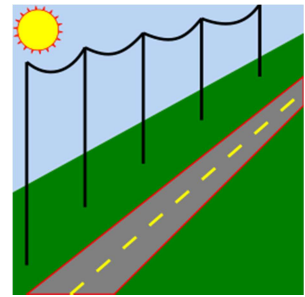


2022 PLS-CADD Advanced Training and User Group Meeting **What's New in PLS-CADD™**



Summary of changes since June 2019 User Group, covers versions 16.01-17.31. This includes the general releases v16.20, v16.51, v16.81, v17.22 and subsequent insider releases.

PLS-GRID

PLS-GRID is an enterprise application add-on for all PLS-CADD users in a company. It can also be used by PLS-POLE or TOWER only users as a project manager for structure files. PLS-GRID is made up of 3 parts which are the PLS-GRID Server software that runs on your company server and will be the location where your projects will be stored, PLS-GRID Desktop Application that is an add-on to PLS-CADD similar to Optimum Spotting or SAPS, and the PLS-GRID Web Client Application that is a separate web access to the PLS-GRID information through a web browser that can be shared with non-PLS users.

- 1) PLS-CADD now includes an optional PLS-GRID client. See <https://www.powerlinesystems.com/pls-grid> for more information.
- 2) PLS-GRID Project Manager can now manage PLS-CADD projects.
- 3) **File/Open** dialog now has a button to open the PLS-GRID Project Manager Discovery dialog.
- 4) The PLS-GRID Project Reviewer now allows Batch Update of all projects that share a file that changed during the last check in. For example, if you change a .wir file and check it in, Batch Update allows you to update all other projects that use that same .wir file without having to download, Check Out, update the file, and finally Check In the project.
- 5) Project Manager Reviewer now has a context menu option to Batch Update "projects using previous version of selected file".
- 6) QuickSearch toolbar now searches PLS-GRID for all projects in Project Manager. Clicking on a match will zoom to that project in Grid Map View or open it in Project Manager Reviewer if Grid Map View is not active.
- 7) Added **File/New/From Template** command that starts a new project from a PLS-GRID template.
- 8) Added **Lines/Design Rule Check** command (which is run automatically when performing a Project Manager Check In). The currently supported design rules include: required Criteria, Feature Codes, Part File, Drafting Settings, Coordinate System, Unit System, User Structure Number Regular Expression, various File/Preference settings, Model Has TIN, Terrain Clearance Line Side Profile, Terrain Clearance Line Spikes and Enable Revision Tracking.
- 9) **Structures/Available Structure List/Add or Delete Structure** now has a "Add from PM Discovery"

button so you can find and add structures to your project directly from Project Manager.

- 10) Added "Grid Links" which are URLs for projects stored in PLS-GRID Project Manager. A sample Grid Link is "https://grid:443/CPID/1:4c3b3244".
 - a. Right click on a project in Project Manager Discovery to copy the Grid Link or use the "Copy Grid Link" button in Project Reviewer.
 - b. Pasting the Grid Link into the QuickSearch Toolbar will open and/or get that project.
- 11) "Terrain/Edit/Merge Points from External File/Merge Points from LAS/LAZ Files" and "File/New From Template" now query the PLS-GRID Survey Data Management database for any LAS/LAZ files that intersect the project.
- 12) **Lines/General Data** now has an option to exclude structure usage information from PLS-GRID.
- 13) When importing survey data in New From Template, now search for an .Imp for the selected LAS/LAZ file to get the class to Feature Code mapping from.
- 14) The Project Repair Wizard now has a "PLS-GRID Search" option which searches the Project Manager database and downloads the first file that it finds with a matching name.
- 15) Now warn PLS-GRID users that turning **F1/Enable relative path remapping and the Project Repair Wizard** off is a terrible idea and will break PLS-GRID.
- 16) **File/PLS-GRID/Import Backup** now lets you choose between Batch or Interactive mode whenever importing two or more .bak files. Batch mode will not display further dialogs and will import projects with defaults.
- 17) **File/PLS-GRID/Grid Analytics...** can now run Structure Usage and/or Thermal Rating reports on multiple projects simultaneously and upload results to a PLS-GRID server for viewing in the GRID Map View

Reliability, Usability & Performance

- 1) Restructured XYZ, PFL and TIN code to better support working with more than two billion points. Note this requires at least 128 GB of RAM and substantial patience.
- 2) The PLS software no longer supports 32-bit version of Windows or Windows Vista support.
- 3) Improvements to error handling including the ability to redirect all errors to a report for the duration of many operations.
- 4) Multi-threaded "File/Open" available structure list read (so reads are spread across processor cores) for an average 5x reduction in read time.
- 5) Multi-threaded **File/Open** DXF/SHP file read (so reads are spread across processor cores) to speed up open.
- 6) Multi-threaded the XYZ and PFL checksums that are performed every File/Open and File/Save for 4x speedup. Multi-threaded TIN checksum for 2x speedup.
- 7) Dramatically improved the efficiency of building L4 FE sag-tension models when have many different structure files included. The first L4 FE analysis will now be faster.
- 8) **Structures/Available Structure List/Batch Model Check** and **File/Auto-Organize Project** now use

multiple instances of PLS-POLE and TOWER to complete more quickly. We will extend this capability to other functions in future versions. You may disable it via the **File/Preferences** setting "Enable multiple concurrent background processes" if this overwhelms your computer.

