

31 October 1994

Release of V4.80 TNT products

Introduction

Status of Client Base.

MicrolImages is pleased to distribute **V4.80** of the **TNT** products and the 32nd consecutive quarterly release of the Map and Image Processing System. We are also pleased to report that **V4.70** of the **TNT** products was widely used around the world with only minor difficulties. However, the focus for the last quarter has continued to be to increase the reliability in all **TNT** products.

Improved Reliability.

During the last quarter the new MicrolImages' system for monitoring new feature requests and errors has been used extensively to track and control these issues. As a result **V4.80** has greater reliability than any previous **TNTmips** and probably higher than any **DOS MIPS** product which it replaced. As a result MicrolImages was able, and will continue to give those errors you report immediate attention. Over 75% of the errors reported to MicrolImages in **V4.70** during the last 3-month period were either already repaired, or were repaired that day, and a correction was supplied by disk and mail or via Internet within 24 hours.

Effective with **V4.80** MicrolImages expects to raise this 24-hour error repair / response level from 75% to above 90%. The exceptions to this will be several processes which are being rewritten now or scheduled for this in the immediate future as noted below. Some errors in these processes have proven difficult to eliminate due to the older structure and hasty implementation of their code when it was converted from **MIPS** to **TNTmips**, rather than rewritten.

Processes to be Overhauled.

Supervised / Unsupervised Classification Processes. Rewrite is nearly complete at the time of shipping of **V4.80**, however no partial changes were released in **V4.80**. Rewrite with new features will be completed by the time you read this MEMO.

Vector Intersect. Rewrite was partially complete for **V4.80** resulting in substantial improvement in reliability. Rewrite will be complete for release in **V4.90**.

Buffer Zones. Rewrite complete and released in **V4.80** with new features and considerable improvement in speed.

Raster Scanning. Rewrite currently underway and will be available in **V4.90**.

Editvector and EditCAD Processes. Rewrite as a single integrated advanced process called the **TNT** Object Editor will have just begun by the time you read this MEMO. However, due to the complexity of this new process, it will not be available for distribution with **V4.90**.

Ortho/DEM Process. Rewrite will not begin until January and will take considerable time as this is more of a scientific project than a software coding activity. All the remaining technical coding errors in the current process have been corrected. However, these corrections and new minor features were completed after the **CDs** for **V4.80** were published, so please contact technical support for a current version if you are using this process in **V4.80**.

3D Display Process. This rewrite is scheduled primarily to add features and to integrate this capability with the 2D display process into a single process. This rewrite is not underway or scheduled yet.

Other current, minor processes which are scheduled for an overhaul and modernization for one reason or another are the Fourier Analysis, Raster Watershed, Progressive Transform, Polygon Fitting (vector home range), and Trend Removal processes. These activities are not scheduled at this time.

Cross-Platform Compatibility.

It might be interesting for all clients to know that the cross-platform approach taken by Microlimages is working out well. That is to say, the actual process and application errors being reported and repaired during the past quarter have been generic across all platforms and not unique to a particular platform or operating system.

Initially, many unique problems are encountered when a radically new processor, platform, and operating system are simultaneously added, such as the new 64-bit **DEC** Alpha using **OSF/1** being released this quarter, or the pending **Mac OS** products being prepared. However, after the general adjustments are made to the **TNTsdk** libraries and other coding, further platform unique errors are not often encountered (you learn how to avoid them!).

The greatest single problem encountered in supporting both of these and other radically new platforms are the errors in their compilers and operating systems. These are usually not even acknowledged or fixed (especially between major releases) by their manufacturers as they consider it to be bad for marketing to admit that they make errors. When only one aspect of a platform is changed, such as the operating system, or the processor, Microlimages has only limited complications in adjusting the **TNT** products and almost all of these are associated with the manufacturer's errors in their new product. Thus changes such as from Microsoft **NT** 3.1 to 3.5, Windows 3.1 to Windows 95, from **IBM RS/6000** processor to Power **PC**, and so on is much easier due to the high market pressure on their manufacturer to maintain some form of compatibility.

Plans for V4.90.

A significant portion of the time between now and the release of **V4.90** of the **TNT** products in mid-December will be devoted to further increasing the reliability of the **TNT** products on all platforms. With the release of **V4.90**, Microlimages expects to be able to claim that the **TNT** products are some of the most reliable professional products of their type on the market today. It will be difficult to claim just how reliable as we are not well acquainted with the reliability and inter-release error correction policies of our competitors.

The level of reliability of **V4.80**, and subsequently of **V4.90**, will allow Microlimages to redirect most of its software engineering attention to other objectives. **TNT** products for all commercially important major computer platforms and operating systems will also be completed at that time. It is also expected that most major coding issues related to 2-byte languages will be resolved (but not necessarily implemented as this takes time to ripple into all of the processes). Thus in 1995 Microlimages software engineering efforts will refocus toward new applications and enhancements and improvements in existing applications to push even further ahead of the competition.

During the past couple of years we have faithfully recorded all client and internal staff requests for new features in the **TNT** products. Naturally, some of these have been implemented during the conversion to a multiplatform windows product, and others during the

recent efforts to improve reliability. However, many requests for new features remain on file, so there is no shortage of ideas and expectations for the **TNT** products. Microlmages is gradually resuming a more normal operation characteristic of the later phases of our older **DOS MIPS** product where new features were often promptly added. At that time about half of the new ideas came from our clients and the other half were generated internally. This mode of operation will resume in early 1995, but will now result in new features and processes which are immediately available to all clients on all popular platforms in windows for use in their language.

As the conversion cycle from our earlier **DOS** product draws to a complete close, you may wish to compare the **TNT** products you now have to those of our competition. For this purpose you will find enclosed a new marketing item entitled Technical Characteristics Checklist. This check-off form can be used as a yardstick or measurement tool with which to compare the **TNT** products with competitive professional image processing products such as ERDAS, PCI, ER Mapper, ... and with separate competing **GIS** products such as MicroStation, ARC/INFO and others. And, with the release of **V4.90** we will add an additional section to this checklist promoting the reliability and our rapid error correction policies.

New Features.

The most important new features added to the display activities in **TNTmips 4.8** include a new Group Controls Window to better control this activity and to provide new features such as matching another layer's projection, clipping to a base layer, changes in the placement controls for a group, and others. Individual layers in a group can now be hidden or shown. The display of vector, **CAD**, and database objects (e.g. Pin Mapping) will now remember (i.e. default) to display in the fashion of their previous use including all selection and styling options, queries, etc. Pinmap (database object) displays now show multiline labels selected from their attribute fields or a query expression (see attached color illustration). If two or more display windows are now shown they can now be optionally geographically or coordinate locked to operate in tandem.

Other new important features in **TNTmips 4.8** include a new multilingual text editor. For those using English, this text editor has many new functions not available in the previous model. A newly rewritten and even faster buffer zone process is available with more controls (see attached tables). The process for copying rasters has been rewritten with new features and controls. The multispectral classification processes (supervised and unsupervised) have been rewritten and improved (did not make **CD-ROMs** but available now on direct request). Additional database query control has been added. Some import utility features added include importing and linking to **SPOT** images on **CD** or downloaded from tape, a new decorrelation method of color image enhancement, a simple scientific calculator, correction for the photographic lens distortion for the Russian satellite imagery provided by Priroda / Moscow via JEBCO, and others.

A new feature of great importance to a portion of our clients is the support of Chinese and Japanese in the Map and Poster Layout to annotate and label maps (see attached sample image map). Thus you may now optionally install for your Microsoft Windows version a single Japanese or Chinese Unicode encoded font imported from TrueType.

Limiting Materials Shipped.

With the release of **V4.80 TNT** products, Microlmages is reducing the materials shipped to those registered for the use of older products to this informational Microlmages **MEMO** which will continue to be airmailed. Thus if the product you have registered for current use is a

DOS MIPS or TNTmips 4.3 or earlier, you will receive only this **MEMO** and its attachments (our unofficial newsletter). You will find that you are not automatically receiving Application Notes, supplemental documentation, news materials, **CD-ROMs** or other materials which accompany the release of this version. While we would like to continue to keep everyone up to date, this change will significantly reduce Microlimages' shipping and reproduction costs for the quarterly releases and enable us to ship them more promptly to those who are active subscribers and users of the current products.

