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TruFlite - 3D Terrain Visualization, v. 5.1. Martin D. Adamiker, Tiergartenringstrasse 304/8, A-5081 Anif, AUSTRIA. Fax: +43-6246-72935. URL: http://www.truflite.com ($295; $195 educational; upgrades to registered users are free)

System Requirements: Windows 3.1+, NT or 95; 2.2 mB hard drive space; 4 mB RAM; CD-ROM (Note: TruFlite is fully executable from the CD-ROM; full installation of program and examples requires 14 mB hard drive space.)

About fifteen years ago, after two long CPU hours during which my VAX minicomputer and workstation had churned away with great intensity, I was rewarded with my first ever "Realistic Perspective" three dimensional view of a section of digital terrain. Primitive though the results were by today's standards, it occurred to me then that if computer animation was ever to become possible for visualizing digital landscapes either supercomputers had to be brought to bear (as in the movie industry) or we were going to have to wait for a new generation of hardware and software. The new generation of hardware has been around for some time now in the form of very powerful microcomputers and workstations with immense processing abilities. What was missing was the inexpensive, efficient and effective software package capable of exploiting the new hardware. Several software solutions are now emerging to fill the gap, including Vistapro (www.romt.com/products/vista/index.html), Visual Explorer (www.woolleysoft.co.uk) and TruFlite (www.truflite.com). With TruFlite in particular, we can at last say that the software has finally arrived.

TruFlite is a remarkable Intel-PC based computer mapping program for generating visualizations of terrain. It is remarkable not only for its capabilities, which are extensive, but for its modest price and high efficiency. TruFlite comes on CD-ROM for the Intel platform. It requires a minimum configuration of Windows (3.x, 95 and NT versions are available) on a PC with a 386 processor and 4 MB of RAM. Experience with the software on my old faithful 66MHz 486 with 8 MB of RAM however quickly showed that "cartographic quality" requires a far more powerful system. TruFlite recommends a Pentium PC with 16 MB of RAM, and of course a CD-ROM reader. The faster the clock speed the better. I tested the software on a Pentium PC with 128 MB of RAM at 133 MHz. Fortunately, more capable systems are now pretty much universally available, and are likely to be in the academic Geography Department laboratory where TruFlite is best used to effect, or perhaps even on the Department secretary's desk. For displays, TruFlite comes in both a 32 bit and a 16 bit version. In the latter, files are constrained to 16MB in size, while in the 64 bit version Windows determines
the limit. Retail cost is $295, and interested parties should see the TruFlite web site at http://www.truflite.com for ordering and shipping details. When I ordered a copy, it arrived three days later by Express mail, as promised in e-mail from the vendor. Geography programs will be interested in the highly satisfactory academic discount price of $195 per copy, or a site license with unlimited copies for $1,950.

What can TruFlite do? TruFlite is a 3D renderer capable of rendering over 200 million polygons with ease. With computer graphics, more polygons equal better resolution and realism. Practically, this means that for terrain a 20MB Digital Elevation Model and a 60MB color drape file are manageable. This stretches beyond the traditional one map quadrangle — one image approach, and allows images to be joined together or mosaicked to take advantage of TruFlite's rendering. TruFlite really does two things. First, it allows the user to create three dimensional views of terrain. Secondly, it allows the user to create a flight path through the terrain and to generate a frame-by-frame animation that can be processed into many animation formats, such as MPEG, by utility programs. Such visualizations are normally called fly-bys (static view, moving observer) or a fly-throughs (moving observer and view). The MPEG link is important, because this allows the animations to be linked to pages on the World Wide Web, and viewed with a standard Web browser.

