COGO+ Release Notes

By Simple Geospatial Solutions

The release notes summarize the revisions of each version of COGO+ since Version 3.05.

Version 4.19 – October 29, 2019

- **Ellipsoid INVERSE** calculations now show grid direction and distance between the two points, and the second term correction at each end
- Added option to solve Sub-chords by Station from **Horizontal Curve Solver**, much like Tangent Offset by Station.
- Corrections to one or two grid projections pre-defined parameters.
- Various adjustment routines no longer assign the description “Adjusted” to the newly calculated point. In all cases the existing information is retained (description, and where applicable also the elevation).

Version 4.17 - August 3, 2018

- Added option to solve Tangent Offsets by Station from **Horizontal Curve Solver**.

Version 4.16 - July 30, 2017

- Fixed issue with Grades display format set to anything other than **% (V/H*100)**. Input forms could crash with Ratio display formats.

Version 4.14 - June 17, 2017

- **Convert Grid to Geodetic** would produce an error if converting grid coordinates based on a Lambert Conformal Conic projection and the user entered a negative ellipsoid height.

Version 4.12 - February 8, 2017

- **Subdivide Area** by the Sliding Bearing method could in some cases yield incorrect results.
- **Area by Points** added options to export results to the Stack or the Clipboard.

Version 4.10 - January 19, 2017

- **Inverse Points** and **Inverse Curve** feature new options to calculate coordinates. Previously it was possible to solve the coordinates of any station and offset along the line or curve, now new options are available to solve at **Distance Intervals** or divide by **Equal Partitions**.

Version 4.03 - April 17, 2016

- **INVERSE Geodetic** and **INVERSE Grid** now also solve for the Cartesian x,y,z Coordinates, and the dX, dY, dZ vector components.
- **Sliding Bearing** area subdivision could incorrectly return "No Solution" with larger areas.
- Mean Earth Radius option would not convert to feet when recalling current custom value, although it would save it properly when entering in feet.
- Two Alaska State Plane Zones were not selectable.

Version 4.02 - October 31, 2014

- Fixed a possible error when migrating from older databases during update to Version 4.x.
- **Inverse Point to Alignment** features some additional options in COGO+ Pro.

Version 4.01 - July 27, 2014

- Completely rewritten database structure to allow larger jobs to work smoothly on the calculator.
- All files are now stored in a **SGSDAT** directory in HOME instead of the hidden directory.
- Added ability to rename jobs, alignments and levelling jobs.
- Added ability to convert between bearings and azimuths during direction inputs.
- Font sizes for choose items and input screens are now handled within the Toggles settings and not by the calculator system flags.
- **Inverse Point to Line** and **Inverse Point to Curve** now display cut/fill information.
- **Inverse Point to Alignment** features some additional parameters.
- **Traverse Plus** setup methods updated:
    - *Known Backsight Point* method includes a Remote Elevation option to update the station elevation.
    - *Resection* method updated to allow zenith angle and target height measurements to determine station elevation
    - A new *Helmerts* method similar to *Resection* but also uses distance measurements to determine station coordinates.
- **Alignments** improvements:
    - Cross section templates can be defined by "Width and Slope" or by "Width and Vertical Change".
    - Cross section slopes were previously limited to 100%, this has been corrected to allow for much steeper slope definition.
    - Added ability to edit cross section templates.
    - Added ability to plot cross section templates.
    - Added ability to plot horizontal and vertical alignments.
    - Coordinate Alignment improved, previously certain situations would result in unexpected behaviour.
    - Coordinate Alignment option now allows a selection to store radius points.
- **Triangle Solver** now features a Spherical Triangle Solver option.
- Alaska Zone 1 coordinates can now be exported to KML or Lat/Long like all other projection zones.
- **INVERSE** ellipsoid calculations now calculate an average azimuth, and a ground distance based on ellipsoidal heights entered.