Under this new arrangement, those whose registered **TNT** product predates **V4.40** can still obtain these materials without cost by contacting technical support each quarter. Similarly, those clients with the older versions will no longer receive the **CDs** for the current release. Thus, when you upgrade to the current version of a **TNT** product, you will need to anticipate waiting to receive shipment [air express outside the U.S. only] of the latest **CDs** before you can install and use the product. Those who are upgrading from versions after **V4.30** will already have the **CDs** for **V4.80** in their possession and can still order the upgrades via **FAX** and be **FAXed** back an authorization code the next day for immediate installation.

CD-ROM Drives at \$100.

Microlimages can again temporarily obtain the **NEC-25 CD-ROM** drives and provide them as long as they last at our cost of \$100 plus shipping to those who still obtain their **TNT** upgrades on floppy disks. To use this **CD** drive you will need to already have a **SCSI** connector on your **PC** or obtain an inexpensive **SCSI** card which Microlimages can also supply. You are reminded again that buying this slow but useful **CD-ROM** is cheaper or at least equal to the difference paid if one annual subscription is ordered on floppy disks in lieu of the **CD-ROM** automatically shipped.

Damage to Authorization Keys

First remember that hardware authorization keys are as much, if not more of a nuisance to Microlimages than to you. However, it is these same keys which enable Microlimages to continue to develop and sell advanced technical products at a low price while providing technical support without cost.

It has been found that the Microlimages hardware authorization key can be damaged by attaching any tape backup unit and some other devices other than printers to the key. Some of these strange devices use lines for data transmission that are sensed by every printer as required control lines. During operation of these devices it is possible that the data being transmitted will be sensed by the key as a code to alter the programming of the key in a manner controlled by the key's manufacturer (not Microlimages). This is part of the protection scheme used by the key's manufacturer to prevent illegal reprogramming of the key and can not be altered or repaired by Microlimages.

If you use devices other than a printer on your parallel port and are uncertain about their effect on your protection keys, remove all protection keys while using such devices. There have been no known cases reported in the many years of use of these hardware keys where the attachment of any type of printer has caused a key to fail.

Probably the most common way to damage the parallel key is to plug it into a serial or SCSI port and attempt to use it which will irreversibly reprogram it. Also it is not a good idea to pull keys on and off the port while they are being used.

Another reported instance of reoccurring key damage recently occurred at a site with a highly unreliable power supply where a surge protector was in use. However, the printer connected to the key was not plugged into the surge protector and spikes passed back to the key via the printer destroyed a succession of keys. In this situation the key also acted as a useful fuse to protect the parallel port.

Another way to damage the key is by attempting to reprogram it or strobe out how the key protection codes work. Such activities will definitely cause a key to die in a fashion which it can not be reprogrammed by Microlimages.

Microlimages will replace any key immediately upon receipt of the damaged key. Replacement for 30 days after purchase is without cost. Replacement after 30 days is at the cost of the key to Microlimages (\$50 to \$100) plus shipping costs. For further information on Microlimages key replacement policy, please see the section Guarantees in the Domestic or International Terms of Purchase section in the green folder entitled TNT products.

Windows NT 3.5

Microsoft has just officially shipped Windows **NT 3.5 (MSNT3.5)** for general release. **MSNT3.5** was installed for the first time today by Microlimages on a Intel 486/25 based machine with 16 megabytes of memory. **TNTmips 4.8** was then installed from the **V4.80 TNT products CDs**. Microlimages is pleased to report that 2D display and a number of other processes ran immediately without apparent problems. Microlimages will now determine if it is worthwhile to use **MSNT3.5 (MSNT3.1 is not recommended)** rather than **MSW3.11** for the **TNT products** (i.e., improvements in performance without increased memory requirements). Should you have any questions about this testing activity before the next Microlimages **MEMO** is distributed, please contact technical support services.

TNTmips™ 4.8

If you have subscribed to **TNTmips 4.8**, please proceed to install it from the **V4.80 TNT product CDs** following the instructions provided by the **INSTALL** process on either disk or in the new enclosed **V4.80 Detailed Installation and Optimization Manual**. If you did not order **TNTmips 4.8** and wish to do so now, please contact Microlimages by **FAX** or phone to arrange to purchase your quarterly upgrade to **V4.80**. Microlimages 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 start to use **TNTmips 4.8** and the other **TNT products**.

If you do not have an annual subscription to **TNTmips**, you can purchase **V4.80** under the elective upgrade plan at the cost in the table below. Please remember that new features have been added to **TNTmips** with each quarter. Thus, the more quarters you are behind **V4.80**, the higher your upgrade will cost up to a limit. Upgrades from all versions of **MIPS** and **TNTmips 4.2** or earlier are the same, fixed cost shown below. As usual, there is no special additional charge for the upgrade of the peripheral support features which you may have added to your basic system.

Within the **NAFTA** reselling area (Canada, U.S., and Mexico):

Product Code	Price to upgrade from TNTmips :					MIPS: any version
	V4.70	V4.60	V4.51	V4.40	V4.30	
D30 to D80 (CDs)	\$250	450	600	700	750	750

D30 to D80 (floppies)	\$300	560	750	875	940	940
M50 (replaces U45)	\$250	450	600	700	750	750
U100	\$450	800	1000	1200	1300	
U200	\$780	1400	1875	2200	2350	
U300	\$1030	1850	2475	2900	3100	

For all other nations:

<u>Product Code</u>	<u>Price to upgrade from TNTmips:</u>					<u>MIPS:</u>
	V4.70	V4.60	V4.51	V4.40	V4.30	any version
D30 to D80 (CDs)	\$300	560	750	875	940	940
D30 to D80 (floppies)	\$350	600	800	925	990	990
M50 (replaces U45)	\$300	560	750	875	940	940
U100	\$500	850	1050	1250	1350	
U200	\$830	1450	1925	2250	2400	
U300	\$1080	1900	2525	2950	3150	

M50 is the new product code for the Apple Macintosh **Mac OS 7.x** versions and replaces their older designation as **U45** for the Mac using **A/UX**.

Loading a full installation of **TNTmips 4.8** onto your **PC** hard drive for Microsoft Windows 3.1 will require 88 megabytes with an additional 17 megabytes for the illustrations. The full install of the **TNTmips 4.8** processes onto your **PC** hard drive for **MSNT-I** (Intel) will require 117 megabytes with an additional 17 megabytes for the illustrations. The full install of the **TNTmips 4.8** processes onto your hard drive for **MSNT-A** (Alpha) will require just more than 127 megabytes with an additional 17 megabytes for the illustrations.

The full installation size, including illustrations, will vary for workstations depending upon the platform type as follows: Data General = 98 mb; Hewlett-Packard = 109 mb; Sun SPARCstation with Solaris 1.x = 100 mb; Sun SPARCstation with Solaris 2.x = 89 mb; **SGI** = 112 mb; **DEC Ultrix** = 108 mb; **DEC OSF/1** = 108 mb; and **IBM RS/6000** = 152 mb.

There are no **V4.80 TNT** products on these **CD-ROMs** for the Macintosh using **A/UX**. Since Apple has discontinued providing this version of UNIX for new platforms, Microlimages has discontinued developments for use with it. Those clients using the **TNT** products for the Macintosh platforms will be provided an automatic resumption of their quarterly upgrades with the new pending release of the **TNT** products for native operation under **Mac OS 7.x**.

TNTsdk™ 4.8 for TNTmips 4.8

As announced previously, those who purchased access and use of **TNTsdk 4.7** (but not earlier versions) will now automatically receive quarterly upgrades at no extra subscription fee above that charged for **TNTmips**. Thus, if you have previously purchased **TNTsdk 4.7**, simply install it using the menu option provided as part of the normal installation process.

No special features were added to **TNTsdk** other than the quarterly improvements in existing functions and the additional functions.

TNTview™ 4.8

All the applicable changes in the display program noted below are similarly available when **TNTview 4.8** is installed.

The other significant activity for this product was the previous separate distribution to all subscribers of the final printed copy of the **TNTview 4.7** manual.

TNTatlas™ 4.8

The significant addition to this product is that when a multi-layer layout is viewed, a "Layer Controls" window will appear which allows the user to turn individual layers on or off. This works the same as the hidden layers concept for Display / 2-D described in more detail below.

MicrolImages is now finally close to distributing the large, sample project files prepared from various data sources for the San Francisco area for use as test data by **TNTmips** users in prototype form. As has been previously noted, these project files and objects are also organized into a sample **TNTatlas** to promote this concept and product. All the descriptive material and software for this sampler are already available (except the Apple Mac versions) and MicrolImages and several clients are currently testing beta versions of **CDs**.

