

# Improvements for Carlson Survey/Civil/Takeoff/Mining 2010

## Top 20 Highlights

1. **64 Bit** – Support for running in 64-bit.
2. **Data Depot** – Document management for workgroups and archiving.
3. **Settings Explorer** – Manage all command settings.
4. **Draw Standard Item** – Create drawing entities using standards.
5. **Multiple Backsights** – Uses least-squares to calculate backsight orientation from multiple targets.
6. **Smart Annotation** – Rule based annotation styles.
7. **Template Grade Table** – Powerful and easy method for template transitions.
8. **Draw Profile** – 101 new settings for more control.
9. **EOP Profiles** – RoadNet generates and Draw Profile annotates EOP profiles.
10. **Hydrology Network** – Link watersheds and structures with interface to HydroCAD.
11. **PDF Reports** – Quick and easy reports to PDF from several commands.
12. **PDF Import** – Read a vectorized PDF into the drawing.
13. **Sections From Polylines** – Automatically create sections by layer.
14. **TIN's for Mining** – Support for triangulation surfaces for surface and pit bottoms.
15. **Fence Diagram Upgrades** – New method for multiple fences and new command for real-time fence diagrams.
16. **3D Mine Model** – Draw and view an underground mine in 3D.
17. **Ultra Large Datasets** – New engine for Point Clouds supports clouds with a billion points.
18. **CG/Carlson Survey Combined** – Survey module includes both Carlson and C&G Survey.
19. **Languages** – Support for language translations with five initial languages included.
20. **New Modules** – New Carlson GeoTech and Carlson Construction modules.

## General

- **CAD Platforms** – Added support for running on AutoCAD 2010 and Map 2010.
- **64 Bit** – Added support for running in 64-bit for 64-bit versions of AutoCAD.
- **Install** – Added setting to specify a custom AutoCAD profile name to use when launching Carlson.
- **Languages** – Added support for language translations with initial translations for French, Spanish, Portuguese, Russian and German.
- **New Carlson GeoTech** – New geotechnical module for civil and environmental firms.
- **New Carlson Construction** – New module for earthworks, drillholes, roads, machine control data prep, survey as-built mapping and stakeout.
- **IntelliCAD** – Added ability to switch to the standard IntelliCAD menu.
- **File Selection** - Added a search function.
- **Data Files** – Switched to using relative data paths for all stored file names to make it easier to transfer projects between users.
- **New Data Depot** – New set of commands for document management to share files between user and to archive.
- **New Settings Explorer** – New command for a central place to manage settings for all the Carlson commands with features to report settings, restore defaults, manage layers, save and recall settings.
- **New Settings File Manager** – New command to browse all available settings files and select current ones.
- **New Layout Manager** – New command to organize the plot sequence and properties of multiple layouts.
- **New Draw Field Text** – New command to create dynamic text based on a drawing or project attribute.
- **New Remove Xdata** – New command to remove extended entity data from the selected entities.
- **Layer Report** – Added line width field.
- **New Layer Order** – New command to define display order by layer and apply this order to the drawing.
- **New Flip Text by Twist Screen** – New command to flip the selected text as needed to read right side up for the current twist screen.
- **New Callout Leader** – New command to draw text in a box with a leader.
- **New MultiLeader with Text** – New command to draw leader with multiple segments with a label.
- **Restore Layer State** – Added support for reading LDD style layer state snapshots.
- **New Tangent from Snap** – New snap to go tangent from a curve.
- **Layer Library** – Added function to create the layers from the library into the drawing.
- **Store Project Archive** – Now puts xref drawings and images attached to the drawing in the archive.
- **Set Project/Data Folders** – Added function to reassign data folders and function to clear the data folder history and go back to defaults.

