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# New Features in TNTmips 2011

## **Highlight Features:**

- Automatically Georegister images
- New manual georeferencing of raster or geometric objects
- Easy selection/use of Internet-based geodata
- Use Bing Maps image and road layers
- Faster viewing of Internet-based tilesets
- Expanded use of KML layers
- Create table-based tilesets for popular databases
- Use table-based tilesets via the Internet
- Use/Modify an Open Layers Internet viewer
- Create Geomashup for use in Open Layers
- Directly use LIDAR LAS files as objects
- Real-time viewing of surface for LIDAR Points
- Interactive selection/reclassification of LIDAR points

## **Georeferencing Your Project Materials**

TNTmips is widely used to georeference many types of geographic data. These materials come in many digital forms such as rasters: satellite images, photos, scanned maps, ... and geometric files: CAD drawings, road maps, database locations, ... The TNTmips georeference process used for this purpose has been completely rewritten to accommodate new materials and provide new features you have requested, but that could not be retrofitted into the structure of the previous georeference process. The process has also been extended to provide a robust means to automatically, accurately georegister images that have only a nominal or inaccurate georeference. Images that have no recorded position still require manual addition of several control points (e.g., 3 or 4) before they can be auto-registered.

The auto-registration in TNTmips uses a reference image to search for, model, and evaluate thousands of control points that match the input image. As is characteristic of TNTmips, the reference image can be a very large mosaic or tileset covering an area that can be used for many input images. The procedure works best if the reference image's primary resolution (i.e., as collected) is similar to, or exceeds the resolution of your input images. However, your input image(s) and reference image do not need to match in Coordinate Reference System (CRS) or cell size. For example, LANDSAT images can be auto-registered anywhere in the conterminous USA using the 1-meter standard web tilesets published by MicroImages for use in your TNT product. These are the same standard web tilesets MicroImages provides for viewing in Google Maps and Bing Maps. Simply select the state and year (choose from 2003 to 2010) from the list provided in TNTmips. For other nations you can use any Internet-based imagery as a reference if you create a TileSet Definition file so that web access to the image emulates a standard web tileset. SML scripts can be created to auto-register similar single band, color composite, or multispectral images (e.g., Landsat) in a hands-off, production-line fashion using a single large local or Internet-based tileset (e.g., a state or province) or individual reference images.

CRS = Coordinate Reference System

SML = MicroImages' geospatial scripting language



The following Technical Guides are available at [microimages.com](http://microimages.com) to help you use the new georeference process. Several more and a simplified tutorial are planned.

- Import GPS Control Points from GPX File (1 page)
- Simple and Implied (1 page) • Multiband and Multiresolution Images
- Choosing a Model • Snap Control Points to Elements or Reference Grid

#### *Guided Setup of Your Georeference Project*

- Select any geometric object or coincident raster objects  
(choose any local object/format except tilesets)
- Prompted for bands of multispectral images
- Choose a wide variety of reference images/maps  
(Bing Maps, Internet image and road maps, tilesets, ...)
- Prompted for model with description of each
- Prompted for CRS to apply

#### *Manual Georeferencing*

- Interface matches current view interface in TNT display  
(e.g., reposition, scroll-wheel zoom, locator/zoom panes, ...)
- View single band or any RGB of target multispectral image
- Use Bing Maps image, map, or hybrid layer for control points
- Use MicroImages' online tilesets for control points
- Use any web-based image/map that can be linked to  
(e.g., WMS, Arc, KML, Open Street Maps, tilesets defined by a TSD, ...)
- Directly import control points in any CRS  
(e.g., from GPS in GPX format, text or CSV file, ...)
- Automatically redraws if georeference model is changed
- Option to redraw image warped to selected CRS
- Assigns georeference to all bands of multispectral image
- DataTip for each control point  
(shows name/residuals in primary/secondary coordinates)
- Snap control points to geometric elements in reference layer
- Snap control points to map grid intersections
- Reference to center or corner of image corner cells
- Select corner or center of any arbitrary raster cell
- Choose units for raster cell size appropriate to CRS
- Color-code control points in view by residual magnitude
- Auto-assign elevation to control points from DEM
- Set angle between crosshairs to align with features
- Use hotkeys to switch tools
- Transfer georeference from higher to lower resolution rasters  
(extents must match)

