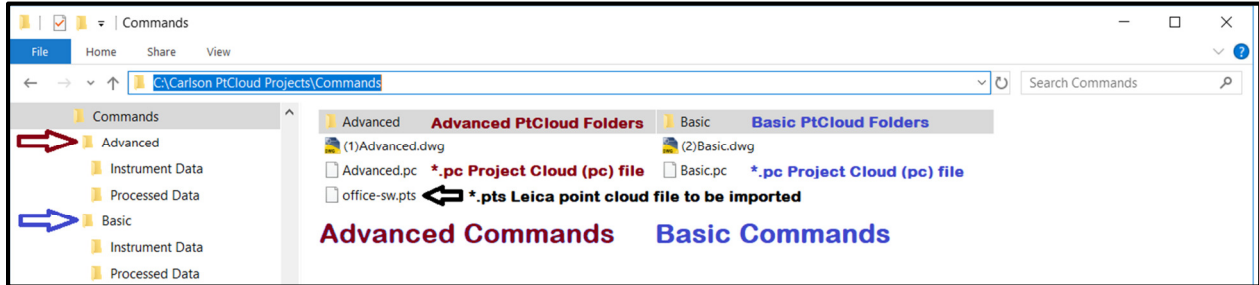


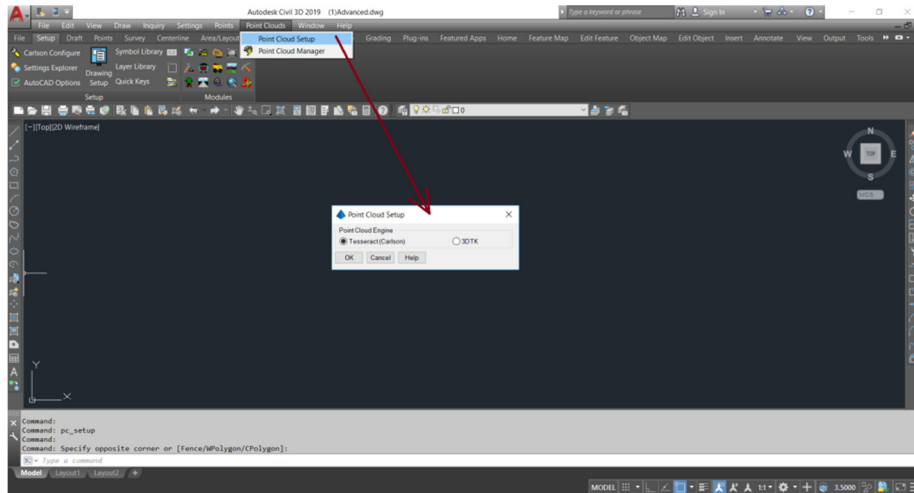
Carlson PtCloud Advanced and Basic 2019 “command differences”

Virtual Survey Features Advanced and Basic

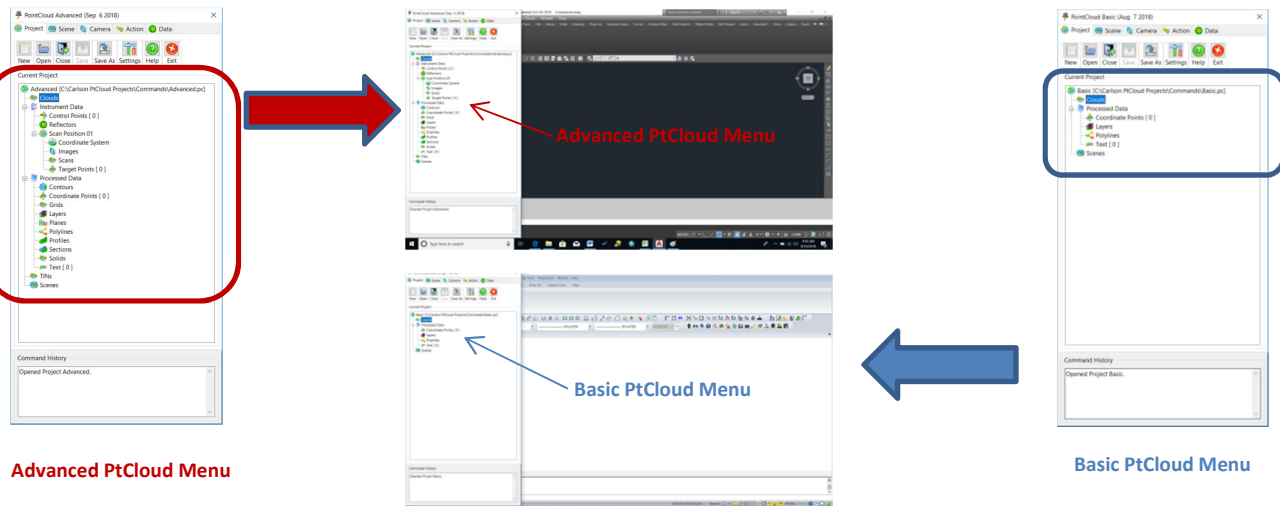
1. Files and Folders used by Carlson Point Cloud 2019 Advanced & Basic (no difference)



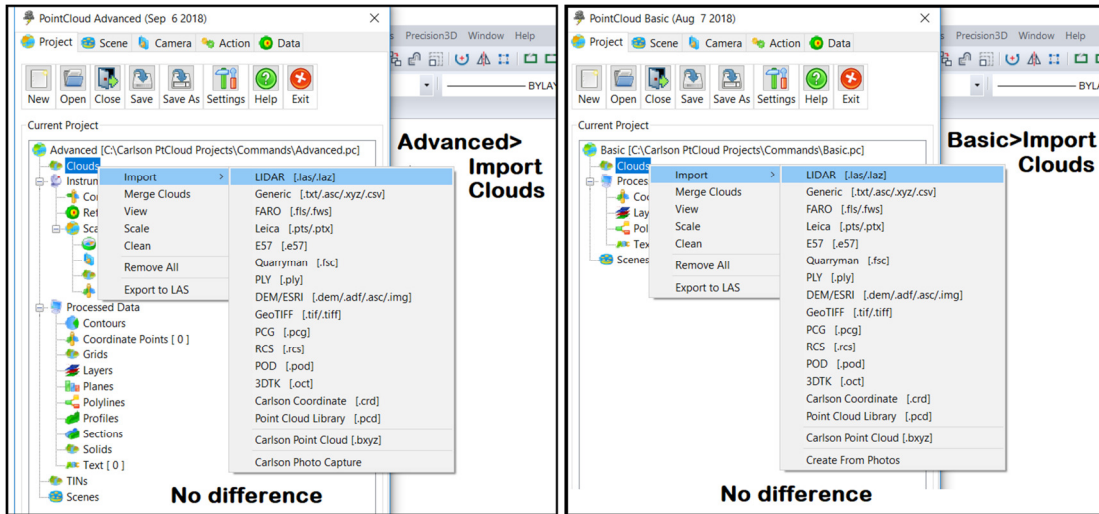
2. Point Cloud Setup - Tesseract (Carlson) - default recommended format (no difference)



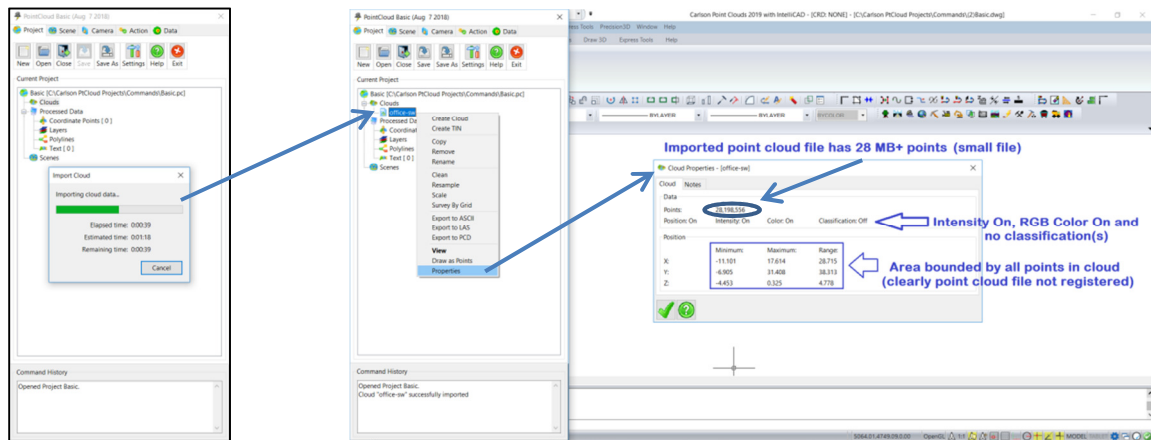
3. Advanced & Basic Point Cloud Menus (different)



4. Cloud > Import file formats to convert to Tesseract (Carlson) default cloud type (no difference)



5. Import Cloud i.e. office-sw.pts Leica PTS file and select Properties by right click (no difference)



6. View > highlight and right click on cloud i.e. office-sw to create a Scene (no difference)

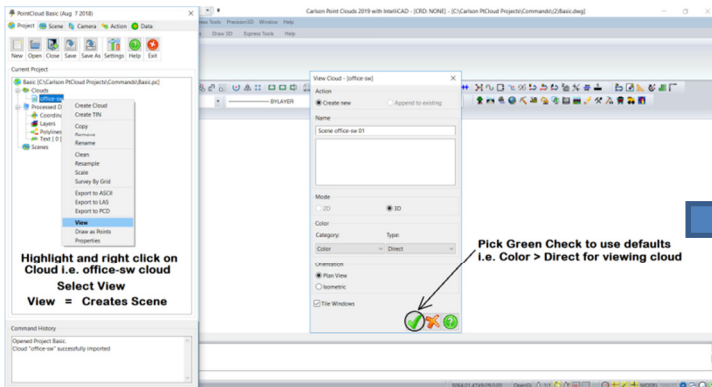


Figure 1 - Create a Scene using View

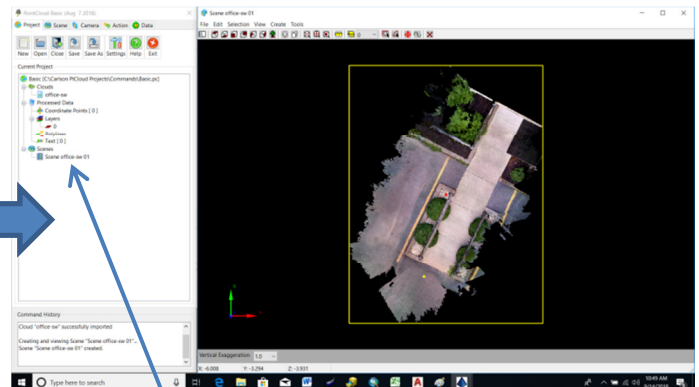


Figure 2 – Scene created for point cloud office-sw in plan view

7. The 10 Views explained that can be created using the View option and recommendations on best practices when selecting a View (Scene) to work with i.e. V4 - 10) Color_Direct_Iso. (No difference)

Create New or Append existing Scene

Input Scene filename

Recommendation to use easy to understand filenaming convention when creating multiple Views (Scene) filenames.

Mode 2D or 3D (default 3D)

4 Categories

- Simple
- Position
- Intensity
- Color

2 Orientations

- Plan View
- Isometric

PV - Plan View
Iso - Isometric

Orientation controls only first view at start, do you want to start in plan view or isometric view?

The 10 Views (Scenes) explained by Category, Type and Orientation.

