INERTIAL EXPLORER® 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)
- Attitude corrections are now applied for the effect of the deflections of the vertical, computed from the Earth's geopotential model EGM2008 (included in setup). This helps maximize roll & pitch accuracy with high accuracy GNSS+INS systems as attitude is computed with respect to the gravity vector and not the ellipsoid normal.

- Inertial Explorer 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 Inertial Explorer users benefit from all improvements implemented in the 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

- Multi-pass processing is now a check box option on the TC processing dialogue. This allows users to process a forward or reverse multi-pass solution rather than always applying multi-pass processing in both directions.
- 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.
- Automated alignment in version 8.70 will use a maximum of 2 hours of data in static alignment prior to entering navigation mode (formerly the limit was 10 minutes). Increasing this limit helps ensure all available static data is applied in the initial alignment.
- Fixed an issue applying CUPTs entered manually or loaded from an ASCII file affecting the correct application of the provided estimated error

- If using a gimbal lever arm to shift Inertial Explorer's processed output to another location, we will now use the instantaneous angular rate to compute the velocity and acceleration at that point. Previously, filtered values were used which introduced latency in the computed values.
- The PVA file format, which provides a flexible means of entering an unlimited number of external position, velocity and/or attitude updates, has been extended from absolute updates to now also include relative updates. As such, if users have the means to form their own relative updates between epochs, this information can now be input to Inertial Explorer.
- Added a user command "INS_REVERSE_ALIGN" which attempts to automatically detect whether the IMU is moving backward during kinematic alignment. Previously, if this had occurred users were required to process forward and reverse directions separately with different installation settings or an alignment error would occur in the backward case.
- Removed support for "PPP_ETCOFF" command which could be used to disable Earth tide corrections

- Added a user command "RBV_CALIBRATE" which allows users to solve the rotational offset from the IMU frame to the vehicle frame
- Added a user command "VELCONSTRAINT" which allows users to implement X, Y and Z vehicle velocity constraints
- 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 and Inertial Explorer write new trajectory formats. This results in fewer files produced by the processing engine and 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 the File | Load options, and it will be automatically converted to the new trajectory format. Version 8.70 also includes an "Export Waypoint Legacy Format" option under the Output menu which will produce the former ASCII and binary trajectory formats for any users who require these in their downstream workflow.

GUI

- Inertial Explorer's quality numbers have been re-defined and are now better linked to estimated position accuracy. This will effectively highlight the relative good and poor quality areas within a survey and will not show an apparent degradation relative to GNSS-only processing.
- When solving the IMU to GNSS lever arm in version 8.70, users will now have direct access to the averaged lever arm estimate between forward and reverse processing rather than just the forward or reverse estimate.
- Re-designed alignment options which enable users to more easily input the initial position and/or heading values for static alignment. This facilitates an easier workflow for INS-only users or anyone wanting to use compass aided static alignment.

- Users can now specify default GNSS and INS processing profiles 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
- Users can now specify an IMU->DMI lever arm and an IMU->Secondary GNSS lever arm in the vehicle profile manager

- ARTK indicators will no longer disappear from the map window after smoothing, preserving that information which is useful in QC
- 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
- When selecting between aerial, ground vehicle, marine and pedestrian profiles the lever arm image on the processing dialogues will change appropriately

- New "Combine Two Solutions" dialogue which allows users to combine processed solutions for the purposes of comparison directly within Inertial Explorer. No knowledge of Inertial Explorer's file extensions is required when using the dialogue.
- Customer created processing profiles with the "INS" keyword will now appear in the profile list of the processing dialogues when choosing not to filter profiles by IMU type
- An issue has been fixed that caused the incorrect display of the processing profile applied in the processing dialogues which occurred when re-accessing the processing dialogues and when using third party (non-SPAN) systems

- 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 Waypoint IMU Data Conversion 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.
- All manufacturer pedestrian and marine processing profiles will now automatically engage multi-pass processing when processing in tightly coupled mode. This is the recommended workflow for best attitude performance in these low dynamic environments.
- A GNSS Pedestrian profile has been added to the setup, which enables automated loading of this processing profile for pedestrian data sets

