X3D Earth White Paper for the Web3D Consortium

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Abstract:

The MA Mortenson Company is an industry leader in the development and utilization of Building Information Modeling (BIM) within the AEC fields. As such we are continually pursuing new technology and technology advancements for use in our day to day work. Our integrated design advancement team spearheads these pursuits working with project teams, consultants and sub consultants to investigate any and all relevant avenues for improved work flow and process.

In its pursuit of both accurate BIM and business development goals Mortenson foresees a need for a highly intuitive and highly detailed X3D model of the Earth. This model would be most helpful if it met a certain list of criteria and needs. This list is compiled from the suggestions of a group of at least 30 architects, engineers, and construction professionals at Mortenson and represents current and future needs of the AEC industry at large.

It is the hope of Mortenson that all suggestions be considered and discussed and that the list of requirements for an X3D Earth will assist the web consortium in producing a valuable tool for the industry.

List

The following is a list of requests features to incorporate into an X3D earth compiled from the suggestions of the AEC industry at large. These request stem from day to day work within the industry and subsequent needs. A manageable X3D Earth would be an invaluable tool booth in design and construction as well as coordination and business development. While there are solutions currently available most are geared toward the general public. The practical capabilities of these existing solutions do not fully satisfy the needs of the AEC industry.

The list should be read in descending order of importance per section. It is difficult to anticipate the myriad ways an X3D Earth could be used within the AEC industry. Projects vary so widely that each end user may have specials needs unique to their project. The order of importance was determined by number of requests for a certain function. While there were some unique requests most respondents agreed with their peers and requested similar functions.

Physically functionality

- Create a user friendly interface that allows for the easy importation and manipulation of 3D models. Support as many file formats as possible or provide conversion abilities.

- Support different navigation modes (Fly Vs. 1st person interface)

- User defined layers system to allow for different display and navigation settings in one model.
- Ability to measure and query geometries.
- The ability to add view independent text and tags
- The ability to add hyperlinks to geometry and text and tags

- Be able to change and manipulate the X3D Earth to support different needs.

- Be able to move below ground
- Hold back geometry in order to place imported models (i.e.) building foundations)
- Be able to move underwater.
- Ability to hide unwanted areas
- Allow for transparency

Import and Export

- Support importing and exporting of geometries and secondary data.

- Accommodate as many file formats as possible both for import and export
- Parcel and Zoning Information: zoning, land use, special districts, utilities, Lot and Block info...
- Economic Development GIS Property Locator and Reports
- Downloadable GIS information
- Be able to create, and save an association between a coordinate system and a cad coordinate system so that geometries only have to be positioned on the earth model once.
- Included a references to coordinate systems other then latitude and longitude. For example locate objects on the earth according to state plane coordinate system.
- Provide a user friendly and flexible interface to locate objects on the earth accurately. For example be able to tell the program the Northing and Easting and State plane of the origin of your CAD file and have it position the building on the Earth.
- Be able to import/export Google earth KML files where there are similarities between the programs.
- Ability to export terrain (in several 3D and 2D formats)
- General export abilities including geometry.

Display and View

- Create robust display controls

- Flexible view control that can be used to create and store viewpoints

- Ability to create viewpoints relative to imported geometry (i.e. standing at the base of the geometry looking up.
- Support for animation
- Support materials and mapping either 3rd party or integral.
- Support shadows, alpha channels
- Real world Lighting information support (geographic location etc)
- provide rendering or static image creation functions (Screen capture, print, render)

Technical Considerations

- Secondary Hardware and software support

- Viewing / reading standalone software (no edit capabilities)
- Stereo Viewing support
- Spaceball or other physical user interface support.

thank you for taking the time to review this list and hope that the Web Consortium and X3D Earth development group can and will implement many, if not all, of the ideas and requests contained in the above list. An X3D Earth will be an invaluable tool for the AEC industry and we applaud and support your effort.

Sincerely
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