New Features in 2008 TNT Products

MicroImages is pleased to provide you with this detailed inventory of advanced capabilities in version 2008:74 of the TNT products (hereafter called version 2008). The next new version of your TNT product will be released in early 2009 (hereafter referred to as TNT version 2009). The new features in this next official release can be tested or used by downloading the weekly edition of this development version 2009 (DV2009).

If you are not currently using this powerful new version of your TNT product, you can order it immediately using the enclosed pro forma invoice. You will immediately be provided an authorization code by return email or FAX to let you install version 2008 from the enclosed media. If you have missed any other previous releases, this update of your TNT product is comprehensive and will include all the new features released in every previous version.

Highlight Features: Convert any georeferenced view to stereo
Real-time panning with "look ahead"
Sharpen/filter images in view
Theme map raster layers in view
Synchronize view with Google Earth
Draw or edit with a stylus
Streamlined editing of geospatial data
Convert layouts to georeferenced PDF and KML
Use WMS and ArcIMS map and image layers via Internet

Global Modifications

There were extensive modifications to the TNT products at the system level to improve performance and ease of use.

DataTips

Display external raster files as DataTips
(e.g., pop in images/rasters from a selection of *.jpg, *.png, or *.tif files)
Display image stored in a database as a DataTip
(e.g., pop in geotagged photos stored in a BLOB field in a table)
Add other components to an image DataTip using HTML formatting
(e.g., annotate the image with text, data values, and all other HTML formatting)
Improved HTML formatting
(i.e., expanded support for HTML for more elaborate layout of the DataTip)

Selection of Objects

Raster objects with red, green, and blue in names display as color composite
(i.e., treated as RGB components if the three have matching extents and dimensions)
Add all (including subfolders) icon selects all objects in the current folder and subfolders
(i.e., much faster selection of hundreds of similar objects in a directory structure)
Show volume labels in addition to drive letters
Optionally show only RVC files (i.e., no auto-link files)
Prompt for a missing linked file shows its current default stored path name
Total space available for temporary files is displayed
(ToolTip on "temporary space available" lists each drive path and its available space)

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Linking to Geodata Files

BigTIFF (*.tif files greater than 4 GB)
LAS (LIDAR Data Exchange Format v1.2)
CDED (Canadian Digital Elevation Data)
Faster use of linked JPEG files
Link files created as needed to read external geodata files and no longer saved
    (Creating link files is fast. They are no longer saved unless they result in alterations in the
    current TNT process that might be used in a subsequent TNT process.)
Link to Oracle and Oracle Spatial as shape objects using OCCI (Open C++ Call Interface)
OCCI links use Oracle's generic OCI (Open Call Interface)
    (much faster than ODBC, available in SML, only for Oracle 10 and later versions)

Styling

Default styles can be automatically assigned by attribute for any geometric element type
Auto generate styles when none are available
    (i.e., All Same, Random Color, Random from Palette, Palette Progression, Color Spread)
Use bitmap patterns for point symbols
    (KML can only use bit-mapped point styles so use these if KML is the destination)
Color Spread option for styling polygons by attribute
    (e.g., color corn field polygons according to their average production per acre)
Spread Width option for styling lines by attribute
    (e.g., width of road shows carrying capacity of the road)
Point symbols can be image thumbnails stored in database tables
    (geotagged photos stored as BLOB fields automatically also have thumbnail images)

Raster Objects

Support binary TIFF as multifile raster
Object names displayed in ToolTip for RGB raster layers
Create a GeoTIFF tileset
Faster creation time for very large masks
Much faster histogram creation for sparse rasters (i.e., rasters with many missing areas)

Project File Maintenance

Object name is color-coded if it has invalid subobjects
    (DataTip for the name identifies the invalid condition)
Subobjects older than their parent object are color-coded to identify this condition
    (identifies potentially old, invalid histogram, pyramids, search tree, …)
Thumbnail views of objects can be reviewed in Overview Window
Create folders and directories
Pyramid tiers of an object can be copied to independent objects
    (i.e., a fast and easy way to create smaller, sampled objects)

Coordinate Reference Systems

New CRS options:

Cylindrical Equal-Area projection	Iraq and Libya datums
Nigerian Transverse Mercator Mid Belt	Spherical Web Mercator
Minna Oml 58 Onshore	Behmann
Maine 2000 coordinate system	Mauritius CRS

Option to convert georeferenced object to local engineering / Cartesian
    (e.g., to use as a screen overlay, a logo or legend that stays in view in Google Earth)

Access the most recent versions of reference materials from the Internet via Help menu
    (i.e., Tutorials, TechGuides and Quick Guides maintained at microimages.com)
Automatic access to daily news from microimages.com
    (new technical reference materials and announcements are brought to your attention)
Built-in Google search of reference materials from Help menu
    (i.e., search microimages.com for reference material on current activity)
Contact Support feature now also accessed from Help menu
    (using it will automatically provide information about your TNT product setup)
Text included in saved/zipped support report is readable by sender
    (i.e., you or your system manager can read what will be sent)

