

Appendices

Appendix A

ArcView - The Ultimate Window to Spatial Data Environmental Systems Research Institute, Inc. ARC News, Reprint, Spring 1991 Issue, Vol. 13, No.2 [Reference/Reprint]

The benefits of using GIS are now widely understood by most organisations that use spatial information. Despite this awareness, the actual number of active users has remained relatively small. This is due in part to the fact that virtually all GIS technology currently available (from desktop to mainframes) requires, at least, basic GIS skills.

This is about to change. This month ESRI is introducing a completely new product called ArcView which provides a major breakthrough in the usability of GIS. ArcView creates a new user environment for geoprocessing by making it easy and fun for users to visualise, query, and analyse geographic information.

ArcView is an easy-to-use productivity tool derived from years of research and development efforts by ESRI that have gone into producing its ARC/INFO software. It is inexpensive and completely compatible with all the various types of data supported by ARC/INFO. These include vector coverages, tabular database management systems, surface models, grids, and a variety of raster images, including remote-sensing data and binary-scanned documents.

"ArcView will revolutionise the way we think about both mapping and GIS," said Jack Dangermond, ESRI president. *"People who are not familiar with GIS can sit down and use it right away with virtually no training. The software is based on simple ideas that allow users to learn to use it naturally and intuitively. They can learn simply by experimentation and be thoroughly competent in a matter of minutes to hours."* This will open up GIS to a whole new category of users, including managers, elected officials, students, the public, and a vast array of others who are not trained in GIS, but who have an interest in and use for geographic information.

"ArcView is not just GIS made simpler," continued Dangermond. "It also introduces many new concepts for interacting with an electronic model of spatial reality. ArcView includes a variety of highly interrelated visualisation and query tools that can be used to craft a literally endless number of interpretations and view of geography. These views can be produced as soft copy publications for access across a network or output directly as hard copy with a variety of desktop-related devices. With the introduction of ArcView, GIS is moving from a tool to create applications to a front-end view of applications."

Although the biggest impact of ArcView will be in making geographic information more accessible and usable to a wider range of potential users, ArcView was originally conceived of as a way to help ESRI's existing user community. This is where the new product will perhaps have its largest initial popularity. Both PC ARC/INFO and workstation ARC/INFO users will instantly be able to publish their data for casual query and display.

They will also be able to integrate ArcView into their application systems, allowing ArcView to function as the display and query module within certain types of application.

"The original idea for ArcView came from our existing users," explains Dangermond. "We learned that many of them needed a way to provide electronic access to their data for people who needed to access it, but could not afford the time to learn a complicated technology. Their option historically was to develop a custom application. With ArcView, the most valuable GIS concepts of ARC/INFO software are organised into a generic system that can serve virtually every user."

ArcView will run on PCs, Macintosh, and any of the UNIX platforms now supported by ARC/INFO. It operates as a stand-alone desktop mapping solution as well as in the role of a client on a client-server network.

As a stand-alone application, ArcView can be used by existing ARC/INFO users to provide copies of their data to other individuals and organisations. There are thousands of ARC/INFO users who have created tens of thousands of coverages around the world. ArcView will create an environment that promotes the publishing and sharing of their data.

"ArcView will revolutionise the way we think about both mapping and GIS."

- Jack Dangermond,
ESRI President

The publishing environment will also take place across electronic networks. On a network, ArcView can be running on a user's existing desktop computer and be accessing and visualising ARC/INFO databases across the network without converting or transporting *any* data. In this sense, ArcView serves as an integrating technology bringing together all of the diverse desktop units into a shared GIS network.

Applications

ArcView will open up computerised mapping to a whole new world of users. Because it is so simple to use, ESRI envisions that ArcView will appeal to the following types of people.