#### *Auto-Registration of Images*

- Auto-register image to reference image
- Automatically generate control points
- Image and reference can be in different CRSs
- Resolutions of image and reference do not need to match  
(max resolution of reference should be near or better than input image)
- Uses any combination of single, multiple band, or composite images  
(you select bands to match in input and reference)

- Uses any supported format for reference  
(GeoTIFF, GeoJP2, TNT raster, or standard web tileset, ...)
- Registration automatically uses pyramid layer of reference image  
(if available, otherwise resamples on fly)
- Uses local or web tileset for reference  
(automatically uses closest zoom level in tileset)
- Option to add multiple geometric objects as start points  
(section corners, road intersections, or other point features)
- Specify control point spacing for input image
- Specify maximum allowed residual for final solution
- Automatically disable, adjust, or accept original control points  
(i.e., points defining nominal position of input image)
- Uses pipeline processing
- Implement custom applications using SML scripts

#### *Manage Control Point List when Georeferencing*

- Used for lists from manual or auto-register methods
- Choose columns to show in control point list  
(point name, elevation, separate X-Y-Z or combined residuals, ...)
- Show points in a secondary CRS  
(choose any CRS, defaults to latitude/longitude)
- Enter or edit any point's primary or reference coordinates
- Set precision to show for primary/secondary coordinates
- Sort list by any column (ascending or descending)
- Select multiple points for snap, enable/disable, delete ...
- Simplified I/O – results of action automatically applied
- Color-coding indicates status of various points  
(e.g., map coordinates predicted from model solutions)
- Immediately see revised residuals as each new point is added  
(based on model and previously entered points)
- Show equations and coefficients for current warping model
- Save text file of coefficients from current warping model

#### *Manual Georeferencing Using Google Maps*

- Display layer in TNT georeference process  
(use any CRS desired)
- Access your My Maps list
- Launch GM from this list
- Mark/save control points in GM as placemarks
- Refresh your My Maps list
- Select My Maps layer in georeference process  
(placemarks are converted into view's CRS)
- Drag control points to positions in TNT view
- Keep My Maps features open in Google Maps view  
(use for reference and placemark changes)

#### **Using Microsoft Bing Maps Layers**

The image, map, or hybrid (map+image) layer you see in Bing Maps in your browser can also be directly added to any display in TNTmips, TNTedit, or TNTview. Adding or repositioning when using one of these layers is fast even though it is fetched via the Internet using the Bing API (typically 1 to



3 seconds via a broadband connection). Each provides a global reference base layer for the location and features in the geodata layers you add to your display. Unlike your browser, these Bing layers are presented in the CRS and differential scale you choose for your current TNT view.

Under the MicroImages license your use of these Bing Layers can be any application that uses them in a visual activity. For example, the extensive GeoToolBox procedures can be used. They can be used to create or update geometric elements in any format. They provide a worldwide means of creating control points for georeferencing your imagery or raster scans and vector, CAD, or shape objects. They can be included in your prints, layouts, and PDF files.

Could a similar use of the Google Maps layers be licensed? See the last section for information on this topic.

#### *Direct Use of Bing Maps Layers*

- Add Microsoft's Bing Maps layers to any view  
(choose from image, road, or hybrid layer)
- Use in TNTmips, TNTedit, or TNTview
- Select and use just as if located on your network  
(added directly using a Bing icon on Display Manager toolbar)
- Automatically matches CRS and scale of current view
- Use as reference layer to select control points  
(e.g., georeference your image, map, or geometric layer)
- Sketch and save features in geometric object
- Use in spatial editor to create/update geometric elements
- License fee paid by MicroImages for 2011  
(not licensed for use in TNTmips Free or Basic)

#### **Single Integrated Selection Window**

*(use to select local, network, and Internet geodata)*

Internet, network, and local geodata can be selected, combined, and viewed in a TNT display in a very similar approach using a single selection window. Selection of geodata from any of these sources for alteration and analysis also uses the same selection window if the ownership / licensing of the geodata permits these additional uses. The geodata selection window used to find, choose, and add layers to a view or process now manages access to local/network layers (i.e., file path access) and Internet layers (i.e., URL access) using a parallel approach. The design of this window is to make the location of the geodata "transparent," i.e., you do not really want to concern yourself about where it is if you can select it! You simply want to easily select any geodata that you have the right to use without regard to its physical location. This unique idea/approach is now implemented in the new geodata selection window in TNTmips. However, to select useful geodata you still must know its location, that you recently used it, that it is cataloged, or you can browse for it on your local drive or network or the Internet. All these approaches are provided for in the new TNT geodata selection window.