- Processing profiles have been added for the SPAN µIMU
- Lowered the gyro raw measurement ZUPT threshold in the LCI100/LCI100C and uIRS ground vehicle processing profiles to lessen likelihood of incorrect ZUPT detection
- Increased Gyro scale factor PPM value in SPAN CPT ground vehicle and aerial profiles to 1000 PPM which generally produces improved results than the previous value of 10 PPM
- Removed scale factor and non-orthogonality states from all pedestrian profiles as the survey dynamics are typically insufficient to observe these states

Plots

- ZUPTs are now automatically filtered from the “Combined Separation with Fixed Ambiguity” plot to ensure any constant biases are the result of incorrect integer fixes. Previously, ZUPTs could be often mistaken for incorrect integer fixes.
- 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 “Attitude (Azimuth/Heading)” plot will now display computed COG values when the vehicle moves > 0.2 m/s. Previously the minimum value for computing the GNSS COG was set too conservatively at 1.2 m/s which was limiting for checking the comparison of the GNSS COG to the IMU azimuth in slow moving applications.

- The IMU Angular rate plot now reports instantaneous values rather than smoothed values
- The IMU Status flag plot will now indicate a CUPT if it occurs off the even second
- 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 where range updates were being reported erroneously in the IMU Status Flag plot
- 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
- Removed Gyro Attitude Misclosure 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

- 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
- Fixed the false zero lever arm warning when processing INS-only
- 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 OEM7 SPAN INSCONFIG log, used for importing installation parameters
- An option has been added to the Novatel/SPAN decoder to "Ignore clock model status for MARKNTIME records". This is important for customer's collecting events in indoor applications.

- Decoding support has been added for the SPAN µIMU
- 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 Inertial Explorer.
- The NovAtel/SPAN decoder will read and ignore RXCONFIGB logs. This ensures we do not attempt to decode the logs that are reported within the RXCONFIG log, as they fail CRC checks and these errors are needlessly reported to users and confused for other problems.
- Added a progress bar for GPB pre-processing, which occurs automatically after conversion

- Added a check for zero receiver idle time to the NovAtel decoder, which can be symptomatic of other decoding issues. A warning will be output for this condition if user's enable verbose messaging within the conversion options.
- Added IMU conversion support for Seapath MRU 5 within the Waypoint IMU Data Conversion utility

- 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.
- Angular rates will no longer be filtered prior to export. This enables users to perform their own custom filtering if desired.

- 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.

Export to RIEGL POF/POQ

- Changed RIEGL output angles to use NED local level frame

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)
- GNSS position updates are now extrapolated to the receiver time frame prior to integration. This provides best results for aerial applications in combination with receivers that do not continually steer their internal clock
- Fixed a problem affecting the interpolation of small IMU data gaps, which was often evident from spikes in the combined separation plot
- Fixed a lever arm solving issue that would result in a crash when the input values were very close to truth

- Updated the SPAN-KVH1750 processing profile and error model, improving both ground vehicle and aerial performance
- Added support for SPAN HG9900
- Added support for the ITRF 2014 datum
- Added a marine processing profile for the SPAN LCI100C

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)

Plotting

- Fixed an issue in the "Raw IMU Data Amplitude Spectrum" plot affecting usage of existing ASD files

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
- Doppler is no longer used in GrafNet processing, which may have been detrimental to the solution quality if using receivers that output poor quality Doppler measurements.

What's new in 8.60.6129?

Available: January 2016

Processing

- Fixed an issue affecting the handling of DMI data when a vehicle is moving backwards
- Fixed an issue that could result in the application of a ZUPT during smoothing even though it had been correctly rejected in filtering
- 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 a week crossover issue affecting the manual setting of start/end processing times in loosely coupled processing.
- Fixed an issue where manually set start/end IMU processing times would be ignored in multi-pass processing (after the first pass)

Leica Workflow

- 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.