Version 3.64 - April 6, 2014

- **Area** subdivsion "sliding bearing" method would in some cases return "No Solution" when in fact there was a solution.
- **Point Traverse** Standard <TR>/<SS> toggle was not working properly since a recent update.
- **Traverse** setup method "Resection" station input was not working properly since a recent update.

Version 3.63 - February 25, 2014

- New area subdivsion bug introduced in Version 3.62 has been fixed.

Version 3.62 - February 22, 2014

- **Compass Rule** export now includes angle balancing information in the report.
- Intersection algorithms updated to improve results in some specific cases.
- Various minor improvements and bug fixes.

Version 3.61 - January 22, 2014

- **Inverse Points** now allows exporting direction and distance values to the stack.
- **Inverse Point to Alignment** now functional with all elements, including spiral-curve-spiral elements.
- Added Alaska State Plane Zone 1 parameters, the oblique mercator projection was previously not supported.
- Most input forms that require point number input now allow entering coordinates for points that did not exist in the job.

Version 3.60 - December 10, 2013

- **Inverse Point to Alignment** bug fixed. Did not properly handle curve elements with direction "left".

Version 3.59 - December 1, 2013

- Menu labels for Alpha mode now display the alpha characters.
- Improved Codelist functions, including import/export of codelists.
- Importing ASCII files now checks for and processes more encoding variations.
- **3D to Plan** now retains the original elevation values for the cross section points northing coordinates.
- **Levelling** job "INFO" now includes sums of backsights and foresights. *Applies to COGO+ Pro only.*
- Fixed issue with input forms when creating custom projections. *Applies to COGO+ Pro only.*
- Small imporovements to pre-determined areas BETA programs. *Applies to COGO+ Pro only.*
- New **Inverse Point to Curve** program to inverse a point relative to a curve.
- New **Inverse Point to Alignment** program to inverse point coordinates to a designed alignment. *Applies to COGO+ Pro only.*

- New Auto-Print toggle available to automatically print to an Infrared Printer from the main COGO programs.
- Various minor improvements and bug fixes.

Version 3.57 - October 13, 2013

- **Area by Points** features a new option to subdivide pre-determined areas by "Sliding Bearing" or "Hinge Point" methods. Both methods are included as BETA features for now. *Applies to COGO+ Pro only.*
- New keyboard shortcuts allow printing input and output screen captures to the HP 82240B Infrared Printer. A new printer settings option allows the user to configure the printer port from within COGO+. *Applies to COGO+ Pro only.*
- **Import/Export** features a new option to export Lat/Long ASCII files. Latitude and Longitude are calculated from point grid coordinates on the fly while exporting. *Applies to COGO+ Pro only.*

Version 3.56 - August 3, 2013

- **Best Fit Line** bug fixed. The program could crash when using points with negative coordinates, results now include the standard deviation for the offsets to the best fit line.
- Direct and Inverse **Ellipsoid Calculations** improved results and added ability to export results to ASCII file. *Applies to COGO+ Pro only.*

Version 3.55 - May 26, 2013

- **Point Traverse** curve traverse now allows access to the horizontal curve solver.
- **Traverse Plus** "Resection" setup method updated to perform a least squares adjustment when more than three control points are used for the resection.
- **Shift/Average** features a new "3D to Plan" option to transform 3D points to 2D cross section plan view points.

Version 3.54 - April 24, 2013

- **Helmerts** bug fixed. Under certain circumstances the program would not correctly calculate the transformation paramaters if the scale was fixed at 1.

Version 3.53 - April 1, 2013

- **Import** ASCII points now displays coordinate differences for points that already exist in the current job if the same point number is found during import.
- **Import** ASCII points now allows a "YES TO ALL" or "NO TO ALL" choice for overwriting existing points.
- **Triangle Solver** solution now displays all sides and angles, not just the solved values.
- **Compass Rule** export ASCII report now includes course information.
- **Average Points** now displays the range of coordinate values and features the ability to view radial inverses to each point from the solution.
- **Traverse Plus** now features a "Stake Alignment" option to enter a station and offset along any previously created alignment to stakeout.
- Bug fixes and minor improvements.