- **Drawing Inspector** – Added ability to select multiple fields to display at the same time. Added option to show the entity type. Added option to show polyline direction with temporary arrows.
- **3D Viewer Window** – Added print function. Added zoom motion to the right mouse button.
- **New Offset to Area** – New command to offset a polyline to create a target area size.
- **New Add Polyline Arcs** – New command to create polyline arcs from a series of short chords.
- **New Text on Line** – New command to create text aligned by the selected linework.
- **Select By Filter** – Added filters for color, text height and text style.
- **New Select Similar** – New command to create selection set by filter of properties from sample entities.
- **New Angle Info** – New command to report all angles defined by two joining segments or by three points.
- **Report Formatter** – For table output, added options whether to draw header and totals.
- **Polyline Report** – Added option for decimal seconds on the angles.
- **PDF Reports** – Added support for PDF in addition to DWF for formatted reports like Calculate Total Volumes.
- **New Layer Lock/Unlock** – New commands to lock and unlock layers on the selected entities.
- **New Layer On All** – New command to turn on and thaw all layers in the drawing.
- **Text Export** – Added support for MText.
- **Symbol Library** – Added 25 new point symbols.

## Survey Commands

- **C&G Survey** – Combined C&G Survey commands with Carlson Survey.
- **Field-to-Finish** – New user-interface for the code table with a spreadsheet organized by category and with customizable columns. Added support for multiple OH special code in the same description by offsetting multiple times. New special code of \ to prefix the description, and new \\ code to prefix the field code description. New special code of NEAR to set the current line to the nearest found connection method. New special code of CTOG to toggle curve mode. New GAP special code to make a single segment break in linework. New LTF special code to flip the linetype orientation. Added code setting for the linetype direction. Added code setting for user-defined custom linetype string. Added option to use an external user-defined linetype file. Added option for specifying symbols outside of the symbol library. Added function to import codes from a user-specified text file format. Added new substitution code lookup table as preprocess step on field descriptions. For text attributes, added separate position controls for each attribute and separate offsets for each position. Added support for SDMS coding methods. Added export of code table to SurvCE FCL format. Added separate controls for the attribute and text descriptions for whether to use the raw description.
- **Edit Process Raw File** – Added method to process multiple backsight targets at a setup using least-squares to calculate the orientation and report residuals. Added ability to multiply and divide in modify measurements function. For the find function, added specific search fields for the foresight and occupy point numbers.
- **New Edit Process SDMS File** – New command to edit and process SDMS format raw data in it's native format.
- **Edit Process Level Data** – Added support for both differential and trig level data, and support for SurvCE TLV.
- **SurvNET** – Added support for processing SDMS and Trimble format raw data.
- **Elevation Labels** – Added method to draw elevation decimal on point for Field-to-Finish, Draw-Locate Point and Spot Elevations.
- **Coordinate File Utilities** – For Compare Points, added option to use the report formatter. For Description for Points, descriptions for any drawing point entities are updated as well as the coordinate file. For Elevation for Points, added methods for elevation difference and scale. For both Description and Elevation for Points, added selection from screen or by point group. Made command names for the individual CFU functions to allow running the functions from the command line or toolbar.
- **Edit Points** – Added method to filter by a point group for editing by point range, elevation range or description filter.
- **Erase Points** – Added option for whether to erase the symbols.
- **Point Group Manager** – Added function to copy group definition and then adjust. Added move up/down functions to change order of groups.
- **Fix Point Attribute Overlaps** – Added function to erase attributes.
- **Enter Deed Description** – Added option to choose Tangent for line segment after a curve. 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** – Added ability to switch bearing and distance columns in the spreadsheet editor. Add function to export to RW5 format.
- **Legal Description** – Added method to pick an interior point to get the perimeter. Added ability to generate legal descriptions from lot files. Added option to output to external files by the lot names. Added user-defined distance tolerance on finding points for descriptions. Added option to round angles to the nearest 5 seconds. Added method to process multiple boundaries at a time.