General

Use Piecewise Affine in CAD/vector warping process
Process ID number automatically shown in title bar of every TNT window
    (use this number shown to identify each active TNT process in Windows Task Manager or
    Mac Activity Monitor windows)
Temporary file folder now in Programs folder on Mac
    (change its location if you like, but it's easier to find and manage in this location)
Geoformulas align output cell grid to integer multiple of cell size
Gallons/min and gallons/sec volumetric flow rate units are available
Raster read speed tests now include Random, No Cache, and Aligned options
    (i.e., new tests of a system's data read rate from a source)

Visualization

Stereo Viewing

Stereo icon converts any accurately georeferenced 2D or 3D view to stereo
    (stereo defaults to anaglyph but can optionally default to other viewing modes)
Stereo is automatically created from global 90 meter, USA 30 meter, or your local DEM
    (use paper anaglyph glasses provided or secure better stereo viewing equipment such as
    glasses, monitor, projector, …
90-meter global and 30-meter USA DEMs provided on DVDs
    (use these tileset DEMs for stereo of any view)
DEMs are in MicroImages' unique tileset format and can be used from hard drive or DVDs
Pan the stereo view
    (not predictive, rebuilds stereo of view after it has been panned to new location)
Use stereo for printing
    (e.g., produce a color anaglyph map/poster and hang/place some glasses nearby)
Render a display or map layout to anaglyph stereo to print it as a map
    (e.g., render to TIFF for use outside TNTmips)

Panning

Raster layers pan in real time with cursor
    (i.e., cursor with the left mouse button down pans view in any direction)
Panning is multithreaded and predictive
    (i.e., blank areas do not occur in view unless cursor moved unrealistically fast
    —use Locator view for gross movements)
Stereo views can be panned
    (stereo of current view will not be created until pan action is finished)
Arrow keys pan view 90% in the direction selected

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Zooming

Scroll wheel zooms in and out
Zoom view by resizing outline box in Locator view
Single click of right mouse button zooms out 2X when zoom tool is active

Locator View

Small reference view shows at bottom of Legend
    (similar to separate Locator window but only related to view it is in)
Shows the entire extent of all layers in view but can be zoomed as needed
    (i.e., use keys to zoom + for in, - for out, space to recenter, 0 for full view)
Reference box shows the zoomed/panned location of main view
Pan location of main view by moving reference box with mouse or 5% with arrow keys
Zoom main view by resizing reference view with mouse
Menu entry toggles Locator on and off in Legend
    (e.g., delete Locator temporarily for more vertical legend space)

3D

CAD and shape elements draw directly into view as graphic elements
    (i.e., shapefiles are drawn into view and no longer converted to an image layer)
Insert pinmap elements from a database table into a 3D view
Select a pinmap element in a 3D view
Open and manipulate a Goggle Earth view from an icon in a 3D view

Syncing Google Earth with 2D views

Google Earth icon launches matching Google Earth 2D nadir view of same area
    (view Google Earth's coverage of the area of the current TNT view from any orientation)
Movement in 2D view repositions Google Earth in vertical 2D view
    (i.e., repositioning TNT 2D view switches Google Earth to new vertical view)
Google Earth Synchronization window controls optional 2D relationships between views
Slider zooms observer's eye in/out for vertical Google Earth view
    (i.e., moves in and out along vertical axis while maintaining a matching center point)
Toggle on/off a marker in Google Earth representing the common center point of both views
    (useful reference point if when you independently reorient Google Earth View)
Show outline of extent of group of layers in TNT view as temporary place in Google Earth
    (i.e., manipulate Google Earth to show its view of current TNT project from any position)
Show outline of extent of current TNT view as temporary place in Google Earth
    (i.e., manipulate Google Earth to examine area of current TNT view from any position)

Syncing Google Earth with 3D views

Google Earth icon in 3D view will open a matching 3D view in Google Earth
    (view Google Earth's coverage of the area of the current TNT view from any orientation)
Movement in the 3D view is tracked by Google Earth view
    (i.e., repositioning TNT 3D view moves Google Earth view to match)
Google Earth Synchronization window controls optional 3D relationships between views
Slider zooms observer's eye in/out for Google Earth view
    (i.e., moves in and out along view axis while maintaining a matching center point)
Toggle on/off a marker in Google Earth showing the common center point of both views
    (useful reference point if when you independently reorient Google Earth View)
Show outline of extents of group of layers in TNT view as temporary place in Google Earth
    (i.e., manipulate Google Earth to show its view of current TNT project from any position)

