GRAFNAV/GRAFNET® VERSION HISTORY

What's new in 8.70?

Available: November 2016

Processing

- GLONASS integer ambiguity resolution will be automatically attempted when processing in differential mode. This generally results in more fixed integer solutions in mixed GNSS signal conditions, more accurate fixed solutions and lower probability of incorrectly fixed solutions.
- Galileo and QZSS are supported within the differential processor (float and fixed solutions)

- GrafNav projects now accept up to 32 base stations (formerly the limit was 8). This enables users to process large project areas with dense base station coverage more efficiently. The filter will still only accept raw measurement data from the nearest eight.
- Faster loading & scanning of 8.70 converted GPB files. This significantly reduces the time required to process large multi-base projects.

- ARTK has been upgraded to OEM060700RN to ensure GrafNav users benefit from all improvements implemented in real time RTK engine
- Increased the baseline distance over which ARTK will rewind integer ambiguities
- Fixed an issue that would affect ARTK performance if the base station sampling rate was lower than the remote sampling rate

- Users can now specify their processing datum independently of their base station coordinate datum. If the base station coordinates have been entered in a different datum than the processing datum they will be automatically converted prior to processing.
- Improved outlier detection performance at project startup and immediately following a Kalman filter reset
- Added time correlation handling within static differential GNSS processor. This ensures estimated errors do not become problematically optimistic and do not vary significantly with the processing interval.

- Removed support for "PPP_ETCOFF" command which could be used to disable Earth tide corrections
- Fixed an issue loading IONEX files (Map of the TEC) relevant to single frequency processing

Licensing

- USB licensing is no longer supported. Users must have a software-based license to use version 8.70.
- A single remote desktop connection is now supported within the permanent license model, potentially reducing the need to transfer the software-based license between computers.

- More efficient licensing checks have been implemented during processing, resulting in processing speed improvements.

Output file formats

- GrafNav now writes to a new binary trajectory format which was necessary to best support future improvements. Version 8.70 maintains backward compatibility with old solution files. When opening an 8.60 or previous project in 8.70, a previous solution can be loaded through File | Load, and it will be automatically converted to the new format.

  Version 8.70 also includes a "Export Waypoint Legacy Format" option under the Output menu which will produce the former ASCII trajectory format for any users who require these in their downstream workflow.

GUI

- Users can now specify a default GNSS processing profile within the "Solution" tab of Settings | Preferences. This enables more efficient workflow for customers who use their own customized profiles, or who have noticed errors in the automated processing environment/profile detection.
- When loading a base station converted from RINEX, we no longer auto-fill the datum converted from the position provided in the RINEX header, as this is unknown. Instead, users are required to enter this or use the "Select from favourites" option in order to help ensure the accuracy of this information.
- Users can now specify the epoch of base station coordinates for the purposes of tracking this through to the Export Wizard. Currently, if entering a base station epoch for multi-base projects, all base station are required to have the same epoch.
- Users can define different datums for each base station in a multi-base project, provided they share a common epoch. The base station coordinates will be automatically converted to the processing datum prior to processing.

- "Select from Favourites", "Compute from PPP", "Use average position", "Enter grid values", and "Enter MSL height" buttons are now accessible under a "Coord. options" pull down on the master coordinate dialogue
- The "total", "fixed" and "restored" numbers of satellites reported in the processing dialogues and written to the message log files (in relation to the number used in ambiguity fixing) has been fixed to accurately display this information
- New "Combine Two Solutions" dialogue which allows users to combine processed solutions for the purposes of comparison directly within GrafNav. No knowledge of GrafNav's file extensions is required when using the dialogue.

- When accessing processed information from the map window (by clicking on processed epochs), the appropriate UTM zone will be automatically detected. Previously, the map window would always default to UTM zone 15.
- Added an error dialogue should a user attempts to load a GNSS data file which spans more than two weeks, which will result in a crash when attempting to allocate memory.
- The Project Overview now reports the time range of GPB files in HH:MM:SS.ss format rather than in seconds
- The Project Overview now includes the number of epochs for GPB files

- Significant simplification of options accessible within Settings | Preferences, the Feature Editor, the Load Camera/Event marks utility, the right click menu options from the map window, the Window menu, the Download Service Utility, and the File menu.
- Support has been removed for the processing history
- Discontinued "Remove Processing Files" utility
- Discontinued GPB to RINEX converter
- Discontinued the "Copy User Files" utility
- Removed the "CORS(CORS96)" and "IGS(ITRF05)" groups within the favourites manager to simplify available choices when downloading CORS or IGS base station data and using the

"Select from favourites" option to load precise coordinates

Download Utility
- Improved search techniques when using the "GPB Search Mode" which is necessary when the trajectory crosses the anti-meridian
- When downloading hourly files, the utility will no longer run GPB pre-processing following conversion of each hourly file. Rather, it will only perform pre-processing on the final combined file which results in a significant improvement in the time it takes to retrieve hourly data.

Processing profiles
- Advanced ARTK settings have been enabled within all manufacturer processing profiles which help minimize the chances of accepting an incorrect ambiguity fix while not significantly decreasing the chances of achieving a fix.
- A GNSS Pedestrian profile has been added to the setup, which enables automated loading of this processing profile for pedestrian data sets

Plots
- Fixed an issue in the "Combined Separation" plots which would falsely report large values if an epoch had been rejected from forward or reverse processing
- The combined weighting plot has been fixed such that it can be displayed after re-opening/loading of a project. Previously, this plot could only be displayed after processing as the values were only saved in memory.