V1 Category: Simple
Simple
1) Simple_Direct_PV
2) Simple_Direct_Iso

V2 Category: Position
Position
3) Position_Elevation_PV
4) Position_Elevation_Iso

V3 Category: Intensity
Intensity
5) Intensity_Direct_PV
6) Intensity_Direct_Iso
7) Intensity_Colorized_PV
8) Intensity_Colorized_Iso

V4 Category: Color
Color
9) Color_Direct_PV
10) Color_Direct_Iso

Type

Simple has one Type Direct

Type: Direct

Position has one Type Elevation

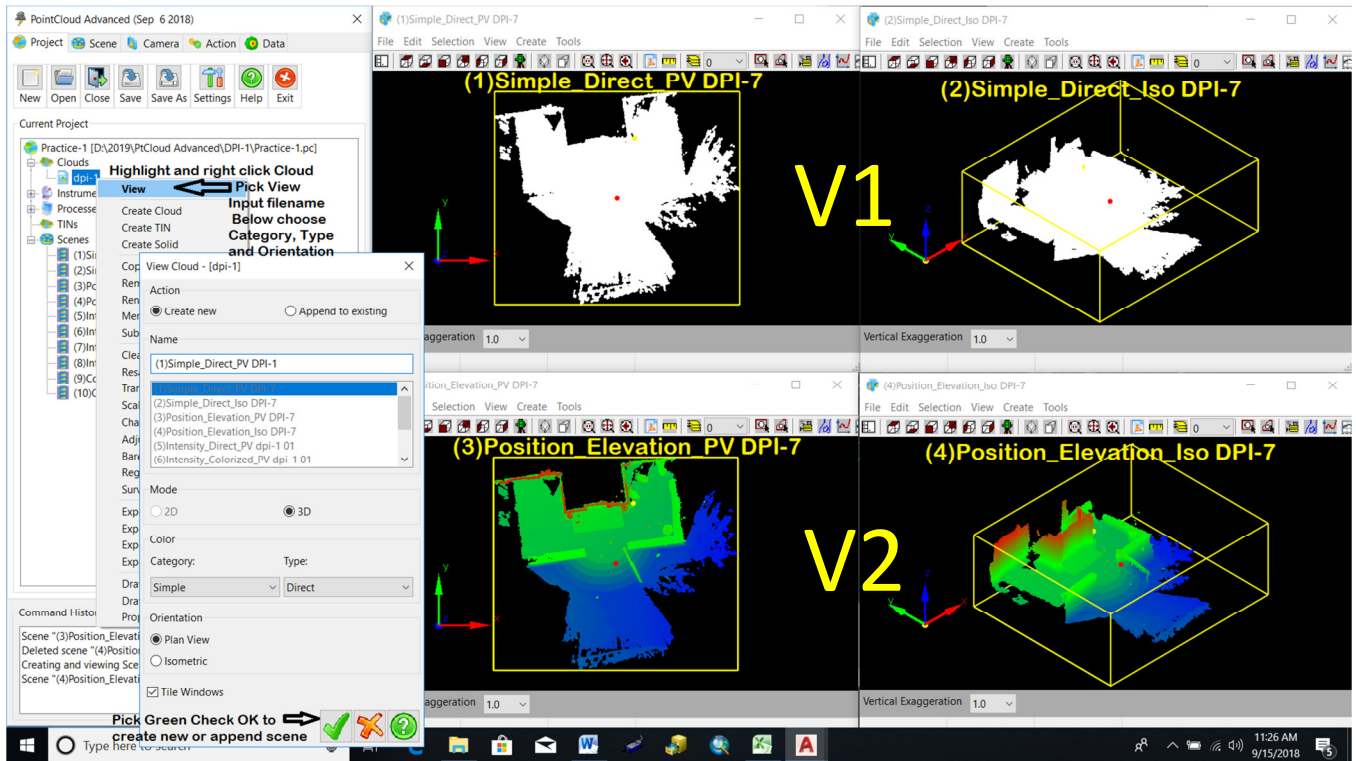
Type: Elevation

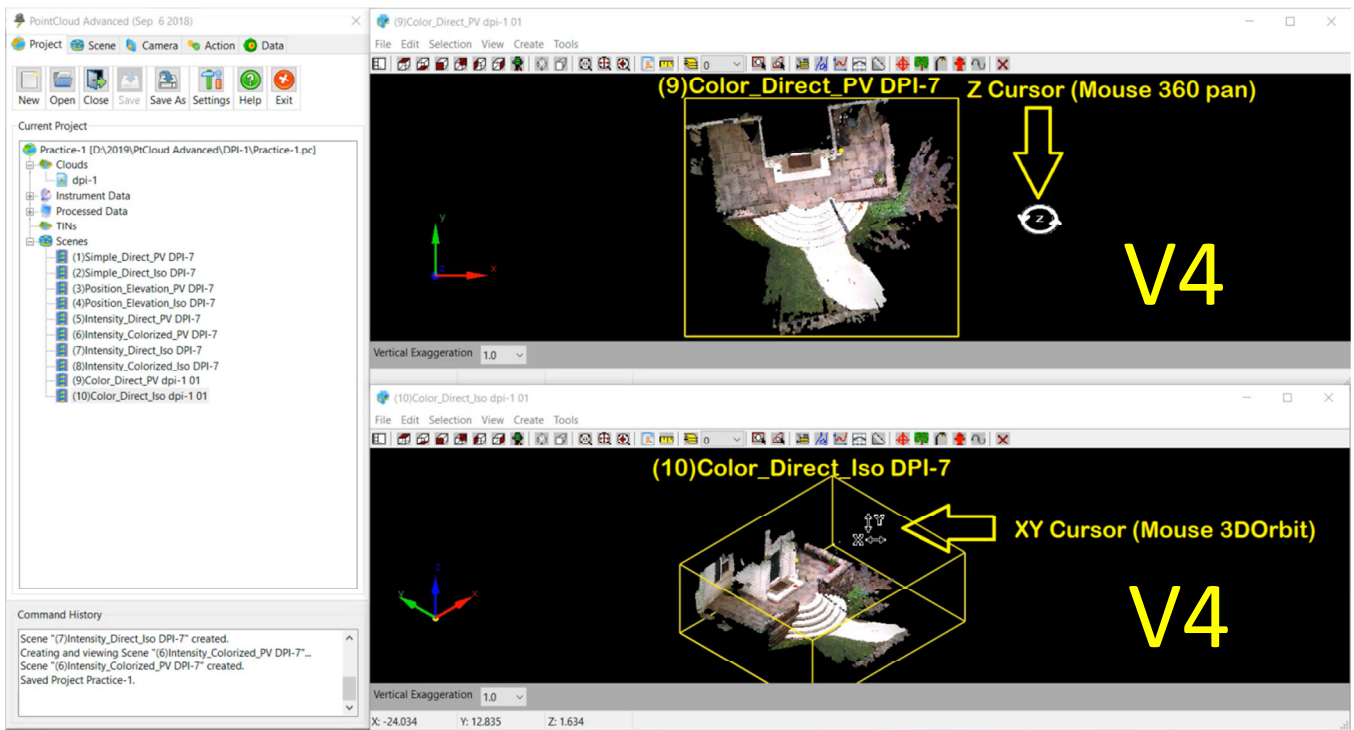
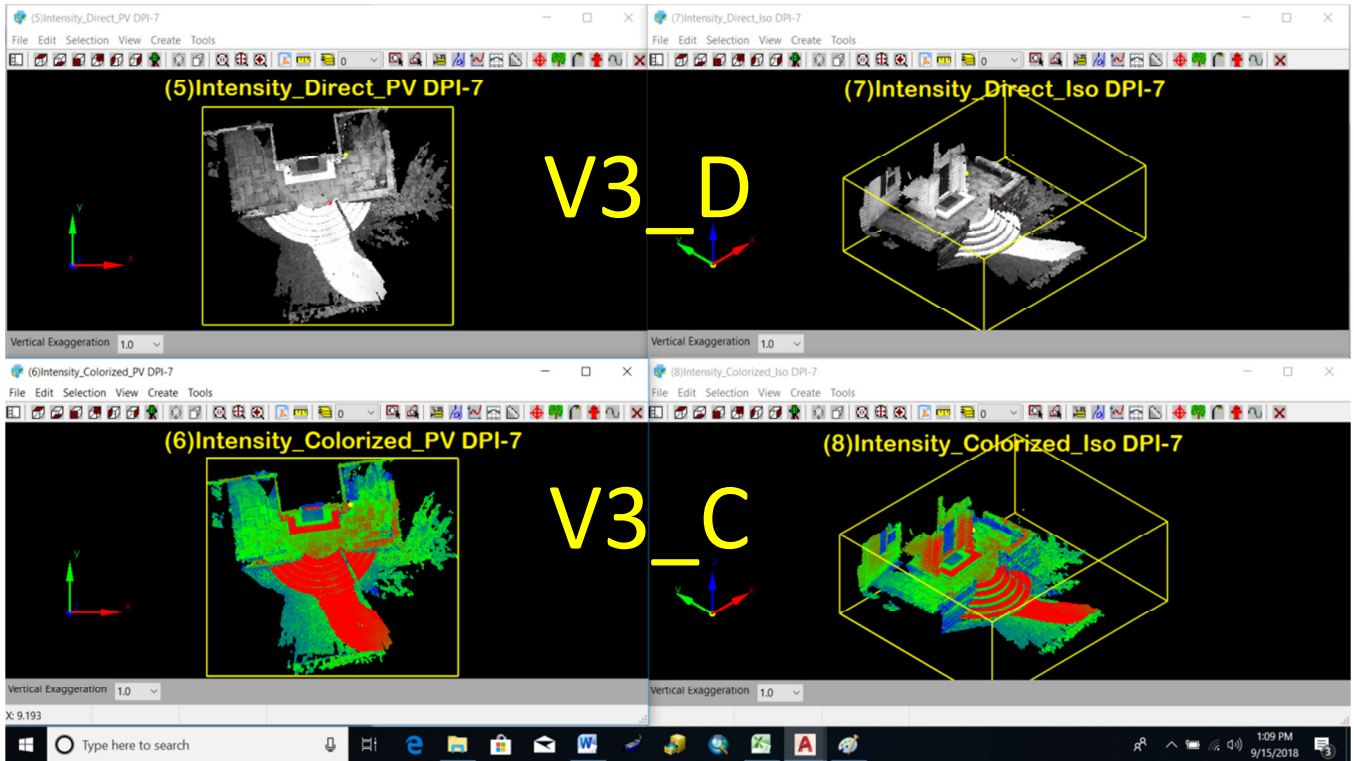
Intensity has two Types Direct and Colorized

Type: Direct, Colorized

Color has one Type Direct

Type: Direct





V1 Simple – This Scene setting is rarely used unless an imported point cloud has neither RGB color nor I for Intensity. Points display as white in plan view or isometric view when the background is set to black.

V2 Position – This Scene setting is useful to see where low (blue), green in the middle and high (red) areas are in the point cloud. If an imported point cloud has no color or intensity this option is useful.

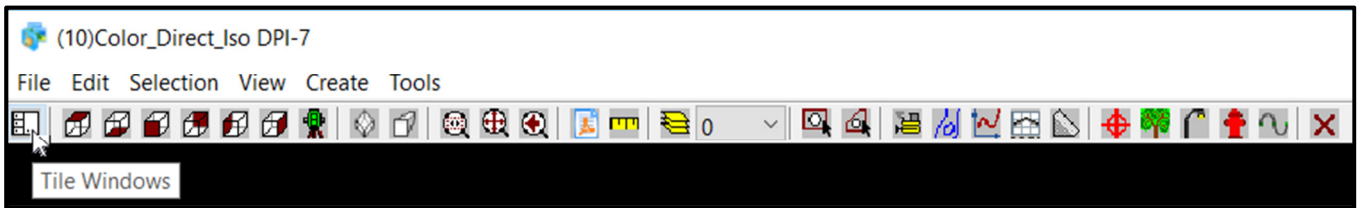
V3-D Intensity Direct – Even when an imported point cloud has both color and intensity assigned to each point in the point cloud, this Scene setting can be the easiest to view if the cloud has strong intensities dark to light.

V3-C Intensity Colorized – Colorizes the point cloud as low intensity starting as blue, middle intensity green and high intensity red. If point cloud has strong intensities dark to light it may help drawing in 3D.

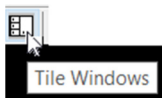
Recommended Scene Setting →

V4 Color – This Scene option is the most popular and allows Carlson Point Cloud users to see both color and intensity when viewing in 3D or drawing within the 3D point cloud. Choose to start in either plan view or isometric view.

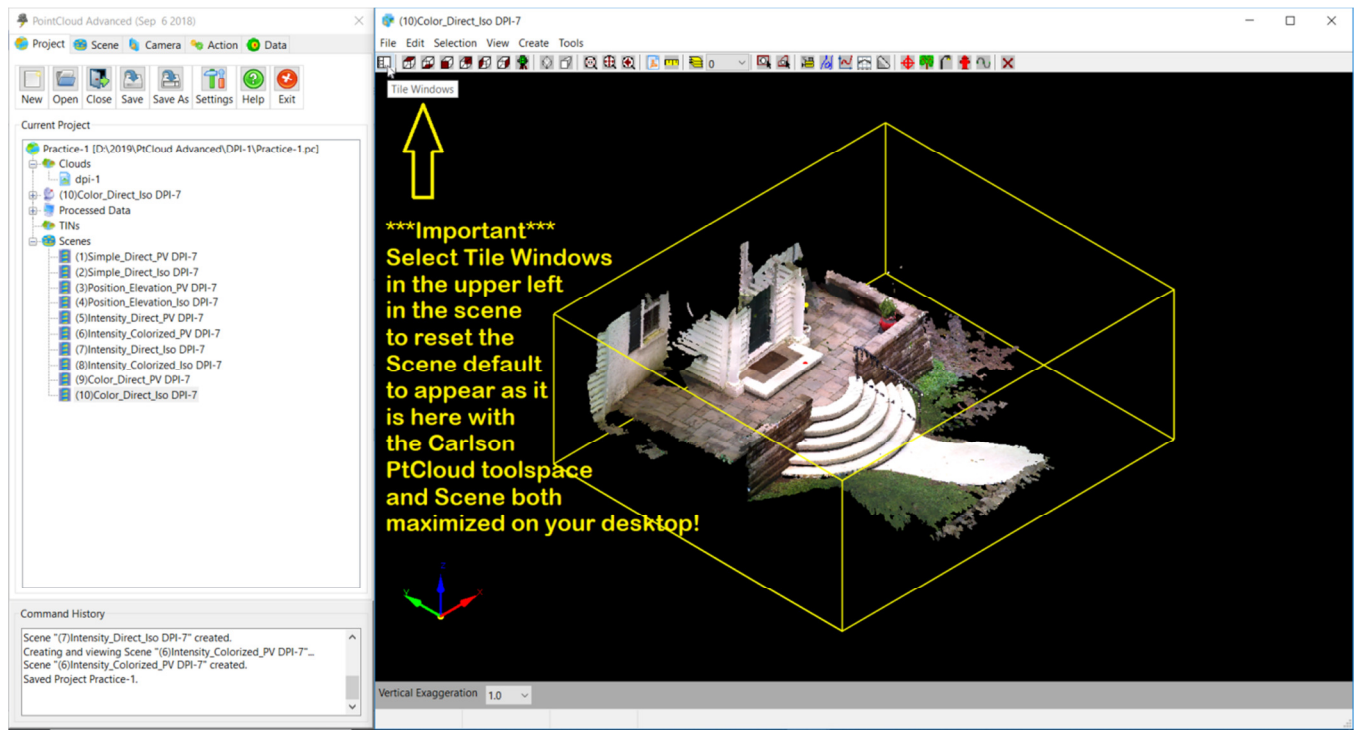
Explanation for each of the top left important Title-bar commands in the View (Scene) dialog.