Plotting

- Measurement residual plots now show both the RMS and SD after smoothing. Previously, the SD values were removed from the plot after smoothing.

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
- Fixed output of attitude separation values when they are negative. Previously, a large positive value would be output.

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
- Fixed an issue in the computation of quality numbers (1-6) displayed on the map window which would result in the quality factor being computed as 1 (best) even when no GNSS updates were received for extended periods of time
- Fixed an issue affecting the "Solve Lever Arm" feature. The minimum velocity setting (in the "States" tab) was being ignored which would result in no change to the estimated lever arm if travelling less than 5 m/s.
- 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 affecting the proper copying of the week number to processing files when using transfer alignment. This issue prevented combination of forward and reverse processing files, as no common data would be detected.
- 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
- Improvements for the application of external heading updates from the NovAtel dual antenna ALIGN system. The boresight standard deviation in the HMR file header will now be decoded with a default value of 0.1 degrees instead of the previous value of 0 degrees.

- 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.
- If logging INSPVAX and using the NovAtel decoding option to "Create trajectory files for supported records", the real time velocity is now written to the file. This allows plotting of the real time computed velocity and comparison with post-processed values.

- 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

- Pedestrian profiles have been added for most SPAN systems
- We now provide the reference epoch for all IGN stations within the favourites manager

- Changed all ground vehicle profiles to use a variance factor threshold of 20 for acceptance testing of Zero Velocity Updates (ZUPTs). This value has been tested to be more effective than the previous value of 1 for reliably detecting ZUPTs.
- Added support for Lambert93 French grids
- Improved the STIM error model for better performance in challenging GNSS conditions.

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

- Added support for automatically detecting "GNSS Pedestrian" as a pre-processing environment. This will result in the pedestrian processing profile being automatically loaded when first accessing the processing dialogue for these applications.
- 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

- Increased number of decimals displayed in body to IMU rotations to three
- Increased number of decimals displayed in position and phase variance factor testing to two

- Removed reporting of GPB epoch count in the project overview as it was not accounting for missed epochs
- Added space to enter a lever arm when editing the alignment options to use a user-entered position. This saves users the trouble of calculating the starting position to the IMU center of navigation.

Plotting

- Fixed an issue in the "File Data Coverage" plot where IMU data was sometimes plotted 1 week off from the GNSS data

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 an issue that would result in "error in binary interpolation" message when interpolating some feature marks in tightly coupled processing where coordinate updates (CUPTs) were applied.
- Fixed "Export Binary Values" function under the "Output" menu to properly output base station parameters
- Fix for properly outputting the "Total Horizontal Distance" variable during vehicle stops (ZUPTs)

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 affecting static alignment of navigation grade IMU's where the initial estimated misalignment errors were too optimistic in some cases
- Fixed a bug affecting the application of coordinate updates (CUPT's) in the first pass of multi-pass processing

- Fixed an issue where the initial external heading in an HMR file was not being used in auto-alignment if the HMR file had a significant delay relative to the start of the GNSS and INS data
- Reduced the misalignment spectral density (gyro random walk) in the STIM300 error model. This results in improved performance in position and particularly in heading in challenging GNSS environments, or during extended complete GNSS signal outages
- Increased the gyro Zero Velocity Update (ZUPT) threshold in the STIM300 Pedestrian processing profile in order to detect ZUPTs more reliably with backpack systems
- Fixed an issue where a crash would occur if 3 or more days of ESA GPS+GLONASS precise products were loaded in a single project

Leica Workflow

- Users will now be warned if their processing datum is not WGS84. This is to help ensure the datum of the SOL file is WGS84.
- Fixed an issue affecting the Leica TM file extraction in some cases

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

- The title of the map window will now reflect whether a loosely coupled or tightly coupled solution is loaded
- 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
- Fixed a false warning regarding more than 3 days of data collection in GNSS+INS projects over the week crossover in special cases

Export Wizard

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

Plotting

- Corrected title of estimated accelerometer bias accuracy plot
- Fixed an issue where pseudorange updates (PSR) were being falsely reported as range updates in the IMU status flag plot
- Fixed an issue where un-scaled DMI residuals were being plotted instead of the properly scaled values.

