

31 March 1994

# Release of V4.60 TNT products

## *Introduction*

MicrolImages is pleased to announce that **TNTmips** and **MIPS** are now used in **55** nations.

The principal efforts on **TNTmips**<sup>™</sup> and **TNTview**<sup>™</sup> since the shipment of **V4.50** have been the addition of new features and the support of Microsoft Windows **NT**. Extensive testing and improvement of the existing processes has continued. **TNTatlas**<sup>™</sup> is also being released for the first time for all platforms supported by MicrolImages **TNT** products.

The most important new features added to **TNTmips 4.6** include the first release of pin mapping, automatic legend generation, automatic label generation and placement, supervised neural network classification, and polygon dissolve. Several processes also received major overhauls including surface fitting, buffer zones, and spatial filtering.

Another significant change is a switch from Watcom **C V9.0** to **V9.5** for use with the Microsoft Windows 3.1 (**MSW3.1**) version of the **TNT** products. This required minor but significant adjustments to the **TNTsdk** libraries. The change was mandatory because new clients purchasing **TNTsdk** can no longer purchase Watcom **C V9.0**. The **V9.5** compiler now sold is not backward compatible with **V9.0 TNTsdk** libraries which required changes as well as recompiling. However, using **V9.5** now provides all **TNT** processes optimized for **586** based **PCs** improving execution speed. Reports in the literature indicate an average 15% increased performance when using 32-bit optimized code on 586 based **PCs**. Those using **386** or **486** based **PCs** will experience no change in speed of execution or operation.

All **V4.60 TNT** products are now being distributed in the standard MicrolImages' **CD-ROM** format including **TNTmips**, **TNTview**, **TNTatlas**, and **TNTsdk** for all platforms supported by MicrolImages. Previously **TNTatlas** did not exist as a product and **TNTsdk** was distributed separately on floppies and tape. Also two additional versions of all of these **TNT** products are being distributed for the first time, increasing the number of versions of the **TNT** products supported from 9 to 11.

The new versions released are for use with Microsoft Windows **NT** for Intel based systems (**MSNT-I**) and for **DEC Alpha AXP** based systems (**MSNT-A**). Thus, for the first time two **CD-ROMs** (red **A** and black **B**), are being used to distribute the **V4.60 TNT** products. You need not worry which disk contains the version of interest to you. Simply start with either disk red **A** or black **B** and the installation process present on both disks will instruct you as to how to proceed.

None of the 11 versions of **TNTmips 4.6** are compressed and every version (except for Mac via **AU/X**) can now be run directly off the appropriate CD-ROM with a minimum, simple, fast installation. The new *Detailed Installation and Optimization Manual* shipped with this **V4.60** release will instruct you how to set up to run each version from CD-ROM. Alternatively, simply start the installation and follow the instructions to

transfer to your hard drive or run from the CD-ROM. If you wish to start with the correct CD-ROM for the platform (this is not required however) you will find that:

disk red A contains the versions for installation on  
Intel based **PC** using Microsoft Windows **V3.1**;  
Intel based **PC** using Microsoft Windows **NT**;  
Alpha based **PC** using Microsoft Windows **NT**;  
**DEC** 3000 or 5000 using Ultrix;  
Mac using **AU/X 3.01**; and

disk black B contains the versions for installation on:  
Sun SPARCstation using Solaris 1.x;  
Sun SPARCstation using Solaris 2.x;  
**SGI** using **IRIX**;  
**IBM** using **AIX**;  
Data General using **DG/UX**; and  
**HP** Apollo using **HP-UX**;

The two **CD-ROMs** for **V4.60 TNT** products are being supplied to every MicroImages' client regardless of the status of your subscription for **TNT** products. Floppy disk media for **PCs** and tape media for workstations are also supplied to those who have subscribed to a **TNT** product and specified such other media in their current product registration.

**V4.7 TNT** products will be shipped to all active subscribers about mid-June on the normal quarterly release schedule.

## *TNTmips™ 4.6*

If you have subscribed to use **TNTmips 4.6**, please proceed to install it from the **V4.6 TNT** products' **CD-ROMs** following the instructions provided by the **INSTALL** process on either disk or in the new *Detailed Installation and Optimization Manual* shipped with this **V4.60** release. If you did not order **TNTmips 4.6** and wish to do so now, please contact MicroImages by **FAX** or phone to arrange to purchase the required quarterly upgrades to **V4.60**. MicroImages will immediately supply you with an authorization code by **FAX**. Entering this code when running the installation process will allow you to complete the installation and immediately use **TNTmips 4.6**. Also, any additional support feature (**P5**, **X3**, **L3**, and so on) can now be directly ordered via phone or **FAX**. A similar authorization code will be provided by **FAX** which will allow the immediate installation and use of the new feature by following the instructions in the new *Detailed Installation and Optimization Manual*.

Loading a full installation of the **TNTmips 4.6** processes onto your **PC** hard drive for **MSW3.1** will require just less than 65 megabytes with an additional 11 megabytes for the new compressed illustrations. The full install of the **TNTmips 4.6** processes onto your **PC** hard drive for **MSNT-I** will require 109 megabytes with an additional 11 megabytes for the new compressed illustrations. The full install of the **TNTmips 4.6** processes onto your hard drive for **MSNT-A** will require just less than 118 megabytes with an additional 11 megabytes for the new compressed illustrations. The full installation size, including illustrations, will vary for workstations depending upon the platform type as follows: Data General = 84 mb; Hewlett-Packard = 89 mb; Sun SPARCstation with Solaris 1.x = 89 mb; Sun SPARCstation with Solaris 2.x = 77 mb;

SGI = 126 mb; Mac via **AUX** = 73 mb; DEC Ultrix = 113 mb; and IBM RS6000 = 160 mb.

## *TNTlink™ 4.6 for TNTmips 4.6*

**TNTlink** is the new designation of the extended feature previously referred to as the HyperIndex® linker option. The word HyperIndex® now refers to a concept for the storage and retrieval of geographic materials in the **TNT** products.

When adding a new index into a HyperIndex stack, clicking the right mouse button not only saves the index area, but also activates the "Edit Link ..." window so that you can add links to the new index area. Previously, it was necessary to switch between the two modes, which was not intuitive.

## *TNTsdk™ 4.6 for TNTmips 4.6*

If you have subscribed to use **TNTsdk 4.6** please proceed to install it from the **V4.6 TNT** products' **CD-ROMs** following the instructions provided by the **INSTALL** process on either disk or in the new *Detailed Installation and Optimization Manual* shipped with this **V4.60** release. If you did not order **TNTsdk 4.6** and wish to do so now please contact MicrolImages by **FAX** or phone to arrange to purchase the required quarterly upgrades to **V4.60**. MicrolImages will immediately supply you an authorization code by **FAX**. Entering this code when running the installation process will allow you to complete the installation and use **TNTsdk 4.6** immediately.

As outlined above, to use **TNTsdk** with **TNTmips** via Microsoft Windows 3.1 (**MSW3.1**) platform you will now need to use Watcom **C V9.5**. The use of **TNTsdk** with **TNTmips** on Microsoft **NT** for the Intel or **DEC** Alpha **AXP** platforms requires the Microsoft 32-bit **C** available for these platforms. There has been no change in the compilers used by MicrolImages for those using other UNIX platforms.

**TNTsdk 4.6** now contains approximately 1850 **C** functions grouped into several categories as follows: **TNT** Project File access, user interface and graphics, font management, I/O port interface, object display, database query, map projection conversions, and others. Since **V4.50**, the simple documentation of each of these functions has been reviewed and upgraded and is available as part of this **V4.60** release. This upgrade of the documentation has also been completed to support the upgrade and re-issuing during the next quarter of the Application Note (essentially a user reference) describing the use of the **TNTsdk**.

Interest in the use of the powerful **TNTsdk** library is growing among **TNT** clients. At the MicrolImages' 6th Annual Workshop in January, several clients requested a workshop on the use of the **TNTsdk** and the simpler internal Spatial Manipulation Language (**SML**). An announcement of an opportunity for such specialized training to be provided by Paris and Associates in sunny California is enclosed with this release. MicrolImages encourages you to consider this program seriously if you are using or anticipate the use of either of these tools to expand **TNTmips** for your special purposes.

Again, MicrolImages again strongly recommends that anyone using **TNTsdk**, and the **MIB** it provides, should obtain *Volume 6: Motif Programming Manual* from the O'Reilly and Associates *X Window System Series*. A small brochure covering this and the many other fine O'Reilly books in this series is enclosed. Our United States clients will also

find that Barnes and Noble stocks the O'Reilly books in their book stores as well as many other technical books on X Windows, UNIX, and Internet.