(No difference)

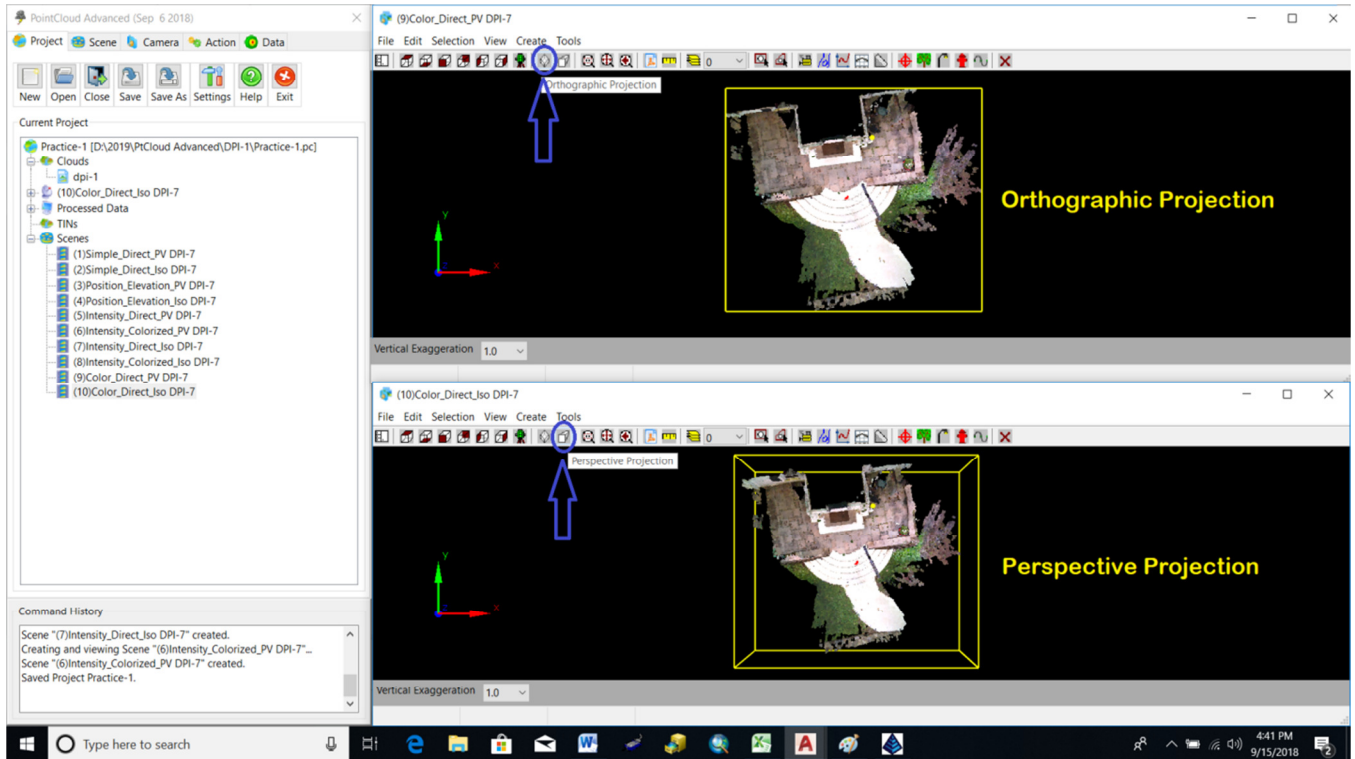


Tile Windows icon – Select this icon to reset the desktop screen to display only the Carlson PtCloud Toolspace dialog and the one View or Scene selected to work in.



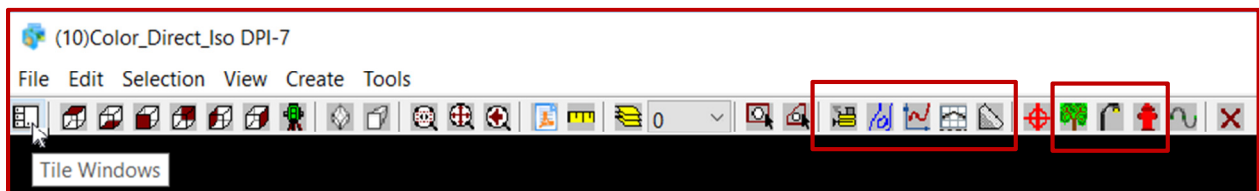
(No difference)

Carlson PtCloud Viewcube settings Top, Bottom, Front, Back, Left, Right and Scan position (if exists). Very handy to use Top if viewing point cloud leads to confusion, simply pick Top to return to plan view.

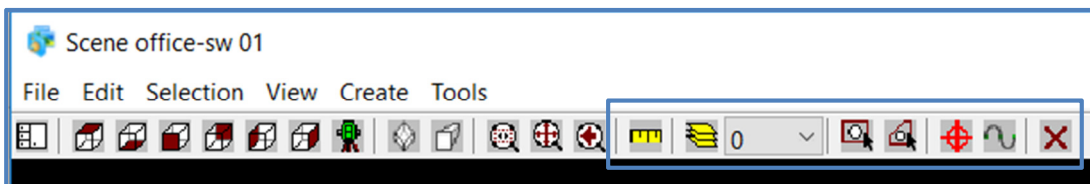


Orthographic and Perspective Projection, Zoom Window, Zoom Extents and Zoom Previous icons (no difference).

What are the differences between Advanced and Basic Tool-bar icons in View (Scene).



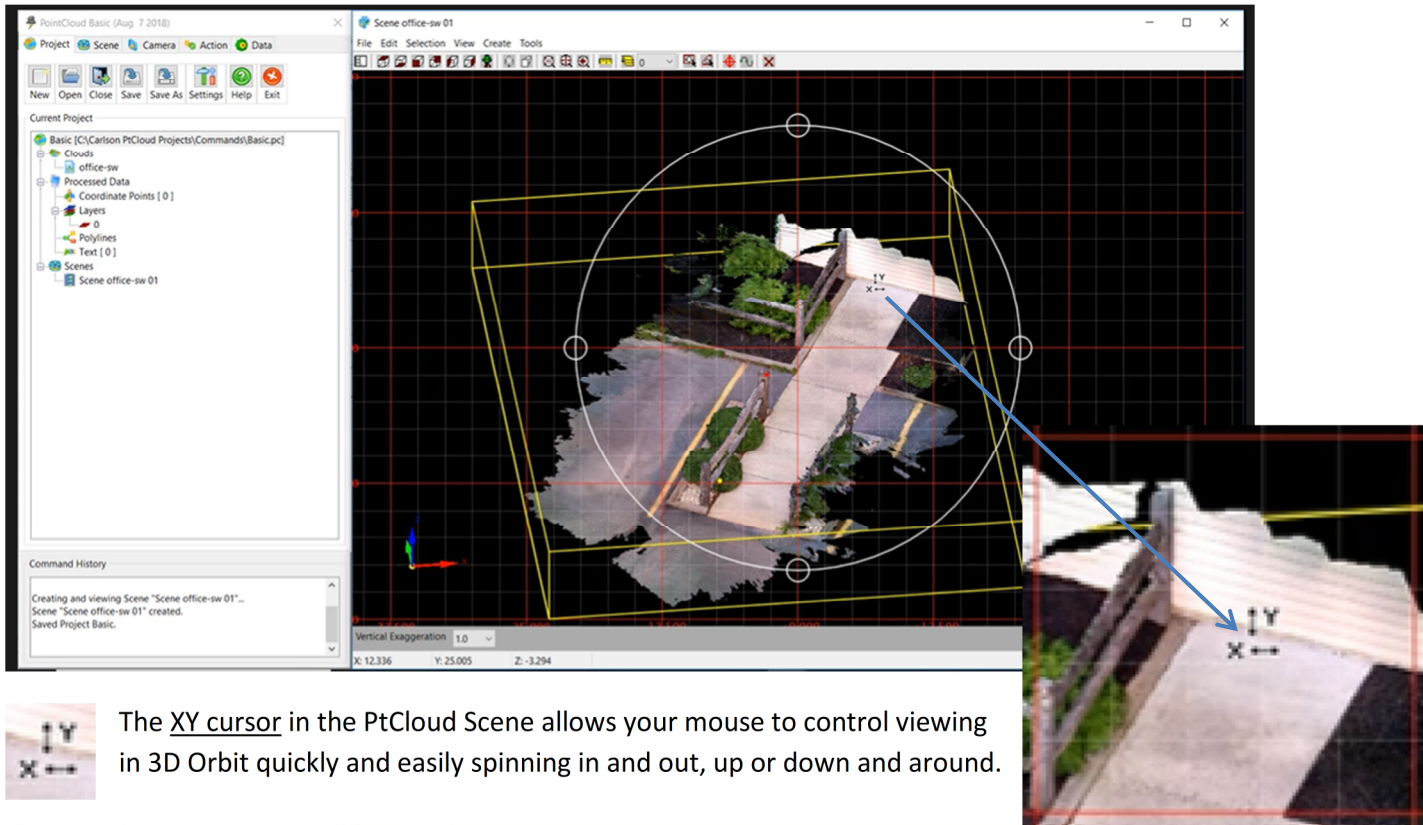
Advanced Tool-bar icons in View (Scene)



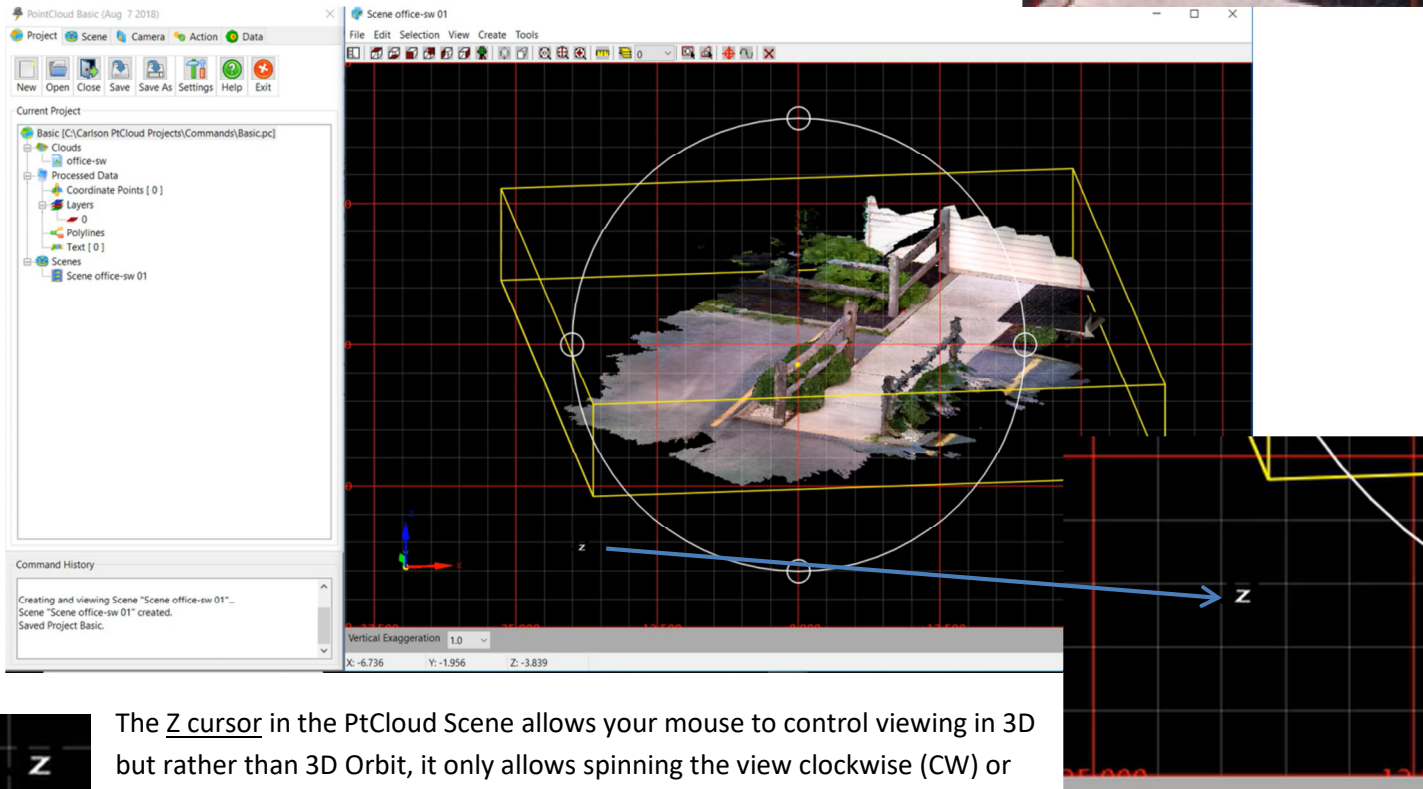
Basic Tool-bar icons in View (Scene)

Basic tool-bar menu doesn't have any of the Advanced tool-bar Extract icons for Bare Earth, Contours, Profiles, X-Sections, Plane and 3D Tree, Light Pole and Fire Hydrant solid symbols. Both tool-bar menus have Measure, Layer command, Select Windows Inside, Select Perimeter Inside, Create Points and Create 3D Polyline.