A final draft copy of the manualette, for this **CD** sampler which will be inserted into the plastic box, is enclosed. It will be printed in red and black ink for this first prototype release. Also attached is a black and white reproduction of the color artwork to occur upon the **CD**. This prototype **CD** sampler will be mailed to all clients in about 3 weeks. After you have tested and commented upon the prototype version of the sampler, it will be reproduced again in final form and widely distributed as a promotional item.

All the software modifications needed to allow the creation of licensed versions of the **TNTatlas** software coupled or bonded to your Project Files have been completed. This "bonding kit" was needed by MicrolImages in order to prepare the San Francisco sampler to demonstrate the concept of keyless, licensed, run-time versions of **TNTatlas** reproduced on a single **CD** for all platforms but sharing one common set of Project Files.

TNTdemo™ 4.8

As described in more detail below, the **DEC Alpha OSF/1** version of the **TNT** products has been completed and is provided on the **V4.80 CDs**. Thus it is possible for anyone who purchases a **TNTdemo 4.8** to install and try this new version.

As has been noted above, the **TNT** products are no longer available for the Apple Macintosh for use via **AUX** since Apple is not providing it for advanced platforms. Correspondingly, this version of the **TNT** products has now been omitted from the **CDs** for **TNTdemo 4.8**.

On-Line Documentation

An equivalent of 1703 single-spaced printed pages of on-line documentation are included with **V4.80**. This is an increase of 207 pages over that supplied with **V4.70**. Seven last minute additional sections were completed for the newest features in **V4.80** after the master disks were created for the reproduction process. Please note that MicrolImages has upgraded its internal reproduction equipment and these printed materials are now of a better print quality, especially the illustrations. These 69 additional pages are included in supplemental, printed form as follows.

- More About Group Controls (14 pages)
- Scientific Calculator (3 pages)
- More About the Route Tool (5 pages)

Decorrelation Stretching (8 pages)
Multilingual Text Editor (21 pages)
Adding Database Tables (12 pages)
Priroda Lens Correction (6 pages)

Orders for **TNT** products (except **TNTdemo**) shipped since 15 September have included a printed copy of the current on-line manual. The 2-sided copy is not punched or bound since it is usually shipped outside the United States where a wide variety of hole punching and binding practices apply.

MicrolImages will now be printing numerous copies of the on-line manual at the beginning of each quarter (they are already printed for **V4.80**). As a result, MicrolImages will discontinue the practice of referring you to the local Kinko's copy center to purchase a printed copy of the **TNTmips** manual. Kinko's is now under contract to print manuals for MicrolImages on a high speed Xerox printer / copy machine. The quality of the printing of these unbound, 2-sided documentation sets is better (especially for illustrations) than MicrolImages' new copy equipment used to prepare the supplemental documentation sections enclosed. This results from the direct, electronic printing of each 1703 page set of documentation from disks provided to Kinko's by MicrolImages.

The procedures, costs, shipping methods used, and so on for obtaining a printed copy of the **V4.80** manuals are identical and equal to those for the quarterly or annual subscription to the current **TNTmips** release for a **PC**. A single shipment of a manual within the NAFTA area will be \$250 including shipment by **UPS** or airmail. An annual subscription to 4 quarterly issues will be \$800 prepaid including shipment. International customers may similarly purchase the manual at \$300 per quarter prepaid with shipment only by air express or \$1000 per year prepaid with air express shipping included.

Order forms for the quarterly / annual printed documentation subscriptions will subsequently be prepared and sent to all clients. Please try wherever possible to pay for the shipment of manuals via credit card to avoid high billing and collection cost for MicrolImages which would eventually involve increasing the cost of this new service.

Yes, it is true that keeping a printed copy of the manual on hand quarterly will cost as much as the quarterly subscriptions to **TNTmips** for an Intel based **PC**. Printing, packing, handling, shipping, billing, collection, accounting, correspondence, and other related activities to provide this printed documentation are all labor intensive operations and account for the high cost. Thus, as always, MicrolImages strongly recommends you consider becoming accustomed to using the on-line version of the **TNTmips** manual to take advantage of its cross-referencing features and to view the many illustrations in color. You are also reminded that you can directly print your own identical copies of the on-line manual from versions included on the **CD** in Microsoft Word format for both the **PC** and the Mac.

On 15 September MicrolImages ceased shipping A Guide to Map and Image Processing with orders as it is out-of-print and out-of-date by not reflecting the user interface change to windows, and this caused new purchasers to complain. Thus the printed, current manual was substituted as it would take a year to upgrade the Guide. However, MicrolImages is now considering reprinting additional copies of the current Guide and including it again with every shipment of **TNT** products including **TNTdemo**. The Guide still illustrates the generic concept of many features used in an integrated **GIS**, image processing, and **CAD** system. The Guide is also not that preoccupied with the interface and operation of software. Thus,

perhaps with an appropriate disclaimer attached to the cover, it would still be useful to those who use the **TNT** products. Your opinion on this matter would be appreciated, but please note that MicroImages is not close to scheduling any rewrite of the Guide.

MicroImages X Server (MI/X)

No significant features were added to **MI/X** during this quarter except those noted below to support Japanese and Chinese and their associated keyboard entry methods.

DEC Alpha via OSF/1

Fully complete and tested versions of **TNTmips**, **TNTview**, and **TNTatlas** for the **DEC** Alpha using **OSF/1** are included on these **V4.80 CD-ROMs** for the **TNT** products. These are the first fully 64-bit implementations of the **TNT** products! Large floating point computational tasks are common in the **GIS**, image processing, **CAD**, map making and other **TNT** processes. Initial experience with **TNT** products has shown that the identical floating point processes of this nature execute 10 times faster on a entry level desktop **DEC** Alpha **OSF/1** (150 MHz processor) based system compared to a similarly equipped desktop Pentium 90 MHz system.

As has been pointed out many times before, the code for **TNT** processes is identical and is simply compiled on each platform supported. Thus comparisons between machines are valid if the nature of the setup of the machines and tests are understood. Most workstations and Pentium based machines are not greatly different in results with the **TNT** products. However, the entry level **DEC** Alpha **OSF/1** based product stands out well from all others and makes it worthwhile to take on the added headaches of a **UNIX** based platform.

Several companies (e.g. Aspen Computers) are currently delivering complete 275 MHz Alpha **OSF/1** based desktop systems using **OSF/1** (also **NT**) for less than \$10,000 complete. With other chip and cache memory improvements, they improve performance over the basic **DEC** 150 MHz system by 3 times. These new machines should perform the buffer zone test and other **TNT** computational intense tasks at up to 30 times faster than the Pentium 90 MHz system.

As noted previously, prices for the **OSF/1** version of the **TNT** products will be the same as for any of our other **UNIX** and workstation based products (for example, U100 = \$10,000 and so on).

Apple Macintosh via System 7.x.

It was planned for the Apple Macintosh to be supported with the release of **V4.80** of the **TNT** products. Alas, the preparation of this new version is taking longer than anticipated due to hidden complications which must be resolved step by step. For example, the internal file selection process used for all other platforms required replacement as Mac OS does not have paths as with all the other operating systems supported. Thus all the file selection routines were modified for all processes and systems (remember **TNT** products use a single set of code). This is only one of the numerous variations introduced by Mac **OS**, a totally different operating system.

As noted earlier, these new products will provide an identical X/Motif interface within a Mac window via an X server just as the **TNT** products operate within Microsoft Windows **3.1** and **NT**. Of course, the user interface within **TNTmips** and the other **TNT** products will be

identical to that used on all the other platforms and the **RVC** file structure and resulting Project Files will be completely transparent and portable to any platform which uses them. At the present time Microlmages anticipates no differences in the way in which the Mac systems operate relative to the identical **PC** and Workstation products currently being shipped.

Two different X servers have been tested and found usable with the Mac version of the **TNT** products. One is the official Apple Mac-X server and the other is produced by WhitePines Inc. Both support full local client and remote server support. At present Microlmages is planning to supply one of these X servers with each **TNTmips** purchased. At some future date Microlmages might produce its own X server as it has with Microsoft Windows 3.1 and Microsoft **NT**. Current Mac users can employ any 8-, 16-, and 24-bit color and resolutions as supported by their display board and available memory. **TNT** products can use these same resolutions and colors via the X server with a Mac window set equal to or smaller than these equipment limitations. Mac users are also quite familiar with the using additional display boards and monitors and simply dragging a window out to a 2nd monitor or expanding it to fill both monitors. Since there are no resolution controls or limits set within this version of **TNTmips**, the Mac window containing the X window(s) can similarly be made to span as many color monitors as are available.

