Release Notes

SPECTRA PRECISION SURVEY OFFICE

Version 4.00

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Welcome to Spectra Precision Survey Office

Spectra Precision® Survey Office (SPSO) software is ideal for processing and analyzing satellite and terrestrial survey data recorded in the field. The software provides numerous innovative and unique features, and it is easy to learn and use.

Installing or updating

For installation or update instructions, see the appropriate bullet below.

Notes:
- Spectra Precision Survey Office (SPSO) licensing information is contained in a Sentinel HASP hardware or software key connected to or installed on your computer. If no key has been connected or installed, SPSO allows you to import and view data only. It does not allow you to use any licensed features. To view your license after installation is complete, select View License Manager on the Start Page. For a description of the features available in each licensed configuration, see "Licensed Features" in the online Help.
- After installation, be sure to select Check for Updates on the Start Page to ensure you have the latest updates for Spectra Precision Survey Office.

- **New users installing SPSO to use with a single-user license:**

  a. Before you insert the new Sentinel HASP hardware key you received in your installation package, install SPSO from the SPSO installation package downloaded from the Spectra Precision website.

  b. Before running SPSO for the first time, insert the new Sentinel HASP hardware key into an available USB port on your computer.

  All licensed features will be available when you run SPSO. Your 1-year warranty begins the first time you open the software.

- **Existing users installing this version of SPSO:**

  Install SPSO from the installation package downloaded from the Spectra Precision website.

  Important Note! This version is available to users whose current warranty expiration date is **1 September 2017 or later**. If your warranty expires prior to this date and you proceed with the installation, licensed features will not be available. Contact your distributor to purchase a warranty extension. In the SPSO ribbon, select Support > License Manager to verify your warranty expiration date.

SPSO licensing updates

For this release of Spectra Precision Survey Office, the available licensed editions have been updated as follows:

- **_Base_ edition** (formerly _Basic_ edition)
  The _Base_ edition provides the tools you need to import and review field data, perform entry-level CAD- and QC-related tasks, and generate reports.

- **_Intermediate_ edition** (formerly _Complete_ edition)
  In addition to all _Base_ edition functionality, the _Intermediate_ edition enables you to perform full GNSS and total station adjustments and post-processing. It also supports data-reduction, site-calibration, and surface-creation workflows.

- **_Advanced_ edition** (formerly _Complete with Roads_ edition)
  In addition to all _Intermediate_ edition functionality, the _Advanced_ edition offers the full CAD package along with plotting and corridor design support.

In addition, the following new SPSO modules are available. See your local Spectra Precision distribution partner for more information and to add any of these modules to your installation of SPSO.

- **_Aerial Photogrammetry_ module**
  The _Aerial Photogrammetry_ module provides the combined functionality of onboard support for Trimble-branded UAS hardware as well as Trimble's Inpho UASMaster application for Trimble and third-party branded UAS hardware.

  - Import, calibrate, process, and adjust autonomous and trajectory-enabled UAS flight mission data.

  - Perform complete quality checks and adjustments on your UAS data.

  - Create orthomosaic, raster-based digital surface model (DSM), and point cloud deliverables.

  - Perform spatial- and intensity-based point cloud sampling.

  - Perform ground extraction and automatic point cloud classification.

  - Use the Smart Picking semi-automatic feature extraction to create curb and gutter linework.

- **_Data Prep_ module**
  The _Data Prep_ module enables you to create 2D and 3D models.

  - Import, place, and georeference raster and vector PDF data.

  - Automatically extract linework data from Adobe PDF vector files.

  - Digitize your Raster PDF and images using streamlined workflows.

  - Elevate your 2D data into 3D using automated commands.

  - Standardize your layers to streamline your deliverables and enable easier project management.

- Use Project Cleanup to remove any unwanted CAD objects and "clean up" up your data.

- *GIS* **module**
  The *GIS* module enables you to integrate GIS workflows and data into your SPSO project.

  - Quickly connect to a Geographic Information System (GIS) data source

  - Download a GIS schema (feature definitions).

  - Use the schema to create a Feature Definition Library (FXL) file that can be used to collect and process feature data.

  - Upload the processed feature data back into the GIS data source using the same schema.

- *Scanning* **module**
  The *Scanning* module expands your point cloud data processing capabilities.

  - Register, refine, and georeference point cloud scans.

  - Create scan stations.

  - Perform spatial- and intensity-based sampling.

  - Perform ground extraction and automatic point cloud classification.

  - Generate orthophotos from point cloud data.

  - Create projection planes and use the Cutting Plane View to create CAD geometry.

  - Use Smart Picking semi-automatic feature extraction to create curb and gutter linework.

New features

Following are the new features included in the various licensing options for this version of Spectra Precision Survey Office. To view context-sensitive help at any time while using SPSO, press F1.