8. Viewing – XY and Z 3D Orbit mouse and visual controls (No difference)

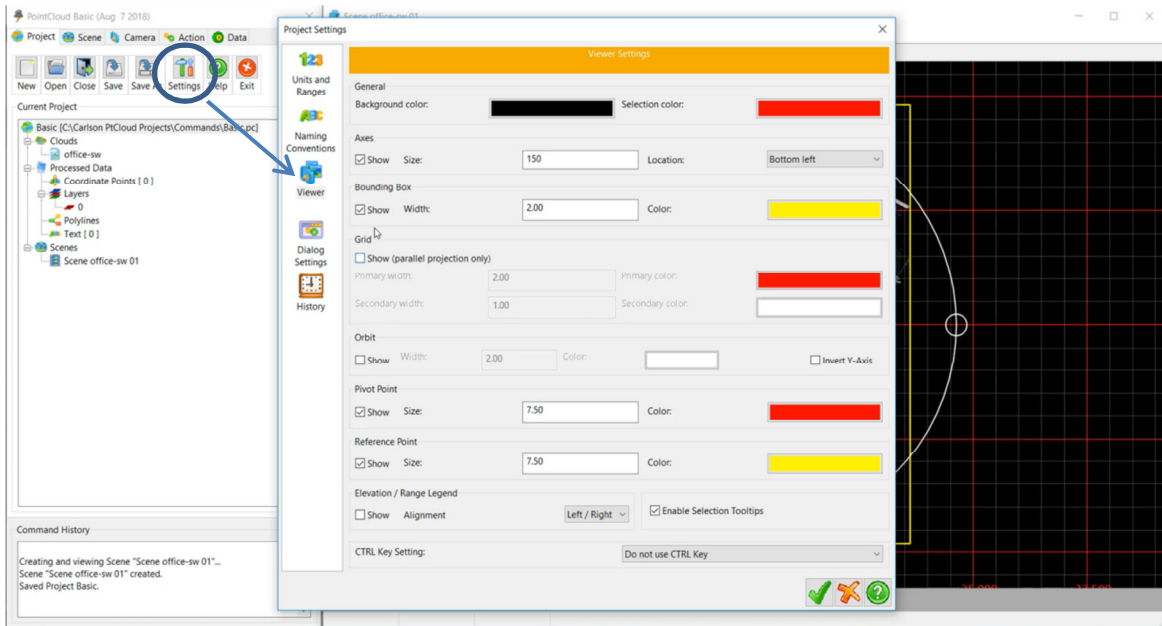


The XY cursor in the PtCloud Scene allows your mouse to control viewing in 3D Orbit quickly and easily spinning in and out, up or down and around.



The Z cursor in the PtCloud Scene allows your mouse to control viewing in 3D but rather than 3D Orbit, it only allows spinning the view clockwise (CW) or counter clockwise (CCW). (See Carlson PtCloud Basic 2019 movie i.e. 1-PtCloud Basic Menus.mp4)

9. Settings > Viewer settings (No difference)



Settings > Viewer sets the background (black) and selection (red) colors viewing the point cloud

Toggle on or off 3D Axis X,Y,Z (Default lower left)

Toggle on or off Bounding box and color (default yellow)

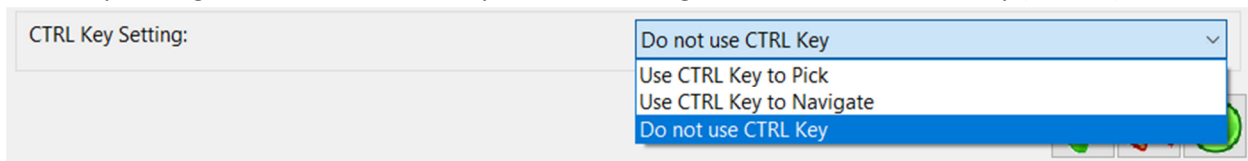
Toggle on or off Grid and color for Primary (red) and Secondary (white) grid lines

Toggle on or off Pivot Point (red) used to pivot 360 degrees around (Automatically centered)

Toggle on or off Reference point (yellow) and set manually

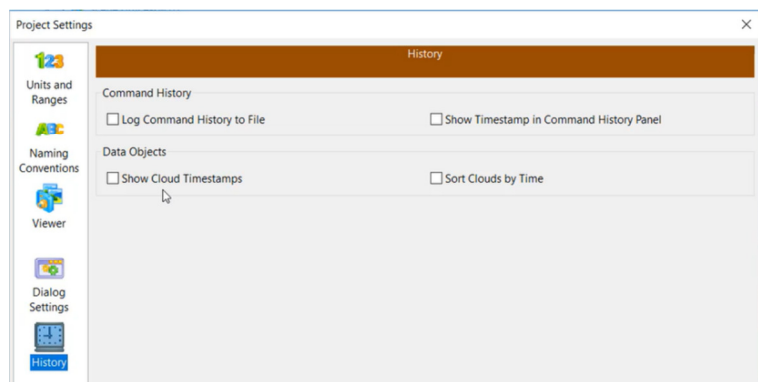
Toggle on or off Elevation and Range Legend

CTRL Key Settings > Set to "Use CTRL Key to Pick, to Navigate or Do not use CTRL Key (default)

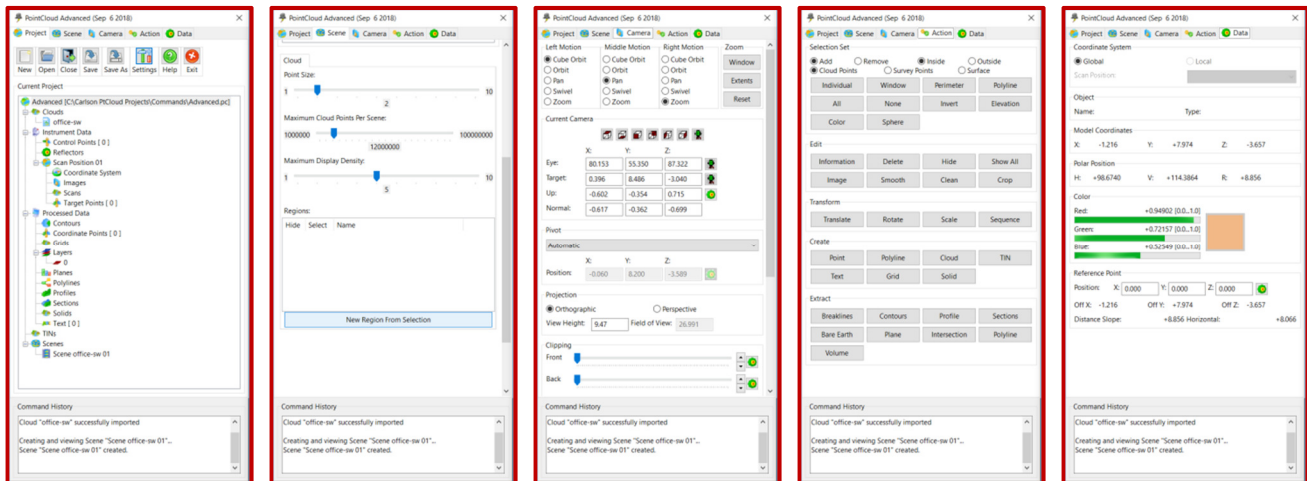
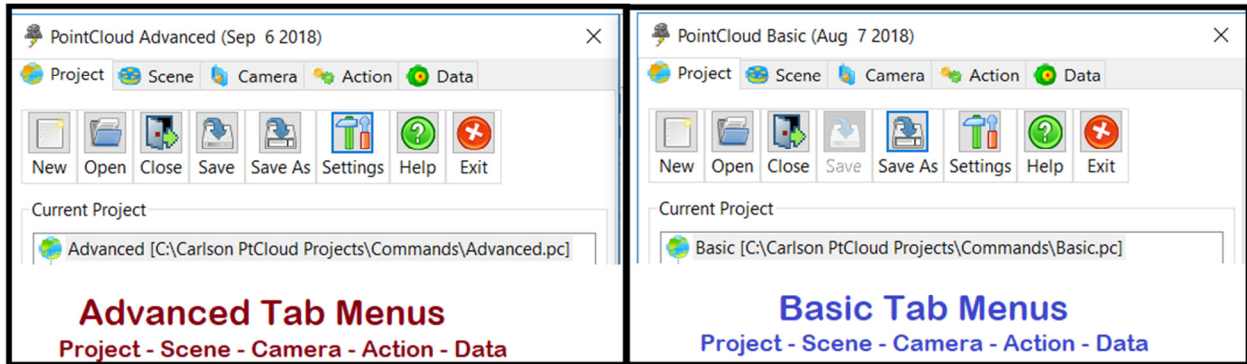


Additional Settings in Project Settings

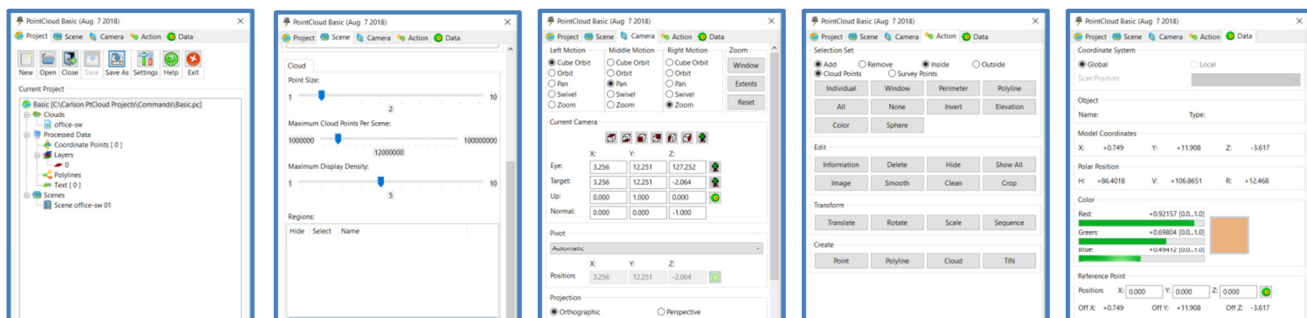
- a. Units and Ranges
- b. Naming Conventions
- c. Viewer (See above)
- d. Dialog Settings (Save/Load)
- e. History
 - a. Log Command Hist.
 - b. Show Cloud Timestamps
 - c. Show Timestamp in Command Hist. Panel
 - d. Sort Clouds by Time



10. Carlson PtCloud Toolspace Menus Advanced and Basic (2 of the 5 Tab Menu Different)



Project Tab (Different) -- **Scene Tab (No difference)** -- **Camera Tab (No difference)** -- **Action Tab (Different)** -- **Data Tab (No difference)**

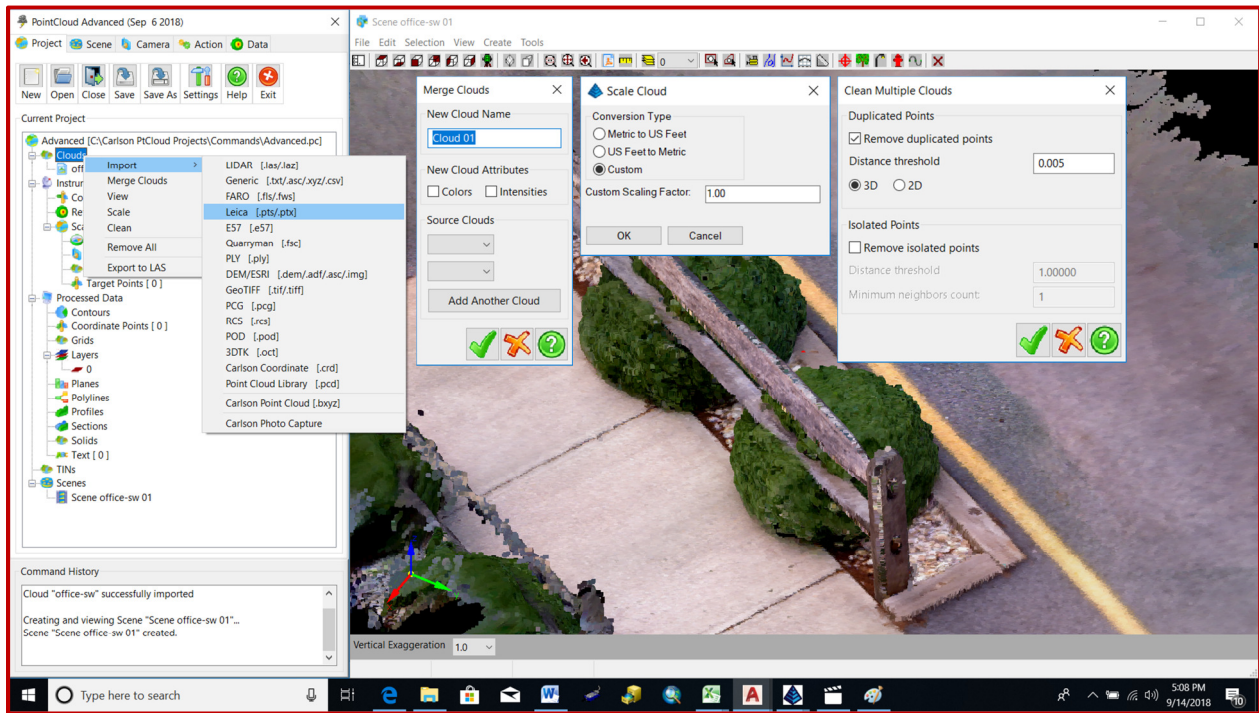


Project Tab (Storage Location) -- **Scene Tab (Set Point Size)** -- **Camera Tab (Mouse Controls)** -- **Action Tab (Slice & Dice Cloud)** -- **Data Tab (View RGB Color)**
(Export/Import Data) **(Create Regions-Classify)** **(View Controls)** **(Virtual Survey)**

