

New Dimension in Communication

Context 3D Printing to Increase Prototyping Accuracy and

Historically, the creation of a 3D model or prototype has been a tedious and time-consuming process that allowed for a significant amount of human error. For example, creating a large, three-dimensional topographical map with accurately scaled elevations, overlaid with a perfectly positioned color texture map, and inclusion of all relevant GIS data would take a day or two to recreate. However, with the advent of Context's 3D printing technology, prototyping can be less time-consuming.

By Jesper Erlandsen

How it Works

What is 3D printing and how does it work? Three-dimensional printing, also referred to as 3DP, is a type of rapid prototyping that creates a three-dimension prototype/physical model from Computer Aided Design (CAD) data. It uses an inkjet print-head to deposit a liquid binder that solidifies layers of powder. Using an adapted inkjet printing system, layers of a fine powder are selectively bonded by printing a water-based adhesive from the inkjet print head in the shape of each cross-section as determined by a CAD file. Alternately the machines feed liquids into individual jetting heads that squirt tiny droplets as they are scanned to form a layer of the model. The liquid hardens after being deposited. Once a single layer is deposited, a milling head is used to ensure uniform thickness before the next layer is deposited. This rapid prototyping technology enables models designers, product developers, and GIS professionals to construct models of real-world objects like buildings and landscapes or to communicate a topographical surface.

There are many applications for 3D models. One can think of concept models, presentation models, functional testing, and Finite Element Analysis. Sales presentations, market research on style, color, and packaging options are other examples. 3D models of designs can also be used as tools to demonstrate the scope of a project or as a leave-behind.

3D Printing and the GIS Market

While it is still relatively new to the GIS environment, 3D printing offers unlimited possibilities for mapping, surveying and related topics. The 2005 Wohlers Report recognizes GIS as a "non-traditional" market along with architecture and medicine. However, with the emergence of multi-color 3D printing technology like the DESIGNMate CX from Context, the door into these non-traditional markets is rapidly opening. In fact, GIS is expected to be a very strong growth market for 3D printing. Virtually any GIS software application that can produce CAD data can produce a file that can be then output on a 3D printer. Promising 3D modeling applications in the GIS sphere include urban planning, environmental impact analysis, and site planning for

GIS Application

Operations/Response Planning

Description

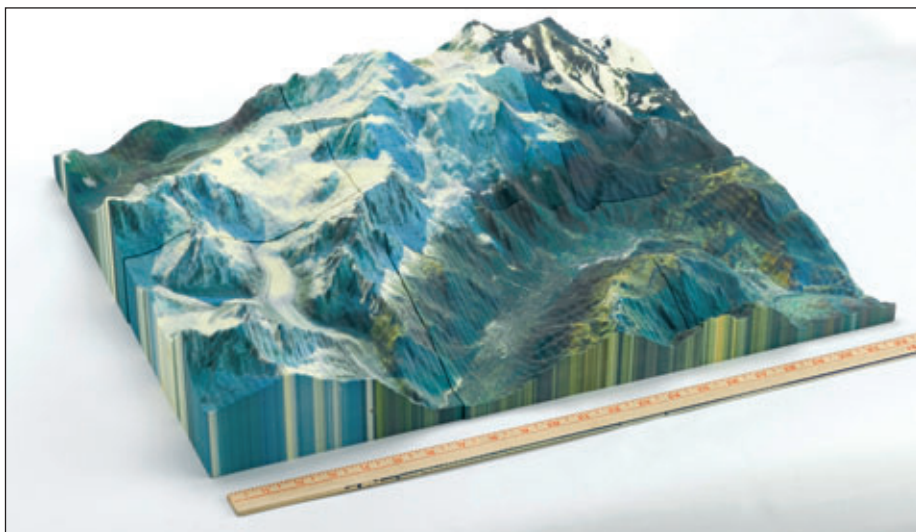
- Deploy 3D Terrain and Urban models to field units and operation centers quickly and accurately, replacing "the sand table" with models printed in real-time geospatial intelligence;
- Line of sight;
- Plume analysis;
- Least cost path.

Communication and Review

- Create communication models for client/public review process;
- Create full-color models to enhance communications and customer impact;
- Make complex information easy to understand.