Data review and editing

- **Share project data using Trimble Clarity** - Use the Publish to Clarity command to publish point clouds, photo images, and other 3D data in SPSO Station View to a Trimble Clarity presentation that can be shared with clients and other team members. The web-based Clarity Viewer allows users to explore geospatial data using intuitive navigation techniques, make on-the-fly measurements, and add sticky-note annotations without the need to install or learn a new software application.

- **Copy objects to the Profile View** - Use the Copy to Profile command to copy objects from the Plan View to the Profile View. The objects x-coordinates are plotted directly on the X-axis (station) in the Profile View. The objects y-coordinates have the vertical exaggeration setting applied and are then plotted on the Y- axis (elevation) in the Profile View. This command is useful when viewing imported third party profile design data, that has been drawn in an X-Y coordinate system.

- **Insert DigitalGlobe Imagery background maps** - Using the Toggle Background Map command, you can now insert georeferenced background maps supplied by DigitalGlobe Imagery, a provider of global high-resolution satellite imagery based on a 16-year time-lapse image library. A free Trimble Connect login is required.

- **Point Description properties added to Point List Custom Report template** - The Custom Report Microsoft Word-based Point List Report template now supports the insertion of the Description1 and Description2 Point List data fields.

Survey computations and COGO

- **New static baseline processor engine** - Specifically developed to improve results for baseline lengths exceeding 200 kilometers, the new static GNSS baseline processor engine increases precisions, lowers RMS values, and results in more fixed solutions compared to previous GNSS baseline processors. The new engine allows you to select specific satellite constellations independent of the GPS constellation (for example, use GLONASS-only to process your baselines). In addition, the new baseline processor supports the Differential Code Biases (DCB) for satellites and Earth Orientation (Rotation) Parameters (EOP) models from the Internet Downloads. This combinations of enhancements makes the new GNSS baseline processor the most powerful and flexible processor available on the market today.

- **Volume calculations from large data sets** - Use the Create Volume Grid command to rapidly compute the volume between two large surfaces. A volume grid displays in the Plan View showing the areas requiring cut or fill earthworks to transform the initial surface into the final surface. View the properties of the volume grid to review the cut and fill volume calculations, or to edit the grid settings and recompute the volumes. Using this command can reduce the computation time from hours to seconds when compared to the Earthwork Report with large data sets. The amount of memory required is decreased and display speeds are increased. This method uses an interpolated grid and ignores all breaklines and should not be used when breaklines are required for an accurate difference model.

Feature coding and attribution

- **ADAC importer/exporter** - Pipe inverts are now imported from feature attributes when provided, and 0 values are correctly exported.

CAD and drafting

- **Drafting enhancements** - The *Advanced* edition of SPSO now supports the following drafting enhancements:

- Prepare a custom or template-based plan set that includes one or more sheet sets.

- Create and edit Plan, Cross-Section, Plan and Profile, and Plan Grid sheet sets.

- Create projection planes on which you can create CAD object deliverables.

- Key-in point and line geometry with the CreateCOGO graphical interface.

- Generate parcels and compute closure reports.

- Automatically generate a collection of textual legal descriptions for cadastral survey projects that include parcels, polygons, and/or closed linework.

- **COGO parcel creation enhancements** - The parcel creation feature in the Create COGO command has been enhanced as follows:

  - You can now optionally select to ease the parcel-creation rules and allow temporary nodes to be created at line intersections to calculate misclosure and create parcels, instead of requiring that misclosure be calculated based on existing vertex nodes. This provides the flexibility you need to further control the conditions under which parcels are created, especially when working with field data of less than optimal precision.

  - The new Add parcel button allows you to create additional parcels in your collection without overwriting the existing parcels. This enables you to easily make customized modifications throughout the parcel creation process without requiring that all parcels be re-created each time, possibly losing earlier changes.

- **Legal Description Writer enhancements** - The Legal Description Writer has been enhanced as follows:

  - You can now optionally select to ease the description-writer rules and allow temporary nodes to be created at line intersections to create the shortest path to a parcel when a gap in the linework exists, instead of requiring that the path use existing vertex nodes. This provides enhanced flexibility in controlling the conditions under which paths are created, especially when working with field data of less than optimal precision.

  - The Description Template Editor now allows you to insert into legal descriptions relative directions (right, left, front, and back) for chord, concavity, tangent, and radial arcs.

- **Create a line segment orthogonal to a previous segment** - You can now use the Ortho tracking snap mode in SPSO to create a linestring or polyline segment that is orthogonal (perpendicular) to the previous line segment. This is in addition to the existing Ortho snap mode that creates line segments orthogonal to the axis.

- **New properties for object matching and selecting** - The Match Properties command and the Select Similar command have both been enhanced to include *object name*, *block rotation and scale*, and *feature attribute* properties you can use to perform match and selection tasks. The additions enhance these commands' powerful capabilities to find and transform data.