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

- Improved automated alignment for pedestrian applications
- 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

- Fixed a crash affecting loosely coupled processing of very long surveys
- Improved performance when heading updates are applied. The computed boresight between the GNSS antennas and the IMU forward pointing axis is now removed prior to applying the heading update
- Improved loosely coupled automated alignment for several corner cases

Leica Workflow

- Fully supports decoding of all system installations for Leica FlightPro 4.20

Export Wizard

- Increased display of user-entered time camera mark time offsets to six decimals
- Attitude covariance values are now available when exporting camera events

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
- Fixed bug where the "Enable code/carrier clocks (Trimble)" option was not being automatically turned on when Trimble data was converted from RINEX

- 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.

Processing profiles

- Changed SPAN Ground (LCI100C) ground vehicle processing profile to use an elevation mask of 5 degrees and an L1 locktime cutoff of 0 seconds
- Pedestrian profiles for the ADIS16488, STIM300, CPT, KVH1750 and FSAS systems have been added. These contain adjusted alignment thresholds that work well for slow moving pedestrian-type applications.

GrafNet

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

Plotting

- Fixed issue where range updates were being falsely indicated on the IMU status flag plot when PSR updates were in fact being applied

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
- The NovAtel/SPAN decoder will now skip any IMU records with invalid week numbers. This helps prevent false IMU gaps in decoded data
- 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
- If invalid measurements are present the single point computation will return a 0 for position and clockshift. These epochs are ignored by GrafNav/IE.
- Fixed GPB to RINEX formatting issues
- Fixed OEM42GPB conversion issue where empty GPB records were output when the time status indicated a failed validity check
- wconvertimu.exe supports conversion of raw IMU data when the GPS SOW does not properly rollover on the week crossover

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
- Range updates are no longer applied
- Fixed issue displaying solved lever arm in the forward direction if the GNSS update rate was > 1 Hz

Preprocessing

- A warning will be issued if the secondary lever arm has not been entered (if using heading updates)

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 issue where lever arm standard deviations and minimum velocity could not be accessed
- Fixed a display issue in the download utility which occurred on some graphic cards
- Simplified GUI for HMR file usage

Leica Workflow

- TM and SUP files are now generated properly during data conversion
- Support for LCI100C 500Hz IMU
- Added decoding support for the IMURATEPVA log during data conversion

Decoding

- Fixed the GPB to RINEX utility such that it will work with software based licenses
- Fixed issue converting IPAS surveys immediately after SPAN surveys

- 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 Inertial Explorer 8.60?

Available: December 2014 [release]

Processing and Smoothing

- Full support for BeiDou in GNSS-only and GNSS+INS data processing
- ARTK has been updated to OEM060510RN0000. This version provides improved results on long baselines and in challenging GNSS signal conditions. This version also fixes BeiDou carrier phase ambiguities.
- PPP TC processing now with much improved results for urban\challenging GNSS applications. This processing mode can be used when no GNSS base station is available.

- PPP/PPP TC 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. It also allows Inertial Explorer to maximize the availability of GNSS signals should multiple constellations be available but precise products not be available for each constellation.
- After smoothing position movement during Zero Velocity Updates (ZUPT's) is now much reduced than in previous versions
- Improved smoothing further reducing the likelihood of discrete position jumps in challenging GNSS signal conditions

- We have added the lever arm states as well as the accelerometer and gyroscope bias states to our backsmoother
- Additional checks have been implemented to reject false Zero Velocity Updates (ZUPTs) which can cause large GNSS/INS processing errors
- More robust kinematic alignments: Version 8.60 tracks metrics following alignment in order to detect whether the accepted initial position, velocity and attitude were affected by gross errors. This often only becomes obvious several seconds or minutes after the alignment has been accepted if GNSS signal conditions are challenging. If a gross error is detected a new alignment will be automatically computed.