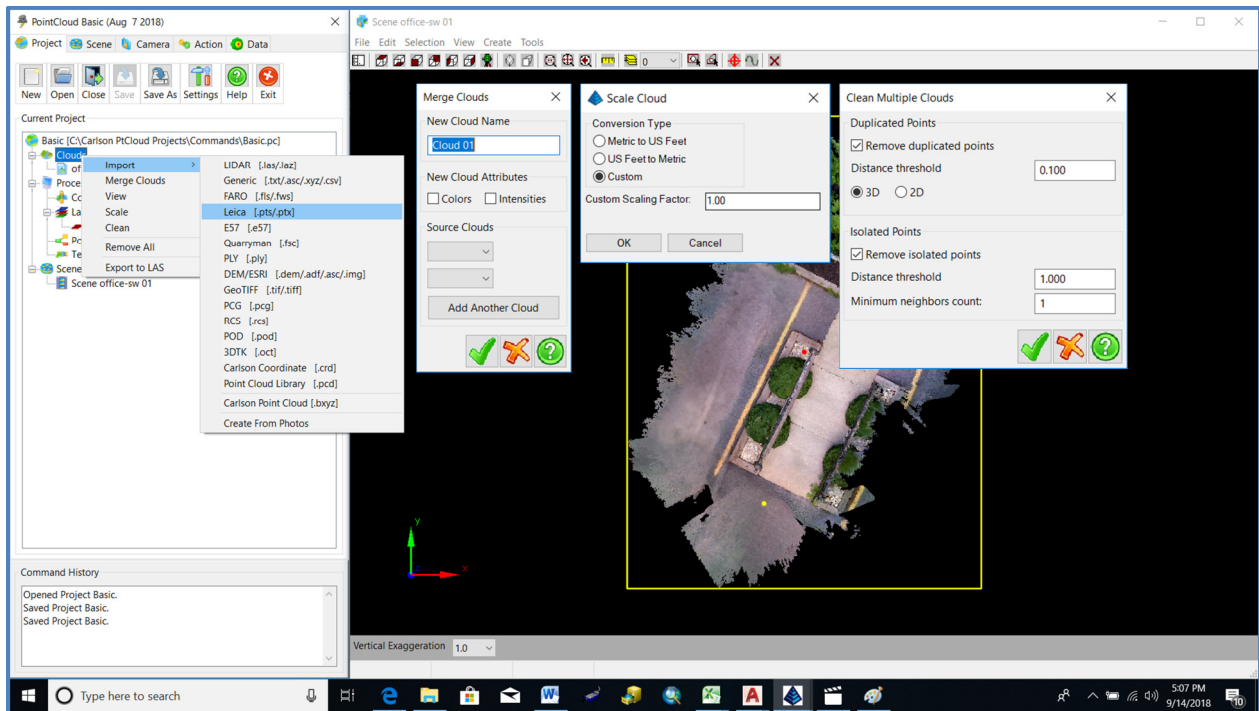
Project Tab (Smaller Menu) -- **Scene Tab (Smaller Menu)** -- **Camera tab (Smaller Menu)** -- **Action Tab (Smaller Menu)** -- **Data Tab (Smaller Menu)**

Carlson PtCloud Basic 2019 smaller menu selection is designed to do "Virtual Surveying" using any point cloud. Picking points with descriptions snapping to the point cloud, uses Carlson Software's Field-to-Finish coding system to output points, 2D and 3D polylines back into a drawing to ACAD or ICAD DWG.

11. Cloud - Advanced and Basic menus highlighting the Clouds fly-out (No differences)



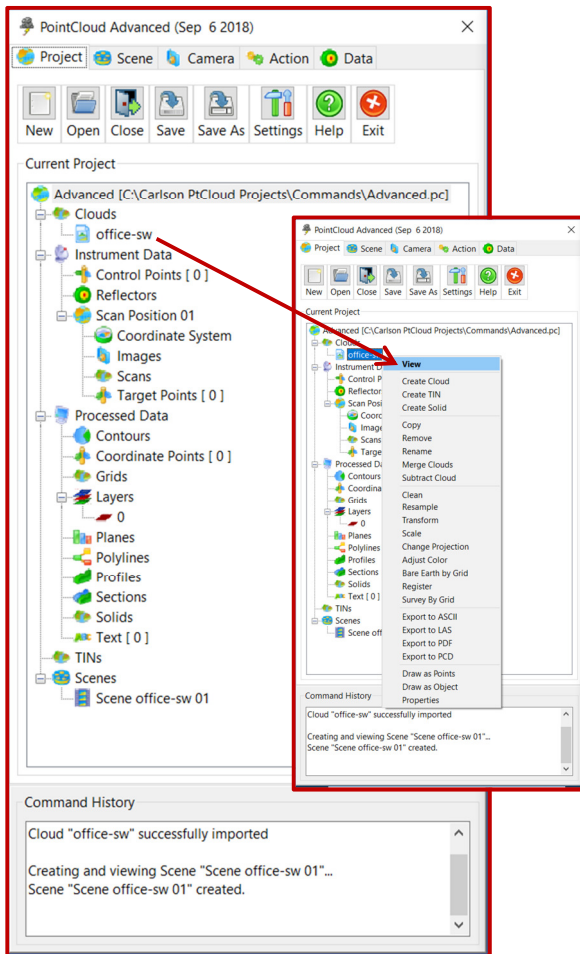
Advanced PtCloud Menu > Right Click on mouse selecting Clouds to see fly-out Cloud menu options



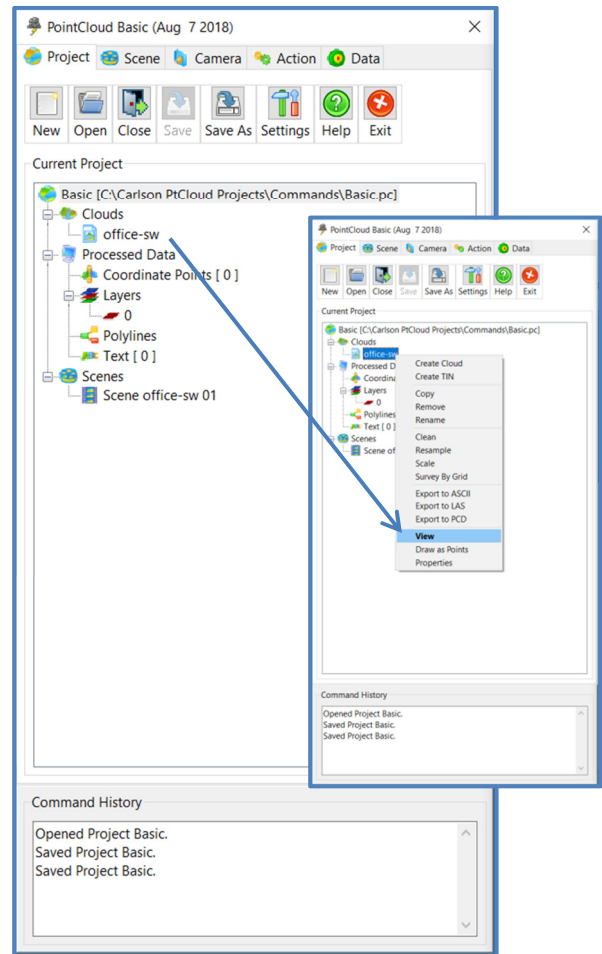
Basic PtCloud Menu > Right Click on mouse selecting Clouds to see fly-out Cloud menu options

12. What are the core differences between PtCloud Advanced and Basic menus selecting the cloud

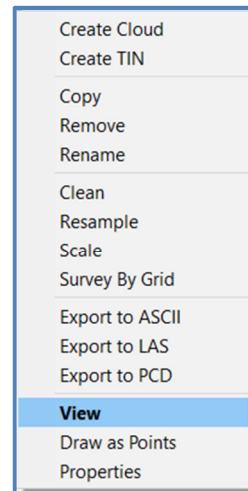
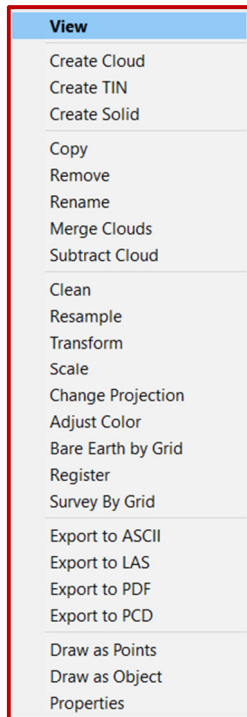
a. Project Tab menus > Highlight cloud file and right click mouse to select fly-out menu



Advanced - Project Tab Menu

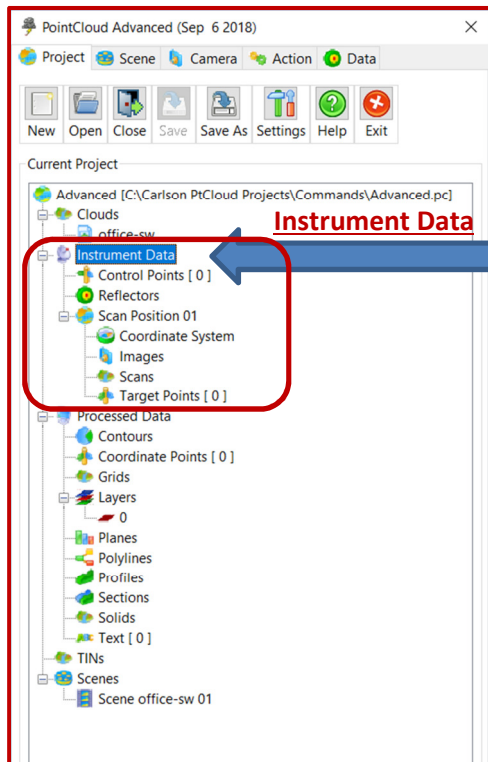


Basic - Project Tab Menu



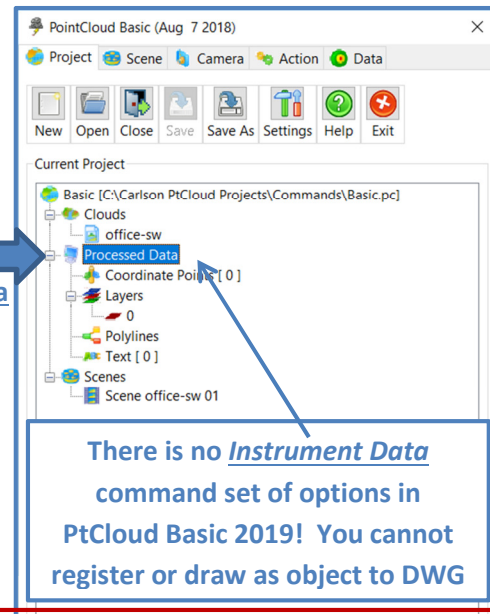
13. Project Tab - Advanced PtCloud Menu has Instrument Data and Basic PtCloud Menu does not!

The PtCloud Basic menu cannot import control points and cannot do a registration between source (scanned points) and destination (field control) points.



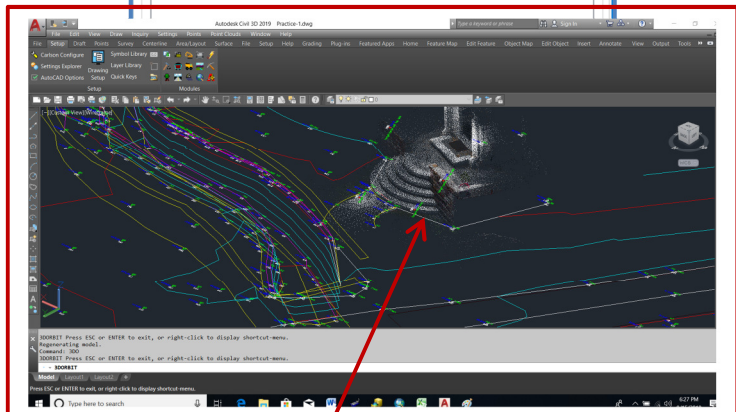
Instrument Data

**No Instrument Data
In the Basic Menu**



There is no Instrument Data command set of options in PtCloud Basic 2019! You cannot register or draw as object to DWG

Review MP4 movie "Register and Draw as Object only in the Carlson PtCloud Advanced 2019 menu", to see how these two commands work & workflow.