At the present time it is anticipated that Microlmages will begin internal and beta testing of the Mac **OS** version of the **TNT** products in about 2 weeks. Due to the substantial differences between Mac **OS** and other systems, each **TNT** process will need to be separately checked for the first release as was the case with the new **V4.80** release for **DEC OSF/1**. At this time it appears that a checked version of the **TNT** products will be available for release on the **V4.90 CD-ROMs** in December for the Mac **OS** for System **7.x** for both the Motorola 680xx and Power PC based systems.

Outstanding orders for this new version of the **TNT** will be filled as soon as possible. The current price for the existing Macintosh version of **TNTmips** is \$5000 for any display resolution. Orders for the **TNT** products for the Mac **OS** are being received now at introductory prices. After these new products are shipped they may increase somewhat due to the requirement that Microlmages purchase and supply someone else's X server for each **TNT** product shipped. Revised prices will be announced as needed when these Mac **OS** products ship.

Internet Support

Revised instructions are attached for communicating with Microlmages via Internet. Microlmages is now routinely obtaining requests for assistance and sample data sets from clients and supplying corrected processes via Internet.

New TNTmips Features

* Paragraphs or main sections preceded by this symbol "*" introduce significant new processes or features in existing processes which are released for the first time in **TNTmips 4.8**.

* General System Level.

The screen width/height of your display can now be set via Support/Setup/Preferences... (for Windows **3.1** and **NT** only). Setting these screen parameters will let you display map

materials to any specified scale if they have been calibrated to scale (via a cell size, scale, or georeference).

The method for specifying drives has been changed (Windows **3.1** and **NT** only). An option menu is now used for selecting the drive. As a result a set of "recently used" directories is retained to allow rapid movement between an often-used set of directories. This operation functions similarly to the equivalent feature in Word and several other Microsoft products. Also, when manually entering a directory path the drive designation may be specified as well. **V4.70** did not allow the drive designation to be changed.

The amount of your free disk space available on the currently selected drive / filesystem now automatically shows on all file selection dialog boxes as well as in the Support/Maintenance/Project File and General File windows.

A new directory can also now be created via any and all file selection dialog boxes.

Project File Maintenance.

A "multi-copy" feature has been added which allows sub-objects to be quickly copied to multiple new "parent" objects. For example, a standard colormap sub-object can be rapidly duplicated among many rasters. Simply select the colormap and press "Multi-Copy ...". You will then be prompted for the rasters to copy the colormap too.

General File Maintenance.

The file size and last modification date and time are now displayed in this process.

*** Improved Group Placement.**

A new "Group Controls" window (accessed from the Group / Controls... menu) has been added to the display process. This simplifies the use of this powerful concept while providing a mechanism for adding new features. The new window replaces several options on the Group menu, as well as the Group Clipping window and the Placement Tool window. These changes are well documented and alterations, descriptions, and illustrations appear in the on-line documentation. The important descriptive sections are also provided in the enclosed printed supplemental documentation section entitled: More About Group Controls.

Groups may now be renamed. This makes complicated layouts easier to work with. Now if you assign descriptive names to your groups you can tell what they contain rather than having to keep notes or remember that Group 37 contains a scale bar.

The "Group Controls" window contains a "Match Layer Projection" button which when processed will set the projection of the group to the projection of the currently selected layer. In many instances you will find that the desired projection for your output is the same as that to which the input objects are georeferenced.

The "Group Controls" window contains a "Match Layer" button in the "Clipping" section which will set all clipping parameters to the projection extents determined for the currently selected layer. This allows easy clipping to a particular base layer defining the extent and boundaries of the layout or hardcopy desired.

The group size (in user-selected units) is always shown. Previously it appeared only in Map & Poster Layout.

In hardcopy mode the "At Scale" field on the Group Controls window will be the same as the output scale, and changing the scale value will change the output scale.

In the hardcopy mode, groups will be automatically attached to the page if no other selection is made. This allows adjustment of positions using the placement tool without first having to set attachments. This makes the user interface much more intuitive, and the previous approach confused many beginning users.

When the "Placement" tool is active you can now press the right mouse button in the view window to initiate a redraw.

*** Hiding and Showing Layers.**

Layers can now be "hidden" in the display process using the new Layer / Hide menu option. When a layer is hidden it will not be drawn, though it will continue to occupy "space" for view positioning purposes. Therefore hiding a layer will have no effect on the position of other layers in the view. When a layer is shown or "unhidden" it will be drawn immediately (on top of all other layers). The "hidden" state of a layer is saved with the "layout" so when a layout is restored or printed, the hidden layers will not appear. This feature is especially useful to speed up printing of a complex, many-layered map where you are working only to perfect features in a particular layer(s). Turning off other layers, whose rendering is already correct or will be dealt with later, will yield a much faster print or display of your changes and features currently being altered and developed.

This hide / show feature can also be useful in building HyperIndex stacks. A layout can now be created with a base map and a number of hidden layers as overlays. When the layout is used in **TNTAtlas**, the hidden layers will not initially appear, but can be immediately added and viewed by showing or "unhiding" them as desired. Both hidden and visible layers will appear on the list of layers and can thus be toggled on and off. This provides functionality similar to the "V = Vector" key option in **DOS MIPS**, but is much more flexible as any layer type (i.e. object) can be hidden or unhidden at any time.

*** Geographic Locking of Views.**

When you are displaying more than one View window, they may now be "locked" together by geographic position, scale or both. Use the View / Position Lock and View / Scale Lock options to toggle this new feature on or off. The operation of this new feature is simple and thoroughly covered in the on-line documentation.

The general result of geographic locking is that when one of the locked views is zoomed and/or scrolled, all other locked views will be zoomed to the same scale and/or scrolled to the same center position. You may open, lock, and create as many views as you desire. This feature is very easily used with objects which have been georeferenced. However, since **TNTmips** allows you to specify an arbitrary rectilinear grid for objects which can be interrelated between objects, do not forget that you can also lock views of separate objects which have not been georeferenced. This powerful display feature can be used in many ways especially if you are using a fast machine, fast display board, and a display resolution of at least 1024 by 768 pixels.

For example, you could display the georeferenced color scan of a topographic map in one view and when you select a georeferenced satellite image for a second view, it will display with the same scale, map projection, and position so as to match the map. When you then alter the viewing parameters of one view (e.g., zoom and reposition the map) the second view (e.g. the image) can be automatically redisplayed to match.

Another use would be to display the same object or layout in both views locked by geographic position only and use one of the views for a zoom view of any size which

automatically repositions with changes in the position of the primary view. Alternatively, you could set up a complex line map layered display over an image in one view and then create a much simpler second view of the same objects and area using different queries or the new hide/show layers feature.

Since you can display two or more different images which have been georeferenced separately and scroll, pan, and zoom them in tandem, this is a partial step in the completion of a feature for viewing and controlling the viewing of stereo images on screen with the Cyberscope or a mirror stereo scope. A Quick Stereo Select window was planned for **V4.80** but didn't make the **CD-ROMs**. This new selection window will make it easy to select nominally georeferenced right and left stereo images or an orthophoto and its orthophoto mate. It will then open two views containing these images in an initial estimated default stereo viewing position (areas, separation, scale, etc.) and condition for the particular viewing device. The stereo image view can then be scrolled, panned, etc. in tandem for interpreting areas of the images.

*** Retaining View Defaults.**

For vector, **CAD**, and database table (pinmap) objects the options for viewing that object are now "remembered" as a default for the next time that object is used. This includes all selection and styling options, queries, etc. For this feature to be used, you must have write permission on the **RVC** file containing the object. This also makes the "Quick-Add" feature much more useful for vector and **CAD** objects.

*** Showing Pin Mapping Labels.**

Database table (pinmap) displays can now show text labels for the "pins" using either a single selected field from the table or a query expression. If the query is used multi-line labels can be generated. The labels will be drawn at the upper right of the symbol. Additional positioning control in positioning the labels will be provided as requested. At the present time no effort is made to resolve overlapping labels so they may overlap each other.

The database table display controls dialog has been redesigned to allow for the use of labels. In addition, the field selection has been changed to use a pop-up list instead of an option menu. This eliminates the problem of having too many fields to fit on the display screen.