- 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.
- Support for a new binary PVA file format for the application of external position, velocity and/or attitude updates in Inertial Explorer. This format allows the entry of an unlimited number of external updates.

- The DMI measurement standard deviation, option to detect ZUPTs from DMI measurements and initial DMI scale factor can now be saved and retrieved from a processing profile
- Fixed a bug applying high rate GNSS updates (> 1 Hz) when raw IMU data is also output at the top of the second and on even intervals. This is the case with SPAN CPT systems operating with firmware more recent than v6.22.
- 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.

Output

- Export to SBET format now directly supported under the Output
- Export to RIEGL POF/POQ format now directly supported under the Output menu

GUI

- "Solve Lever Arm" function accessible under "Process" button on IMU processing dialogue. The solved lever arm is reported at the end of processing.
- Vehicle profile manager allows storage of the primary lever arm, body to IMU rotation, IMU to gimbal lever arm and GNSS heading offset for individual vehicles. This helps avoid manual data entry on the LC and TC processing dialogues.
- 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.

- "GNSS Heading Offset" variable has been added to the IMU processing dialogue. This is applied in kinematic alignment to account for any large intentional misalignments between the vehicle and IMU frames.
- New "GNSS" tab which provides more control over GNSS pre-filtering options including standard deviation, DOP, GNSS quality number and the option to require fixed ambiguities.
- More sensible units are now displayed for spectral density values when viewing error models

- 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
- Fixed tab order in LC processing dialogue

- We now support the loading of up to 31 characters when loading external camera event files
- Added "Yaw-COG" to processing window. This is a useful parameter to monitor during processing as it will help indicate any unintentional mismatch between the GPS COG and the IMU azimuth due to the IMU installation.

Leica Workflow

- Real Time Navigation (RNV) files are only extracted if the option to "Create trajectory files (*.fsp) for supported records" is engaged within the NovAtel OEM/SPAN conversion options.
- Fixed an issue where the Raw GNSS Conversion utility would crash if filenames of longer than 80 characters were in the same directory as the data to be converted

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. Inertial Explorer will maintain backwards compatibility with V2 GPB files which were used by versions 7.80 to 8.50.

Plotting

- A new "Raw IMU Data Amplitude Spectrum" plot has been added. This plot can be used to show the signal strength in designated frequency bands. This can be used to profile expected frequencies for specific vehicles and operating environments which may be helpful in troubleshooting problematic data.
- If processing with the "Apply Heave" processing option (marine applications) the heave compensated ellipsoidal height will be displayed together with the computed ellipsoidal height in the "Height Profile" plot
- 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, IMU-GPS misclosure and others.

- Week crossover bug fixed in the DMI Analysis Tool
- MMR files are now supported within the "File Data Coverage" plot
- 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)
- BESTLEVERARM2 is supported and will be written to the decoded HMR file header for automatic importing to Inertial Explorer. Note that the secondary lever arm will also be written to the HMR file if SETIMUTOANTOFFSET2 was used to store the secondary lever and IMUTOANTOFFSETSB was logged

- BESTGNSSPOSB is now supported

- IMU data gap messages are now displayed in red for increased visibility
- INSPVAX message now supported and will be written to a Waypoint readable trajectory if detected
- Added support for IMURATEPVA/IMURATEPVAS records

GPBViewer

- New GPB Viewer to best support version III of the GPB format
- 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

- Preprocessing now considers the detection of other file types (HMR, DMR, MMR) in determining the processing environment
- 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.
- Added "Marine Heave Ellipsoidal Height" and "Marine Heave Orthometric Height" variables to the Export Wizard. These variables output heave compensated height when processing with the "Apply Heave" processing option (marine applications)
- Attitude covariance can now be output from the Export Wizard

- 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

- Default processing direction has been changed to "Both"
- 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]

Processing

- Fixed a round-off issue when processing GNSS data at 5 Hz that caused the filter to ignored some GNSS updates

Utilities

- Added conversion profiles for SPAN KVH1750
- 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 file names that are greater than 80 characters would lead decoder to crash

What is new for 8.50.4320?

