

# Improvements for Carlson Office 2019

## Highlights

- **3D Viewer Speed**
- **Surface Objects**
- **Solid Modeling**
- **Angled Drillholes**
- **3D Timing Viewer**
- **Pressure Pipes**
- **Point Cloud Basic module**
- **IntelliCAD 9.0: CUI, DGN**

## General

- **AutoCAD 2019** – Added support for this new version.
- **IntelliCAD 9.0** – 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.
- **Ultra High Resolution Displays** – Improved font and image scaling for dialogs.
- **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. Added keyboard controls for panning and zooming the scene.
- **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

- **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 survey, 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. Added Improve Valley function for flowline in valleys.
- **Create Ridge Polylines** – Added Improve Streams method for flowlines to improve watershed modeling.
- **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.
- **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.
- **Handicap Marker** – New command to draw a handicap symbol for a parking stall.
- **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.
- **Capture Profile/Settings From Drawing** – New command to select an existing profile plot in the drawing and automatically create profile files and Draw Profile settings.
- **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.
- **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, valves, 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.
- **Make Block Model** – Added method to composite multiple strata.
- **Block Model 3D Viewer** – Added option to draw inside a solid model and option to use top and bottom limit grids.
- **Pit Optimization** – Added method to load model from Geologic model.

## 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.
- **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.
- **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.
- **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.
- **Import/Export** – Added support for PCD and RCS formats. Added export to DXF from mesh and solid elements.
- **Timestamp** – Added option to append timestamps to items in the project tree.
- **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 Australia 2020, Sweden 2017, Argentina, Belgium 18, Norway 18A and Mexico GGM10.
- **Projections** – Added projection for Hotine 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.
- **Topcon** – Added import for Topcon GIS feature definitions.
- **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.