A color sample page of labeled pin maps is attached. The stream data portrayed in blue is from the **DLG** sample vector object provided for the Crow Butte map quadrangle. The histogram bars of mineral concentrations at sample points in the streams is pin mapped from attributes which were made up and attached to the streams in the vector object. The bar colors, sizes, labels, label offsets, label color, and so on were established by the query shown on the reverse. These color prints were prepared on the excellent HP 1200C printer which is now available via national chains such as Best Buy and Office Depot at \$1400. The prints were prepared at a rate of 2 per minute (independent of ink used) on regular copy paper at a total cost about equal to that of printing the same illustration on a black and white laser printer.

Other 2D Display Changes.

Layouts designed for producing hardcopy on printers, plotters, and film recorders will default to hardcopy mode when loaded in the display process. All layouts loaded in Map & Poster Layout will default to hardcopy mode.

3D Display Changes.

3D vector objects now display properly without use of an elevation raster for reference if the contain Z-values for vertices. This provides for proper drawing of vector and CAD objects in parallel or perspective view.

*** Multilingual Text Editor.**

Management of the entry and rendering of 2-byte Unicode encoded characters in Map and Poster Layout and for other **TNT** processes required the creation of new character string entry functions. It also requires recognizing and using the character entry method supplied and installed with the operating system for each language supported. These and related modifications were undertaken this quarter by completely rewriting the Microlmages text editor and adding these additional characteristics into it. This text editor is used to prepare blocks of 1- or 2-byte text for use in **TNTmips** processes such as Map and Poster Layout. This activity also required the creation of keyboard entry support and string handling changes in **MI/X** and elsewhere where single line text entry is to support 1- and 2-byte languages.

V4.80 provides a completely new, interactive multilingual text editor replacing the simple **V4.70** text editor. The new editor is still available via Support / Text File Editor. Details on the use and operation of this editor are provided in the enclosed printed supplemental documentation section entitled: Multilingual Text Editor. This editor is not yet fully available for UNIX workstations as their keyboard entry methods are not yet supported.

This text editor is an extensive modification of a public domain editor available for use with Motif. It is interactive and mouse controlled as with other popular editors. The editor utilizes bit mapped fonts as is the case with most X interface components (not Microlmages ***.OF** or outline fonts). It can read and write files in any of the following encodings: **JIS**, Shift-**JIS**, **EUC**, **ISO-2022**, Unicode, and plain **ASCII**. Use the "Encoding ..." button on the file selector to specify which of these language encoding schemes was used on any text files created outside this editor and which you wish to edit. There are several ***.BDF** and ***.PCF** bit mapped fonts automatically installed by the **TNT** products for use in this editor including fonts for Russian, Greek, Hebrew, Japanese, Chinese, and others. The bit mapped fonts installed automatically for use in this editor are **ISO 8859-1**, **ISO 8859-2**, up to **ISO 8859-9** (e.g. **ISO 8859-5** is Russian) for the 1-byte languages; **JIS0208** for Japanese; and **GB-2312** for Chinese. The font for the language you want is automatically selected to be that needed for the language you have selected to use in Microsoft Windows. For example, while running the Japanese version of Microsoft Windows 3.1 (**J-MSW3.1**) you can automatically switch to German from English by using the Window Control Panel.

The new editor has the ability to select and show glyphs or characters in all languages currently supported and is a more of a complete "what you see is what you get" (**WYSIWYG**) editor.

The languages currently handled by this editor include all 1-byte character based languages which do not use special rendering algorithms. It will support data entry and use of those languages such as Russian and others which use the upper 128 codes in the 8-bit single character range as well as English and others using the lower 128 codes. Also supported are those languages which extend this to a 2-byte encoding system where simply a larger set of glyphs are available. These languages include Japanese, Chinese (both Republic of China and the Peoples Republic of China), and Korean and their derivatives. Fonts for these languages contain English characters, Arabic numbers, and other similar symbols and characters in the normal positions in the first 256 positions. Their additional 7,000 to 12,000 glyphs or ideograms are then encoded elsewhere in the additional 2-byte or 64,000 positions.

Languages not supported at this time are those which require special rendering or drawing requirements. For example Thai has only 48 consonants and 18 vowels, but also has 4 tone marks and 5 special marks which composite with the regular characters like diacritical marks (2 levels above and 1 below) depending upon the context and use of the regular character within the word. Arabic and Farsi require rendering and related procedures which are recursive in nature (characters join in ways depending upon what is adjacent to what). Hebrew and other 1-byte right to left languages are more readily added by providing support for their keyboard entry methods, but will require their users to enter characters in reverse order until Motif 2.0 is reliable and then integrated into the **TNT** products.

You can readily mix languages within a line of text in the new editor. For example you can mix English and Russian in a text line by pressing both shift keys to toggle between these language's keyboard definitions. Similarly the toggle between Japanese and English using the ALT and ' and for Chinese / English you use both control keys. These are the keyboard sequences used by Microsoft in these language's versions of Windows 3.1 to switch language keyboard entry methods.

*** Multilingual Outline Fonts**

TTFTOTNT font utility translates TrueType described fonts into MicrolImages outline fonts (*.OF) for use within **TNTmips** processes which render characters (e.g., Map and Poster Layout or the object editors). This utility also recognizes, reads, and translates the encoding of the font being imported into the 2-byte Unicode international standard encoding being used by Microsoft, Apple, Sun, and others in their operating systems and application products.

TTFTOTNT has been modified to translate the currently popular Shift-JIS Japanese 2-byte character encoding scheme used with TrueType into standard Unicode when converting from TrueType to *.OF. Similarly **TTFTOTNT** will translate 2-byte Chinese TrueType fonts from Big-5 (used in **ROC**) and Simplified (used in **PRC**) into Unicode in the *.OF format.

TrueType 2-byte fonts are naturally much larger than the 1-byte versions with which most are familiar. You will find that after importation, the *.OF font is about 5 times larger than the original TrueType font due to the less compact nature of MicrolImages' outline font (*.OF) format which contains outlines of the glyphs compared to the TrueType glyph which uses descriptions. A single Japanese and Chinese outline Unicode font (*.OF) has been created in this fashion. They are only installed if you specially request via the menu during the installation of **TNTmips**. They are

JAPAN1.OF at 10,813,440 bytes

(Source: **MSMINCHO.TTF** from Japanese Windows **3.1**)

CHINA1.OF at 13,946,880 bytes

(Source: **SIMHEI.TTF** from Simplified (**PRC**) Chinese Windows **3.1**)

To compensate for the large font size, which would require several minutes to load, the function used within **TNT** processes to buffer the outlines of glyphs has been altered to cache the character so that it loads the font in 256 character pages as needed. Only a single 256 byte page is required for English and other 1-byte fonts so this does not change their access times. Each time a character is requested the single 256 character page which contains that character is loaded and held in memory. As more characters are requested, all the popular pages become resident in memory. Thus the larger fonts are loaded in small pieces (pages) spreading the loading time out and significantly reducing the impact if only a few annotation characters are needed.

It is important to understand that the text entry methods for the new multilingual editor and the single text string entry methods used your interaction with X windows does not use the *.OF fonts. **MI/X**, the editor, and other entry processes use bit mapped *.PCF and *.BDF fonts. These bitmapped fonts are smaller, rapidly loaded, and non-scaleable and thus the entry and review of multilingual text is as fast as the keyboard 2-byte entry method will allow. The *.OF fonts are used only directly within **TNT** processes which render and rescale characters on output products (on prints or within View windows) such as for annotating features, displaying legends, displaying feature labels, pin map labels, and so on. Since these processes take time to execute anyway, the impact of the longer loading time of the larger 2-byte *.OF fonts is not particularly noticeable within these processes.

It is planned at a future date to modify the **TNT** processes so that they use and render TrueType fonts directly with Unicode encoding or as translated in real time from other encoding schemes using look-up tables. This will allow direct use of TrueType, render even more attractive glyphs, and reduce font file size. However, this is of secondary importance at this time compared to other pending language management alterations in all **TNT** processes to use Unicode and *.OF and since a workable scheme is in place.

*** Map and Poster Layout.**

Significant effort went into modifying this process to create annotations with 2-byte fonts. In addition to the creation of the Multilingual Text Editor outlined above, this was the first process to be converted to partial multilingual use. The results of this effort can be summed up by saying that if you're running Japanese or Chinese Microsoft Windows 3.1, their text entry methods for Japanese and Chinese will work in the text entry dialog for text layers in Display 2D / Map and Poster Layout. Upon redraw, the annotations placed in the View window will show in Japanese or Chinese as well as in the printed map which results. This process provides the same font size and style controls (bold, enhanced, italics, and so on) with 1- or 2- byte languages that were previously provided for 1-byte languages (English, Russian, German, and so on).