This review covers TruFlite version 5.1, but at the time I was writing version 5.2 was released, carrying some new capabilities, primarily compatibility with ERDAS Imagine, IDRISI, and Arc/Info.
A version 5.2 demo is available free from the Web site. While the three dimensional viewing is critical to the ability of TruFlite, I was particularly impressed with the incidental or utility functions for processing the files necessary for use. As many already have found through experience, most computer mapping and GIS packages require extensive data preparation for use. TruFlite has narrow requirements for data. DEMs are single band 24-bit Targa files, and color drape files (the optional "image" that is placed over the terrain in the view) must be a 24-bit three band Targa file. Support for data manipulation begins with metadata. On the TruFlite Web page are several links to sources of Digital Elevation data worldwide, and a handy index list of all the available 3 arc second and 30 meter DEMs. These DEMs, in their raw or native formats, can be introduced into TruFlite, and mosaicked over contiguous blocks. There are also pre-generated color images for use as drape images, structured by State, and numerous examples of data at the different stages of processing and display.

The user interface for the software depends on a single window and pull-down and pop-up menus. Part of the interface is a context sensitive help systems, including hypertext, with diagrams and screenshots.

With no manual (one is planned in the near future) many menu contexts and problems can only be covered in general. While context-sensitive help a very useful feature, it occasionally fails to locate the exact source of a problem. It is rather confusing at first, when the examples fail to walk the user through the most basic steps, such as how to initiate a new display. For example, in TruFlite you do not work in ground coordinates, as in a GIS. Pixel counts, lines and samples, and sampling rates are the order here. The viewing model is the camera, so that viewing parameters control the camera pitch, roll, angle and so forth but camera and viewing positions can also be stated explicitly in pixel coordinates. Quite notable is that the light source, luminosity, and appearance of the view are user controlled, with reasonable defaults. As computing a large image can take a long time, even on a fast PC, there are two preview modes, a wire-frame and a coarse plot mode. Obviously large images and long animations should be tested on coarse data abstractions before investing the time it takes to generate the views. With reasonably small size DEMs, coarse sampling and single frames, plots take seconds. High resolution plots and long animations can take hours.

For a fly-by or fly-through the user "draws" the line of flight onto the image, and then puts in starting and ending camera parameters. So, for example, the camera may climb and back up from an image to give the impression of "take-off," or move along a curve or line. With the flight path generated, the viewer chooses the number of frames to generate and the resolution, along with such time-consuming luxuries as Gouraud shading, antialiasing and fog effects. Useful at this stage would be even a wild guess at how long the computations will take. Without even a blinking icon or a "cometing" Netscape icon, it is hard to tell whether the computer is actually working away or not. An additional stop is necessary for the frame output to be compiled to FLI/FLC, AVI, MOV or MPEG animations, and this can involve the downloading, unzipping and installation of shareware. The results are particularly worth the effort, however.

Support for the software I found impressive, but the company is yet small. While currently in Austria, there is a planned move to California, where their user base is probably larger. The Web assistance and the online help I would rate from good to very good. Questions about data problems were answered efficiently and correctly, often by return of e-mail. The software publicity boasts that "the crew that has been developing TruFlite over the past decade are all C++ and visualization experts" and that the software, written under Windows in C++, uses the object paradigm and as a result is highly adaptable. It is highly likely that we can look for some interesting improvements in the near future.

TruFlite is not for the computer wimp. It demands a solid knowledge of many of the aspects of computer graphics, color image handling, Internet use, shareware installation, and above all terrain mapping. Nevertheless, TruFlite has the power to make the computational 97-pound weakling look like a world class muscle-builder. As GIS and computer mapping students, scientists and professionals move into a future where scientific visualization will be the norm rather than the exception, the makers of TruFlite will truly be able to say that they got many people there first.

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{Editor's notes: TruFlite version 5.3 has since been released and a free demo is available off the publisher's web site. Included within this new release is a product called TFMAKE "that automates the entire process of downloading, converting, importing and rectifying of elevation and texture data from the Internet for a specific 1 degree DEM quad anywhere in the US."

The North American sales representative is Tony Kehlhofer, who can be contacted by e-mail at: anthony@truflite.com. Mr. Kehlhofer notes that TruFlite does indeed have a status indicator " . . . a percent counter in the status line that says how far along each image is and in the "View - Options" dialog, there is a "redraw interval". When set low the screen is updated regularly to show the progress of the rendering."}

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