- Specialists who only occasionally need to access geographic information and, therefore, do not have the time or the inclination to learn to use a comprehensive GIS
- ARC/INFO users who are using ARC/INFO for analysis and would like to use ArcView for quick and easy display and query
- Individuals who want a single desktop GIS that is totally integrated with a database
- ARC/INFO users who want to make data available to other departments, field offices, or other remote locations
- Private and public organisations that want to publish their data electronically for others to examine and access
- Managers who need an "at-a-glance" look at geographic data
- Organisations that want to present electronic interpretive maps
- Public agencies that can save staff time by making records available to the public who can access the data from a conveniently-located terminal
- Students in elementary, high school, and college, who can use mapping as a fun way to become geographically literate, as well as to improve their knowledge of computers
- The public who wants to enquire about their community and its data

How Does ArcView Compare with Other Desktop Mapping Systems?

ArcView is unique. There is no other solution that comes close to its unusual approach to organising and integrating geographic information. ArcView can be considered to be a stand-alone desktop mapping and GIS solution. In this capacity, it is far cheaper and far more functional than any competitive products. ArcView is also a network product and will have the capability of providing full integration between desktop computing users and large GIS repositories.

Beyond its architecture, ArcView has the additional benefit of being compatible with nearly one billion dollars worth of data that have been converted into the ARC/INFO format. There are thousands of ARC/INFO user organisations that have historically developed or are currently developing smart geographic databases that can be used immediately by ArcView users.

Major Features of ArcView

What are ArcView's features? In a nutshell, it provides the following capabilities.

Visualisation: tools including raster/vector display, pan and zoom, and multiple windowing

Map Legends: tools for easily creating user-defined legends and map classes

Spreadsheet: tools that fully integrate the functionality of a spreadsheet with the functionality of a GIS

Selection tools for spatially selecting a feature by pointing to it with the cursor or by creating a box, polygon, or circle around a set of features. Additional tools are used to manipulate and view attributes of their selections in a spreadsheet type of format

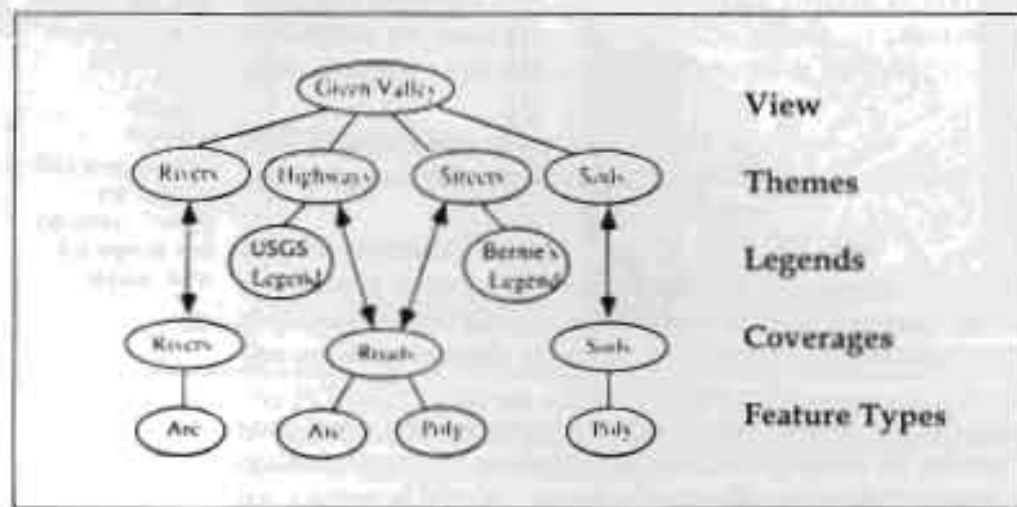
Logical manipulation: tools for logical modelling of tabular data with closely-integrated visualisation tools for graphic representation of the map model

Statistical tools: tools to calculate and summarise statistics about a geographic feature or set of features

Planning: tools that output hard-copy graphics on a host of ESRI-supported hardware devices, as well as tools for generation of industry-standard files, such as PostScript, for easy integration with other desktop applications

Because ArcView is an entirely new product, its design is based on a new approach to working with geographic information. This new approach builds a conceptual model of a user's perception of geographic data into the graphic user interface, resulting in a more intuitive approach to working with geographic data.