- **Inverse** – Added option to report slope distances. Added method to select group of points and inverse from a base point. Added options to zoom to the occupy point or both the occupy and backsight points.
- **Visual COGO** – Added option for north rotation.
- **New Locate By Delta** – New command to create points by specified delta x, y, z from a reference point.
- **New Interval Between Points** – New command to create points by interpolating between points by distance interval.
- **4 Sided Building** – Added method for two points for the face then a third point or enter an offset.
- **Radial Stakeout** – Added option to use the report formatter.
- **Best Fit Line/Curve** – Added ability to add or remove points from processing and then recalculate.
- **Lot File Manager** – Added option to manually change lot order by moving selected lots up/down. Added sort function by block name and/or lot name. Added method to export selected lots from the lot file.
- **Area Labels** – Added option for custom fixed label. Added option for second scaled distance based on Drawing Setup report scale factor.
- **Area By Interior Point** – Added option to create a closed polyline.
- **Inverse with Area** – Added option to use the report formatter and option whether to include the station in the report.
- **Change Polyline Linetype** – For user-defined, added control for the gap at the label.
- **Sketch Tree Line** – Added options to reverse, auto-close, select polyline to convert and set scale.
- **Curve Table** – Added fields for radial bearing-in and bearing-out.
- **Line/Curve Tables** - When using a tag number is already used, added option to renumber the table. Added separate settings for the second distance columns.
- **New Edit Table Properties** – New command to change properties such as decimals for the selected line/curve tables.
- **Curve Annotation** – Added option to combine common radii with position option for radius label. Added option to label half of the delta angle. Added option for end point leaders on curves. Added method to define chord direction by picked end.
- **Angle Annotation** – Added option to always label azimuths to the east (0-180 degrees). For flip label option, added angle tolerance to north for threshold when to flip. Added option to drop trailing zeros for minutes and seconds on even degrees. Added option to draw end point leaders on angle only labels. Added user-defined suffix settings for degrees, minutes and seconds. Added option to label cardinal angles by user-specified names instead of degrees, minutes and seconds.
- **Distance Annotation** – Added an option to label only the second scaled distance. Added option to label in feet and inches. Added setting for distance label precision.
- **Angle/Distance Annotation** – Added separate controls for layers and style for both angles and distances. Added option for whether to erase previous labels. Added ability to left or right justify labels at ends of line instead of center justification. Added new method to combine common angles in series plus an option to label the total distance. For common angles in parallel, added option to label only the outside angles. The common angle labels have separate settings for layer, style, size and offset. Added option to space out angle and distance along the segment when there is room. For specifying segments by point numbers, the routines will now recall the last entry mode and uses a sequential entry method.
- **Auto Annotate** – Added option to create stacked curve labels. Added option to automatically switch to stacked bearing and distance labels when the segment is short.
- **Fix Label Overlaps** – Added option to make a label with a leader to resolve a conflict.
- **New Move Label with Leader** – New command to make a leader label out of the select angle/distance label.

## Civil Commands

- **Contour Labels** – Added option whether to draw the labels at real-z or zero elevation. Added control for size of box around the labels. Added option to use MText and option to center justify the labels. For contouring roads, added an option to position the labels at a fixed offset from the centerline.
- **Crossing Contour Checks** – Added setting for the max number of rechecks for crossings.
- **Contour Elevation Label** – Added method to use a polyline for the label alignment.
- **New Contour ID** – New function to report the surface file name used to generate the selected contour entity.
- **Move Label Along Contour** – Added option to flip the label for facing uphill.
- **Triangulation Simplification** – Added new elevation difference simplification method to Triangulate & Contour and Triangulation File Utilities to reduce the data points while preserving the model within a tolerance.
- **Triangulation Surface Manager** – Added ability to selection set of points and 3D polylines to the source data. Added function to move existing triangulation points. Added function to copy a surface.
- **Volumes by Triangulation** – Added option to use the report formatter. Added option whether to include CF.