- 9) Optimized **Structures/Automatic Spotting/Optimum Spotting** memory management to allow for lines more than 10x as long as previously possible.
- 10) Parallelized some terrain functions and sped up centroid (LiDAR classification) operations by a few percent.

Subscription Based Licenses (SBL)

- 1) Added ability to "Unclaim" a license from the license dialog reached via the key button in Help/About. Licenses may only be "Unclaimed" from within the software if they had been claimed for at least 30 days. Please continue to contact technical support to unclaim licenses that are younger than 30 days.

Coordinate Systems & Terrain

- 1) Updated to PROJ 6.3.1 for coordinate system calculations. Note that this introduces a dependency on "proj.db" which must be in the PROJ folder in your PLS-CADD application directory (the setup program will place it there automatically).
- 2) Now support ".prj" files for attachments and prompt to use one when we detect it. When ".prj" file is used it will be included in any ".bak" file you make.
- 3) Shapefile ".shp" export will now export a ".prj" file for the data. Use File/Preferences setting "Default WKT (Well-Known Text) format for .prj file during SHP export" to control this.
- 4) You may now select a ".prj" file anywhere in the program where you define a coordinate system (this file must contain WKT or a PROJ string).
- 5) Added more custom coordinate systems.
- 6) Made **Terrain/Enable GPS Tracking...** work again on Windows 10. Users will need to enable "Settings/Privacy/Location/Allow access to location on this device" in Windows 10 manually since Microsoft took away our ability to do this for you.
- 7) Now default to using PROJ 6.0+ improved "EPSG:XXXX" coordinate system definition syntax if "EPSG" is selected, and a grid shift file is not specified. You can revert to the old behavior with the File/Preferences "Use legacy EPSG coordinate system definition syntax".
- 8) Added option to **Terrain/Edit/Merge Points from External File/Merge Points from LAS/LAZ Files...** to import as Long/Lat instead of Northing/Easting.
- 9) Sped up coordinate system transformations used for structure long/lat labeling by factor of 10-1000x resulting in much faster draw when these are displayed.
- 10) **Terrain/Edit/Merge Points from External File/Merge Points from Internet** now imports USGS 3DEP data from June 2021. This provides 1/3 arcsecond LiDAR data for much of the US.

- 11) **Terrain/TIN/Create TIN** now includes survey points that are more than 500km from the centroid of the ground survey data in the TIN Bad XYZ Report.
- 12) Added **F1/Survey/Terrain Features/Delete all inactive points on next** save that does just that.

Sections, Jumpers, and Cables

- 1) Bundle Geometry may now be input in the Sections Table and Section Modify. When present:
 - a. Bundles will be drawn in all views
 - b. Bundle Geometry is considered for most clearance calculations. Bundle radius is used for clearance calculations and not individual subconductors.
 - c. Bundle Geometry is considered in Line Constants and EMF Calculations
- 2) **Sections/Clearances/To Structure...** now moves minimum distance bundle radius distance towards structure/jumper to account for bundles. All clearance commands are now bundle aware.
- 3) **Sections/Electric/3D EMF Calculator...**:
 - a. Calculate Electric and Magnetic fields in 3D including effects from multiple circuits and ground model
 - b. Create a color coded contour map based on specified field limits
 - c. Use multiple processor cores to reduce calculation times
 - d. Add electric and magnetic field cross section graphs for all selected spans
 - e. **Sections/Electric/3D EMF Along Line...** that shows EMF values along a line that you can draw anywhere in your project
- 4) **Sections/Electric/Configure Sections by Circuit** that makes it easy to change the voltage, current, and display conditions for all sections which use a given circuit label.
- 5) **Sections/Electric/Full Line Constants Calculator...** improvements:
 - a. Now includes adjacent parallel spans when calculating mutual impedance
 - b. Now allows for different earth resistivity for each span
 - c. Circuit lengths includes jumpers and the distance between attachments at dead end structures
- 6) Added **Sections/Slip and Clip...** command for easily adding/removing conductor to/from the currently selected span and the ahead/back spans.
- 7) Added optional cable file (".wir") field for "default tension". If input then a "Load Default Tension From Cable" button will be enabled in **Sections/Modify** and **Line/Setup** dialogs that allow you to use that tension (Ultralite prompts for it as well).
- 8) Graphical sagging now aborts immediately when you press the Escape key rather than continuing on for an interminable period of time.
- 9) **Sections/Add...** now uses any bundle geometry that may have been copied from a previous section.
- 10) Added **Sections/Cable Files/Available Cable List** that is similar to the Available Structure List. If the Available Cable List includes cables that are not used by sections, criteria, or the Batch Thermal Calculator then the project will be saved in a new file format.