### New Features in MI/B.

MicroImages Builder (**MI/B**) is a graphical process for building **X** Window user interface components for **OSF/Motif 1.2** applications. With **MI/B** you can define the look of your interface and test it immediately as you design it. You can then create standard 32-bit **C** code for the interface which can be recompiled with your 32-bit application code on any of the platforms supported by MicroImages **V4.60 TNT** products. Several new features have been added to **MI/B** for **V4.60** as follows.

Callback functions can now be added when a widget is created.

MxdxCreateWin, which creates a display window as in 2D display, has been added to the tool box.

MxButtonField has been added to the tool box and can be used to create a push button and associated text inside of a form.

MxPrompts has been added to the tool box and can be used to create a reference label and the text inside for a push button inside a form.

Please note that for use on **MSW3.1** based platforms, your file (\*.mui) that was saved by **MI/B** in **V4.50** or **V4.51** cannot be opened by **MI/B** in **V4.60** due to alterations imposed by changing from Watcom **C V9.0** to **V9.5**.

Those using **MI/B** should provide input as to what they would like to have added next as we have exhausted most of our ideas.

## *TNTview™ 4.6*

**TNTview 4.6** has been upgraded from **V4.50** with the new and modified features such as pin mapping which it has in common with **TNTmips 4.6** and as described in detail below in the section on *New Features* .

A **TNTview** product authorization key works with either PC or all platforms according to the version you purchase. **TNT** Project files or HyperIndex stacks prepared with **TNTmips** using the **TNTlink** product (formerly HyperIndex Linker) on a specific platform (for example a Sun SPARCstation) will immediately work in **TNTview** on any other platform (for example a portable **PC** using **MSW3.1**).

The sample use of **TNTview 4.6** is included with every **TNTmips 4.6** system and is provided on the **V4.60 TNT** products' **CD-ROMs**. This is referred to as "sample use" because it can be installed and used as a separate product with your current **TNTmips** product authorization key. However, **TNTview** is a stand-alone product designed for use on a separate platform with its own product authorization key.

Those who have purchased **TNTview**, or its predecessor **MIPSview**, for its designed use on a separate and stand-alone platform [product **V10**] will also use these same **CD-ROMs** for installation. Similarly, those who have purchased the older stand-alone HyperIndex for its designed use as a separate and stand-alone product [products **J10** and **H10**] can also use these same **CD-ROMs** for installation with their authorization key.

**TNTview** has its own installation procedure provided when you run **INSTALL** off either **CD-ROM**. The installation is also described in the new **V4.60 TNT** products *Detailed Installation and Optimization Manual* shipped with this **V4.60** release. As before, **TNTview** can be installed to run from your hard drive or from the appropriate **CD-ROM** (except on UNIX platforms) and started from an icon in **MSW3.1** or **MSNT**.

If **TNTview 4.6** is being installed on the same hard drive as **TNTmips 4.6**, it will detect this and share many of the files such as the **MI/X** function. Thus, the directory created for **TNTview 4.6** will have fewer files if installed on the same hard drive as **TNTmips 4.6**. If you install only **TNTview 4.6** in stand-alone form on the hard drive of computer equipped with **MSW3.1** or **MSNT** it will require nearly 10 mb. An installation on a workstation using UNIX will require somewhat more hard drive space.

MicrolImages has upgraded at no charge, all previous versions of the stand-alone HyperIndex, **MIPSview**, or **TNTview** into the latest **TNTview 4.6**. In the future it will be necessary to purchase a subscription at a small cost to receive the new features which will be added quarterly to the stand-alone **TNTview** product. The upgrade price is contained in the enclosed revised price list. Those clients who use **TNTview** for sample use with their **TNTmips** product authorization key will continue to receive it without additional cost for sample use as part of their **TNTmips** upgrades.

A preliminary draft of a descriptive marketing brochure on the **TNTview** product and its general application is included with **V4.6**. The final printed version of this promotional item will be shipped to all clients during the next quarter.

The detailed printed manual for **TNTview** is not yet available but is expected to ship to all clients in final form in 6 weeks.

## **TNTatlas<sup>TM</sup> 4.6**

**TNTatlas 4.6** has now been recreated from the earlier stand-alone HyperIndex product and is available for purchase and use at a lower cost on any computer platform supported by MicrolImages. It is also distributed on the same **V4.60 TNT** products' **CD-ROMs**. It can be installed from these **CD-ROMs** on any of the computer platforms supported by MicrolImages and equipped with a **TNTatlas 4.6** physical authorization key.

A **TNTatlas** key works with PC or all platforms according to the version you purchase. HyperIndex stacks prepared with **TNTmips** using the **TNTlink** product (formerly HyperIndex Linker) on a specific platform (for example a Sun SPARCstation) will immediately work within **TNTatlas** on any other platform (for example a **PC** using **MSW3.1**).

**TNTatlas 4.6** can also be installed for sample use by any **TNTmips 4.6** or **TNTview 4.6** client on the same computer platform using that authorization key. This is referred to as "sample use" because it can be installed and used as a separate product with your **TNTmips** product key. However, **TNTatlas** is a stand-alone product designed for use on a separate platform with its own authorization key or in licensed version directly from **CD-ROM** without an authorization key. If you install only **TNTatlas 4.6** in stand-alone form on the hard drive of computer equipped with **MSW3.1** or **MSNT** it will require nearly 10 mb. An installation on a workstation using UNIX will require somewhat more hard drive space.

It will also be necessary to purchase a subscription at a small cost to receive the new features which will be added quarterly to the stand-alone **TNTatlas** product in the future as described below in the section entitled *New Synoptic Price List* and on the enclosed price list. Those clients who use **TNTatlas** for sample use with their **TNTmips** or **TNTview** product authorization key will continue to receive it without additional cost for sample use as part of their **TNTmips** or **TNTview** upgrades.

## **TNTdemo<sup>TM</sup> 4.6**

During the quarter you received a supplemental mailing of a draft of a promotional item on this new **TNT** product. The final printed version of this promotional item is included with the release of the **V4.60 TNT** products. Additional copies of this promotional item will be airmailed to you upon request.

**TNTdemo** is working well for those clients who have associates who might be interested in applying **GIS** and image processing in their professions. **TNTdemo 4.6** allows them to try the Microlimages products on almost any computer they may have.

## ***Revised Detailed Installation and Optimization Manual***

A revised and updated *Detailed Installation and Optimization Manual* has been included with this release. Please note that it contains descriptions of all the tricks currently known to Microlimages to speed up your use of Microsoft Windows 3.1 for large task operations and thereby the **TNT** products.

from floppies for Microsoft Windows 3.1 (MSW3.1).

The 5.25" disk version has 42 disks as follows: 34 containing processes (system outline fonts are not being replaced); 7 containing the on-line documentation including illustrations; and 1 with the installation process and the utilities.

The 3.5" disk version has 36 disks as follows: 29 containing processes (outline fonts are not being replaced); 6 containing the on-line documentation and illustrations; and 1 with the installation process and the utilities.

from tape for 8 brands of UNIX.

If you have requested your UNIX variant of **TNTmips 4.6** on 4 mm, 8 mm, or 1/4" **QIC** tape please see the instructions in the new **V4.60 TNT** products' *Detailed Installation and Optimization Manual* included with this release. Alternatively, please follow the instructions on the page which accompanies your tape.

## ***On-Line Documentation***

The 689 on-line illustrations for **TNTmips** are being distributed for the first time using the advanced compressed, tiled **TIFF** format (**ctTIFF**) instead of the **RVC** format. In the uncompressed form these 689 illustrations would have been 87 mb but occupy only 11 mb in this new **ctTIFF** format. Overall this has compressed the illustrations by a factor of 9 to 1 since many of the illustrations are simple window samples. Microlimages now recommends that the **TNTmips** illustrations be installed on your hard drive for convenient access, although access from the **CD-ROM** remain possible and equally fast.

The illustrations will not be decompressed when installed and are directly displayed by the on-line documentation process from the **ctTIFF** files. Displaying illustrations from

the new **ctTIFF** format will be just as fast or even faster than from the previous **RVC** raster object format used in **V4.5**. The speed increase is greatest on faster machines such as a **586** as the effect of slow drive reading is now much less and the faster decompression is a function of processor speed.