- Fixed an issue computing 2D and 3D statistics directly from the plots
- Fixed an issue in the File Data Coverage plot that would sometimes result in the GNSS file (base or remote) being plotted in the incorrect week

- The number of Galileo and QZSS satellites have been added to the number of Satellites (Line) plot
- Simplification of the available multi-base plots

Pre-processing
- Added a check for multiple precise files that cover the same day
- Users will no longer be warned regarding the presence of L2C when processing PPP, as this is only a potential issue for ambiguity determination performance in differential processing
- Fixed a base station resampling issue that occurred when both the "Data Rate" (indicating a data logging interval mismatch between the base and remote) and the "Too Many Small Gaps" error would occur in the same project

- Pre-processing now limits itself to the start/end GNSS time range, which avoids reporting errors that occur outside of the processing range.
- Users will be warned if any broadcast GLONASS ephemerides are missing in the project, as this is required for usage of the satellite regardless of whether a precise ephemeris is available
- Fix to check base stations and remote files for dual frequency data prior to enabling /disabling ionospheric & tropospheric processing options

Decoders
- Added support for u-blox M8 receivers
- Added support for the THISANTENNATYPE log in the NovAtel/SPAN decoder. This enables users to log the antenna profile which will automatically flow through to GrafNav.
- Added a progress bar for GPB pre-processing, which occurs automatically after conversion

- Fixed an issue reading the last line of navigation parameters from some BeiDou RINEX navigation files
- Fixed and issue in RINEX to GPB conversion issue which prevented decoding if the input file had a period within the filename

Export Wizard
- Combined Separation values can now be output for features/camera marks. Previously this could only be exported for epochs.
- Support has been introduced for exporting UTC time stamps correctly if your survey is conducted over a UTC leap second boundary
- Users will no longer be prompted to enter an average ground height when exporting omega, phi, kappa values.

- Removed "Combined RMS" export variables as they were only relevant to GrafNav Batch, which was discontinued as of version 8.30.
- Removed interpolation and downsampling options for GNSS-only trajectories
- Removed support for local grid definitions. Users can still define local Cartesian systems rotated to local level, which is a far more common use-case.

Moving Baseline Processing
- The computed local level vector will no longer always be between the phase centers of the GNSS antenna. Rather, it will reflect any L1 to ARP offset applied in the antenna model at the base and/or remote.

GrafNet
- All improvements to the GNSS processor, including GLONASS ambiguity fixing, updating ARTK to OEM060700RN, new constellation support (Galileo and QZSS), and handling of the time correlation of GNSS measurements, are also applicable to GrafNet.
- The tropospheric error state, previously only available within GrafNav/IE, is now directly accessible within GrafNet's processing options and will automatically be engaged when processing long baselines (> 150 km). This is effective at reducing residual tropospheric error in long baseline processing.
- Improved logic when computing/accepting the final result from a processed vector in "float" mode, to help guard against poor data at the end of the session from contaminating the final result
- Fixed an issue where ignored baselines were being un-ignored after removing observations from a project

What's new in 8.60.6717?

Available: July 2016

Processing
- Fixed an issue affecting positioning computations around the anti-meridian (where longitude changes between values of +/- 180 degrees)
- Added support for the ITRF 2014 datum

Export Wizard
- "Leica PegasusOne" export profile has been renamed to "Leica Pegasus"
- Added support for displaying unsigned longitude values without scaling the value between 0-360 degrees

GUI
- Fixed an issue that would lead to an error when attempting to open a project with no hardlock key (affecting only user's with USB licenses)

Decoding
- Fixed a problem in the computation of the receiver clock bias when no GPS data is available (i.e. all measurement data is from BeiDou and/or GLONASS). This issue affected BeiDou-only or BeiDou+GLONASS processing quality
- Fixed pre-processing issues affecting NovAtel SAASM user's where the RANGE_1B log is collected
- Fixed an issue in the Thales Real-Time decoder that would sometimes result in obtaining the incorrect week number
- Fixed an issue in the Leica 1200 decoder that would sometimes result in the incorrect locktime values

GrafNet
- Fixed a problem affecting the correct re-opening of previously processed GrafNet projects

What's new in 8.60.6129?

Available: January 2016

Processing
- Satellite PCV corrections are now applied for generic antenna models when precise ephemerides have been added to the project. This corrects a bias of up to a couple of cm on projects where no antenna model was used and precise ephemerides have been added to the project.
- When processing PPP, all ephemerides in the project, including base station ephemerides, will be available to the processor. Previously, only the ephemerides associated with the remote data file or those that had been added as alternate files would be used.
- Added NAD83(CSRS) as a processing datum
- Fixed an issue with the "Compute from PPP" button on the Master Coordinate dialogue for multi-base projects and when using the "Convert input coordinates to processing datum" feature

Pre-processing

- Fixed the "No GLONASS Ephemeris" pre-processing message as it would occur even if no GLONASS data was present in a GPB file
- An appropriate error message is now displayed when a user attempts to process without pre-processing under the following conditions: no precise files are present and the advanced tropospheric state is engaged. Precise files are required for the application of the advanced tropospheric state.