- 11) **Structures/Jumpers/Delete Range** as well as a context menu option to delete all jumpers from a structure.
- 12) Now draw yoke plates on jumper idlers. The best effort was made and this won't always look perfect.
- 13) Can now save temperatures per span from Thermal Rating Report so they can be imported into the Batch Thermal Calculator

Structures

- 1) **Structures/Automatic Spotting/Optimum Body and Leg Extension Selection...** now works with more than 2 million configurations.
- 2) **Structure/Modify** "View" button now prefixes file name with the user customized structure comment title when available and "Open" when not.
- 3) Structure Groups now ignores sets attached to jumper idlers when deciding if a group applies to a structure. This makes "All sets DE" apply when a suspension insulator has been added and used as a jumper idler.

Criteria, Codes & Structure Loading

- 1) Initial implementation of EN50341-2-4:2016 German NNA provided for testing.
- 2) No longer issue warning about GRF not matching Wind Height Adjust in **Criteria/Weather** when enter a numeric GRF and select a AS/NZS 7000 wind height adjust option since you may actually want to do this.
- 3) Added **Criteria/Structure Clearances** and option to **Lines/Reports/Structure Clearances** to check currently displayed WC, WC from criteria or both. Use of the criteria option will force saving the .CRI file in a new format.
- 4) Added the following Adjust Cable Loads commands to **Criteria/Structure Loads (methods 3,4)**: "Source Set:Phase:Span for after sag-tension structure loads", "Destination ... load copy...", "Destination ... load move...", "Rotate structure loads downward..." and "Rotate structure loads ... about vertical axis...". Use of these new commands will force saving the *.CRI file in a new format.
- 5) **Criteria/Structure Loads (methods 3,4)** now allows 50 structure loads commands.
- 6) Added **Criteria/Weather** Wire GRF option "EN50341-2-2:2019 Belgium NNA Mean Wind" which is identical to "EN50341-2-2:2019 Belgium NNA" except $G_c = 1$. Note that use of this method will force saving the .CRI file in a new format.
- 7) Added "EN50341-2-2:2019 Belgium NNA" Structure Wind Model option to **Criteria/Structure Loads (methods 3,4)**. Note that use of this method will force saving the .CRI file in a new format.
- 8) Now convert "EN50341-2-2:2015 Belgium NNA" to "EN50341-2-2:2019 Belgium NNA" on read because publishing was delayed from 2015 to 2019 and calculate Terrain Factor, kr , using $0.19(Z/0.05)^{0.07}$ instead of $0.189(Z/0.05)^{0.07}$. Note that use of this method will force saving the .CRI file in a new format.

- 9) **Criteria/Weather Cases** and **Criteria/Structure Loads** now support ASCE 74-2020 wire wind/ice height adjust, wire gust response factor and structure wind adjustment selections. Use of ASCE 74-2020 will force saving the ".CRI" file in a new format not readable by older versions.
- 10) Added Climbing Strength Factor to .CRI file and save in a new file format whenever it is non-zero. Currently only used for Belgian NNA.
- 11) **Criteria/Weather** now detects weather case description changes and offers to automatically update references within the project.
- 12) Added "Disable Live Checks" option to **Criteria/Weather** that turns off the safeties introduced in version 17.20 so that you are once again free to update your weather cases and have access to insert/remove row commands. This is the switch to turn off the feature in item 11).
- 13) Now write a provenance string to LCA/LIC files that lists criteria file, RS or FE (and level), user, time, date, PLS-CADD version and structure location (long/lat).
- 14) Added AS/NZS 7000 terrain category selection: "1_2021" which includes the new Mz,cat values for TC1 in AS 1170.2-2021. Use of this will force .CRI file to save in a new version.
- 15) Added "IS802:2015 NFW" Structure Wind/Ice Loading Method (NFW = Narrow Front Wind) same as IS802:2015, but with $K_z = 1$ (note IS802 refers to K_z as GRF, but it is K_z). Use of this method forces saving in a new file version.
- 16) Added NESC 2023 "Structure Wind Load Model", "Wind Height Adjust" and "Wire Gust Response Factor" options for testing and evaluation purposes.

Drafting

- 1) Added "Longitude and Latitude" option to **Drafting/Structure and Section Labeling/...** as well as various long/lat tags to the prefix and suffix customization options in this dialog so can have lat/long, degrees or DMS, etc.
- 2) Shapefile attachment options now allows for selecting between including shapefile extents in project extents (the default) or excluding them.
- 3) Portugal REN P&P sheet options now work in standard (non-Long Axis) mode; note that you need to temporarily enable Long Axis plotting to select the REN option, but you may then disable Long Axis plotting.
- 4) **Drafting/Attachments (Raster and Vector)/Stretch** and **Drafting/Attachments (Raster and Vector)/Move** are now undoable and move now has a preview rectangle.
- 5) Added options to Inset Structure Views to "Hide symmetrical labels", "Only label angle members" and "Avoid text collisions".
- 6) Added a "Elia" long axis plot option for P&P sheets that also includes a "Single Span Per Page" option.
- 7) Added independent XYZ center for structure inset view clip boxes. Use of this will force saving in a new file format.
- 8) Allow customization of "sag" text when labeling wires in profile and sheet profile views.