- **New Three Triangulation Surface Volumes** – New command to use existing, design and strata surfaces to report strata cut and overexcavate in addition to regular cut/fill volumes.
- **Stockpile/Pond/Pit Volumes** – Added option to set elevation range and interval and report volumes by interval.
- **Grid File Utilities** – Added option in Set Value to null cells within a specified elevation range and added option in Less/Greater Value to set to null. Added ability to export multiple grids at a time. Added scale function to switch units between English and metric. For export grid, added option to use inclusion perimeters.
- **New Min/Max Slopes for 3D Polylines** – New command to check 3D polylines to make sure slopes are within the specified range and sets the elevations as needed.
- **Edit Assign Polyline Elevations** – Added method to assign elevation by slope from a reference point. Added setting for whether to allow moving of point positions.
- **Points by Slope** – Added support for elevation difference by slope percent or delta z. Added methods to screen pick the target point, to set by high/low points and to follow a polyline.
- **New Elevation Between Points** – New command to interpolate new points at single elevation or elevation interval.
- **Draw Spot Elevations** – Added method to set spot elevation by slope percent or ratio from a reference point. Added option to draw label on the leader.
- **Elevate Lot Edges by Grade Rules** – Added option to drape the back lot edge on the reference surface.
- **Design Bench Pond** – Added method to design out from base of pond perimeter. Added options whether to draw side lines and to color side lines red/blue for cut/fill.
- **Non-Surface Entities** – Expanded non-surface points to include any selected entity.
- **New Import Goggle Earth Surface** – New function to import a grid surface from Goggle Earth.
- **RoadNet** – For T-intersections, added option whether to create the top part of the T for cases like merging into a parking lot. Also for T-intersections, added setting to define intersection as a T and auto extend or trim the side centerline when the main centerline is moved. Added option to output design profiles for any template grade point such as the edge of pavement. Added method to connect multiple roads or driveways to bulb of cul-de-sacs. Added option for a separate template or template series to use on cul-de-sacs and option to control the direction of the cul-de-sac stationing. Added method to create L-intersections with a knuckle on the corner. Added ability to create existing surface profiles ahead or behind the length of the design profile. For point output, added option to offset the points horizontally. Added special stations per road instead of entire network. Added ability to use Topsoil Removal definitions for each road. Added option to process without intersections. Added report of input road names and their data files. Added option to process without joining the resulting polylines. Added method to create offset profiles for the existing ground. Added option for tie slopes as perpendicular to profile slope or to centerline.
- **Process Road Design** – Added option for gap station ranges to skip cut/fill quantities.
- **New Define Road Design Parameters** – New command to define road parameters such as min sight distance per station range. These road parameters can be applied in RoadNet and Process Road Design.
- **Centerline Report** – Added options for station interval with x,y coordinates and for profile to report elevations.
- **Station Polyline/Centerline** – Added option to create data tables for the spiral and curve data. Added option to offset the labels along the centerline. Added option for station tick mark on the main interval to match the half mark of the intermediate interval. Added option for prefix for station labels. Added option to drop trailing zeros on the stations.
- **Label Station Offset** – Added label alignment option for vertical. Added options to label the point number, northing, easting and elevation of the points. Added option for 3D slope distances along 3D polyline alignment. Added option to label offset in feet and inches.
- **Calculate Offsets** – Added option for 3D slope distances along 3D polyline alignment.
- **Input-Edit Centerline** – Added ability to fit a spiral between two line segments.
- **Input-Edit Profile** – Added Undo function. Added control of grid spacing in graphic preview. Added depth to reference profile to real-time feedback. Added function to reverse the profile.
- **Input-Edit Road Profile** – Added Undo function, translate elevation function, check stations function and control of grid spacing.
- **Pipe Thickness** – Added pipe thickness to Input-Edit Profile and Draw Profile.
- **Create Profile From Triangulation** – Added option to link profile to update on any changes to the triangulation file or the centerline alignment.
- **Draw Profile** – Added ability to output plan-profile sheets to a separate drawing. Also for plan-profile, added setting the page size of the layout to the specified paper size, added a setting for the top of the grid to allow a gap between the profile and plan views and added a setting for the offset from the lower left of the sheet to the profile grid corner. Added option to output layouts to the layout set manager. New break point depth labels to report elevation difference between selected profiles. New draw slope labels feature to apply to any profile. Added ability to label road intersections with the road name, station and elevation using data from RoadNet.

Also from RoadNet, added method to draw edge of pavement profiles including special annotation at intersections. Added option to set reference centerline in initial dialog. Added option for horizontal VC labels offset from curve. Added option for blank line between VC labels. Added option to draw pipe crossing labels with leaders. Added option to draw pipe labels as Mtext. Also for pipe labels, added option to automatically make multiple rows as needed to fit labels for short pipes. Added option to label pipe lengths in feet and inches. For inverts as vertical dimensions, added settings for prefix and suffix for invert in and out and whether to draw invert in and out or both. For sewer slope labels, added setting for whether to include the minus sign on negative slopes. For pipe crossing labels, added separate decimals settings for each field. For sewer labels above manholes, added option for a vertical dimension line. Added option whether to label the invert-in for the top sewer structure. Added option whether to connect sewer pipe polylines to structures. Added option to label pipe direction quadrant with the invert in/out. Added options to skip labeling the horizontal axis stations and the vertical axis elevations. Added separate settings for the major horizontal and vertical grid intervals. Added settings for the symbol size of PVC/PVT and sag/crest points. For road labels, added setting for format of algebraic difference label. For horizontal axis elevation labels, added support for selecting any of the profiles for either the existing or design profiles. Added support for station equations with options for labeling the equations along the horizontal axis. For selecting profiles to draw, added method to select multiple at a time. Also for selecting, added functions to move profiles up/down to change their order. For elevation axis labels, added option to justify by center in addition to bottom.