Version 3.52 - January 23, 2013

- Added ability to choose or enter the mean earth radius to use for elevation factor calculations. (Geodetic->Grid and Grid->Geodetic conversions.)
- Improved **Fit Points to Curve**:
    1. Accepts points on tangents to solve BC and EC coordinates (optional).
    2. Radius solution includes standard deviation.
    3. Added ability to fix the radius and recalculate a new least squares circle with the fixed parameter.

Version 3.51 - January 3, 2013

- Added ability to define custom projections and user-defined ellipsoids for geodetic calculations.
- System Flag 90 is now left unchanged when COGO+ starts. This system flag now controls font sizes for choose boxes and other input screens in COGO+.
- Fixed a bug in **Fit Points to Curve**. A crash would occur when cancelling out of a calculation.

Version 3.50 - December 22, 2012

- COGO+ Pro software files now consist of five separate files, each smaller in size than the previous versions. A new INSTALL.HP file is included to install/update the new configuration. The smaller file sizes reduce the chances of seeing a "Insufficient Memory" error when installing the software.
- The maximum point number value of 1048575 is no longer in effect, any integer point number value up to 12 digits is now accepted.
- Browse for points everywhere point numbers are required through a [BROWS] softkey. Multiple point selections are allowed where appropriate.
- COGO+ now disables USR keys upon startup as they could interfere with some operations. All original settings are still restored upon exit so you don't need to worry about toggling your USR mode.
- New coordinate decimal display setting.
- When entering complex azimuth/bearing or distance inputs within input screens, use the [EVAL] key to parse the input before proceeding to the next screen. Example of complex input: 1..2+30.3, etc.
- Improved output screens for many solutions with available functions such as metric/imperial conversions and multiple page displays with large font.
- Updated **Area by Points** program:
    1. The "clockwise" or "counter clockwise" direction choice is no longer required, the program automatically determines the direction.
    2. Results now include the perimeter of the polygon along with the square units and hectares/acres.
    3. Toggle results between metric/imperial.
    4. The PLOT option draws the area using the full display.
    5. Export a DXF file of the line work of the polygon.
- Irregular Boundary and Grant Boundary (as per BLM manual) programs available through the **Fit Points** option.
- Improved **Compass Rule** adjustment now allows angle balancing for closed loops.

- **Helmerts** transformation paramaters can now be saved to a parameters file and used at a later time to transform points based on the same parameters without defining any control points.
- Updated **Traverse Plus** program includes improved Stakeout, Reference Line and Reference Arc calculations.
- Updated **Levelling** program:
    1. Improved interface.
    2. Ability to backup jobs to SD card.
    3. Observations are now editable.
    4. More options for data review and export.
    5. Store station elevations to points in the current job database.
    6. Improved cut/fill calculations.
    7. Adjust level circuit/loop between fixed elevations.
- Updated **Alignments** program:
    1. Ability to backup jobs to SD card.
    2. Fast toggle between editing horizontal alignment/vertical alignment/cross section assignments when editing alignments.
    3. Access solvers from input forms when defining or editing alignment segments.
    4. Vertical alignments and cross section assignments can now extend beyond the limits of the horizontal alignment.
- Updated **Horizontal Curve Solver** program:
    1. Now accepts arc length and chord length of curve to solve using Newton's method.
    2. Added a "Curve through Fixed Point" solver.
    3. Spiral Curve Solver now accepts Parameter A as known.
    4. Spiral Curve Solver now also able to solve coordinates for any station and offset.
- Added more options to the **Vertical Curve Solver** to solve vertical curves through fixed points, and with slope intersections.
- Updated **Import Points** program:
    1. Added P,N,E,D and P,E,N,D formats.
    2. Now able to import ASCII files with alpha-numeric point numbers. COGO+ strips out the alpha characters during this process.
- Updated **Export Points** program:
    1. Added P,N,E,D and P,E,N,D formats.
    2. Export DXF file of 2D or 3D point nodes with point number and description text.
- Geodetic->Grid and Grid->Geodetic conversions now accept a ellipsoid height to calculate the elevation factor and combined scale factor for points.
- Fixed South Azimuths bug.
- Improvements and bug fixes.