Decoding

- Updated the NovAtel decoder to use the proper frequency numbers for GLONASS satellites. This has no impact on processing results but GLONASS carrier phase values in the GPB file will now match those decoded to RINEX using NovAtel's Convert4 program.
- L5 signals are now decoded from NovAtel RANGECMPB logs
- Fixed a Leica 500 decoding issue for full observation records

- Fixed an issue in Septentrio decoder that would sometimes result in missing epochs
- The Septentrio decoder now considers a week number validity check during decoding
- The Ashtech (Thales) real time decoder has been updated to support MCA records
- Fixed an issue affecting the single point computation when 4 SV's are available, but not all from the same constellation

GUI

- Made the "Missing File … Search for New Location" dialogue wider to accommodate long file paths. This dialogue appears when you open a Waypoint project but the project files could not be located.

Export

- Fixed an issue affecting the export of all processed epochs for high rate surveys (20 Hz) when the project is re-loaded

Utilities

- The concatenate, slice and resample utility (GpbCat) copies pre-processing information from the input file when breaking GPB files into time sliced output files instead of re-preprocessing each file. This could lead to undesired changes in the static/kinematic flag.
- Fixed an issue in GPB Viewer when changing static/kinematic flags "from current position"

What's new in 8.60.5025?

Available: October 2015 [update]

Processing

- Improved ambiguity resolution performance by passing estimation of satellite ionospheric corrections to ARTK
- Enabled usage of alternative linear combinations when ARTK is used in "default" mode (only applicable to ground vehicle and pedestrian applications). This generally results in an improvement in the number of ambiguity fixes achieved in challenging GNSS conditions.
- Improvements to GLONASS data handling when ARTK is re-engaging or choosing when to re-engage
- Improvements to the criteria used in deciding whether an epoch has an ambiguity status of fixed or float in challenging GNSS conditions. This affects how solutions are combined between forward

and reverse when generating the final combined result.

- Fixed issue mixing L1 C/A and L1P data in the differential processor that previously resulted in a "no common data" error message
- When loading alternate broadcast ephemeris data we previously ignored any ephemeris data at the base and remote files. We now load all available ephemeris data, from the base, remote, and any additional files that have been added to the project.
- Fixed an issue where outages could occur following automated satellite rejection
- Fixed an issue in project start up if multiple constellations are present (GPS+GLONASS+BeiDou) and GPS data is invalid

Decoding

- JAVAD/Topcon decoder improvements. New records supported and now all measurements for all satellites will be decoded (i.e. both L2 and L2C, both L1 and L1P etc).
- Added support for UTC time tags in Javad events

- Fix for decoding BeiDou satellites with PRN values larger than 33
- Improvements to single point computation where GPS and GLONASS are present
- Fixed bug in GPB pre-processor affecting high rate files (< 1 Hz) where the clockshift was not being automatically computed after decoding when absent from original file.

- Fix to RTCMV3 decoder such that we only decode data from one receiver if multiple data streams are present in the file
- Fixed a RINEX conversion issue that would result in a crash if the compressed RINEX observation file (*.??d file) was invalid.
- Introduced a limit to the number of times the "Unrecognized constellation and/or signal type" message will be output to the decoding summary in the NovAtel decoder. This was slowing conversion for files collected with the RANGECMP2B log that contained currently unsupported signals.
- Fixed an issue affecting decoding of BeiDou data in RANGECMP2B logs that would result in invalid carrier phase measurements.

Manufacturer Files

- We now provide the reference epoch for all IGN stations within the favourites manager
  Added support for Lambert93 French grids

Antennas

- Fixed an issue where any customer created or modified antenna profiles in a "user.atx" file would be loaded first instead of the "Generic" profile if no antenna was auto-detected

Pre-processing

- Implemented a GLONASS-specific check to warn of any missing broadcast ephemerides. These are required for usage of GLONASS data regardless of whether precise orbits have been added to the project.
- Improved the detection and reporting of bad L2 signal tracking
- Added a pre-processing function to check for duplicate GLONASS orbits with conflicting times. This can be responsible for a significant reduction in accuracy when GLONASS is included in post-processing.

GUI
- Removed reporting of GPB epoch count in the project overview as it was not accounting for missed epochs

Download Utility
- Using new global GLONASS broadcast ephemeris provider due to data integrity concerns
- Fixed an issue affecting proper downloading hourly RINEX files
- Fixed an issue affecting the false detection of cycle slips when multiple RINEX files are downloaded and concatenated together. This affects performance of both hourly RINEX data (where a new RINEX file is downloaded for each hour of data) and the combination of daily RINEX files (if surveying over multiple GMT days).

GPB Viewer
- Fixed an issue where the static/kinematic flag would always be set to static when saving a new GPB file through the File | Save As feature
- Fix for automatically handling the week crossover when manually editing week numbers in a GPB file

Export
- Fixed "Export Binary Values" function under the "Output" menu to properly output base station parameters

GrafNet
- Fixed issue affecting the correct detection of start and end GPB file times when out of range ephemerides are detected. This would affect the proper formation of vectors between stations.
- Increasing number of input decimals for the Grid Scale Factor within the Export Wizard from 9 to 12

What's new in 8.60.4609?

Available: June 2015 [update]

Processing
- Fixed an issue affecting usage of Trimble NETR5 CORS stations that do not output GLONASS L1 carrier phase data. This was causing the default "automatic" processing data type to choose C/A-only processing over dual frequency carrier phase processing.
- Fixed an issue where a crash would occur if 3 or more sets of ESA GPS+GLONASS precise products were loaded in a single project.