#### *Selecting Geodata from the Internet*

- Toggle selection window between local and web geodata
- Operates similar to selection of local geodata
- Used to locate/select all web-based geodata:
  - tilesets (\*.tsd)      My Maps (\*.kml)
  - KML/KMZ files      ArcIMS layers
  - Web Map Service layers (WMS)
- Preview web layer before adding to view
- Control window for each type of web layer
- Save, name, and then reselect web layers

- Navigate to any local/web geomashup
- Select any local/web layers used in any geomashup
- Geomashups show as groups of layers
- Save any local or remote geomashup file

#### *Faster Internet Tileset Viewing*

- (i.e., add layer at any scale from typical remote tileset of any size in 2 seconds versus 20 seconds in TNTmips 2010)
- Separate threads used to retrieve tiles
- Launches multiple connections to server(s)
- Auto-tracks download rate of servers
- Auto-requests more tiles from fastest servers
- Logs download activity
- Tilesets using GIF tiles can be linked and used  
(*GIF files sometimes used by some instead of PNG*)

#### *KML Layer*

- Use KML or KMZ files as layers
  - add local file to view
  - add Internet file to view
  - add your Google My Maps to a view
  - add your Google Fusion Tables to a view
  - show lines with styles
  - show polygons with fills
  - show points with styles
  - show labels with properties
  - use links to local rasters, KMLs, ...
  - use links to Internet-based rasters, KMLs, ...
- Save local copy of KML / KMZ as object
- Save only local link to internet KML / KMZ file
- Import KML / KMZ into other objects

#### *Search Web for KML layers*

- Search the Internet for useful KML layers  
(11 million filetype:KML found by Google)
- Geodata selection window provides search panel
- Search filters KMLs and evaluates each  
(e.g., number of elements, linked rasters , ...)
- Use keywords  
(e.g., try [Japan Maps](#) or [UK Ordnance Survey](#))
- Define area of interest by lat/lon box
- Define area of interest by name  
(e.g., country / state / province / county)
- Graphic DataTip shows area on global image
- Set limit on number of elements  
(e.g., must have at least 100 points)
- DataTip shows properties  
(e.g., extents, number of elements, province, ...)
- Preview any KML layer
- Add useful layers to Favorites list



### *Layer Selection Location DataTip*

- Cursor over web or local layer shows DataTip
- Graphic DataTip now includes global image
- Extents box of layer shows on global image
- Lists name of area at center  
(e.g., country / state / province / county)
- Shows URL or path to layer

### *Launch Geoviewer to Match View*

- Use “Google Icon” to open to same area:  
in Google Maps    in Bing Maps    in Google Earth
- Use tools in geoviewer to create KML:  
Tools in Google Maps  
SketchUp in Google Earth
- Use as remote KML layer in view
- Save and use as local KML file
- Import into a geometric object

### *Directly Display Google My Maps Layer*

- Choose Add Web Layer icon in Display Manager
- Choose My Maps from menu
- Enter your My Maps gmail account and password  
(these can be saved for repeated use or not)
- TNT accesses this My Maps account
- Panel then lists public/private My Maps
- List shows names you assigned in GM
- Select any My Maps file by name to add to view  
(i.e., no need to use URLs to add)
- Button refreshes My Maps list at any time  
(uses gmail account/password as logged-in)
- Option auto-opens GM to create new My Map

### ***Making and Using Tilesets***

Standard web tileset creation, management, and publishing was introduced in TNTmips 2010. Many important new capabilities have been added to the tileset processes in TNTmips 2011. These include:

- producing a single tileset for use in Google and Bing Maps and Open Layers,
- support for faster/smaller 8-bit PNGs (24-bit PNGs are now optional),
- convert a file-based tileset to a table-based tileset for use in Oracle, Microsoft SQL Server, My SQL, or Postgres,
- a portable Open Layers (open source) mashup viewer,
- more geomashup features including drawing tools,
- extraction of a standard tileset from a tileset using a region,
- support for “mobile gesture devices,”
- direct integration as new layer type in TNTmips, and many more.

A comprehensive selection list of Internet tilesets of general use and interest is provided in the TNT geodata selection window. The current version of this list is automatically retrieved from microimages.com every day to provide any additions since the last automatic update. The tilesets you prepare for special or private content and publish via the Internet or on your local network can be added to a local Favorites list for your convenient reselection at a later time.



