

What's New in Carlson?

What's New in Carlson 2022.....	2
What's New in Carlson 2021.....	10
What's New in Carlson 2020.....	17
What's New in Carlson 2019.....	26
What's New in Carlson 2018.....	33
What's New in Carlson 2017.....	41
What's New in Carlson 2016.....	49
What's New in Carlson 2015.....	57
What's New in Carlson 2014.....	63
What's New in Carlson 2013.....	71
What's New in Carlson 2012.....	76

Each section of this document includes new features for the below modules

- | | |
|--------------------|---|
| ◆ General commands | ◆ Geology |
| ◆ Survey | ◆ Surface/Underground Mining |
| ◆ Civil | ◆ Natural Regrade |
| ◆ Hydrology | ◆ TakeOff (Construction, CADNet, Trench, Geotech) |
| ◆ GIS | ◆ Field |
| ◆ Point Cloud | ◆ Misc data conversions |

Learn More!

Interested learning more about the various Carlson Software modules? We invite you to learn more about Carlson by visiting <https://www.carlsonsw.com/all-industries/> (all information subject to change).

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What's New in Carlson 2022

General

- ◆ AutoCAD 2022 – Added support for this new version.
- ◆ IntelliCAD 10.1 – Improved speed and new features like sheet sets with the Publish command.
- ◆ Toolbars – Added over 30 new toolbar icons and a new ribbon for GeoTech.
- ◆ Open Drawings Map – Added method for custom properties for drawing records and method to store a drawing database on a shared network location. From the Map view, added function to open Windows File Explorer for the drawing's project folder.
- ◆ Settings Server – Added method to copy data files into project folders.
- ◆ Project Data Sub-Folders – Added separate Program Settings folder for settings files.
- ◆ Data Depot – Added details to the history log and the ability to restore a previous version of a data file. Adding files to Data Depot supports working from project level with controls on which files to add.
- ◆ Carlson Configure – Added setting to control font used for dialogs.
- ◆ Select CAD Default Settings – New command to choose classic or modern CAD user interface settings.
- ◆ Drawing Cleanup – Added functions to remove duplicate text and to remove unused registered apps.
- ◆ Import Polyline File – Added method for locating by station/offset values from the file.
- ◆ Drawing Inspector – For polylines, added reporting of current position distance. For centerline polylines, added reporting of spiral data.
- ◆ Draw MText – In many commands that create MText, added an option to set the Text Frame to draw a box around the text.
- ◆ Translate Layers – Added method to import layer names from the drawing.
- ◆ Line Up Text – Added method to pick two points to define angle, option to respace and option to use text for alignment reference.
- ◆ Arrowhead with Line – New command to draw a two point leader with an arrowhead.
- ◆ Boundary Polyline – Added option to create 3D polyline.
- ◆ Shrink-Wrap Entities – Added options to ignore zero elevation entities for input, to elevate zero elevation vertices, and to erase the input entities.
- ◆ Add Intersection Points – Added option to average elevations at intersection within a tolerance.
- ◆ Draw Label For Companion Linework – New command for Draw To Standard to create a label using properties by layer.
- ◆ Draw Standard Item by Quick Key – New command to create entities for Draw To Standard by typing a quick key instead of dialog list selection.
- ◆ Reports – For PDF reports, added option to make PDF report files read-only. For Report Formatter, new option to put text lines at the bottom of the report and added function to sort the list of available fields.
- ◆ 3D Viewer – Added zoom extents function.
- ◆ Angle Info – Added ability to handle 3D angles.



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- ◆ Layer ID – Added option to label the layer name.
 - ◆ Command Search – Added reporting of toolbars for the commands.

Survey Commands

- ◆ Carlson Photo Capture – Added method to download files by file type.
- ◆ Input/Entry Distance Scale – Added method to scale distances in many COGO commands such as Enter Deed Description.
- ◆ Import Text/ASCII File – Added ability to read points from a SurvCE/Layout job database (.jdb) file. Added functions to save and load settings to a .rpnt file.
- ◆ Import Distance/Angle File – Added field for deed name for importing multiple deeds.
- ◆ Edit Process Raw Data – Added function to update the descriptions in the RW5 from a coordinate file. Added function to apply Field-to-Finish substitution codes to the descriptions in the RW5 file. Added report option for the description on the same line as the data. Added an optional warning on processing for points with a blank description. Added option to use a larger font for the spreadsheet. For processing GPS records added storing the lat/lon and RMS values to the CRDB as attributes.
- ◆ Edit Process Level Data – Added method to adjust elevations based on the number of turns.
- ◆ SurvNET – Added option to merge output point text file with control points.
- ◆ Draw Points – Added option to label elevations in inches.
- ◆ Point Group Manager – Added methods to create a point group of points unassigned to a group and to create group from point number suffix.
- ◆ Field to Finish – Added ability to run Triangulate & Contour to draw contours or make a TIN of the points and polylines. Added new utility feature. For pipe features, added ability for separate pipe feature settings per code, option to label structure names along the pipe and option to draw both pipe 3D faces and polylines. For tree features, added offset by tree symbol size as factor of text offset, added option to draw labels as MText and added settings to control order of input parameters. Added setting for annotative points per code. For GIS attributes on a line, added support for multiple attributes. Added option to match first symbol scale when creating a second symbol. New special code of OO for Offset Only that draws only the offset polyline. For OH offset horizontal special code, added method to repeat the offset multiple times. For hedge linetype, added ability to control width using OH or OFB special codes. For RECT special code, added setting for using a third point as a rectangle corner or an offset for the rectangle width. For text attributes prefix/suffix settings, as string of [DESC] gets replaced by the point description. Added method to draw only points with GPS status of Fixed. Added option to hide the drawing under the Mtext labels. Added support for using fixed parameters with multiple codes.
- ◆ Offset Point Entry – Added option for slope stations.
- ◆ Annotation – Added option to use a custom block for endpoint leaders. For Stack Label Arc and Annotate With Leader, added option to create as MLeaders. For bearing leaders, added support for annotative leaders.
- ◆ Line/Curve Table – Added option to draw the table as MText without the grid lines.



- ◆ Stack Label Arc Auto Place – New command to automatically place the arc labels at the mid-point of the arc.
- ◆ Stack Label Arc Pick Side – Added option whether to draw leader.
- ◆ Label Angle – Added method to create an angle table. Added ability to handle 3D angles.
- ◆ Distance Table – New command to create a distance table of pairs of points and distances.
- ◆ Offset Dimensions – Added option to use CAD's current dimension style.
- ◆ Linetypes – Added method for multiple dashes between the symbol/letter such as ---C---C---
- ◆ Legal Description – Added method to report exterior angles.
- ◆ Map Check – Added support for azimuth format angles.
- ◆ Deed Correlation – Added method to screen pick points.
- ◆ Process Deed File – Added option to report using the Report Formatter.
- ◆ Area Descriptions By Interior Text – New command to tag area descriptions by automatically finding text inside polylines.
- ◆ Best Fit Line – Added method to screen pick CAD points, method to add more points to the calculation and option to set output layer.
- ◆ Convert CRD to ASCII By Folder – New command to batch process converting coordinate files to text files.

Civil Commands

- ◆ Triangulation Surface Manager – Add Point inside TIN hole has new option to fill the hole.
- ◆ Triangulation File Utilities – Added a Remove Spikes tool and added function to draw drainage low points.
- ◆ Grid File Utilities – Added export for DEM files.
- ◆ Triangulate & Contour – Added option to use linetype for depression contours.
- ◆ TIN Rebuild Inside Perimeter – Added method to apply inverse distance to adjust elevations within a perimeter. Added method to raise low points within a perimeter to fill-in low points to prevent ponding.
- ◆ 2D to 3D Polyline By Profile – New command to elevate a polyline using a profile.
- ◆ 2D to 3D Polyline By Screen – Added method to extrapolate elevations.
- ◆ Curb Ramp – Added graphic preview to dialog. Added option to taper only the first ramp section. Added method to do curbcut only with no ramp. Added method to pick the curb position separately from the polyline selection. Added a separate curb taper method.
- ◆ Wall Polyline Editor – Added layback slope, freeboard, bury depth, output to solid model (.mdl), color/texture for 3D viewing, and report including backfill quantities and wall volume. Added double-click on the wall polyline to run the wall polyline editor. Added support for using wall polylines in Takeoff design surface modeling.
- ◆ Elevate Pads By Grade Rules – Added option to add break points to lot lines and option to create swales.
- ◆ Cut/Fill Movement – Added option to label cells.
- ◆ Stockpile Volume – Added method to use lowest elevation around perimeter as flat base elevation.



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- ◆ Surface 3D FlyOver – Added support for viewing solid models (.mdl). Added settings for camera based light and shading for front, back or both sides. Add Model to the scene also draws a symbol in the drawing when the Model Library has the model defined with a CAD symbol.
 - ◆ Slope At Points – Added method to use a coordinate file and two points to define the slope.
 - ◆ Elevation Zone Analysis – Added method to use TIN surface and set colors in the TIN file for the elevation zones.
 - ◆ Vehicle Path Tracking – Added option to draw section view of vehicle with dimensions and added vehicle section view preview to dialog.
 - ◆ Polyline To Centerline File – Added method to define station at a reference point.
 - ◆ Label Station Offset – Added method to label CL crossings in plan view with option to label layer names.
 - ◆ Design Parking Inside Perimeter – Added ability to create islands at ends of parking rows. Added option whether to create spaces around the perimeter and option to add remainder parking space to the corner.
 - ◆ Design Parking Along Alignment – Added support for alignments with multiple segments, ability to use a polyline or centerline file for the alignment, and support for angled parking. Added functions to create auto treatments and to mirror treatments between left and right sides.
 - ◆ Draw Template Polylines – Added option to densify the template polylines.
 - ◆ Template Series File – Added interpolation option for none.
 - ◆ Shrink/Swell Table – New command to define different shrink/swell factors by station range for cut/fill and subgrade materials.
 - ◆ Draw Super Elevation Color Centerline – New command to draw the centerline polyline with colors for the super elevation transition zones.
 - ◆ Process Road Design – Added method to Template Point Profile to apply change in slope to another grade for a divided highway. Added method to use clip lines at the ends of the road for skewed ends.
 - ◆ Road Network – Added method to create a bottom of subgrade surface. Added method to hatch the template grade areas. Added method for road template gaps by station range.
 - ◆ Lot Network > Road Network – Added option to chamfer ROW intersections instead of arcs.
 - ◆ Station Polyline/Centerline – Added method to store deflection angle into the point description.
 - ◆ Draw Profile – Added option for fixed grid top/bottom elevations. Added option to draw horizontal line at bottom of elevation axis labels. Added option for line under label base elevations. For utility profiles, added pipe thickness and option to limit max offset for station by reference CL. For hatch, added option to label areas. For sewer profile labels above the rim, added method to place by grid top location and option for vertical labels with a leader from the rim. Added option to label manhole names using MText.
 - ◆ Draw Section File – Added method to label the total section distance. For tunnel sections, added support for end areas from a single closed section. Added option to create labels as MText. Added ability to set a description for each station that can be drawn in Draw Section File and reported in Section Report. For slope labels, added filter by user-specified slope amount.
 - ◆ Section File Editor – Added ability in translate elevations to use a profile to adjust the sections.



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- ◆ Section Report – Added method to only report user-specified offsets.
 - ◆ Set Descriptions By Offset – New command to set cross section descriptions by offset.
 - ◆ Draw Mass Diagram – Added method to graph as immediate cut/fill difference instead of accumulative.

Hydrology Commands

- ◆ Rain Lookup Table – New command to store custom rain events.
- ◆ Merge Watersheds – New command to combine the polyline perimeters of neighboring watersheds.
- ◆ Time of Concentration – Added Kerby-Kirpich method.
- ◆ Channel Routing – Added Muskingom-Cunge and Modified Puls methods.
- ◆ Pond Exfiltration – Added functions to save and load parameters to a .pdx file.
- ◆ Drop Pipe Spillway – Added lookup table for entrance loss coefficient. Added functions to save and load parameters to a .drop file. Added PDF report and function to draw diagram to the drawing.
- ◆ Pipe Culvert Design – Added report option for stage-discharge graph and option to draw HGL on pipe detail graph. Added support for Muskingom-Cunge method.
- ◆ Advanced Weir Design – Added functions to save and load parameters to a .weir file.
- ◆ Orifice Design – Added functions to save and load parameters to a .outlet file.
- ◆ Multiple Outlet Design – Added PDF report method with diagram and stage-discharge graph.
- ◆ Sewer Network – Added ability to automatically set inlet as on-grade or sag based on the surface. Added support for Inlet Control Devices to limit intercepted flow. Added support for structures with underdrains. Added new yard inlet structure. For SCS rainfall lookup, added methods to choose from lookup table, rain map or NOAA. Added method to round elevations by decimal precision. For draw plan view, added setting for direction of pipe polylines as upstream or downstream. For data table, added ability to control which structures to include in the table. For Review Sewer Network Links, added a method to reassign the data files. Added pipe thickness to editor and reports. Added setting for having raised rim heights. Added a new Line Name field for each structure.
- ◆ Collision Check – Added option to draw 3D lines between the crossing pipes along with 3D text for 3D viewing. Added coloring of pipe portions that have conflicts. Added report of minimum horizontal and vertical clearance. Added method to check for collision with a surface model. Added option to color pipe segments with a conflict.
- ◆ Compare Sewer Networks – New command to report differences between two sewer network models.
- ◆ Draw Sewer Profile – Added ability to draw profiles for normal and critical depth lines.
- ◆ Move Profile Pipe Label – New command to move sewer profile pipe labels and create a leader.
- ◆ HydroNet Explorer – Added support for circular pipe reach and culverts. Added support for the Clark and Snyder hydrograph method. For draw plan view, added options to create MText labels, draw connection lines, use default symbols and save/load settings. For reports, added method to control the order of elements.



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- ◆ Utility Network – For pipe labels, added settings to control offset from line and layer for labels. For creating profile at depth, added method to create streamlined profile with min number of profile points and ability to set max depth and min segment length. Added report function to check pipe depths and min/max cover. Added a description field for each utility with option to label in Draw Profile and Draw Sections. For laterals, added location by offset and slope.
 - ◆ Pressure Pipe Network – Upgraded calculation engine to EPANet 2.2. Added ability to set tank level to create specified pressure. Added ability to add multiple connections or laterals at a time with a specified station interval and demand.
 - ◆ Upgraded interface for setting up demand patterns. Added ability to draw symbols for valves in plan view.
 - ◆ Pipe Network ID – New command to pick a pipe network entity and report which pipe network model it belongs to.
 - ◆ Review Network Drawing Links – New command to review pipe network entities in the drawing and report network files with ability to reassign network files.
 - ◆ HEC RAS – Added method to output a cross section of the water level. Added support for version 6.0.

GIS Commands

- ◆ Database support – Added support of all GIS database formats to all GIS routines.
- ◆ Upgraded User-Interface – New dialogs for many commands including GIS Data Editor and GIS Data Inspector.
- ◆ Define GIS Features – Added import for StartNET, ESRI SHP and Carlson GIS .db features.
- ◆ Point GIS Editor – Added import for StartNET attributes.
- ◆ Place Camera Symbol – Added method to use points.


Geology Commands

- ◆ StrataCalc – Added method to limit pinchout by strata name range.
- ◆ Drillhole Import - Added option to import mineral drillholes, dynamic import preview in a spreadsheet format, additional error checking and reporting to ensure correctness of imported drillholes
- ◆ Draw Geologic Column – Added complete custom control over formatting and which values to label. Added option to label bed thickness.
- ◆ Graphic Drillhole Report - Added new option to specify drillhole length to display on report rather than specifying a plotting scale.
- ◆ Drillhole Text – Added method to create MText.
- ◆ Google Earth Drillholes – New command to tag drillhole symbols with drillhole/strata labels for viewing in Google Earth.

Surface/Underground Mining Commands

- ◆ Surface Mine Reserves – Added custom strip ratio formula. Added non-key tonnage to stored pit attributes.



- ◆ Prepare Value Block Model – Added cut surface and value calculation method tracking and grid info. Added export to text file function.
- ◆ Assign Directions – Added support to define directions by lines or leaders.
- ◆ Surface Equipment Timing – For 3D Pick, added ability to turn benches on/off. Added delay amounts to the report. Added output of period centroids to the spoil timing output file. Added option to skip non-key for timing.
- ◆ View Surface History – Added method to color surfaces by timing periods.
- ◆ Label Pit Formatter – Added options for commas in numbers and for higher order rounding.
- ◆ Block Model Viewer – Improved loading speed by over 10 times. Added option to merge matching grade blocks, option to render the outer shell of grades, option to tag blocks for inspecting in the viewer and ability to set the transparency of block by grade.
- ◆ Block Model Statistics – Added method to report by grades.
- ◆ Make Solid From Design – Added support for vertical alignments. Added option to draw cross section and template 3D polylines.
- ◆ Make Solid By 3D Triangulation – New command to create a 3D solid for a tunnel from a point cloud.
- ◆ Create Gap Points – New command to create points on a plane to fill in gaps in the point cloud.
- ◆ View Solid – Added setting for separate color for back side of 3D Faces.  Draw 3D Mine Model – Added method to output an MDL file.

CADnet Commands

- ◆ 3D Image Viewer – Added method to download aerial image from Google Earth.

Construction/Trench Commands

- ◆ Convert Dashes to Polylines – Added individual method to trace by picking starting segment.
- ◆ Topsoil Removal – Added method to assign topsoil removal as outside of subgrade areas.
- ◆ Input Trench Line – Added option to interpolate invert elevations in case of junction without elevation label.
- ◆ Trench Network Quantities – Added option to use a user-specified TIN as the reference surface. For the plan view map, added option to label stations.

Point Cloud Commands

- ◆ Import – Added function to import cloud data from CAD points.
- ◆ Export – Added support for E57 format and RCS format.
- ◆ Solids – Improved selection, editing and visualization.
- ◆ Create Solid By Poisson – Added option to use reference alignments for modeling tunnels.
- ◆ Bare Earth – Added option to put the ground points into a region instead of creating a new cloud. Added method to create a cloud of the non-ground points.
- ◆ Create Polyline – Added method to create polylines with tangential arcs.
- ◆ Edit Polyline – Added function to zoom scene to current polyline in editor dialog.
- ◆ Extract Slices – New function to view cross sections of cloud data and create points and polylines.



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- ◆ Curb Breaklines – New method to create 3D polylines for top and bottom of curb by using edge clusters.
 - ◆ Create Breaklines By Slope – New function to create 3D polylines at the boundaries of slope zones.
 - ◆ Color Lines – Added new method for creating polylines that follow color lines in the cloud such as roadway paint stripes and new method to follow color boundaries such as edge between pavement and grass.
 - ◆ Slope Lines – New function to create breakline polylines by following a slope grade break.
 - ◆ Feature Extraction – Added batch process method to extract multiple features at a time.
 - ◆ Power Lines - New function to extract overhead wires as polylines.

Data Conversions

- ◆ Geoids – Added geoids for Germany-Hessen, Thailand and Lithuania.



What's New in Carlson 2021

General

- ◆ AutoCAD 2021 – Added support for this new version.
- ◆ IntelliCAD 10.0 – Tool palettes with key Carlson commands. Graphics upgrade with anti-aliasing, visual styles and lighting. Added dynamic input and revision control for drawings.
- ◆ Carlson Photo Capture – New command to download project data including TINs, images, coordinate files and point clouds.
- ◆ User Interface – Added 5 new ribbons, added 50 new toolbar icons and updated hundreds of icons.
- ◆ File Selection – Added functions to create, rename and remove subfolders.
- ◆ Save Drawing Named by Current Time – New command to create a copy of the current state of the drawing with a unique name by the current date and time.
- ◆ Report Formatter – Added setting for attribute format for output to Excel. Added option to underline rows.
- ◆ 3D Viewers – Added ability to place text in the scene and draw text to CAD. Added support for TIN files with textures.
- ◆ Google Earth Export – Added option to make polygons for closed polylines.
- ◆ Join Nearest – Added setting to skip the options dialog. Added progressive filters option to automatically run multiple times with greater tolerances.
- ◆ Draw 3D Polyline – Added ability to create a 2D polyline at the same time. Added method to create an arc to a specified tangent out. Added ability to simultaneously draw the polyline in the 3D Viewer window.
- ◆ Draw Table – Added method to create a table from scratch using spreadsheet entries. Added setting for table justification.
- ◆ Add Polyline Vertex – Added method for projecting picked point onto the polyline.
- ◆ Boundary Polyline – Added method to auto-select entities to process.
- ◆ Shrink Wrap Entities – Added setting to control max gap to join.
- ◆ Colors from Layers – New command to set entity colors by layer color.
- ◆ Drift Offset – New command the increases the offset amount proportional to the distance along the polyline.
- ◆ Offset 3D Polyline – Added option whether to remove co-linear points.

Survey Commands

- ◆ Area Annotation – Added method to create both area labels and area table. Added options to label with underline and italics.
- ◆ Line Annotation – Added method to place labels at a percent position from the end points.
- ◆ Auto Annotate – Added control to put line and curve table tags on the inside or outside.
- ◆ Stack Label Arc – Added more leader format options.
- ◆ Point Import Text File – Added option to apply prefix or suffix to point names. Added filter to skip points with a specified description string.