Decoding
- Fixed an issue where zero values would be assigned to positions in the GPB file is the single point computation failed. This would result in false pre-processing messages and problem searching for nearby service data within the download utility
- Fixed a conversion issue affecting RINEX 3.X files where redundant observation codes are present in the header but do not appear in the data file.

- Reduced the minimum time for breaking up multiple observations into separate GPB files to 5 minutes in the Leica System 1200 decoder
- Fixed an issue affecting proper decoding of Doppler measurements in the Septentrio decoder

- Fixed an issue where negative satellite elevations would sometimes be displayed in the GPBViewer

GUI
- Implemented a limit of 300,000 features or camera marks in a project. Loading of excessive numbers of features was causing a memory allocation failure

Export Wizard
- Fixed an issue where an undefined number (-1.#IND0) would sometimes appear when attempting to export ECEF covariances

GrafNet
- Fixed an issue properly saving very low manually entered GCP standard deviations (values of 0.00001 m) to the project files. This ensures consistent results from the network adjustment if it is ran more than once in this case.

What's new in 8.60.4331?

Available: March 2015 [update]

Processing
- Fixed a crash affecting differential processing of GPS+GLONASS+BeiDou surveys where total number of satellites exceeded 26
- Fixed a crash affecting usage of GBM precise orbit and clock files

Export Wizard
- Increased display of user-entered time camera mark time offsets to six decimals

Preprocessing
- The "No Precise Files" preprocessing message is now guaranteed to appear if you attempt to process PPP without first adding precise files to your project. If no precise files are detected you will be given a choice; automatically attempt to download precise products or process using only the broadcast ephemeris data
- Fixed false detection of L2 tracking problems for V3 GPB files when only L2C is tracked for satellites broadcasting this signal

- Preprocessing will no longer alter the static/kinematic flag for any data files where a mix of static and kinematic epochs have been detected prior to processing. This improves support for stop and go surveys where the static/kinematic mode has been set through supported receiver logs during data collection
- The threshold used in the "Master data gap" pre-processing check has been adjusted such that false detection of data gaps in base station data no longer occurs.

GrafNet
- Fixed a crashing issue if the software was installed under "C:\Program Files\" instead of the default "C:\NovAtel\" directory

Utilities
- Added Ordnance Survey (OS) service to download utility

- Fixed bug affecting base station interpolation when resampling through the GUI and choosing "Remote File Times" (View -> GNSS Observations -> Master -> Resample/Fill Gaps using -> Remote File Times)

Decoding
- Fixed RINEX decoding issue affecting epochs where the receiver clockshift changed by a large amount between epochs
- Fixed RINEX V2.XX to GPB conversion issue for files that contain L2 and L2C data
- Fixed RINEX V3.XX to GPB conversion issue where an increase in the number of characters read per line was required for a data file

- Fixed GPB to RINEX formatting issues
- If invalid measurements are present the single point computation (called during data conversion) will fail rather than return an invalid position
- Fixed OEM42GPB conversion issue where empty GPB records were output when the time status indicated a failed validity check

What's new in 8.60.4131?

Available: February 2015 [update]

Processing
- Fixed issue were antenna radome was not being applied when selecting an antenna profile

GUI
- Fixed issue where the manufacturer, user, and settings directories could not be changed through the Update tab of Settings | Preferences
- Fixed issue where the "Disable baselines when distance becomes greater than" option in the Measurement tab always appeared checked
- Fixed a display issue in the download utility which occurred on some graphic cards

Decoding
- Fixed the GPB to RINEX utility such that it will work with software based licenses
- Fixed decoding problem for NavCom Sapphire data
- Suppressed JAVAD error messages for logs that are not used in post-processing
- Added support for decoding u-blox event marks

Plotting
- We now support three manufacturer plot groups to assist GNSS and GNSS+INS data Q/C. These will be accessible after downloading the latest manufacturer files
- Fixed the display of the C/A RMS plot if launched from a plot group

GrafNet
- All constellations will be automatically plotted when accessing the "Plot L1/Plot L2 Tracking" menu item for specific observations within the "Add Observation" window

What's new in GrafNav 8.60?

Available: December 2014 [release]

Processing and Smoothing
- Full support for BeiDou
- ARTK has been updated to OEM060510RN0000. This version provides improved results on long baselines and in challenging GNSS signal conditions.
- PPP processing option to "Allow processing without precise files". This allows a survey to be processed immediately after data collection, before any precise clock or orbit correction files are available. This allows a user to verify that all data is collected properly and processes reasonably prior to leaving the site.

- Improved outlier detection in high multipath conditions (when code RMS is high)
- Less dependence on broadcast ephemeris data. Unlike previous versions, version 8.60 will not require that a broadcast ephemeris be present for GPS and BeiDou satellites if a precise ephemeris file has been added to the project. Usage of GLONASS data still requires that broadcast orbits be available, however.
- When processing PPP and selecting to process without first adding any precise clock or orbit products to the project, we will now automatically download two concurrent sets of precise products if your survey ends within 15 minutes of the end of the GMT day. This is to ensure no missing processed output due to the coverage of the precise ephemeris file which ends 15 minutes prior to the end of the GMT day.

GUI
- Added "OK" and "Cancel" buttons to the "Computing Coordinates Using PPP" dialogue. This allows a user to easily accept or reject a PPP derived coordinate when using the "Compute from PPP" feature for base station data.
- Removal of the Fixed Static tab as Waypoint's former fixed static solution is no longer supported. We now use ARTK in static mode to resolve ambiguities for static sessions.
- Removal of the Ionosphere/Troposphere tab. These options are now found in the Measurement tab.

