VRML AS A TOOL FOR WEB-BASED, 3D, PHOTO-REALISTIC GIS

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The three steps…

- Creating the 3D model
  - videography, single images
  - reverse engineering, modeling first -then measuring

- Online vector graphics.. the Virtual Reality Modeling Language
  - converting the existing format to VRML format (.wrl)
  - programming with VRML to solve the problems and enhance the model

- The discussion of VRML as a GIS media
  - geometrically reliable models
  - in-built query possibilities, possible integration with other programming
Creating the 3D model

The graphical relative orientation of an image and the room model. The change of viewpoint is shown on the left and the results on the right:

a) a video image presented as a background and the movable room model on it;
b) the viewpoint of the model changed so that the scale corresponds the one of the image;
c) the viewpoint of the model changed until the locations in X and Z are the right ones;
d) the orientation specified by the $\omega$– and $\psi$– rotations.

(The image is taken from Haggrén et al. 1997)
The wireframe model

Accuracy of the coordinates

$S_x = 0.3$ cm.
$S_y = 0.3$ cm.
$S_z = 0.6$ cm.
VRML Model

- Wireframe in Sense8’s .nff format.
- Converters didn’t give a good result
- Programmed in VRML 2.0 using a text editor
  - Viewed by CosmoPlayer plug-in
Features added to the VRML Model

- Textures
- Transparency
- Light effects
- Different view points (cameras)
- Links to web sites (anchors to non graphical data)
The Language

A piece from the edited VRML code

```
--
#VRML V2.0 utf8
"--
WorldInfo {
  title "Virtual Institute"
  info "By Arzu Coltekin"
}

skyColor [1 1 0 0 1]
skyAngle [3.14]
}

#CORBOX2
Group {
  children [DEF X1_X2_corbox2 Shape {
    appearance Appearance {
      material Material {
        diffuseColor 0.937500 0.937500 0.000000
        ambientIntensity 0.200000
        specularColor 0.000000 0.000000 0.000000
        emissiveColor 0.000000 0.000000 0.000000
        shininess 0.200000
        transparency 0.500000
      }
    geometry IndexedFaceSet {
      coord Coordinate {
        point [coordinate set here]
        coordIndex [indexed face set here]
      }
    }
  }
  }
```
Conclusions

- The 3D WebGIS seem to evolve to using the VRML
- Yet to develop, but already functional