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- ◆ List Points – Added option to report GIS attributes from CRDB format. Added full set of projection definitions for reporting a second projection.
 - ◆ Point Group Manager – Added method to create a group by non-surface status and method to switch group definition to a point list.
 - ◆ Dynamic Point Attributes – New command to create point attributes that dynamically resize to view in the current zoom level.
 - ◆ Move Point Attribute with Leader – Added option to turn off snaps. Added setting to control offset from leader to the label.
 - ◆ Auto Annotate – Added suffix setting to total distances.
 - ◆ Edit Process Raw File – Added report of points by date and added report method to report in color using the spreadsheet coloring. Added support for linking photos to points using SurvPC coding in the RW5.
 - ◆ Field To Finish – When redrawing points, the program will retain any custom edits of the label positions. Added setting for linetype text font style. Added method to set linetype by code or GIS attribute and added method to label a GIS attribute along linework. Added prefix wildcard coding. For the pipe features, added option to use the code description for the pipe material or name. For the tree features, added support for companion codes for the tree canopy, option to skip treeline for specific codes, added setting to report in fractions of an inch and added option to only use the label setup for the table and not the point description. Added a separate setting whether to draw GIS attribute labels. Added new COLOR special code to set the entity color. For OH special coding, added support for changing the number of offsets along the polyline. For OFB special coding, added code option to close the polyline.
 - ◆ SurvNET – For computing closures, added automatic traverse loop detection. Added option to report traverse point only, not sideshots. Added option to use the normal distribution for error ellipse on points that pass the Chi-Square test. The standard error results are now automatically stored as point attributes to the output CRDB file.
 - ◆ Legal Description – Added option to report course numbers. Added option to report railroad curve values and option to report scaled areas.
 - ◆ Double Proportion Line Division – Added option to output resulting point to the coordinate file.
 - ◆ Edit Text on Arc – Added option to change text offset.
 - ◆ Best Fit Circle – Added option to report using the report formatter.
 - ◆ Best Fit Centerline – Added option to remove outlier points.
 - ◆ Create Points from Entities – Added option to create points at center of polyline rectangle.
 - ◆ Change Polyline Linetype – Added option to set the text font style.
 - ◆ Offset Dimensions – Added option to create labels as MText.
 - ◆ Label Point Comparison – New command to label the difference between two points.
 - ◆ Label Offset Distances – Added settings for layer, style, rotation, curvy, mtext and sizes.
 - ◆ Label Coordinates – Added settings for number of digits before the decimal.

Civil Commands

- ◆ Grid File Utilities – Import georeferenced TIF files uses projection to set GRD position.



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- ◆ Triangulate & Contour – Added index label style. Added method to set label distance as a scalar by horizontal scale.
 - ◆ TIN Editing – Added undo within the editor and apply function to save the current changes. Shows log of changes with option to revert edits.
 - ◆ Triangulation Surface Volumes – Added option to report deep cut and deep fill volumes separately.
 - ◆ Draw Curb Ramp – Added method to pick curb direction.
 - ◆ Design Pad Template – For grading limits, added method to put retaining wall next to pad and then slope to limits.
 - ◆ Cut/Fill Movement – Added option to apply shrink and swell factors.
 - ◆ Spot Elevation Links Manager – New command to report number of spot labels per surface and reassign surface file.
 - ◆ Export DEM TIF File – New command to create a GeoTIFF DEM file from a TIN file.
 - ◆ Quick Profile – Added settings for the profile colors.
 - ◆ Profile Editor – Added function to set depth from reference profile including method to transition depths between stations. For check stations, added ability to check offset as a cross slope.
 - ◆ Create Curb Profiles – New commands to create curb profiles from a reference EOP profile with series of different templates.
 - ◆ Draw Profile – Added method to clip grid lines above the profile lines. Added new stack profile label method to group values from multiple profiles. Added new grid style of ticks along axis. Added option to label CL stations for PC/PT along profile. New grid title setup for profile names, scales and datum.
 - ◆ Draw Section – Added method to clip grid lines above the section lines. For closed loop sections, added method to report over cut and under cut end areas. Added option to label subgrades with the end areas.
 - ◆ Design Template – Added method to force berm at top of cut.
 - ◆ Draw Typical Template – Added option to label template name and label subgrades for the right side.
 - ◆ Vehicle Path Tracking – Added option to hatch the path, option for path at CL offset, multi-axle support, method to pick icon positions and new description field.
 - ◆ Road Network – Added methods to Draw Profiles and Draw Sections for selected roads. Added support for self-intersecting centerlines. For cul-de-sacs, added option to adjust the centerline to the offset and added method for a hammerhead style with the curb all the way around. For intersection curb return profiles, added method for direct start to end profile without any PVI. Added method to turn off selected roads from processing.
 - ◆ Contour from Grid – Added settings for default layer prefix/suffix. Added option to draw labels as MText.
 - ◆ Surface 3D Flyover – Added model tree of entities in the scene.
 - ◆ 2D to 3D Polyline by Text – Added options to keep the existing polyline and assign a new layer to the elevated polyline.



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- ◆ Station Polyline/Centerline – Added method to create offset points at vertices of reference offset polylines. Added option to label the northing/easting at the end point. Added option to label the CL file name. For positioning the station at the +, added method not to draw the +. Added text justification settings for deflection labels.
 - ◆ Station/Elevation Label – Added option for label underline.
 - ◆ Parking Perimeter Tools – Added separate methods for interior corners, exterior corners and extended corners. Added undo function and ability to change settings while in the command. Added graphic previews in the dialog.
 - ◆ Parking Islands – New command to create parking island polylines.
 - ◆ Design Parking Along Alignment – New command to layout parking spaces along a centerline.
 - ◆ Design Parking Inside Perimeter – New command to layout parking spaces inside a closed perimeter polyline.
 - ◆ Connect Driveways – Added option to fillet with curves or flare.

Hydrology Commands

- ◆ Time of Concentration – Added regression equation method used by LA County.
- ◆ Curve Numbers – Added area precision settings for both dialog display and reports.
- ◆ Peak Flow – Added Modified Rational Method used by LA County.
- ◆ Runoff Hydrograph – Added Rising Limb Factor method.
- ◆ Overland Sheet Flow Manning's n – New library for this type of Manning's n.
- ◆ HydroNet Explorer – Added ability to process using EPASWMM engine and added support for Rational method. Added method to reference pre-existing values when reporting proposed analysis results.
- ◆ Sewer Network Model – Added setting for initial velocity. Added snap to curb method for placing new structures.
- ◆ Sewer Network Plan View – Added method to draw easement boundaries and added option to use wipeout with the structure labels when using MText. For structure labels, added option to draw a box around the labels and option for no rim elevations on outfalls
- ◆ Sewer Network Profile – Added ability to label collision clearance of crossings. Added option to prefix or suffix layer names of the profile entities using the sewer network system name. Added layer and color settings for tributary pipe crossings.
- ◆ Sewer Network Reports – Added subarea report for each catch basin with report formatter.
- ◆ Check/Label Clearance – New command to label vertical clearance and elevations for two pipes picked in plan view.
- ◆ Stage-Storage Editor – Added option for biofiltration, option for stone encasement for underground pipes and improved the report.
- ◆ Design Bench Pond – Added option to use biofiltration.
- ◆ Design Channel- Added circular pipe method and PDF reporting.
- ◆ Check Collisions – Added method to check 3D polylines.
- ◆ Laterals – Added new methods to create perpendicular connections on pipes. Added support for multiple cleanouts.



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- ◆ Import Laterals from Text File – New command to add laterals to the model using data in a delimited text file.
 - ◆ EPASWMM – Added assign average slope method for runoff input types.
 - ◆ HEC-RAS – Added boundary conditions. Added multiple steady state station/flow values to export. Added option to output velocity and depth points.
 - ◆ Utility Network – Added method to add utility lines by selecting multiple 3D polylines. Added method to automatically set profile at depth from surface. Added option to draw easement boundaries. Min Cover Check report includes position of min and max cover. Added method to link Draw Profile to Utility Network to auto update the profile when the network model changes. Added method to draw laterals on the profile.

GIS Commands

- ◆ Color TIN by Image – New command to assign colors to the TIN faces using color from a georeferenced image.
- ◆ Point GIS Editor – Added method to add all attributes for a feature. Added imports for Trimble JXL and format settings for Trimble CSV.
- ◆ Define GIS Features – Added import for feature attribute definitions from Google KML.
- ◆ Import ODBC – New command to import GIS data from ODBC databases including relational databases.
- ◆ Export Geodatabase – New command to export GIS data to an ESRI Geodatabase.

Geology Commands

- ◆ Drillholes – Added status flag for each strata record whether the strata has been edited from the original values.
- ◆ Compare Drillholes To Block Model – New command to report differences between drillhole attribute values and the block model.
- ◆ Import Drillholes – Added support for CONSOL format.
- ◆ Graphic Drillhole Report – Added method to label water table and draw symbol.
- ◆ Custom Drillhole Report – Added options to process selected strata and to substitute label for null values.
- ◆ Composite Strata by Interval – New command to composite a drillhole by depth interval.
- ◆ Composite Strata by Elevation – New command to composite a drillhole by elevation range such as for benches.
- ◆ Apply Wash – New command to calculate attribute values at different densities.
- ◆ Apply Faults – Added method to apply high/low models to make continuous strata surface.
- ◆ Auto Run Residuals – Added method to output GRD files.
- ◆ Define Block Model Auto Run – New command for batch processing creation of multiple block models.
- ◆ Block Model 3D Viewer – Added support for viewing multiple block models.
- ◆ Draw Block Model – Added method to set layers by grade.
- ◆ Geologic Column – Added setting for label offset and option to label bed names for composites.



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- ◆ Fence Diagram – Added option to draw grades from block diagram on separate layers and option to groups fence diagram entities.

Surface/Underground Mining Commands

- ◆ Surface Equipment Timing – Added weighting by qualities in 3D Pick.
- ◆ Solids Timing – New command for underground timing of 3D solid models.
- ◆ Merge Small Benches – Added option to run on all benches or a specific bench.
- ◆ Tunnel Network – New command to create 3D solid of an intersecting network of tunnel alignments.
- ◆ Make Solid by Sections – Added method to model an open surface like a cliff face, method to use interior points, option to limit the sample width, option to triangulate ends and option to show resulting solid in the 3D viewer
- ◆ Make Solid from Survey Points – New command to create a solid from survey points plus a perimeter polyline.
- ◆ Trim Solid – Added method to trim by station range along a 3D polyline.
- ◆ Draw Solid Centerline – New command to create a 3D polyline along the center of a solid.
- ◆ Panel Precedence by Polylines – New command to assign precedence from polylines.

Construction/Trench Commands

- ◆ Overexcavate Volumes – Added reporting of overexcavated strata volumes.
- ◆ Water Table – Added method to model water table surface and report cut below water table.

CADnet Commands

- ◆ BIM Commands –For IntelliCAD, new BIM commands to create a Revit or IFC underlay in the drawing, show BIM properties, snap to BIM objects and explode BIM objects to standard CAD entities.
- ◆ AEC Entities –For IntelliCAD, new commands to create AEC objects including walls, doors, windows, railings and stairs.

Point Cloud Commands

- ◆ Graphics – Using adaptive point sizing with foreground points shown larger than background points. Scene view allows changing coloring method for clouds and added setting for direct cloud color.
- ◆ Select by Color – New selection method for high contrast and ability to screen pick to set color tolerance.
- ◆ Import Cloud – Added ability to import Carlson surfaces for TIN and GRD files.
- ◆ TIN Surface – Added smooth function using the moving least-squares method.
- ◆ Draw Polyline – Added keyboard shortcut actions like A for Arc and C for Close. Added right-click menu with common functions like Move, Arc and End. Added active polyline display modes for highlight as dashed, thicken or none. Added color setting for elevation labels. Added method to name polylines using the polyline layers
- ◆ Edit Polyline – Added function to set a single elevation.



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- ◆ Register Cloud – New method to transform a cloud using multiple control points and a least-squares method.
 - ◆ Align Cloud – Added a method to use two sets of control points to define the transformation.
 - ◆ Create TIN – Sets colors of TIN faces using point cloud colors.
 - ◆ Volumes – Added report method for the Report Formatter and method to enter a base elevation.
 - ◆ Tree Feature – Added method to put tree points in a region or hide.
 - ◆ Export Cloud to Text File – Added option to include colors.

Data Conversions

- ◆ Geoids – Added geoids for US Geoid18, Florida 2018, Netherlands Geoid 2018 and Romania ETRS89v103.
- ◆ Land Desktop Fieldbook – For import to RW5, added support for direct and reverse shots and option to apply prism constants.



What's New in Carlson 2020

General

- ◆ AutoCAD 2020 – Added support for this new version.
- ◆ IntelliCAD 9.1 – New selection set manager. Improved speed for creating entities. New start page option instead of drawing1. New commands include block editor, vpsync, sysvar editor, publish to PDF, digital signature and convert to mesh. Added method to click command prompt keywords. More support for DGN fonts, line styles and cells.
- ◆ Context Right Click Menus – For IntelliCAD, added Carlson Point and Label right-click menus.
- ◆ Twist Screen – For IntelliCAD, added option for mtext and MLeader to use a default angle of horizontal to current twist screen.
- ◆ Install Settings – Added method for install to apply custom program settings during the install.
- ◆ Migration Wizard – New command to transfer program settings and files between program versions.
- ◆ Carlson Academy – New command for on-line learning with movies, blogs and data sets.
- ◆ Toolbars – Added 24 more toolbar icons.
- ◆ Open Drawing – New command to select geo-located drawings from a map view.
- ◆ File Selection - Expanded list of files in current folder and added ability to sort by the file name, size or date.
- ◆ Drawing Explorer – Added Carlson surface objects, more right-click commands and setup double-click commands.
- ◆ MText Labels – Routines with option to hide drawing under the text use the mtext background mask instead of separate wipeout entity. Applies to commands such as Triangulate & Contour for contour labels and Leader with Text.
- ◆ Zoom Most – New command to zoom to show the bulk of the entities in the drawing and avoid outliers.
- ◆ 3D Viewers – Added clip planes from top and bottom, plus way to enter elevations or screen pick clip plane position. Added x-ray view mode to make surface transparent in window around the cursor. Added method to select more entities from the drawing to add to the current scene. Pick mode displays distance from previous pick point. Added option to label the bounding box with x,y,z. Added methods to texture surface by slope range and to substitute a texture per color. Added setting for pixel size to draw point entities. Added keyboard hot-keys to rotate left/right and up/down. Added settings for default surface colors.
- ◆ Surface Object View Properties – New command to set display properties for Carlson grid, triangulation and point cloud objects.
- ◆ 2D Linework Library – New command to force linework to zero elevation by layer.
- ◆ Centroid Point – Added support for calculating the centroid for a solid model.
- ◆ Draw 3D Polyline – Elevation prompt has new method to add or subtract an amount like for a curb.
- ◆ Trim 3D Polyline – Trims polylines and handles 3D.
- ◆ Hatch Wizard – Added auto-connect mode to make closed areas from selected linework.



- ◆ Boundary Polyline – Added method to create closed polylines for all the areas from the input linework.
- ◆ Insert Symbols – Added support for creating annotative symbols.
- ◆ Consolidate Table – New command to renumber a table to remove any gaps in the row numbering.
- ◆ Edit Table Properties – Added method to automatically create multi-line rows for long labels.
- ◆ Text on Line/Polyline – Added method to select label polyline by picking a crossing line and added options to hide the drawing under the labels, to center the text on the line and to repeat the placement.
- ◆ White Solid Behind Text – Added setting for layer name.
- ◆ Colors by Elevation – New command to assign entity color by elevation.
- ◆ Line of Sight Viewshed – Added method to use a polyline for the view position and option to change layers.

Survey Commands

- ◆ Draw Points – Added option to limit the length of the drawn description and notes.
- ◆ Erase Points – Added option to erase only Field To Finish points and option to erase only symbols.
- ◆ Edit Point Attributes – Changing point elevation updates TIN surfaces that include the point.
- ◆ Point Group Manager – Added function to merge groups.
- ◆ Point Attribute Layout Manager – New command to handle custom point attribute layouts.
- ◆ Vertical Datum Utilities – New command for NGVD29 and NAVD88 elevation conversions.
- ◆ Nikon Data Transfer – Added support for running on 64-bit computers.
- ◆ Edit Process Raw File – Added option to renumber only duplicate point numbers.
- ◆ SurvNET - New interface. Added ability to edit by selecting graphically.
- ◆ Field To Finish – New XSCT special code to define a template from points. New PARKING special code for drawing parking stall lines. For RECT special code, added support for putting the code on the first point. Added support for multiple vertical offsets on the same 3D polyline. Added method to create circles as 3D polylines when the code is set as 3D Polyline. Added option to match substitution codes for codes with a number suffix. For linework description labels, added option to draw using mtext. For linework templates, added setting to control the template grade to use for the offsets. For the tree feature, added option to draw the dripline as a smooth polyline. Added method to label elevations in feet/inches.
- ◆ Inverse – Added options to report point header, to report point after the angle/distance and prefixes for bearing and distance.
- ◆ Crandall Polyline Adjustment – New command to adjust a polyline using the Crandall method.
- ◆ Compass Polyline Adjustment – Added option for geodetic report.
- ◆ Interval Along Entity – Added option to create points at endpoints separate from all vertices.
- ◆ Legal Description – Added input method to select a deed from a deed file. Added option to report point coordinates. Added option for geodetic areas in report.
- ◆ Process Deed File – Added ability to set POB and then report closure from this point.



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- ◆ Cut Sheet – Added option to set colors for cut and fill labels.
 - ◆ Bearing/Distance Annotation – Added setting for number of spaces between the bearing and distance labels.
 - ◆ Draw Endpoint Leaders – Added perpendicular tick style.
 - ◆ Edit Text on Arc – Added function to flip the text.
 - ◆ Label Coordinates – Added method to select points by point name or point group. Added method to label point numbers.
 - ◆ Label Station/Offset – Added option for drawing brackets or parenthesis around the labels. Added option for cut/fill in feet/inches. Added setting for label offset amount from the leader.
 - ◆ Station Polyline/Centerline – Added options for using MText, suffix on curve labels and suffix on spiral stations.
 - ◆ Calculate Offsets – Added options to repeat the command and select another alignment and to report cut/fill in feet/inches.

Civil Commands

- ◆ Triangulate and Contour – Added option for inclusion/exclusion perimeters to break the edges at the boundaries.
- ◆ Draw Triangular Mesh – Added option to color breakline edges separately.
- ◆ Rebuild Inside Perimeter – New command to rebuild a TIN surface within a perimeter polyline.
- ◆ Triangulation File Utilities – Added functions to Crop or Cut the TIN by a perimeter polyline. Added Clean function to remove skinny and tiny triangles. Added smooth method that uses moving least-squares.
- ◆ Triangulate Surface Manager – Improved performance for editing large TINs by using custom object to display edges and contours. Added separate color for breakline edges during TIN editing. Added function to add points to the TIN by point number range or point group, and to include Field to Finish generated breaklines from these points. Added functions to untag edges as breaklines, to remove triangles by window selection and to remove by perimeter polyline. For TIN history, added method to change original selection set to create the TIN.
- ◆ Grid File Utilities – Added smooth function that uses a moving least-squares method.
- ◆ Draw Template Polylines – New command to turn 3D polylines into template polylines such as curbs.
- ◆ Check 3D Polylines Match Vertices – New command to adjust polylines vertices to match with a tolerance.
- ◆ Label Elevations Along Polyline – Added option to dynamically link labels to polyline and method to save/load settings.
- ◆ Label Pad Elevation – Added option to dynamically link labels to polyline.
- ◆ Label Pipe Polylines – New command to label pipe size for 3D polylines tagged as pipes.
- ◆ Cut/Fill Color Map – Added support for True Colors.
- ◆ Cut/Fill Labels – Added option for custom colors.
- ◆ Color 3D Lines by Slope – New command to assign colors to 3D lines by slope range.
- ◆ Surface 3D Flyover – Added method to add a solid model to the scene.



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- ◆ Slope at Points – Added option to link label to the surface model.
 - ◆ Lot Network Point Check – Added support for T-intersections.
 - ◆ Lot Number Report – New command to report range of lot numbers used and any gaps in the numbers.
 - ◆ Draw Lot Setback – Added option for rounded corners.
 - ◆ Draw Curb Ramp – Added option for back landing pad.
 - ◆ Parking Perimeter Tools – New command to add islands and curb returns to a parking perimeter polyline.
 - ◆ Parking Spaces – Added method to fit a specified number of spaces on an alignment.
 - ◆ Centerline – For ROW definitions, added support for using arcs.
 - ◆ Centerline Report – Added method to set a second centerline and profile for making offset reports.
 - ◆ Quick Profile – When alignment is adjusted, added option to save a centerline file.
 - ◆ Create Profile from Polyline on Profile Grid – Added support for polyline arcs for creating profiles with circular curves.
 - ◆ Label Profile on Centerline – Added option to label start/end stations and to label slopes when the vertical curve is zero.
 - ◆ Label Polyline Slope/Distance – Added slope prefix/suffix settings and added option to label distances.
 - ◆ Draw Profile – For road intersections, added option for separate prefix/suffix for each label. For sewer labels, added separate precision for invert and rim. For horizontal axis labels with cut/fill active, added option to center on the middle label. For culvert headwalls, added setting for width. For horizontal label box, added method to create gaps between rows.
 - ◆ Vehicle Path Tracking Profile – Added option for clash detection with selected entities.
 - ◆ Section Files – Changed default file extension to .xsct to avoid getting blocked by email servers. The .sct is still available.
 - ◆ Input Edit Section File – Added method to update From Elevation when edit slope. Added function to Rename Stations to remove station equation adjustments.
 - ◆ Section to 3D Polyline – Added method for creating water level profiles.
 - ◆ Update Sections from Slope Stake – New command to update the cross-section tie points using the slope stake report from SurvCE.
 - ◆ Draw Section – Added option to hatch subgrades. Added option to label offset distances between data points. Added option for label along vertical axis.
 - ◆ Elevation Zone Section Volumes – New command to report elevation zone volumes for multiple section files.
 - ◆ Draw Super Elevation Diagram – Added method to import grades from a super elevation file (.sup).
 - ◆ Design Template – Added method to import a 3D polyline to define the grades.
 - ◆ Template Series File – Added support for interpolated curb dimensions between templates.
 - ◆ Template Grade By 3D Polyline – New command that uses a 3D polyline to define template point profiles and centerlines.



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- ◆ Template Grade Table – Added Import Polyline function to use a 3D polyline to set slopes.
 - ◆ Process Road Design – Added method to skip the first template grade for adding onto existing roads. For cut/fill bench surfaces, added option for user-entered elevations. For super elevation, added a method to set the low side pivot point. Added option to output solid models for the subgrades.
 - ◆ Road Network – Added method to draw 2D template polylines. Added method to output multiple EOP profiles.