As yet feature and element labels generated from attached attributes tables can not be rendered in Japanese and Chinese. Thus the element labels (Cu, Pb, and Zn) on the attached pin map illustration can not yet be automatically generated with 2-byte fonts. Support of 2-byte labeling is underway now and requires solving such new problems as the management, searching, and matching of 2-byte character entries in database fields.

A sample Japanese image map of Mount Fuji and surrounding urban and rural areas is attached to illustrate the results which can now be achieved. The image was provided by OpenGIS in Tokyo via a sample **CD** prepared and distributed by the National Space Development Agency of Japan (**NASDA**) to illustrate several optical and RADAR image types. The image shows a portion of a Landsat TM image downloaded by the Japanese tracking station. Band 4 is rendered in this black and white laser print. The sample image was georeferenced using 4 of the 1/200,000 standard topographic map quadrangles provided by OpenGIS. **V4.80** of Map and Poster Layout was then used on a **PC** via Windows 3.1 to annotate the interior features in both Japanese and English as well as create the title and the legends.

Database Queries.

If you have multiple records attached to a vector element, a query on that element will only check only the first attached record. So the query:

```
TABLE.FIELD == "something"
```


will find all elements in which the first attached record from TABLE has the value "something" in FIELD. If the first attached record does not contain "something" the element will not be selected, even if it has other records from the same table that contain the value "something".

* The new query:

"something" in TABLE[*].FIELD

will select the element if any of the attached records contain the value "something". In this query, TABLE[*].FIELD is a list of all values in FIELD from the records of TABLE attached to the current element. If the field is numeric, this can also be passed to any of the Set functions. For example:

SetMean(Well[*].DEPTH) > 500

* There is also a new Set function

SetNum()

which will return the number of things in the set, counting multiple occurrences multiple times. For example:

SetNum(WELL[*].DEPTH)

will return the number of records attached to the current element from the WELL table. SetNum() is different from SetVariety() which returns the number of unique values. For example:

SetNum(20, 30, 30)

will return 3

SetVariety(20, 30, 30)

will return 2

Color Conversions.

The raster color conversion process now allows hue to be in range (0 to 255) so that it can be color enhanced in the display process.

Georeferencing.

The control point file can now be saved to a text file. This feature was previously available only in **DOS MIPS**.

Raster Resampling.

You can now override the default null cell value for the output rasters in cases where the input rasters do not have a null value set.

Importing and Exporting Rasters.

The **EOSAT TM** Fast Format can now be imported directly from 8mm tape under Microsoft Windows 3.1 for those with the tape support feature [product **T7**].

SPOT imagery can similarly be imported directly from fast file format on 8 mm tape or files downloaded from tape, or from **CD-ROM**.

RVC project files can now be linked directly to **SPOT** and **EOSAT** Fast Format data on **CD-ROM** with access to all needed header data, just as if it were imported. This allows all **TNT** processes to display and copy these images and subsections from the **CD-ROM**. However, remember that the rasters on **CD-ROM** are not in tiled format and thus you will benefit by subsequently copying them onto a hard drive for more rapid access in extensive processing activities.

Decorrelation Image Stretch.

A new color enhancement technique has been added which uses the steps of principal component analysis, modification of the components, taking the inverse, and then displaying

the resulting components in color. The operation of this new feature is provided in printed form as the supplemental documentation section entitled: Decorrelation Stretching.

Explanations of the concepts incorporated in this enhancement process are summarized in the following paragraphs extracted from remote sensing reference sources.

*"Another modification of **PCT** is called decorrelation stretch and considered highly useful in processing correlated multidimensional image data. It involves the following steps: (1) a principal component transformation, (2) followed by a contrast equalization by Gaussian stretch, so that histograms of all principal components approximate a Gaussian distribution of a specified variance, resulting in 3-D composite histogram of a spherical symmetric 3-D Gaussian type, (3) next, a co-ordinate transformation that is the inverse of the principal component rotation to project data in the original space. The inverting operation has the advantage of restoring basic spectral relationships. The decorrelation-stretched images can be used as components for making color composites."*

Abstracted from the book Remote Sensing Geology. Chapter on Image Enhancement. by Ravi P. Gupta. Springer-Verlag Publisher. date not known. pages 203 to 206.

*"The most powerful means of stretching contrast is principal component analysis, which is an essential part of the decorrelation process involved. Images where different principal components are represented by red, green, and blue are often confusing. Although they discriminate subtle differences very well, the colors are not clearly related to different types of surface. This can be overcome and the advantages of the analysis exploited by transforming the components back to the domain of the original variables. The transformation involves using the original eigenvector matrix of the principal component analysis with its rows transposed with the columns. The eigenvectors are used as weighting for each principal component in their arithmetic combination to reproduce the original bands. Displaying the manipulated original variables conventionally in **RGB** color space retains the 'normal' color appearance of the image, but maximizes the spectral separability of different surface types."*

Abstracted from the book entitled Image Interpretation in Geology. Section 5.4 Principal component analysis. by S. A. Drury. date not known. pages 131 to 148.

Also for more information see the paper Color Enhancement of Highly Correlated Images. I. Decorrelation and **HSI** contrast stretches. by Alan Gillespie, Anne B. Kahle, and Richard E. Walker. Remote Sensing of Environment 20:109-235. 1986.

Importing Arc/Info E00 format.

During the last quarter clients have occasionally encountered Arc/Info *.E00 files which could not be imported. These difficulties arise from files which contain conditions not yet encountered in any test files previously provided to MicrolImages. As has been noted previously, MicrolImages does not have specifications for this *.E00 format and is reverse engineering this format as we encounter variants in it not yet accounted for. The **V4.80** process handles all known cases. If you should encounter an *.E00 file which will not import, please forward that file to MicrolImages and receive back a revised version of the process to accommodate it.

Copying Rasters

The process for copying raster objects now copies null values.

Copying Vectors.

This process was expanded so that all boundary options are now available: clip to specified boundary or extent, clip to last node outside of boundary, or clip to first node outside the boundary.

Status of Object Editors

Numerous minor improvements were made in both of these processes. However, not all problems were resolved due to the complex and older nature of this code and a coding structure and approach which dates back to **DOS MIPS**. As a result, as noted earlier, these two processes are scheduled for a substantial rewrite to include new and advanced features.

This rewrite will commence with the release of **V4.80** but will not be complete until after the first of the year (not for **V4.90**). The new single replacement process will be called the **TNT** Object Editor and will incorporate the existing features of the edit **CAD** and edit vector process. It will enable the loading of mixed objects and then the interactive selection of any object element for editing. The new editor will be recoded in modular form from the many functions created for various other **TNT** processes.

*** Buffer Zones.**

Repeating Earlier Tests. This process has again been completely rewritten for this quarterly release. It now has high reliability and has a significant increase in execution speed over **V4.70**. The user interface has also been improved to make it more logical. The process also provides better control over the selection and use of attributes, for example, you can now elect to reassign attributes for polygons, lines, points.

V4.60 was reported to be several times faster than **V4.50** and 20 times faster than the same process in **DOS MIPS V3.33**. The attached table for the same Lancaster County test data shows the improvements in **V4.80** relative to these previous versions. **V4.80** is now 2 to 20 times faster on exactly the same 60 MHz Pentium platform than **V4.70** and hundreds of times faster than **V4.51**, with the greatest gains being made in more lengthy complex application of the process. The relative better performance is because some of the original test data sets selected 6 months ago now execute so fast on the same test machine so as to produce meaningless comparisons between versions.

It is again suggested that in interpreting these results that the most significance be placed on the comparisons of the relative times. All Pentium 586 tests were conducted on the same Gateway 2000 model 586/66 just as received from the factory which is taken as the base unit of performance and time. Numbers in parenthesis in tables represent the increase in speed on the specific processor of **V4.80** relative the earlier version noted. For example the **(98X)** indicates that **V4.80** was 98 times faster than **V4.60** on this base 586/66. Adjacent numbers such as the 2056 all represent the actual time in seconds to complete these tests. Microsoft Windows for Workgroups **3.11** was used for all tests on 586 and 486 machines.

