and Communication of Cultural Heritage". The document reviews current technologies for 3D visualization including laser scanning, photogrammetry, Reflectance Transformation Imaging, Structured-Light 3D Scanning and CAD modeling, and provides pros and cons of each. End products are discussed that span a spectrum from passive media to interactive environments. Examples of passive media include static images and video files that show virtual camera fly-overs. Interactive models include 3D pdf files, panoramic views of sites and landscapes that can be made available as html documents. The use of interactive environments using computer game engines is also addressed. Example 3D digital models illustrating these practices were developed for historic interiors at Marine Corps Barracks, Washington, DC, and for the remains of 16th-century Santa Elena at MCRD Parris Island. Models were developed using existing photographic, archaeological and GIS data in Autodesk Maya. Renderings of those models were prepared in still and interactive html formats that can be made available for distribution via the internet or via disk.

## Benefit:

Effective outreach helps DoD promote and interpret the cultural resources under its care. Educating military personnel and the interested public about the resources that installations manage and protect increases the support for conservation efforts. Digital modeling technology can virtually recreate sites or properties that no longer exist, or make virtually accessible existing sites that have little or no public access. Digital 3D models of significant historic sites or landscapes may be suitable for mitigation of adverse effects to high profile historic properties where the DoD mission would benefit from high impact visual materials. The military mission of communicating DoD conservation efforts will also benefit from wider, if virtual, public access to significant sites such as National Historic Landmarks.

## Accomplishments:

This project has prepared best practices and protocols for 3D visualization of DoD cultural resources, along with example visualizations at Marine Corps Barracks Washington and MCRD Parris Island.

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