Hydrology Commands

- ◆ HEC-RAS – New command that integrates directly with HEC-RAS to input cross sections, process and output to the drawing.
- ◆ EPA SWMM – New command to create an EPA SWMM project from a Carlson sewer network and to process the project.
- ◆ NOAA Atlas 14 – Added the Texas region and added more storm events: 200, 500 and 1000 year.
- ◆ Hydrograph Routing SCS – Added automatic rain depth for rational. Added support for Clark and Snyder SCS methods.
- ◆ USGS Soil Area Download – New command to download polyline boundaries for soil type areas.
- ◆ Sewer Network Model – All data for the model is now stored in the SEW file without other reference files. Added option to set bypass flow as off-site.
- ◆ Draw Sewer Network Plan View – Added option to draw plan view polylines center-to-center. Added controls for label sequence of fields.
- ◆ Draw Sewer Network Data Table – Added fields for drainage including area, gutter spread and bypass flow.
- ◆ Spreadsheet Sewer Editor – Added option to order by high to low.
- ◆ Collision Conflict Check – Added option for a reference centerline to report station and offset. For utility networks, added utility type to the report. Added order rules by utility type for utility networks such as gas can't be above water.
- ◆ Channel Lining Analysis – New command to calculate channel flow and depth from channel and liner parameters.
- ◆ Culvert Design – Added nominal HW/D design method. Added HY8 report to PDF and HGL graph.
- ◆ Orifice Design – Added option to calculate headwater from flow.
- ◆ Design Detention Pond – Added report of both required and provided storage.
- ◆ Pipe Material Library – Removed restriction on inlet configuration.
- ◆ Sewer Network Import from Text File – Added support for many more input fields.
- ◆ Sewer Network Import Bentley – New command to import Bentley sewer models from SDB files.
- ◆ Report Sewer Network – Added method to create PDF reports using PDF templates. Added option to report many more fields. For Inlet Computation Report, added rainfall intensity. Added controls for calculating using rounded values.
- ◆ Pressure Pipe Network – Added tolerance setting for junctions. Added separate attribute per element type.



GIS Commands

- ◆ Place Image by World File – Added support for geo-tagged images.
- ◆ Place Google Earth Image – Added option to manually pick image position for drawing that aren't geo-referenced.
- ◆ Image Inspector – Added method to list all images attached to entities in the drawing and report.
- ◆ Place Camera Symbol – Added option for layer and put all options in a dialog.
- ◆ Drape Image on Surface – Added support for running on IntelliCAD.
- ◆ Sqlite/Spatialite – Added these database formats as an option for Carlson GIS commands.
- ◆ Point GIS Editor – Added method to import multiple coordinate files at a time and added export to Sqlite.
- ◆ Label Closed Polylines – Added method to label tags inside the areas and create a table with the attribute data.
- ◆ OpenGIS GML – New command to import GIS data from GML files.
- ◆ Import Sqlite – New command to import GIS data from a Sqlite database.
- ◆ Export Sqlite – New command to export GIS data to a Sqlite database.
- ◆ Import ESRI Geodatabase – Added support for importing linework with the GIS attributes.
- ◆ Import ESRI SHP – Added support for storing to CRDB when importing.
- ◆ Web Feature Service – Added USGS National Map services to defaults.

Geology Commands

- ◆ Edit Drillhole – Added function to sort strata attributes within the drillhole.
- ◆ Create Drillhole from eLog – Added support for format 1.2 and method to import multiple eLogs.
- ◆ Calculate Variogram – Added output for lag points and plot. Added support for analyzing multiple strata and variable types at once.
- ◆ Drillhole Text Formatter – Added option to use null as zero.
- ◆ Graphic Drillhole Report – Added method to draw multiple drillholes. Added option to draw symbols for drillhole attributes such as for the water table. Added option to draw a legend and option to draw on layouts named using the drillhole name. Added options to limit the length of string attributes, to draw vertical lines in the header and set the layer for the linework in the report body.
- ◆ Label Fence Polylines – New command to label fence diagram polylines in plan view.
- ◆ Surface Mine Reserves – Added method to combine bottom elevation with bottom surface model.
- ◆ Crop Block Model – New command to clip a block model.
- ◆ Import Block Model – Added Setting for null value to skip.
- ◆ Block Model 3D Viewer – Added methods to switch grade parameters in the viewer and to define new grade parameters. Dialog shows legend of grade name along with block color. Added option to color by elevation.



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- ◆ Grade Parameters by Attribute Range – New command to create strata attribute grids between two surfaces from a block model.
 - ◆ Make Grade Solid Model – New command to create a solid from a block model for a grade.
 - ◆ Geologic Model Viewer – New command to load strata elevation models into the 3D Viewer.

Surface/Underground Mining Commands

- ◆ Advanced Projections – Added settings for layer names.
- ◆ Pit Precedence by Polyline – New command to assign precedence from direction polylines.
- ◆ Design Bench Pit – Added option to output only pit surface without merging with topo.
- ◆ Merge Small Benches – New command to combine benches in a pit polyline that have quantities less than a set tolerance.
- ◆ View 3D Surface History – Added function to report and highlighting of perimeter polylines during edit.
- ◆ Make Solid from Points By 3D Triangulation – New command to make a solid from a cloud of points using 3D triangulation.
- ◆ Make Solid from Points by Sections – New command to create a solid by stitching together section slices.
- ◆ Make Solid from Points by Poisson – Added option to smooth the input data.
- ◆ Make Solid from Surfaces – Added method to use 2D polyline for the rib.
- ◆ Import Solid – Added method to import TIN surface files.
- ◆ Edit Solid – New command to edit a solid by using cross sections.
- ◆ Draw Solid – Added method to draw as a custom object.
- ◆ View Solid – Added method to select faces to remove.
- ◆ Section Solid – Added method to create sections perpendicular from a 3D polyline.
- ◆ Color Solid – Added option to set a texture.
- ◆ Erase Isolated Points – New command to remove points without a specified number of neighbors within a distance.
- ◆ Smooth Points – New command to smooth a point cloud using a moving least-squares method.
- ◆ Interior Points Filter – New command to remove wayward interior points in a tunnel or cavity point cloud.
- ◆ Haul Cycle Analysis – Added support for using scrapers. Reports both tons and volume.
- ◆ Surface Equipment Timing – Added reports per shift. For 3D Pick, improved speed performance on large models, added more tooltips, added save and load functions, added undo function and added custom formulas to the chart options.
- ◆ Spoil Timing – Added Lead and Lift reporting.

Construction/Trench Commands

- ◆ Define Layer Surface/Material/Subgrade – Added method to create solids of subgrades.
- ◆ Display Surface – Added option to draw triangulation as a surface object.



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- ◆ Edit Assign Polyline Elevations – Added function to set elevation from a surface model, and added reduce function option to retain all control points. Polyline edits automatically update TIN surfaces that include the polyline.
 - ◆ Make Combined Removal Surface – New command to make a TIN surface from all the removal surfaces.
 - ◆ GeoTech Edit Drillhole – Uses strata attributes from Define Attributes and drillhole attributes from Define Lookup Database.
 - ◆ Utility Network – Added display of crossing in the profile editor and new function to edit the profile around the crossing. Added method to add connection points from importing coordinate file points by range or group. Added function to sort connections and laterals by station. For labels, added options to label connections with station, to place label fields above or below symbol, to create horizontal labels, to label pipe size, to create leaders and settings for label prefix/suffix. Setup separate attributes per utility type. Added attributes to report connections. Added option to use the Report Formatter for the data report. Added functions to save and load settings to a UNS file. Added additional types for Electric, Irrigation, Fire and Utility Duct.

CADnet Commands

- ◆ Raster Decompress – Added support for TIFF image in LZW compression.
- ◆ Export Solid Model IFC File – New command to create an IFC model from a Carlson solid model.

Point Cloud Commands

- ◆ Point Performance – Improved speed for working with large coordinate files.
- ◆ Cloud Import – Added option to resample or clean duplicates on import to reduce the size.
- ◆ Cloud Selection – Improved method for selecting a limited number of points from the cloud using a spatial method.
- ◆ Cloud Clean – Improved consistency to avoid checkerboard effect and added option to iterate.
- ◆ Cloud Contour – Added option to smooth input points to create smoother contours.
- ◆ Cloud Profile – Added method to sample cloud at an interval and snap within a tolerance.
- ◆ Cloud Color – Added function to assign color using intensity values.
- ◆ Pole Snap – New point snap method with two picks. One pick for the x,y and other for the z.
- ◆ Building Corner Snap – New point snap method with three picks. Two picks on wall sides for the x,y and other for the z.
- ◆ Draw Points and Polylines – Added option to automatically draw points and polylines to CAD as created in Point Cloud.
- ◆ Edit Polyline – Improved interface and added functions including reverse, delete vertex and edit elevation by slope. Added functions to elevate polylines by cloud or TIN. Added snap actions for intersection and right angle.
- ◆ Solids – Added functions to contour, profile and section solid models.

Data Conversions

- ◆ MUTCD – Added symbols to Carlson Community for Manual on Uniform Traffic Control Devices from FHWA.



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- ◆ Geoids – Added geoids for Italy 2009, Poland 2007, Norway 2018B, Slovenia 2016 and France 2018.
 - ◆ Grid Projections – Added support for NAD83(HARN), NAD83(2011), Web Mercator Auxiliary Sphere, Norway, Las Vegas and Michigan GeoRef.
 - ◆ Import InRoads Settings – New command to import program settings from XIN files.



What's New in Carlson 2019

General

- ◆ AutoCAD 2019 – Added support for this new version.
- ◆ IntelliCAD 9.0 – Support for latest .dwg file format. New commands like 3D solids, Text Explode to Polylines and CLine. Properties dialog has tree view option with sub-selection. More DGN command support. Added Customize User Interface dialog and Tool Palettes.
- ◆ Enterprise Licensing – Added support for multiple seats per serial number.
- ◆ 3D Viewers – Major performance improvements for handling large models. Added method to use different textures for surfaces based on slope. Added method to color the surface by the normals of the 3D faces. Added display of x,y,z coordinates for position of the cursor on the surface. Added control for thickness of linework.
- ◆ Surface File Viewer – Added function to reload the surface. Added method to load multiple surfaces or solids.
- ◆ 3D Model Library – New command to define how to render CAD entities for 3D viewer for points, lines and areas.
- ◆ 3D Entity to 2D – Added support to flatten 3D Solids.
- ◆ Transparent Snap – Added a PI snap method.
- ◆ Drawing Save Log – New command to report the date, time and user for when the dwg has been saved.
- ◆ Select by Filter – Added filter for open/close status of polylines.
- ◆ Make Arcs Tangential – New command to adjust polylines to make arcs tangential.
- ◆ Chamfer by Chord Length – Added method for multiple chords.
- ◆ Remove Polyline Arcs – Added method to replace arcs with a set number of chords.
- ◆ Change Lineweight – New command to set the lineweight for the selected entities.
- ◆ Centroid Point – Added options to draw symbol and report elevation.
- ◆ Leader with Text – Added option to underline the text with the leader.
- ◆ Style Report – New command to list font files used in the drawing and the style properties.
- ◆ Output Layouts to PDF – Added option to optimize geometry.
- ◆ Drawing Setup – Added optional field for project location to include in reports and use for geolocating.
- ◆ Report Formatter – Improved Import/Export to process selected reports and avoid name conflicts.

Survey Commands

- ◆ Move Point Attributes with Leader – Added method for labels above or below leader.
- ◆ Edit Points – Added a toolbar to the dialog for quicker access to common functions.
- ◆ Point Group Manager – Added functions to sort the groups by name or number of points.
- ◆ Edit/Process Raw Data – Added method to track any edits such as changing a rod height. Added function to scale values such as from meters to feet. Added processing for SurvCE tilt records.
- ◆ Edit/Process Level Data – Added report summary of elevations changes to the coordinate file.



- ◆ Field To Finish – For multi-point symbols, added option to center the symbol instead of using the first control point when only one point is surveyed, and added detection for points surveyed in the wrong order. For split multiple codes, added option to only draw symbol from the second code. Color setting now used for main, point and 3D polyline layers. Added option to keep trailing digits when creating a code table from CRD file. Added method to store GIS data to the CRDB.
- ◆ Draw Building Envelope Polyline – Added option to draw cross lines between corners.
- ◆ Distance Between Two Entities – Added option to dimension the minimum distance.
- ◆ Best Fit Centerline – Added settings for the minimum points on an arc and settings to make arcs tangential.
- ◆ Label Station Offset – Added option to label the lat/lon.
- ◆ Offset Point Entry – Added option whether to draw the new points.
- ◆ Elevation Along Entity – New command to create points at an elevation interval along a 3D polyline.
- ◆ Import Angle/Distance File – New command to draw a polyline using angles and distances in a text file.
- ◆ Annotation Defaults – Added setting for bearing leader offset and option to round angles to nearest 15 seconds.
- ◆ Arc Annotation – Added option to strip degrees leading zero for delta angles.
- ◆ Arc Dimensions – New command to label arc values along the chord or radial lines.
- ◆ Label Angle – Added option to draw dimension leaders for interior angles.
- ◆ Line Table – Added option to include the total distance.
- ◆ Curve Table – Added fields for the PC, PT and PI stations.
- ◆ Set Lot Edge Angles to Nearest Second – Added setting for how many seconds to round to.

Civil Commands

- ◆ Triangulation File Utilities – Added Quadric Error method for the Simplify function. Added a Laplacian method for the Smooth function. Added minimize flat triangles method in the Enhance Flats function. Added function to Refine triangulation that adds points for more uniform triangles. Added Export method to output a text file of the points and triangle indexes. Added Shrink-Wrap function that removes perimeter edges. Added Clean function to remove duplicate points within a tolerance and rebuild.
- ◆ Grid File Utilities – Added Slope function.
- ◆ Import Google Surface – Updated method for creating a surface model for an area from Google Earth data.
- ◆ Slope Report – Added option to report by cut/fill areas.
- ◆ Design Pad Template – Added option for no tie slope when the cut/fill is less than a minimum.
- ◆ Draw Triangular Mesh – Added option to draw the TIN surface as a surface object.
- ◆ Draw 3D Grid File – Added option to draw the grid surface as a surface object.
- ◆ Draw Spot Elevations – Added option to use MText. Added option for prefix or suffix on a separate row. Added leader style with horizontal underscore and option to draw a symbol with a leader.



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- ◆ Label Pad Elevation – Added option to create labels at real Z.
 - ◆ Cut/Fill Labels – Added option to only label cut or fill.
 - ◆ Extend 3D Polyline to Surface – New command to extend a 3D polyline to the intersection with a surface model.
 - ◆ Parking Spaces – Added options to set line width, to draw baseline, to pick side and to draw handicap marker.
 - ◆ Parking Buffer Zone – New command to draw a buffer zone next to a parking space such as for handicap parking spots.
 - ◆ Label Station/Offset – Added option to use MLeaders.
 - ◆ Vehicle Path Tracking (Profile) – New command for checking a profile for vertical clearance.
 - ◆ Profile From 3D Points – Added method to process a selection set of points.
 - ◆ Draw Profile – Added a description table to translate profile descriptions into labels and set symbols by description. Added option to skip the profile grid range dialog. Added method to draw a waterline profile based on a profile point description. Added method to create slope labels at an interval. Added option to label the sump depth on sewer profiles. Added option to label the pipe capacity on sewer profiles.
 - ◆ Draw Sections – Added offset label settings for prefix and suffix and option whether to label offsets. Added option to skip zero end area labels. For the horizontal label box, added options to label at an interval, to label at break points and to use first section to control label positions.
 - ◆ Digitize Sections – Added option to prompt for descriptions.
 - ◆ Input Edit Section File – Added depth display and method to edit elevations by depth. Added option in translate to remove station equations.
 - ◆ Sections To 3D Polylines – Added option to layer the polylines using the section offset descriptions. Added option to connect 3D polylines by sequence number of the section offsets.
 - ◆ Sections Set Descriptions by Polylines – New command to assign section descriptions by selecting plan view polylines.
 - ◆ Design Template – Added method for subgrades to set their distance to the TIE point. Added method for subgrade slope method of Continue Slope to tie in vertically at grade limit when no intersection is available.
 - ◆ Process Road Design – Added method to use a target surface for fill benches. Added control for break point spacing on parabolic grades.
 - ◆ Process Design Sections – Added option to use profile and small station interval in case input design sections are far apart.

Hydrology Commands

- ◆ Time of Concentration – Added Maricopa County method.
- ◆ Detention Pond Design – Added option to use separate drainage areas for existing and design.
- ◆ Sewer Network – Added more time of concentration methods. Added method to create a junction box structure when there is no runoff from surface.
- ◆ Sewer Network Editor – Added method to add a tributary.



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- ◆ Draw Sewer Network – For plan view, added option to use the pipe material and size to define the layer name.
 - ◆ Set Parameter for Entire Network – New command to globally assign a value to a sewer network model.
 - ◆ Transform Elevations – New command to globally adjust elevations in a sewer network model.
 - ◆ Collision Conflicts – Added option to label the crossings in plan view.
 - ◆ Identify Sewer Network Entity – New command to pick an entity and report the source sewer network model.
 - ◆ Erase Plan View – New command to erase the sewer network plan view entities.
 - ◆ Import/Export ESRI – New commands to transfer between a sewer network model and ESRI SHP.
 - ◆ Pressure Pipe Network – New command to model a pressure pipe network with pipes, pumps, tanks and reservoirs.
 - ◆ Utility Network – Added method to draw profiles for the selected utility and draw symbols on the profile. For utility profiles, added option to add reference surface break points when setting profile by depth, and added function to reduce the profile data points. Added default settings for connection symbol and model. Added draw plan view option to label utility name along the centerline at an interval.

GIS Commands

- ◆ Data Capture > CAD Properties – New command to assign GIS values from CAD properties for selected entities.
- ◆ Label GIS Data > Along Polyline – Added settings for decimals, angle and interval.
- ◆ Point GIS Editor – Added method to filter by inclusion perimeter.
- ◆ Import ESRI SHP – Added method to create AutoCAD Map object data for linework.
- ◆ Place Google Earth Image – Added method to select the area for the image from a map viewer.
- ◆ Place Image by World File – Added option to scale the image. Added support for reading the world file data embedded in the image file. Added support for ECW image file format.

Geology Commands

- ◆ Edit Drillhole – Added separate dip/azimuth table to handle dip data at different interval than strata. Added setting for vertical angle reference for the dip angles.
- ◆ Import Dip/Azimuth – New command to import dip/azimuth data to existing drillholes.
- ◆ Draw Geologic Column – Added settings for outline color and thickness. Angled 3D drillhole plots the depth axis along the drillhole.
- ◆ Edit Fault Line – Added method to interpolate shifts.
- ◆ Strata Isopach Maps – Added method to set hatch properties from .PAT file.
- ◆ Surface Mine Reserves – Added min/max attribute values to the report.

Surface/Underground Mining Commands

- ◆ Elevation/Thickness Points – New command to label elevation and thickness.
- ◆ Range Diagram – Added rehandle list on the dialog.



- ◆ Haul Cycle Analysis – Added method to report elevation.
- ◆ View 3D Timing – New command to review in 3D the results of Surface Equipment Timing, Spoil Timing and Haul Cycle Analysis.
- ◆ Block Model 3D Viewer – Added option to draw inside a solid model and option to use top and bottom limit grids.
- ◆ Surface Equipment Timing – Added option to output a TIN surface. Added option in 3D pick to account for timing. Added function to copy an equipment. Added option to show symbol in Mine Progress Inspector.
- ◆ Spoil Placement Timing – Added option to output a TIN surface.
- ◆ Pit Optimization – Added method to load model from Geologic model.
- ◆ Design Tunnel Template – Added function to change the starting alignment point.
- ◆ Draw Typical Tunnel Template – New command to draw a tunnel template.
- ◆ Make Solid From 3D Faces – New command to create a solid model from 3D Faces from the drawing.
- ◆ Make Solid from Points – New command to use 3D triangulation to create a solid model.
- ◆ View Solid – Added options to smooth, display edges, color by texture, color by normal and color by elevation.
- ◆ Draw Solid > 3D Solid – New command to create a 3D Solid entity from an MDL file.
- ◆ Draw Solid > Perimeter – New command to draw a polyline perimeter for the solid outline.
- ◆ Section Solid – Added output of 3D polylines and method to create elevation sections.
- ◆ Combine Solids – New command to put two solids into the same model.
- ◆ Simplify Solid – New command to reduce the data points in a solid model using the quadric method.
- ◆ Clean Solid – New command to remove duplicate point within a tolerance and rebuild the solid.
- ◆ Refine Solid – New command that adds points to the solid to make more uniform triangles.
- ◆ Smooth Solid – New command to smooth the solid using a Laplacian method.
- ◆ Intersect Solids – New command to draw 3D polylines where two solids intersect each other.
- ◆ Add Points to Solid – New command to add points or linework into an existing solid model.
- ◆ Report Offset Point to Solid – New command to report the perpendicular distance of a point to the solid.
- ◆ Translate, Rotate, Scale Solid – New commands to transform solids.
- ◆ Flip Solid Order – New command to reverse the vertex order of the 3D faces in a solid model.
- ◆ Remove Solid Dangles – New command to remove unattached faces from the solid model.
- ◆ Solid Stats – New command to report number of points and faces in a solid and the coordinate range.
- ◆ Reduce Points – New command to remove duplicate points within a tolerance.
- ◆ Import Solid – New command to create a solid model from .OBJ, .SJP and .DXF file formats.
- ◆ Export Solid – New commands to output the solid model to .OBJ, .STL and text file formats.

Construction/Trench Commands

- ◆ Takeoff Surfaces – Added options to densify breaklines.



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- ◆ Assign Contour Elevations by Label – Allow processing multiple layers for the contour lines.
 - ◆ Edit Assign Polyline Elevations – Added a dynamic profile view in the dialog. Added by crossings option to add vertex on reference crossing polylines. Added option to label non-control points and setting for label alignment.
 - ◆ Trench Quantities by Profiles – New command to calculate trench quantities using trench and surface profiles.

CADnet Commands

- ◆ Rubber Sheet – Added mesh transformation method. Added initial transform when destination control points are outside original image. Added report of control points. Added import/export functions for control points.