New Test Results. These small original tests using the Lancaster County TIGER hydrology and street vector objects now take only about 10 to 20 seconds on various fast machines tested. Thus, these times no longer illustrate computational differences but depend upon the variation in reading and writing of the objects from the drive and transferring them over the bus. This is obvious from the fact that a much faster machine, such as the **DEC Alpha** via **OSF/1**, showed only minor improvements (2X) in total performance. This minor difference was due to its use of **DEC's** 100 megabytes per second TurboBUS when compared with the 32 megabytes per second **PCI** bus of a Pentium based machine.

To overcome these limitations a new and much larger vector object was imported from the Digital Chart of the World containing the hydrology layer for a 5 by 5 degree area centered on San Francisco. Computing buffer zones for this vector object using **V4.80** takes long enough to illustrate the computational performance differences between the faster state-of-the-art desktop machines (see attached table). This same hydrology vector object will be available on the San Francisco **TNTAtlas CD-ROM** which will be distributed to all clients shortly. Thus you will be able to try this new buffer zone test for yourself to compare the performance of your system to those listed in the new table provided.

Challenge. Tests have now been made where an identical set of TIGER hydrology data for a different county has been used to compute similar buffer zones using Arc/Info on a workstation and **TNTmips** on the standard 586/66. Microlimages is pleased to repeat the report that the **V4.80** process you now have is faster on the 586/66 PC than their workstation based product.

During the last couple of quarters Microlimages, by rewriting and applying improved buffer and programming techniques, has made major speed increases in the buffer zone, route tracing, 1:1 raster display, and printing processes with meaningful increases in vector validation and other utility processes. Other time consuming processes will be subjected to similar improvements in future quarters. For example, the display of subsampled images will be improved by the creation of a raster pyramiding concept within the **RVC** Project File and the functions which use it.

Overall, these new fast processes exceed the performance of similar processes of our **GIS** and image processing competitor's products (if they even have the feature)! Clients should now identify those time consuming processes within **TNTmips** which are significantly slower in operation than those of a competitor on a comparable computer platform. Microlimages will then schedule them for careful examination and revision to try to exceed the performance of that competitor.

*** Route Tracing.**

The route tool in Display 2D can now solve the traveling salesperson application. Any number of visit points, or way points can be selected. Details on the use and operation of this feature are not included here as they are provided in the enclosed printed supplemental documentation section entitled: More About the Route Tool.

A new easier and quicker method of selecting nodes was also introduced into this process. Simply select the node you want to set or change in the route window, then click near the node in the Display 2D Window.

A <close> button was added which will "unhighlight" any route in the Display 2D Window and close the window. This is much easier than having to select another tool in the Tool Menu to close this process.

The next additions to this process will allow you to completely control the flow through nodes, as well as setting a different weight or "impedance" through a node as a function of direction, and to control one-directional lines.

New Image Printers/Plotters Supported

Epson Stylus Color.

The Epson Stylus color ink jet printer is now supported via a parallel port. It prints at 360 and 720 dots-per-inch for a page of 8.5 x 11 inches and requires **TNT** product **P3**. It requires a

special paper to produce good results at the 720 dpi resolution. While inexpensive and high resolution, this Epson printer is very slow for printing full color images.

HP Deskjet 560C.

The HP 560C color ink jet printer is now supported via a parallel port. The model 560C prints at 300 dots-per-inch for a page of 8.5 x 11 inches or A4-size (210 x 297 mm) and requires **TNT** product **P3**. While inexpensive, this HP printer is slow for printing full color images.

HP Color LaserJet [Model C3099A].

Microlimages has just received this new color printer. Since it comes equipped standard with Postscript and a parallel port, it can be used immediately with those **TNTmips** systems equipped with the appropriate printer support feature (product **P8**). Microlimages will also immediately add direct, non-Postscript support for this new color printer for this parallel port (via product **P10**). Using this direct support will provide faster color printing than via Postscript. If you need this new direct support driver before the shipment of **V4.90**, please contact technical support services to obtain an early copy. Sample prints produced by **TNTmips** on this printer will be included with the next Microlimages client mailing.

New Scanners Supported

No new scanners were supported during this quarter.

New Price and Reference Materials

Increase in International Subscriptions.

As announced several months ago, an increase in price will become effective for any new subscription or upgrade ordered for **TNTmips** effective with this release of **V4.80**. Any subscription which has already been will continue to be filled as placed without additional charge until completed.

The cost of new annual subscriptions to be shipped to destinations outside the United States, Canada, or Mexico for a **PC** based system is \$1000 per 4 quarters (up from \$800) and \$1700 for a workstation based single user system (up from \$1500). This additional charge for international annual subscriptions will be used to ship all these quarterly upgrades for **V4.90** and later via air express instead of air mail. Over the last few years Microlimages has learned by experience that air mail is not a reliable, rapid way to deliver our products and causes Microlimages and its clients considerable grief and problems.

Many international clients are already paying Microlimages extra for air express shipment of their upgrades and thus will pay no more with this increase than they currently do. Others will find the increased cost of concern, but it is hoped you will understand its necessity. Microlimages will be requesting bids from popular international air express carriers (**DHL**, **UPS**, and **FEDEX**) for this service. At present we do not know which carrier will be selected for this new service. Delivery of **TNT** products to addresses within the United States, Canada, and Mexico will continue to be made via United Parcel Service by ground service or air mail.

Workstation Bundle Changes.

Effective immediately the printer support feature **P15** will no longer be included in the optional support features bundled with the workstation products such as **U100**.

Exclusive International Representatives

MicrolImages welcomed several new representatives during the last quarter.

Bolivia.

MicrolImages products will now be exclusively available in Bolivia from GeoPlus; Calle Sucre 617; Casilla Correo 4134; Santa Cruz; voice (591)334-5027; FAX (591)336-4583; and please ask for the manager: Rafael Arias-Paz. GeoPlus was recently organized by several former long-time professionals of the Bolivian state petroleum company (**YPFB**) and other remote sensing specialists. GeoPlus is focused upon in the application of image processing, GIS, map making, and other related technologies in the collection and analysis of geoinformation in South America. GeoPlus starts off with a base of 4 **TNTmips** systems in place in Bolivia for use in the oil and gas service industry and in the offices of the municipal government of the capital of La Paz.

Indonesia.

MicrolImages' products will now be available from Citradata Intersystem, PT; Jl. Rawamangun Muka Raya No. 1M; Jakarta 13220; voice (6221)489-6883; FAX (6221)489-8881; and please ask for their Director: Eko Refia Iswantioro. Citradata is a well established firm of 20 professionals already conducting consulting and software services in **GIS**, **IPS**, **AM/FM**, and other spatial data analysis and visualization as well as designing and installing computer systems and networks. Citradata will supply the commercial **TNT** products as well as custom software, installation, training, project design, consulting, data preparation, and related services from their offices in Jakarta. Citradata is also a reseller for Silicon Graphics, Compaq, and a variety of other peripheral equipment manufacturers.

Finland.

MicrolImages' products will now be exclusively available from the Geological Survey of Finland (**GSF**); Betonimiehenkuja 4; Espoo 02150; voice (358)046-932487; **FAX** (358)046-2205; ask for Pentti Ruokokoski in the Information Management Department. **GSF** is one of the leading geoinformation organizations in Europe with a permanent staff of more than 800 involved in all aspects of geological services, nature conservation, environmental studies, construction, land use planning, and other interdisciplinary activities. **GSF** will also market the **TNT** products in the Baltic and other Nordic nations. **GSF** will supply **TNT** products exclusively and will also focus its internationally renowned skills on assisting its clients in the design, implementation and conduct of map making, **GIS**, image processing, and other spatial data management projects.

Peru.

As noted previously, CHASKY has been appointed as our new Representative in Peru.

Domestic Reseller and VARs

The current NAFTA Resellers list is enclosed for your reference and files.

Lincoln, NE.

Archaeological Mapping Specialists (**AMS**) located in Lincoln is the latest **NAFTA** reseller for the products of MicrolImages. Chris Dore and LuAnn Wandsnider operate this new firm and can be located at PO Box 80105, Lincoln, NE 68501-0105, voice (402)473-7978, and FAX (402)476-7074. Chris will be remembered by some clients as a former writer for MicrolImages Press. AMS will specialize in contracting for the collection of archaeological data and its organization and analysis with GIS systems. AMS will also focus upon assisting

professionals in archaeology and related professions in establishing and applying GIS systems in their own field work.

Staff Additions

There were no staff additions at MicrolImages during the last quarter.

Technical References

Selecting a Small Format Color Scanner.