Available: March 2014 [update]

SDK/WPGCMD

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

Processing

- Fixed a bug affecting the application of the ARP to L1 phase center in loosely-coupled processing when the remote antenna height was measured to the ARP
- Fixed an issue affecting the success of kinematic alignments when the GNSS update rate is > 1 Hz

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

Leica Workflow

- Fixed an issue affecting usage of NovAtel base station data within Project Wizard when using Leica Workflow

Decoding

- Added RAWIMUSX support for NovAtel SPAN LCI100C, HG1900, HG1930, ADIS16488, STIM300 and KVH1750 IMU's within NovAtel decoder
- 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

Processing profiles

- Added processing profiles for NovAtel SPAN KVH1750 systems
- Changed the DMI variance factor to 20 from 3 in all SPAN ground vehicle profiles order to lessen the likelihood of false rejections

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

- Modified all marine processing profiles to guarantee no Zero Velocity Updates (ZUPTs) will be applied
- Modified kinematic alignment thresholds in all ground vehicle processing profiles to decrease likelihood of failed kinematic alignments in challenging GNSS signal environments
- Increased ARTK quality acceptance criteria to Q4 for all ground vehicle processing profiles to reduce likelihood of an incorrect ambiguity fix in challenging environments
- Improved alignment for low dynamic surveys when processing loosely coupled

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)
- Fixed an exporting problem affecting a survey collected with 5 Hz GNSS updates and 200 Hz IMU data

What was 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

Leica Workflow

- Improved performance of the “Apply IPAS lever arm correction for old FCMS/FlightPro” option within Settings | Preferences

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 was new for 8.50.2722?

Available: July 2013 [update]

Interface

- Added Leica workflow option to "Apply IPAS lever arm correction for old FCMS/FlightPro versions" within the “Solution” tab of Settings | Preferences

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
- Fixed a bug applying heading updates (HMR files)

Utilities

- Fixed bug when downloading current CORS files (available hourly)
- Fixed the display of the distance separation plot after loosely coupled processing
- Cleaner plots when comparing the combined DGPS and PPP trajectory within the IE interface
- Modified DMI Ticks/s functionally (Please note that: DMI Analysis Tool’s requirement is time-tags must be within 0.1 seconds of the even seconds)
- Fixed an Export wizard bug affecting the export of UTC time for users within the UTC+2 (Harare, Pretoria) time zone

What was 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 was new with Version 8.50?

Available: April 2013 [release]

Licensing

- Support for both USB and software-based licensing

IMU Processing

- Leica workflow option for IPAS-TC and IPAS-PRO users
- Improved variance factor testing methods used in accepting and rejecting GNSS updates. The new method produces better results with high GPS update rates (greater than 1 Hz) and challenging GNSS conditions. It can also help a solution recover more quickly in the event of a poor alignment
- New thresholds for automatically detecting ZUPTs, resulting in significant improvement for MEMS sensors such as the ADIS16488
- Improved lever arm estimates. We have implemented a default (but user configurable) minimum velocity for solving lever arms which helps prevent diverging lever arm estimates

GNSS 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)

Diagnostics

- DMI Analysis tool that displays DMI computed velocity vs GPS/INS post-processed velocity. This tool can be useful for optimizing input DMI parameters and troubleshooting

Interface:

- New option to enable smoothing automatically after processing within the solution tab of Settings | Preferences

- "Compute from PPP" button on master coordinate dialogue provides quick access to check or survey base station coordiantes with Waypoint's Precise Point Processor
- Support selecting 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 coordiantes from favourites, you can now choose whether to apply 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 in our download utility

What is new for 8.40.5121?

Available: January 2014 [update]

Processing

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

What was new with Version 8.40.3116?

Available: November 2012 [update]

Processing

- Improved support for Coordinate Updates (CUPT). Users can now specify a standard deviation for each CUPT.