Version 3.13 - March 4, 2012

- Added bearing/azimuth toggles to **Inverse** output screens that work similar to the metric/imperial toggle key.
- Added a new entry to the COGO+ library menu visible as a softkey labelled **[911dr]** that can be used to attempt emergency COGO+ data recovery. Under rare circumstances calculator memory can become corrupted and as a result COGO+ may not be able to function correctly. This program attempts to recover any data created by COGO+ that is still useable. *Warning: The recovered data may not be 100% as originally created.*
- Fixed a bug that prevented COGO+ Pro from launching correctly after a ON+A+F hard reset. *Applies to COGO+ Pro only.*
- **Alignments** program sees the following revisions: *Applies to COGO+ Pro only.*

1. Bug fixed when modifying an existing straight vertical alignment element by the "Length, End Elev" or "End Sta, End Elev" methods.
2. Various safety checks implemented to avoid possible incorrect elevation calculations.
3. The last selected alignment now remains selected when returning to the main Alignments screen from any of the "LOAD" options.

Version 3.12 - February 26, 2012

- Made toggle softkeys more obvious by changing their appearance from other softkeys.
- Added <SS>/<TR> toggles to both **Point Traverse** *Standard* and **Point Traverse** *Sideshot* modes to change the default 'From Point' suggestions.
- **Traverse Plus** setup method *Known BS Point* now allows the setting of any backsight azimuth different from the calculated backsight azimuth. *Applies to COGO+ Pro only.*
- Added Gauss-Krüger 3° and 6° projection zones to the available Coordinate Groups for geodetic calculations. *Applies to COGO+ Pro only.*
- Added Krassovsky 1940, Bessel 1841 and PZ-90 ellipsoid definitions. *Applies to COGO+ Pro only.*
- Added DIRECT and INVERSE calculations on the ellipsoid based on Vincenty's equations. *Applies to COGO+ Pro only.*

Version 3.11 - January 4, 2012

- Fixed a bug in Version 3.10 that could hide all previous jobs/alignments/levelling jobs when upgrading from any previous version to Version 3.10. This error is possible to correct by restoring a backup that was created prior to the upgrade **after** installing Version 3.10. *Applies to COGO+ Pro only.*

Version 3.10 - December 31, 2011

- **Point Traverse** *Sideshot* now features a new [tr?] softkey to toggle the ENTER & F6 key behaviour between SSHOT or TRAV. The other function will be assigned to F3, which was always SSHOT in previous versions.
- Fixed a issue that arises when the optional SDfiler & SDLIB libraries are installed for exporting ASCII files. SDLIB routines require much more memory to operate than standard calculator software which could in some cases lead to the inability to export larger ASCII files to the SD card, and when memory is low to begin with even small files would fail. A workaround is used to check if SDLIB 'should' work, and if not then the standard SD write is performed. *Applies to COGO+ Std and COGO+ Pro only.*
- User settings can now be saved to and restored from Flash memory for quick backup and restore, completely optional. *Applies to COGO+ Pro only.*
- Stake Points within **Traverse Plus** has been redesigned to allow 2D or 3D stakeout calculations. *Applies to COGO+ Pro only.*
- Creating coordinates from an alignment now accepts start and end stations. Previous versions would alwasy create coordinates for the entire alignment. *Applies to COGO+ Pro only.*
- Numerous speed-ups throughout, some minor bug fixes and various minor improvements.