- 9) Updated ECW/JPEG2000 and PNG image libraries to latest release to improve image loading performance.
- 10) **Drafting/Inset Views/Add/Inset Cross Section View** creates a cross section inset view based on a line the user draws in the Plan View
- 11) You may now apply bold, italic, and/or underline styles to text annotation. When used annotation will be saved in a new file format.
- 12) Text annotation now has an option to auto-size to fit in a box. When used annotation will be saved in a new file format.
- 13) Annotation table edit now applies the same background color to all rows in multi-part entities (e.g. polygons).
- 14) P&P Sheet Grid Labels for EDF and Elia Long Axis options are now customizable.
- 15) Added Circuit Notes Labeling option to **Drafting/Structure and Section Labeling/Sheet Profile View** and **Drafting/Structure and Section Labeling/Profile View**.
- 16) **Drafting/Structure and Section Labeling/Sheet Profile View** now allows control over the order section labels are printed in (similar to structure labels).
- 17) Section labels now have a %UL (ultimate tension) label option.
- 18) Polygon annotation may now be filled with a color of your choice.
- 19) Added Current section labeling option to **Drafting/Structure and Section Labeling/Sheet Profile View** Section Labels Tab. If used (or reordered) will save PPS file in a new format.

Web Mapping Services (WMS/WMTS) Improvements

- 1) **Drafting/Attachments (Raster and Vector)/WMS** import dialog now allows input of a custom suffix for user defined servers. One use of this might be to add an "&APIKEY=something" suffix for servers that require authentication.
- 2) Added OpenStreetMap WMS server to predefined list of servers.
- 3) Improved compatibility with a variety of perverse WMS/WMTS server dialects.
- 4) WMTS downloads now use the coordinate system for the selected layer, rather than always using the coordinate system for the first layer.
- 5) WMS import along the alignment now clips the station range to the first and last PIs so don't import tiles that project on segment before first PI (or after last PI) when have a fishhook shaped alignment.

Project References and File Management

- 1) **Lines/Reference Manager** which keeps track of any non-project file you want to associate with a project. These files can be tagged with keywords, searched for, viewed and included in .bak files.
- 2) Added **Lines/General Data** as a place to enter project metadata such as "Line Code", "Last Thermal Rating Date", "Last Inspection Date", etc. These fields can be revised to an organizational standard when

using PLS-GRID and used to search and identify projects.

- 3) Added **Enable Automatic Project Revision Tracking During Each Save** option to **Lines/General Data** that functions just like that option in TOWER and PLS-POLE. Use of this option will force saving in a new file format.
- 4) **File/Backup...** now adds all files from the reference manager, regardless of file extension, and also include reference manager files from PLS-POLE/TOWER models in PLS-CADD projects when you select "Include files in Reference Manager" in the "Backup Options" dialog.
- 5) **File/Auto-Organize Project** that uses newly developed Project Manager technology for PLS-GRID to make a new copy of your project that automatically adheres to PLS recommended file management practices.
- 6) Consolidated the separate Projects directory settings in PLS-CADD, PLS-POLE and TOWER to a single "Project Workspace Directory" setting that is shared by all programs. Whichever program you run first will have it's Projects directory become the "Project Workspace Directory" which is the root for PLS-GRID Project Manager.
- 7) Removed "Pick File" option from Criteria Notes right-click menu since **Lines/Reference Manager** should be used to associate a file with a project.
- 8) Added **F1/Move files from Criteria Notes to Reference Manager** command to aid in migration to the Reference Manager.
- 9) Added **Lines/File Reference Check** that generates a report of all missing files in a project (including those referenced by method 4 structures) and checks for each structure in the available structure list if the base structure for any customized structure and the seed structure for any M1/M2 file exist.

User Interface

- 1) Added **Help/Register for Training Classes** command which enables you to see and sign up for classes (including our popular free Webinars) directly from within the software. You may also download videos of previous Webinars from this command.
- 2) The structure selection tab in various report dialogs now allows selecting structures based on structure groups. **Lines/Reports/Structure Usage** and **Lines/Reports/Section Usage** now use the new structure selection tab and can now run for discontinuous structure ranges.
- 3) Automatic window resizing when you drag to the border of the application can now create half height windows if dragging to the bottom or top.
- 4) **View/Measure Distance/Between Points** and **View/Calculate Area or Angle** now respects preferences settings "Line angles in Grad rather than Degrees (selected reports & drawings)" and "Line angles in Grad unit label" also extended optional use of gradians to Dimension Angle annotation and a few other places.
- 5) Now allow you to specify the minimum height above ground when creating cross section views (previously hard-coded to 30m).

