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Olympics Provide Showcase for 3D Geospatial Models

Amid the gold, silver and bronze of the Beijing Olympics is TIN, that is, triangulated irregular networks. TIN models and wireframe diagrams, produced by AEgis Technologies, are merged with 0.6-meter resolution QuickBird satellite imagery from DigitalGlobe to produce an array of highly accurate, 3D terrain and building models of venues within the city of Beijing. NBC requested these models to augment its televised coverage of the games (Figure 1).

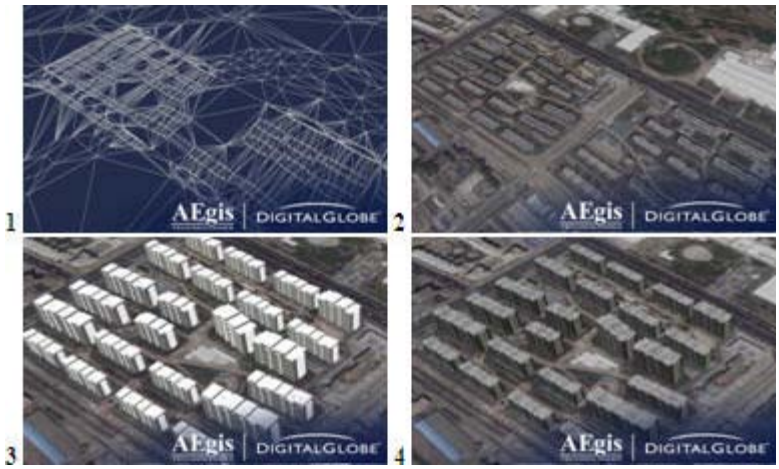
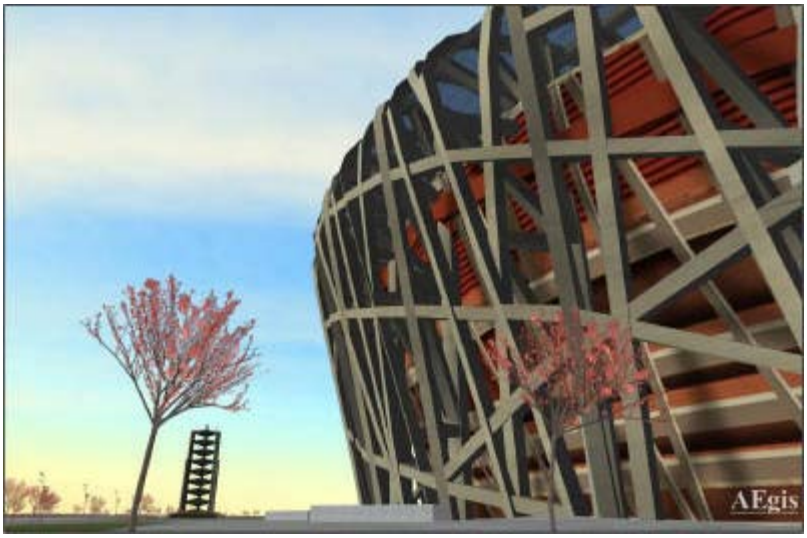


Figure 1. Image 1=wireframe; Image 2=DigitalGlobe satellite image; Image 3=extruded building models; Image 4=building models rendered with textures. Source: AEgis Technologies

The dataset shown on TV covers 15,000 Km2 totaling 42 gigabytes. It's rendered at a scale of 1:1 to allow NBC to develop high definition "fly-through" videos. AEgis developed the terrain data from off-nadir QuickBird imagery. Land-based features also come from the QuickBird imagery and are enhanced by 3,200 NBC produced, ground-based digital photographs. Combining all three, AEgis created accurate and up-to-date building models, including textures and signage of the Olympic venues (Figure 2).