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Interface Changes

Cursor remains visible in all views when using graphic tool
    (e.g., cursor shows when dragging open a box and thus its coordinates show)
Cursor position in profile view is tracked in 2D views
    (i.e., point to a position in a profile and see the position on the profile line)
Latitude/Longitude coordinates can optionally be displayed in a variety of formats
    (new formats include minutes, minutes+seconds, or seconds)
Choose or design a point symbol to represent location of geotagged images
    (you can also use the images themselves as point symbols)
Precision of coordinates displayed determined from the ground unit represented by a pixel
    (e.g., if screen pixel represents Lat/Lon cell then coordinates default to minutes, minutes plus
    seconds, seconds, or decimal seconds, and so on)
Show/hide status and other parameters shown in position report saved with group/layout
Manual grid lines in Profile View are divisible by grid interval

Inline Spatial Filtering

Define and save spatial filters for a raster object using Raster Layer Controls window
Apply spatial filters inline for each subsequent display of a raster object
    (e.g., automatically apply a sharpening filter every time the same raster is displayed)
Filtering is applied only to portion of raster in view
Filtering is fast and applied along with other transformations during panning
    (e.g., filter, CRS resampling, color balance, stereo, … and also pan)

Raster Theme Mapping

Theme mapping can now be applied as a display option to any raster in the current view. Select it
    in the Raster Layer Controls window to open the Raster Theme Map Controls window.

Theme color spread and associated range in cell value show in Legend
    (i.e., each color step and its range represent the raster in the Legend)
Set any number of steps for distribution over selected data range
    (e.g., choose 6 steps for entire raster histogram and set upper and lower values)
Choose distribution method for steps
    (i.e., select from Equal Range, Equal Count, User Defined)
Choose automatic color spreads for steps
    (e.g., RGB, HIS clockwise, HIS counterclockwise, HBS clockwise, ...)
Manually enter cell values for beginning and ending of each color step
    (i.e., choose User Defined distribution method)
Use Color Editor window to select color for each step
    (i.e., pick colors from RGB, HIS, HBS, CMY, CMYK, or standard palette)
Save theme as a subobject of the raster
Multiple themes can be saved with a raster and reused

Web Layers

Web icon provides choice of selecting layers from remote ArcIMS or WMS sources
Any layer properly published by these protocols can be selected
Add multiple web layers in combination with any local layers
    (i.e., combine layers accessed via the Internet with any local geodata)
Local layers use predictive real-time panning, but web layer position changes are slower
    (i.e., position changes requested from web sources updated as background task)
Built-in access to catalogs of web published maps and images
    (MicroImages catalogs of WMS and ArcIMS layers and other catalogs also provided)

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Favorites tabbed panel provides access to 1- and 2-meter imagery of USA
    (i.e., the imagery available from TNTserver at microimages.com using WMS protocol)
Each web layer is rendered as reference raster
    (i.e., source service can host vector, CAD, image and other geodata and all will be returned
    as composite rasters for addition to the current view with appropriate transparency)

Raster Layers

All methods available for image contrast adjustment for all rasters types
    (i.e., define and apply contrast to 16-bit, color composite, … not just 8-bit images)
Bilinear and cubic convolution resampling available when cell rendered as multiple pixels
    (i.e., when zooming in greater than 1X zoom at which 1 cell = 1 pixel)
Choose the same contrast settings for the display of multiple raster layers
    (i.e., contrast tables can be saved and applied to any raster object)
Quick-add multiple RGB sets simultaneously
Optionally show lines between cells when zoom way in
Optionally show labels in cells when zoomed way in
Automatically use null mask subobject first time raster is displayed

Geometric Layers

Use stylus or mouse for Tablet PC and Wacom devices on Mac and Windows
    (i.e., more accurate and natural drawing operations directly on screen or pad)
Selecting a pin symbol can open Photo View of photo from table's BLOB field
Display image thumbnails for vector point symbols

Legend

Show a raster theme map legend similar to the color scale range legend
Show thumbnail view of raster layers in the Legend
Null cells are transparent in raster samples in Legend
Menu entry toggles Locator view on and off in Legend
    (e.g., delete Locator view temporarily from for more vertical legend space)
DataTip on name identifies why a particular object name's text is colored coded
Legend layer/group functions now synchronized with Display Manager
    (e.g., provides same functionality and changes occur in both)

Display Manager

Layer order in a group can be changed by dragging their names up/down
Menu option to Collapse All and Collapse Inactive layers in a display (group or layout)

Geotagged Photos

Support reading of waypoint type GPX log
Support TIFF files in geotagged image viewer
Tabular View window has option to view images stored in record
    (simply click on BLOB field stored in record to open it in Photo View window)
Flip back and forth through set of geotagged images in Photo View window
Support viewing BLOBs stored as TIFFs in Photo View window
Import JPG files to database including embedded EXIF information
Allow selection of point symbol to represent geotagged images
Text editor is available to edit descriptions

TNTsim3D

Geotagged images can be displayed as billboards for point symbols
    (i.e., use your geotagged photos as billboards)
Variable sizes can be set for photo billboard symbols using attributes