- 6) Can now shift-right click on file name buttons in dialogs (not in tables) to copy the filename to the clipboard (e.g. the cable file name in **Sections/Modify**).
- 7) Otto-Pilot is now always invoked by a capital "O" (Shift+O) and Rooster via capital 'R' in all supported views.
- 8) Otto-Pilot improvements: adjusted defaults so small projects fly by smoothly, added a U-turn option (press 'U' to enable), set default mode to station based, updated instructions in the status bar, now try to draw at a consistent rate irrespective of how much of the model is on the screen (will move smoothly for sparse scenes and take larger steps for more complex scenes).
- 9) **Terrain/Edit/Merge Points from External File/Merge XYZ Points from User Defined XYZ Files** now works when have both "Use elevation from TIN whenever possible instead of the Z read from file" and "Northing and easting are actually latitude and longitude (in decimal degrees, not DMS)" options selected.
- 10) Added "Append" command to table right click menu which will append text in the clipboard to all selected cells.
- 11) Added a scale indicator to the lower right of most graphics views. Control default visibility with new **File/Preferences** setting "Default show scale indicator" and explicitly turn it On/Off with **View/Pan, Zoom & Rotate/Show Scale Indicator**.
- 12) Added **Help/Download Examples...** command that enables access to the latest examples at any time (you can now restore examples inadvertently overwritten without a reinstall) as well as examples that are too large to ship with regular updates.
- 13) Added context menu command to "View this location in Google Maps" to complement the view in Google Earth and view in Bing Maps options.
- 14) **File/Backup** now indicates that it includes files from the Reference Manager by default.
- 15) Now save window state for Profile, Plan, 3D, P&P Sheet, and Grid Views in <project name>.wnd file when you save the project and attempt to restore windows to that state when you next open that project.
- 16) Introduced a "preview" of PLS-CADD projects which can be rendered in the Windows Explorer Shell as well as some File/Open dialogs (shows the alignment and/or sections in a plan view).
- 17) Now print distance in the status bar when using **Drafting/Annotation (User Input)/Add/Dimension**.
- 18) Added option to **View/Measure Distance/Between Entities** to Create Cross Section Inset View based on the 2 snapped points if they came from a plan or profile view (or sheet plan or profile).
- 19) **Terrain/Feature Code Data/Load FEA File** can now download sample feature code files directly from the PLS Cloud.
- 20) Added option to import "Concentrated Loads Locations" as XYZ points from Line Summary Report.
- 21) Set the default wind angle increment for Wind360 load cases to 10 (deg) and now warn that increments smaller than this will slow the program down.
- 22) The distance printed in the status bar for **Sections/Clearances/To Ground/TIN Vertical** and **Sections/Clearances/To Ground/TIN Minimum Distance** now accounts for bundle diameter so it is consistent with the graphics.

- 23) Streamlined **Help/Download Upgrade** so it launches directly into the upgrade selection dialog. Options that only apply to legacy upgrade methods are no longer displayed.
- 24) **View/Goto** now draws a red "X" when zooming to long,lat in the plan view
- 25) Added **File/Preferences** setting "Enable project preview in file open dialogs" so clients forced to use cloud hosted storage can avoid the delay these systems inflict while fetching files to preview.

Reports

- 1) PLS-CADD now remembers most report settings between sessions. These settings are stored in the "pls-cadd.rps" file which is installation specific (like the "pls-cadd.sma" file).
- 2) **File/Project Diff...** which currently compares all items with another project
- 3) **Sections/Cable Files/Cable Diff, Terrain/Feature Code Data/Feature Code Diff, Terrain/Break Lines/Break Line Diff, Structures/Available Structure List/Available Structure List Diff, Drafting/Drafting Diff** so can compare a subset of the things that File/Project Diff compares.
- 4) Added **Structures/Material/Parts and Assemblies File/Material Diff** to compare part files.
- 5) **Lines/Reports/Structure Wind Rating** which for a given load case finds the maximum wind pressure that each structure can sustain. You can use this to establish priorities for structure repair and uprating.
- 6) **Lines/Reports/Structure Usage...** now has an option to generate Pole Overview Reports for all pole structures in the report.
 - a. The Pole Overview Report now lists pole and non-pole element usages on separate lines so that the pole will always be included in the summary even when it doesn't control.
 - b. PLS-CADD/LITE fully supports the Pole Overview Report: added additional fields to Lines/Setup so you can enter line description, pole number, location, comments, and picture.
 - c. The Pole Overview Report includes CAN usage and properties as well as an option in the Configure dialog to display longitude and latitude in decimal degrees instead of DMS.
- 7) Now auto-detect PDF print driver built into Windows 10. You may manually choose a PDF print driver in the File/Preferences setting "Print driver used to create PDF files".
- 8) The new "Save As PDF" command now includes an option to save that PDF to Google Drive automatically.
- 9) Added right click (on tab) menu command "Save As PDF to Reference Manager" that saves view to a PDF file which is added to the Reference Manager.
- 10) Added option to the Configure Overview Report dialog to save the Overview Report as PDF as well as an option to update a structure comment field with that PDF file name. This is also used when running Structure Usage report with the Pole Overview report enabled.
- 11) Added a Tower Overview Report that is similar to the Pole Overview report.
- 12) Added option to export tables to Google Sheets (both those in windows and those in reports): we preserve formatting, color coding, etc. during export.
- 13) **Sections/Concentrated Loads/Concentrated Loads Automatic Placement** report now uses separate

columns for minimum height and elevation to eliminate confusion about what mode it is running in.