Utilities

- SPAN CPT status bit now used to check validity of raw measurements prior writing to disk
- 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
- Fixed problem of occasional repeated records when exporting at 1000 Hz or greater
- Fixed problem where GPS week number was sometimes not properly computed in fine alignment

What was 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 8.40.2717?

Available: July 2012 [update]

Processing
- Fixed issue where nominal dt was being used in inertial filter instead of computed dt, which occasionally led to spikes in solution
- Fixed bug in PPP-TC processing where Doppler-derived cycle slips were not being handled properly
- Made improvements to auto-align feature when GPS data is poor
- Fixed issues with roll/pitch angle output in the *Export Wizard* when values approached +/- 180º

What was new with Version 8.40.2523?

Available: May 2012 [update]

Processing
- Improved handling of data with large clock-shift values in tightly-coupled processor

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]

Processing

- Improved reliability of automated zero-velocity (ZUPT) detection, which drastically improves the results of some urban surveys
- Tropospheric states can now be used during TC processing

Bug Fixes

- Removed warning messages related to lever arm for IMU-only processing
- 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
- Fixed error messaging in tightly-coupled processing to more clearly communicate any processing failures
- Improved error message when adding an empty GPB file to a project
- Fixed issue affecting correct handling of covariance information for newly acquired satellites in tightly-coupled processing. This occasionally led to position jumps after smoothing.

Export/Reports

- Improved auto-selection of source (epochs/features/static sessions) in *Export Wizard*
- Fixed "sequence number" output in *Export Wizard*
- Fixed a week numbering issue for INS-only processing which caused a problem during export
- Now outputting correct baseline distances of first and last epochs in *Processing Summary*
- Fixed issue with CurveFit values to clearly show they are not available for GNSS/INS export

Utilities

- Added a tool tip to auto-update tool in order to more clearly display changes in new builds
- Improved handling of very long GNSS outages (>20 minutes) in smoother
- Added full support for new SPAN models (HG1900, HG1930, LM20 and LM40)
- Improved handling of D-files in HOSE2GPB.DLL

What was new with Version 8.40.1408?

Available: February 2012 [update]

Bug Fixes

- Fixed smoothing issues where epochs were sometimes dropped from forward or reverse solutions when using GNSS update rates greater than 1 Hz
- 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 mark files

What is new with Version 8.40.1214?

Available: January 2012 [update]

Bug Fixes

- Fixed issue in Inertial Explorer where GPS outages greater than 600 seconds were not being handled properly
- Improved PPP /PPPTC performance in challenging conditions
- Fixed issue in GrafNet where printing was disabled
- *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 is new with Version 8.40?

Available: November 2011 [release]

New Features

- Improved variance propagation in RTS smoother to eliminate small jumps during GNSS updates. This is especially important for LIDAR and road profiling applications.
- Users can now generate high-rate plots within Inertial Explorer. This can be useful for solution analysis.
- Body frame velocities and accelerations are now computed and available for export and plotting
- IMU to GNSS lever arms can now be entered to the antenna reference point or the phase center
- *Waypoint Updates* feature will notify customers of new software updates and patches and willdownload 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
- Issues when setting the static coarse and fine alignment times have been fixed
- 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

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
- IMU Auto-detection for NovAtel SPAN data has been improved
- NovAtel decoder now supports SITEDEFB logs. This ensures your static sessions are preserved and that an event is written to the STA file.
- NovAtel decoder now computes a rough estimate of velocity when writing BESTPOSB trajectories to FSP file in order to allow the file to be used as the source of updates in loosely coupled processing
- 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
- Issue concerning high-rate output of angular rate data is now fixed

What was new with Version 8.30.1123?

Available: November 2010 [update]

Bug Fixes

- Fixed bug where DMI window was unresponsive when adding DMR data to project
- Fixed bug where multiple menu items were disabled for IMU-only projects
- 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*

What was new with Version 8.30.1007?

