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GIS Supports Summer Olympic Games Security

Digital Photogrammetric Products Provide Cost Effective Data for GIS

Geographic Data Files: Single European Currency for Geographic Information

By Seppe Cassettari
and David R. Green

User Interfaces: An Important Consideration for the Future

How often, I wonder, do GIS users give much thought to the importance of the appearance and layout of the computer screen in front of them? Probably very seldom I should think! However, the screen design, position and type of menus, accessibility, and the colours used, amongst many other things, can have quite an important effect upon the working environment, and much more so than people might think.

For example, software interfaces have been found to affect the ease with which the user interacts with the software, the learning curve, and the accuracy of interaction and information interpretation. Interfaces can even influence the "pleasure" derived from using a system. Such factors can become quite significant to the use of software in an operational environment.

Graphic user interfaces (GUIs), Windows, WIMPS (Windows Icons Mouse Pointer), usability and user-friendly are all part of the current jargon. What do all these really mean to the user of a GIS?

It largely boils down to the computer environment and facilities available to permit effective and efficient interaction with both the computer and the applications software. This might include consideration of the use of a mouse and pointer; screen design and layout; positioning of windows and menus on the screen; use of colours for text, menus and borders; use of icons, buttons and dialogue boxes; and capabilities for user customisation, e.g. choice of layout and colours.

For many new users, the one major drawback to most computer systems and software, GIS or otherwise, has been the human/computer interface. Significant improvements have been made over the last few years to provide users with improved interfaces, such as structured "pull-down" and "pop-up" menus that replace keystroke commands and predefined function keys. However, some software has tended to remain fully accessible only to the truly experienced user.

Talking to a cross section of computer users will inevitably reveal the well-seasoned user or the computer buff who thinks that the so-called "command line interface" (CLI) is great — the next best thing to sliced bread — but there are many other users who are not quite so chuffed about having to learn and remember a lot of commands, often accompanied by fiddly and easily forgotten syntax! For many people, commands only add unwelcome complications and confusion to the use of applications software. Indeed, if sufficiently complex, they can interfere with the work by engendering considerable frustration when typing mistakes are made. Although most software now includes help files to aid with command syntax, these are only a partial solution to the problem. Having to continually refer to help files is not efficient and, furthermore, it doesn't say a great deal for the software being user friendly!

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The alternative is a GUI, which has grown increasingly popular following the introduction of the first Apple Macintosh microcomputer. Anyone who has used an Apple Macintosh will acknowledge the ease with which it is possible to use this computer and the software. Once you have used one piece of software, the others are relatively familiar through their use of a common screen layout, icons and dialogue boxes.

Since then, GUIs have been introduced by others including Acorn Computers, e.g. the Archimedes, and, more recently, by Microsoft Windows. GUIs also have become available for UNIX Workstations, testimony, perhaps, to the value now being placed on this type of user interface.

Essentially, what a GUI offers the user is a work environment complete with icons, pull-down or pop-up menus, dialogue boxes and buttons, all of which can be selected by pointing and clicking a mouse button. An icon should be a simple and easy to comprehend graphic which summarises a particular function. Pointing to and clicking on one of these icons can provide direct access to functionality or take the user to a menu of text commands or icons contained in either pop-up or pull-down menus, or a dialogue box.

One benefit of a GUI is the provision of a standard user environment for different software on the same computer, or for the same software on different platforms. In addition, it provides an intuitive and aesthetically attractive working environment which can be learned easily and quickly. This should enhance the speed and efficiency with which a user can interact with the applications software.

Despite such developments, the popularity of a GUI, in practice, has grown surprisingly slowly. Furthermore, as yet there are still no real standards for GUIs. There may be

strong similarities between systems and platforms — the basic principles and operations are the same — but each one is still uniquely different. An increasing number of GIS and digital image processing (DPI) systems are now offering a GUI version of their software, and the list is growing.

For the future GIS user, the availability of a user-friendly interface to applications software will become increasingly important. Providing a working environment which allows the user to concentrate on an application will be possible only if unnecessary interference is minimised. This can be achieved through careful design of the user interface — to provide a pleasant, aesthetically attractive interface, which is easy to learn and use with minimal unnecessary recall and hand movement. A good GUI has the potential to improve work productivity, speed, efficiency and rapid experimentation. Some additional advantages might be the potential for GUIs to provide a corporate identity for a company, and to facilitate the communication of ideas and skills between different departments where a large GIS is shared.

As aesthetically attractive as a GUI may be, however, one must not forget the continuing desire by some for the good old-fashioned CLI. Indeed not everyone finds a mouse/keyboard combination to be ideal for all tasks. There are instances when a software functionality can be far quicker if one is familiar with the commands and key short cuts. Ironically, typing in a command can reduce the amount of time expended through pointing, and clicking! A combination GUI/CLI may be a more appropriate long-term option, but one must bear in mind that tomorrow's users won't necessarily be computer experts or enthusiasts.

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GIS IN SPAIN

By Michael D. Gould

GIS Manages Spain's Water Resources

Among the most valuable of natural resources in Spain is water, which is scarce in most regions except in the mountainous and coastal North. Many of the rivers in central Spain, for example, carry only a trickle of water, if any. Thus, it is not surprising that GIS technology is being applied in Spain to water resource management in nearly all its aspects. Here we look briefly at two sides of water resource management in Spain: containment and distribution.

Dam Restoration

The Dam of Proserpina in Mérida (western Spain) is relatively small at 300 meters by 15 meters, and its original construction — earth with an impermeable facade of 30 centimeters by 60 centimeters granite blocks — is thought to be Romanic. In centuries past, the dam provided Mérida with sufficient water for drinking and irrigation, as well as for the cleaning activities of the local wool garment industry. During the 20th century, the dam was cosmetically maintained as a tourist attraction, but was not structurally maintained. Minor restoration was performed in the 1950s to plug several leaks, but general restoration has only just begun under the direction of the consulting firm, Ingeniería 75, S.A. The reservoir recently was drained to facilitate dredging of excess sediment from the dam's base and for overall inspection. The dredging exposed several new rows of granite blocks showing evidence of earlier construction methods, and that a lead water-release mechanism once had been used.

To be able to better measure and manage the delicate restoration process, Ingeniería 75 solicited the assistance of the Department of Cartographic Engineering at the Universidad Politécnica de Valencia (UPV), to create a cartographic database at 1:100 scale. The database was built partly using terrestrial photogrammetry, including 15 stereopairs of the dam taken with a Zeiss Oberkochen TMK-120 camera. Three-dimensional data on each granite block of the dam facade and supporting structure now exists in vector-based files, to be exported to ARC/INFO in Planimap format. The cartographic laboratory at UPV recently installed 10 UNIX workstations, with which it plans to archive and analyze the large-scale database in both vector (ARC/INFO) and raster (ERDAS) formats. The latter is comprised of satellite images which also will be used in assessing the restoration's progress.

The department at UPV is involved in a second GIS-based restoration project, a medieval dam site at Ontigola (in the province of Murcia, southeastern Spain), and it plans to undertake similar projects in the near future. Using its new GIS facility, the department hopes to be able to take on almost any water resource management or historical monument preservation project which requires the precision of terrestrial photogrammetry and the bird's-eye view of satellite imagery.

For more information on these restoration projects, contact Prof. José Herraez Bosquera of the Universidad Politécnica de Valencia [FAX: 34 6 387 71 69].

Municipal Water Management

The Sociedad General de Aguas de Barcelona (SGAB), or General Water Society of Barcelona, is a company responsible for managing the distribution of water for the 3 million inhabitants of the Catalan capital and for 17 surrounding