Another important advantage of the distribution in **ctTIFF** format is that each of the 689 individual illustrations can now be directly loaded into other commercial software packages for manipulation, alteration, translation, printing, etc. However, it is important to note that not every commercial product has yet supported the loading of this advanced format, and few can save into it. If you need to use illustrations in other software in other more conventional **TIFF** formats, then import the **ctTIFF** into a raster object and then export to the format needed.

An equivalent of 1519 single-spaced printed pages of on-line documentation are included with **V4.60**. Last minute, additional sections were completed for the new features in **V4.60** after the master disks were created for the reproduction process. These 34 additional pages are included in supplemental, printed form. The on-line documentation printing capability is available but will not yet print the on-line illustrations.

As in the past, a master copy of the **V4.60** on-line documentation, including illustrations, has been deposited at Kinko's Copy Center in Lincoln for your direct ordering. It does not include the temporary supplemental printed sections which you are receiving directly with **V4.60**. Please be careful to specify the exact version number for the documentation you wish to order from Kinko's since they have both **V3.32** (no changes for **V3.33**) and **V4.60** on hand. Please contact George Hiatt; Kinko's Copy Center; 1201 "Q" Street; Lincoln, NE 68508 at voice (402)475-2679 or FAX (402)475-2523 for this service. The printed copy of the 1519 pages for **TNTmips 4.60** (specify single or double sided) is approximately \$120 plus the charge for shipping by the method you specify. A credit card is the best way to pay Kinko's for both the copying and shipping.

## *Microlimages X Server (MI/X)*

### Using Microsoft Windows 3.1 Keyboard Drivers

**MI/X** has been altered so that it will use any Microsoft keyboard driver which you have already loaded to localize **MSW3.1** for your language. Thus, if you have set up **MSW3.1** for use in Russian, you have already loaded the Cyrillic keyboard driver for use by **MSW3.1** and it will also be used by **MI/X** and all the **TNT** products.

The Russian (and other non-U.S.) versions of **MSW3.1** use character sets encoded in the upper 128 positions of the normal 1-byte = 256 character encoding scheme. English and other Latin based languages use the lower 128 encoding positions and normal keyboard drivers. **MSW3.1**, and now **MI/X** and the **TNT** products, map the keyboard into these upper 128 codes so they can be used. These new **MI/X** features have been tested in Russian and allow them complete use of **TNT** products in Cyrillic, including their need to edit **TNTmips** database records.

Microlimages will now focus attention on adding to **MI/X** the keyboard entry methods for 2-byte languages. The first effort will be on Chinese since Microlimages has already written and tested a separate version of the popular phonetically based keyboard entry method. Microlimages also has Chinese software staff to assist us in this step.

Japanese keyboard entry methods are also being researched and undertaken to assist our new clients in that nation.

### Future Platforms.

The release of the **TNT** products for **NT** on the Intel and Alpha **AXP** platforms brings the total number of platforms supported by these products to 11. Digital Equipment has now arranged to provide Microlimages in late April with a **DEC** Alpha **AXP** 3000 model 600 to support porting the **TNT** products to this platform using **OSF/1** = UNIX. It is anticipated that the **TNT** products will be available for this new platform with the release of **V4.7** in June.

## *Use on 586 based PCs*

As noted above, the **V4.60 TNT** products for Microsoft Windows 3.1 (**MSW3.1**) now use Watcom **C V9.5** which provides about a 15% increase in performance on **586** machines relative to **V4.50** which used Watcom **C V9.0**.

The 14 March issue of INFOWORLD contains the test results of 10 personal computers using the **586** processor (Compaq, Acer, Dell, and so on). The Gateway machines we have been recommending received the highest score and had the lowest price. Gateway and several other manufacturers have announced that **586** models operating at 90 megahertz that will be available for order in a month. Models based upon 100 megahertz **586** processors will be introduced in late summer by Gateway and others.

The 12 April 1994 version of PC Magazine contains an article entitled Unleashing the Power of the Pentium on pages 114 to 181 which compares 31 of **586** based machines and which ranks a Dell machine as best. However, please note that this Dell machine cost \$7300, which makes it approximately twice as expensive as the Gateway machine tested in the INFOWORLD review article included with **V4.60**.

Microlimages has now purchased and successfully tested the current standard Gateway 2000 with a 66 megahertz **586** processor and all standard features including display board and monitor. These are the same machines we are introducing into our own internal operations and being purchased by our staff for their personal use. In tests comparing this model with its **PCI** bus, accelerated graphics card, and so on to our Sun **IPX** and **LX** machines, this Gateway model significantly outperformed these workstations even when multiple task situations were tested and compared.

The current price on the Gateway **586/66** (66 megahertz chip) is \$4000 when equipped as their standard "best buy" bundle as follows: **586/66**, 16 mb **RAM**, tower case, several **ISA** and **PCI** expansion slots, keyboard, double speed **CD-ROM**, 528 mb hard drive, 3.5" floppy, **ATI's** new **PCI AX0** display board with 2 mb of **VRAM** (1024 by 1280 by 8 bit), 17" monitor, mouse and pad, **MSW3.1**, and a Microsoft software product such as Word or Excel. Delivery time is now 3 weeks.

The Office Depot and Best Buy national chain stores have just lowered the price of their entry level Packard Bell **586/60** based machines to \$2500. This includes a 1024 by 768 pixel fast color display board but no monitor. These stores have just added a model with a **CD-ROM**.

## *Sun Solaris Errors*



There have been additional errors acknowledged by Sun in Solaris 1.x and 2.x in Open Windows V3.0, 3.1, and 3.2 when used with Motif 1.2 programs subsequent to those distributed with **TNTmips 4.5**. If you are not sure if you are using Open Windows V3.x check this on the Open Windows start-up screen. **TNTmips 4.4, 4.5, and V4.6** use Motif 1.2 and will be affected!

You will experience serious problems with Motif 1.2 based software if your version of Open Windows has not been patched. Please check with your systems manager to make sure all these patches have been applied to upgrade you for operation with Motif 1.2 processes such as the **TNT** products. Please make careful note to bring to their attention that the required patches vary depending upon whether you have a Sun class 4C (older) or "Sun class 4M (newer) machine.

Solaris 2.3 has been released by Sun and **TNTmips** is being tested with it for any idiosyncrasies. Please contact Microlimages if you are already using this product and are having any difficulties.

## *Internet*

Microlimages has just completed the installation of a Tatung workstation node on Internet at T1 communication rates (approximately 1.4 megabaud service). Our domain name will Microlimages.com (case insensitive). More information on this will be provided to all clients in several weeks as we get this node developed. Please give us some time over the quarter to organize this new service.

It is anticipated that you will eventually be able to access and download the processes in the official quarterly release of the **TNT** products (for example **V4.60**) on this server at the same time as they are distributed via **CD-ROM** and that they will remain available for the balance of the quarter. It is also anticipated that you will be able to access for downloading, at your own risk, a fixed but less tested supplemental version of various processes.

If you do not have access to Internet, CompuServe has announced that it will provide full feature access to Internet sometime this year, including logging into remote computers such as ours and downloading software and files. America Online and Prodigy Services have made similar announcements. Delphi International and BIX already provide full access to Internet should they be locally available to you.

## *New TNTmips Features*

\* Paragraphs or main sections preceded with this symbol "\*" introduce significant new features or processes released for the first time in **TNTmips 4.6**.

### System Level Changes.

\* The View Position window is renamed the Locator window. It is also now available in all processes which provide the standard display to show the relative size and position of the extent of the composite of all the layers in that display.

Icons have been added to the View window for "Redraw", "Skip", and "Cancel" buttons.

The "last used" directory is retained for each available drive. This directory will be automatically selected when switching to select something from that drive.

New folders can now be created in existing **TNT** Project Files as previously in **MIPS V3.33**. Folders in **TNT** Project Files are analogous to subdirectories and are available to assist you in logically organizing and accessing objects in the file.

\* Pin Mapping in Display [A prototype feature]

Pin mapping has been added as an important new feature within the 2D display process. It allows a database table whose records contain X-Y coordinate information to be displayed directly and graphically. The coordinates can be in any supported coordinate scheme and map projection. In addition, you have considerable control over how the points are displayed. Symbols from a "style" object can be specified in a query, with size, color, orientation and other drawing attributes are controllable based on fields in the record.

The addition of pin mapping provides a new orientation toward showing symbols on maps and images. With this new feature you do not have to start out from a graphically oriented GIS viewpoint and learn how to get your database records attached to point elements in a vector or **CAD** object. A spatially oriented relational database object is also now defined for you if it contains coordinate fields. It can be internal to **TNTmips** or linked externally. Those more comfortable with database systems and their manipulation can now design and run queries against their database tables and immediately create complex spatial displays of their results.