Point Cloud Commands

- ◆ Basic module – Added new module of Point Cloud Basic with a subset of the commands.
- ◆ Import LAS – Added option to import data from selected classification such as ground and option to create regions by the classification.
- ◆ Select by Color – Added method to select cloud data by color range and make a region from the color selection.
- ◆ Select by Sphere – New selection method to get objects within specified distance of pick point.
- ◆ Select Coordinate Points – Added selection mode for picking points.
- ◆ Create Points by Grid – Creates coordinate points in a grid pattern.
- ◆ Clip Planes – Added viewing clip planes from top, bottom, front and back.
- ◆ Delete from Cloud – New function to erase selected data points from the cloud.
- ◆ Crop – Added function to crop a cloud.
- ◆ Cross Section Snap – Added new snap method.
- ◆ Curb Snap – Added option to set fixed curb height and best fit with the data.
- ◆ Profile – Updated to handle making a profile of vertical walls and surfaces with overhangs.
- ◆ Volumes – Added function to calculate volumes for TIN surfaces.
- ◆ Create Solid – Added option to smooth the input data.
- ◆ Draw Solid – Added function to draw a solid to CAD as 3D Faces.
- ◆ Draw Cloud – Added method to draw in CAD as a point cloud object.
- ◆ Simplify Solid – New function to reduce the data points in a solid model by tolerance level.
- ◆ Heal Solid – Updated method to only fill holes and retain the original solid everywhere else.
- ◆ 3D Viewing – Added lighting and graphic controls for mesh views and improved performance. Added option to show wireframe for mesh and solid.

Data Conversions

- ◆ Geoids – Added geoids for Sweden 2017, Argentina, Norway 18A and Mexico GGM10.
- ◆ Projections – Added projection for Hotline Oblique Mercator Azimuth Center.
- ◆ LSP API – Added LSP functions to convert between lat/lon and grid coordinates.
- ◆ MrSid – Added support for the new SID image file format.
- ◆ Greece Power – Added drillhole import for this format.



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- ◆ SDMS – Added import of CTL files in Points > Import Text/ASCII File. Added import of EFB into Carlson Field to Finish code table.
 - ◆ Civil 3D – Added export drawing method to convert Carlson TIN to Civil 3D Surface custom objects and Carlson centerlines to Civil 3D alignment custom objects. For import objects, added support for converting surface labels, note labels and grading objects to regular CAD entities. Also added import of Civil 3D Profile Styles from the drawing into Carlson Draw Profile PFS style settings.



What's New in Carlson 2018

General

- ◆ AutoCAD 2018 – Added support for this new version.
- ◆ IntelliCAD 8.3 – New commands like MLeader, selection filters, gradient coloring and etransmit. Performance improvements such as selection, snapping, multi-threaded open and regen. Stability improvements overall. More DGN command support.
- ◆ Network License Report – New function under About Carlson to check on usage status of network license.
- ◆ Geolocate DWG Files – New command to display placemarks for dwg files in Google Earth.
- ◆ Startup DWT – Added method to control initial startup drawing template (dwt) to load.
- ◆ Annotative Text – Added option to set annotative scale to match drawing setup horizontal scale. Added setting for how to name annotation scales.
- ◆ Layer Library – Added setting for non-surface to filter out layers in Triangulate and Contour. Added method to create AutoCAD layer filter from selected layers. Added support for true color.
- ◆ Fix Text Overlaps – New command to find overlapping text and either auto-adjust by rules or review and fix each overlap.
- ◆ Text Mask – Added support for curve/arc text.
- ◆ Sequential Numbers – Added method for fixed symbol size and size text to fit.
- ◆ Hatch Wizard – Added setting for transparency.
- ◆ Draw Table – Added method to import Microsoft Excel from selected sheet with ability to link table to xls file. Added many more controls for the table style and option to auto split long tables.
- ◆ Add/Replace Layer Prefix – New commands to add or replace a prefix to selected layers in the drawing.
- ◆ 3D Entity To 2D – Added support for hatch, leader, solid and 3D face entities.
- ◆ Offset to Layer - Added option to draw easement polyline around source polyline.
- ◆ Median Offset – Added new method that uses offset intersection method.
- ◆ Edit Table Values – Added functions to sort rows by selected field, to add columns and to delete columns.
- ◆ Move Text with Leader – Added options for curved leaders and to draw a box around the text.
- ◆ Move Attributes with Leader – New command to move block attribute and draw a leader to the block insertion.
- ◆ Shrink Wrap Entities – Added method to create interior hole boundary polyline.
- ◆ Block Data Report – New command to report the number of different types of blocks in the dwg along with their attributes.
- ◆ Text File to Report Formatter – New command to load a comma delimited text file into the Report Formatter.
- ◆ Report Formatter – Added option for double space between rows. Added left/center/right justification controls per field. Added prefix/suffix per field. Added method for user-defined field as a percentage of total for the field.



Survey Commands

- ◆ COGO Distance Input – Added method to input distances by point numbers using # as the delimiter.
- ◆ Edit Process Raw File – Added support for processing offset records (OF) for in/out, left/right and depth. Added display option to only show the traverse point records. Added search and replace function by point number.
- ◆ Geoid Utilities – New command to report geoid values, apply geoid values or switch the geoid for points.
- ◆ Coordinate Cloud – New command to store points to on-line database to share publicly or for personal lookup.
- ◆ Draw Points – Added option to mask point labels.
- ◆ Compare Points – Added option on dwg startup to compare the coordinate file with the point entities to report differences.
- ◆ Merge Points – Added option to make a point group from the new points.
- ◆ Export Points – Added method to select multiple coordinates files and output to a single coordinate file.
- ◆ Point Group Manager – Added function to thaw a select point group.
- ◆ Move Point Attribute with Leader – Added method to recall moved position when redrawing points.
- ◆ Field To Finish – For points with GIS attributes, added method to draw different symbols based on the attributes. New RAMP special code for placing curb ramps. Added method for circle by two points for diameter like SurvCE method. For Wall3D special code, added method for width relative to left or right instead of center. For multi-point symbols, added option to label a single averaged elevation and option to draw rectangle that encloses the symbol points. For points tagged as No Elevation on 3D polylines, added option whether to skip the point or interpolate the elevation. Added new YZ special code for Yes Elevation to turn on the real-z axis for that point. Added new LABEL3 special code for skipping the point labels. Added option whether to auto insert a space in the point description label when appending a description. For tree features, added option to label tree tag id when without creating a tree table. Added option to offset labels by tree symbol size. For pipe features, added option to use the code layer for the pipe entities, and added method to use points from top of pipe, enter material and pipe size for the program to calculate the bottom of pipe. For offset polylines, added option to label elevations and symbols on the offset points. For using road template to create parallel polylines, added option to use template grade ids in layer names. Added support for true color. Added check to Carlson Community for any symbols not found in the code table.
- ◆ Change Polyline Linetype – Added new half circle style linetype.
- ◆ Deed File by Interior Text – New command to create multiple deeds using linework boundary around selected text.
- ◆ Link Linework With Points – New command to create reactors on existing linework to update when coordinates change.



- ◆ Annotation – Added option whether to flip labels for twist screen and for separate mtext for the angle and distance labels.
- ◆ Bearing/Distance with Leader – Added style to center the distance label with the bearing label.
- ◆ Point to Point Table – Added methods to screen pick points and to pick from a list.
- ◆ Label Lat/Long – Added option for MLeader.
- ◆ Draw North Arrow – Added option to draw true, grid and magnetic arrows.
- ◆ Line Table – Added option to create table of only distances.
- ◆ Order Table – New command to order line/curve tag numbers by direction of left/right, top/bottom or alignment polyline.
- ◆ Draw Legend – Added option to draw table lines.
- ◆ Offset Dimensions – Added support for different precision by length.
- ◆ Stack Label Arc – Added method for multiple labels on the same row. Added option to label PI coordinates and station.
- ◆ Right of Way Crossing Table – Added options for including header and horizontal table lines.

Civil Commands

- ◆ Triangulate and Contour – Added option to auto densify breaklines. Added option for label layers to use main contour layer as prefix.
- ◆ Display Last TIN Error Log – New command to show the last data error log from Triangulate and Contour.
- ◆ TIN History – New ability to track source data and edits for TIN for review and reprocessing.
- ◆ Triangulation File Utilities – Added new merge TINs method that retriangulates from original point data. Added functions to offset, divide and multiply by another TIN.
- ◆ Import NASA World Elevation Dataset – New command to create a surface grid from this dataset at 1 arc-second interval.
- ◆ Draw Contour Marker Label Line – New command to control placement of contour labels.
- ◆ Design Pad Template – Added method for creating retaining wall at the grade limits.
- ◆ Design Template – Added a new curb style with batter and rise. Added subgrade method to fit surface to subgrade.
- ◆ Template Grade Table – Added function to return to defaults.
- ◆ Template Point Centerline – Added support to apply to the TIE point.
- ◆ Process Road Design – Added method for divided highways to use separate centerlines for stationing and for road design. Added use of material density for reporting subgrade tons by material.
- ◆ Road Network – Added support for creating an island inside cul-de-sacs. For output of existing ground profiles, added option to create left/right offset profiles. Added option to skip creating intersection curb return for crossings like an overpass or RR. Added method for intersections for second template point profile.
- ◆ Tag Curb Ramp – New command to locate positions along alignment for creating curb ramps for Process Road Design and Road Network.



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- ◆ Station Polyline/Centerline – Added options for labeling PIs at deflections. Added settings for PI station label prefix and suffix, controls to rotate perpendicular or horizontal, separate properties for layer and style, and setting for size of PI lines.
 - ◆ Label Station/Offset – Added option to label cut/fill.
 - ◆ Calculate Offsets – Added option to label cut/fill.
 - ◆ Offset Point Entry – Added method for multiple offsets per station.
 - ◆ Draw Curb Ramp – Added method to pick left/right ends, option to set ramp slope and option to taper back. Added method to select driveway polylines for ramp area. Added method to updating crossing road linework besides the curb such as sidewalks.
 - ◆ Super Elevation – Added support for station equations. For transition part in tangent, added option to have tangent as distance as well as percent.
 - ◆ Slope at Points – Added style settings, option to draw box with solid background and option to label horizontal.
 - ◆ Elevate Intersection Curb Return – New command to assign elevations for a curb based on main and side road elevations.
 - ◆ Cut/Fill Labels – Added method for gradient colors.
 - ◆ Cut/Fill Slope Lines – Added zigzag style.
 - ◆ Cut/Fill Slope Color Map – New command to color a surface based on slope amount separately for cut/fill areas.
 - ◆ Draw Spot Elevations – Added option to prompt for second elevation.
 - ◆ Profile From 3D Polylines - Added method to process multiple polylines and put breaks between like for curb profiles.
 - ◆ International Roughness Index – Upgraded to report IRI by station interval.
 - ◆ Draw Profile – Added method to label horizontal axis elevations on both top and bottom of profile grid. For sewer labels above rim, added placement controls for vertical line. Added method to draw grid as lines on major interval with dots for minor interval. Added option for vertical elevation bar.
 - ◆ Input Edit Section Alignment – Added method to station by another reference CL.
 - ◆ Draw Section File – Added support for drawing an unlimited number of section files. Added separate controls for major/minor grid intervals. For volume labels, added settings for label names and whether to draw elevations. Added settings to configure the printer/plotter when creating layouts. Added option to output to sheet sets. Added method to draw grid as lines on major interval with dots for minor interval. Added option for vertical elevation bar.
 - ◆ Calculate Section Volumes – Added method to report incremental volumes by elevation zones.
 - ◆ Tunnel Section Comparison Report – New command to report over or under excavation between as-built and design.
 - ◆ Footprint Creator – Added method to place multiple footprints within building pads. Placement controls for center or lot edge. Added option to rotate footprint. Added method to draw multiple footprint options. Added method to draw driveways.
 - ◆ Parking – Added method for parking space depth by offset from curb.



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- ◆ Lot Network – Added method to draw buildable areas on a layer and use for report of buildable width and depth. Added option to align building pads with lot edge. Added method to draw driveways. Added method to hatch setback and driveway areas. Added option to automatically output to a Lot file.
 - ◆ ID Linework – New command to identify the type of LotNET linework such as ROW or lot edge.
 - ◆ Untag Linework – New command to remove a tag from an entity to remove it from the LotNET model.
 - ◆ Connect Driveways – New command to connect driveway linework to ROW or a selected polyline.
 - ◆ Assign Building Type – New command to set building types for lots in LotNET.
 - ◆ Tag No Building Area – New command to define area to avoid for LotNET building placement.
 - ◆ Set Lot Edge to Nearest Second – New command that adjusts lot lines to set them to the nearest second.
 - ◆ Point Check – New command to snap lot points together within given distance.
 - ◆ Output to Lot File – Added options to create lots for ROW and boundary linework.
 - ◆ Lot File Manager – Added method to select lots by screen pick or within an inclusion perimeter.

Hydrology Commands

- ◆ Design Detention Pond – Added option for one watershed condition with user-specified peak flow. Added units settings for input and report.
- ◆ Culvert Design – Added HY8 method.
- ◆ Subtract Hydrograph – New command to subtract hydrographs.
- ◆ Sewer Network – Added support for negative step-up. Added funnel option for headwall inlet structure.
- ◆ Sewer Network Plan View – Added method to label drainage areas. For pipe labels, added label layers and option to label only when structure has id.
- ◆ Sewer Network Data Table Report – Added support for reporting multiple invert-in's.
- ◆ Create Lateral Structure – Added default pipe connection height.

GIS Commands

- ◆ Place Google Earth Image – Replaced image server engine. Support for higher resolution images using auto-tiling. More image options including Road and Terrain.
- ◆ Web Feature Service (WFS) – Added method for storing point data to the coordinate file and storing GIS data to the CRDB.
- ◆ ESRI ArcGIS Services – New version of this routine with smoother workflow.
- ◆ Point GIS Editor – Added import and export for ESRI Geodatabase. For Google Earth output, added controls for symbol and label style. Added method to extract attributes from point descriptions delimited by space or comma.



Geology Commands

- ◆ StrataCalc – Added setting for whether to adjust non-key strata for key pinchout or conformance. Added drillhole description keyword FAULTED that skips pinchout and conformance for that drillhole.
- ◆ Kriging – Improvements to 3D kriging.
- ◆ Fence Diagram – Added option to dimension strata thickness.
- ◆ Strata Isopach Maps – Added option for true color.
- ◆ Auto Run Strata Grids – Added option to filter data samples by elevation range. Added support for modeling by 3D Kriging.
- ◆ Make Block Model – Added method to model attributes in Model by Strata Name mode and then use in Surface Mine Reserves reporting.
- ◆ Create Drillhole from eLog – Added settings for minimum attribute values. Added more attributes to model.
- ◆ Edit Fault Line – Added option to set priority number to faults to control processing order.
- ◆ Make Unfaulted Strata Grid – New command that creates a strata elevation grid with the faults removed.
- ◆ Remove Faults from Grid – New command to adjust a grid to remove faults.
- ◆ Tag Heave Zones – New command to tag heave zone polylines to skip min/max thickness calcs in Surface Mine Reserves.
- ◆ Make Value Block Model - Overhauled to allow for import of multiple models at once. Equation writing using new equation definition tool.
- ◆ Optimized Pit Design – Upgraded to new engine. Routine now allows for the definition of multiple pit angles. Several strata layers can be optimized as a single pit. Run times have been improved.

Surface/Underground Mining Commands

- ◆ Design Bench Pit – Added option to output 3D solid for volume of each bench. For processing multiple pits with down slopes, added adjoining edge cleanup to avoid egg carton effect. Added option for bench slope to follow a seam. Added option to taper bench at tie with surface. Added function to pick perimeter to report elevation range during parameter input. Added option to set target surface by entering elevation.
- ◆ Design Spoil Pile – Added support for TIN surfaces. Added option to taper bench at tie with surface. Added setting for minimum bench height.
- ◆ Edit Pit – Added function to convert key material of selected grade from grade parameters to non-key.
- ◆ Surface Mine Reserves – Added option whether to interpolate block model for breakout quantities. Added method to make strata grids a half step higher than the block model for when the top/bottom values are at centroids instead of edges.
- ◆ Surface Production Timing – Added support for TIN surface for the bottom surface. Added method to use grid file for density.



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- ◆ Surface Equipment Timing – Added method to assign key material destinations based on grade parameters. For 3D Pick, added graphic chart with horizontal pit sequence and vertical attributes. Added function to remove block.
 - ◆ View 3D Surface History – Added function to save image, setting for playback speed and option to show axis icon.
 - ◆ Design Tunnel Template – Added method for alignment offset such as for a circle template with the profile in the center.
 - ◆ Make Solid by Design – Added option to make ends vertical or perpendicular to the profile slope. Added method to pick 3D polyline to define the horizontal and vertical alignments.
 - ◆ Make Solid from Polyline – New command to create a solid from a series of 3D polyline hoops.
 - ◆ Color Solid – New command to assign a color for the solid model.
 - ◆ ID Solid – New command to pick any solid face and report the source solid model file.
 - ◆ Blast Pattern Layout – Added support for TINs.
 - ◆ Range Diagram – Added method to flatten spoil created by reach.
 - ◆ Dozer Push – Added controls for separate cut angles for left and right sides.
 - ◆ Process Dragline Sequence – Added support for using a TIN surface.
 - ◆ Gantt Charts – Improved Gantt chart output options in Underground, Surface and Spoil timing routines.
 - ◆ Haul Fleet Manager – Improved fleet default performance parameters.
 - ◆ Underground Timing – Added retreat thickness.

Construction/Trench Commands

- ◆ Edit Assign Polyline Elevations – Overhauled user interface for smoother workflow. Added report function and controls for grip sizes.
- ◆ Elevate Pads by Grade Rules – Added option for dz to inner pad after elevating main pad such as a garage slab within a building pad. Added option to set vertical offset and option to maintain 3D polyline by using a dz instead of fixed elevation such as for an exposed basement.
- ◆ 2D to 3D Polyline by Points – Added option whether to filter by description and put options into a dialog.
- ◆ LWPolyline to 3D Polyline – New command to convert lwpolylines to 3D polylines.
- ◆ Material Quantities – Added block attributes to the report.

CADnet Commands

- ◆ Export Surface Architecture IFC – Added method to output TIN to separate models for each color.

Point Cloud Commands

- ◆ New Engine – Added new Tesseract database and graphic engine.
- ◆ Registration – Improved cloud registration including option whether to scale.
- ◆ Bare Earth – Added a new method that works by a grid analysis.
- ◆ Cross Sections – Added option to use Section Alignment File (mxs) to define section locations.
- ◆ Create Solid – New function to create a 3D solid from a cloud.



Data Conversions

- ◆ Civil 3D – Added import for Field-to-Finish code definitions. Added support for converting feature lines, lot lines, pipes and structures into standard AutoCAD entities.
- ◆ Geoids – Added support for Brazil 2015, New Zealand 2016, Denmark DVR90, Ireland and Great Britain-OSGM15.
- ◆ Projections – Added support for Albers Equal Area projections. Added OSTN15 projection for Great Britain.
- ◆ Novapoint – Added function to import Novapoint centerlines and profiles.
- ◆ Trimble – Added functions to import and export Trimble DC files with Carlson localization.



What's New in Carlson 2017

General

- ◆ AutoCAD 2017 – Added support for this new version.
- ◆ IntelliCAD 8.2 – Added new Solids module with commands to create and process solids. Set paper size for new layouts. MText in-place editor. 3DORBIT. Customize for toolbars and ribbon. Work with DGN files natively without conversion and do basic CAD edits. Performance improvements.
- ◆ Carlson Community – For sharing point symbols, 3D models and other files with Carlson Software users.
- ◆ LandXML – Added support for LandXML 2.0 to output TIN surfaces with colors and materials. Added support for import of linework (plan view features).
- ◆ Startup Wizard – Added method to select dwt for new drawings.
- ◆ Merge PDF Files – New command to combine PDF files to make master PDF report.
- ◆ Output Layouts to PDF – New command to create a PDF from selected drawing layouts.
- ◆ Save/Restore Layout Layers – New commands to store and recall the visible layers for the layout model view.
- ◆ Drawing Explorer – Added right-click functions to zoom and pan to selected data files.
- ◆ Change Layer Color – New command to change the color for a layer by selecting an entity on the layer.
- ◆ Google Earth File Export – Added control for which point attribute to use as marker.
- ◆ Supersonic Viewer – New command to view large surface models and 3DX files.
- ◆ 3D Solid and Polymesh Converter – New command to convert solids and polymesh entities into 3D Faces.
- ◆ 3D Model to Solid – New command to convert .mdl files to 3D solid entities.
- ◆ 3D Arc – New command to draw a 3D arc by three points.
- ◆ Draw 2D/3D Polyline – Added option to draw smooth curves on-the-fly.
- ◆ Draw 3D Line – New command to draw a line in 3D.
- ◆ Field Text – Added method to apply labels to block attributes.
- ◆ Text Import – Added method to import Microsoft Word documents as formatted MText with ability to dynamically update when document is changed.
- ◆ Text Math – New command to apply math functions on values in text labels.
- ◆ Replace Text – Added method to copy replacement text from another label.
- ◆ Zoom Extents on All Layouts – New command to do a zoom extents on all layouts in the drawing.
- ◆ Move Text with Leader – Added option to draw as MLeader. Added settings for separate layer or use layer of text.
- ◆ Offset 3D Polyline – Added Slope Intersection method to create 3D polyline at intersection of two slopes from 2 reference 3D polylines. Added option to use separate layer.
- ◆ Hatch Wizard – New command to hatch by picking an interior point.
- ◆ Chamfer by Chord Length – New command to chamfer by a specified chord length.



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- ◆ Rotate by Bearing – Added option to update existing viewports.
 - ◆ Draw Model View – New command to draw border of model view viewport into plan view.
 - ◆ Report Formatter – Added method for sub-headers. Improved saving of the report formats. Added method to setup list of values per field to select from for field options.
 - ◆ Command Search – New command to search menus for a command name.