- **New Adjust Profile Grid** – New command to change the grid range or scale for an existing profile grid.
- **Quick Profile** – Added function to print. Added option to show pipe crossings. Added method to create a profile from a 3D polyline. Added option whether to ignore zero elevation screen entities.
- **Design Template** – Added support for parabolic grades for the crown. For curbs with the base at a slope, added option for break offset for the flat portion and option to match gutter slope to the crown. For rounded curbs, added setting for the radius. Also for curbs at slope, added method for different slopes for super elevation by table lookup. Added ability to force fill in cut or force cut in fill for a specified max depth at a separate slope. Added function to convert units between English and metric. Added ditch library to save and recall ditch geometries. Added method for benches in fill.
- **Template Point Profiles/Centerlines** – Added method to select 3D polyline to define the transitions.
- **New Template Grade Table** – New command to define lookup tables of slope and distance at stations for grade points. A simple way to handle complex transitions.
- **New Draw Super Elevation Diagram** – New command to draw a super elevation diagram.
- **Draw Section** – Added option to output to a separate drawing. Added ability to find and draw pipe crossings on-the-fly. For labeling right-of-ways, added options for leaders, location controls and label settings. Added style controls for zero offset label. Added support for drawing a horizontal label box below each section grid with configurable fields. For slopes, added option to label direction relative to away from zero offset, and option to label slopes between specified descriptions. Added option to draw sections in reverse station order. Added option for a vertical leader for the elevation at the zero offset.
- **Create Sections From Points** – Added method to connect points by nearest found (ie for tunnels). Added option whether to sort the points by offset or use the point sequence.
- **Create Sections From Polylines on Grid** – Added option to create subgrades.
- **Section Report** – Added option to compare two section files and report the differences.
- **Calculate Section Volumes** – Added ability to report overexcavation volumes when using strata surface.
- **Section Station Equations** – Added support for station equations to Calculate Section Volumes and End Areas.
- **Input-Edit Section File** – Added function to remove data points outside specified offset or elevation range. Added support for overlaps (ie tunnels) for the interpolate function.
- **New Review Section Links** – New command to list and remove entity links to section files in the current drawing.
- **Lot Network** – Added new lot type field for separate annotation and reporting per type. Added option to hatch the lot areas. Added setting for building pad setback from lot front setback. For layout, added method to specify specific bearing for lot edges and method to make lot edges perpendicular to the back edge. Added control for direction of lot side lines either towards or away from centerline.
- **Check Lot Network Parameters** – Added a check for the ROW offset for a parallel road check.
- **New Assign Lot Type** – New command to set the user-specified type of the selected lots.

## Hydrology Commands

- **Watershed Delineation** – Added method to pick interior to get watershed area from surrounding linework on a specified layer. Added ability to specify layer for soil type linework and breakout watershed subareas by soil type.