- **Multi-line text editor enhancement in Create Text command pane** - When entering text in the Create Text command pane, you can now advance to the next line of text by pressingthe Enter key, making text creation faster and easier.

- **Single text object for multi-line text labels** - When you create a multi-line text label for a point, line, or polygon, all text lines are now combined into a single text object that you can move, rotate, scale, and delete. This makes transforming a label easier and more efficient than previously, when each line had to be transformed separately. You can still edit specific properties for each line using the label's Properties pane.

- **Enhanced Smart Text** - The Smart Text Editor, which allows you to insert dynamic attribute text within text annotations and labels, now supports the insertion of numerous new codes representing information contained in the fields in the General Information section of the Project Settings, including company and user information (user names, street and email addresses, phone numbers, etc.). This make inserting company/user metadata easy, and when the data is updated in the Project Explorer, the annotation or label is automatically updated as well. (See "Smart Text Codes" in the online Help for a complete list of codes and instructions on inserting them.)

- **New tangent arc creation options** - When creating a tangent arc segment for a horizontal linestring, you can now base the arc on a bearing, radius, or delta angle along with a specified arc length. This is in addition to the existing begin tangent, end tangent, and tangent/tangent input methods. This provides you the flexibility to create tangent arc line segments using a wide variety of input data.

- **Divide an existing CAD line into multiple segments** - Use the new Divide Lines command to divide any existing polyline, linestring, or other line object into multiple segments defined by either the specified number of segments or segment length. You can then specify to create CAD points or orthogonal lines ending with CAD points at each division.

- **Create points using single proportioning** - The Single Proportioning command provides a powerful tool for locating or re-establishing missing survey markers by reconciling recorded and measured distances. The command enables you to create one or more proportioned points between two measured points or along measured segment lengths using either planar (grid) or geodetic (global) calculations. It also allows you to utilize fixed-length record distances (for a right-of-way, for example) and relative record distances when computing the proportioned point(s).

- **Add a fill color to boundaries** - Fill a boundary with a specified color and transparency.

Corridor design

- **Corridor Earthworks Report** - When running a corridor earthworks report, you can select multiple clipping boundaries to limit the sections of the alignment you want to report on.

- **Station and Offset View -** Use the Station and Offset View, to view selected objects from the Plan View relative to a horizontal alignment. In the Station and Offset View the alignment will appear as a straight line along the x axis. The alignments station value is displayed on the horizontal axis, and the objects perpendicular offset from the alignment is displayed on the vertical axis. This offset value is scaled by the Vertical exaggeration project setting.

Point clouds

- **Export LAS files in US and International feet** - You can now export LAS point cloud files in US and International feet (in addition to meters), allowing you to share LAS data with more third-party software packages.

- **Import/export LAZ point cloud files** - You can now import and export point cloud data in the LAZ file format, which is a compressed version of the LAS format, a commonly used binary file format for point cloud data.

- **Choose ground or grid scaling when exporting point clouds** - You can now specify to export point cloud data using either ground-based (scale factor = 1) or grid-projected scaling for e57, LAS, LAZ, POD, and PTS file formats. When a grid-scaled point cloud is exported, a *.txt file is also created with the coordinate system and projection information. This ensures that the scaling matches the third-party software package into which you will be importing the data.

Mobile Mapping

- **Export Mobile Mapping panoramas to Mapillary** - Export Mobile Mapping panorama images from your SPSO project for hosting, processing, and viewing on Mapillary.com. All images are processed and reconstructed in 3D to create a visual experience where users can observe and explore locations at no charge.

Machine Control

- **Copy material sets -** In the Material and Site Improvement Manager, copy material sets that you want to use in other Business Center projects to a new external library. Then, in a new project, copy the material set from the external library into your local Material and Site Improvement library. If a material set includes a material that is not already in the library you are copying to, the material is also copied to the library. If you have an existing external library and you want to add material sets, create a new library then copy the existing materials and site improvements into the new library.

Aerial photogrammetry

UASMaster update - The new Trimble Inpho UASMaster version 9.0, which is installed with SPSO, extends its support of UAV data from fixed-wing nadir-looking flight missions to UAV projects (close range 3D data acquisitions). Image data taken from drones (quad- and multi-copter systems) are now supported from UAV flights around objects.

General software enhancements

- **Project History Log** - Use the new History Log View tab to view all commands that have been performed in SPSO since creating your project. You can click to expand any command entry listed on the History Log View tab to view its details, including any subcommands, objects and properties affected, and old and new values. This provides a handy means for you to review your work and troubleshoot workflows.

- **Chain distance unit setting** - SPSO now supports *chain* distance units. Type "ch" or "chain" following a value in any distance field and SPSO will automatically convert the value from chain units to the default distance units set in Project Settings (for example, US Survey Feet). A chain is equivalent to 66 US survey feet.