Survey Commands

- ◆ Legal Description – Added option for decimal degrees and for fraction degrees. For using centerline option, added setting for max offset for reporting station/offset values.
- ◆ Enter Deed Description – Added method to enter bearings and distances by selecting text in the drawing. Added method to use TPOB.
- ◆ Section Subdivision – Added option to draw lines.
- ◆ Cut Sheet – Added function to undo edits. Added method to apply a pipe equation. Added option to report zero elevations. Added method to import points from text file. Added storing of the report formatter settings into the Cut Sheet .cut file. Added option to color labels by tolerance. Added option to draw arrow from design point towards the survey point.
- ◆ Polyline Report – Added option to report only the perimeter and area.
- ◆ Bearing Entry – Added support for entering bearings in formats like “NE45.1234” and “N45 12 34E”.
- ◆ Angle Rotation – Added option to apply rotation defined in Drawing Setup to all bearing and azimuth labels and reports.
- ◆ Edit Process Raw File – Improved reporting for GPS measurements to include RMS and other values recorded in the raw notes. Added processing for DZ notes. Added method to output selected notes to the coordinate file.
- ◆ Field To Finish – Added function to edit all the code definitions in a spreadsheet. Added method to hatch areas from closed linework. Added option to thaw layers used during drawing. For text attributes, added controls for label order, separate settings for the size of each label and option to group the text entities. Added new special code LABEL to control point attribute format. Added new special code BFIT to make best-fit line between points. For WALL3D special code, added method to set width by second value after code. Automatically creates photo links when image files are stored by SurvCE. For PHOTO special code, added option to create CAD hyperlinks for images. For Offset Both special codes, added option for offset amount as full or half offset. For multi-point symbols, added option to set code for automatic, option for rotate only (no scale) and option to create a fourth corner point. Added method to draw text fitted by two or three control points using multi-point symbol with Fit Description option. Added option to apply rotation to labels only and not the symbols. For Rotate to Line, added settings for align by forward or backward tangents or by ends for culvert. For pipe features, added option to label structures. For tree features, added option to label each field on a separate line and option to group tree trunk circle with the symbol. Added new LTW special code to set line width. Added linework method to stop linework when point numbers change in point groups. Added option to label elevation just once for points on linework or rectangle with same elevation. Added method



to use a GIS special code to append to the main code for processing. Added method to use point description for GIS attributes by using Fixed Parameter settings. Added method to put point attributes (name, elevation, description) into custom attributes on the point symbol. For labeling descriptions along linework, added setting for start of the increment. Added a linework coding style for having the linework code before the main code. Added function to import Topcon F2F codes and layers from an XML file. Added LandXML style coding that reads point linework from the XML file to determine how to connect the points.

- ◆ Label Station Offset – Added option to highlight labels more than specified offset tolerance. Added option to use MLeaders. Added leader style to point to beginning of label. For metric, added cm and mm unit options for offsets. For line from centerline to point, added options to place label along line and to shorten the line.
- ◆ Point Groups – Added new Isolate function for point groups. Added more functions to call for point groups including Edit Point Attributes, Renumber, Change Elevations and Set Description. Added method to define group by date range using the data stored in the CRD history. Added method to define group by number of digits from start of point numbers.
- ◆ Draw Points – Added option whether to draw point node.
- ◆ Draw/Locate Points – Added option to draw only new points.
- ◆ Point Symbols – Added set of symbols to Symbol Library that have built-in wipeout to hide linework under the symbols.
- ◆ Search for Points – New command to search for a point number or description in CRD and RW5 files in a folder.
- ◆ Edit Point Attributes – Added display of images attached to points with ability to add and remove images. Added display of point groups and setting for non-surface status.
- ◆ Renumber Points – Added method to create points by sequence along a centerline.
- ◆ Edit Points – Added function to delete a range of points or all points.
- ◆ Erase Points – Added option to delete the linework associated with the points.
- ◆ Freeze Points – Added method to freeze linework associated with the points.
- ◆ Local Transformation – Added method to enter translate, rotate and scale parameters, and save/load parameters to file.
- ◆ Annotation – Added support for linework reactors to update labels for deflection angle and interior angle labels. Added settings for total distance prefix. Added option for strip trailing zero to leave single zero. Added leader endpoint style of angle, arrow and distance and control for length of leader. Added method to use different number of decimals based on size of the number and added option to round distances to the nearest half. Added option to remove extra leading zero on angles in degrees. Added option on distance units to label as Rods or Varas. Added option to label scale factor when using geodetic distances.
- ◆ Label Coordinates – Added method to combine coordinate label with lat/lon. Added settings to center justify and to label headers.
- ◆ Label Angle – Added option for decimal degrees.
- ◆ Line/Curve Tables – Added method to create a combined line/curve table.
- ◆ Swing Table – New command to draw a swing table.



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- ◆ Stack Label Arc – Added option for label header line and method to use C/L symbol.
 - ◆ Draw Legend – Added option for second description and method to draw the symbol on the right.

Civil Commands

- ◆ Grid File Format – Added indexed binary grid format that uses 50% less file size and loads twice as fast.
- ◆ Triangulate and Contour – Added Reduce Meander filter for creating smoother contours.
- ◆ Triangulation File Utilities – Added function to break bent edges, to draw ridge/valley lines, to apply polynomial smoothing, and to export x,y,z text file of TIN points. Added controls for the color display method.
- ◆ Triangulation Surface Manager – Added method to draw Carlson points when adding points to TIN.
- ◆ Slope Zone Analysis – Added method to model surface using contours and hatch zones between contours.
- ◆ Contour Elevation Label – Added option for separate layers for main and intermediate labels.
- ◆ Design Pad Template – Added method to apply subgrade depth to pad when balancing.
- ◆ Edit Pad Template – Added functions to add and remove perimeter points.
- ◆ Cut/Fill Color Map – Added option to limit map cut/fill range to color. Added auto color styles.
- ◆ Cut/Fill Movement – New command to optimize earth movement with reporting by dozer and truck/shovel ranges.
- ◆ Draw Curb Ramp – New command to adjust 3D curb polylines to fit in ramp of specified dimensions.
- ◆ Lot File Manager – Added method in check lot to report closure with tolerance and option to draw symbol at any bad misclosures.
- ◆ Tag ROW Segments to Skip Frontage – New command to control setback amount for lot sides.
- ◆ Input/Edit Centerline – Added function to scale centerline.
- ◆ Station Equations – Added support for station-equations in more commands including Input-Edit Profile, Profile Report, Draw Sections, Input-Edit Sections and Section Report.
- ◆ International Roughness Index – New command to report this index of a profile.
- ◆ Draw Profile – Added option to use MLeader for leader labels. Added option to draw manhole names within an ellipse. For sewer profiles drawn as single lines, added setting for polyline width. Also, for sewer profiles, added option to draw symbol for pipe flow arrow, option to prefix label layers with profile name, and option to skip rim and invert elevations for outlet and to skip invert-in label for first structure. For crossings, added option to label elevation at top of pipe and draw label leader to top of pipe. For the horizontal label box, added settings for text offset with a row and option whether to draw row header labels.
- ◆ Draw Section File – Added sheet output method to model space with viewports from layouts into model space. For crossings, added option to show pipe thickness. For crossings on-the-fly, added method to check selected .sew and .util files associated with the drawing. Added option



to output each station to a separate dwg when using vertical stack. Added settings to control label position for grid elevation and offset labels.

- ◆ Profile Solids – New command to create profiles from solids or polymesh entities in the drawing.
- ◆ Section Solids – New command to create cross sections from solids or polymesh entities in the drawing.
- ◆ Input Edit Section Alignment – Added method to create sections at pipe crossings and method to use polylines to define cross section alignments.
- ◆ Section Cut Sheet – Added support for using grade ids.
- ◆ Design Template – Added method for subgrade depth to match existing surface for road rehabilitation. Added option for ditch on end of fill to use only when existing ground goes uphill from the tie.
- ◆ Template Grade Table – Added method to create table from polylines.
- ◆ Process Road Design – Added method to output TIN surface for bottom subgrade.
- ◆ Road Network – For point output, added controls for left and right sides.

Hydrology Commands

- ◆ Rainfall – Added method to lookup using NOAA Atlas 14 method. Added SCS triangle and Delmarva storm types to storm sewer networks.
- ◆ Watershed Grid Area – New command to create grid model of drainage area above each node.
- ◆ Watershed Above Points – Improved method for calculating watershed using a grid model.
- ◆ Run Off Tracking – Improved method for using a grid model for calculating flow lines.
- ◆ Time of Concentration – Added FHWA Kinematic Wave method. For the SCS-TR55 method, added K-table for shallow concentrated method and added method to pick flow 3D polyline and make multiple flow segments using specified delta slope tolerance.
- ◆ Peak Flow Regional Method – New command for peak flow by this KY DOT method.
- ◆ Edit Bench Pond – Added option to size for target storage at elevation. Added functions to add and remove perimeter vertices.
- ◆ Design Detention Pond – Added stage-discharge editing onto the main dialog.
- ◆ Hydrograph Routing – Added option for formatted reports to Hydrograph, Pipe, Channel and Reservoir routines.
- ◆ Pipe Routing – Added support for multiple barrels.
- ◆ Draw Stage/Storage Curve – Added option for spillway and cleanout.
- ◆ HEC-RAS – Added support for multiple skews on cross sections.
- ◆ HydroNET – Improved report contents and format, and added method to report multiple rain events at once.
- ◆ Plan View Labels – Added option to label pipe stationing. Added control to place symbol at inlet or structure location.
- ◆ Circular Inlet – Added support for circular inlets in Sewer Networks.
- ◆ Input Sewer Line – New command to create sewer network by placing structures on polyline vertices.
- ◆ Sanitary Sewer Network – Added option to enter known flows and label.



- ◆ Edit Sewer Network – Added undo function in the editors.
- ◆ Edit Sewer Profile View – Added functions to change pipe size and rim elevation.
- ◆ Move Plan View Label – Added option to use leaders.
- ◆ Sewer Network Quantities Report – New command to report pipe and structure quantities by depth.
- ◆ Import Network from Text File – New command to read a sewer network model from a CSV text file.
- ◆ Transform Coordinates – New command to transform the x,y coordinates in a sewer network model.
- ◆ Report Sewer Network – Added method to report multiple storm events at once.
- ◆ Utility Network – Added setting for utility type (i.e. gas or water) with default colors per type. Added support for rectangle, hexagon, trapezoid and ellipse shape pipes. Added method to place solids along utility alignment for valves, connections and elbows. Added support for laterals with spreadsheet editor and methods to input by picking points or lines. Added material quantities report. Added pipe material parameter and user-defined parameters to the model. Added LandXML export for utility networks.

GIS Commands

- ◆ Point GIS – New system to store GIS data in CRDB coordinate files with ability to use this data in all point-based GIS commands.
- ◆ Point GIS Editor – New command to import, export, edit and report GIS data for points.
- ◆ Topology Area Check – New command to find gaps or overlaps.
- ◆ Topology Point Check – New command to report points that are within tolerance of each other.
- ◆ Set Text Layer by Text String – New command to set text entity layers to match the text string.
- ◆ Web Feature Service (WFS) – Added default service for FEMA and USDA soil maps.

Geology Commands

- ◆ 3D Kriging – Upgraded 3D kriging routines and 3D variogram. Added option to output statistics grid with estimated error per node.
- ◆ Voronoi Modeling – Added method to create models using the Voronoi algorithm.
- ◆ Define Grade Parameters – Added option to set density per grade to use in reporting tons in Surface Mine Reserves.
- ◆ Make Block Model – Added option to set top/bottom surface grids for top/bottom of cells with grade defined to crop out no grade cells.
- ◆ Edit Drillhole – For angled drillholes, the editor shows the adjusted elevations.
- ◆ Draw Geologic Column – For angled drillholes, the labels use the adjusted elevations.
- ◆ Isopach Maps Auto Run – Added support for hatch zones.
- ◆ Inspect eLog – New command to report values in real-time while moving cursor along eLog graph.
- ◆ Remove All Non-Key Bed Names – New command to remove bed names from non-key strata.
- ◆ Key Strata Missing Bed – New command to report strata with blank bed names.



Surface/Underground Mining Commands

- ◆ Range Diagram – Added summary report of rehandle and spoil rehandle parameters. Add function to transfer current dragline and function to clear.
- ◆ Spoil by Interior Text – New command to assign names to spoil polyline using interior text.
- ◆ Design Bench Pit – Added method for slopes with fixed width.
- ◆ Surface Equipment Timing – For 3D pick, added method to color timing blocks by grade parameter.
- ◆ Surface History – Added method for picking pit and perimeter polylines for manually defining surface history.
- ◆ Flatten Spoil Top – Added method to flatten to a specified height about the pit floor.
- ◆ Sections From 3D Solids – Added method to use MXS section alignment file.
- ◆ Make Solid from Design – Added method for template transitions.
- ◆ Trim Solid – New command to trim a solid model by a perimeter polyline.

Construction/Trench Commands

- ◆ Tag Area of Interest – Added support for using multiple areas with the same name.
- ◆ Make Design Surface – Uses layer settings to set colors for the TIN.
- ◆ Calculate Total Volumes – Added option to output report to layout.
- ◆ Make Overexcavate Surface – Added function to define by selecting a TIN file.
- ◆ Make Layout – New command to create a layout with title block and optional model view.
- ◆ Place Image on Layout – New command to crop an image to fit the dimensions of a view window.
- ◆ Linework Length Report – New command to report lengths of linework.
- ◆ Cost Summary Report – New command to report project costs from Takeoff commands including Material Quantities and Calculate Total Volumes.
- ◆ Input Trench Line – Added method to make trench at fixed depth from the surface.
- ◆ Import Sewer Network – New command to import a sewer network .sew file into trench network.
- ◆ Import Utility Network – New command to import a utility network .util file into trench network.
- ◆ Input/Edit Trench Template – Added method to define backfill relative to middle of pipe.
- ◆ Trench Network Quantities – Added option for costs in the report.

CADnet Commands

- ◆ Import PDF File – Added method to handle dense hatch by option to skip tiny lines.
- ◆ 3D PDF Reports – Added method to use template PDF. Added output to 3D PDF directly from 3D Viewer Window and 3D Drive Simulation commands.
- ◆ Pipe Connector – New command to draw pipe between two connections with output to BIM.
- ◆ Trace Polyline – Improved ability to follow image and snapping. Added method to create 90-degree corners. Added auto zoom options. Added ability to switch active end of line for tracing.
- ◆ Trace Rectangle – New command to draw a rectangle from an image.
- ◆ Trace Circle – New command to draw a circle from an image.



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- ◆ Replace Color – New command to reassign selected colors to a new single color.
 - ◆ Remove Speckles – Added method to select area to process by window or polyline. Added option for preview.

Point Cloud Commands

- ◆ Import IMG – Added function to import image DEM files.
- ◆ Regions – Added functions to define and set visibility for a selection of points in the cloud.
- ◆ Contours – Added Reduce Meander filter for creating smoother contours.
- ◆ Import Cloud – Added option to batch import files (i.e. LAS and E57) and to apply scale on import.
- ◆ Color Cloud – Added method to color by elevation range with control of range with repeating pattern.
- ◆ Subtract Cloud – New function to subtract cloud from current cloud.
- ◆ Scale Cloud – New function to scale cloud between feet and meters or by custom amount.
- ◆ Camera – Added clipping method by polyline.
- ◆ Command History – Added function to report the history and added option to time stamp each command in the history.

Data Conversions

- ◆ Civil 3D – Added support for spot elevations in Import Civil 3D Labels.
- ◆ Geoids – Added support for Florida FPRNGD16, Malaysia EMGG05a, Australian Cocos, Norway 2016Aand Latvia 15.
- ◆ Indiana – Added Indiana County projections INDOT INGCS.
- ◆ MicroStation – Upgraded routines to import and export GENIO files.
- ◆ Trimble – Added import/export of Trimble GIS attribute data from CSV files.
- ◆ WinCMM – Added support for .cor and .lev files in Points > Read Text File.



What's New in Carlson 2016

General

- ◆ AutoCAD 2016 – Added support for this new version.
- ◆ IntelliCAD 8.1 – Batch plotting and ribbon toolbar. Multi-core open and regen. More annotative support. New commands REVLOUD, POINTCLOUDATTACH, HELIX, XPLODE, PUBLISH, TXT2MTXT, LOFT, SWEEP and POLYSOLID.
- ◆ Data Depot – Added support for Subversion (SVN) server in addition to Bentley ProjectWise.
- ◆ Settings Server – New functions in Carlson Configure to distribute command settings and files to Carlson users.
- ◆ Save Settings in Drawing – New option in Carlson Configure to save command settings within each drawing.
- ◆ Toolbars – Added 36 new toolbar icons.
- ◆ Hatch – Added support for user-defined hatch patterns from PAT files.
- ◆ Symbol Library – Added description field for each symbol. Added option to setup sub-categories. Added function to restore default symbols.
- ◆ Load Last Report Formatter – New command to run the report formatter using the report data automatically saved from the last report.
- ◆ Drawing Inspector – Added method to report surface elevation from a TIN file.
- ◆ Drawing Setup – For set text styles, added lookup of font name and settings for width, oblique angle and multiple fonts.
- ◆ 3D Viewer By 3DX – New command to select 3DX model file to set scene to show in 3D Viewer.
- ◆ Station-Offset Transparent Snap ('CL) – Added method to station from selected segment. Added real-time report of station/offset.
- ◆ Angle Distance Transparent Snap ('TRAVPT) – New command to set a point by angle and distance from a starting point.
- ◆ Select Objects Filter ('FSELECT) – New transparent command for select objects prompts to apply a selection filter.
- ◆ Show/Hide by Selection – New set of commands to select entities to hide, isolate or make visible.
- ◆ Set Level – New command to assign an additional name to entities which gets used in other commands like filter selection.
- ◆ Level Manager – New command to list, create and rename level names.
- ◆ Select by Filter – Added control for combining inclusion and exclusion filters plus new filters for level and linetype.
- ◆ 2 Radius Curve Series – New command to draw a series of two curves between two tangents.
- ◆ Draw Table – New command to create a table entity by reading a comma separated text file.
- ◆ Edit Table Properties – Added support for all types of tables instead of only line and curve tables.
- ◆ Text Wizard – New command to draw text with settings for size, style, layer and color, plus method to use current drawing properties.



- ◆ Text with Leader – Added option for default text angle.
- ◆ Move Text with Leader – Added support for moving a group of text entities.
- ◆ Draw Text on Line – Added settings for layer, size, style and color, plus method to use current drawing properties.
- ◆ Line Up Text – Added option to use polyline to follow.
- ◆ Join Two Polylines – New command to join two polylines into a single polyline.
- ◆ Remove Polyline Arcs – Added method to make chords on selected side of polyline.
- ◆ Import 3D Viewer – New command to import drawing entities from a 3DX file.
- ◆ Google Earth Import – Added support for aerial images and for GIS data.
- ◆ Google Earth Export – Added method to create Google tags from Carlson GIS data.
- ◆ Set Google Tags – New command to add labels to drawing entities to show as labels for Export Google Earth.

Survey Commands

- ◆ Cut Sheet Report – Added functions to set and modify values for elevation, station and offset. Added method to import from TDS raw data. Added option for user-defined data columns.
- ◆ Map Check by Screen Entities – Added support for reading data from line/curve tables.
- ◆ Visual COGO – Added bearing-bearing, bearing-distance and distance-distance intersection functions.
- ◆ Best Fit Line – Added method to calculate a 3D line.
- ◆ Point Creation – Added option to apply full Field-To-Finish coding for all routines that draw points.
- ◆ Point Entity Updates – Improved performance greatly for routines that modify point entities in the drawing.
- ◆ Renumber Points – Added method to renumber by adding prefix or suffix to point numbers.
- ◆ Point Group Manager – Added method to set point range by RW5 file.
- ◆ Enter Deed Description – For entering curve data, added method to use different units.
- ◆ Deed Correlation – Added method to use polylines for input instead of points. Added option to use the Report Formatter. Added option to move deed points to survey points.
- ◆ SurvNET – Added method to draw map view graphics in the drawing.
- ◆ Edit Process Raw File – Added process setting to override backsight azimuth when have a backsight point in the coordinate file.
- ◆ Field To Finish – Added new /// special code for a comment to replace the description label. For text and custom attribute labels, added ability for fields as equations of note or GIS attributes. Added bar separator in description to indicate end of coding. Added method for linework descriptions to use point special descriptions. For custom block attributes, added settings for prefix/suffix. Added method to set level names by code. For tree features, added method to size symbol by the code.
- ◆ Offset Points by Interval – Added method to use a TIN or grid surface to set point elevations.
- ◆ Building Offset Extensions – Added method to create points along building envelope and option to create points at polyline vertices.



- ◆ Annotation Leaders – Added arrow-line style for end point leaders.
- ◆ Distance Annotation – Added option to use commas in distance labels.
- ◆ Azimuth Annotation – New set of commands to label azimuths together with distances similar to the bearing methods.
- ◆ Curve Annotation – Added new method to draw curve dimensions along chord line and radius lines.
- ◆ Curve Table – Added field options for tangent in and out.
- ◆ Label Coordinates – Added different prefix settings for north/south and east/west.
- ◆ Point to Point Table – New command to create table with from point, to point, angle and distance.
- ◆ Point Table – Added option to create as a Table Entity.
- ◆ Polyline Report – Added option to select and report multiple polylines.

Civil Commands

- ◆ 2D to 3D Polyline by Slope from Reference – New command to elevate vertices by slope from a reference 3D polyline.
- ◆ Cut/Fill Report – New command to report cut/fill between two surfaces at an interval.
- ◆ Cut/Fill Contours – Added option to use color ramp and added setting for daylight tolerance.
- ◆ Cut/Fill Grid Map – Added option to label the cell number within the grids.
- ◆ Cut/Fill Slope Lines – Added option for continuous and new styles for middle dot and end dot. Added proportional method. Added setting for line color.
- ◆ Draw Spot Elevations – Added option to round elevation labels to the nearest 0.5.
- ◆ Station Polyline Centerline – Added option for units in miles.
- ◆ Label Station Offset – Added option for units in miles.
- ◆ Triangulation Data Check – New command to check source data for errors like crossing breaklines.
- ◆ Triangulate and Contour – Added option to prefix layers with the surface file name. Added option to draw shrinkwrap perimeter polyline on specified layer.
- ◆ Triangulation File Utilities – Added function to apply geoid to the TIN. For large TINs, added option for low res graphics.
- ◆ One Triangulation Surface Volumes – Added stockpile mode that uses TIN perimeter to make reference surface.
- ◆ Two Triangulation Surface Volumes – Added option to use multiple inclusion perimeters and report each separately.
- ◆ Two Grid Surface Volumes – Added option to use multiple inclusion perimeters and report each separately.
- ◆ Grid File Utilities – Added function to offset perpendicular to the surface. New function to apply a geoid to the grid.
- ◆ Contour from Grid File – Improved speed for generating contour polylines.
- ◆ Design Pad Template – Added method for topsoil removal within the disturbed area. Added option to set color of pad triangles when updating the TIN surface.