- Project Overview is now accessible under the "Save Settings" pull down menu in the IMU processing dialogues
- Added a summary of the constellations available (GPS, GLONASS and BeiDou) within the project overview

- Improved automatic antenna detection if the scanned radome of the antenna does not exactly match an NGS antenna profile
- We now support the loading of up to 31 characters when loading external camera event files

Antennas
- Users can now create or customize antenna profiles by creating a "User.atx"

Raw Data Format
- A new GPB format (V3) has been created to best support BeiDou and all other current and future GNSS constellations and signals. The Raw GNSS Data Converter in version 8.60 will write to this format. GrafNav will maintain backwards compatibility with V2 GPB files which were used by versions 7.80 to 8.50.

Plotting

- Plotting improvements resulting in improved clarity when GNSS conditions are challenging. Affected plots include the Combined Separation, C/A RMS, L1 RMS, Doppler RMS, PDOP, DD DOP and others.
- The float/fixed ambiguity status plot now distinguishes between "Forward Fixed" and "Reverse Fixed" when only one direction returns a fixed integer solution
- Added BeiDou to Number of Satellites (Line) plot and the Satellite Sky Plot

- Fixed a bug computing statistics from Multi-base plots
- More detailed statistical summaries when computing statistics from plots
- Removed all support for digital elevation model (DEM) plots as this is no longer a supported feature

Utilities

Download Service Data Utility

- The "Add Closest" tab now features two search modes; a GPB file based search and a fixed position search
- When selecting "Plot in Google Earth" after using the file-based search mode an unprocessed trajectory is plotted together with the CORS stations returned by the search to support better decision making when choosing which stations to download and add to your project.
- When using the GPB file search mode, each unique station is only returned once in the list even if it is available on more than one service. If the data is available on multiple services, each service is attempted until the data is successfully downloaded or they all fail.

- The utility keeps FTP connections open until all downloading is complete. This reduces the time the utility takes to download from multiple sources.
- Auto downloading of precise clock and orbit products now checks for GLONASS and BeiDou data in the project and attempts to download from the appropriate source. Previously, the auto-download function always downloaded GPS-only products.
- Improved support for downloading hourly data. Specifically, no additional hourly files will be attempted to be downloaded after the time requested which could result in a failure if they were unavailable.

NovAtel/SPAN Decoder

- RANGECMP2 is now supported (required if logging BeiDou)
- BDSEPHEMERIS is now supported (required if logging BeiDou)

GPBViewer

- New GPB Viewer to best support GPB V3 files
- The Novatel OEM4/V/6 receiver model is now displayed within the "Data Information" section provided a VERSIONB log is detected

Concatenate, Slice and Resample Utility

- Input of start and end week numbers are now supported when using the "Copy GPS Time Range" option under the "Time Interval Options"

Preprocessing

- The pre-processor now considers the GNSS processing interval before prompting to resample base station data, should the base station(s) be logged at a lower rate than the remote.

- The GPB preprocessor checks for very poor Doppler measurements in data converted from specific receiver types. If large discrepancies are detected the values are automatically recomputed from the C/A measurements during data conversion.
- Improved identification/reporting of problematic GLONASS L1, L2 and L2P signal tracking

Software Update Utility
- A link to the version history document is now directly accessible within the update utility in order to better inform customers of what has changed in minor releases

Export Wizard
- UTC offsets are no longer tied to individual export profiles. Rather the UTC offset will be read from a manufacturer file and the correct UTC offset will be applied based on the age of the data being processed.
- Fixed a bug where the signed heading and unsigned heading were outputting the same value. Signed and unsigned heading values are now output correctly.
- Added vertical datums to Canadian and American geoids (WPG files). The height datum will now be reported in the Export Wizard header.

GrafNet
- BeiDou fully supported
- Fixed static solution has been replaced with ARTK's static engine. The fixed static processor was GPS only; ARTK currently supports GPS+GLONASS+BeiDou. The new method has been tested to have a much lower failure rate on baselines over 30 km.
- Redesigned GUI following the removal of the former fixed static processor and the addition of BeiDou support

- After creating a new project, GrafNet will automatically launch the "Add Observation" dialogue
- Redesigned "Add Observation" dialogue which provides access to import options (previously these were only available under the processing options after a project had already been created)
- Export to STAR*NET format now directly accessible under Output menu

- Fixed issue where long station names (>31 characters) in station file were causing a software crash
- Fixed issue to make "Enter Grid" button on master coordinate dialogue compatible with ECEF coordinates

What is new for 8.50.4923?

Available: September 2014 [update]

Utilities
- Fixed bug in the download service utility where resampling more than 3 days of data would result in wrong week number
- Increase the number of character allocated for decoder to display, as pointing to a folder with filenames that are greater than 80 characters would lead decoder to crash

What is new for 8.50.4320?

Available: March 2014 [update]

SDK/Command-line utility (WPGCMD)
- Added support for forward slashes within file names, Thales B-File and Thales Real-Time in SDK / WPGCMD

Export Wizard
- Added "Apply Daylight Savings Time" option for exporting local time
- Fixed a bug where slope distance was not being output correctly when vehicle was near stationary

Decoding
- Added support for P1 float phase record in Javad decoder
- Improved the decoding of the tracking status bit within the Javad decoder
- Added support for extracting the week number to GPB files when decoding Navcom data

What is new for 8.50.4120?