- 14) Added Source and Target voltages and section numbers to Wire Clearance Results XML output.
- 15) Added Long/Lat (decimal and DMS) to **Terrain/Survey Data Report...**
- 16) Reports may now be saved directly to PDF via right click "Save As PDF" command like other views.
- 17) Added ability to specify page size to use when saving reports to PDF to the Page Size dialog (defaults to sheet page dimensions). If you enter a different value then the PPS portion of structure file will be saved in a new version.
- 18) Added section, phase, cable file, circuit and phase label columns to the survey point clearances report for survey points; they are hidden by default.
- 19) Added experimental **File/Preferences** setting "Include XSD export along with XML export" that defaults to No. When set to Yes, the software will write the XSD file that corresponds to the XML exported.
- 20) Added **File/Preferences** setting "Program version to report during XML export" which defaults to blank. You may set this to whatever version you would like (e.g. "Version 16.00") to have shown in the XML file header.
- 21) "Wire Loads In Structure Coordinate System" and "Detailed Manufacturer Loading" now respect the DecaNewton setting in **File/Preferences**.
- 22) Added right-click open file option to Structure List Report, Structure Material List Report, and Cable Material List Report.
- 23) Added a warning to the Galloping Ellipse report when used on a section with bundled conductors since we don't consider bundle geometry in galloping calculations.
- 24) Now include the full cable path name in the Sections Evaluated report output so it can be exported to XML (when "Include full path name in XML export and when copying tables" preference is set).
- 25) Structure Overview Reports now use provenance string for the header whenever available.
- 26) Structure Overview Report Configuration now allows you to show/hide the compass rose and always autosizes text to ensure it fits.
- 27) Upgraded the following Lines/Reports: "Structure Longitude, Latitude, and Height Report", "Structure Clearances", "Wire Clearances", "Construction Staking Report", "Bill of Material", " Bill of Material Delta", "Wind Weight Span Report", "Wind Weight Span Report", "Blowout and Departure Angle Report", and "Structure Loads Report" as well as **Terrain/TIN/Clearance to TIN** to the new structure selection user interface that allows discontinuous selections.
- 28) Added circuit and phase selection to **Lines/Reports/Wire Clearances**.

PLS-CADD/Lite

- 1) PLS-CADD/LITE now has **Line/Define Coordinate System...** and **File/Export/KMZ (Google Earth) ...** commands. Saving with a coordinate system defined will force use of a new ".loa" file format.
- 2) PLS-CADD/Lite projects can now use **File/Project Diff** and **Line/General Data.../Enable Automatic Project Revision Tracking During Each Save**

- 3) Added Project Report to PLS-CADD/Lite and is accessed via **Window/New Window/Project Report**. This report is saved as a new file with .rpt type and is included in File/Backup.
- 4) Moved **Line/Define Coordinate System...** in PLS-CADD/LITE into a button within "Line/Setup", and added Long/Lat fields to "Line/Setup" for converting between structure base XYZ and Long/Lat values. Modifying XYZ values will update Long/Lat (if coordinate system is defined), and vice versa.

KML/KMZ

- 1) Improved KML Export of structure placemarks: now include links to the structure file and project, also show a custom icon and improved formatting of structure information.
- 2) Now auto-detect most structure file names in reports that get exported to KML and insert links so that you can open them directly from Google Earth.
- 3) KML Export now detects file names in structure comments, inserts a link to them and labels the link using the customized structure comment label when it exists.
- 4) **File/Export/KMZ (Google Earth)** default value for tour offset is now just the maximum profile offset instead of five times it. Now also omits the centerline tour when a tour offset of zero is entered.
- 5) Section and sagging information is now available in KML/KMZ export by clicking on the corresponding wire in the graphics.
- 6) Now hide structure icons in KML/KMZ export and you may now click anywhere on the structure in Google Earth to display its info.
- 7) **File/Export/KMZ (Google Earth)** now includes structure icons for Method 1 structures without view geometry as you otherwise don't have anything to click on to get details.
- 8) Now ignore **Drafting/Show Cable Attachment Points** during KML export and never include cable attachments because they are ugly in Google Earth.