This embedded list includes tilesets published by MicroImages, by users of the TNT products, or anyone else. For example, the MicroImages Reseller in Japan has published a contour map tileset (from 1:25,000 maps) and a topographic map tileset (from 1:200,000 maps) of all of Japan for selection from this list or in any browser for convenient access in the TNT products for MicroImages' Japanese clients.

MicroImages has added all the available USDA 1-meter tilesets of the conterminous states for the years 2010 and 2009 to this list. MicroImages is currently processing all the early 1- and 2-meter annual color and color-infrared coverage of each state into tilesets for addition to this list. As each of these annual state tilesets for the years 2003 to 2008 are published at [microimages.com](http://microimages.com), they will be added to the list that you can refresh at any time. Several Midwestern states already have all the available 1- and 2-meter state tilesets available and listed for the years 2003 through 2010.

A large collection of 53 Technical Guides is available to help you understand what a standard tileset is and how it is structured. These describe how they are specified by Google and Microsoft and used without alteration in TNTmips. All the processes that create, manage, and publish tilesets are covered in considerable detail. A simplified tutorial booklet is planned.

#### *Table-based Tilesets*

- Easier integration into DB-oriented infrastructure  
(DB staff more receptive to table structure)
- Export any file-based tileset to a table  
(Oracle, MySQL, Postgres, or Microsoft SQL Server)
- Export to SQL files to move into selected DB  
(unpack at destination with optimal indexing)
- Export directly into table if access permitted
- Viewing via Internet or in TNT is fast  
(access as fast as file-based tileset)
- Each tile file is a BLOB field in a record  
(JPG/PNG BLOB = Binary Large Object)
- Geolocation of each tile also in each record
- Table(s) indexed for fast access to tiles
- Select size of multiple SQL files required  
(DB unpack routines may limit size of SQL file)
- Creates HTML pages to view via any browser  
(Google Maps, Google Earth, Bing Maps, Open Layers, ...)
- Creates TSD (TileSet Definition) link file to view in TNT
- Use as layer in any geomashup

#### *Tileset Definition File (\*.tsd)*

- Multiple tilesets treated as a group  
(e.g., one TSD for multiple dates of same area)
- Tileset name in URL can be variable  
(e.g., automatically links to tileset of new date)
- Capture any TSD file on Internet for modification  
(use right mouse button on name in object list)

#### *Extract Tileset*

- Select multiple existing local tilesets as input
- Region, shapefile, or KML defines new area  
(e.g., area along river or route)
- Creates smaller portable tileset  
(e.g., use on devices with storage limits)



- Tiles on boundary automatically clipped  
(e.g., JPGs converted to PNGs)
- Option that keeps whole tiles on boundary (i.e., not clipped)  
(e.g., JPG tiles on boundary remain JPGs)

#### *Additions to Merge Tilesets*

- Input tilesets that are zipped
- Clip each input with a region  
(e.g., clip each with a county boundary)
- Clip output tileset with a region  
(e.g., clip with a state boundary)
- Merge input tilesets by zoom level  
(i.e., select zoom levels used from each input)

#### *Additions to Manage Tilesets*

- Multi-threaded zipping/unzipping of tilesets
- Create a tilemap file  
(i.e., for tilesets built before this was standard)
- Create a binary archive file (a \*.cpio file)  
packs entire tileset folder into a single file  
facilitates moving large tilesets  
expedites copying or ftp to web site

#### *Additions to Export Tilesets*

- 8-bit transparent PNG tiles created by default:  
8-bit reduces size to 30%  
3X improvement in read time  
bandwidth required for access reduced to 30%
- 32-bit PNG tiles now optional

#### *Tileset Maps*

- Tileset map file records spatial distribution of tiles
- Automatically created and maintained in tileset folder
- 8-bit values created for each tile at each zoom  
(first use is to display tileset continuity)
- Value identifies corresponding tile's properties  
(e.g., JPG, 8-bit PNG, 32-bit PNG, ...)
- 2nd map contains 8-bit size of each tile
- Values also stored as small Project Files  
(for display in TNTmips)
- Stored in reference folder with parent tileset
- Display tileset maps by zoom level in TNTmips  
(e.g., visually validate tile type/distribution)

### ***Geomashup Your Geodata for Internet Use***

A geomashup is an HTML page that assembles widely distributed geodata into a web mashup that creates a geographical view in any web browser. The web layout Geomashup process in TNTmips is used to assemble standard web tilesets, KML files, tabular data, and tools into HTML pages for use as mashups in Google Maps, Google Earth, and Bing Maps. The materials you select for your geodata overlays can be located locally and/or anywhere on the Internet. The process permits interactive preview of your materials in all popular browsers at anytime as it is being used to assemble these materials. When you are satisfied with how your geomashup will appear





the process creates the HTML page (HTML+JavaScript) ready to be published on the Internet for use in any browser that selects it.

