



## Highlights of TNTgis 2016 New Features

For all of the new features in TNTgis 2016 see:

<http://www.microimages.com/documentation/FeatureSummaries/2016/whatsnew2016.htm>

For the Technical Guides available for TNTgis 2016 see:

<http://www.microimages.com/documentation/FeatureSummaries/2016/2016.htm>

### Spotlight Features

#### New Processes

- Radiometric Correction of satellite images to radiance and reflectance, including dark object and topographic corrections.
- Lens Correction (geometric distortion and vignetting) for aerial camera images.
- Raster Auto-Register to Reference: batch georeferencing of nominally georeferenced images or geolocated images with unknown orientation, using keypoint matching and image cross-correlation.
- Compute Key Points: compute and store keypoints for reference image for auto-registration.
- Raster Reassign Cell Values: reassign cell values using automatic or manual modes.
- Raster Convert Data Type: simple interface for raster data type conversion.

#### Processes Redesigned with Added Capabilities

- Geometric Transfer Attributes: transfer attribute tables and records to spatially-matching elements in vector, CAD, or shape objects.
- Raster Set Null Cells: specify null areas by minimum or maximum value, zero, specific value, range of values, or from a binary mask.
- Raster Color Conversions: streamlined interface for color-space conversion and creation or separation of color-composites.
- Bitmap, Hatch, and Line Pattern Editors updated with more flexible color and editing controls.

Watch for an updated Mosaic process in the first quarter of 2016 to support automated mosaicking and orthorectification of ungeoreferenced or geolocated aerial images acquired by low-altitude UAVs (drones). These updates will be incorporated in the 2016 Release version of TNTmips.

### New Processes



[link to Technical Guide](#)

#### Radiometric Correction of Satellite Images (Image / Radiometric Correction)



- Sensor data automatically read from metadata file, object, or subobject.
- Process ASTER, DMC, GeoEye, IKONOS, Landsat, KOMPSAT, Pleiades, QuickBird, RapidEye, SPOT, and WorldView images.
- Enter sensor data manually for other satellite sensors.
- Apply sensor gain/offset to correct digital numbers to radiance.
- Convert image band values to top-of-atmosphere reflectance.
- Correct for path radiance via histogram edge, predicted values from scattering model, from a dark object area designated in the View, or by manually entering values.
- Apply cosine TZ (COST) atmospheric absorption correction.
- Apply topographic correction using a DEM to normalize reflectance values to a flat surface.



### **Lens Correction for Aerial Camera Images** (Image / Resample and Reproject / Lens Correction)

- Camera and lens parameters automatically read from EXIF image metadata if available.
- Process uses open-source Lensfun lens calibration library.
- Correct for barrel distortion, vignetting, and/or transverse chromatic aberration prior to georeferencing or mosaicking.

### **Image Auto-Register to Reference** (Image / Auto-Register to Reference)

- Automatically georeference multiple aerial or satellite images to one or more reference images.
- Process images with nominal georeference or geolocated images with unknown orientation.
- Use multiresolution keypoint matching in addition to image cross-correlation to find control points from reference image.
- Keypoint matching is used to determine correct orientation of aerial camera images with single EXIF geotag location.
- Input and reference images are automatically associated based on location information.

### **Compute Key Points** (Image / Utilities / Compute Key Points)

- New process to compute and store keypoints for reference image for auto-registration.
- Choice of AKAZE or BRISK keypoint detectors.

### **Convert Key Points to Vector** (Image / Utilities / Compute Key Points)

- New process to convert image keypoints to vector points for display and analysis.
- Keypoints automatically created if they do not already exist.

### **Raster Reassign Cell Values** (Image / Classify / Reassign Cell Values)

- Reassign cell values and change data type using automatic or manual modes or from raster database table.
- Automatic mode: assign integer output values for specified set of uniform input value intervals (integer or floating-point) within the specified range.
- Value mode: specify individual output values for individual input values.
- Threshold mode: define a set of minimum thresholds to subdivide the input values and specify value to assign above each threshold.
- Range mode: define a set of contiguous or noncontiguous ranges by minimum and maximum value and the output value to assign for each.
- Database mode: assign new value for each cell from specified field in a raster database table.

### **Raster Convert Data Type** (Image / Convert / Data Type)

- Provides simple interface for changing raster data type and rescaling values.
- Automatic or manual rescaling to the new data type range.
- Set out-of-range output values to null or to the limiting value of the output range.

### **TNTmips Menu Changes**

- Web GIS menu replaces Tileset menu.
- Image menu reorganized to better group similar processes; added Classify, Statistics, and Spatial Analysis submenus.
- Geometric menu reorganized to better group similar processes; added Statistics and Spatial Analysis submenus.
- Access Assemble Geomashup and Assemble Composite KML from Web GIS menu.
- Access TNTAtlas assembly wizard from Main / TNTAtlas / Assembly Wizard.
- Raster Arithmetic and Indices (Image / Combine / Arithmetic and Indices) is the new name for the previous Raster Calculation process.



## Processes Redesigned with Added Capabilities

### Geometric Transfer Attributes (Geometric / Attributes / Transfer)

- Process window redesigned for greater ease of use.
- View window automatically displays source and target objects.
- Use CAD or shape object in addition to vector as either source or target.
- Use all or marked elements in source and/or target.
- Add attributes directly to target object or to a copy.
- Transfer attributes from points/lines/polygons to vector labels.
- Transfer attributes from source lines to target lines by intersection, subset, or distance.
- Choose which tables to transfer.
- Transfer all records or only those attached or related to elements.
- Option to save text report with summary and details of the transfer operation.




### Raster Set Null Cells (Image / Utilities / Set Null Cells)

- Set a specific value as null or create a null mask.
- Redesigned process window shows input about existing null settings (null value, null mask).
- Option to set a specified range of values to null.
- Set Minimum, Maximum, or Zero as the null value from menu or manually enter any value.
- Choose to create a new raster or process in place.
- Apply a specified binary raster to modify the null mask.





### Raster Color Conversions (Image / Utilities / Set Null Cells)

- Streamlined interface now allows processing multiple input composites or raster sets.
- Convert color-composite rasters from or to sets of RGB separates.
- Perform color-space conversions (RGB, IHS, BHS, CMY, CMYK).
- Apply contrast during conversions.

### Pattern Editors for Geometric Element Styles

- Line Pattern Editor updated with embedded palette and all settings consolidated in pattern element list. 
- Hatch Pattern Editor updated with more flexible color controls and direct editing of hatch elements in list. 
- Bitmap Pattern Editor updated; menu functions moved to icon buttons and color controls streamlined. 

### Other Highlights

- Georeference Auto-Register operation: register geolocated aerial images with unknown orientation (e.g. from UAV or other aircraft) using keypoint matching and image cross-correlation.  
- Mosaic ungeoreferenced UAV or other aerial images with automatic tiepoint generation.
- Run TNTgis software in Mac OS X 10.11 El Capitan.
- Create and use database tables for vector label elements.
- File/Object Selection window includes optional sidebar tree control for navigation and preview and provides improved management of saved locations, favorites, and recent items.  
- GeoTagged Image Table: allows writing to existing image databases and creating vector object with points attached to image database records. 