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- ◆ Elevate Pads by Grade Rules – Added method to elevate by reference point on pad.
 - ◆ Tag Pad Reference Point – New command to set reference points to use with Elevate Pads by Grade Rules.
 - ◆ Surface Inspector – Added options to show surface slope and station/offset from a reference centerline.
 - ◆ Slope Zone Analysis – Added method to hatch triangles by zone when using TIN surface model. Added ability to save slope zone colors into the TIN file.
 - ◆ Draw Sections – For sheet output, added setting for column station order. Also, for sheet output, when using the method to output to a new drawing, added option to create separate drawings for each sheet. Added method to save and recall a set of SCT files for drawing to a XST file.
 - ◆ Draw Profile – Previews in settings dialogs use active drawing viewer instead of fixed image. For VC labels, added options to left justify, label prefix on separate row, set prefix for slopes and place station text at the top. Also added option to draw VC labels in a table. For crossing labels, added control of leader size and option to solid fill pipe shape. Added prefix option for grid elevation labels. For profile label names, added settings for size, layer and location. Added support for stacking more than three profiles. Added method for pipe label equations using other pipe values. For horizontal label box, added settings for prefix for cut and fill labels. For grid settings, added style of none.
 - ◆ Horizontal Axis Elevations – Added controls for colors and added functions to save and load the settings.
 - ◆ Station-Elevation-Slope Label – Added settings for style, draw leader and orientation as horizontal or vertical.
 - ◆ Offset-Elevation Label – Added settings for layer, style and orientation as horizontal or vertical. Added pick point method.
 - ◆ Define Median Adjustments – New command to setup road design for a median by picking a plan view polyline for the median alignment and creating the road design files for the Template Point Centerline and Template Series File.
 - ◆ Design Template – Added method to extend ditch to tie at ROW limit.
 - ◆ Road Network – Added setting to extend the intersection station range by a distance.
 - ◆ Section Report – Added method to reference a TIN surface and report elevation difference to the cross sections.
 - ◆ Lot Network Report – Added method to report all buildings that fit per lot with method to create table.
 - ◆ Import National Elevation Dataset (NED) – New command to import a surface model from NED.

Hydrology Commands

- ◆ Ribbon – Created new ribbon toolbars for hydrology commands.
- ◆ Draw Sewer Network Plan View – Added separate settings for invert in/out labels. Added option to draw rip-rap.



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- ◆ Sewer Network Design – For HEC-22 energy loss, updated calculations to the 2009 (3rd edition) formula.
 - ◆ Edit Sewer Network Plan View – New command to change a structure location by screen pick.
 - ◆ Edit Sewer Network Profile View – New command to change the pipe network model by screen pick edits on profile view.
 - ◆ Hydrograph Editor – New command to edit time and flow data in a spreadsheet.
 - ◆ Pipe Culvert Design - Added outlet control by gradually varied flow method.
 - ◆ Utility Network – New command to define model for utility networks.

GIS Commands

- ◆ Import GIS Data – Added method to import GIS data from TDS rw5 and raw files.
- ◆ Export Esri SHP File – Added option for positions in lat/lon format.
- ◆ Define GIS Features – Added functions to import feature definitions from SurvCE VTT and TDS RAW files.
- ◆ Web Feature Service (WFS) – New command to import GIS layers as linework with GIS data.
- ◆ Edit World File – Added function to transform coordinate system for geo-referenced images.
- ◆ Web Map Service (WMS) Image – New command to place images from Carlson Image Server or user-specified server.
- ◆ Draw Entity Images – New command to draw images attached to entities.

Field Commands

- ◆ Drivers - Upgraded many drivers from the SurvCE updates.
- ◆ Tilt and Compass – Added support for tile and compass sensors in the 3D Viewer for the Microsoft Surface 3.
- ◆ Field To Finish – Switched to using full Field To Finish coding from Survey module.
- ◆ Elevation Difference – Shows surface profile in real-time.
- ◆ Pipe Network – New set of commands to measure pipe networks and store as-built values.

Geology Commands

- ◆ Define Geologic Model – Added Auto-Complete option for adding grids that fills out settings based on previous patterns.
- ◆ Surface Mine Reserves – Upgraded user-interface with tab dialog to organize settings. Improved processing speed by 25%. Setup adjustments for key loss by top/bottom thickness, key dilution by adding non-key to key, key loss by thickness and overall recovery factor. Added method to set key dilution and loss adjustment parameters per seam by using Strata Definition File.
- ◆ Strata Models – Added ability to use channel samples for seam stacking.
- ◆ Strata Grids Auto Run – Added method to create strata composite grids.
- ◆ Strata Isopach Maps – Improved speed for generating isopach polylines.
- ◆ Drillhole Text Formatter – Added option for header for labels and option to color labels by grade parameters.
- ◆ Voronoi Diagram – Added method to process points.



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- ◆ Draw eLog – Added method to automatically draw multiple LAS files next to geologic columns in the drawings.
 - ◆ Create Drillhole from eLog – Added option to filter data.
 - ◆ Export Block Model – New command to output a block model to a text file.

Surface/Underground Mining Commands

- ◆ Merge Solids – New command to combine two solid models that overlap or touch into a single solid model.
- ◆ Make Solid from Design – New command to create a solid model using tunnel template, centerline and profile.
- ◆ Design Tunnel Template – New command to define closed loop template for a tunnel.
- ◆ Range Diagram – Added spoil by reach method. Added option to label areas in the preview and controls for linework color. Added option to show dragline limits. Added option to flatten the spoil pile on key cuts. Added method to process rehandle.
- ◆ Import Fault Line – New command to create fault polylines from a text file.
- ◆ Edit Fault Line – Added method to reduce vertices.
- ◆ Draw Fault Symbols – Added method to use surface to set dip and strike.
- ◆ Timing Project Manager – For Mining Precedence Rules, added method to screen pick.
- ◆ Surface Equipment Timing – Upgraded bottleneck analysis with unit rotation scheme, save/load setup and improved user-interface. Added method to save and load schedule data to a CSV file. Added option to output timing results to spatial database.
- ◆ Configure Section Info – Added method to define section by selecting existing section insert from the drawing.
- ◆ Auto Panel Layout – New command to draw outlines for panels using polylines and text labels.
- ◆ Reverse Panel – New command to switch direction of a panel.
- ◆ Import Mine Plan – New command to import an underground mine plan in the drawing from a MPD file.
- ◆ Underground Timing – Added support for multiple levels or seams. Added method to set precedence for retreat mining. Added method to save and load schedule data to a CSV file. Added option to output timing results to spatial database.
- ◆ Haul Fleet Manager – Added support to have different truck types within the fleet.
- ◆ Haul Cycle Analysis – Updated calculations to account for acceleration. Added method use output from Spoil Placement Timing to report cycles and number of trucks needed for each block. Added ability to set slow down points along path polylines. Added method to output 3D polylines with truck timing data assigned for playback in 3D Motion Viewer. Added method to use one-way path polylines. Added option to report travel details along the road. Added option to process different grades on a road polyline separately.
- ◆ Spoil Placement Timing – Added method to set quantity rate from Surface Equipment Timing and skip haul fleet assignments. Added method to set haul fleet assignments using min cycle time or min distance from Haul Cycle Analysis. Added functions to Print and Export to Microsoft Project. Added period unit (day, week, month) for spreadsheet.



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- ◆ Gantt Charts – Added Gantt chart output options in Underground, Surface and Spoil timing routines.

Natural Regrade Commands

- ◆ Profiles – Improved default profiles for sub-ridges and sub-valleys to be smoother. Also added new global setting to control lengths for sub-ridges and sub-valleys. Profile view shows both current and original profiles.
- ◆ Check Ridgeline – New function to check ridgeline slopes.
- ◆ Clear Previous – Added function to clear entities from previous design.
- ◆ Settings File – Added functions to save and load settings to a file.

Construction/Trench Commands

- ◆ Edit Assign Polyline Elevations – Added methods to select another polyline to process, to reverse the polyline and to pick the point. Added Distance tab to show distances between points with option to edit.
- ◆ Trench Network Quantities – Added option to output a TIN surface for the trench.
- ◆ Carlson Grade Project – New command to setup a project file for Carlson machine control.
- ◆ 3D Grade Simulation – New command to load a Carlson Grade Project into the 3D drive simulation.

CADnet Commands

- ◆ Rubber Sheet – New command to adjust an aerial image to fit specified control points
- ◆ Raster to Text – Improved text recognition. Added options for prefix/suffix for numeric mode and option to draw leader by pick. Added method to process multiple labels at a time. Added one pick method after the first conversion.
- ◆ Import Raster to Vector – Added method to process image within perimeter polyline or window.
- ◆ Raster Save As – New command to save current image to another file with option to change format.
- ◆ Raster Cut Image – Added option for background color and method to cut by picked window.
- ◆ Raster Crop Image – Added option for background color and method to crop by picked window.
- ◆ Raster Deskew – New command to rotate an image.
- ◆ Raster Negative – New command to inverse the image colors.
- ◆ Raster Mirror – New command to flip an image top to bottom or left to right.
- ◆ Raster Shrink Resolution – New command to lower the image resolution.
- ◆ Raster Brighten/Darken – New command to change image brightness.
- ◆ Raster Black/White by Threshold – New command to make an image binary by assigning grays based on threshold.

Point Cloud Commands

- ◆ User Interface – Upgraded user-interface with more toolbars and cleaned up tab dialogs.
- ◆ 3D Viewer – Added method to auto-center the pivot point for rotating the view.
- ◆ Import Tiff – Import TIFF image with elevation as color field into a cloud.



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- ◆ Clean Cloud – For the duplicate point method, added method to compare 2D distance. For the redundant method, added option whether to clean vertical or horizontal data.
 - ◆ Merge Clouds – New function to combine two or more clouds.
 - ◆ Register Cloud – New function to register cloud using control points.
 - ◆ Cloud Change Projection – New function to change cloud coordinate system.
 - ◆ Adjust Color – New function to change the cloud color or intensity, or set the cloud color from an image file.
 - ◆ Resample Mesh – New command to resample a mesh to reduce size.

Data Conversions

- ◆ Civil 3D – New function to convert Carlson points to Civil 3D points. New function to import centerlines from Civil 3D drawings.
- ◆ Geoids – Added support for Iceland, Latvia 14, Russia and Korea 13.
- ◆ InRoads – New function to import centerlines from ASC format.
- ◆ MicroStation – New import point file support for TA2 format.
- ◆ TDS – Import localization from RAW file.
- ◆ Trimble – Added export JXL from Carlson RW5.



What's New in Carlson 2015

General

- ◆ AutoCAD 2015 – Added support for this new version.
- ◆ IntelliCAD 8.0 – Direct support for 2013 DWG file format. Added 64-bit version. New features including support for dynamic entity reactors, layer states and improved dddvpoint interface.
- ◆ Google Earth – Added support for exporting 3D Faces.
- ◆ Import 3D View Model File – New command to create drawing entities from a 3D model file.
- ◆ Export 3D View Model File – New command to create a 3D model file from selected drawing entities.
- ◆ 3D Model Library – New command to prepare the 3D models to use in the 3D Viewer commands.
- ◆ Toolbar Manager – New command to save status of toolbars and allow migrating toolbar settings between versions.
- ◆ File Selection – Added list of subfolders within current folder and button to move up a folder level. Added option for warning when selecting a data file that is not within the current project folders.
- ◆ Textures – Added 40 new textures for 3D viewing.
- ◆ Settings File Manager – Added function to compare two settings files and report differences.
- ◆ Leader with Text – Added option for horizontal tick and option to create with Mtext.
- ◆ Join Nearest – Added filters for common colors and linetypes.
- ◆ Join Polyline by Trace – New command to join linework into a polyline with prompts at intersections.

Survey Commands

- ◆ Field To Finish – Added special pipe feature coding with ability to create pipe network (.sew) file. For tree feature coding, added option for drip as diameter instead of radius, added option for solid circle for trunk and option for relative tree size for the symbols. Added control for separate layers for the point attribute block and point node. Added new AFIT special code for making a curve tangent through a series of three curve points. Added method for dynamic templates with variable horizontal and vertical offsets by using the OH and OV special codes. Added settings file default distinct point layer prefix/suffix. Added separate text size settings for attribute text labels and point block attributes.
- ◆ SurvNET – Added error report for individual observations to track down blunders. Added import for TDS GPS vectors.
- ◆ Edit Process Level Data – Added support for processing with zero horizontal distances.
- ◆ Carlson Cloud – New command for communicating with SurvCE for sending messages, data files and crew locations.
- ◆ Report Distance Scale – Added methods for grid/ground factors on-the-fly in addition to a fixed factor.
- ◆ 3D Transformations – Added 3D coordinate transformations.



- ◆ Point Group Manager – Added method to create point group by offset distance from alignment polyline.
- ◆ Move Point Attributes with Leader – Added controls for attribute order and ability for curved leaders.
- ◆ Import Text/ASCII File – Added method import from text with fixed widths and method to use inclusion/exclusion perimeters.
- ◆ Legal Description – Added method to report station/offset using a reference centerline. Added method for reporting with geodetic mean angle and geodetic distances.
- ◆ Cut Sheet – Added method to get station/offset from the point description coding. Added field for design point description.
- ◆ Offset Points by Interval – New command to create offset points along an alignment.
- ◆ Label Coordinates – Added options to include a description, to use Mtext, to draw the labels at an angle and option for MLeader.
- ◆ Draw Legend – Added method to put each symbol on a specific layer.

Civil Commands

- ◆ Draw Profile – For paper space profiles, added method to use an existing layout as a reference template for the new layout. For the horizontal label box, added option for horizontal text in addition to vertical. For pipe profiles, added settings to label invert by left/right order, added option to draw cutoff style pipe extensions, added option to create labels as MText, added option for flow arrow in middle of pipe, new option for labels above the pipes, added justification settings per label, added setting for separate layer for pipe thickness than pipe profile and option to connect rims with a polyline for a simple surface profile. For Label Line/Point crossings, added option to label elevations at crossings, added method for labeling GIS attributes, added method to label points of selected descriptions within offset tolerance, added option to label CL deflections and added option to avoid label overlaps. Added special CL stations for break point station/elevation labels plus new prefix/suffix settings. For EOP profiles, added new break point and EOP leader style to the start of the labels, added option to label ground profile on road EOP profiles and added controls to select which profiles are EOP, road and ground. For the manhole name within circle option, added setting to put the name and number on separate lines and added the option to auto shift the labels to avoid overlaps.
- ◆ Draw Sections – Added option to label cut/fill volumes per station. Added separate settings for pipe crossing layers for decimals on pipe size, offset and elevation.
- ◆ Draw Plan View Sheets – Added option to set station range to draw.
- ◆ Input-Edit Centerline – Added Fit Curve method to apply speed table to all PIs in centerline.
- ◆ Input-Edit Profile – Added method to apply speed table for vertical curve lengths to all PIs in profile.
- ◆ Label Station/Offset – Added method to use a TIN or grid surface for the elevation reference.
- ◆ Draw Lot Setback – Added method for separate corner side setback amount.
- ◆ Move Spot Elevations – New command to move spot labels and update elevation to new position on reference surface.



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- ◆ Line of Sight Viewshed – New command to calculate line-of-sight from a point and eye height on a surface.
 - ◆ Draw Spot Elevations – Added option for label only and option to pick an entity instead of a point.
 - ◆ Cut/Fill Labels – For points method, added more options like separate layers for existing and design. For the TIN method, added options for deep cut/fill labels and option for marker symbol.
 - ◆ Smooth Polygons – Added method to smooth polygon between selected points.
 - ◆ Triangulation File Utilities – Added function to color TIN within inclusion perimeter.
 - ◆ Road Stripe Library – New command to setup named sets of road stripes with offsets, colors and styles.
 - ◆ Draw Road Stripes – New command to draw linework for road stripes.
 - ◆ Linear 3D Object Polygons – New set of commands to manage alignment polygons for 3D Viewer commands for linear 3D features such as fences or guard rails.
 - ◆ Label Profile on Centerline – Added label position by left/right in addition to above/below. Added prefix/suffix and station interval settings.
 - ◆ Offset 3D Polygon by Grade Table – New command to offset a 3D polygon using the distances and slopes from a template grade table.
 - ◆ Road Network – Added settings for station range to process for each road.
 - ◆ Mass Haul Analysis – For borrow pits, added offset from road to account for offset travel time.
 - ◆ Sections From 3D Polygons – New command to create cross sections from 3D polygons.
 - ◆ Surface 3D Viewer – Added option to show contours. Added functions to edit triangulation by swapping edges, adding breaklines, removing points, removing triangles or editing point elevations.
 - ◆ Surface 3D Flyover – Surface model is kept in sync with any edits in CAD so that the 3D view is automatically updated. Added method to add models to the scene by screen picking plus the ability to pick models in the scene to edit properties (location, rotation, scale). Added function to record a movie. Added method to map textures by color and method to scale textures. Added run view mode for detached from moving vehicle. Added option to show contours. In pick mode, display real-time coordinate and elevation for mouse position on surface.
 - ◆ Motion 3D Viewer – New command to assign path polygons with speeds to 3D models and the camera.

Hydrology Commands

- ◆ Design Detention Pond – New command with all steps for detention pond design plus support for multiple rain events.
- ◆ Pipe Culvert Design – Added method for tailwater by channel or discharge rating and added overtopping analysis.
- ◆ SCS Rainfall Library – New command to define an SCS data reference library for rain events.
- ◆ Rational Rainfall Library – Added import of IDF tables from comma separated text files.
- ◆ Collision Conflict Check – Added support for checking unlimited pipe networks and using the report formatter.



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- ◆ Sewer Network Design – Added option for junction loss for pipe connections including laterals. Added method for tailwater at each outlet. New method to set symbol rotation by screen pick. Added graphic preview during .sew file selection.
 - ◆ Lateral Design – Allow for multiple lateral connections at manholes.
 - ◆ Identify Pipe Polylines – New command to ID or list pipe data assigned to 3D polylines.
 - ◆ Import Network From 3D Polylines – Added method to control order of names by design order, elevation or polyline direction. Added method to set rim elevation by depth.

GIS Commands

- ◆ Label GIS Point Data – New command to create text labels or block with attributes for selected GIS attributes.

Field Commands

- ◆ Drivers: Upgraded many drivers from the SurvCE updates.

Geology Commands

- ◆ Define Mining Model – Added Mine Model collection of surfaces for modeling only mineable strata already adjusted for recovery, roof/floor gain/loss and minimum parting. Renamed “Pre-Calc Model” to “Geologic Model”.
- ◆ Geologic to Mining Model – New command to adjust a Geologic Model to make a Mining Model.
- ◆ Drillhole Database – Added support for MS Access .accdb format.
- ◆ DHDB – Added drillhole database import/export to DHDB format.
- ◆ Import from Coal Section – New command to create pit/channel samples from coal sections.
- ◆ Configure Section Info – Added method to set folder for section drawing to allow storing the section info on a server.
- ◆ Import/Export Coal Sections from Text File – New commands to import/export coal sections from/to text files.
- ◆ Grid Files – Added option to store .grd files as binary to improve read/write speed.
- ◆ Grid File Utilities – Added method to call other GFU macros and pass parameters from another macro. Added sin() and cos() functions for grid math. New dialog interface including dialog for creating IF statements. Added 3D window to show grid while modified.
- ◆ Draw Geologic Column – Added method to draw in 3D with strata sections sized based on grade parameters. Also added 3D draw method as 3D lines. Added method to label grade names and added separate layer settings for attribute labels. For labels in 3D, added options for rotate labels vertical and draw label leaders. 3D Viewer Window now shows 3D text generated by Geologic Column.
- ◆ Drillhole Report – Added method to report grades for each strata.
- ◆ Drillhole Core Images – Added method to draw the report to the drawing and added option for labeling depth or elevation.
- ◆ Draw eLog - New command to draw graph of selected attributes from an eLog LAS file.
- ◆ Create Drillhole from eLog – New command to create drillholes with strata classification using the eLog parameters.



- ◆ Trim Isopach Within Fault Zone – New command to isopach elevations and break contours at fault zones.
- ◆ Draw Fault Labels – New command to label fault deltas.
- ◆ Draw Fault Symbols – New command to draw +/- symbols for faults.
- ◆ Apply Faults to Grid – Added method to handle thrust faults. Added method for processing multiple grids at a time.
- ◆ Surface Mine Reserves – Added Adjust Pits Manager for adjusting pit perimeters with real-time quantity updates.
- ◆ Draw Grade Boundary – New command to draw boundary polylines around area with specified grade.
- ◆ Block Model Statistics – Added min/max/average elevation and depth to the report. Added level # to report name.

Surface/Underground Mining Commands

- ◆ Ribbon – Added a mining ribbon for running with AutoCAD 2012 and higher.
- ◆ Import Pit Points – Added method for user-defined input file formats.
- ◆ Import Polyline File – Added method to draw 3D polylines from sequence of top/bottom points for blast holes.
- ◆ Label Property Lines – Added option to label owner or id labels and added setting for label layer.
- ◆ Surface Equipment Timing – Improved calculation speed by 25%. Added method to use table of production targets with variable equipment usage to adjust to meet the targets.
- ◆ Underground Timing – Added option for transparent hatching and for buffer hatching.
- ◆ Dozer Push – Added support for push cut area by closed polyline. Added method for reporting single, average push. Added option to keep existing polylines, to draw centroid symbol and to label total push distance. Added settings for label text size, layer, style, decimals and prefixes.
- ◆ Regrade Backfill – Added bench option to cross section regrade design.
- ◆ Range Diagram – Added dimensions for all angles and distances. Added options to output final profile and to output parameters to sequence file.
- ◆ Design Ramp Profile – New command to create a ramp profile between two surfaces.
- ◆ Ramp Bench Polyline Generator – New command to design bench pits using polylines.
- ◆ Edit Dragline Sequence – New command to edit the steps for pit cuts.
- ◆ Make Solid from Points – New command to create a solid model from a cloud of points.
- ◆ View Solid – New command to view a solid model in the 3D viewer.
- ◆ Draw 3D Mine Model – Added method to make model from coal sections and pillar/perimeter polylines.
- ◆ View 3D Surface History – Added support for displaying TINs.

Construction Commands

- ◆ Define Layer Target/Material/Subgrade – Added support for up to 7 subgrades.
- ◆ Color TIN by Layer – New command to color the surface TIN using the color assignments in Define Layer Target.



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- ◆ 3D Drive Simulation – Added method to apply textures to design layers in addition to colors for viewing in 3D.
 - ◆ Tag Segments to Skip Linear – New command to tag polyline segments to skip for material linear quantities.