If you choose to display an object(s) from any **TNT** Project File prior to the execution of your query, then the "pins" which you create will be "stuck" at the right positions in the map, line drawing, image, or whatever reference material you display. And as always, the geographic coordinates of your pins will be converted, as queried, to match whatever geographic coordinate scheme and map projection you choose for the display of your pin map. Finally, the "pin map" you create may be printed using Map and Poster Layout.

The operation of this new pin mapping feature is provided in the printed supplemental documentation provided.

\* Displaying Compressed, Tiled **TIFF** files (**ctTIFF**) [A prototype feature]

**TIFF** files of every known **TIFF** format, including the most complex compressed, tiled **TIFF** format (**ctTIFF**), can now be linked to via the selection process in display. A link to the **ctTIFF** format is significant in that it allows both the large raster display advantages of the tiled format and very significant compression of some large raster objects such as those which contain scans of line drawings. Should you already have such uncompressed raster objects in **TNT** Project Files, they can be exported to the **ctTIFF** format and then linked back to a B Project File using the display or import processes.

The scanning process within **TNTmips** has not yet been altered to scan to this **ctTIFF** format. You will also find that other scanning programs you are using with your scanner will not scan to **ctTIFF** format but to other simpler **TIFF** formats including tiled **TIFF** without compression. A **TNTmips** utility program **COMPTIFF** has been added which will convert a file of any other known **TIFF** format to **ctTIFF**. This utility should be used on any other generic **TIFF** file before linking to it in display.

Links to all **TIFF** and **TARGA** files created in display are now "permanent" and you will be prompted for the new raster object defined by the link. Thus the linked objects created in display are now available to every other process, just as if they had been

linked previously in the import process. This allows printing of raster objects which are actually linked **TIFF** or **TARGA** files. It also lets **TNTview** and **TNTatlas** users access linked objects which can be changed or updated in other processes.

#### \* Auto Color Displays.

An important display option has been added under "Enhance / Auto Color Map" which will be referred to as auto color map. Auto color map provides for automatic color table generation for a classified image based on the means of the spectral classes of the source images. These color tables are then used to display natural or color infrared images from unsupervised classification results (usually 256 classes).

Unsupervised classification programs produce output rasters that have random color maps. Much more meaningful color displays can be prepared using color maps created in this new auto color map process. Displaying unsupervised classification results in pseudo color, or pseudo color infrared, greatly assists in their subsequent interpretation and labeling into a final class map. Labeling a 256 cluster image, while viewing it in pseudo color infrared, provides considerable insight into the identity and class of each of the original clusters.

Distributing a single 8-bit image which can then be displayed in color, color infrared, and other renditions is also an effective data compression concept. Furthermore, the single band classification image can also be effectively compressed spatially since it contains less noise than any of the original images.

First, display the output of the classification program using the display process. Then select Enhance and Auto Color Map from the menu. A dialog box will appear and ask you to select statistics for the rasters which will determine the colors as the inputs for Auto Color Map. These rasters will usually be the ones you used for the inputs for the original classification process. However, you may also select other rasters that are the same size as the classification raster.

After your raster selections are made, a list of them will appear inside a scrolled window. Designate separate rasters to represent red, green, and blue for the current display. Then select a contrast table for each raster. A color map will be produced and the classified raster object will be redisplayed using this new color map.

You can save the new color map for subsequent use with the classified raster in other **TNTmips** processes. You can change your designations for rasters, contrast tables, and create another color table. In this fashion, a single classification raster can later be viewed in color infrared, natural color, special color combinations, and individual bands.

More quick-use details are available under "Help" and "On Window". The detailed operation of this new auto color feature is provided in the printed supplemental documentation.

#### Other 2D Display Modifications

The raster display control panel has been simplified separating the single and multiple raster display modes.

A "skip" button has been added to skip the display of layers in the View window. It will cancel the drawing of the current layer and immediately begin to display the next layer. This is particularly useful in Map and Poster Layout to speed up the display of the particular layer you are actively working on without displaying all other lower layers or displaced groups.

The "draw" button can be pressed during drawing process to "update" the display showing the progress of the composing of the display in memory to that point.

The View window will now automatically refresh every 30 seconds during the drawing process. A "Refresh Interval" selection is provided on the Options menu to set this time interval to some other value. Thus, the display will now automatically "update" the display at the interval you select so progress can be seen when drawing large objects. This is also useful when demonstrating to others the process of the complex overlay of numerous layers.

Additional group orientation options: top-at-left, top-at-right, and upside-down have been implemented allowing non-georeferenced groups to be reoriented when displayed.

\* Making Legends in Map and Poster Layout [A Prototype Feature].

This significant new feature is now provided in Map and Poster Layout. It is used to automatically generate a map legend for your layout. The items shown in the legend can be points, lines, or polygon fills and the associated descriptive text. With this prototype release of this new feature you must create separate legends for points, lines, and polygon fills. However, you can create as many legends as you like in a particular layout.

The legend design is stored in a new layer type available in Map and Poster Layout for legends. This layer can be created by selecting "Layer / Add / Legend". A Legend layer requires a Legend object (select "New Object" to create one) and also requires a style object. The style object can be one which already exists as a subobject of a vector or **CAD** object. It contains the description of how all of your points and lines would be rendered and the patterns used for polygon fills. When you have identified your legend and style objects, you will be shown the Legend Display Controls window. This window allows you to design the overall appearance of each legend block, such as the sizes and spacing of the elements in your legend; text style (font, style, size, and so on); color of background; number of columns of elements; and other characteristics. If you want every style for an element type to appear in the legend, then simply click OK.

The Edit Legend button in the same window will present a Legend Editor window to select which point, line, or polygon fill styles will be placed in the legend. This window will present two scrolling lists, the right containing all the styles for the selected element type in the style object you selected, and the left for those you wish to appear in your legend. For a new legend object, both lists will be initialized to contain all styles of the selected element type. For a new legend object, simply delete those styles from the left list which you do not want to appear in your legend. For a previously created legend object you can use the list of all the available styles to restore style to the legend list on the left.

The order of the styles selected to appear in the legend can be set in the Legend Editor window. Simply select a style from the left scrolling list and click the Up or Down button to move it in the list.

The text description for each style in the legend defaults to the name of the style. To change this description, select the style in the left list and edit the description in the area provided. This text is left justified and can be several lines which will be centered vertically to the right of the style sample. **V4.70** will provide for getting this text by a

relational database query from the associated attribute tables and representing either fields or computed results.

Selecting elements to delete, move or edit in this new legend process uses new standard multiple selection procedures. These procedures will gradually become available elsewhere within **TNTmips** (for example, they have also been added in the style editor). These procedures expedite the selection of multiple entries. There are thus several ways to highlight multiple entries.

Click and hold the left mouse button, then drag the mouse down the list. This will highlight several consecutive entries.

Click on one entry, then while holding down the Control key, click on another entry. This will highlight the 2nd entry in addition to the first one. You can highlight any number of randomly selected entries with this approach.

Click on the first entry, then while holding down the Shift key, click on another entry. This will highlight all entries in the list between the two selections.

Click on any entry to make sure that the list has keyboard focus, then press <Ctrl-/> (the control key and forward slash). This highlights all the entries in the list.

Please note that the format of the legend object may change between the release of **V4.60** and **V4.70** as this feature is not fully implemented. Thus, legends you create now may not be reusable again in **V4.70**. In fact, we request your input for the improvement of this prototype feature during this quarter. Features which we already plan to include are legend headings, grouping of sample styles with headings, combining sample styles for points, lines, and polygon fills into a single legend object; outlining box for the legend, additional control of the placement of the samples relative to their descriptions and each other, and so on.

The detailed operation of this automatic legend generation feature is provided in the printed supplemental documentation.

#### Importing and Exporting Rasters.

ERmapper raster images can be imported into a raster object. The export for this process will be added immediately after the shipping of **V4.60**. If you need this export format for ERmapper before the release of **V4.70** please request it via Technical Support for interim delivery via airmail or grab it from MicrolImages via Internet in a few weeks.

The generic raster import process has been improved to more efficiently import large rasters. For rasters with a column count greater than about 3000, the import will now run 20 times faster.

#### Slope, Aspect, Shading.

The aspect raster is now correct.

#### Combining Rasters.

The user interface for this process has been totally redone to streamline it. The Modified Normalized Difference procedure has also been added to this process.

#### Spatial Filtering.

The spatial filtering process has been completely overhauled. The user interface has been improved and all known problems in this process have been resolved.