Available: January 2014 [update]

Processing
- Fixed an issue reading GLONASS ephemerides for data collected after the 14th January, 2014

Utilities
- Fixed an issue in the satellite rejection routine used within single point computations which would lead to a crash on some data sets during conversion
- Fixed bug in HOSE2GPB converter where zeroed bytes in raw data would lead to bad epochs

What is new for 8.50.3210?

Available: December 2013 [update]

Interface
- Fixed an issue affecting base station resampling to the remote file interval for receivers with very large clockshifts. This option is accessed through View | GNSS Observations -> Master -> Resample/Fill Gaps using -> Remote File Times.

Pre-processing
- Fixed an issue where the base station antenna selection would be lost if the pre-processor resampled data that did not have an associated station (*.sta) file.
- Fixed the "Master Data Gap" pre-processor warning to work over the week crossover

- Fixed a problem where the pre-processing checks applied after conversion were detecting a false time reversal in specific instances where a very large time jump would occur

Processing
- Increased ARTK quality acceptance criteria to Q4 for all ground vehicle processing profiles to reduce likelihood of an incorrect ambiguity fix in challenging environments

Utilities
- Fixed an issue affecting computed GLONASS Doppler measurements during conversion from RINEX. This affected data downloaded from the download service utility.
- Fixed JAVAD conversion bug where a crash would occur if the message size was greater than 255 bytes (maximum size should have been 260)

What is new for 8.50.2923?

Available: September 2013 [update]

Pre-processing
- Fixed an issue where the re-sampling of user collected base station data would result in any user entered base station coordinates being ignored and the average base station coordinates would be applied instead
- Single frequency data files will no longer trigger a "failure to track L2" warning from the pre-processor, this warning is only meant for dual frequency receivers that fail to track L2

Utilities
- Fixed a bug in the GPB to RINEX converter affecting the output of P2 GLONASS measurements when GPS L2C measurements are present
- Concatenate, Slice and Resample will now preserve the processing environment in the header when it is used to combine GPB files
- Fixed a bug affecting the resampling of base station data when the receiver clock bias is invalid
- Added dll support for specific Malaysian datum transformations

What is new for 8.50.2722?

Available: July 2013 [update]

Pre-processing:
- Raw GNSS files will now be automatically decoded entirely in kinematic mode if the detected processing environment is Airborne, Ground Vehicle or Marine
- The PPP processing option to engage dual Kalman filter states for the code and carrier measurements (necessary for Trimble receivers) is now correctly set by the pre-processor
- Pre-processor will now issue a warning if a data gap is detected in the base station data

Processing:
- Fixed an issue where the "Maximum RMS" ARTK option was being rounded to the nearest millimeter

Utilities
- Fixed bug when downloading current CORS files (available hourly)
- Cleaner plots when comparing the combined DGPS and PPP trajectory within the GrafNav interface

- Fixed an Export wizard bug affecting the export of UTC time for users within the UTC+2 (Harare, Pretoria) time zone

What is new for 8.50.2604?

Available: June 2013 [update]

New Feature:
- Added support for GPB files that have periods within their filenames (prior to the extension)

Pre-processing
- Fixed a problem where the pre-processor would zero base station coordinates when automatically resampling base station data (specific to multi-base projects)

Processing:
- Fixed a bug affecting manual ARTK engagements

Utilities
- Meteorological (.13M) files will no longer be "Auto-detected" as RINEX files by the Convert Raw GNSS utility
- Fixed an issue related to the display of the Download Utility with some graphic cards

What is new with Version 8.50?

Available: April 2013 [release]

Licensing
- Support for both USB and FlexNet (keyless) licensing

Processing:
- Support for absolute antenna models
- New advanced ARTK options, providing a high degree of control if preprocessing is needed
- Improved multi-base GLONASS data handling when mixing receiver types
- Support for moving baseline station processing (previously this functionality existed only in GrafMov)

Interface:
- "Compute from PPP" button on master coordinate dialogue provides quick access to check or survey base station coordinates with Waypoint's Precise Point Processor
- Ability to select a default datum within the "Solution" tab of Settings | Preferences
- Automatic setting for the tropospheric error state within the Ionosphere/Troposphere tab
- Any pre-processing warnings are displayed prior to processing. Examples include a check of the base station sampling rate vs the remote sampling rate, insufficient base station coverage relative to the remote file, gross base station coordinate data entry errors, and other checks
- Improved automatic antenna selection when adding base station data converted from RINEX. The radome (if provided) is now automatically extracted and used to choose the antenna model.
- When selecting base station coordinates from favourites, you can now choose whether to apply published station velocities

- Simplification of processing options within "Measurement" tab of the GNSS processing options Check for software updates through the Help Menu.
- Full control over items plotted to the map window within the "Display" tab of Settings | Preferences. You can choose to turn on/off text, epochs, feature marks, ARTK marks, base stations and static sessions.
- Improved Google Earth Plotting. A time slider animation bar is now available, as well as a velocity and elevation profile

Utilities:
- Support for the NavCom Sapphire data format within Raw GNSS Conversion utility
- Improved search for download sites when using "Position from GPB" option within "Add Closest" tab. The search is performed at regular intervals along the trajectory (instead of the average position in the file) and the minimum distance is returned to each station.
- A calendar has been added to the mission planner and the download utility to help more easily select dates
- Support for South Africa's Trignet service within the download utility

What is new with Version 8.40.3116?