- **New Hydro Network** – New set of commands to build and process network of subcatchments, pond, reaches and links using HydroCAD format project files. Choice of interfaces as either docked dialog or graphic schematic. Ability to draw network as a schematic diagram or in the model at real-world locations. Custom report tools with option to output to PDF.
- **Draw Sewer Network Profile** – Added setting for starting station of the profile and option to label structure ids.
- **Draw Sewer Network Plan** – Added option to align labels by pipe centerline. Added available fields for structure id and inlet id. Added offset field with specified elevation difference from the rim. Added option to auto stack the labels when the segment is too short. Added setting for separate layer for flow arrows. Added option to turn off automatic redraw of the labels.
- **Move Sewer Label** – Added option to rotate labels.
- **New Renumber Structure Names** – New command to renumber the selected structures.
- **New Create/Edit Structure with Inverts** – New commands to create standalone structures with inverts for plan view labeling.
- **Time of Concentration (TR55)** – Added support for any number of separate segments for the different flows.
- **Channel Design Non Erodible** – Updated user-interface for main dialog.
- **Culvert Design** – Added support for more culvert materials.
- **New Grass Channel Design** – New command to design grass channels.
- **Multiple Outlet Design** – Improved user interface with spreadsheet editor.
- **New Report Hydrograph** – New command to view and report hydrographs.
- **Sewer Network Design** – Added setting for a drop across the structure. Added a method to align the inlet by a reference screen entity. Added function to re-apply design rules. Added separate edit field for the step-up. Added drop across manhole dimension setting.
- **Sewer Network Surface** – Added option to model the surface using the structure rim elevations only.
- **Sewer Network Export to Points** – Added option to offset the points horizontally.
- **New Set Rim Elev to Match Surface** – New command to set the rim elevations to match a surface with an option to adjust the invert elevations.
- **Report Sewer Network** – Added VDOT fields and station lateral connections from the nearest down structure.
- **Structure Library** – Added controls to specify connection points on box structures.
- **Pipe Library** – Added pipe thickness field.
- **Ditch Sag Inlet** – Added a new inlet type for ditch sag inlets.
- **Collision Conflicts Check** – Added amount of overlap to the report. Added check for conflicts within the same sewer network.
- **LandXML Import** – Added option to set manning's n if sewer network if not set in the XML. Also added option to add structures to structure library if the XML contains new structure dimensions.
- **New Import Carlson Sewer Network** – New command to load a sewer network into another sewer network.
- **New Export Carlson Sewer Network** – New command to export selected structures into another sewer network.
- **Spreadsheet Sewer Editor** – Added option whether to use the actual pipe or center-to-center dimensions for the pipe length and slope. Added support for sanitary and utility type networks.

## GIS Commands

- **Label Map Object Data** – Added support for AutoCAD Map Feature Data Objects (FDO).
- **New Define/Report Area By Layers** – New commands to assign names to layers and then report sub-areas within a perimeter using closed polylines on those layers.
- **Image Set Manager** – Added function to reduce resolution and function to crop the image. Added function to create geo-referenced image by user-specified coordinates for two image points. Added routine to convert image to greyscale.
- **New Image World File (Create By Image in Drawing)** – New function to create world file by image position in drawing.
- **Import SHP File** – Added method to import geometry only. Added support for pointm, polylinem and polygonm shape types. Added option to reassign entity elevations from the elevations in a 3D SHP file.
- **New Import Google Earth Image** – New command to import an aerial image from Google Earth.

## Geology Commands

- **StrataCalc Data Sheet** – Added report option to HTML format.
- **Edit Drillhole** – New user-interface dialog.
- **Import Drillhole** – Added support for Carlson Grade DRL format files.
- **Define Strata** – Added ability to select multiple strata and edit their properties to set them all to the same.

- **Draw Geologic Column** – Added setting to label thickness on same row as strata name. Added option whether to use the strata definition for the strata name label.
- **Fence Diagram** – Added method generate multiple fence diagrams at a time. Added ability to use a triangulation file for the ground surface.
- **New Quick Fence** – New command to pull fence diagrams in real-time.
- **New Fence Polylines** – Set of new commands to tag fence alignment polylines.
- **Composite Duplicate Strata** – Added option to ignore the strata name and option whether to process key, non-key or both.
- **New Composite Strata by Beds** – New command to composite strata by bed names.
- **Mark Compliance Drillholes** – Added option to create a selection set of the drillholes from the filter.
- **Strata Isopach Maps** – Added option to label values next to the drillholes.
- **Auto-Run Isopach Maps** – Added field for min and max contour elevation range.
- **Identify Limit Lines** – Added method to pick a point and report all covering limit lines with option to hatch selected limit line areas.
- **New Edit Fault Lines** – New command to add/edit points in fault lines.
- **New Apply Faults to Grid** – New command to adjust an existing grid by the selected faults.