The View. The fundamental concept of ArcView is a view. A view is an organizing principle for managing information about geography. Views are dynamic in that they can be updated and modified in the geographic database. Views can also be saved. This means that you can save a view, quit ArcView, then restore the view in ArcView some time later. You can also define multiple views of the same geographic database, a view can also be created from a variety of different data sources. A view is made up of a collection of *themes*.



The Theme. A theme is the representation of a geographic topic of interest. It can be derived from any one of several geographic data sources, including ARC/INFO coverages, image data, or GRID or TIN data. An ARC/INFO coverage can be represented as an individual theme, or several themes can be derived from a coverage representing various categories of features contained within a coverage. For example, you could derive the themes "highways" and "routes" from the coverage "roads" based on attribute information.

A theme also has an associated *legend*, which governs the rendering of features within the theme based on an attribute value. The simplest legend contains one symbol, with which every feature within the theme would be rendered identically. Another legend might contain many different symbols allowing symbolisation of features based on attribute value.

Legends. Legends are an organised set of symbols associated with some property of a theme. A legend is a table organised by a value or a range of values through which a symbol definition may be acquired. For example, a legend of road symbols published by the U.S. Geological Survey and organised by a minor attribute code could be used to render any feature that had corresponding values. That is, if a user had an arc feature with the attribute value "40005" and the feature was rendered using the USGS legend, it would be drawn with the symbology specified by the USGS for that value. If the user then wished to render the map adhering to another standard, a different legend could be loaded.

Table of contents. The *table of contents* is a graphic object with which the user interacts. The table of contents is used to organise the themes of a view. While it is not the view itself, it does reflect the view by listing the themes currently defined for the view, the display status of themes, and their symbology or legend. As the table of contents of a book reflects the contents of a book, ArcView's table of contents reflects the contents of the view.

The table of contents is not simply a static representation of the contents of a view, but an object that is manipulated interactively to facilitate view operations and theme manipulation. For example, adding and removing themes from the current view, changing the symbol or creating a legend for a given theme, or toggling a theme from "visible" to "invisible" is done by interacting with the table of contents.

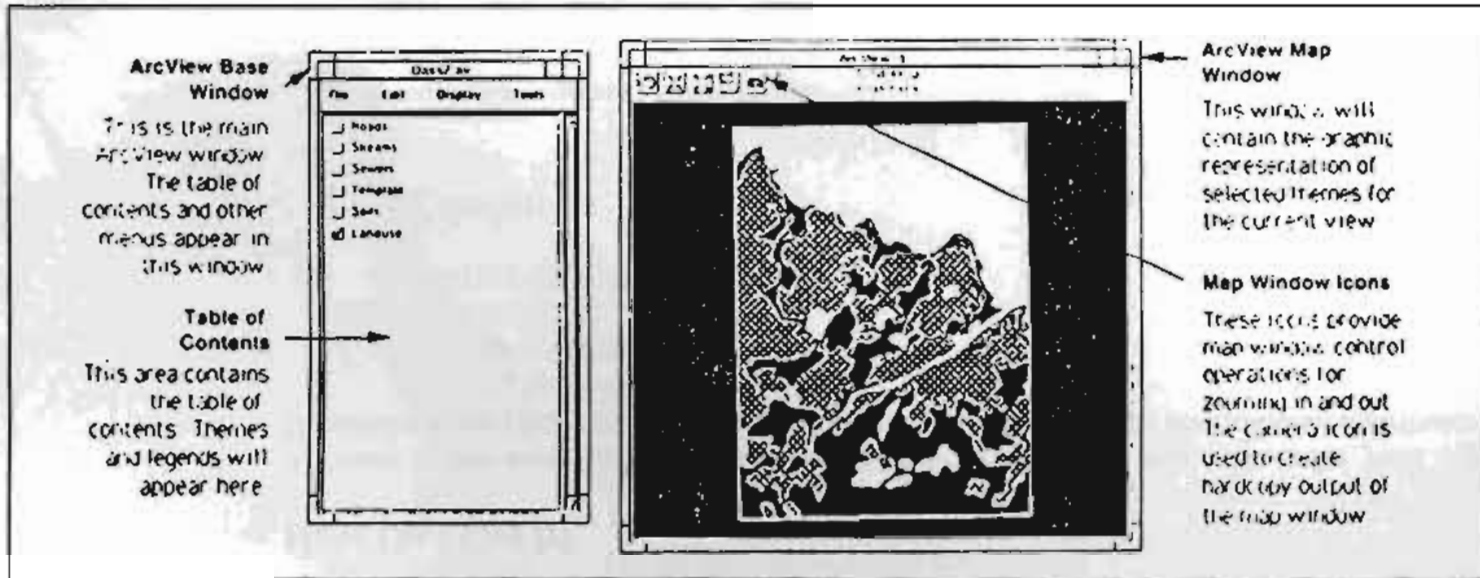
The ArcView interface incorporates two types of windows within the interface design. These windows are called the ArcView Map Window and the ArcView Base Window.