CADNet Commands

- ◆ Merge Raster Files – Added method to automatically select control points.
- ◆ Import SketchUp File to Drawing – New command to create drawing entities from a SketchUp file.
- ◆ Import PDF File – New import engine with ability to use layers for PDFs with layers.
- ◆ Drawing to 3D PDF – New command to create a 3D PDF from selected drawing entities.
- ◆ 3D Viewer to 3D PDF – New command to create a 3D PDF from a 3DX file from the 3D Viewers.

Point Cloud Commands

- ◆ Faro – Added direct import method uses Faro toolkit.
- ◆ E57 – Added support for importing industry standard e57 format.
- ◆ PLY – Added import for PLY format.
- ◆ LAS – Added method to use LAS classification for coloring and selection.

Data Conversions

- ◆ 12D – Added import and export for pipe networks plus support for some more entity types.
- ◆ Canada – Added support for NTV2-NAD27-83
- ◆ Geoids – Added support for Canada CGG2010 and CGG2013n83, Sweden 08_rh2000, Sweden 08_rh70, Poland 2011 and Georgia 2012
- ◆ Iowa – Added projections for Iowa Regional Coordinate System
- ◆ Ireland – Added national grid projection.
- ◆ KOF – Added function to draw linework from KOF files.
- ◆ MDL – Added support for binary data within FSC file.
- ◆ Norway – Added support for N2000 format.
- ◆ SketchUp – Added import for SketchUp models in Surface 3D Flyover
- ◆ SurvCE – Added import for points with photos in Google KML format as created by SurvCE.



What's New in Carlson 2014

General

- ◆ AutoCAD 2014 – Added support for this new version.
- ◆ IntelliCAD 7.2 – Improved performance and stability.
- ◆ Symbol Library – Added 18 new 3D symbols, 130 new points symbols and 5 new north arrows.
- ◆ Toolbars – Added 38 new toolbar icons.
- ◆ Linetypes – Added 16 new linetypes.
- ◆ Hatches – Added 7 new hatches.
- ◆ Unlock Attributes – New command to unlock block attributes.
- ◆ Drawing Cleanup – Added method to set negative thickness for polylines to zero.
- ◆ Median Offset – New command to create median polyline between two existing polylines.
- ◆ Merge Closed Polygons – New command to select closed polygons and enter a min area and then automatically merge too small polygons.
- ◆ Join Nearest – Added option to elevate zero linework to matching linework at elevation.
- ◆ Annotative Text – Added support for creating annotative text.
- ◆ Text Styles – In Drawing Setup, added method to create text styles for various sizes for current drawing scale.
- ◆ Convert Text to MText – New command to create MText from selected Text entities.
- ◆ Text Capitalization – New command to set capitalization of selected text.
- ◆ Text on Polyline – New command to create text that follows a polyline.
- ◆ Text Unmask – New command to remove text masks from selected text entities.
- ◆ Curve - Arrow – Added option for draw text and put all options into a dialog.
- ◆ Leader with Text – Added option to store and recall text for the labels.
- ◆ Layer Turn Off by Pick – New command to turn layer off by picking an entity on that layer.
- ◆ Layer Turn Off by Selection – New command to turn layers off by selecting entities on the layers.
- ◆ Turn On Layers – New command to turn on layers that were turned off by the layer off commands.
- ◆ Freeze Layer by Name – New command to enter layer name to freeze.
- ◆ Thaw Layer by Name – New command to enter layer name to thaw.
- ◆ Isolate Layer by Name – New command to enter layer names to isolate.
- ◆ 3D Viewer Window – Created faster dynamic zoom, pan and rotate for large models. View rotation works from current view center instead of overall model center. Added functions to save and load the model to a .3dx file. Added model view tree for setting properties of objects and turning layers on/off. Added transparent shading mode for surfaces.
- ◆ Twist Screen Restore Due North – Added option to choose between geodetic or grid north.
- ◆ Align Paper Space with Model Space – New command to pan the view to match a pair of points between paper and model space.
- ◆ Section Line – New command to draw section line with labels in plan view.
- ◆ Arc by Tangent/PC/PT – New command to draw an arc defined by tangent-in, PC point and PT point.



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- ◆ Curve Info – Added tangent-in and tangent-out to the report.
 - ◆ Export Google Earth – Added option to easily create URL to KML results for sharing results with others. When exporting linework, special data attached to linework such as volumes attached to perimeter polylines become tags for display in Google Earth. Added support for text, image and solid entities. Added settings for transparency of data when shown in Google Earth.

Survey Commands

- ◆ Data Collection SurvCE – Added method to transfer using external drive and method to transfer by copying files to a folder. Added support for .STK files.
- ◆ Draw Locate Points – Added Match Properties function to pick existing point to set current point style.
- ◆ Edit Process Raw Data – Added support for entering and reporting angles with decimal seconds. Added option for reporting raw data to use the report formatter.
- ◆ Edit Process Level Data – Added option to use the report formatter for reports. Added imports for Topcon and old Carlson LEV formats.
- ◆ Field-To-Finish – Added new pipe special coding to create pipe polylines with assigned width with option to draw 3D pipes. Added height parameter and option to use point number for tree id for the tree special coding. Added method to make two- and three-point curves tangent by adjusted the PC/PT points as needed within a given tolerance. New special code ZO for points to be used for elevation only when creating linework. New special code PHOTO for specifying image to attach to the point symbol. Added method to automatically stop linework when there is a gap in the point numbers for the linework code.
- ◆ Cut Sheet – Added method to filter the spreadsheet by point# or description. Added function to label in drawing with full control of fields (cut/fill, station/offset, point#, elevations and description). Added report style with design and survey data on separate lines and added option for summary statistics in the report. Added method to pair survey and design point numbers manually.
- ◆ Lock Points – New set of commands to lock selected points in the coordinate database to prevent modifications.
- ◆ Coordinate Transformation – Added method to grid to grid transformations between user-defined projections.
- ◆ Freeze/Thaw Point Attributes – New commands to freeze or thaw all the point attributes in the drawing.
- ◆ Create Points from Entities – Added method to number points from left to right or top to bottom.
- ◆ Building Offset Extensions – Added options for perpendicular and for second offsets.
- ◆ Point Group Manager – Points specified by number now retain user-specified order. New editor with method to flag radius points. Added import groups from another coordinate file or C&G points list PTS file.
- ◆ Compare Points – Added method to create point groups for point matching status.



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- ◆ Twist Point Attributes – Added option to twist specific attributes instead of whole point. Added option to set perpendicular when using line for angle reference.
 - ◆ Mask Point Attributes – New command create wipeout behind selected point attributes to hide other entities.
 - ◆ Edit Multiple Point Attributes – Added save/load settings to file for managing different point styles.
 - ◆ Calculate Offsets – Added prefix/suffix label settings.
 - ◆ Legal Description – Added method to use point group for input.
 - ◆ Enter Deed Description – Added option to apply a rotation to the entered angles. Added option to use curve calculator to enter curves.
 - ◆ Irregular Boundary Adjustment – New command to adjust angle/distance courses between two control points.
 - ◆ Polyline Compass Adjustment – New command to adjust misclosure at end of polyline by compass rule.
 - ◆ Bearing-Distance Intersect – Added support for geodetic angles and distances.
 - ◆ Distance-Distance Intersect – Added support for geodetic distances.
 - ◆ Perpendicular Intersect – New command to find intersection perpendicular from a point to another point and angle.
 - ◆ Tangent Intersect - New command to find tangential intersection from a point to another point and distance.
 - ◆ Best Fit Line – Added method to process points for two parallel lines and create two parallel lines.
 - ◆ Best Fit Centerline – Added option to create only tangents to PIs.
 - ◆ Inverse – Added option to report geodetic distances.
 - ◆ Geodetic Traverse – New command to traverse by entering geodetic bearings and distances.
 - ◆ Double Proportion – New command for geodetic double proportion computation.
 - ◆ Area Labels – Added fields for geodetic areas and area centroid northing and easting.
 - ◆ Inverse with Area – Added methods to use linework or point group for input. New option to report closure by angle/distance precision. Added option to adjust perimeter by compass rule with option to draw adjusted polyline.
 - ◆ Polyline to Special Line – Added controls for spacing gaps and sizing labels.
 - ◆ Annotate Distances – Added option to label distances in chains and option to label geodetic distances.
 - ◆ Auto Annotate – Added method to use point group for input.
 - ◆ Create Point Table – Added settings for the header and footer for the table. Added setting for the max number of rows before splitting to a new table. Added option to create table with coordinates in degrees, minutes, seconds format.
 - ◆ Label Lat/Lon – Added option to label using an attribute block and added option for elevation.



Civil Commands

- ◆ Draw Profile – Added a method to draw sheets in model space and create layouts in paper space with viewports for the profiles in model space. For redrawing updated profiles, program now only redraws the updated profile instead of the entire profile sheet. Added new controls for text layers and styles for many types of labels such as pipe labels. Horizontal Label Box now shifts labels or skip within a tolerance to avoid overlaps, has new fields for combined cut/fill, descriptions and MXS stations, new options to use road high/low stations or centerline special stations for labels, and new controls for which profiles to use for break point stations and which fields to have vertical lines. For road labels, added option to label PVI next to the PVI and option for slope arrow along the profile line. Added option to prefix all layers with name of first profile. Added option to draw matchline elevation. For PVI labels on reverse vertical curves, added label controls for combined PVC/PVT station. For break point leaders, added option to label centerline special stations and added method to position labels on row offset from grid bottom. Added option for station grid added to start and end of profile. For sewer profiles, added option to draw short pipes at the start and end. For sewer labels, added method for vertical line with fixed height and added option to label invert-in separately at bottom of manhole. Added option to hatch cut/fill areas between two profiles. Added setting for offset from grid for linework crossing labels.
- ◆ Design Template – Added setting for vertical offset of profile to handle elevated center of profile for medians. Added method to create template by selecting a polyline.
- ◆ Template Grade Table – Added support for controlling cut/fill slopes.
- ◆ Road Network – New user-interface with tree view of road elements for compact project view and right-click functions. Added support for following template point centerlines with arcs including handling cases that cross the centerline. Added method to draw 2D linework. Added support for intersections with a zero radius.
- ◆ Locate Template Points – Added option for creating points at special stations.
- ◆ Vehicle Path Tracking – Added method to place vehicle along path at picked station with real-time preview.
- ◆ Draw Single Manhole – Upgraded to support all the manhole dimensions and label settings
- ◆ Input Edit Sewer Profile – New command for editing sewer structures and pipes in a spreadsheet.
- ◆ Draw Spot Elevations – Added options to prompt for description and to apply a text mask.
- ◆ Input Edit Section File – Added method to graphically edit offset points.
- ◆ Extend Progress Sections – New command to extend sections that partially cover design sections to reach the full extent of the design.
- ◆ Section Area Report – New command to report surface area from the cross sections.
- ◆ Calculate Section Volumes – Added support for using a third cross section representing a stage of progress for reporting progress quantities. Added option for inclusion perimeter to limit area for volume calculations.
- ◆ Draw Section File – Added option to label elevations at an offset interval.



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- ◆ Slope/Length/Elev Calculator – New command to calculate slope length from elevation difference and slopes.
 - ◆ Cut/Fill Width Analysis – Added support for report formatter and option for multiple offsets.
 - ◆ Surface 3D Flyover – Runs separately from CAD for dual CAD/3D Viewer display. New function to pick in 3D viewer and zoom in CAD or place marker. New option to draw icon for current vehicle position. Added transparent shading mode for surfaces.
 - ◆ Triangulate and Contour – Improved memory usage to increase capacity of data model by 50% which also improved speed.
 - ◆ Triangulation File Utilities – Added functions to transform TIN by translate, rotate and scale.
 - ◆ Surface Inspector – Added option to report elevation difference between two surfaces.
 - ◆ Cut/Fill Labels – Added setting for deep cut/fill tolerance with settings for layer and color for cut/fill/daylight.
 - ◆ Slope Zone Analysis – Added median slope value for each zone to the report
 - ◆ Slope at Points – Added option for report output.
 - ◆ Design Bench Pond – Added support for using surface file for bottom of the pond.
 - ◆ Footprint Creator – New command for placing blocks into drawing for different building footprints with various building options and ability to draw labels.
 - ◆ Set Linework Angles to Nearest Second – New command adjusts linework to set angles to the nearest second.
 - ◆ Set Linework Intersections to Perpendicular – New command to adjust linework with a tolerance at T-intersections to be perpendicular.
 - ◆ Cleanup Lot Linework – New command that finds any overshoots or undershoots in the lot linework with the options to highlight or fix the errors.
 - ◆ Lot Network Subdivide Area – Added method to size lots by frontage.
 - ◆ Lot Network Report – Added option to use the report formatter and added reporting of the frontage.
 - ◆ Lot File by Closed Linework – New command to create lots for each closed area from the selected linework.
 - ◆ Lot File Manager – Added method to draw lots as non-overlapping lines and arcs in addition to closed polylines. Added function to set clockwise point order for selected lots. Added function to create point groups. Added option for station/offset from reference CL for report function.

Hydrology Commands

- ◆ Rainfall Events – For rational method, added 1-year event and user-defined year event.
- ◆ Watershed Analysis – Improved processing speed by 300%.
- ◆ Network Plan View Labels – Added options to draw pipe labels as mtext and to draw funnel flared end at end of pipe.
- ◆ Lateral Design – Added riser height and slope parameters. Added option for lateral extension for cleanout to building. Added method to update laterals when mainline changed. Added many new settings for the plan view labeling.



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- ◆ Sewer Network – Added pipe connection wizard to visualize adding new pipe connection to existing pipe line.
 - ◆ Create/Edit/Remove Lateral Structure – New set of commands for updating the lateral network model.
 - ◆ Collision Conflict Check – Added option to draw symbols at collisions.
 - ◆ HydroNet Explorer – Added method to add a single link for culverts.

GIS Commands

- ◆ Define GIS Features – Added import from Trimble FXL files.
- ◆ Data Capture – Added support for ungrouped text.
- ◆ Attach Image to Entity – Added support for attaching files besides images to entities such as PDFs.

Field Commands

- ◆ Drivers: Upgraded many drivers from the SurvCE updates.
- ◆ Track Position – Added method to track position within the 3D Viewer window.

Geology Commands

- ◆ Geologic Column – Added option for all attributes on single line to help avoid overlaps. Added option to append bed name to strata name. Added option to use MLeader for label leaders.
- ◆ Graphic Drillhole Report – New command to create formatted report with geologic column plus data columns.
- ◆ Parent/Child Strata Splits – Improved reporting in Surface Mine Reserves to automatically report quantities as parent strata for areas without children strata.
- ◆ Calculate Variogram – Created new interface and closer linkage with StrataCalc.
- ◆ Compare Strata to Model – New command compares strata elevation/thickness/attribute data to strata models.

Surface/Underground Mining Commands

- ◆ Surface Mine Reserves – Improved speed to run more than 3 times faster. Added an option to process with low precision on grid cell subdivision for running another 2 times faster for quick, rough calculations.
- ◆ Design Bench Pit – Added method to suspend bench as road crosses and added option to create a berm in the road.
- ◆ Design Fill Surface – Added method to suspend bench as road crosses and added option to create a berm in the road.
- ◆ Range Diagram – Added extended bench, dozer bench and spoil bench methods. Added option for pre-stripping. Added method to position dragline on strata.
- ◆ Blast Pattern Layout – Added option to draw 3D lines.
- ◆ Check Pit Polyline Overlaps – New command to report any pit polylines with overlapping areas.
- ◆ Check Property Polyline Overlaps – New command to report any property polylines with overlapping areas.



- ◆ Merge Pits – Added method to select all pits and enter min pit area and then automatically merge the small pits.
- ◆ Make Solid from Surfaces – New command to build solid from roof/floor surfaces plus rib 3D polylines.
- ◆ Make Solid from Sections – New command to build solid from tunnel cross sections along an alignment.
- ◆ Draw Solid – New command to draw a solid model into the drawing as 3D faces.
- ◆ Label Solid – New command to draw labels at selected points for the roof, floor or height of the solid.
- ◆ Section Solid – New command to create a cross section of the solid along a specified line.
- ◆ Calculate Solid Volumes – New command to calculate overall solid volume along with strata quantities.

TakeOff Commands

- ◆ Digitize Profile – New command to create a profile by digitizing.
- ◆ Digitize Cross Sections – Added method for subgrades by specified depth.
- ◆ Raster to Text – New command to use character recognition to convert label images into text entities.
- ◆ Vector to Text – New command to convert labels made of linework into text entities.
- ◆ Raster Snaps – Added preview of snap location to see current snap position.
- ◆ Trench Network Quantities - Added option to draw trench in 3D.
- ◆ Model 3D Viewer – New command to view BIM model with textures.
- ◆ Import Architecture IFC File to Drawing – New command to import BIM model from IFC to 3D Faces.
- ◆ Import Architecture IFC File to Model – New command to import BIM model from IFC to OBJ format.
- ◆ Export Architecture IFC File - New command to output a surface model to IFC format.

Point Cloud Commands

- ◆ Create Profile – Added method to create profiles directly from the cloud in addition to mesh.
- ◆ Create Sections – Added method to create sections directly from the cloud in addition to mesh.
- ◆ Create Contours – Added method to create contours directly from the cloud in addition to mesh.
- ◆ Extract Plane – New function to create a best-fit plane from a selected spot in the cloud. Includes method to create breakline at intersection of two planes.
- ◆ Clean Cloud – Added new redundant point method that quickly and effectively reduces cloud data.
- ◆ Trace Polyline – New function to create polylines by following a selected color or intensity spot on cloud data.
- ◆ LAS Format – Added support for color and intensity properties on import and export.
- ◆ Point Cloud Engine – Added option to use Carlson engine in addition to Pointools.



Data Conversions

- ◆ Geoids – Added support for USA Geoid2012A, New Caledonia 2008, Singapore 2009, and Mexico 97.
- ◆ Projections – Added WI County projections for WisCRS.
- ◆ 12D Export – New command to export drawing linework, centerlines, profiles, sections and surfaces.
- ◆ 12D Import – Added support for Unicode file format. Added support for centerlines, profiles, sections and surfaces.
- ◆ ADAC – Added import/export to ADAC sewer network data.
- ◆ Civil 3D – Updated support for newer Civil 3D versions for points and surfaces. Convert surface now works on the current drawing and has option to output surface to Carlson TIN format.
- ◆ dgDialog – Added export from Carlson RW5 to DGD format.
- ◆ ePlan – New commands to import/export ePlan parcel data.
- ◆ Leica – For DBX importing, added new point data import to get Leica attributes and added new GPS points import.
- ◆ MassDOT – Added symbol and layer libraries for MassDOT standards.
- ◆ Netherlands – Added export from Carlson RW5 to SFN.
- ◆ Saskatchewan – Added Field-to-Finish code table.
- ◆ Sokkia SRX – Added support in Field.
- ◆ Trimble DC – Added support for importing centerlines, profiles and sections.
- ◆ WinCMM – Added export from Carlson RW5 to LSA.



What's New in Carlson 2013

General

- ◆ AutoCAD 2013 – Added support for this new version.
- ◆ IntelliCAD 7.2 – Improved performance and stability.
- ◆ Ribbons – New ribbon user-interface with ribbons for General, Survey, Civil and Takeoff.
- ◆ Toolbars – Added 173 new toolbar icons.
- ◆ Report Viewer – New output method from Report Formatter for formatted fields and table layout.
- ◆ Symbol Library – Added 22 new symbols.
- ◆ Linetypes – Added 9 new linetypes.
- ◆ Hatch – Added 30 new hatch patterns.
- ◆ Barscale – Added two new barscale styles.
- ◆ Twist to 3D View – New command to rotate points, symbols and text to face the current 3D viewpoint.
- ◆ Draw Box Around Text – Added settings for gap offset and whether to round corners.
- ◆ Draw Item - Added support for using point #'s from the current coordinate file and for creating 3D polylines.
- ◆ Freeze Layer by Pick – New command to pick individual entity on layer to freeze.
- ◆ Erase by Layer – Added functions to save and load layer selections.
- ◆ Export Google Earth – Added ability to export point entities. Added support for layer and color attributes. Added support to create kmz files as well as kml.
- ◆ Import Google Earth – New command to import points and linework from kml file.

Survey Commands

- ◆ CRDB – New coordinate file format built on SQLite database for better performance than MDB.
- ◆ Search Published Control - New command to lookup points from NGS geodetic control database.
- ◆ Edit-Process Raw File – Added method to display only selected point range and hide the rest.
- ◆ Field-To-Finish – Many new coding methods for tree surveys including coding by description sequence, by GIS attribute or by user-defined special characters. Also added method to draw circle for drip radius, method to draw circle for truck radius and method to draw polyline for tree line perimeter. Added function to generate tree table and reports based on tree coding in the point descriptions. For general point reports, added option to use the report formatter and include fields for the dwg description and code full name. For GIS labeling, added settings for decimal places and custom symbol attributes as reals. Also, for GIS processing, added support for using GIS attribute for special codes such as horizontal offset. For ROT special code, added method to rotate by description using companion codes.
- ◆ Edit-Multiple Point Attributes – New user-interface with tabbed dialog. Added method to change attribute colors. Added ability to toggle visibility of attributes.
- ◆ Edit-Process Deed File – Added method to use label precision for calculating closure.
- ◆ Twist Screen Surveyor – Added option to use grid mapping angle.



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- ◆ Inverse – Added option to report distances as delta north-south-east-west. Added option to report lat/lon. Added option whether to report coordinates.
 - ◆ Draw Locate Points – Added method to create points by entering lat/lon.
 - ◆ Bearing/Bearing Intersect – Added support for geodetic bearings.
 - ◆ Distance Between Entities – Added average distance to the report.
 - ◆ Map Check by Screen Entities – Added options whether to auto-select entities and set max offset.
 - ◆ Best-Fit Point – New command to average points and report statistics.
 - ◆ Cut Sheets – New spreadsheet interface, import from SurvCE and plan view labeling methods.
 - ◆ Lot File Manager – Added function to hatch lots.
 - ◆ Angle/Distance Annotation – Added settings for bearing quadrant labels. Added control for arrow size for end point leaders. Added separate settings for justification of angle and distance labels. Added option for prefix for distance labels.
 - ◆ North Arrows – Added ability to add custom north arrow symbols.
 - ◆ Label Coordinates – Added style for labels along X/Y axis.
 - ◆ Label Lat/Lon – Added real-time display of lat/lon while picking points to label.
 - ◆ Area Labels – Added option to use grid to ground conversion to label geodetic areas.
 - ◆ Geodetic Single Proportion – New command to split line by proportion between record part and total distances.
 - ◆ Geodetic Double Break – New command to break two intersecting lines based on mean bearing.
 - ◆ Geodetic Middle Break – New command splits line to make lines with same geodetic length and mean bearing.
 - ◆ Grant Boundary Adjustment – New command to apply Grant boundary adjustment on closed polylines.