Known issues

Following are known issues in this version of SPSO:

- **View refresh** - If you change focus from SPSO to another application window on your desktop and then return focus to SPSO, it is possible that the tab view will be black. In addition, if you "float" your cursor on the view, a string of cursor icons will be drawn. This is a graphic view refresh issue and can be resolved simply by panning or zooming on the view.

- **Cannot check in detachable HASP license early** - A HASP network key can be configured to allow users to check out a "detachable" instance of the multi-user license for a limited period of time, allowing the user to run the software without being connected to the network. In earlier versions of SPSO, a detachable license could be checked back in (canceled) early, prior to the expiration date and time, making it available for other users. However, at this time, a detachable license cannot be checked in early (a system-time error message is displayed) and is checked in only on the expiration date and time. Then it is available for use by other users.

- **Windows 10's Anniversary Update** - Upgrading to Windows 10's Anniversary Update (version 1607) with the HASP drivers installed can cause the HASP license system to stop working for SPSO. To resolve the problem, you must reinstall the HASP drivers. See the *HASP Troubleshooting Guide* for instructions.

- **Microsoft Edge web browser** - When SPSO reports are displayed in a Microsoft Edge web browser, the links to objects within the application no longer work. It is recommended that you use a different browser to view SPSO reports.

- **HASP license key and Intel C602 chipset** - The HASP license key required to run SPSO is not compatible with the Intel C602 chipset used in some server/workstation environments. The use of the HASP license key in combination with the C602 chipset will cause the application to crash.

Miscellaneous notes

- **OpenCL Runtime driver** - OpenCL Runtime is a graphics accelerator driver required when SPSO is performing automatic tie point matching or dense point cloud creation. If the driver is not installed, an error message is displayed indicating OpenCL Runtime cannot be found. In this case, you must download OpenCL Runtime from https://software.intel.com/en-us/articles/opencl-drivers#phiwin and install it on your computer using the instructions provided.

- **VCE compatibility** - As a general rule, you cannot open a VCE project file created in a newer version of SPSO in an older version of SPSO.

- **Windows 8 users** – Some components in SPSO require Microsoft .NET Framework 3.5 to operate. If the .NET Framework 3.5 is not installed, you are prompted to install it when you install SPSO. If your computer is connected to a domain that does not allow you to directly connect to Windows Updates on the Internet to enable and install .NET 3.5, you may need to change your group policy settings. See your system administrator for assistance.

  For more information, see http://technet.microsoft.com/en-us/library/dn482065.aspx

- **Windows XP users** – Some components in SPSO require Microsoft .NET Framework 4.5, which is not supported by the Windows XP operating system. To run this version of SPSO, you must install a different operating system. See "System requirements" for complete operating system requirements.

- **TabletSync transfers -** If you use TabletSync to transfer large files (for example, panoramas) into SPSO, it can take a long time for the upload to complete. As an alternative, you can shorten the transfer time by copying the files from the tablet onto a USB memory stick and copying the files from the stick into SPSO.

System requirements

Operating system:	Microsoft Windows® 10 (64-bit version)
	Microsoft Windows 8 (64-bit version)
	Microsoft Windows 7 (64-bit version with Service Pack 1)
Processor:	Dual-core 1.80 GHz or better recommended
	Quad-core 2.80 GHz or better (for example Intel i7-860 2.8 GHz) recommended for Aerial Photogrammetry Module and Scanning Module
Random access memory (RAM):	2 GB or more recommended
	32 GB or more recommended for Aerial Photogrammetry Module and Scanning Module

Hard disk space available:	5 GB or more recommended
	100 GB or more on solid-state drive required for Aerial Photogrammetry Module and Scanning Module
Monitor:	1280 x 1024 or higher resolution with 256 or more colors (at 96 DPI)
I/O Ports:	USB 2.0 port required if HASP hardware key is used
Graphics:	DirectX 11 compatible graphics card with 512 MB memory or more
	OpenGL version 3.2 or later required when working with point cloud data (latest version recommended)
	2 GB graphics card (for example, NVIDIA GTX 670) required when working with UAS data (Aerial Photogrammetry) and/or point cloud data

Important!
It is critical that you keep your graphics driver(s) updated if you are working with point cloud data.
Whether your computer has one or multiple graphics cards installed, you must ensure each has been updated with the latest driver provided by the card's manufacturer. The best way to determine if your driver needs to be updated and, if so, perform the update is to visit the card manufacturer's website. For more information, see "Update and Configure Your Graphics/Video Driver" in the online Help.

(If, instead, you decide to update your driver using the Windows Device Manager and the "Search automatically" option, the program may suggest using a Microsoft-approved WHQL version of the driver. However, to ensure you have the latest bug fixes and new features for your graphics card, it is recommended that you use the latest manufacturer version instead.)