A selection of sample geomashups can be tried using the panels at the bottom of the front page at [microimages.com](http://microimages.com). These example HTML geomashups have been assembled using this process to illustrate the kinds of geoview layouts you can easily create by combining your geodata with that already available on the Internet. Internet capabilities and new geodata sources are continually evolving in this area, such as cloud-based geodata (e.g., table-based tilesets for Oracle, MySQL ... and online geometric elements in Google Fusion tables). In response new features are continually being added to the TNT Geomashup process and can be used with your TNTmips 2011 materials by using your free access to TNTmips DV2012.

A geomashup that uses the Google or Bing geoviewers and their base layers (i.e., their Internet APIs) and your materials must be public and freely available via the Internet. You can pay Google and Microsoft for a private license to use these geoviewers and your geomashups via a VPN or private local network. Alternatively, you can use these APIs for their content and your public content but use authentication to restrict access to your private content. However, under any circumstance, your geomashup must have access to the Internet to use their API, even if you do not include any of their base layers.

All TNTmips 2011 tileset processes produce an Open Layers HTML page to use the standard web tileset you create in an Open Layers geoviewer in addition to the HTML pages created to use the tileset in Google and Bing geoviewers. The Geomashup process can also be used to assemble an HTML layout page of local and Internet layers for use in this Open Layers geoviewer. You can then save both the HTML layout and the Open Layers geoviewer to use your mashup via the Internet, a VPN, your private network, or from a portable drive. For example, you can copy the free Open Layers geoviewer, your geomashup, and your tilesets, KML, ... to a portable hard drive, DVD, SD card, or USB thumb drive. Its operation can then be totally independent of any network and will be fast since it is using the same standard web tilesets that could also be used via the Internet in the other geoviewers.

The Open Layers geoviewer (i.e., an open API) provided by TNTmips 2011 permits free, unlicensed use of your geomashup or standard web tilesets for public or private use. Create and use this HTML page if you want all the contents of your geomashup to be used in this private geoviewer locally or via the Internet by only those that are authorized. The source for this HTML geomashup and the Open Layers API are also automatically available to you so that you can use their HTML or JavaScript for new applications.

### *Geomashup*

- Add point, line, polygon tools to Google Maps  
(adds icons to select each drawing tool)
- Redraws view and elements when a tool is selected
- Adds side panel to view for element controls:
  - shows editable name/description of element
  - shows measurement of each element
  - check box to delete any element
  - icon to save all elements as a local KML file  
(immediately use the KML as layer in a TNT view)
- Open Layers added as new geomashup option
- Open Layers geoviewer automatically created/saved
- Modify, extend, redistribute OL geoviewer's source
- Use OL geoviewer and geomashup without license restrictions:
  - use publically, privately, or offline for tilesets)



can be operated independently of “stay-in-browser” licenses  
(i.e., Google Maps, Google Earth, and Bing Maps licenses)  
distribute geoviewers, geomashup, and local tilesets on a pocket hard drive

- Select/display any tileset in a geomashup group

#### *Open Layers (OL) Geoviewer*

- Distribute OL geoviewer or HTML - no licensing
- Modify source for either to add functionality
- HTML client created in tileset processes
- Option to add OL viewer to any tileset folder
- View local tileset without access to Internet
- Makes fast tileset structure completely portable
- Choose OL as destination in Geomashup
- Download/install of OL geoviewer

#### **Viewing and Editing LIDAR Objects**

Direct use of LIDAR point files in the standard LAS format was introduced in TNTmips 2010. TNTmips 2011 extends this support to the latest LAS 1.3 format specification including waveforms. Using LIDAR data in a fully-featured geospatial system, such as TNTmips, rather than a special LIDAR software package, provides the basis for many applications (e.g., combine and view with many other kinds of geodata without regard to format, structure, reference system, cell size,...). Various complex and specialized processing and analysis operations can be performed on LIDAR data in TNTmips using SML scripts.