Thresholding works correctly and the options provides you with greater flexibility in controlling the output. All filter kernels can now be edited and filter kernels, along with their optional settings, can be saved as a filter object. This means that large kernels requiring extensive editing can be saved and later reloaded for alteration and reuse. The filtering process is also about twice as fast and the output raster is tiled for greater efficiency when displayed or used in other processes. The process also now has on-line help available.

#### Surface Fitting.

The user interface has been redesigned to streamline this process.

The process now will create an output raster object of any numeric data type selected.

An automatic "auto-rescale to output range" option has been added.

\* All input data points are honored for all methods (except for the polynomial method).

The process is now significantly faster in some cases.

\* The triangulation method will no longer extrapolate outside the triangles created. This will improve the fit to the area inscribed by the triangles.

\* The specific elements in the vector object to be used to define the surface can be selected by a query. This feature can also be used to exclude data which is obviously out of range due to data preparation errors.

The inverse distance method has been modified so that the search region used can be selected and sized as "circle", "square", and "diamond".

#### Progressive Transform.

The Progressive Transform process has been simplified for new users. The layout of band information has changed to make it more complete. You can also save the status and data of the process at any stage of use and reload it later. This allows you to do a large complex operation in several different sessions instead of having to work from start to finish in one session.

The titling of component rasters has changed from "Bands" to "Components" for clarification,

The selection of a contrast has been added to the selection of component rasters.

The editing of a reference raster layer now allows the user to change color maps without reselecting and rezooming the same raster object.

"Save Current State" and "Load Previous State" options are available. These allow the saving and resumption of a transform.

The selections on the main menu File option are now presented in a more intuitive order.

Help text is available for the main window of the display process.

#### Georeferencing.

The Locator window has been added and can be selected via the View menu.

#### Resampling Rasters.

The process will now automatically handle projection conversion if you select Scale to Reference on the Scale menu.

Null values are now also properly observed.

#### Copying Rasters.

The user interface for this process has been streamlined and reduced in size to fit in 640 by 480 pixels. It also now uses icons to select the raster rotation direction.

#### Converting Color.

A "linear" contrast table is now automatically saved with each raster object for **RGB** output. Previously, the default display of **RGB** raster objects converted from a color composite raster object would default to use auto-normalize, and would not appear the same as the direct display of the color composite. Automatically saving the linear contrast tables will make the color display of the **RGB** object default to be identical to the display of the corresponding color composite raster.

#### Raster Editing.

The cursor editor for paint brushes can now scroll the brush being edited up, down, right, or left one row or column so that the design can be positioned accurately relative to the "hot spot" or selection point for that brush.

The 24-bit color selection feature now works in the 24-bit color display mode.

#### Feature Mapping.

The "Cancel" button now allows the Classification, Marking, and Redraw operations to be canceled.

The user can now set the background color of the display.

\* The "Transfer Labels" feature previously available in **MIPS V3.33** has been introduced into **TNTmips**. It allows attributes to be transferred from vector polygons to the corresponding features identified in a feature map. Tools are provided to stretch the vector to fit the raster if one or both are not yet georeferenced. The user is then prompted for the polygon to attach to each marked feature which is selected automatically in most cases. User-selected attributes from the polygons are recorded in the feature mapping report files. This addition to the Feature Mapping process is still in prototype stage and MicrolImages' welcomes your input for possible immediate adjustment or addition.

The process to transfer labels was not completed in time to be reproduced on the **CD-ROM** for **V4.60**. It is being sent along on floppy disks to those known to MicrolImages to use this specialized process and will be generally distributed as part of **V4.70**. If you did not receive it and need its capability, please contact Technical Support for its immediate airmail to you or grab it from Internet in a few weeks.

#### Multilinear Regression.

The user interface has been redesigned to streamline the process.

Any raster data types can be used for the input and output raster objects.

The masks used for the input rasters and output rasters can be different.

The output mask can be selected as inverted as well as normal.

#### Unsupervised Adaptive Resonance Classifier.

The approach used to sample the multispectral images has been altered in this process to increase the already fast performance by at least 20 to 30%. In **V4.50**, the multispectral images in the input rasters were resampled for each of the learning

iterations requiring continuous rereading of the source raster objects. In **V4.60**, the sampling you specify will be performed once with these pixels stored in a temporary file used for each learning iteration to form the preliminary mapping model. When the learning process stops for the sampled images, the current mapping model is revised by applying it to the entire image area and all the pixels for one or more additional iterations. The final mapping model is then applied to the balance of the multispectral image yielding a clustered raster object. The temporary files created are also now also deleted after the process is finished.

#### New Supervised Back-Propagation Classifier.

A new, improved back-propagation algorithm is included in this release. The earlier, alternate back-propagation method has also been left on the menu for comparison. It is important to note that this and the other neural network classification processes in **TNTmips** differ fundamentally from all the other classifiers. The other classifiers, such as maximum likelihood and K-means, which use Euclidean distance, Mahalanobis distance, and others all assume normal distribution of the data in the training sets and images which is seldom correct or even close. Neural network methods do not make any assumptions regarding the distribution statistics of the images and therefore are *not sensitive to such distribution properties*.

A back-propagation algorithm is central to many neural network learning processes. It is a generalization of a least mean square (**LMS**) algorithm. It uses a gradient search technique to minimize a cost function equal to the mean square difference between the desired and the actual net outputs.

The desired output of the neural network operation is the class to which the input raster cells belong. This neural net process is trained, as any other supervised process, by selecting training sets. Random weights and internal thresholds are used to initialize the neural network model. Both weights and thresholds are then adjusted using information about the performance of all the raster cells in the training sets in the current model. This teaches the neural network to more accurately assign the raster cells into the desired classes represented by the training sets. Based upon the accuracy of the correct assignment of all raster cells in the training set, new sets of weights and thresholds are computed defining a new neural network. The training nets are then processed again by this new model. This iterative process continues until the conditions specified by your input parameters are satisfied.

Four input parameters are used to control the process and default parameters are supplied. They are: 1) the learning rate, 2) the momentum term, 3) the number of iterations on the training sets, and 4) the maximum allowed system error. By manipulating these parameters, you can determine how "smart" the network process will be when it has finished learning.

The learning rate is a gain term that controls the amount of errors used to modify the associated weights. The momentum term represents the portion of the last weight change value being added to the current weight change process. It is essentially a stabilizing and smoothing factor. If convergence occurs, the learning rate and momentum will influence how fast it is achieved. Thus, some settings of these parameters will degrade the final results by preventing the neural network from finishing its learning process within the specified number of iterations.



The number of iterations specified determines how many cycles will be performed before the process stops. Usually the more iterations performed the smaller the overall error will be and smarter the mapping model will be up to a point. The system error is based upon the inaccuracies in the current model's class assignment of the raster cells in all the training sets. When the specified number of iterations is completed or the desired system error is reached, the learning process stops and the current mapping model is applied to the original multispectral images yielding a classified raster object.

The Crow Butte 7-band multispectral image map supplied with each TNTmips has been used to test this process. Depending on the number of training sets and classes used and the degree of spectral overlap, the quality of classified outputs range from good to excellent. The training set input is prepared as usual by the Feature Mapping process. The statistics file, if selected, contains the final weights for the entire network and the system error for the last iteration in the learning process.

Further information on the concept used in this new TNTmips supervised classification process can be found in Introduction to the Theory of Neural Computation, J. Hertz, A. Krogh, and R. Palmer, 1991, Lecture Notes of Volume I, Santa Fe Institute, Studies in the Sciences of Complexity, Addison-Wesley, 350 Bridge Parkway, Redwood City, CA 94065, pages 115 to 130. Another general reference on the topic is the Introduction to Neural Networks: Design, Theory, and Applications, Jeannette Lawrence, 1993, California Scientific Software Press, Nevada City, CA, 324 pages..

\* Importing ArcInfo **E00** format [a prototype feature].

The ArcInfo 'EXPORT' or **E00** format can now be imported into a vector object. All data in the E00 file which can be stored and used in a **TNTmips** vector object is imported. These files will have the extensions \*.E00 and \*.E01, \*.E02, ... E0x if multivolume.

Only ArcInfo specific format housekeeping information is not imported as it is meaningless to **TNTmips** or any other system. Currently, label points in the **E00** format are imported as point elements. However, ArcInfo may use label points for attaching attributes to polygons. This attachment feature was not yet available in this import process when the disks for **V4.60** were reproduced. This feature will be added immediately and if you need it, request a revised process via MicrolImages' Technical Support.