Map window. The *map window* is the main graphic canvas on which geographic features are rendered. It supports pan and zoom operations for control of spatial scene extent. It reports the current location of the screen cursor in the coordinate system of the view and indicates the coordinates of the current spatial scene extent. Like the table of contents, the map window also reflects the view. The themes specified in the table of contents control the contents of the map window.

Multiple map windows can be displayed for the current view. This allows you to have one window that may be used as a reference map, while other windows can be used to zoom in for a close-up view of specific areas, or even display different themes in different windows.

The map window provides tools represented in iconic form, with which spatial queries can be made.

ArcView Tables. Another window in which user interaction with themes can occur is each theme's table. This window displays the attribute information associated with the theme, and it provides tools with which to perform logical selection, generate statistics, and to save reports separately, etc.



Multiple Platforms and Data Compatibility

ArcView has been designed to address all of these requirements necessary for multiplatform support, data compatibility, and network intelligence. Because of new breakthroughs in user interface design tools, ArcView will be available on most of the platforms supported by ESRI that also support windowing environments. This means that ArcView will work on UNIX workstations, PCs, and there will even be a Macintosh version.

The PC and Macintosh versions will be able to access ARC/INFO databases over a network or as stand-alone platforms. Also, because each of these platforms support windowing environments, ArcView will have a similar look and feel no matter what platform the user is working on.

Another significant operational breakthrough for ArcView will be its ability to be a 100 per cent data compatible across all platforms that support ArcView. This means that ArcView will "know" the binary structure in which ARC/INFO geographic data sources are stored on all supported platforms.

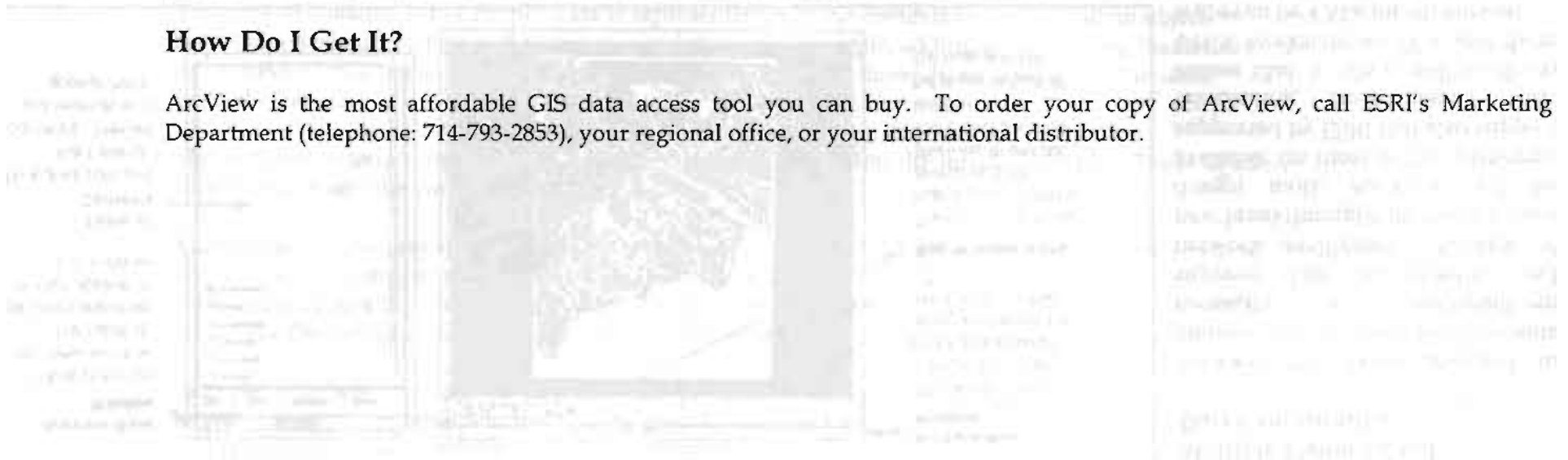
This data compatibility makes ArcView "network intelligent," that is, ArcView will be able to find and access supported data anywhere on a network. For instance, if you have ArcView running on your PC and your PC is on an Ethernet network of PCs and workstations, ArcView will be able to access your local data or data on any of the workstations on the network. If you have Macintoshes connected to the network, the Macintosh version of ArcView will also be able to access workstation data on the network. This capability will be supported on local area PC networks; workstation Ethernet networks; and mixed Ethernet networks having PCs, Macintoshes, and workstations.