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(i.e., control sizes of each of your billboards using attributes)
Stalk height of image billboards can be set
Set the size of the window that is used to render a movie
    (i.e., render movie simulation at a higher resolution and quality)
Select order of textures being drawn at the same offset
Grid view added to view all points and parameters
Flight plan SML script altered to use any geometric object as boundary
TNTsim3D redrawing is suspended when the process is inactive

Spatial Data Editor

Interface

Uses narrower dialog with drop-down vertical panels to better organize functionality
    (i.e., tall narrow tool windows are easier to position laterally near work area)
Hotkey equivalents shown in drop-down panel in Tools window for easy reference
    (i.e., see keyboard equivalents for a tool without checking documentation)
Sample for currently selected fill/border style shows in Raster Tools window
    (i.e., you can directly see the selected style for drawing and for filling)
Clipping and Special tabs added to the group settings
Optionally automatically add new reference layers below editable layer
Legend provides same layer control menu on right mouse button as Layer Manager

Raster Operations

Map and images published by WMS / ArcIMS web sources used as reference layers
    (i.e., interpret, created, adjust, … any local TNT layer using web layers)
Cut, copy, and paste between two rasters
Any area selection tools can define the area of a raster for cut, copy, paste operations
    (e.g., select a complex area using a region with multiple polygons, holes, …)
Set the area cut from a raster to null
Paste into active raster object or into a new raster object
    (creating object directly by paste operation has extents of copy/cut area)
Paste replaces cells in target raster object
Preview results of paste operation before replacing cells in target raster object
Use inline spatial filtering for image sharpening
Raster Tools window presents cell value as text field
    (i.e., directly edit the value by selecting field and typing in it)
Change color/cell value brush while the paint tool is being used

Geometric Operations

Cut, copy, and paste selected elements between geometric objects of different types
    (e.g., select elements from a CAD object and paste into existing vector object)
Copied elements can be directly pasted into new geometric object of any type
    (i.e., selected elements can be directly moved between object types)
Preview elements that will be pasted into a geometric object from clipboard
Automatic icon provides all editing operations for lines and polygons
    (seamlessly switch between line editing modes depending on cursor position)
No longer necessary to use the following icons to select each operation
    (optional icons: Add End, Add Start, Insert Vertex, Drag Vertex, Delete Vertex)
Line Markers indicate the automatic operation that cursor will perform
    (i.e., symbol will indicate if a vertex will be inserted or dragged)
Add to start or end of line
    (i.e., this is the automatic edit operation when cursor is close to end of line)

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Insert or drag vertices
    (i.e., this is the automatic edit operation when cursor is close to line)
Erase vertices from anywhere in the line using the line edit tool
    (use center mouse button or the eraser end of the stylus)
Erase any vertices in a polygon using the polygon edit tool
    (use center mouse button or the eraser end of the stylus)
Nodes can be manually inserted into lines

Stereo Operations

Stereo icon will convert any georeferenced view in editor to stereo
    (uses elevation rasters supplied with this TNT release or more accurate local DEM)
Any stereo device mode supported by the TNT products can be selected
    (e.g., use your anaglyph or interlaced stereo device)
Convert any 2D geometric object to 3D object when editing in stereo
    (z values added for vertices and nodes using bilinear interpolation of surface)
Interpret or edit layer in stereo with elements lying on the terrain
    (e.g., stream will be on the 3D surface in the image)
Editing elements in 3D layer in stereo will automatically adjust their z values
    (i.e., computes their vertices' new z values using bilinear interpolation of surface)

Object and Database Templates

Template automatically creates TNT databases structure, or schema, for new object
    (i.e., selecting a template when creating a new object automatically defines its empty relational database, tables, fields, constraints, …)
Use any existing TNT object's database schema as a template for a new object
    (i.e., select an existing object and its database schema is duplicated for the new object but without any record contents)
New Table Wizard lets you select any predefined table definitions
Sample templates for International Hydrological Organization's (IHO) S-57 schema
    (S-57 is the international data model for Electronic Nautical Charts)
Constraints for fields can be set and reused via templates as illustrated by S-57 schema
    (i.e., define the list of text choices for each field as part of the data model)

Databases

Link to Oracle Spatial as shape objects using Open C++ Call Interface (OCCI)
    (much faster link than ODBC but requires Oracle 10 or later version)
View images stored in table using Photo View window option in Tabular View
    (i.e., select field in any record that represents an image BLOB to view the image)
Wildcards can be used in string expressions
    (e.g., use %.PNG to find any string containing .PNG at the end of the string, use AB_YZ to find any 5 character string beginning with AB and ending with YZ, precede % and _ with \ *[backslash]* symbol to use as real characters in string)

Raster Linear Combinations

Process rewritten to streamline and speed it up using pipeline processing
    (sample SML script illustrates how you can set up your own combinations)

Raster Extract

Apply a buffer distance inside or outside raster area to be extracted by a region or polygon
    (i.e., expand or contract buffer zone that is automatically applied during the extraction)

Extract by polygon without displaying in view
(i.e., it's not necessary to display a large and unpyramided object to extract from it)

Rendering Layouts

The Render To operation in your TNT product converts the components of a TNT map layout or the current display layout (i.e., layers in the view) to other popular georeferenced layout structures. External layout formats supported by Render To are all georeferenced and include PDF, KML/KMZ, and SVG. A layout can be simple or very complex. A complex layout of one type may include unique features that have no equivalencies in another layout structure.