This **E00** import process works only with uncompressed files. If you can supply several files containing the identical **E00** files in compressed and uncompressed forms, MicrolImages may be able to decipher the compression method used and provide an import for both variants. If you encounter problems importing an uncompressed **E00** file, please provide a copy of the file to MicrolImages for diagnosis.

Since MicrolImages does not have complete **E00** format information to describe the housekeeping information in this format, an export to it has not been created. For this reason, any **E00** format information you might have would also be greatly appreciated.

\* Importing the Digital Chart of the World [a prototype feature].

The Digital Chart of the World (**DCW**) in the Vector Product Format (**VPF**) can now be imported into vector objects in **TNT** Project Files from the 4 **CD-ROMs** making up coverage of the earth: disk 1) North America; disk 2) Europe and Northern Asia; disk 3) South America, Africa, and Antarctica; and disk 4) Southern Asia and Australia. **VPF** is

a tiled vector format with topology which was developed by **ESRI** in a directory hierarchy similar to their Arcinfo coverage files.

There is a total of 1.7 gigabytes of data on the 4 source disks. Each **CD-ROM** contains over 400 megabytes structured in approximately 5000 to 7000 directories and 30,000 to 40,000 files. In addition, many of the feature tables (elements) contain over 200,000 feature records, ranging up to a maximum of over 600,000 records. This is the largest scale, unclassified global map digital map coverage available and was assembled from 1:1,000,000 and 1:2,000,000 scale maps. Additional background information on the **DCW** is enclosed including information on how to order it.

The files on each of the 4 **CD-ROMs** are organized into coverages for 5 degree by 5 degree tiles. For each of the tiles there are 17 separate themes as follows: **PO** = Political / Oceans; **PP** = Populated Place; **LC** = Land Cover; **VG** = Vegetation; **RD** = Roads; **RR** = Railroads; **UT** = Utilities; **AE** = Aeronautical; **DQ** = Data Quality; **DN** = Drainage; **DS** = Drainage Supplemental; **HY** = Hypsography; **HS** = Supplemental Hypsography; **CL** = Cultural Landmarks; **OF** = Ocean Features; **PH** = Physiography; and **TS** = Transportation Structure.

The software provided with these **CD-ROMs** displays individual themes or combinations of themes for an area of 2 by 2 tiles each covering a 5 by 5 degree area. Display at any other scale but an outline of the full view is not provided. The vectors in each tile and theme are topologically correct but this topology is not used by the accompanying software.

The import process provided by **V4.60** allows you to select a single, combination, or all themes for a single disk and will then import all tiles from that disk for each theme selected into a single vector object with correct topology. For example, one vector object will be created for the drainage of North America. The 17 themes on the disk containing North America will yield 17 separate vector objects in separate **TNT** Project Files or one combined **TNT** Project File. Due to the huge number of input files, you may also choose a rectangular subset of these tiles to import. Simply enter the latitude and longitude box containing the area you wish to import. The encompassing array of tiles from a single disk containing any portion of the box you specify will be imported into a single composite or set of individual **TNT** Project Files.

Importing each theme for a vector object for an entire disk takes a long time because the topology for the tiles must be assembled and verified as part of the import process. It is thus recommended that you import one theme at a time into separate **TNT** Project Files which will take overnight for a whole continent. After importation you can use the Copy Vector and other processes to subset the vector object for your nation, combine themes, prepare a single **TNT** Project File, and so on.

Importing the data for the small railroad theme from the North America **CD-ROM** yields a **TNT** vector object of 10 mb and takes 12 minutes on a 586/66. The vector object which results contains 29595 nodes, 32696 lines, 3498 polygons, 0 points, and 42 labels. Displaying this entire railroad vector object for all of North America with **TNTmips** takes 21 seconds (all lines in white lines on the same computer). Displaying the same railroad theme for all of North America by the **DCB** software directly from the **CD-ROM** takes 6 minutes. Displaying railroads for a 10 by 10 degree area from the same 10 mb vector object by **TNTmips** requires 7 seconds whereas the **DCW** software

requires 45 seconds. A 5 by 5 degree area with **TNTmips** requires 5 seconds and 15 seconds using **DCW**. Zooming in to a 1 by 1 degree area with **TNTmips** requires 4 seconds which is matched by the **DCW** software.

All data in the **VPF** file, which can be stored and used in a **TNTmips** vector object, is being imported. Only **VPF** specific housekeeping information about the format is not imported since it is meaningless to **TNTmips** or any other system. Because of the complex and topological nature of this **VPF** data set, it is doubtful that other formats into which it is imported (except possibly those of ArcInfo) would retain all these characteristics. For example, an import to the **CAD** formats used by AutoCAD's **\*.DXF** or MapInfo's **\*.MIP** would lose the polygon concept, topology, and other characteristics. If the target format has no place for the descriptive features of the source material being imported, then it will be lost and may not be possible to easily reconstruct.

MicroImages is still considering the publication of this data in **TNT Project File** format on **CD-ROMs**. However, the **VPF** import process was completed just before the release of **V4.60** and no decision on this has been made pending examination of the convenience, client demand, file sizes, display speed, and **CD-ROM** space required for the redistribution of these public domain **VPF** datasets as **TNT Project Files**.

#### Other Vector/CAD Import/Export Modifications.

Improvements have been made to the import process for ArcInfo Coverage format.

#### Editing Vector Objects.

The height and rotation of multiple text elements can be changed. Multiple text elements can be selected by the multiple selection tools including a circle, a polygon, a query, or even individually.

Multiple vector elements can be selected and assigned Z values. Multiple vector elements can be selected by the multiple selection tools including a circle, a polygon, a query, or even individually.

A node element can now be selected and its position can be changed. Simply select Edit Node from the Edit menu which will activate the cursor. You can then select the nearest node which can be dragged around and its attached lines will elastically follow.

A line can be selected and the points which make it up can be reversed. This is occasionally needed to adjust the "coordinate flow" of individual lines so that subsequent rendering with an asymmetrical line pattern will appear correct. For example, the same line type flowing in segments of opposite direction, from the perspective of the observer, would produce segments with inverted line symbols. Thus the flow of the coordinates of some segments will need to be reversed with this new feature.

#### \* Automated Label Generation.

The Edit Vector process now automatically generates text labels. First, select the type of vector element you wish to label. To do this use the Edit Vector Options menu and select Auto Label Generation and then select Point, Line, or Polygon. Your choice will show a dialog box to be used for selecting those elements to be labeled and automatically switches to the tool used to select multiple vector elements. Use this tool to select the vector elements to be labeled manually with the mouse or by a database query. Use the All button to request labels for every element of that type (points, lines, or polygons) in the vector object you are editing.

Next, select the text for the elements to be labeled by clicking on the Text button in the tool dialog box. This will show a Select Table Field window which lets you select the database field to be used as the label. Two scrollable lists are shown. Pick the table from the left list and this will show the fields in that table in the right list. Simply select the field to be used as the label from the right list. In V4.70 you will also be able to get this label text by a relational database query from the associated attribute tables and it can represent either fields or computed results.

The height of the labels can be selected using any of the standard units which relate the text size to screen points or printed scales. At the present time you can only control the height and the system font used. Press the "Apply" button or right mouse button to preview the labels assigned to the current View window. For the time being, if you wish to have the labels show up again in subsequent redraws, be sure to select Labels All on the dialog box presented by selecting Options from the Display menu. This Labels All option will be automatically turned on in V4.70 within the edit vector process when you create labels.

Obviously there are many additional features which will make this feature more useful. In fact we request your input for the improvement of this prototype feature during this quarter. Features which we already plan for some future version will provide for controlling the text styles; defining multiline labels; placing multiple labels per element, provisions for using leader lines, and many others. However, please realize that label placement is a complex process even for the expert cartographer.

Detailed information on the operation of this automatic label generation feature is provided in the printed supplemental documentation provided.

#### Editing Vectors and CAD Objects.

The status of tool is displayed on the bottom of the dialog box. For example, *No query exists, No elements fit entered query, and Element = 4.*

\* The element which satisfies your query in pan-by-query is now highlighted and selected. Thus, as in **MIPS V3.33**, the pan-by-query process will successively find, display, and select for alteration the potential aberrant elements (spurs, undershoots, overshoots, and so on) for your possible deletion, modification, or skipping.

\* Pan-by-query has also been altered so that it does not pan if the next or previous element is already displayed in the current view window. It will simply highlight the next element which satisfies the query for your possible deletion, modification, or skipping. This significantly speeds up pan-by-query by not continually delaying you while rebuilding the view when you browse through your vector or **CAD** object to edit and improve its content.