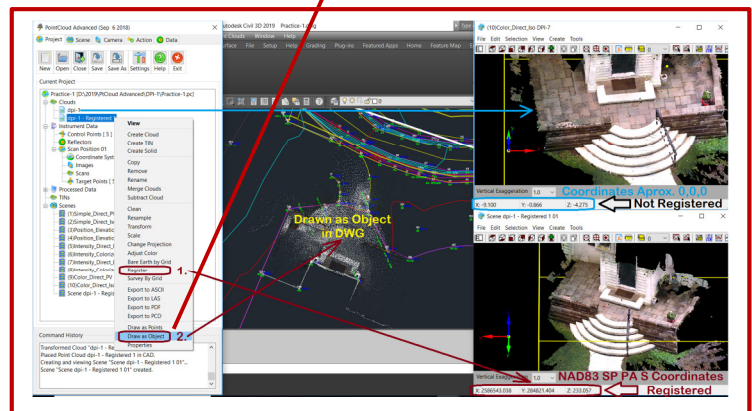


Opened Project Practice-1. - Register

- 0.062638 between Target "1" and Control "2001"
- 0.040949 Horizontal, 0.047399 Vertical
- 0.091003 between Target "2" and Control "2002"
- 0.090633 Horizontal, 0.008190 Vertical
- 0.023871 between Target "3" and Control "2003"
- 0.006896 Horizontal, 0.022853 Vertical
- 0.032268 between Target "4" and Control "2004"
- 0.032210 Horizontal, 0.001939 Vertical
- 0.069099 between Target "5" and Control "2005"
- 0.066633 Horizontal, 0.018295 Vertical

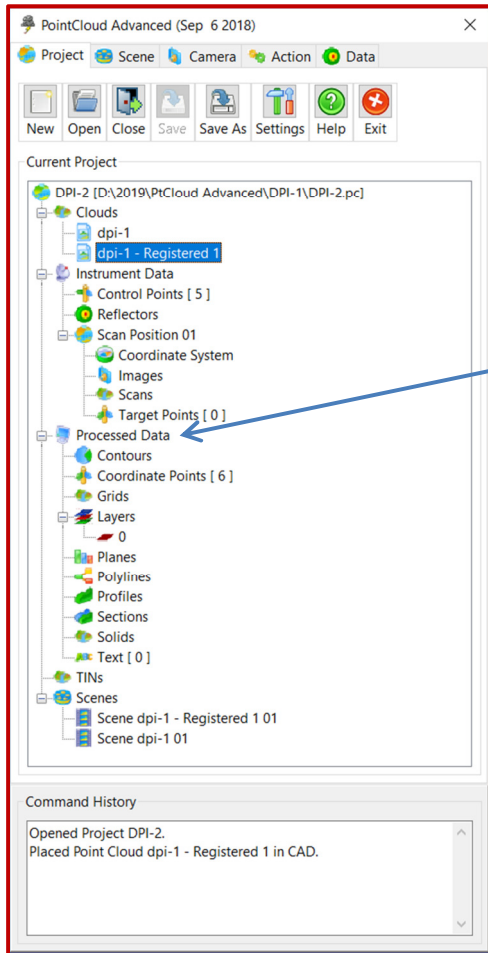
Success: registration complete!
Translating Cloud...
Transformed Cloud "**dpi-1 - Registered 1**" created.

2. Draw as Object – New command in PtCloud Advanced 2019

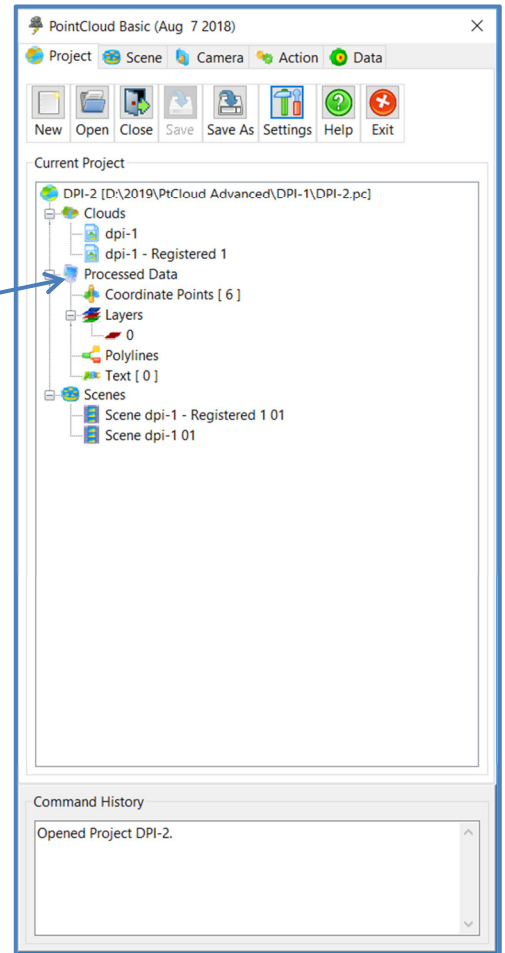


1. Register scan points (source) to field surveyed points (destination) – Transformed Cloud i.e. "dpi-1 – Registered 1"; all points in point cloud stored as coordinates in this example are now in state plane NAD83 PA S

14. Project Tab > Processed Data differences between Advanced and Basic menus (Different)



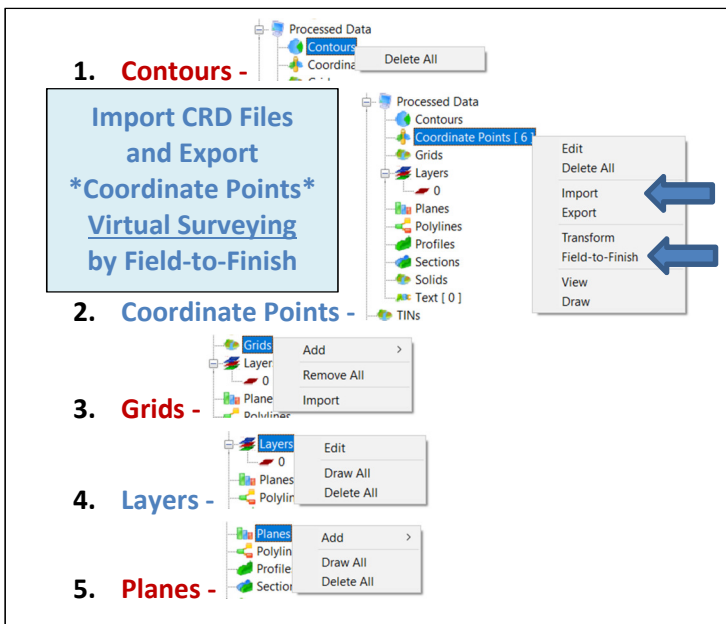
PtCloud Advanced 2019 Project menu



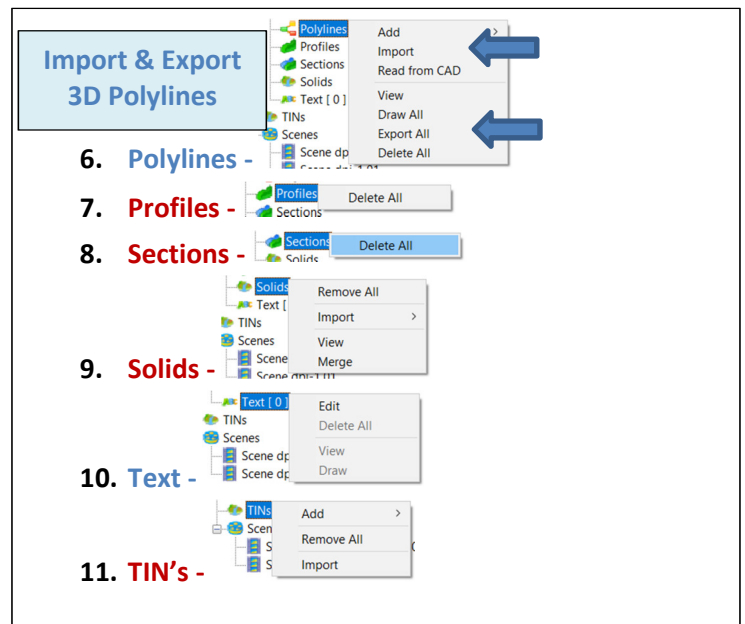
PtCloud Basic 2019 Project menu

What's missing in Basic's Processed Data (in red)?

1. **Contours**
2. **Coordinate Points**
3. **Grids**
4. **Layers**
5. **Planes**
6. **Polylines**
7. **Profiles**
8. **Sections**
9. **Solids**
10. **Text**
11. **TIN's**

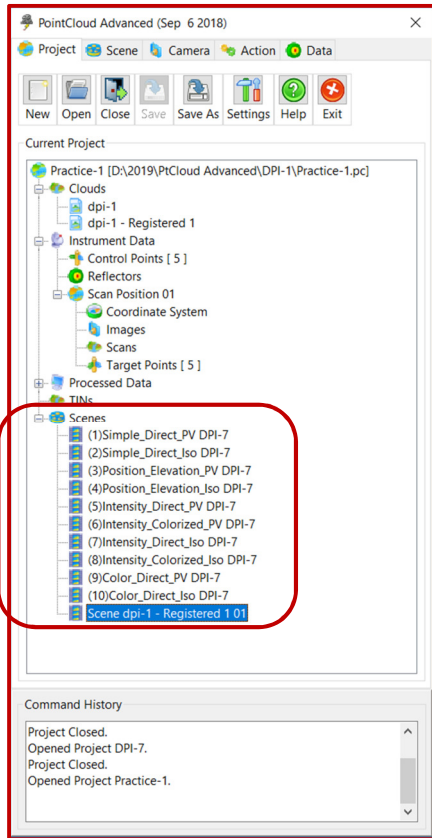


Advanced & Basic Processed Data - Right Click Fly-out menus

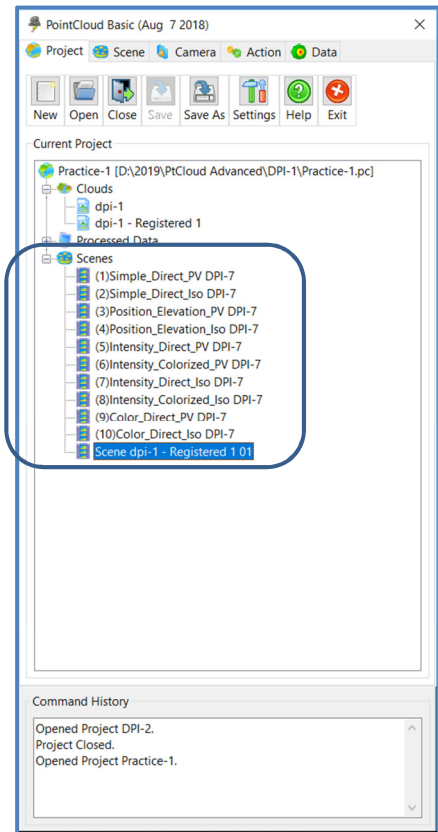


Advanced & Basic Processed Data - Right Click Fly-out menus

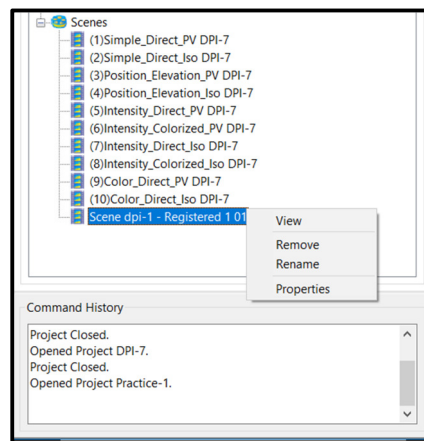
15. Project Tab – Scenes – See above section on the 10 Views (Scenes) in PtCloud (No difference)



Project Tab > Scenes (Advanced)



Project Tab > Scenes (Basic)



Right Click - Advanced & Basic Fly-out menu for any Scene to View, Remove, Rename and display Properties

16. Action Tab Advanced and Basic command differences (Differences)

- a. **Selection Set** (Slice & Dice) category of commands are identical
- b. **Edit** category of commands are identical
- c. **Transform** category of commands are identical
- d. **Create** category – **Subset of commands in Basic**
- e. **Extract** category – **There are no Extract commands in Basic**
- f. **Command History** is identical