Your current complex TNT view can be rendered to these other layout structures. When you use Render To for this purpose it can be set to render only the portion of the object and features currently visible in the view (i.e., objects are clipped). However, it can also be set to render the entire extents of all the objects and features that define the view. When a saved map layout is rendered everything in it is converted.

Render to Geospatial (georeferenced) PDF

Adobe Acrobat 9 supports creating and using what they call geospatial PDFs. Acrobat 9 Reader displays these georeferenced PDFs and provides a minimum tool set for displaying feature coordinates, measuring, … These latest developments are supported by a major overhaul of the Render To PDF process in TNTmips. Rendering to a PDF will now create a geospatial, georeferenced PDF suitable for use in Adobe Reader 9 with its tool set.

Georeferenced TNT layers render an Adobe geospatial PDF
(this is automatic and does not require any other software)
Inserts in a layout with different georeferencing are mapped into the geospatial PDF
(e.g., Reader will readout different coordinates for inserts)
Separate layers and groups in complex TNT display layout or map layout are layers in PDF
(i.e., groups/layers in TNT layout can be turned on/off from legend in Acrobat Reader)
Convert only area currently in view area or entire extent of the display layout
Optionally choose to link to system fonts, embed fonts, or render fonts as text
Automatically launch PDF in your preferred viewer

Render to KML and KMZ

Rendering a multicomponent TNT layout to KML can produce multiple files if multiple rasters are in the layout and fonts are linked. Geometric objects and other components of the layout are converted and embedded in the KML. Using a KMZ will act like a zip operation and package all the external components into a single file and compress it. However, you can create a TNT layout that uses features that are not defined in a KML or KMZ file type. For example, a relational table structure is not defined in these external layout structures, can not be rendered, and would not be interpreted by any subsequent use of these layout types. You will need to limit the design of your TNT layout to support its conversion to KML/KMZ or make appropriate decisions about conversions using the tabbed panels provided in the rendering process (i.e., do not use a relational table as only a single table is permitted).

Render all components in layout to KML or KMZ
(i.e., convert vector, CAD, shape, raster, and any linked file formats)
Required object type conversions made during the rendering
(e.g., vector, CAD, shape, and raster objects are converted, one table is converted)
Separate tabbed panels to set parameters to control conversion of each object type
(i.e., Raster Controls, Geometric Controls, Placemark Controls, WMS/ArcIMS Controls)
Control tabbed panels are absent if layout contains no object of that type
(i.e., any tab shown indicates that an object of that type is present in your layout)

Point symbols and thumbnail images converted to placemark icons with scaling specified
(points must be represented in a KML structure as small, transparent PNG files)
Match layer/group visibility settings in KML file and display process
ArcIMS and WMS layers from remote sources are downloaded and converted
(managers of these remote services set a limit on the maximum size of the image that can
be requested, e.g., this limit defaults to 1024 by 768 pixels in a TNTserver installation and can
be changed by the manager)
ArcIMS and WMS layers can be represented as URL links not as downloaded components
(e.g., these components of a KML file are dynamically retrieved when used and can change)
Manually or automatically open Google Earth to show layers in 2D and 3D view
(i.e., choose whether to open in Google Earth after rendering is complete)
Non-georeferenced components of layouts are now also rendered
(i.e., legends, logos, … that Google Earth calls screen overlays and keeps in every view)
KML 2.0 is now supported
Defaults to last used settings
Autonaming is available

Geometric Buffer Zones

A new alternative buffer zone procedure is available using a geometric approach. This method can
be somewhat slower but permits the use of much narrower buffer zones and some other new
options. The earlier raster-based method is still available and it is fast. However the raster
approach limits the buffer zone process when very narrow buffers were required for features in
objects with large extents.

Compute buffer zone geometrically
Derive narrow buffer zones for elements and regions
Buffer CAD, shape, vector, and pinmap elements and regions
Output resulting elements to regions in addition to CAD or vector objects
(i.e., a simpler form if it's only to represent location of elements and not their properties)
Create buffer zones in decimal feet or meters
(e.g., buffer roads from lines or road curb setbacks)
"By query" option for selecting elements to be buffered
Improved interface using tabbed panels to organize selections
Used in Raster Extract process to add a buffer distance inside or outside area defined
(i.e., expand or contract region that will be automatically applied during the extraction)

Mosaic

A new mosaic process has been added to your TNTmips menu. It has been designed initially to
assemble orthophoto imagery into large rasters or tileset rasters. As such, it does not yet
implement all the earlier mosaic feathering, overlap, and related features. Thus TNTmips 2008
also provides access to the earlier version of mosaic.