Available: November 2012 [update]

Utilities:
- Improved support for Ashtech's dual frequency GLONASS receivers in HOSE2GPB.DLL

Bug Fixes:
- Fixed a base station resampling issue affecting GLONASS Doppler measurements that was occasionally causing biased velocity measurements.
- Fixed problem computing GLONASS orbits in reverse processing over week crossover

What is new with Version 8.40.2827?

Available: August 2012 [update]

Processing:
- Fixed issue with satellite rejection when using precise ephemerides

Bug Fixes:
- Trace value now computed correctly for *Estimated Position Accuracy* plot
- Improved undulation computation for points near geoid boundaries
- Fixed plotting issue when comparing trajectories with two different data rates
- Improved GUI in *Favourites Manager* to accommodate longer group/datum names

What was new with Version 8.40.2523?

Available: May 2012 [update]

Utilities:
- Added support for TrigNet service (South Africa) in the *Download Service Data* utility

Bug Fixes:
- Improved support for compressed RINEX data

What was new with Version 8.40.2504?

Available: May 2012 [update]

Bug Fixes:
- Fixed bug where only features would be printed when attempting to print *Map Window*
- Fixed issue where new projects created via *Project Wizard* would copy some settings from previous project
- Added support for auto-selection of "Features" as output source in *Export Wizard*
- Fixed bug where downloading SP3/CLK files in GrafNet would fail

Utilities:
- Fixed bug in OEM42GPB.DLL where some GLONASS ephemeris records would be ignored if GLOCLOCKB was not logged
- Improved handling of RINEX 3.00 navigation files in RIN2GPB.DLL

What was new with Version 8.40.1522?

Available: March 2012 [update]

Processing:
- Fixed issue during reverse PPP processing where a crash would occur if insufficient satellites were present at the end of the file
- Improved error message when adding an empty GPB file to a project

Export Wizard:
- Improved auto-selection of output source (epochs/features/static sessions) in *Export Wizard*
- Fixed "sequence number" output in *Export Wizard*
- Fixed issue where features would sometimes be extrapolated instead of interpolated

Utilities:
- Added a tool tip to auto-update tool in order to more clearly display changes in new builds
- Improved handling of D-files in HOSE2GPB.DLL

What was new with Version 8.40.1408?

Available: February 2012 [update]

Bug Fixes:
- Fixed issue during forward PPP processing where a crash would occur if insufficient satellites were present at the beginning of the GPB file
- Improved week number support for camera marks

What was new with Version 8.40.1214?

Available: January 2012 [update]

Bug Fixes:
- Fixed issue in GrafNet where printing was disabled
- Improved PPP performance in challenging conditions

- *Master Coordinates* window now displays average values when coordinates in STA file are zero
- Improved profile-detection in pre-processing checks
- Fixed issue in RINEX decoder concerning Version 3.00 navigation files

What was new with Version 8.40.1108?

Available: November 2011 [release]

New Features:
- *Waypoint Updates* feature will notify customers of new software updates and patches and will download them
- *Waypoint News* feature will keep customers up-to-date regarding Waypoint software releases, training seminars, and other important announcements
- GLONASS data is now supported in the Precise Point Positioning (PPP) module
- GLONASS base station data can now be resampled
- GLONASS data can now be used in the ARTK engine to improve single frequency performance
- ARTK reliability has been improved in challenging conditions by implementing a stricter acceptance criteria
- New profile selection feature will attempt to automatically determine your application in order to select the most appropriate processing profile
- Improved ARTK performance for multi-base projects that have different start or end times for each base station
- Added option to limit the distance at which dual frequency ARTK will engage
- *Export Wizard* can now filter output based on Quality Number and/or standard deviations
- New "Combined Separation with Fixed Ambiguity" plot shows forward/reverse separations only where both solutions are fixed. This helps identify problem areas/incorrect ambiguity resolution.
- Precise ephemeris and clock files are now automatically downloaded when clicking the "Process" button for Precise Point Processing (PPP). It is no longer necessary to download the files as a separate step prior to processing.
- Added option to only accept ARTK fixes from closest baseline (for multi-base projects)
- Cache memory setting has been implemented for more efficient handling of very long and/or high rate projects
- Issue where datum conversions were not always reversible has been fixed
- ECEF coordinates can now be used when entering base station coordinates
- Units can now be changed on many plots
- Orthometric heights are now computed using a Lagrange interpolation instead of a nine-point polynomial
- The "User" and "Description" fields in the processing dialogs can be modified and will be saved to the *Processing History*
- Improved message filtering ensures only the most important error and warning messages are output to the processing window
- HTML reports output by software now work in Google Chrome

GrafMov:
- Support for ARTK has been added to provide ambiguity resolution that is faster and more accurate than KAR, while also working more reliably on longer baselines
- Users are no longer prompted for precise coordinates when adding a base station

GrafNet:
- Default processing interval has been changed to 30 seconds to help avoid processing static data at a high rate, which can produce overly optimistic standard deviations
- When using the *Export Wizard* after performing a network adjustment, "Network" will be automatically selected as the "Source"

Raw GNSS Data Converter:

- Pre-processing checks are now performed during data decoding to automatically solve common conversion issues and set the static/kinematic flag
- RINEX Version 3.0 is now supported
- NovAtel decoder now supports SITEDEFB logs. This ensures your static sessions are preserved and that an event is written to the STA file.
- Leica System 1200 decoder now supports the Antenna Record (ID #108)
- Javad decoder now supports L2C records
- Trimble Real-Time decoder now supports dual frequency measurements for the expanded logs
- Bug where Septentrio decoder was flagging GLONASS observations as containing L2C measurements has been fixed. Multi-antenna decoding has also been improved.
- Default L2C offset for RINEX decoder has been set to zero in order to accommodate downloaded data from Trimble base stations, which commonly have the offset removed

Download Service Data Utility:

- Users can now download broadcast GPS and GLONASS orbits in EPP format. This is useful for projects with missing or incomplete ephemeris data.
- New option added to download precise GLONASS orbits and clock products for PPP
- Added support for rapid precise clock and orbit service (SGU). This service typically has products available at a latency of 4 to 6 hours.
- The maximum number of days for which data can be downloaded been increased to seven
- Support has been added for the ERGNSS, ITACyL, CATNET and BARD reference networks

What was new with Version 8.30.2105?

