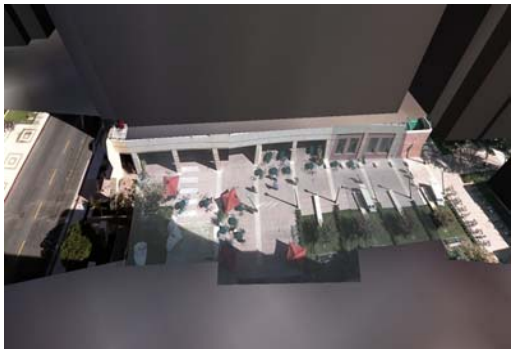
VIDEO STREAM INTEGRATION



The integration of video streams and the 3-D model allows the user to visualize all data in a single context to maximize "big-picture" comprehension. It enhances obscure features and spatial/temporal relationships, and addresses dynamic visualization and change detection – a real-time 3-D GIS – a "world in miniature".

GLOVE-BASED USER INTERFACE

The user interacts with our system using an intuitive interface based on hand gestures obtained via data gloves and a tracking device.

FURTHER INFORMATION/CONTACTS

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http://infolab.usc.edu/projects/geodec/index.jsp

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GeoDec

GEO-SPATIAL DECISION MAKING

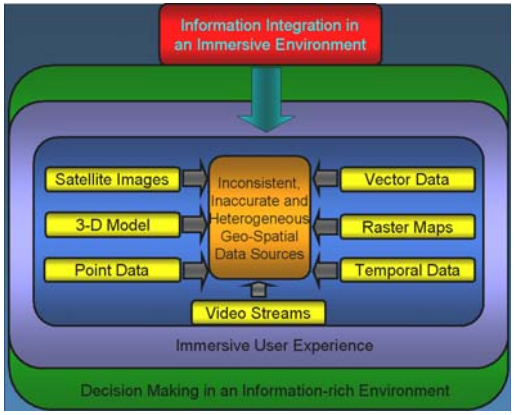
OVERVIEW

GeoDec (Geo-Spatial Decision Making) is a collaborative project under the University of Southern California Integrated Media Systems Center (IMSC).

The goal of this project is the construction of an information-rich and realistic 3-D visualization and simulation of a geographical location, rapidly and accurately. This environment should support a comprehensive set of queries for information about the area through an intuitive user interface.

Due to the inherent difference in data formats available and their different accuracy levels, a seamless, consistent and efficient integration of different data sources is a very challenging task.

CHALLENGES

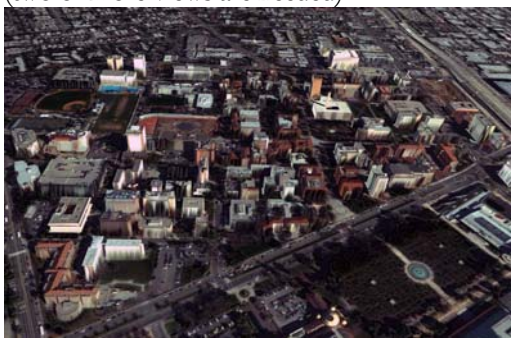


- Accurate, rapid reconstruction of 3-D models from satellite imagery
- Heterogeneous geo-spatial data formats available with varying accuracy and consistency levels e.g. vector data, images, temporal data
- Integration of 3-D models, satellite imagery, video streams and geo-spatial data in a single environment
- Intuitive user interface

The following sections describe our approach to this problem:

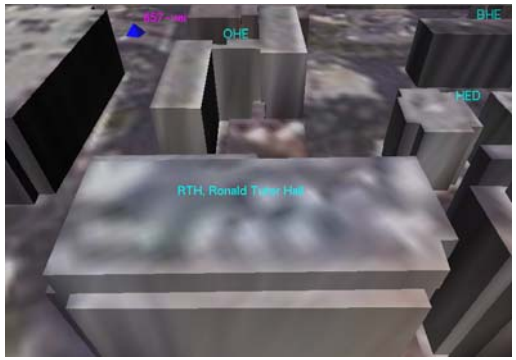
3-D MODEL CONSTRUCTION

Through the Interactive Multiple View building modeling System (iMVS), the user provides some roof corners and the system automatically computes 3-D building models (two or more views are needed).



The resulting models can be edited for height, sides and positions. Using two satellite images, 253 Building Components are generated within a couple of hours. Complex structures are modeled by adding/subtracting rectangular or triangular components to a seed model (simple rectangular building).

POINT DATA INTEGRATION



The system uses record linkage to match the geo-coordinate information, building names and codes obtained from the USGS gazetteer and USC website and displays the results on the 3-D model.

VECTOR, MAP AND IMAGE DATA CONFLATION

Our automatic conflation technique retrieves vector data representing the road network, finds corresponding intersection points on the imagery and aligns the vector data with the imagery using the intersection points. This approach is also used to support the alignment and integration of other data sources such as maps.

TEMPORAL DATA INTEGRATION

Tram locations are received from GPS installed on the trams and their locations are constantly updated on the model.