Civil Commands

- ◆ Centerlines – Added support for non-tangent spirals.
- ◆ Station Polyline/Centerline – Added settings for deflection angle precision. For polylines on a profile grid, added setting for vertical exaggeration.
- ◆ Label Station Offset – Added option for arrow on leader.
- ◆ Draw Profile – Added method to label linework that crosses reference centerline. In options dialog, added screen pick method for dimensions like plan view window size. Added option for output to DWG to have separate DWG for each layout. In metric mode, added unit setting for pipe size labels as m, cm or mm. For horizontal axis labels, added settings for prefix/suffix on elevation labels. Also, for horizontal axis elevations, added option to draw tick and option for separate interval along curves. For sewer labels, added control for vertical shift of labels with leaders, added method to place manhole label as offset from rim, and added controls for different combos of pipe length and slope labels. For sheets, new setting for whether to label sheet #. Added option for separate rows to crossing labels with vertical lines.
- ◆ Profile Report – Added support for reporting elevations and cut/fill for any number of profiles at once.



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- ◆ Draw Sections – Added option to hatch cut/fill end areas. In metric mode, added unit setting for pipe size labels as m, cm or mm. For sheet output, added option for all in same layout or separate layout for each sheet.
 - ◆ Label Profile on Centerline – Added method to label at station interval.
 - ◆ Calculate Section Volumes – Added support for cut/fill gap stations.
 - ◆ Lock Sections – Added method in Input-Edit Section File to lock sections to prevent changes by any routines.
 - ◆ Input-Edit Section File – Added display of end areas when editing two section files.
 - ◆ Mass Haul Analysis – Added average haul distance per range to report. Added support for cut/fill gap stations.
 - ◆ Template Transition – Added report function.
 - ◆ Template Point Profile – Added report function.
 - ◆ Template Point Centerline – Added report function.
 - ◆ Road Network – Added cut/fill gap stations per road. In Show Sections review, added method to go to specific station. Added setting for transition distance from template ID at intersections. For report, added option to use report formatter.
 - ◆ Draw Spot Elevations – Added option for vertical offset and option to label a second elevation. Added method to use 3D polylines for elevation reference and added option to link labels to the reference polylines.
 - ◆ Set Point Elevations By 3D Polylines – Added option to link elevations to reference polylines.
 - ◆ Set Point Elevations by Surface Model - Added option to link elevations to surface model.
 - ◆ Cut/Fill Grid Map – New command to label cut/fill quantities at a grid interval.
 - ◆ Elevate Text – New command to set elevation of text entities by values in the text labels.
 - ◆ Edit Wall Polyline Profiles – New command to define 3D wall for surface modeling by top and bottom profiles.
 - ◆ Triangulate & Contour – Added option to control number of digits in elevation labels and put comma in labels for values in thousands.
 - ◆ Contour Elevation Label – Added options to label ends of contour lines and to align labels facing uphill.
 - ◆ Draw Contour Gradient Marks – New command to draw tick marks along contour to show slope direction.
 - ◆ Cut/Fill Slopes Lines – Added options to hatch slope areas and to use different slope symbols.
 - ◆ Draw Surface Boundary – Option to label polyline perimeter with user-specified text at an interval.
 - ◆ Triangulation Surface Volumes – Added ability to report staging volumes.

Hydrology Commands

- ◆ Design Bench Pond – Added option for sloped pond bottom.
- ◆ Design Valley Pond – Updated user-interface with new options dialog.
- ◆ Sewer Network – Added method for headwall with skew rotation.
- ◆ Lateral Design – New lateral structure types for sewer network plus reporting and profiles.



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- ◆ Plan View Labels – Added label options for deflection angle, structure description, northing and easting values. Added option to add pipe material to invert-out label. Added setting for separate layer for outside line of dashed thick linetype.
 - ◆ Sewer Spreadsheet Editor – Made dialog resizable.
 - ◆ Pipe Profile Label – New command to label bottom or top of pipe elevations at picked locations.
 - ◆ Library Files – Added default libraries for pipe and rainfall for North Carolina and Kentucky standards.

GIS Commands

- ◆ Create Image from Drawing – New command to create a georeferenced image from the drawing entities.
- ◆ Esri ArcGIS Services - Added support for server 10.x.
- ◆ SQLite – Added support for SQLite databases in addition to MDB and ESRI MSC.

Geology Commands

- ◆ CDB – New drillhole database format built on SQLite for better performance than MDB.
- ◆ Define Drillhole – New user-interface with spreadsheets. Added method to restrict strata/bed/attribute names to pre-defined lists.
- ◆ Define Lookup Database – New command to define drillhole and custom attribute tables.
- ◆ Edit Drillhole – New user interface with spreadsheet. New functions to lookup strata and bed names from pre-defined lists. Added options to color strata by strata definition or by grade parameters.
- ◆ Drillhole Data Sheet – Added function to run Edit Drillhole for selected drillhole.
- ◆ Drillhole Core Images – New command assign core images to depth ranges of drillhole.
- ◆ Drillhole Text Formatter – Added method to set text rotation per text field. Added option to create mtext.
- ◆ Select Drillholes By Filter – New command to build selection of drillhole by parameter filters.
- ◆ Auto-Run Isopach Maps – Added setting for whether to extrapolate models from grid files.
- ◆ Fence Diagram – Added support for angled drillholes and drawing multiple additional surfaces.
- ◆ Quick Geologic Column – New command to show selected drillholes in section view.
- ◆ Geologic Column – Added options to draw mtext labels and to create a block of the geologic column entities. Added setting to control offset amount between columns.
- ◆ Define Grade Parameters – Added support for up to 50 attributes to define grades.
- ◆ Grid File Utilities - Scripts allow a custom message for file selection and perimeter selection prompts.

Surface/Underground Mining Commands

- ◆ Range Diagram – New command to design cut/place for dragline with dynamic graphics and reports.
- ◆ Design Bench Pit – Added support for using TINs as surface model in addition to grids. Added setting for minimum bench height. Added method to process multiple pits by using Timing file (TIM) for sequencing.



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- ◆ Quantities by Grid Method – Added options to set grid resolution and choose modeling method.
 - ◆ Recalculate Extraction - Added additional layer capture ability: entry width and attribute group.
 - ◆ Assign Timing Grids – Added auto-run method to make assignments.
 - ◆ Surface History – Added support for TINs in addition to grid surfaces.
 - ◆ Hatch Pits – New command to hatch pit polylines.
 - ◆ Surface Equipment Timing – Added method to assign block sequence by rules. In 3D pit scheduling, added real-time display of selected quantities and qualities. Also, in 3D pick window, added time slider and scheduling information. Weight qualities by volume instead of area. Added ability to define precedence rules as formulas to be applied automatically based on custom naming strategy. Timing window has new function to adjust sorting of unassigned pit/panels so that precedence is satisfied. Added ability to define how attributes are weighted by another attribute. Pit attribute data is moved to the extension dictionary to allow for more attributes to be assigned.
 - ◆ Underground Equipment Timing - additional option for the timing events to affect only secondary units and not the unit encountering the event.
 - ◆ Spoil Placement Timing – Added swell factor and added time available to place volumes.

TakeOff Commands

- ◆ Drawing Cleanup – Added method to rename layers with wildcard characters in names.
- ◆ Cut/Fill Color Map – Added two more coloring schemes.
- ◆ Report Subgrade Areas – New command to report areas by subgrade type.
- ◆ Make Surfaces – Added option to minimize flat triangles.
- ◆ Make Existing Surface – Added drillhole surface elevations into surface model.
- ◆ 3D Drive Simulation – Added display of current coordinates and option for reference CL for station-offset.

Point Cloud Commands

- ◆ Snap Modes – Added new snap modes for top of slopes and bottom of slope.

Data Conversions

- ◆ ESRI – Added function to export ESRI grid surfaces from Grid File Utilities.
- ◆ Geoids – Added three Bayern geoids and GCG05-KUESTE geoid for Germany, Romanian geoid, Papua New Guinea geoid, Slovenia geoid, Croatian HRG2009 geoid and TRST geoid.
- ◆ Horizon – Added import for Horizon raw data.
- ◆ Minex – Added import for Minex grids in Grid File Utilities.
- ◆ Vulcan – Added imports for Vulcan grids and Vulcan block models.



What's New in Carlson 2012

General

- ◆ AutoCAD 2012 – Added support for this new version.
- ◆ IntelliCAD 7 – Improved performance and stability.
- ◆ Toolbars – Added 16 new toolbar icons.
- ◆ Data Depot – Added XREF support. Added option to unlock checked in drawing at close time. Added unique icon for files that are newer on the server than local copy. Added Purge Local Copies function per drawing. Added Clean INI file function to remove missing files. For ProjectWise, added ability to deal with the ProjectWise caching server.
- ◆ Field Text – Added separate fields for drawing path, drawing name, time, project name and job number. Added support for running with IntelliCAD.
- ◆ Translate Layers – New command to rename layers by user-defined lookup table.
- ◆ Select by Block – New command to build a selection set using a block name filter.
- ◆ Scale Wizard – Added option for whether to scale in 2D or 3D.
- ◆ Join Nearest – Added filter to match polyline widths.
- ◆ Coordinate Systems – Added support for user-defined coordinate systems in Drawing Setup. Added support for 14 more projection methods, hundreds more pre-defined projection definitions and added 11 more built-in ellipsoid definitions. Added support for SurvCE CSL and ESRI PRJ projection definitions.
- ◆ 3D Viewer Window – Added support for showing 3D symbols. Added ability to show realistic sky background and ground textures.
- ◆ Symbol Library – Added 86 new 3D symbols for trees, people, vehicles and utilities.
- ◆ Settings Explorer – Only shows the settings for currently licensed modules instead of everything.
- ◆ Report Header – Added option to set project name and job number to use in header for reports.
- ◆ Report Formatter – New controls for report header/footer and text style properties per field.
- ◆ GONS Support – Added support for angles in gons in many routines.

Survey Commands

- ◆ Geoids – Improved delivery of geoid models with addition of automatic download from web server when a geoid is referenced for the first time. Added Geoid Manager function to Data Collection to carve out a portion for uploading to SurvCE.
- ◆ Export Text/ASCII File – Added filter methods of within inclusion perimeter polyline, by coordinate window or center within radius.
- ◆ SurvNET – Added ability to report both grid and ground coordinates.
- ◆ Draw Locate Point – For polyline filter, added support for both inclusion and exclusion perimeters.
- ◆ Field-to-Finish – Added option for two different symbols with different sizes. For size special code SZ, added method to scale symbol x,y separately from z. Also added method to scale symbol z by another shot. Plus added SZ code method as a scaler size instead of absolute size.



- ◆ Edit-Process Raw File – Added method in Modify Measurements to adjust latitude/longitude/z of GPS records.
- ◆ Enter Deed Description – Upgraded to use Auto-Annotate for labeling with full set of controls including ability to link labels to the linework. Added option to choose Tangent for line segment after a curve to save having to enter the line bearing. Added option to enter angles as angle rights or deflections. For RW5 output, added ability to append to the RW5 and include the deed name as a note.
- ◆ Process Deed File– For Draw function, added option to label angles and distances in addition to drawing geometry. Added function to copy a deed.
- ◆ Inverse – Added option to report mean bearing.
- ◆ Label Station-Offset – Brought back feature to add offset description to existing point descriptions.
- ◆ Offset Point Entry – Added support for custom field order for import from file, and support for importing a point description.
- ◆ Station Polyline/Centerline – Added option for separate station intervals along curves.
- ◆ Cut Sheet – For points method, added option to match points by description field and added description field filters for station and offset data.
- ◆ Right of Way Crossing Table – New command to create table of ROW distances and lot data for polyline crossing through lots.
- ◆ Sliding Side Area – Added method to set angle for new edge by two reference points, by entered angle or by reference line.
- ◆ Survey Text Defaults – Added setting for decimal places to match current drawing precision.
- ◆ Stack Label Arc – Added option to center justify labels and option for delta symbol.
- ◆ Label Angles – Added support for labeling mean bearings.
- ◆ Label Coordinates– Added setting for the text style.
- ◆ Line/Curve Table Defaults – Added setting to control row height. Added functions to save/load settings to a file. Added support for Switch Bearing Quadrant to work with Table Entity style tables. Added support for using an alphanumeric string for the tag label.
- ◆ Split Table – New command to split a table entity style line or curve table into two tables.
- ◆ Merge Table – New command to combine two table entity style line or curve tables into a single table.
- ◆ Edit Table Values – New command for table entity style line or curve tables to edit table data in a spreadsheet.
- ◆ Line Types – Added new double parallel continuous line type.

Civil Commands

- ◆ Triangulate & Contour– Added option to filter selection set by the inclusion/exclusion perimeters.
- ◆ Points by Slope– Added method to set slope by two points.
- ◆ Design Pad Template– Added options to force cut slopes in fill conditions and likewise to force fill slopes in cut conditions.



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- ◆ Cut/Fill Centroids – Added option to use inclusion/exclusion perimeters.
 - ◆ Cut/Fill Slope Lines– New command to label cut/fill slope lines with slope direction arrows.
 - ◆ Quick Draw Surface – New command to draw a triangulation surface with temporary graphics.
 - ◆ Surface 3D Flyover – Added five more 3D vehicles.
 - ◆ Slope Zone Analysis – Added option to use Report Formatter.
 - ◆ Elevation Zone Analysis – Added option to use Report Formatter.
 - ◆ Vehicle Path Tracking – Added support for vehicles with hinge points. Added save/load vehicle dimensions to a file.
 - ◆ Polyline to Centerline File – Added display of direction of polyline with option to reverse.
 - ◆ Best-Fit Profile – Added method to specify starting or ending elevations for matching onto existing road.
 - ◆ Draw Profile – Added ten new fields to the horizontal label box including vertical curve/slope and horizontal curve data, plus added more formatting options. Added setting for separate layer for flow arrows. Added option for text whether double-click edits text or profile settings. Added option to label sewer data in individual data tables. For drawing pipe crossings from sewer networks, added method to selected which networks to process from the drawing.
 - ◆ Design Template – For median elements, added support for dynamics on each median edge such as controlling height by a template point profile.
 - ◆ Template Grade Table – Added method to match surface with delta slope from a variable target slope such as a super elevation target. Added function to import from super elevation.
 - ◆ Road Network – For intersections, added option for second hinge point on side profiles. Added support for a rock surface for special rock cut slope and quantities.
 - ◆ Draw Section File – Added settings for station text layer, style, prefix and suffix. Added prefix and suffix settings to label elevation at zero offset. Added option to label offsets at top of grid. Added separate text sizes for offset and elevation grid labels.
 - ◆ Calculate Section Volumes – Added option to breakout quantities by staging. Added report of horizontal and slope areas.
 - ◆ Calculate End Area – Added option to calculate another end area for unsuitable material.
 - ◆ Edit-Process End Area File – Added support for tracking and reporting unsuitable material.

Hydrology Commands

- ◆ Drop Pipe Spillway Design – Added support for rectangular risers.
- ◆ Advanced Weir Design – Added dynamic graphic preview of weir dimensions.
- ◆ Input-Edit Stage-Storage/Discharge – Added option for Report Formatter for custom reports and Excel output.
- ◆ Sewer Network Libraries – Added ability for user-defined custom fields to add to pipe, structure and inlet libraries. These custom fields are used in Report Sewer Network.
- ◆ Sewer Network Symbols – Added optional 3D symbol for structures for drawing model in 3D.
- ◆ Draw Sewer Network Plan View – Added option to label only structures with assigned ID's intended for clearing up utility network plans.



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- ◆ Draw Sewer Network Profile – Added method to link edits to profile back to sewer network model. Added option to label inlet type.
 - ◆ Collision Conflicts Check – Added method to check 3D polylines with assigned pipe data. Added amount of overlap for any conflicts to the report. Added checking of pipes within same network.

GIS Commands

- ◆ GIS Query/Report – Added method to edit the records that match the query.
- ◆ Place ESRI Map Service Image – New command insert an image from an ESRI ArcGIS Map Server.
- ◆ Place Google Earth Image – Added support for running on x64 computers.
- ◆ Snap Linework to Points – New command to snap linework vertices to points with tolerances.
- ◆ Write ESRI Projection File – New command to create an ESRI PRJ file.

Point Cloud Commands

- ◆ Large Coordinates – Added support for cloud with large coordinate values.
- ◆ 3D Cylinders – Added feature extraction for 3D cylinders.
- ◆ 3D Symbols – Added new Field-to-Finish code for sizing 3D symbols.
- ◆ LAS Export – New function to export a .LAS format point cloud.
- ◆ Import Grid – Added method to import grid data.
- ◆ Create Grid – New function to create a .grd surface model.

Geology Commands

- ◆ Edit Drillhole– When a series of strata are highlighted in the list, the summary of thickness, top/bottom z and depth are displayed.
- ◆ Draw Drillhole Text – Added option to create text at elevation instead of zero.
- ◆ Strata Polyline – Added option to set polyline reference as top elevation of strata.
- ◆ Calculate Fault Shift – New command to assign fault shifts along polyline using strata model.
- ◆ Input-Edit Strike/Dip Symbols – New command to place, edit, report and import strike/dip symbols.
- ◆ Fence Diagram– Added option to set elevation range to draw. Added settings for prefix and suffix for layers and separate layer for additional surface. Added option for pit markers to draw from grid bottom to strata bottom.
- ◆ Voronoi Diagram – Added option to use drillhole instead of specific strata value.
- ◆ Make Block Model – For inverse distance mode, added method for elliptical factor with strike and dip angle.
- ◆ Label Block Model – New command to draw labels of grade ranges at the block model interval in plan view.
- ◆ Surface Mine Reserves – Added option to output spoil data file of waste and/or key volumes for spoil timing.

Surface/Underground Mining Commands

- ◆ Grid Inspector– Switched to spreadsheet interface for defining grid files with support for more surfaces.



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- ◆ Import Pit Points – New command to create pit polylines by pit name and point data in text file.
 - ◆ Remove Empty Benches – Added support for checking pit quantities defined by grids.
 - ◆ Design Bench Pit– Added support for creating a haul road with the pit design. Added option for separate layers for linework per bench.
 - ◆ Tag Slope Groups– New command to place symbols on pit perimeter segments to assign slope group selection for Design Bench Pit.
 - ◆ Assign Panel Attributes – New command to assign attributes to multiple panels at a time.
 - ◆ Cut Only – Added option to make cut for non-key such as prestrip in addition to key removal.
 - ◆ 3D Pick: Surface Equipment Timing– Added method for multiple selections by crossing between two picked blocks. Added option to ignore zero entities in the view. Added save/load bench color settings to a file.
 - ◆ 3D Pick: Underground Timing – Changes colors as blocks are selected for visual feedback.
 - ◆ Surface Equipment Timing – Added support for an unlimited number of output period grids. Added option to output spoil data file of waste and/or key volumes for spoil timing. Added method to split mining blocks into separate key only and non-key only blocks.
 - ◆ Haul Road Manager – New command to set road parameters on 3D polylines for resistance and speed limit.
 - ◆ Haul Fleet Manager – New command to setup truck parameters including performance, capacity and timing.
 - ◆ Haul Cycle Analysis– New command to calculate and report cycle time, fleet size and production rates.
 - ◆ Design Spoil Pile – Added method for cone from point for specified volume or height.
 - ◆ Assign Spoil Names – New command to assign spoil name to perimeter polyline.
 - ◆ Spoil by Interior Point – New command to create spoil polyline by picking inside area bounded by linework.
 - ◆ Spoil Layout by Width – New command to create spoil polylines at specified width inside boundary.
 - ◆ Find Spoil Name – New command to zoom to and highlight spoil polyline with specified name.
 - ◆ Label Spoil Names – New command to label the spoil and site names of spoil polylines.
 - ◆ Remove Spoil Names – New command to untag spoil data from a polyline.
 - ◆ Clear Spoil Volumes – New command to remove spoil quantities from selected spoil polylines.
 - ◆ Merge Spoils – New command to combine two spoil polylines into combined polyline.
 - ◆ Spoil Directions – Set of four new command to manage spoiling direction within polylines.
 - ◆ Calculate Spoil Volumes – New command to assign spoil volumes to polylines for specified surfaces.
 - ◆ Edit Spoil Volumes – New command to edit spoil quantities assigned to spoil polylines.
 - ◆ Edit Spoil Source – New command to edit spoil source data file with quantities from cuts.
 - ◆ Spoil Placement Timing – New command to sequence placement of spoil given cuts and haul fleets.



Natural Regrade Commands

- ◆ Create Vegetation Scene – New command to create vegetation symbols with specified size and density within polylines by layer.

TakeOff Commands

- ◆ Digitize Cross Sections – Added method to highlight digitized sections on drawing instead of preview window.
- ◆ Digitize End Areas – Added support for on-screen mouse mode.
- ◆ 3D Drive Simulation – Added ability to show realistic sky background and ground textures.
- ◆ Set Raster Image – New command to set the image to process.
- ◆ Trace Line – New command to create line by following raster pixels.
- ◆ Trace Polyline – New command to create polyline by following raster pixels.
- ◆ Raster Node Snap – New command to snap a picked point to the nearest of the underlying raster pixels.
- ◆ Raster Endpoint Snap – New command to snap a picked point to the end of the underlying raster pixels.
- ◆ Cut Image – New command to erase raster pixels within a perimeter.
- ◆ Crop Image – New command to erase raster pixels outside a perimeter.
- ◆ Remove Speckles – New command to clean up noise by removing speckles in the image.
- ◆ Undo Raster Edit – New command to undo the last change to the image file.
- ◆ Merge Raster Files – New command to combine two raster files into single image by pair of control points.
- ◆ Erase Raster by Closed Polyline – New command to erase pixels within perimeter polylines.

Data Conversions

- ◆ AUS09 – Added support for this geoid.
- ◆ EGM08 – Added support for this geoid across world.
- ◆ OCRS – Added support for Oregon zone projections.
- ◆ US County Projections – Added support for MN and WI county projections.