New options have been added to the Auto-link procedure that takes place on first use of an LAS file. A spatial index (search tree) is automatically created and stored in the link to allow fast access to the millions of points in the LAS file for display or processing. You can also set up a class list in the link for the LIDAR points to use in your subsequent interactive classification activities. You can choose which of the standard LAS point classes you wish to include in the list and add your own custom classes. These classes are then available for use in your subsequent classification and other processing activities.

An LAS file can be added to any TNTmips display for fast display even if it is large. However, there is a practical limit to the number of points that can be rendered in a single view without blending them together and producing a meaningless view. During the auto-link procedure a practical maximum display scale is automatically computed for the LAS points based on their average ground spacing. You can accept this computer scale or modify it, and the result is stored with the display parameters in the link file for the object. When the LAS file is displayed as a layer the points are automatically turned off when you zoom out beyond the designated maximum scale. A boundary region outlining the actual distribution of the LAS points in the file is automatically created during the auto-link procedure and stored in the link file. This boundary region can be selected for display along with the LAS points to indicate the area occupied by the point cloud when the display is zoomed out to a scale where the points are no longer visible. (This irregularly shaped boundary region is only computed for LAS files containing LIDAR swath data. It is not created for a LIDAR coverage that has been cut up into square LAS tiles.)

LAS point files are now added to displays as a LIDAR layer type with specialized display controls and options, including the display of a virtual surface modeled in real time from the point elevation values. The points used to construct the surface can be selected by class or return type, and these selections do not need to match those used for displaying the points themselves (e.g., the surface can be modeled from points currently classified as ground in the LAS file while the only points displayed are those from all other classes). The virtual surface can be viewed color-coded by elevation, in shaded relief, or a combination of both.



The LIDAR layer controls provide a variety of options for selecting and styling the points for display. Points can be selected for display by class, return type, pulse intensity, scan angle, or any combination of these attributes. Points can be colored by class, elevation, intensity, return type, or return number, and point sizes can be varied by intensity.

These flexible display options make it easy to optimize LIDAR point displays for your manual reclassification activities. By displaying the real-time modeled surface for the selected class or classes of points along with the LIDAR points selected and styled by class, you can easily identify misclassified points and deduce the correct classes for many unclassified points. You can then use the point profile tool and the area selection tools in the GeoToolBox to mark groups of points and assign them to the appropriate LIDAR point class. If you reclassify points that have been used to generate the model surface (e.g., reclassifying ground points into the building class), the model surface is updated in real-time to reflect these class changes so you can immediately assess the effects of your reclassification.

#### *New, Fast LAS (LIDAR) Object*

- Directly select LAS file as object
- Uses original LAS file, no tiling
- First use builds an LAS link file  
(i.e., a spatial index of points)
- Includes bounding region in link
- Supports LAS v1.3 (full waveform)

#### *Using LAS Objects*

- View millions of points in seconds
- Auto-color points by elevation, intensity, class, hit
- Standard ASPRS class names show in legend
- Custom class names show in legend
- Edit class of point(s) in LAS file
- Editing classes does not alter link
- All points retained when classes edited  
(i.e., all LAS points/positions are kept)
- Use in other processes

#### *Auto-surface from LAS Object*

- Select points by class to display as surface
- Use surface as DEM with other layers  
(e.g., shaded relief layer)
- Select points by class to display over surface
- Select and reclassify points to alter surface  
(e.g., reclassify as building removes from surface)

#### **Other Features**

##### *Display Manifolds in Google Earth*

- Display multiple geologic cross-sections in GE
- SML converts manifolds to COLLADA models  
(COLLADA used by GE to extrude buildings)
- Packages COLLADA models in a KMZ file
- Display correctly-located 3D cross-sections in GE  
(i.e., multiple cross-sections as curtain walls)
- Raise and lower cross-sections in GE  
(i.e., raise/lower z of curtain above terrain)



### *Use Custom Terrains in Google Earth*

- Display small TNT image draped over DEM
- SML converts image/DEM to 3D COLLADA model
- Packages COLLADA model in KMZ tiles
- Specify offset vertically above GE terrain (i.e., no custom terrain intersecting GE terrain)
- Shuts off terrain layer in GE if uses 0 zero offset

### *Image Fusion*

- Use histogram for area only in current view
- Use histogram for area specified in mask (i.e., omit areas – snow, water, ...)