Release Plan

ArcView is a completely new product for ESRI. It will be released in several phases on the UNIX workstation. The release plan provides a useful product to UNIX users this summer. The PC and Macintosh versions of ArcView will be released later in 1991.

How Do I Get It?

ArcView is the most affordable GIS data access tool you can buy. To order your copy of ArcView, call ESRI's Marketing Department (telephone: 714-793-2853), your regional office, or your international distributor.



PC-based GIS Hardware Configuration

A. Computers

486 DX2 66 MHZ / Pentium 60/90
8/16 MB RAM
500 MB or Harder Disk
1.44 MB Floppy Disk
SVGA 15" Monitor w/ 1 MB VRAM
Enhanced Keyboard
Mouse

Optional: CD-ROM / Multi-media Kit
Backup system: Streamer tape or Magneto Optical Disk Drive

Brand: Original Brand 113M/Compaq/AST/Dell etc.

B. Power System

600 VA - 1 KVA UPS
for each computer

Brand: AVC/Best or any other



C. Digitizers

A1 size Digitizer w/ 16 button cursor
Size could vary according to User's need
Brand: Calcomp / Summagraphics

D. Plotters

1. HP Designjet 250 C
2. HP Designjet 750C -A1 or A0 size

E. Printers

1. HP laserjet 4 M Plus Laser printer - up to A4 size
2. Tektronix Colour laser printer - up to A3 size