Advanced 2019 - Action Tab Menu - Basic 2019

a. Selection Set

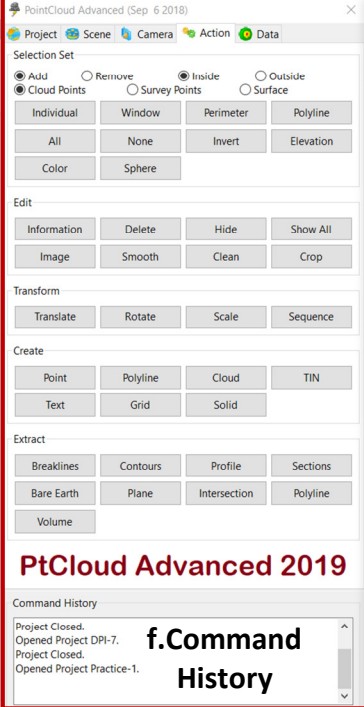
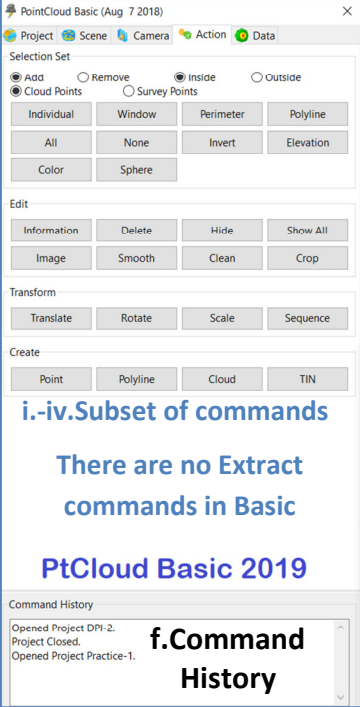
b. Edit

c. Transform

d. Create

e. Extract

f. Command History

i-iv. Subset of commands

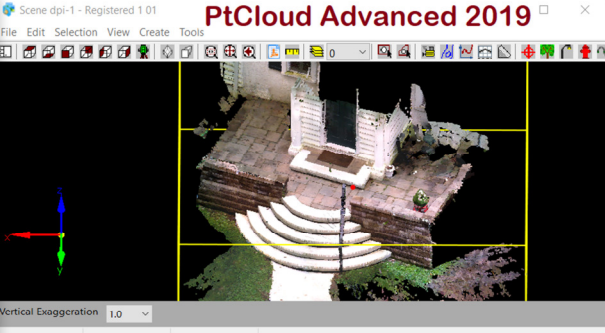
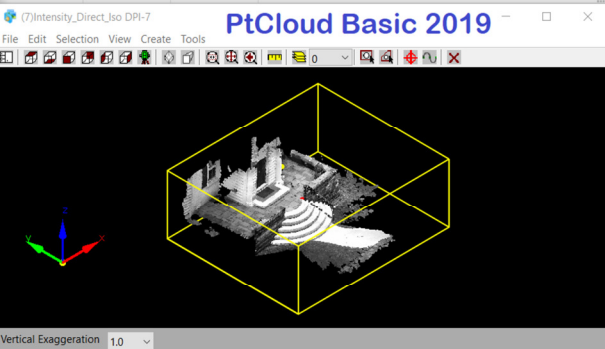
There are no Extract commands in Basic

PtCloud Advanced 2019

PtCloud Basic 2019

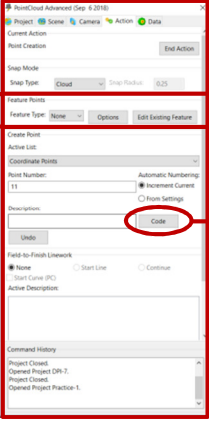
f. Command History

f. Command History

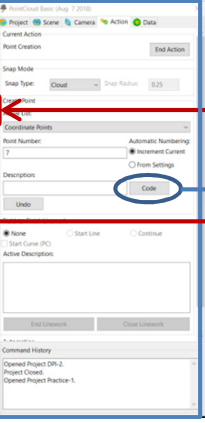



Virtual Survey features – d. Create > i. Points Field-to-Finish (F2F)

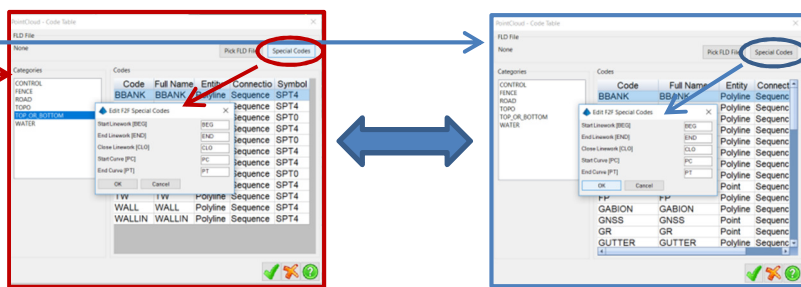
Point - (F2F) Advanced 2019



Point - (F2F) Basic 2019

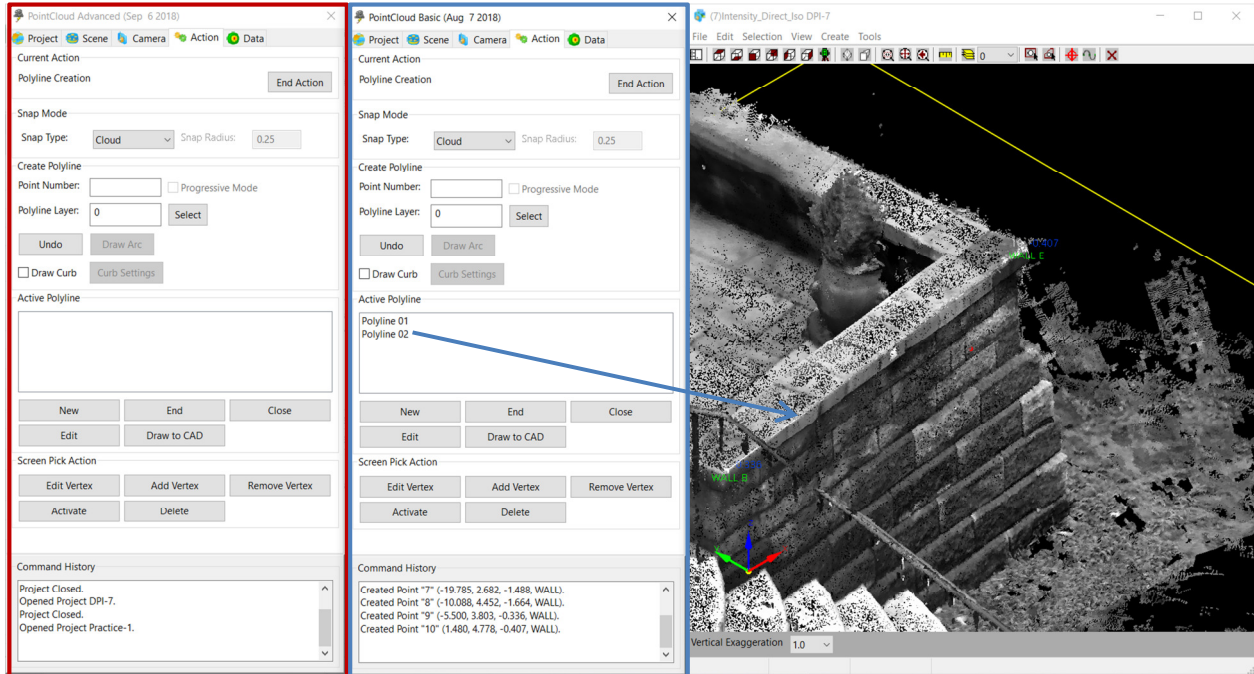


Feature Points options i.e. 3D symbols do not exist in Basic 2019 Points command



No difference loading F2F codes and Special codes between Advanced and Basic PtCloud 2019 menus

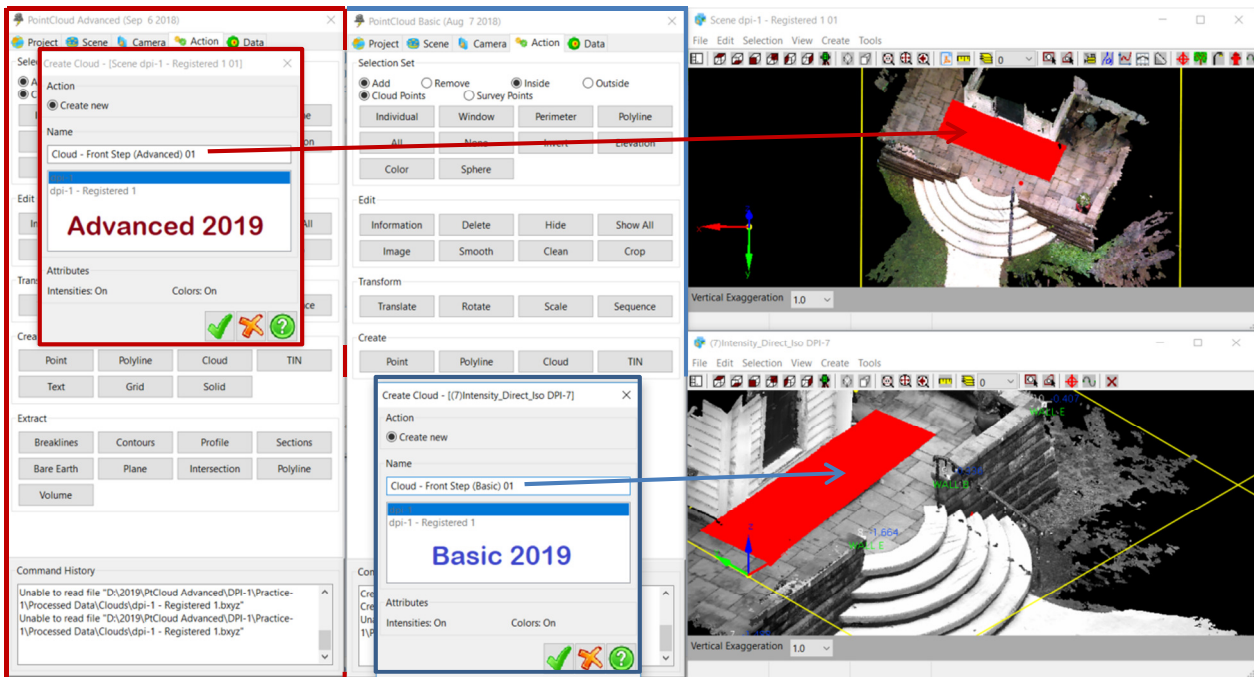
Virtual Survey Features – d. Create > ii. Polyline (Always 3D) (No difference)



**Point - Polyline (3D)
Advanced 2019**

**Point - Polyline (3D)
Basic 2019**

Virtual Survey Features – d. Create > iii. Cloud (No difference) – Select subset and make new cloud



**Point - Cloud
Advanced 2019**

**Point - Cloud
Basic 2019**

Virtual Survey Features – d. Create > iv. TIN (Slight difference)

Slight Differences in Advanced 2019.
Advanced prompts to store TIN to Project or Export directly to Carlson TIN file.
Basic 2019 only stores to Carlson TIN file.

Advanced 2019

Basic 2019

Point - TIN Advanced 2019

Point - TIN Basic 2019

Virtual Survey Features – d. Create > v. Text, vi. Grid and vii. Solid (Not in PtCloud Basic 2019)

Text only in Advanced 2019

Grid only in Advanced 2019

Solid only in Advanced 2019

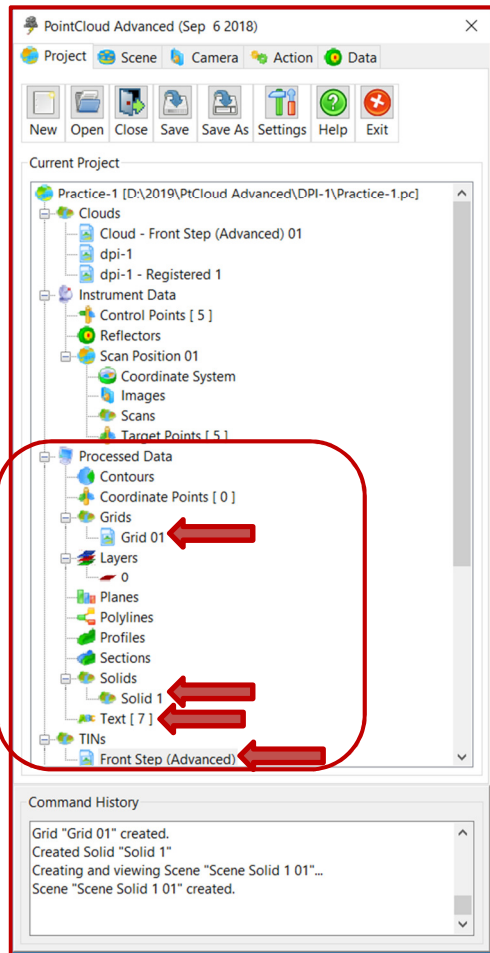
Text and Solid commands only in Advanced 2019

Grid command only in Advanced 2019

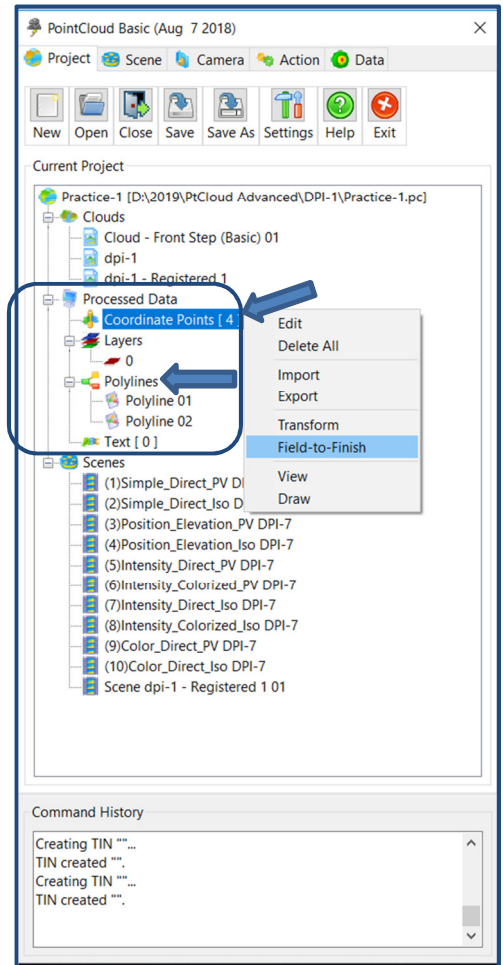
Pick UR

Pick LL

Virtual Surveyed Features – Action tab > Populate back into the Project Tab under “Processed Data”