Available: January 2011 [update]

New Feature:

- Manufacturer file has been updated with new GPS almanac source for Mission Planner. Previous source is no longer available.

Bug Fixes:

- Fixed issue with RIN2GPB where data collected in 2011 would not convert

What was new with Version 8.30.1123?

Available: November 2010 [update]

New Feature:

- GrafNav Lite now supports single frequency GLONASS data

Bug Fixes:

- Automated detection of Doppler units in SYS12002GPB
- Improved support for L2C measurements in Download.exe and Gpbcat.exe
- RIN2GPB now computes valid Doppler measurements for RINEX files where D1 data is zeroed
- Improved ability to modify one/multiple/all features in *Feature Editor*
- Improved handling of antenna heights in GrafMov

What was new with Version 8.30.1007?

Available: October 2010 [update]

Bug Fixes:
- Improved data handling within ARTK when used in multi-base mode with invalid baselines
- Code-only single point processor now works without precise orbit files
- RIN2GPB now handles epochs containing more than two lines of PRNs
- Fixed bug in JPS2GPB where GLONASS satellites were being assigned wrong PRN in the absence of ephemeris data. Also, decoder now handles ephemeris records of multiple sizes.
- Fixed bug in static processor where covariance matrix would become contaminated during satellite outlier detection
- Improved handling of epochs without valid ephemeris data in fixed static processor

What was new with Version 8.30.0623?

Available: June 2010 [update]

Bug Fixes:
- Fixed bug where GrafMov would use ARTK instead of KAR when loading a processing profile
- Fixed bug in GrafMov where ionospheric corrections were always being applied
- *Copy User Files* has been updated to properly transfer user files from previous installations
- RIN2GPB now supports RINEX data with epochs containing more than 24 satellites

What was new with Version 8.30.0331?

Available: April 2010 [release]

New Features:
- Processing settings have been simplified and the GUI has been made more intuitive
- New version of AdVance™ RTK (ARTK) offers improved carrier phase ambiguity resolution, particularly for single frequency data
- Fixed static processor now supports L2C measurements
- Precise point positioning (PPP) filter has been improved
- Improved support for GLONASS processing when mixing receiver types
- Processing profiles have been improved
- Ionospheric corrections automatically enabled/disabled depending on baseline distance
- Software will warn users who attempt to proceed with averaged coordinates at base station(s)

Bug Fixes:
- Fixed bug in RIN2GPB converter where GLONASS phase measurements would occasionally be flagged as L2C
- Fixed bug in "Move-to-Static" option where features would be deleted
- ARTK fixes now displayed properly on *Map Window* when forward solutions is loaded
- ECEF covariance information for PPP positions now available through *Export Wizard*
- Fixed bug where antenna heights were being rounded to nearest centimeter
- Fixed bug in *Signal Strength* plot when re-scaling Y-axis

What was new with Version 8.20.0522?

Available: May 2009 [update]

Bug Fixes:
- RIN2GPB.DLL was not loading on some computers, leading to problems with the *Raw GNSS to*
- *GPB* and *Download Service Data* utilities. This issue has been resolved.
- Problem where *Export Wizard* would not output in any grid except UTM is now resolved
- Support for compressed RINEX format has been updated to incorporate newest changes to format
- Fixed issues surrounding the launching of baselines from GrafNet or GrafNav Batch into GrafNav

What was new with Version 8.20.0427?

Available: April 2009 [release]

New Features:
- The new *Project Wizard* allows users to easily step through the process of creating a new project.
- The *Wizard* automatically detects the user's raw data types, converts them to GPB and, if requested, downloads nearby service station data.
- EGM2008 geoid now available in WPG format
- New *Trajectory Status* plot is available for NovAtel users logging position records

Improvements:
- Handling of manufacturer/user files has been modified to better support Windows VISTA users
- *Download Service Utility* now loads much quicker than previously
- Improved satellite rejection and base satellite selection in differential processor
- Improved handling of satellite antenna offset in PPP processor
- Users can now easily add their static PPP solution to *Favourites*
- The *Map Window* and all data plots use new drawing method that provides much better support for high-rate and/or long data sets

Decoders:
- NovAtel OEMV users can create GrafNav-readable trajectory files from 7 different position records
- NovAtel OEM4/OEMV decoder now supports MARKnTIMEB and MARKnPVAB records
- For Leica 1200 receivers, support has been added for the new measurement record (#119)
- Support for the RTCMV3 raw data format has been added
- Improved handling of GLONASS data in GPB2RIN.DLL
- RIN2GPB.DLL now handles L2C data properly

Bug Fixes:
- Fixed bug where *Select From Favorites* would not work if master GPB file did not contain position