New Features In TerraScan

What's New in Terrasolid v016?

Webinar

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Various Improvements

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- **Compute normal vectors** action on project also without trajectory information
- Multiple source classes in **Classify Using Brush**
- Multiple source classes in **Measure Density**
- Multiple source classes in **Place Catenary String**
- Group attribute added to user defined point file formats
- Trajectory output supports longitude/latitude in user defined file formats
- Write to design file stores better color resolution (3*5 bit) when writing points to design file using point color
- **Set accuracy** menu command for setting accuracy estimates of trajectory positions
- **Scan Move Sun Xxxxx** key-in command for moving sun azimuth for shaded display

GPS Time

- Time conversion can convert from or to **GPS time**
- Project can store **GPS time** in LAS 1.2 or Fast Binary
- '**GPS seconds-of-week**' time stamps are between 0 and 604800
- '**GPS standard time**' defined by LAS, smaller than one 1 000 000 000
- '**GPS time**' stamps are right now bigger than one 1 000 000 000
  - May be easier for some customers who need to track time vs standard time. Diff is 1B seconds.
- **GPS time** = **GPS standard time** + 1 000 000 000

LAZ Support

- TerraScan can read and write LAZ 1.0, LAZ 1.1, LAZ 1.2 and LAZ 1.3 formats
- You can also use LAZ as project storage format

- Reduces file size 50% – 80% compared to LAS, usually 60-70% in most cases
- Excellent when you transfer data to someone else
- Usable when performing manual editing only
  - Not as big of an impact if takes a bit longer to open a block of data
- Too slow for batch processes – example macro timing:
  - Compression and decompression takes a lot of time
  - If not all attributes are needed then FBI is quickest
  - Not very useable for core classification processing

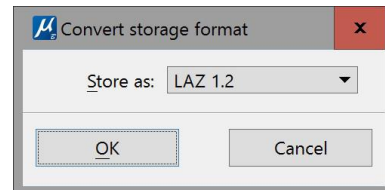| Format	Time
Fast Binary	12 sec
LAS 1.2	50 sec
LAZ 1.2	210 sec

Convert storage format

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- **Tools / Convert storage format** menu command in project window convert project block files to another format
  - Converts each file replacing file extension
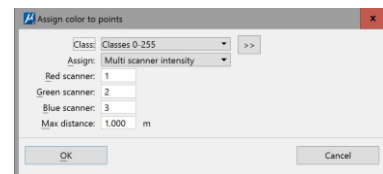 - Modifies project definition accordingly

  μ Convert storage format   ✕

  Store as: LAZ 1.2   ▼

  OK   Cancel

  - Remember that attributes stored in one format, such as normal vectors in FBI, are not stored in LAZ.
  - LAS v1.4 not supported in this command yet

Coloring Points from Multi Scanner Intensity

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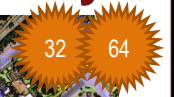
- Optech Titan has 3 laser channels
  - 1550 nm wavelength
  - 1064 nm wavelength
  - 532 nm wavelength (can penetrate water)
- Assign RGB color from three channel intensities
  - Each point gets RGB from intensities of closest points from three different channels
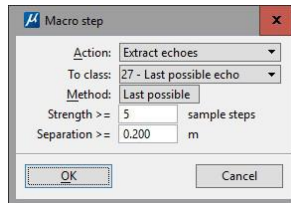 - Each point comes from a single channel

  μ Assign color to points   ✕

  Class: Classes 0-255 ▼   >>
  Assign: Multi scanner intensity ▼
  Red scanner: 1
  Green scanner: 2
  Blue scanner: 3
  Max distance: 1.000   m

 OK   Cancel

Extract Echoes in Macros

- Macro action making it possible to extract new points from waveform data as a batch process
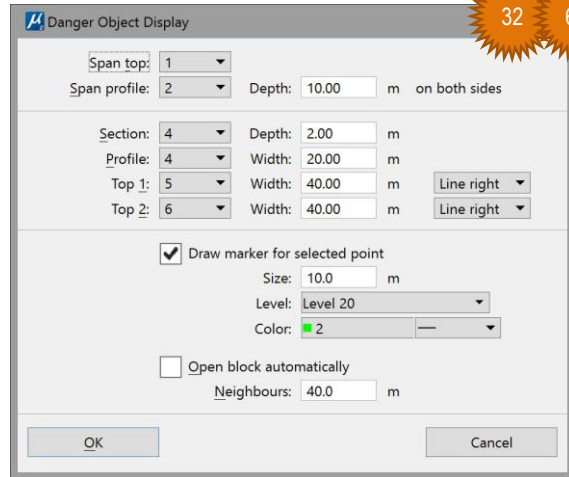
Automatic classes

- When you open block or read points in, TerraScan will check if the loaded data set uses classes which are not defined in **Define Classes**
- Will add a temporary class definition for any missing class
- Makes it easier to manage visibility and classification
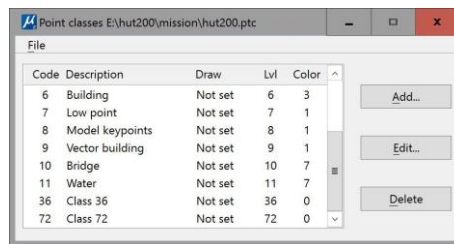
Improvements in Find Danger Points

