Database Support for GIS Application

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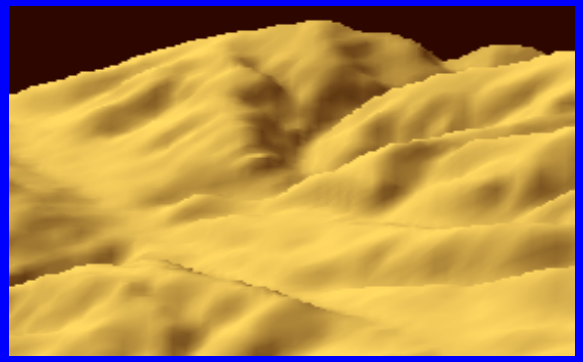
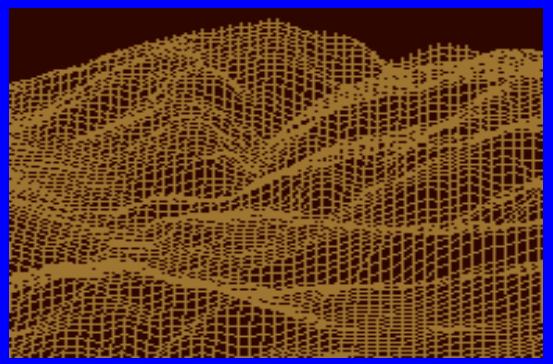
Dataset Requirements

- For providing 3-D terrain rendering, the following datasets were needed:
  - Digital Elevation Models (DEM)
  - Satellite Images
  - Relevant Census Data
- These data were identified as being either in Public Domain or needed to be purchased from commercial organizations.
- Data was evaluated from both these resources.

Digital Elevation Models

- A DEM consists of a sampled array of elevations for a number of ground positions that are normally at regularly spaced intervals. These intervals determine the spatial resolution of the DEM.
- The USGS offers DEM in Public Domain having a spatial resolution of 90 m whereas commercial organizations have the DEM's at 30 m. This is a marked improvement over USGS data.





Satellite Imagery

- Satellite imagery needs to be of high spatial resolution owing to the visual nature of the CIV project.
- Currently the highest spatial resolution available is 5 m obtained by the IRS-1C satellite. This is the finest spatial resolution offered by a non-military satellite.
- The data would consist of a 70km x 70 km swath of the region of interest.
- This would be enhanced with merging techniques that would impart color to the image based on visible wavelength bands.
- Very expensive....

Census data

- The topological structure of the Census TIGER database defines
  - the location and relationship of streets, rivers, railroads, and other features to each other and to the numerous geographic entities for which the Census Bureau tabulates data from its censuses and sample surveys.
- This data is freely accessible to the public, and
  - based on an open architecture that allows other Web developers and publishers to use public domain maps generated by this service in their own applications.
- The Census database also includes
  - social, demographic and Economic Information. Census data is freely available over the Web.

Handling the Data

- A large percentage of the data is static.
  - With the exception of satellite images which are obtained periodically, census data and DEM data are essentially fixed.
- For visually appealing terrain rendering, it is imperative that data having high spatial content be obtained.
- Public Domain data lacks the spatial resolution that the project demands.
- Commercial data, when used, has been found to meet these requirements. In the case of satellite imagery, commercial data is the only reasonable alternative.

Conclusions

- NPAC will aquire samples of commercial data for DEM and satellite imagery
- We will build local databases replicating public domain data in a format suitable for the project
- Data covering the entire scenario area can only be aquired by the funding agency