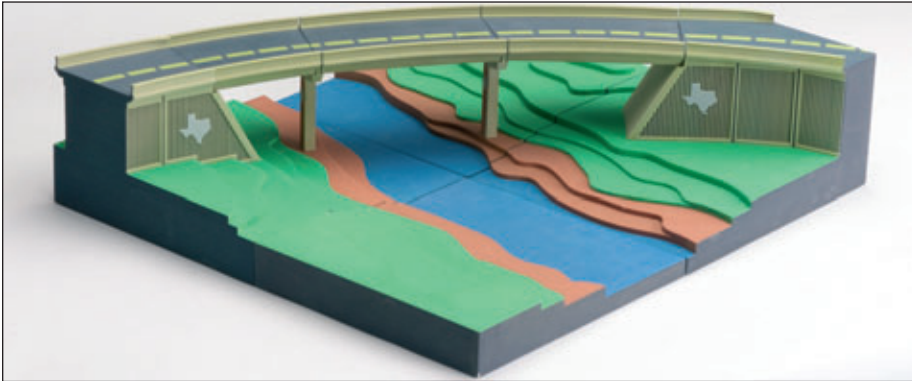
Cartographic Display

- Generate three dimensional topographic models from two-dimensional GIS data;
- Create hydrographs;
- Create city models;
- Simplify cartographer/analyst map production;
- Create educational/museum displays;
- Enable 3D visualization.



ting GIS Data

Effectiveness



mining, construction, and demolition to name a few. With Contex 3D printers, GIS users can reproduce terrain, urban and sub-surface maps and models in less time without geometrical limitations and with high geometrical accuracy. Engineers can use these physical representations of electronic design concepts to communicate more effectively with customers, partners and suppliers. The ability to use 3D printing for GIS applications changes the way GIS data is used to communicate. It opens up a world of possibilities including the ability to increase the exposure and visibility of GIS data, while communicating clearly with clients, co-workers or the general public with three dimensional examples. With 3D printing technology, GIS professionals can create accurate models without existing resources, delays or high costs, capitalizing on internal 2D drawings and GIS content.

Five Basic Steps

Creating three-dimensional GIS output using a Contex 3D printer involves just a few basic steps. For example, using a Contex 3D printer, creating a 3D model is as simple as following these basic steps:

- Select the level of detail and area you want to model and determine the size and scale;
- Choose how the model will be displayed;
- Export a VRML/PLY file for 3D printing from GIS software;
- Generate a color image-texture map overlay on a Digital Elevation Model (DEM) from sources such as Satellite, Aerial, Annotation, Chloropleth in DesignEDIT software;
- Print a 3D model of the VRML file on the 3D Printer.

Contex Imaging Products

Contex digital solutions provide a path to capture technical documents, drawings and other input in order to view, edit, archive, convert, file or print the output data for various applications and jobs. Contex scanners also make wide-format digital copiers by linking a Contex scanner to a large-format printer. Companies requiring in-house copying of posters and drawings—including advertising agencies, billboard manufacturers and sign makers - can also benefit from Contex copy solutions. In 2005 Contex has launched two 3D printers being offered through a select group of distributors with expansion planned well into the future: the Contex DESIGNmate Cx and the Contex DESIGNmate Mx.

According to Contex its 3D printers are distinguished from competitors by the fact that they are the only multi-color 3D

printers available, and are equipped with features such as high-definition print resolution. It is also stated that output speeds are 5 to 10 times faster than other rapid prototyping technologies, cost per-part construction is the lowest, and inkjet printing technology is capable of creating parts with crisply defined features, enhanced accuracy, and precise 24-bit color. Users can leverage color capabilities to highlight and annotate physical models just as they would with a 2D drawing.

Conclusion

More users in an expanding range of environments and industries are looking for ways to accelerate time to market. According to Contex, the demand for fast, accurate, full-color rapid prototyping 3D printers that transform the process of creating physical models will continue to grow. As it does, providers like Contex will be standing ready to provide high-speed high-quality technology solutions that enable them to create 3D models quickly and affordably using in-house resources in a matter of days.

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The Contex DESIGNmate Cx 3D printer.



The new Contex printers offer the same features as 3D printers sold by Z Corporation, a Contex subsidiary. The Contex DESIGNmate Cx 3D printer is a full color printer that produces high-definition (600 x 540 dpi) full color 3D models. The Contex DESIGNmate Mx, with a resolution of 300 x 450 dpi, creates physical models directly from digital data. It allows users to produce concept models and functional test parts and is in fact an entry-level prototyping system for office environments and educational institutions, to mention a few target groups. Contex 3D printers are based on proven technology that originated at the Massachusetts Institute of Technology and was later developed by Contex's Z Corporation subsidiary. The technology is sold under the Contex, Z Corporation and Vidar brand names through separate sales channels. Contex 3D printers are available today from dealers worldwide.