Interface

Since this mosaic process is designed to select and manage thousands of input objects it has a
new interface for this purpose. It provides a scrolling list in tabular form of the input objects and
their properties, tabbed panels for group input and output control parameters, and a preview
window.

Select and manage 1 or 100,000 rasters
Use new Add All (including subfolders) icon to select every object in a directory structure
(i.e., add thousands of objects organized in convenient directory structure with a
single icon)

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Sort objects in input list by name, CRS, cell size, or dimensions
Add or remove multiple objects to adjust input list
Much faster determination of extents after loading layers
    (i.e., faster display of hundreds of layers)
ToolTip in preview shows name of layers at cursor location
    (i.e., see the full name of every input object based on its location preview in mosaic)

Input

Inputs can have different Coordinate Reference Systems
Inputs can be mixed in any directly-supported linked georeferenced raster format
    (i.e., set up job to use a mixture of internal raster objects, *.jp2, *.jpg, *.sid, …)
Specify extents of output raster in deg/min/sec
Select From Georeference as a warping model

Output

Create a massive single raster object
    (i.e., size of raster object is only limited by the available media, several TB if desired)
Create a hierarchical tileset raster object
    (this is a raster object structure for very fast viewing)
Creation of a tileset can be interrupted and restarted later
No large temporary intermediate files are created
    (i.e., drive space required for operation equals only that needed for compressed input objects
    and compressed result)
Use ECW compression for any size of tileset raster object
    (free ECW compression is limited to 500 MB rasters – however, ECW compression is
    applied to each tile as it is formed, thus resulting tileset raster object can be any size)
Output can be in any Coordinate Reference System
Choose compression method for raster or tiles
Pyramid creation is optional
Color maps can be copied for grayscale raster mosaics

Region Operations

Regions can now be created from points, lines, and polygons and from elements in any geometric
    object type. Since any regions can be buffered, a region made up of lines or points can be
    converted to an area region.

Regions can be derived from marked CAD and shape elements
    (i.e., from linked shapefiles, databases, … formerly only from vectors)
Buffer zones can be computed for regions to make or change regions
Creating regions has been generalized to include linear and point components
    (e.g., selected lines can become a single region and can be buffered)
Polygons or other elements in a hidden layer can be saved as region
    (e.g., property boundaries hidden because they are too dense to display)
Buffering can be applied inside or outside a region or polygon used to extract from a raster
    (i.e., omit trees around the perimeter of a field in a classification)

Feature Mapping

Limit the extent that a prototype feature is mapped outward from the point selected
    (i.e., constrain the mapping to cells in proximity of area clicked)
Interactively enlarge or contract the area mapped with the mouse scroll wheel
    (i.e., alter the extent of the area mapped around the point selected)

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Limit the sample cells to be matched only within selected polygons in vector layer
   (i.e., map only cells in previously mapped areas such as wetlands or agricultural fields)

Raster Mask Process

A new mask process is available to permit you to directly and interactively create a binary mask in any TNT view using many different methods.

Create new or edit existing null mask for a raster object
Available as tool in any View and as separate process
Define transparent colors for the areas masked out or included when editing mask
Modify overlay colors and transparency as needed
Use drawing tools to directly draw areas to include/exclude
Scroll wheel expands or contracts area drawn or region selected
   (interactively enlarges or shrinks area by buffering inside or outside)
Define areas using existing region
   (e.g. from marked polygons, buffer zone, basin, ...)
Value Range tool marks areas based on a range of cell values
Use Flood Fill tool to mark contiguous areas with uniform or nearly uniform values
Exclude all cells, include all cells, or invert mask
Save as a null mask subobject or to a separate mask raster object
Null mask subobject is applied automatically by default
Select and apply any mask raster object in a View or TNT process
Use tolerance slider or numeric field to set range of values for flood filling areas
   (i.e., choose a cell for flood filling and expand to a range of values to be filled)
Preview selected areas before they are included or excluded from mask
   (i.e., review how an edit action will add or delete from the mask)

Surface Modeling

TIN formation in previous versions used only real memory to provide fast sorting and other operations related to insuring Delaunay triangle properties in the TIN. The number of points and vertices available as input to this procedure has increased (e.g., LIDAR files) so that it was exceeding the real memory available, then reverted to using virtual memory, and became too slow and impractical to use.

TIN information has been rewritten to improve its performance for large input vector, CAD, or shape objects including shape linked LAS files. The process uses less real memory per point but still loads all points and is limited by it. However, you can now set the amount of real memory to be used to be as large as you can provide. If the amount of real memory is still exceeded, the process reverts to a new hard drive buffering scheme specifically designed for this operation.

Insuring that the TIN has Delaunay triangle properties for contour formation is the reason that real memory is used in this procedure. As part of the redesign, relaxing this and other time consuming checks were experimented with to further improve performance. This resulted in increased performance but also increased the number of sliver triangles (long slender triangles) created in various special contour and terrain formations.