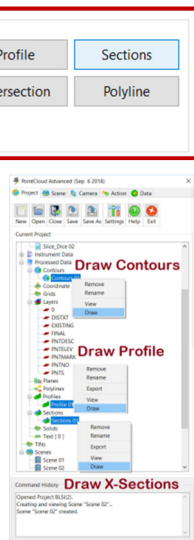
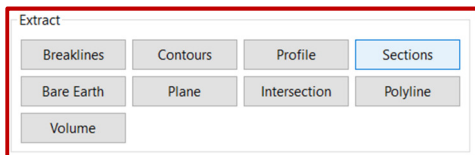


Processed Data in PtCloud Advanced 2019

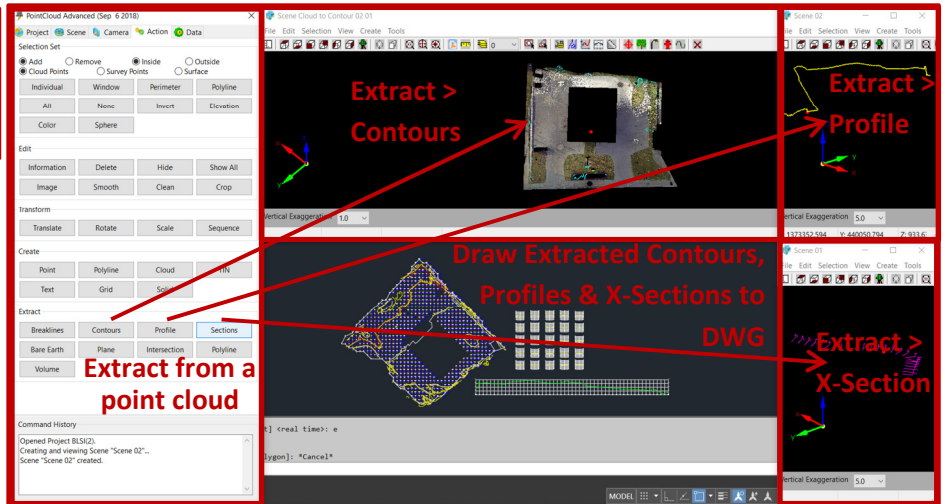


Processed Data in PtCloud Basic 2019

Extracted Virtual Surveyed Features – Populate back into the Project Tab under “Processed Data”
(Only found in PtCloud Advanced 2019)



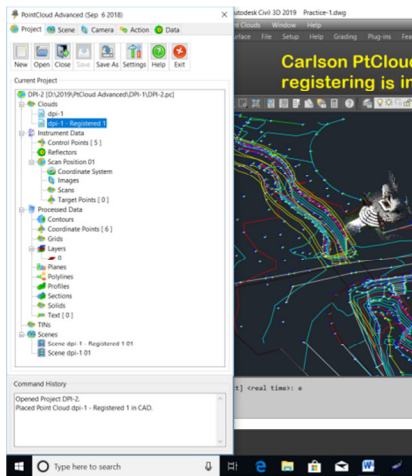
Draw all Extracted features i.e. Contours, Profiles & X-Sections... to DWG entities layered or Carlson PRO and SCT files for plotting in the DWG.



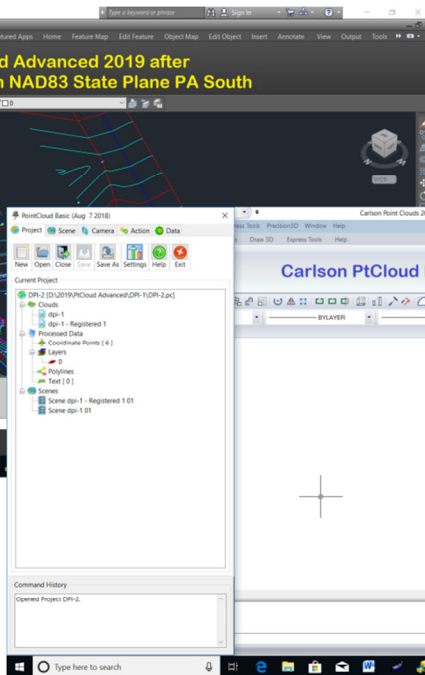
16. Virtual Survey in PtCloud Basic 2019 - What to do when the point cloud isn't registered?

Carlson PtCloud Basic 2019 cannot register point cloud files so how do you "Virtual Survey" in PtCloud Basic 2019 when the point cloud cannot be transformed so the Field-to-Finish coded points with linework are in their proper coordinates i.e. NAD83 State Plane PA South?

Hint – Use in Carlson office 2019 ACAD/ICAD or OEM software, Coordinate File Utilities (CFU) and Coordinate Transformation (CT), to Localize 2 or more point pairs, source to destination; so all the Field-to-Finish points with linework when sent to CAD from PtCloud Basic 2018 are transformed into the proper coordinate system back in the CAD DWG. (See MP4 movie PtCloud Basic 2019 to CAD – CFU-CT to State Plane NAD83 PA S.)

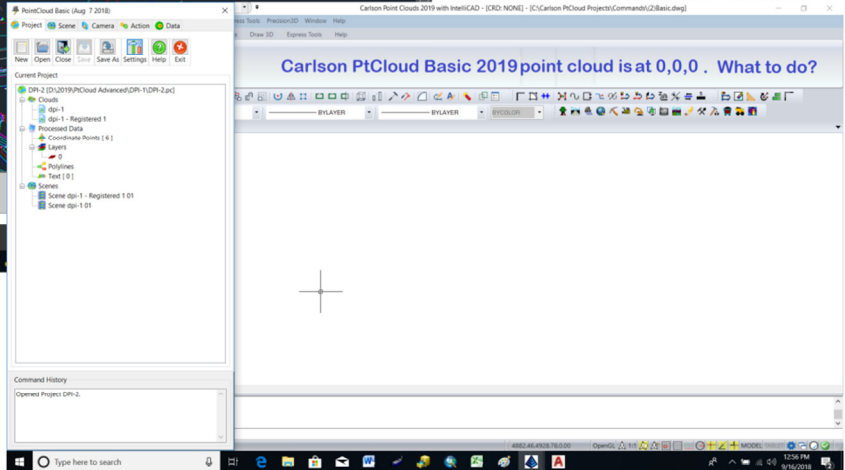


Carlson PtCloud Advanced 2019 above, after Registering the cloud allows drafting by Field-to-Finish Virtual Surveying directly to the DWG in NAD83 State Plane PA South.



What do you do in Carlson PtCloud Basic 2019 if the point cloud isn't in NAD83 State Plane PA South?

Workflow is nearly the same but after plotting all Field-to-Finish points and linework to ACAD or ICAD DWG then use CFU > CT to transform Virtual Surveyed field data to NAD83 State Plane PA South coordinates.



Steps to transform point cloud at near 0,0,0 to NAD83 State Plane PA S use in Carlson Survey Coordinate File Utilities (CFU) – Coordinate Transformation (CT) and Least Squares by inputting source (scanned) and destination (field stored shots) point pairs.

Point	Working	Existing	Elevation	Horizontal	Vertical	Process
1001	4.253	1.626	2.861	0.000	Y	
1002	2.007	16.719	0.796	0.070	Y	
1003	4.253	1.626	0.261	0.000	Y	
1004	1.077	2.263	-4.481	0.000	Y	
1005	1.626	4.486	4.483	0.000	Y	

Virtual Survey - by Point F2F Desc. Codes

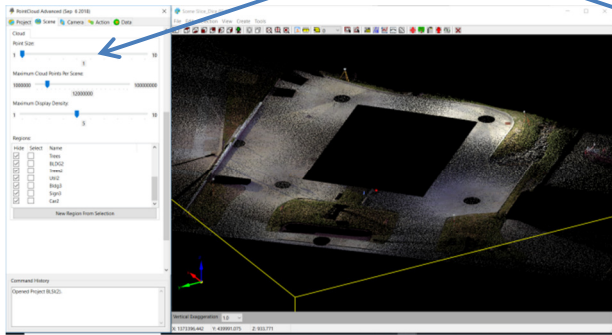
Field-to-Finish

CFU-CT

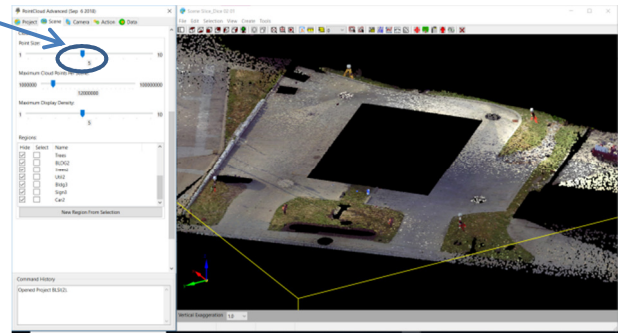
Carlson PtCloud Basic 2019 Virtual Survey Field-to-Finish and Survey By Grid with all points transformed back in CAD by CFU-CT and Move Z

Now all coordinates 1 to 208 are in State Plane NAD83 PA S with the correct Z elevation!

17. Scene tab > Cloud Point Size 1 to 10 settings (No Difference)

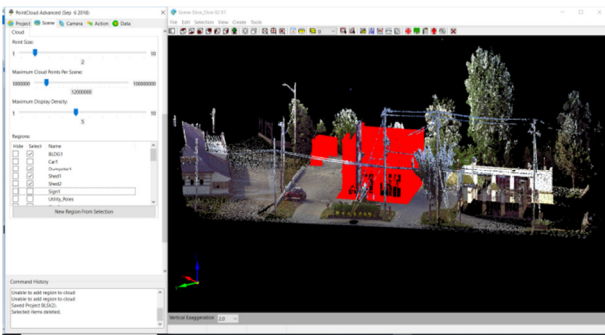


Scene tab - Cloud Point Size is set to 1 small
(Note black seen from background thru pavement)

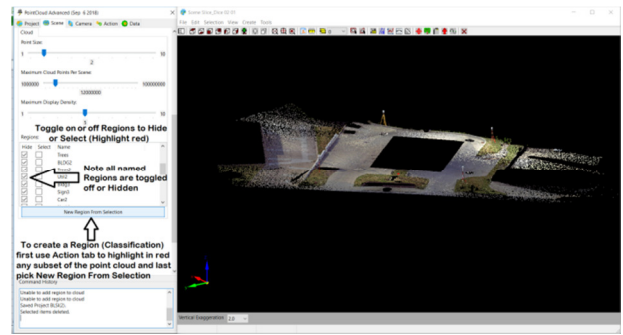


Scene tab - Cloud Point Size is set to 5 medium
Note black background isn't as noticeable set at 5 medium
and is not bleeding thru the pavement

18. Scene tab > Regions (Classifications i.e. Trees, Buildings, Utility Poles, Noise) (No Difference)

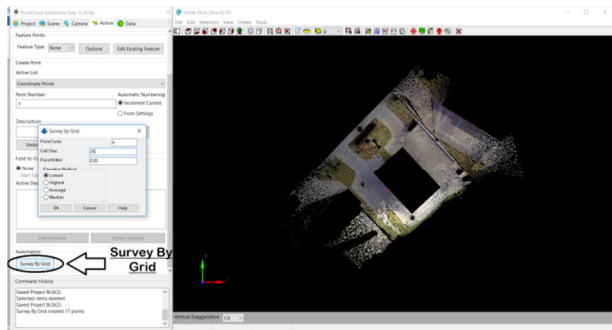


BLDG and Dumpster Regions selected to highlight in red

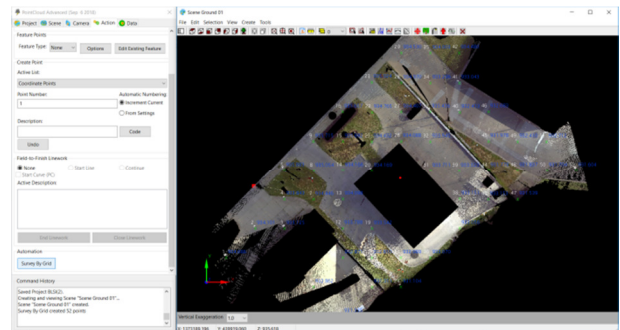


Regions all toggled to Hide (Easier to draw ground features)

19. Action tab > Points (Scroll down to bottom of PtCloud Toolspace) > Survey by Grid (No diff.)



Select Action tab > Scroll down and pick > Survey By Grid



Survey By Grid - Creates points every 25' with Z elevations

20. Carlson PtCloud Advanced or Basic 2019 working within ACAD or ICAD Add-On

You can work in AutoCAD 2010 up to 2019
(AutoCAD purchased from Autodesk)
Or Intellicad 9.x our ACAD similar DWG
(Intellicad included with Carlson office 2019)