Miscellaneous

- 1) **File/Import/Sections Table...** that enables importing of sections from a simple flattened format use this to automate modeling lines from LiDAR.
- 2) Added "F3" hot key to reports for repeating the last Find search. Use "Shift-F3" to repeat previous search but backwards and "Ctrl-F3" to use current selected text for the search, "Shift-Ctrl-F3" same as Ctrl-F3 but search backwards.
- 3) Added option to restrict alignment extension beyond first and last PI in profile views via **F1/Survey/Terrain Features/Change Alignment Extension...** this is stored as an optional value in the NUM file.
- 4) Holding the spacebar down when doing a **View/Initial** command now maintains the camera orientation: it fits the project on screen, but doesn't change any rotations.
- 5) Added "(gon)" to the "Line angles in Grad unit label" Preferences Setting list of unit labels since this is

used in Belgium.

- 6) Added entity info command to hide the display of the currently snapped-to feature code
- 7) When drawing weather sheds on strain insulators, no longer extend them through the energized zone if one is defined in **Components/Insulators/Strain Properties...** in TOWER or PLS-POLE
- 8) Now store ODBC configuration ".dbc" file in the same directory as the project rather than in the Project Workspace directory defined in **File/Preferences**.
- 9) Added wind area and ice accretion area overrides to the marker ball (.mar) file. When input will save as a version 4 file that isn't readable by older versions.

Mainstreamed F1 Menu Commands

<u>Old Location</u>	<u>New Location</u>
F1/Digital Ink F2	View/Digital Ink F2
F1/Custom/Under Development/Sag Span To Known Sag...	Sections/Sag Span To Known Sag...
F1/Custom/Under Development/Ruling Span Calculator...	Sections/Ruling Span Calculator...
F1/Survey/Terrain Features/Coordinate System Calculator...	Terrain/Coordinate System/Coordinate System Calculator...
F1/Survey/Terrain Features/Set Survey Point Z=Z+H and H=0	Terrain/TIN/Set Survey Point Z=Z+H and H=0...
F1/SAPS Finite Element Sag-Tension/Label insulator swings, attachment displacements and/or loads...	Sections/SAPS Label Options...
F1/SAPS Finite Element Sag-Tension/Toggle graphical display of deformed geometry for method 4 structure checks	Structures/Loads/Toggle graphical display of deformed geometry for method 4 structure checks
F1/Survey/Terrain Features/Shift/Scale/Rotate XYZ coordinate system (XYZ files only)...	Terrain/Edit/Shift/Scale/Rotate XYZ coordinate system (XYZ files only)...
F1/Survey/Terrain Features/Set Z of Pls, Polygonal Constraints Vertices or XY Based Structures to 0...	Terrain/TIN/Set Z of Pls, Polygonal Constraints Vertices or XY Based Structures to 0...

FE Sag-Tension

- 1) Extended the nonlinear debugging view into PLS-CADD for SAPS FE sag-tension. Clicking "Cancel" will now give you a nonlinear debug view that can be stepped through and/or animated when FE sag-tension fails to converge.
- 2) Eliminated L3 stiffness matrix generation errors for guyed pole models that wouldn't be used for L3

anyway.

- 3) Added vertical displacements to cable and insulator attachment coordinates printed by **F1/SAPS Finite Element Sag-Tension/Label insulator swings, attachment displacements and/or loads....**
- 4) Added special load case check for NESC Rule 261 (all wires broken) in FE sag-tension for loads generation. Now drop to level 2 whenever generating loads for a structure with all wires broken since results are the same (no loads) and FE sag-tension likely to fail to converge and/or take a long time on previous/next structures when all wires are broken.
- 5) Added **F1/SAPS Finite Element Sag-Tension/Upgrade bundle geometry for clipped sections** command that sets bundle geometry for all sections with a given # of subconductors. This is required for legacy projects with clipped sections since cannot directly edit bundle geometry when clipped.
- 6) Stringing Charts for sections with concentrated loads (Marker Balls) now skips auto-promotion from an RS to a FE stringing condition if option to include the Marker Balls in the stringing chart is set to off (clipped insulators, span specific temperatures, etc. can still cause auto-promotion).
- 7) L3 and L4 FE sag-tension now work with strain insulator chained on a suspension that is used as a jumper idler, but does not support wire otherwise.
- 8) Increased limits for finite element engine to more than double the number of joints and members that can be included in an analysis.
- 9) Small Finite Element Analysis speedup by making further use of vectorized instructions (AVX2) on processors that support these.
- 10) Sped up FE draw of very long (300+ span) sections.
- 11) Improved convergence of L4 FE sag-tension with models that have asymmetrical rotational restraints (e.g. crossarm pinned to face).
- 12) Structure failure to converge when generating loads for a maximum wind 360 case now results in error message explaining the problem and offering to run the structure program with offending loads so that you can use the nonlinear debugging feature.