- Can run the search on project
- Three new automatic view setups: Span profile, Top 1 and Top 2
- Can draw marker to show danger point selected in the list
- Write HTML report menu command for generation of HTML reports using template document
- **Longitude** and **Latitude** fields **Output report**

Danger Object Display

Span top:	1				
Span profile:	2	Depth:	10.00	m	on both sides
Section:	4	Depth:	2.00	m	
Profile:	4	Width:	20.00	m	
Top 1:	5	Width:	40.00	m	Line right
Top 2:	6	Width:	40.00	m	Line right

☑ Draw marker for selected point
Size: 10.0 m
Level: Level 20
Color: 2

☐ Open block automatically
Neighbours: 40.0 m

OK   Cancel

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Danger Point HTML Export

- Creates one HTML file for each danger point
- User designs layout as .html document
- Example layout \terra\example\dangerpoint_report.html created with OpenOffice

Variable	Text Content
#dgrnumber	Point number
#dgrspan	Span (start-end tower)
#dgrwire	Wire numer
#dgrdist	Distance to wire
#dgrstation	Distance from start tower
#dgrclass	Class
#dgrx	Easting
#dgry	Northing
#dgrz	Elevation
#dgrlon	Longitude
#dgrlat	Latitude

Variable	Captured View
#spantop	Span top
#spanprofile	Span profile
#section	Section
#profile	Profile
#top1	Top 1
#top2	Top 2

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Danger Point HTML Export

Point number	Span	Distance from 1st tower
4	77-78	25.93

Easting	Northing	Elevation
1463310.9	6782940.5	220.31

| Longitude	Latitude	Distance from wire
12.873921	61.160488	0.01
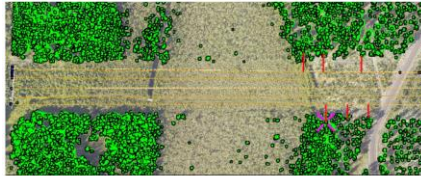
Span top
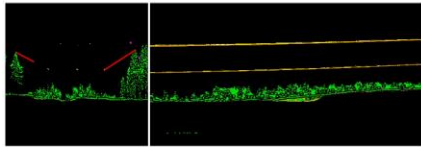
Snapping to Points

- MicroStation tentative click snaps now to laser points
  - Use 1 : snap to define center point around which to rotate view
  - Use 2 : snap to draw elements in 3D using laser data

Class+intensity and Color+intensity

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- Class+intensity: base color from class, brightness from intensity
- Color+intensity: base color from point color, brightness from intensity
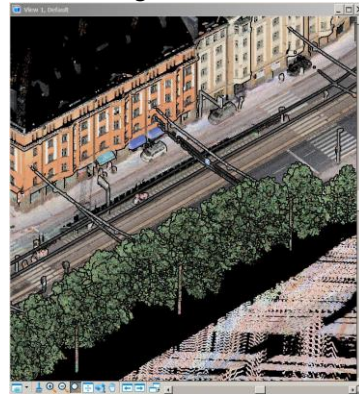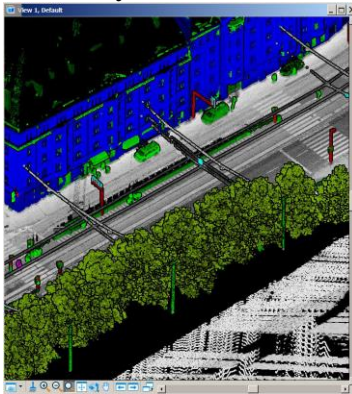
Cut overlap – By density

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- Use with point clouds merged from multiple sensors
- Removes points from locations seen by more than one sensor
- Keeps data from sensor with higher local point density
- For example: merging airborne and mobile point clouds:
  - Mobile data has higher density close to drive passes
  - Mobile data sees building walls
  - Airborne data has higher density far away from mobile drive passes
  - Airborne data sees building roofs and inner yards
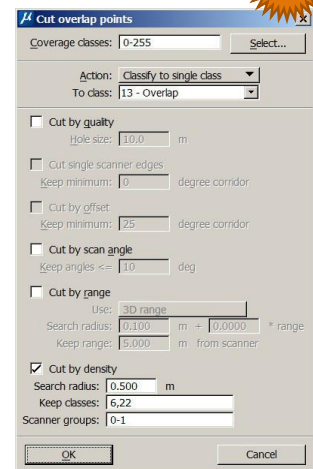
Tools / Merge small blocks