#### Designing Vector Styles.

This process has had further improvements over those released in **V4.50**. The scrolled list of attribute values on the left now allows you to highlight multiple entries in the Key Attribute Style Assignment dialog box. Once highlighted, the Assign and Select buttons will apply to all highlighted attribute values. There are several ways to highlight multiple entries.

Click and hold the left mouse button, then drag the mouse down the list. This will highlight several consecutive entries.

Click on one entry, then while holding down the Control key, click on another entry. This will highlight the 2nd entry in addition to the first one. You can highlight any number of randomly selected entries with this approach.

Click on the first entry, then while holding down the Shift key, click on another entry. This will highlight all entries in the list between the two selections.

Click on any entry to make sure that the list has keyboard focus, then press <Ctrl-/> (the control key and forward slash). This highlights all the entries in the list.

\* Designing CAD Styles.

This process has been substantially revised to have the same changes as described for designing vector styles in **V4.50** as well as above.

Thinning Vectors.

The allowable range of the thinning factor has been increased to 100 to increase the amount of thinning if desired.

\* Dissolving Polygons. [New Prototype Process]

This new process can be used to remove or dissolve boundaries between polygon elements, if they possess common attributes as defined by an attribute list. The process can be located at "Prepare / Vector / Dissolve / Polygons...". First, you will select an input vector object to process. You will then be able to select the polygon attributes you wish to test for communality and start the process. Finally, you will be prompted to select an output vector object for the result.

The dissolve process checks all lines in the input vector object to determine whether the selected attributes of the polygons they divide exactly match. Those lines which have a matching result for the adjacent polygon(s) will be deleted and a single new polygon will be constructed with correct topology. If any pair of the selected attribute values in the attached records are different, the boundary will not be deleted.

Dissolve will therefore remove all spurs in polygons, since the polygon on both sides of the spur will have identical attributes no matter what selection is used. It is important to recognize that this process will also remove any line which is not part of a polygon! This new process is still in prototype stage and MicroImages welcomes your input for possible immediate adjustment or addition.

Detailed information on the operation of this polygon dissolve feature is provided in the printed supplemental documentation provided.

Buffer Zones.

\* This process has had an overhaul and will now handle all vector element types correctly. The process is now about 20 times faster than the equivalent process in **MIPS** and about twice as fast as in **V4.50**.

Improving the Speed of Print-Raster Creation.

Several steps were taken to speed up this process. The major improvement is found when printing a layout for a simple image consisting of a single raster layer printed at a size that will fit on a single page and to a printer that requires only one pass such as most ink jets like the HP 650C. Please note that a single layer can actually be three separate raster objects if they represent **RGB** components or a color composite. Under these commonly encountered conditions, the process now will not create a temporary

Print-Raster, but prints directly to the printer. In all other cases, it is more computationally efficient to print to a print-raster, then send the print-raster to the printer.

Some simple changes in procedure will speed up your preparation of a print-raster in Map and Poster Layout process. While the process is very flexible, some things will significantly slow its operation. For example, closing all other windows with active processes will make more memory available for buffers in this process and significantly increase its performance. On shared workstations, especially after hours, you can also decrease the priority of your other activities to reduce their interruption of the print process and constant swapping of memory which this causes.

The general orientation of the raster objects used in your Map and Poster Layout can have an impact. For example, rasters which are inverted or rotated 90 degrees can be used in the process without reorientation. However, you may know that you plan to make a fancy map and remake its print-raster over and over to perfect its printed appearance. It would thus save time if all the rasters to be used were oriented in the general direction in which they will be processed into the print-raster and then printed (input raster lines map to raster lines in the print-rasters and on the printer).

The exact map projection and scale of the raster objects and the orientation of vector and **CAD** objects have minor impact on the time required to make print-rasters. However, thinking through how your map components are organized relative to the number of times you will reuse them in perfecting your printed map can save you time.

#### Other Printing Modifications.

A problem has been continually encountered in setting up new printers in **TNTmips** for large outputs which spread across several pages, especially outside the United States. Consistently, the printers distributed in the U.S. (often made outside the U.S.) come with inadequate or incorrect information on the exact size and margins of the metric areas which can be printed. Furthermore, Postscript based printers do not have to be acquired by Microlimages to create a print driver. Unfortunately, a Postscript printer does not return any information to its host which defines its printable area. Thus, we are directly dependent on the accuracy and availability of the "printable area" information supplied for the printer. The overall result is that it has been difficult to determine the exact area which can be printed on each page to allow the larger area printed to be pasted together without missing some edge on an individual print.

To overcome this, you may now set the actual printable area for your printer. Thus, if the default printable area set up by Microlimages is not exactly correct for the page size you choose, it can now be modified by trial and error if necessary. After determining the exact printable area you wish to use for each paper size for your single and multiple area prints, it will be stored and used whenever that paper size is selected.

The names for the paper sizes are now also consistent. For example, "A" size paper was previously referred to as "A", "A-Size", "A Size", "8.5 x 11", letter, etc. These are all now referred by their internationally recognized names. The measurement of these paper sizes can now also be viewed or edited in inches, cm, or mm.

Vector text labels now appear in the output raster or print file.

## *New Image Printers/Plotters Supported*

### HP 200

The HP model 200 monochrome ink jet is supported. This low-cost printer is suitable for printing or plotting at 24 by 36 inches at 300 dpi. Paper must be hand fed into this device. To print with this device requires printer support level P15 and pen plotting would use support level L3.

## *New Scanners Supported*

### Eikonix Scanners.

Support for the Eikonix scanners has been added and can be used with workstations and **PCs** via **MSW3.1**.

### UMAX Scanners.

The **UMAX** color scanners now work under **MSW3.1** the **UMAX** proprietary, Trantor T130, or Adaptec **SCSI** interface card using the standard **ASPI** software interface.

## *New Synoptic Price List*

A new condensed, single page price list is enclosed. In general it is changed in form and readability but does not alter previous pricing significantly. One alteration is the addition of a reasonable annual subscription fee for the quarterly updates to **TNTview** when it is purchased separately from **TNTmips** as a stand-alone product. This new upgrade fee will cover the cost of the new features being added quarterly to **TNTview** and the cost of their separate distribution to those sites using only **TNTview**. No additional upgrade fee is required for those using **TNTview** with the same authorization key as **TNTmips**. Similarly, a small upgrade fee has been added for the "protected" version of **TNTatlas** when purchased with its own product authorization key for use independently of a **TNTmips**.

## *Prices for Microsoft NT Versions*

Please note that the use of **V4.60** of the **TNT** products with **MSNT** for Intel based **PCs** (**MSNT-I**) follows the same price schedule. Thus you can choose to use either Microsoft Windows version with the resolution and extended peripheral support features you have purchased. Unfortunately, **MSNT** does not support the type of authorization key Microlimages has used for years with **MIPS** and **TNTmips** for **MSW3.1**. Thus, to use **V4.60** of the **TNT** products for **MSNT-I** you will need to swap your current black authorization key and \$50 plus shipping for a new gray authorization key which also attaches to your parallel port. This new gray authorization key will enable you to install those **V4.6** **TNT** products you have purchased for use with either **MSW3.1** or **MSNT-I**.

**TNTmips 4.6** for the **DEC AXP** Alpha with Microsoft **NT** (**MSNT-A**) is a higher priced product and is now included on the new price list. It will also require the gray authorization key. Purchase of this **TNTmips 4.6** for use with **MSNT-A** is inclusive as usual and thus also allows installation and operation on **MSW3.1** and **MSNT-I** systems.

If you purchased a **U100** version of **TNTmips** (or higher) for use on a workstation and are using the red or blue serial authorization key, you will now be able to install on any of the 11 platforms supported by Microlimages. Simply attach the red or blue key to the platform and install from the **V4.6** **TNT** products' **CD-ROMs** or run directly from them. By installing on various systems, and moving the authorization key around, you can use your **TNTmips** wherever it is most convenient.

## *Revised Product Reference Materials*

The new marketing team at MicrolImages was organized toward the end of the quarter and has begun to assemble improved promotional and reference items for the **TNT** products. Some of these first items are being distributed with **V4.60** in final or draft form and others will be shipped as available during the next quarter.

### TNT Product Brochures.

The **TNTmips** brochure is included in final form with this shipment. Only a limited quantity of these brochures was printed to test the cover color scheme which will be adjusted slightly.

The **TNTdemo** brochure is included in final form with this shipment. Only a limited quantity of these brochures was printed to test the cover color scheme which will be adjusted slightly.