MicroImages is periodically asked if the computer purchased for use with the TNT products should use a 32-bit or 64-bit processor and Windows or Mac OS X. The question seems moot at this time for a desktop machine since there is no significant difference in price for a 32-bit or 64-bit equipped computer. It is now widely understood that the performance benefits of a 64-bit processor are, at this time, related to its ability to address much more real memory.

Applications must be rewritten to exploit this advantage. This rewrite of Delaunay TIN formation in TNT is an example of a process that needs and takes advantage of the availability of more real memory addressable by a 64-bit processor if the memory is available.

Select any geometric object
(i.e., input CAD, vector, or shape object such as linked shapefile, LAS, or database)
Faster Delaunay TIN creation
Much larger TINs can be computed
Real memory allocated to TIN creation can be specified
Delaunay TIN computation reverts to custom hard drive buffering if needed
(i.e., if real memory is exceeded the process will not revert to slow virtual memory)
Nonic Polynomial method is available for surface fitting to a TIN
(i.e., upper limit is now a 9th order polynomial instead of 5th order)
Raster output cell grid is now integer multiple of cell size specified in surface fitting
(i.e., extent of output raster automatically adjusted to ensure final cell size is exactly as specified)

Watershed

Extensive new technical capabilities were added at your request to this 2007 process after its official release last March. As these capabilities were perfected throughout the past year they were provided to you via the weekly editions of 2007 and then more in 2008. They are described in multiple Technical Guides.

Generate stream order table from any vector object using auxiliary process
(i.e., flow paths used to assign Horton, Strahler, Shreve, and Scheidegger orders)
Use geometric layers for watershed seed points
Use point elements as seed points for basin/flow paths
Create reach nodes in watershed flowpaths by elevation interval
(e.g., select equal, exponential, or custom intervals to create stream segmentation)
Create reach nodes in watershed flowpaths by area drained
(i.e., each stream segment adds an equal watershed area to the stream)
Compute new hydrological attributes for basin and stream lines
Compute new geomorphic/hydrologic characteristics of DEM

LIDAR

Utility features have been added to the TNT products to improve their application to LIDAR elevation point files. The LAS file format is a public format for the storage and exchange of LIDAR point data. These binary files store point coordinates, intensity values, and other LIDAR-specific attributes for raw or processed LIDAR points. An LAS file may contain a single flight strip or a merging of many strips into a single file. LAS files can be used in the TNT products by importing them as CAD or vector objects or simply linking to them as shape objects as the format is basically a large, flat database. Watch for more LIDAR analysis features in the 2009 version of the TNT products.

Much faster import of LAS files to a geometric object
(a single LIDAR flight strip can generate 10s of millions of points)
Link to LAS file as shape object
Create region object during linking that contains the irregular boundary of LAS file
(for zoomed out views these region objects can be used to represent the coverage of the many LAS files in the view whereas displaying all points is slow and meaningless)
Set view scale during linking

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(i.e., 10s of millions of points should only become viewable when zoomed in, add the region object to the view to represent the zoomed out coverage of the points)

Point Profile window shows a side view of points in any rectangular area of the view

Select points in the Point Profile view for edit actions in the corresponding 2D view
(i.e., select points in profile and they are selected in 2D view)

Single Record or Tabular View window of linked LAS file shows content of one or every point
(i.e., use table view to view every field for every point record in the LAS file)

Header contents of LAS file automatically stored as subobject in shape link to LAS file
(i.e., view the information stored in the header record of the LAS file at any time)

Import/Export

BigTIFF

The TIFF format has been extended to permit files greater than 4 GB. These can now be created, imported, and exported by your TNT product. All TNT processes that use TIFF files will automatically use BigTIFF. However, at this time few products have been altered to support BigTIFF files so be cautious and check them if BigTIFF is to be used as a transfer format.

Provides for exchange of TIFF files greater than 4 GB
Available for use in Mac OS X and Windows versions
Select TIFF or BigTIFF for export
Use as a pipeline source or target in SML scripts

DWG/DXF

Import/export/link with AutoCAD R14 files
Export from linked shape objects
(e.g., shapefile, PostGIS, Oracle Spatial, ...)
Export labels from CAD or vector to DWG
Support for multiline text formatting codes, DXF subscripts, font and character encoding, and font information with elements

KML/KMZ

Export to KMZ with embedded objects and other data
Export creates multiple CAD and raster objects and databases as needed
Export linked shape objects
(e.g., linked shapefiles or geodatabase layers)
Export style tables
Export photos
Import groups (folder contents) in KML file into separate objects
Improved export of any object, linked file, or WMS layer to KML/KMZ
Export one flat table per element type per KML file
(free version of Google Earth is limited to using 1 table per element type)
Import and export relational tabular data defined in KML schema tags
(schema tags are created and used by Google Earth Pro)
Import and export descriptive fields associated with KML schema tags