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- Menu command for merging small project blocks automatically with their neighbors
- Makes automatic grid blocks practical for airborne data
- No higher intelligence – not always optimal choices
- No consideration for the distribution of the points within a block
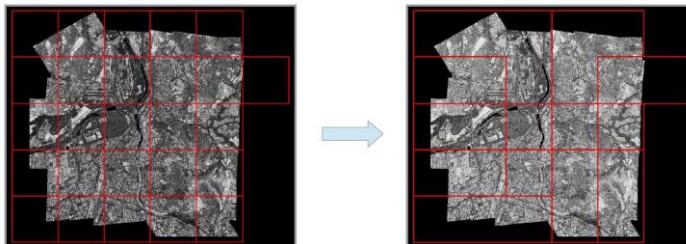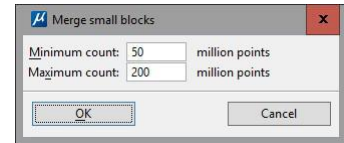
Block / Merge blocks

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- Menu command for merging selected project blocks
- Manual tool but operator can ensure good choices

# Edit info of several project blocks

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- **Edit** menu command can modify folder, file name prefix or extension of multiple selected blocks
- If the current name matches the current data then it will also rename the files, then need to save the project
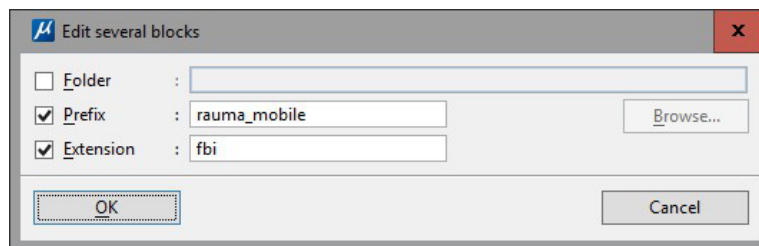
Smoothing of Point Color

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- **Smoothen points** can now smoothen RGB colors as well
  - Might wish to use if for some reason your colouring is noisy
  - May also wish to use if used random colours and with drastic differences in the colour space and then apply the smoothing
- This averages color value of each point with closest neighbours
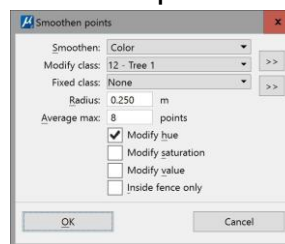
# Classify / By polygons & 3D Polygons

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- **Classify / Inside shapes** renamed to **Classify / By polygons**
- Can classify points based on how close points are to a polygon in 3D
  - Negative offset is inside of polygon and positive is outside
- Example: use to classify points close to roof polygons as 'Roof structure'
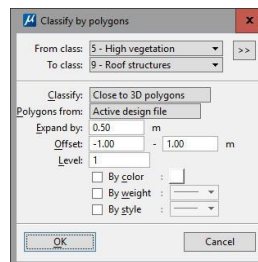
Lattice Export & Closest hit z

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- Each grid cell gets elevation from source point closest to cell center

LAS 1.4 Support

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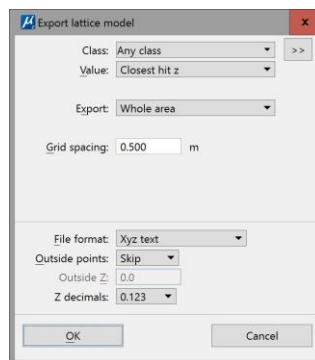
- TerraScan can read and write LAS 1.4
- You can use LAS 1.4 as project storage format
- Limitations:
  - Near infrared not supported
  - No testing done on waveform data
  - Does not read or store coordinate system information at the moment

LAS 1.4 Changes

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- 16 bit mirror angles at 0.006 degree resolution (-180 .. +180 degree)
  - LAS 1.2 has 8 bits (-128 .. +127 at 1 degree resolution), but now stored as 16-bit in memory so values will not be an integer, but a mutable of .006°

- Up to 15 echoes per pulse
  - LAS 1.2 has up to 7

LAS 1.4 Changes

- Two bits for scanner/channel
  - Currently TScan ignores completely these two bits. In mobile scanners with more than four scanners the two bits is not enough so uses the user byte instead

- 8 bits for class – same as normal use has been all the time allowing 256 classes

- Four classification bits
  - Synthetic
  - Keypoint
  - Withheld
  - Overlap

LAS 1.4 & Class Definition in TerraScan

- Create separate entries in **Define Classes** for all 8 bit class + classification bit combinations you intend to use
- For ground, you might define:
  - 2 – Ground
  - O2 – Ground overlap
  - S2 – Ground synthetic
- If class doesn't exist it will create O2, O3, etc, for classes with Overlap bit set

LAS 1.4 Project Workflow

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- If raw data is LAS 1.4 and you need to deliver LAS 1.4, use LAS 1.4 as project storage
  - Classification bits are only stored in LAS 1.4 file format
- In all other cases, use FastBinary as project storage and convert to delivery format at the end
  - Speed advantage and can create 1.4 at the end if no bits needed along the workflow

Set Model KeyPoint Flag

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- Sets bit for keypoint flag and creates then a K2 class

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Set Overlap Flag

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- Overlap now has an option to set the bit for overlap flag and creates then O1, O2, etc classes

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