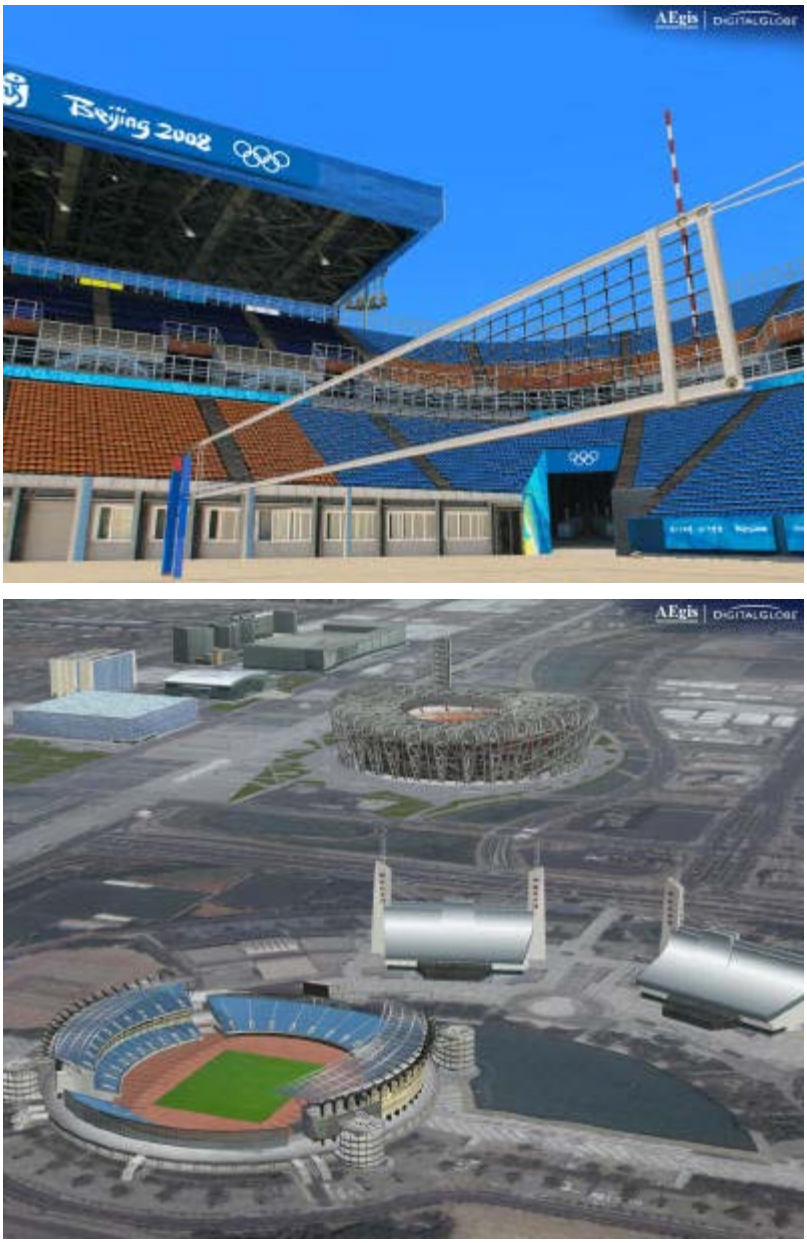


Figure 2. Source: AEgis Technologies. (Click individual image for larger image.)

The dataset is a geospatially referenced model that can be exported as a shapefile for use in ESRI's ArcGIS or as KML for use in Google Earth. AEgis uses an off-the-shelf viewer called LightINT, which it provided to NBC, that is able to determine building height, line of sight, or "as the crow flies" distance in real-time. For example, the Olympic Stadium or "Bird's Nest" is rendered in such detail as to allow the user to pick any seat in the stadium and calculate its line of site and its corresponding 3D (volumetric) view. In addition, if the user of AEgis' viewer removes the texture of the stadium, he will be able to see the building superstructure, similar to what you would see in a typical CAD drawing. But no CAD drawings were used by AEgis; the superstructure was rendered strictly with the datasets it had on hand. According to Scott Allman, director of geospatial programs for AEgis, all models were created simply using the TIN, imagery and ground-based digital photos.

AEgis gives away the LightINT viewer to its clients, along with all the data, as project deliverables. AEgis' intellectual property is its ability to construct the models and develop simulations. "Building terrain models has always been static," said Allman. The AEgis simulation models are extensible, whereby features can be added to the database in a way similar to building a wiki. That is, anything added to the dataset with a time stamp can be recalled at a later time, such as when the terrain or building textures change. For example, the venue for water sports (kayaking, boating, etc.) was not completed at the time the first model was built, but when construction to this area was complete, the detail was added into the model.

Using the AEgis-DigitalGlobe dataset and viewer, NBC producers can select a point location and an elevation above that point to place a simulated camera for varying vantage points. Selecting multiple points and elevations allows them to set a "flight path" for that camera to create a fly-through video. The producers can also set the camera angle so that as the camera moves along that path, the angle of view can be directed away from the path itself to provide a unique perspective. A high definition video is

produced from this process and the results are shown during NBC's coverage.