## Surface/Underground Mining Commands

- **Define Dragline Equipment** – Added save/load functions to store and recall settings.
- **Name Pit Polylines** – Added method to assign exclusion perimeters separately.
- **Surface Mine Reserves** – Added ability to use triangulation for the ground or pit bottom surfaces. Added option to report non-key, key pairs on a single row.
- **New Draw 3D Mine Model** – New command to create and view a 3D model for an underground mine.
- **Surface Equipment Timing** – Improved 3D pick feature to have graphic chart feedback.
- **Blast Pattern Layout** – Added option to preview layout and option to draw the points.

## TakeOff Commands

- **New Import PDF File** – New command to import the vectors from a PDF into the drawing.
- **Define Material Library** – Added function to import definitions from a user-specified text file format.
- **Material Quantities** – Added option to define and report quantities by area square yards. For the standard report, added option to breakout quantities by areas of interest and added option to use the report formatter.
- **Elevate by Grading Rules** – Added the grading rule commands from the Civil module.
- **New Special Fill Areas** – New set of commands to identify areas to report fill separately.
- **Calculate Total Volumes** – Added option for report cut/fill quantities at different depth ranges. For strata quantities, added option for quantities by zone depth areas.
- **Cut/Fill Labels** – Added control for the text style for cut/fill labels.
- **New Plan Graphic Report** – New command to create a plan view report of the site.
- **New Section Graphic Report** – New command to create cross section reports in a single step with option to include the plan view showing the section alignment.
- **New Surface Graphic Report** – New command to create a 3D view report of the site existing or design surface.
- **Trench Network Quantities** – Added report of overall average depth and average depth per trench run.
- **New Label Drillhole** – New command to label selected properties from drillholes.
- **New Import DGN** – New command to import Microstation DGN files into DWG drawings.
- **New Section From Polylines By Layer** – New command to automatically import section data from drawing entities by selecting samples of the different section elements.
- **New Snap Contours to 3D Polylines** – New command to fix of contour polylines to match position on intersection of 3D polylines.

## Field Commands

- **Instrument Settings** – Added functions to save and recall instrument settings.
- **Updated Drivers:**
  - Topcon (GR-3, HiPer Ga, HiPer Gb, HiPer XT, HiPer Pro, Hiper Lite+, Hiper Lite, HiPer+, HiPer GGD, HiPer GD, GB Series, Odyssey, and Legacy)
  - APS (Astrum, Astrum Duo, Argent)
  - Navcom (RT-3010S, RT-3020S, RT-3020M, NCT-2030M, SF-2040G, SF-2050G, SF-2050M, NCT-2000 Series)
  - John Deere (Starfire ITC, GreenStar)

- DataGrid (JSMk3)
- Septentrio (PolaRx2e, PolaRx2eH, PolaRx3e, AstraRx2)

## Data Conversions

- **Bentley** – Added support ProjectWise. Gave Carlson .TIN format to Bentley for exporter in their next release.
- **DLG** – Added support for DLG format in Write Polyline File.
- **DOT's** – Added field-to-finish code tables from CO, FL, IA, IL, IN, MA, MD, MN, ND, NE, SD and WI.
- **C&G** – Added functions to convert cross section data between C&G and Carlson and to convert C&G Point Groups to Carlson Lot files.
- **Finland 2005 Geoid** – Added support for this geoid.
- **French Guyana Geoid** – Added support for this geoid.
- **InRoads** – Added import for InRoads format cross section data.
- **Israel Geoid** – Added support for this geoid.
- **Leica Levels** – Added import for Leica level data.
- **Leica DBX** – New functions to transfer coordinates and raw data directly with Leica DBX.
- **MicroStation** – Added function to import cross section data in .GEN format.
- **MOSS** – For importing linework with Write Polyline File, added layer translation table.
- **New Zealand Geoids** – Added support for these geoids.
- **Poland Geoid** – Added support for this geoid.
- **Sweden Geoids** – Added support for RH70 and RH2000 geoids.
- **Swiss 2004 Geoid** – Added support for this geoid.
- **TDS** – Added export of centerlines and profiles to RD5 format.
- **Topcon** – Added export of Topcon RD3 files from Carlson centerline, profile and section data. Added support for import/export of GC3 format localization data. New routine to import TC3 surface files along with new method to export TC3 surfaces.
- **Topobase** – Added support for Topobase raw data export and import/export of coordinate data.
- **Trimble** – Added import/export for Trimble triangulation surface files and import level data.
- **Vulcan** – Added import for Vulcan block models.