Top-Quality Scanners. If you want to save money by bringing your prepress work in-house, then one of these scanners is for you. by Bruce Fraser. 1994. MacUser, 10(11): 82-91.

Selecting a Low Cost Color Printer.

Color Printers. Five Ink Jet Printer that Let You Colorize Your Work. by Lori Grunin. 25 October 1994. PC Magazine, 13(18):37-39.

Papers referencing work using MicrolImages Products.

Radar Remote Sensing of Forest and Wetland Ecosystems in Central American Tropics. by Kevin O. Pope, Jose M. Rey-Benayas, and Jack Paris. in Remote Sensing of Environment. 48:205-219. 1994. published by Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010. pages 205 to 209.

Identification of Central Kenyan Rift Valley Fever Virus Vector Habitats with Landsat TM and Evaluation of Their Flooding Status with Airborne Imaging Radar. by K.O. Pope, E.J. Sheffner, K.J. Linthicum, C.L. Bailey, T.M. Logan, E.S. Kasischke, K. Birney, A.R. Njogu, C.R. Roberts. in Remote Sensing of Environment 40:185-196. 1992. published by Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010. pages 185 to 196.

Remote Sensing of Tropical Wetlands for Malaria Control in Chiapas, Mexico. by Kevin O. Pope, Eliska Rejmankova, Harry Savage, Juan I. Arredondo-Jimenez, Mario H. Rodriguez, and Donald Roberts. in Ecological Applications 4(1):81-90. 1994. published by the Ecological Society of America. pages 81 to 90.

Assessment of Crop Stress Conditions Using Low Altitude Aerial Color-infrared Photography and Computer Image Processing. by P.S. Fouche and N.W. Booyen. in Geocarto International 9(2): 25-31. 1994. published by Geocarto International Centre, G.P.O. Box 4122, Hong Kong. pages 25-31.

Testimonials

All the following comments were reported for the use of **V4.70** unless otherwise noted.

From an International Representative.

*"We received the disc [CD-ROM] of **TNTmips V4.80B** and it works fine. If seems all the errors that we reported are corrected, thanks."*

From an experienced U.S. client (transcribed from verbal statement).

He reported that he had just visited one of his sites where **TNTmips** was being run on a Silicon Graphics Indy II. Then the same key, as a test, was moved to a new Dell Pentium 586/90 and they saw no appreciable difference in speed. When questioned about the comparison between the responsiveness of the user interface he also reported that no comparative delays or differences were noted. [This points out again that if you use a fast, state-of-the-art display board for your Microsoft Windows based machine, that MI/X adds no

unusual delays when compared with a native X Window System operating on a Silicon Graphics Indy II].

From a NAFTA Reseller.

*"While running a **TNTmips** demo on a Pentium 90 with 64 MB of RAM and a 4 MB video card displaying 40-50 megabyte Russian Satellite images I heard the following from the audience behind me: He is making our workstation look bad with that Pentium" [The workstation referred to was a Sun running a well known competitors software.]*

From an International Representative.

"We left [a city] at 11:00 pm and drove to [another city] in two vans. We reached the [an army base] at 3:00 am and then we installed our system our Sun and two PC486s, a Scanjet IIC, and HP 650C at the hall and finished at 5:00 am. At 9:30 am we began our demonstration. There were 25 officers that participated in this mission: Directors of Intelligence Division, Civil Affairs Division, Staff Division, Information Division [all were of the colonel level] sat in the demo all THREE hours. My demo was perfect - all Directors were interested in our systems so much as they saw how to input [by scanning] and process and output to the printer and they raised many interesting questions to me."

From a new client in natural resources area.

*"Enclosed please find the **TNTdemo** software license key used by [client's name] for **TNTmips** 30 day evaluation. We appreciated the opportunity to give **TNTmips** a thorough evaluation to determine how well **TNTmips** would fit our needs. You will be happy to know that [client's name] has decided to go ahead and purchase **TNTmips**, and we placed an order today through [a reseller's name]. It is our understanding that we will be credited the evaluation fee for returning our **TNTdemo** key."*

"We would like it known that [salesman's name] did an outstanding job of introducing, marketing, and offering any customer support to us during our product evaluation. He found solutions for every concern we had and it was a pleasure to do business with."

"Likewise, we have been impressed with and appreciate the help of all the technical support staff at Microlimages, Inc., including yourself. Thank you for your assistance over the past months."

From an experienced U.S. client.

"Installed the fix for vector copy lines by element. It corrected the application error when trying to use zoom box or slide. Works great! Appreciate the prompt response! Thanks."

From an experienced U.S. client.

*"While on my trip to [another nation] I had trouble with the hard drive on my portable. So I simply ran off the **CD-ROM** on the **PCs** on the desks of the various groups I was visiting. Within 5 minutes I had made the necessary modifications to their Microsoft Windows setups and was immediately running **TNTmips V4.80B**."*

From a new client in the geologic area.

*"We hereby confirm reception of the **TNTmips** package sent to us by service of UPS, which arrived yesterday. You amazed us again with the speed of delivery."*

From an International Representative.

"In general the system is seen as fast, with some comparisons with our Sun LX showing the Pentium to be faster by a factor of 2." [Pentium used was a 586/66]

Advanced User Workshop 7 (AUW7)

Microlimages 7th annual Advanced User's Workshop is scheduled for the icy cold days of the Nebraska winter for January 24, 25, 26, and 27, 1995. As in the past, Microlimages will be unable to accommodate visitors at its office on the Monday of 23 January when we are busy preparing for this workshop. More information on **AUW7** will be provided to you shortly.

Promo Materials

A preliminary copy of a new color folded flier covering the **TNT** products is enclosed. The master for this color flier has been taken to the commercial printer today. Those who would like copies of this flier for distribution at a symposium, meeting, course, or similar activity should let Microlimages know after you receive a final copy in a couple of weeks. Anyone with such an activity about to occur should contact Microlimages immediately to check on the deliver date.

This flier has a perforated, "tear off" panel to request a free sample **TNTatlas CD** of San Francisco and the more detailed brochures for each **TNT** product. The opposite side of this panel is a self mailer.

The standard **TNTmips** brochure has just gone "out-of-stock" and will shortly be revised slightly and reprinted with a new, full color cover. Until this reprinting is received, information requests will be filled with black and white copies of the current brochure. Comprehensive, illustrated brochures for the **TNT** products have also been printed for routine distribution in Russian, Japanese, Chinese, and Spanish by the corresponding Microlimages Representatives.

Advertisements of **TNT** products have appeared in about 15 different publications in the last quarter. Microlimages now advertises in **GIS** oriented publications in Australia, Hong Kong, and Europe. Representatives also place advertisements in Russia and other nations. Microlimages plans to gradually continue to expand this low key advertising campaign using low-cost, black and white adverts that directly target the price and features of the **TNT** products as compared to those of the competition.

TNT Position Available

South Africa.

Sabbatical to work with **GIS** specialists in Human Sciences Research Council (**HRSC**) to further their knowledge of spatial analysis in socio-economic and demographic arenas. Also would present several workshops and short courses during year for other researchers in South Africa. Applicant with relevant academic background should be recognized in field of **GIS** with years of practical experience. Contact Craig Schwabe, **GIS** Unit, Human Sciences Research Council, P.O. Box 17302, Congella, Durban, South Africa 4013, phone (031)815-970, FAX (031)812-040, email CAS@DURBAN.HRSC.AC.ZA

Notes

Need color print diagram via Keith describing "spaces" Addressable (desktop), Viewable, Memory(temp file), ...

Kodak digital camera, have formats, can do

Visualization of Natural Phenomena by Robert S. Wolff and Larry Yaeger (both of Apple) 1993. TELOS, The Electronic Library of Science, Springer-Verlag Publishers, 3600 Pruneridge Ave., Suite 200, Santa Clara, CA 95051. 374pp. 100 animation's on MAC.

Do we test 8 versus 24 bit MI/X vs Windows

use term WORK IN PROGRESS in place of Prototype

Challenge - Sun numbers above should prove speeds of TNTmips on PC - you just are not making correct comparisons if think WS and competitors are faster - if they are prove it and we will go even faster

ratings

Sun's highest endchip, 60 MHz SuperSparc has SPECint92 of 88.9

DEC Alpha AXP 21164 has SPECint92 of 330 and SPECfp92 of 500

HPs PA-7150 has SPECint92 of 135

HPs PA-7200 has SPECint92 of 150

San Francisco Data Set

requires 2 CD-ROMS while on trips