Version 3.09 - November 27, 2011

- [LAST] distance and bearing/azimuth in **Point Traverse** *Standard* are now saved globally so they can be re-used after exiting the program and then returning.
- New setting (in General settings) to choose from ".TXT", ".ASC" or ".CSV" as ASCII file extension.
- Distance and bearing/azimuth inputs have been expanded to accept more possible input:
    1. Distances: before you could enter for example 1..2+5.5 to use distance from point 1->2 and add 5.5 units, now you can have multiple operations after the From..To points, for example 1..2+5.5+3.2+7-1.9. Also you can enter a series of number to be calculated, for example 10+15.32+9.5+6.12, etc.
    2. Azimuths/bearings: you can enter similar types of input as for distances, and when you use "+" or "-" within any of the inputs, it will be treated as "HMS-" or "HMS+" etc, depending on your current settings. The first value will always be treated as a azimuth/bearing, and everything that follows is treated as a deflection angle.
    3. Angles: angle input can also take advantage of multiple values to calculate an angle on the fly.
    4. Almost all input forms now accept the whole range of distance and azimuth/bearing input types, in other words you can use any of the input types, including the new ones, anywhere you are asked to enter a distance/azimuth, including in the triangle solver, etc.
- **Triangle Solver** now features a [INV] softkey to inverse an angle based on existing points in the database to use as an angle to solve triangles.
- Input form menus have been improved and made more consistent.
- **Scale Points** now has a [CALC] softkey to calculate the horizontal scale based on 'before' and 'after' distance numbers.
- [COPY] softkey in **Store New Points** input form now also has the option to [BROWS] all points and select the point you wish to copy.
- **Delete Points** also features same [BROWS] functionality as above.
- **Recall Points** has been renamed to **Review Points** and features a new [RENUM] softkey to re-number points in the database. Points can be renumbered by giving a new starting number or by providing an additive number.
- When calculating points and entering an existing point number to store the point as, now the coordinate changes are displayed within the same box where you can choose YES/NO to overwriting the existing point.
- BACKUP.HP, RESTORE.HP and INSTALL.HP found in the COGOPLUS directory on the SD card can now be accessed from the COGO+ library menu to eliminate the need to use the File Manager. They are visible as [BACKU] [RESTO] [UPDAT]. *Applies to COGO+ Pro and COGO+ Std only.*
- Serious bug in *3 Point Resection* setup method within **Traverse Plus** has been fixed. *Applies to COGO+ Pro only.*
- Geodetic to Grid coordinate **Conversions** now allows you to store the results as a point in the database. *Applies to COGO+ Pro only.*
- **Import/Export** now features a 'Export KML file' option to export points to a KML file that can be viewed in Google Earth: *Applies to COGO+ Pro only.*
    1. Points must be grid coordinates matching your current geodetic projection settings.
    2. Point coordinates can be in any of the three main units (metres, feet (US or Int'l).
    3. Seven different colours to choose from for the icon style.
- Various minor bug fixes and improvements.

Version 3.07 - September 7, 2011

- **Compass Rule** bug fixed where the adjustment would only work correctly if the points were in ascending order.

- **Point Traverse** *Standard* revised input for inversing curves.
- Geodetic **Conversions** now you can set your preferred hemispheres when converting Geodetic to Grid. *Applies to COGO+ Pro only.*
- Various minor bug fixes and improvements.

Version 3.06 - July 20, 2011

- Toggle on/off the 'From Point' suggestions in **Point Traverse** *Standard*.
- Curve traverse option added to **Point Traverse** *Standard* and *Sideshot*.
- New point coordinate scroll option in **Recall Points**.
- ASCII **Import** and **Export** programs entirely rewritten to improve results.
- Some helpful DMS operation softkeys added to the COGO+ library menu.
- The **Import/Export** options are now also available in COGO+ Lt, although only from/to the HOME directory. The Import/Export options are accessed by using the 'X' shortcut key, and are not shown in any menu. *Applies to COGO+ Lt only.*
- Various minor bug fixes and improvements.

Version 3.05 - June 16, 2011

- Improved **Inverse** input forms.
- Improved **Intersections** input form.
- **Horizontal Curve Solver** improvements:
    1. Added ability to solve radius of curve by arc/chord definition.
    2. Added a new three point curve solver option.
    3. Added a new spiral curve solver option.
- Added Finland projections zones. *Applies to COGO+ Pro only.*