3D EMF, Line Constants and Lightning Protection

- 1) Added **Sections/Electric/Structure Space Potential Calculator...** which generates space potential, electric field, and magnetic field contour plots along the cross section of structures. This can be used for locating ADSS cable attachments or climbing safety checks.
- 2) 3D EMF now includes jumpers and has the capability to consider Method 4 structure geometry (PLS-POLE or TOWER models) in its calculations.
- 3) 3D EMF fixes: contour lines showing in the profile view, failing to run when phases weren't assigned, cable and weather information not populating for magnetic field calculations and failure to invert matrix error.
- 4) 3D EMF now includes all segments for spans within area considered rather than only the part of the span that intersects the area under consideration. This avoids anomalies that appear when one phase is within

the area, but other phases are not.

- 5) Added buttons to 3D EMF Calculator and 3D EMF Along Line to immediately erase any existing 3D EMF Contours.
- 6) Added span information to title detail for 3D EMF results and added ability to specify maximum segment length to all 3D EMF functions. Note that small lengths will greatly increase compute time.
- 7) Improved "**Sections/Electric/Lightning Protection Calculator**" when alignment has sharp angles so no longer get extraneous grounding arcs.
- 8) Rolling sphere lightning protection coverage TIN now handles having wires cross underneath other wires.
- 9) 3D EMF functions including Structure Space Potential Calculator parallelized for reduction in calculation times on multi-core computers (up to 6x on a 24 core computer).
- 10) Added current input to **Sections/Table** and **Section/Modify** which if entered will require saving the project in a new file format. Current values are used in **Sections/Electric/2D EMF Calculator**, **Sections/Electric/3D EMF Calculator**, **Sections/Electric/3D EMF Along Line**, **Sections/Electric/Structure Space Potential Calculator**, and **Sections/Thermal Calculations (IEEE, CIGRE and TNSP)/Batch Thermal Calculator**.
- 11) **Sections/Electric/Configure Sections by Circuit** now provides a convenient method to set current values.
- 12) Added notes field to **Sections/Electric/Define Circuits and Phases/Labels**
- 13) **Sections/Electric/3D EMF Calculator** and related commands now have a space potential limit input.
- 14) **Sections/Electric/3D EMF Along Line/Between Entities**, renamed **Sections/Electric/3D EMF Along Line to Sections/Electric/3D EMF Along Line/Between Points**.

Error Handling

- 1) Error log now displays in a floating window and does not steal focus so you can continue working uninterrupted once you send messages to the error log.
- 2) Now disable error suppression when the Project Repair Wizard is active (so you can approve its operations).
- 3) The Error Log dialog now has a hotkey '6' which will transfer its contents to a report tab and close it.

Videos and Technical Notes

- 1) New Videos
 - a. Bundle Geometry - <https://youtu.be/iag2xv9E1jE>
 - b. Sections/Electric/3D EMF Calculator - <https://youtu.be/OOvxe2o8etU>
 - c. Lines/Reference Manager - <https://youtu.be/K04mKvUcVzA>
 - d. Slip and Clip - <https://youtu.be/jiBjBbOF4bQ>
 - e. Cable Load Adjustments for Structure Snub Loads : <https://youtu.be/WiGJ14lbVI0>

- f. Auto-detect PDF print driver built into Windows 10: https://youtu.be/o5F_UzeFVrs
- g. Export tables to Google Sheets: https://youtu.be/o5F_UzeFVrs
- h. PLS-GRID Project Manager: https://www.youtube.com/watch?v=UUZDwMKQi_s
- i. Space Potential features: <https://youtu.be/6INfnDi54bo>

2) New Technical Notes

- a. Modeling Mid Span Taps, Mid Span Phase Transpositions, and Phase Spacers Technical Note: https://www.powline.com/technotes/Modeling_Mid_Span_Taps_Mid_Span_Phase_Transpositions_and_Phase_Spacers.pdf
- b. Cable Load Adjustments for Structure Snub Loads Technical Note: https://www.powline.com/technotes/Snub_Structure>Loading.pdf
- c. Transmission Line Vegetation Management in PLS-CADD Technical Note: https://www.powline.com/technotes/Transmission_Line_Vegetation_Management_in_PLS-CADD.pdf
- d. Google Earth Integration with PLS-CADD Technical Note: https://www.powline.com/technotes/Google_Earth_Integration_with_PLS-CADD.pdf
- e. PLS-CADD Workflow diagram Technical Note: https://www.powline.com/technotes/PLS-CADD_Workflow.pdf
- f. PLS-GRID Workflow diagram Technical Note: https://www.powline.com/technotes/PLS-GRID_Workflow.pdf
- g. Elevated Temperature Creep Technical Note: https://www.powline.com/technotes/Elevated_Temperature_Creep.pdf
- h. Permit crossing drawing creation using inset views in PLS-CADD Technical Note: https://www.powline.com/technotes/Crossing_Permit_Drawing_Creation_in_PLS-CADD.pdf
- i. Updated Line Optimization Technical Note: https://www.powline.com/technotes/Line_Optimization.pdf
- j. Finite Element Methods in PLS-CADD Technical Note: https://www.powline.com/technotes/Finite_Element_In_PLS-CADD.pdf
- k. Updated line constants Technical Note: https://www.powline.com/technotes/PLS_Full_Line_Constants.pdf