Separate brochures with similar covers and layouts, but different color schemes, are being prepared for **TNTview**, **TNTatlas**, and **TNTsdk**. The partial, draft contents for each of these additional brochures are enclosed for your advance reference but are incomplete and subject to considerable change and improvement before final printing.

Finally, a matching cover for the detailed **TNT** products price and reference materials is also being designed. It will replace the similar folder distributed for **MIPS** and contains similar reference information for the **TNT** products including: detailed tables of the peripherals supported by the **TNT** products; the MicrolImages, Inc. corporate profile; the profiles of the MicrolImages' principals; our domestic and international terms of business; and other related materials. Some of these items are included in advance of the preparation of the completed folder.

### TNT Products Flier.

A one page flier covering the scope and focus of all the **TNT** products will be developed this quarter. It will be used for wide distribution at shows and mailings and contain a form to be used to request the family of brochures outlined above.

## *Exclusive International Representatives*

Israel. MicrolImages products will now be available from ORION Technologies which is a subsidiary of CLAL Computer Systems LTD. ORION can be contacted at 11 Gush Atzion St.; Givat-Shmuel 51905; ask for Giora Katzir; (972)353-12020; FAX (972)353-12050.

Malaysia. MicrolImages products will now be available from CEANET (SEA) SDN BHD; 4, Jalan SS21/62; Damansara Utama; 47400 Petaling Jaya; Selangor; Malaysia; ask for Alfred Yeap; voice (603)719-0670; FAX (603)719-0671.

No S.E. Australia. CADABILITY located in Victoria, Australia will no longer represent MicrolImages for the sale of products in Victoria, New South Wales, and Tasmania due to their unethical business practices. MicrolImages advises great caution to anyone contemplating any business with this firm.

New South Wales, in addition to Australian Capitol Territory, will now be serviced by ERIC Pty., Ltd.; 5 Salkauskas Crescent; N. Lyneham, ACT 2602; by Jim Longworth; voice (616)248-8490; FAX (616)248-8490.



Victoria and Tasmania, in addition to South Australia, will now be serviced by Southern Remote Sensing; 24 Curtis Street; N. Adelaide; South Australia 5006; by Richard DuRieu; voice (618)267-3983; FAX (618)267-3983.

## *Domestic Reseller and VARs*

Ohio Area. Geotechnics, Inc. will provide access to the products of MicrolImages for the Ohio Valley region. Geotechnics is owned by Dr. Charles Moore who is also a faculty member in Civil Engineering at Ohio State University. Charles is a long time, experienced user of **TNTmips**, **CAD**, mapping, and many other computer technologies. Geotechnics conducts a variety of projects and research and can be contacted at 912 Bryden Rd.; Columbus, Ohio 43205; voice (614)292-0198; FAX (614)292-3780.

## *Application Notes*

MicrolImages Press made disappointing progress toward the preparation of new Applications Notes during the last quarter. Only one new Application Note has advanced sufficiently to provide a chapter for reproduction and distribution at this time. Thus, only the first draft chapter of the Application Note entitled Creating, Representing, and Visualizing Surfaces is included with this release.

## *Staff Changes*

Brian P. Noonan has joined MicrolImages as a trainee for the marketing team MicrolImages is organizing. He has a BS degree in Journalism majoring in advertising and communication in 1988 from the University of Nebraska at Lincoln. His previous working experience includes that of account executive with the Hastings Tribune newspaper and freelance design in Omaha. His most recent position was sales promotion manager with the Lincoln-Journal Star since 1991.

Larry Lee has joined MicrolImages as a trainee for the marketing team MicrolImages is organizing. He has a B.A. degree in Anthropology/Archaeology in 1976 from the University of Nebraska at Lincoln. M.S. course work was completed in same field at the University of Nebraska at Lincoln in 1979. Larry was most recently owner of a small business which created and marketed bar-code software products for the Macintosh computers. He also created the 200 page manual used with this software product. Larry is also author of a book on an aspect of Colorado History. Larry also has twenty earlier years of experience in working and management in the printing industry.

Mark Kloke has joined MicrolImages as a trainee for the marketing team MicrolImages is organizing. He has a B.S. degree in Business Administration specializing in finance from the University of Nebraska at Lincoln in 1990. Mark was most recently employed as a Research Assistant with the Nebraska Department of Revenue and previously with a local bank.

Scott Wittstruck has joined MicrolImages as a trainee scientific writer for MicrolImages Press. He has a B.S. degree in Life Sciences from the University of Nebraska in 1982 and an M.S. degree in Forest Resources for the University of Georgia in 1990. Scott most recently managed a U.S. Agency for International Development project with a staff of 22 in Mali, West Africa which focused on local, grass-roots development initiatives. Previously he was a Forestry Extension Agent and Teacher in the U.S. Peace Corps in Burkina Faso and Sierra Leone in West Africa.

Dan King has joined MicrolImages as a software engineer. He has a BS degree with a major in Computer Science in 1993 from University of Nebraska at Lincoln. Since 1992 Dan has been a systems operator at St. Elizabeth Community Health Center. Dan worked for years in Auto Service Industry prior to returning to the University to complete his B.S. degree. Dan's initial responsibility at MicrolImages will be to add network (socket) support to MI/X for use with MSW3.1.

Roger Dufresne has joined MicrolImages as a software engineer. He has a BS degree in Computer Science in 1986 from State University of New York at Plattsburg with major in physics and electronics. From 1986 to 1994 Roger worked as computer network specialist in the Department of Telecommunication and the Industrial Engineering Department at that University. He has also been proactive in public television and radio. Roger's initial training task at MicrolImages will be to review the **TNTsdk** library to bring its documentation up to date.

Deborah L. Mulinix has joined MicrolImages as a technical support specialist. Deb has a B.S. in Physics with minor in Mathematics from Nebraska Wesleyan Univ. in Lincoln in 1993. Her previous working experience was in the Soil Physics Dept. at Univ. of Nebraska at Lincoln and in the Physics Dept. at Nebraska Wesleyan University in Lincoln, Nebraska.

Deb increases to 6 the number of staff on the technical support team to help you. Four of them have as their principal responsibility the task of answering your voice and FAX questions as promptly as possible.

Greg Harrison has just departed from MicrolImages for another software engineering position in Omaha, Nebraska. Greg was responsible for creating the on-line documentation process in **TNTmips** and the maintenance of the scanning and import/export processes.

Tom Schafer is no longer employed as a scientific writer at MicrolImages.

## *Space Expansion*

MicrolImages is expanding its office space up to the second floor of the office building whose basement and 1st floor we already partially occupy. This adds 1500 square feet of space bringing the total MicrolImages office area to 12000 square feet. This additional space was needed in order to accommodate the general space adjustments required for the expanded technical support staff and the new marketing team being created within MicrolImages.

## *New Phone System*

Approximately 10 April, MicrolImages staff will install a new internal phone system. No changes will be made at this time in the number of phone lines or the phone numbers you will use to reach MicrolImages. All the changes will be in the internal equipment used to provide better staff access to the phones and provide an internal intercom system.

MicrolImages will continue its policy of actually having a real, live professional answer the incoming phone calls if anyone is present to do so. No recorders will be added to the MicrolImages phone system. If no one answers the phone at MicrolImages it is because no one is in the Technical Support office to assist you.

However, after 6 years, Lee Miller, the President of MicroImages will no longer be the principal party answering the incoming business phone lines. These incoming lines will now be answered by Kelly (Office Manager), Mark (Marketing Specialist), Brenda (Financial Officer), or Lee. If you want Lee or someone else, just ask for them. The technical support phone lines will continue to be answered directly by one of the 6 MicroImages' technical support software engineers.

## *Features missing from TNTmips 4.6*

The **MIPS V3.33** features listed below are not available in **TNTmips 4.6**. These features are being reworked as time allows. If any particular feature listed is specifically holding up your conversion to **TNTmips 4.6**, or your projects, please let us know so we can give their conversion a higher priority.

### Generally used features.

- \*\* Raster profile display
- \*\* Elliptical arcs - (arc, wedge, and chord) can not be created
- \*\* Snap-to-grid feature is not available in **CAD** editor
- \*\* Vector route tracing
- Printers which communicate via Xerox **VPI** card
- Preparing and showing a slide show
- Importing all raster formats directly from open reel **CCT** tapes.

### Specialized features used by 1 or a few users.

- Dual raster color overlay method for georeferencing
- Automatic interval capturing (intervalometer) in video digitizing
- \*\* *likely to be worked on this quarter, ask for status if you need before **V4.70***