Available: October 2010 [update]

New Features

- Added support for NovAtel SPAN LCI and NovAtel SPAN μIRS systems
- NovAtel SPAN users can filter list of processing profiles based on the IMU

Bug Fixes

- Fixed bug in loosely-coupled processor when doing kinematic alignment during week cross-over
- 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]

New Features

- Added support for heading updates from dual-antenna systems
- Added heave output variable to *Export Wizard*

Bug Fixes

- Improved auto-alignment for datasets with poor Doppler measurements
- Fixed bug where DMI data would be ignored during processing
- 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

- Automated alignment option scans data and automatically performs static or kinematic alignment, thus eliminating the need for user intervention
- Precise point positioning (PPP) now available for use with tightly-coupled processing for users who do not have base station data
- Differential tightly-coupled processing can now be run in multi-pass mode for improved attitude convergence over short surveys
- Processing settings have been simplified and the GUI has been made more intuitive

- Distance-dependent output now available through *Export Wizard*
- NovAtel SPAN decoder now automatically sorts IMU data to remove time reversals
- New *ReadWPG* utility reads most of Waypoint's binary data files, including IMR, DMR and high-rate trajectory files
- Smoother has been improved for datasets where scale and non-orthogonality states are used (i.e. SPAN-CPT)
- Float/fixed solution weighting has been improved for tightly-coupled processing
- Range updates have been implemented to improve accuracies during periods with poor GNSS data availability
- Solving routine for GNSS-IMU lever arm has been improved
- Improved support for tightly-coupled processing in local datums
- New version of AdVance™ RTK (ARTK) offers improved carrier phase ambiguity resolution, particularly for single frequency data
- Fixed static processor now supports L2C measurements
- 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)
- Inertial solution automatically loaded upon opening of project. Previously, only the GPS solution was loaded.

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
- *Distance Separation* plot now displays correct baseline distance after tightly-coupled processing
- ECEF covariance information for 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
- Improved *Gyro Drift* and *Accelerometer Bias* plots

What was new with Version 8.20.0522?

Available: May 2009 [update]

Bug Fixes

- *General* tab of the IMU processing options menu now automatically fills in *Start* and *End* times
- IMU processor now properly handles large changes in the values from the DMR file
- Software now handles spaces in the mount (*.*mmr*) and heading (*.*hmr*) filenames
- Better error message returned when IMU auto-detect fails for NovAtel SPAN datasets
- RIN2GPB.DLL was not loading on some computers, leading to problems with the *Raw GNSS toGPB* and *Download Service Data* utilities. This issue has been resolved.
- Problem where *Export Wizard* would not output in any grid except UTM is now fixed
- 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. The IMU model is automatically detected for NovAtel SPAN users before conversion to IMR.
- New file handling routines effectively remove file size limitations for raw data up to 7 days
- RTS Smoother now smoothes attitude as well as position
- For marine applications, a new option is available to apply heave compensation
- Support for auto-stabilized camera mounts has been added
- External heading updates can now be used
- New plots for raw IMU gyroscope and accelerometer measurements
- Lever arm values can now be read into software (if present in IMR file header)
- EGM2008 geoid now available in WPG format
- New *Trajectory Status* plot is available for NovAtel users logging position records

Improvements

- IMU settings have been re-organized in a more intuitive fashion
- Processing profiles can now be easily loaded through the IMU settings
- New residual tests help ensure better filtering of position, phase and ZUPT updates
- Maximum number of allowable external coordinate updates (CUPTs) has been increased to 1,000
- Decreased memory consumption means that smoothing IMU data is now faster
- 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 MARK*n*TIMEB and MARK*n*PVAB records
- NovAtel OEM4/OEMV decoder now automatically detects IMU model for SPAN users
- 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 in *DMI Residual* plot where DMI velocities were being plotted instead of the residuals

- Fixed bug in kinematic alignment where error was returned if GPS data rate was greater than 1Hz
- High-rate data outputted through *Export Wizard* no longer contains position jumps at top of the second
- Bug fixed in *File Data Coverage* plot where gaps in GPS data were not being plotted after IMR file had been loaded
- Fixed bug where *Select From Favorites* would not work if master GPB file did not contain position