F. Scanners

1. HP Scanjet II c up to A3 size
 2. High Resolution Colour Scanners
- Tangent/Vidar/Microtec - up to A0 size

Software Used in MENRIS



ARC/INFO Version 7.0

ESRI, Redlands, CA, USA



ERDAS PC 7.5

ERDAS, Inc. Atlanta



PC ARC/INFO 3.4.2

ESRI, Redlands, CA, USA



ILWIS

ILWIS 1.4

ITC, Netherlands



ARCVIEW 2.0

ESRI, Redlands, CA, USA



IDRISI Version 4.0

Clark University, Massachusetts, USA



ArcCAD
Release 11.3

ESRI, Redlands, CA, USA



Map Viewer
Thematic Mapping for Windows

Golden Software, Inc. CO, USA



AutoCAD for Windows
Release 12

Autodesk, Inc. USA



SURFER for Windows
Version 6.0

Golden Software, Inc. CO, USA



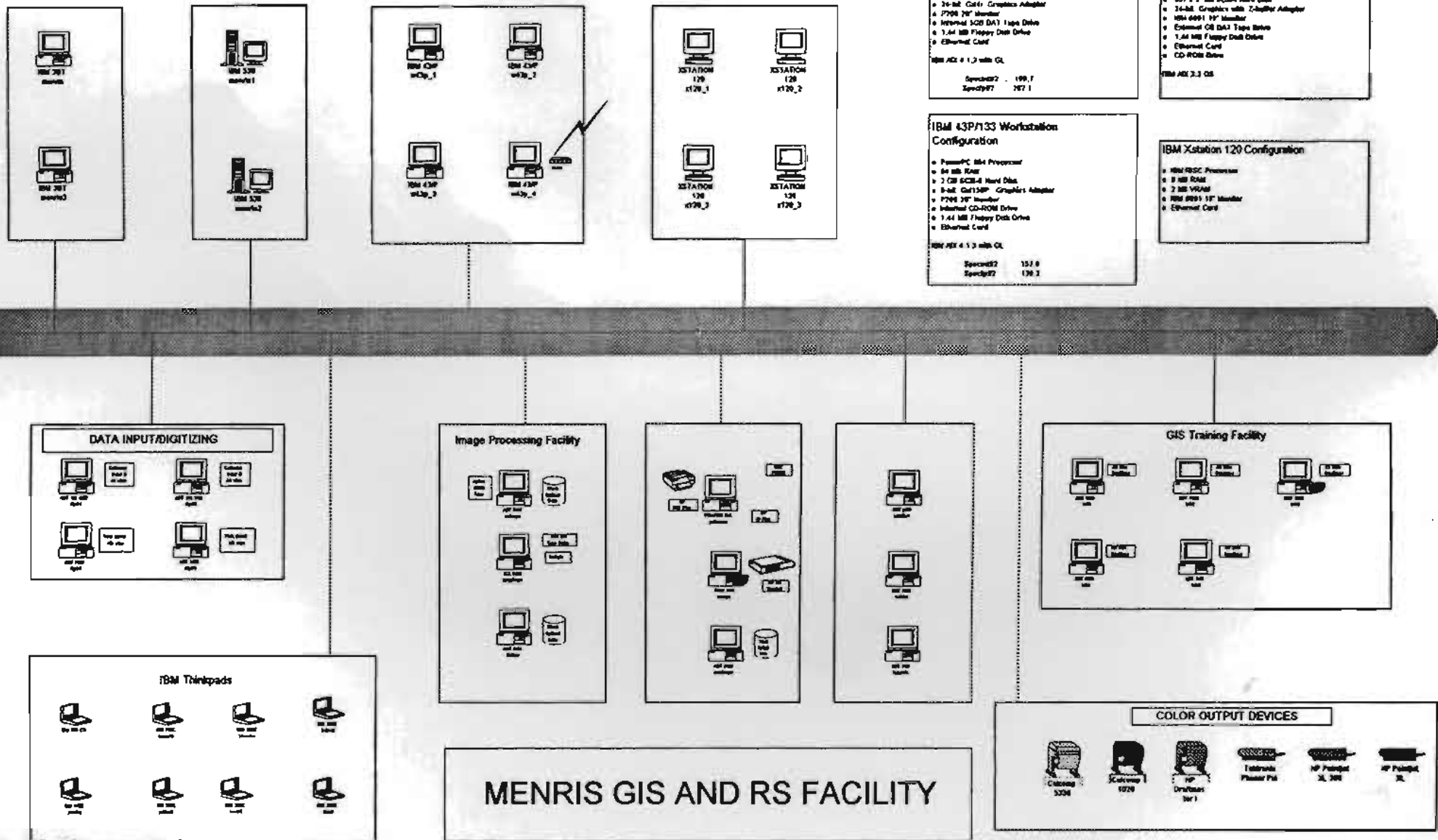
Structured Elevation Model
Version 1.3.0

ESRI, Germany



GRAPHER for Windows
Golden Software, Inc. CO, USA

MENRIS Workstation Configuration



Participating Countries of the Hindu Kush-Himalayan Region

- ☛ Afghanistan
- ☛ Bhutan
- ☛ India
- ☛ Nepal

- ☛ Bangladesh
- ☛ China
- ☛ Myanmar
- ☛ Pakistan

International Centre for Integrated Mountain Development (ICIMOD)
4/80 Jawalakhel, G.P.O. Box 3226, Kathmandu, Nepal

Telephone : 977 1 525313
Facsimile : 977 1 524509
977 1 524317

Telex : 2439 ICIMOD NP
Cable : ICIMOD NEPAL