Miscellaneous Import

CDED (Canadian Digital Elevation Data)
ECW on the Mac (32-bit Mac OS X only)
ALOS system's PALSAR format
ALOS system's PRISM format
symbols from ArcView project file
ERDAS *.img raster's class attribute table

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Vector from shapefile has option to link to its table rather than importing it
Detect local language of the OS and use the encoding for database / text files

Miscellaneous Export

Raster to ASCII XYZ format
ECW tiles
Coordinate Reference System (CRS) files optionally created in various popular formats
    (e.g., world file, KML, KMZ, and MapInfo TAB)
Angle of each label for shapefiles
Via OLE DB link to databases
JPEG export can convert 8-bit color-mapped rasters to 24-bit RGB rasters

Geospatial Scripting Language (SML)

Most SML raster processing operations are now also available as pipeline filters, stages, and tar-
    gets. This is a major addition to SML to make complex raster operations simpler to implement
    and faster. Please refer to the several Technical Guides on this topic, sample scripts, and
    revised tutorials to review this new approach and how to use it.

Raster mosaicking class
Database import class
Send email
Compute point coordinates from distance, azimuth and elevation of point
Determine point type of geometric object
Extract function added for grid generation
Allow resizing drawing area from SML and options dialogs
Support binary mask subobject when create and use pyramid tiers
MieSHAPEFILE class members to support use of Unicode attribute tables
GRE_LAYER_RASTER class members to support setting 3D texture filters
ResampleRasterToProjection() method
Pyramiding method added to RasterCompress

TNTserver and TNTmap

TNTserver: WMS certification increased from version 1.1.1 to 1.3
TNTserver: add license.txt and context directories for use in TNTmap
TNTserver: support Open Layers for client-side use
TNTserver: image request can specify interlaced PNG files
TNTserver: use any TNTmips, TNTedit, or TNTview key to install and operate in test mode
TNTserver: atlases with mutually exclusive groups are supported
TNTserver: HyperIndex links can be optionally shown in an image
TNTserver: create and send anaglyph stereo or color mapped images via WMS protocol
    (in server jargon a stereo or color-mapped image is requested as a "styled" image)
TNTserver: dimension elements are supported and can be sent to server by layer
    (they advertise that modified forms of a layer are available such as a shaded relief option,
    few clients make use of the dimensions published by a WMS for a layer)
Manager: add specified elevation layer to atlas group
    (TNTserver will then advertise that the group and layers can be viewed in stereo)
Manager: watermark logos are not inserted into the locator image
TNTmap: enable operation when renamed or moved
TNTmap: sends user input as "dimension" elements or parameters to modify image
    (e.g., dimensions sent to the WMS can provide parameters for creating shaded relief)

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WMS and ArcIMS Online Catalogs

Version 2008 supports viewing map and image layers published on the Internet by using a WMS or ArcIMS protocol. This new display feature is only useful if you can find these layers on the Internet. MicroImages continuously searches the Internet and has built and updates catalogs of 1,500,000 suitable layers. The latest catalogs are maintained online at microimages.com and can be searched and selected via their URL and layers from any of them can be added to any TNT view.

Catalogs are built by an agent program that can detect any WMS or ArcIMS
   (i.e., a web crawler program scrapes the Internet for any map and image layers)
Cycles through all web sites using results of several search engines
Runs continuously at MicroImages indexing sites, services, and map and image layers
Detects key words required to publish a WMS or ArcIMS service
Interrogates services to determine map and image layers that are available
Tries each layer to determine if it responds
Records current success or failure of service and each layer
Grades reliability of each service and layer to set up return cycle frequency
Records these technical characteristics of each service, layer, and layer groups

Title	Geographic extents
URL	Keywords (WMS only)
CRSs offered	Maximum cell dimensions offered
Formats offered	Reliability index based on repeat visits

Locate layers of local interest by geographic searches of catalogs
   (e.g., enter a geographic point, box, match view extents. …)
Locate layers of local interest by entering local address or feature name
   (i.e., search for coverage using Geonames lookup or Google's address matching)
Preview a remote Internet map or image before adding to current view
When DataTip is set to be object name, its extents also show with DataTip
Layer's scale ranges are shown in Scale Range window if published for the layer
   (i.e., layers off by scale at current view scale appear blank so check this window)
Generate embedded HTTP reply to send to TNTgateway.cgi

Miscellaneous

Sample point generation is now a separate process
Apply contrast tables during image fusion
Voronoi or Thiessen polygon boundary edge extension can be controlled
   (i.e., define bounding area of triangles by clip to object extents, to region, to none)
Output flight plan boundary and lines to CAD object
Add ability to specify up to 6 decimal digits of seconds in the point tab of the map calculator
Labels in map grid layer can be in the DD MM format
Cell size scaling in Raster Resampling optionally set to match the source

Abbreviations

e.g.	For Example	Usually indicates a sample use of the feature
i.e.	In other Words	Another, alternate explanation of the feature

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