### *Resampling*

- Select new image/map resampling options
  - \* bicubic smoother
  - \* bicubic sharper
  - \* Lanczos 4 x 4

### *New, Simple TNT Floating License*

- Uses new HASP NET floating license key
- Does not require any license manager!!!!
- Attaches to USB port for Windows and Mac
- Float to Windows XP, Vista, 7 & Mac 10.4,10.5,10.6 (supports 32-bit and 64-bit versions)
- Simple installation like fixed license HASP key
- Does not support earlier versions of TNTmips (authorizes only use of TNTmips 2010 or later)
- Supports limited term (i.e., time out) licenses
- Status control panel accessible to all users
- FLEXIm license still supported for all versions (key exchange from FLEXIm for \$200)

### *Miscellaneous*

- Use Job Processing for raster spatial filtering
- Metadata imported for more formats (e.g., RPV model stored as GeoTIFF tag)
- Use RPV model stored as image tag (*pending*)
- Import Pictometry imagery
- GDAL supported as pipeline source in SML
- Import GPX (portable GPS) file to vector object
- Option to include field heading to saved CSV file
- Raster combinations using logarithmic calculations
- Select floating point rasters in raster combinations
- Use multiple input rasters in raster combinations
- Run times retained in Job Processing list

### **Why Google Maps Layers Are Not Available**

MicroImages has prepared and submitted detailed information to Google with regard to how TNTmips operates. These materials described the preparation and use of standard web tilesets and their use on the Internet via their Google Maps and Google Earth APIs. These were used as the basis to



request a contact point and information on the possibility of licensing legal access to use their image and map base layers in the TNT products. Please be clear that creating a TSD file to use Google Maps', Google Earth, or Bing Maps' content layers in the TNT products violates their licenses. The most recent information from a real person at Google are included below.

Email to MicrolImages on 27 January 2011 from someone in the Google Maps premium license group.

*Sorry for not getting back to you sooner. You mention first in your email that this is not an inquiry about a premier license. We don't currently sell the maps data outside of the api so I'm afraid we can't help you out right now. Maybe check back with us in a few months and hopefully we'll have a solution for your maps data needs by then. Thanks!*

Return email to this same individual from MicrolImages on 4 February 2011

#### *"One Last Review*

*MicrolImages sells a stand alone, commercial geospatial analysis software system. Purchasers of our products can use Bing Maps image, map, and hybrid rasters in composite views with other geodata via the Bing Maps API. (Please see attached illustration.) Under our Microsoft license to this service we pay them a small monthly license fee for each individual product we sell. Each of our products is protected by a local hardware key. This key is also used to control the duration of the use of these Bing layers.*

*Our clients are continually asking my support staff "when will MicrolImages be providing similar access to Google Maps image layers". They point out that it is easy in other software to access and view these layers in violation of the Google Maps license. They indicate that this can be done in ways that you are not detecting or at least not defeating. Thus it is difficult for them/we to understand why this cannot be legitimized.*

*Since we are a commercial company we can not respond to their inquires by simply incorporating these methods into our products to. However, we do need to provide them with a definitive answer as to why we cannot provide similar access to these Google Maps services. Please indicate one last time that Google is familiar with this Microsoft license and does not lease a similar access to the Google Maps image, map, and hybrid tiles. We can then feel confident in informing them that that no one, including our competitors, can legally access these layers outside a browser independent of a premier license."*

Return email to MicrolImages on 4 February 2011 from the same party in the Google Maps premium license group and included the section below from 10.2.

*"It states in our terms and conditions that you cannot scrape or export out the Google Maps tiles to your own software/application. We do not have a service available which will allow you to do this. See section 10.2 of the Google Maps terms and conditions page."*

*"10.2...copy, translate, modify, create a derivative work of, or publically display any Content or any part thereof (for example, the following are prohibited: (a) creating server-side modifications of map tiles; and (b) stitching multiple static map images together to display a map that is larger than permitted in the Maps APIs Documentation); Thanks.*

What is Google Maps premium license? It permits the private use of the Google Maps API and the Google Maps content for private applications, i.e. applications that are not public facing on the Internet. Prices for this license are not published and are negotiated. However, it appears that the minimum premier license is around US\$10,000 and the price negotiated controls the annual number of hits on their content and other factors.

