

# MagArrow Release Notes

MagArrow 1kHz Version 3.4.2737

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## MagArrow 1kHz 3.4.2737

### Changes

- The instrument log file, named “geometrics.log”, is now written to the instrument’s SD card rather than to the USB drive. This change was made after testing showed that individual USB drives are significantly more likely to fail than are SD cards, particularly under conditions of changing temperatures and multiple writes. The resulting increased reliability is judged to outweigh the less convenient physical access to the SD card, compared to the USB drive.

- GNSS location and time data plus some instrument health data are now periodically written to the log file.

## MagArrow 1kHz version 3.4.2562

### Summary of Improvements

This version includes these changes:

- Addition of the most-recently-received latitude and longitude values to MagArrow screen views that show GPS status information.
- Internal changes to instrument software libraries to improve the reliability of the application.
- Internal changes to Survey Manager and MagArrow Converter to improve the reliability of the application, by handling some additional cases of anomalous or unexpected patterns in GPS data.

### Components

- Geometrics MagArrow Instrument software version 3.4.2562
- Geometrics Survey Manager version 3.4.1433
- Geometrics MagArrow Converter version 2.2.129

Customers should upgrade to the latest versions of all three of these programs. These versions include important improvements in system reliability.

## MagArrow 1kHz version 3.2.2261

### Summary of Improvements

This version includes these changes:

- Additional condition checking during acquisition start and stop, to notify the user of SD card file system errors, faulty magnetometer sensors, poor GPS coverage, etc.
- Links in the Admin page to support and troubleshooting pages
- Added sensor/GPS offset option in Quick Conversions
- Additional information in the status page

### Components

- Geometrics MagArrow Instrument software version 3.2.2261
- Geometrics Survey Manager version 3.3.1411
- Geometrics MagArrow Converter version 2.1.125

Customers must upgrade to the latest versions of all three of these programs. These versions include important fixes, and they may not be separately compatible with earlier versions of other packages.

## Release details

### Additional condition checking during acquisition start and stop

During acquisition start and stop, MagArrow now checks for several conditions that either prevent data collection or that should be reported to the user. These include failed SD card storage, invalid magnetometer readings, and so on. These issues are reported to the user in a popup window.

### Links in the Admin page to support and troubleshooting pages

The Admin tab includes a “Support and maintenance” link to additional pages to maintain and troubleshoot issues with MagArrow.

The “Empty recycle bin” link enables the user to empty the MagArrow’s file recycle bin. When a user deletes a survey, the files aren’t immediately deleted from the SD card. Instead, they are moved to another folder. Every once in a while, this recycle bin should be emptied in order to preserve the best instrument performance. Recommended practice is to do this at the beginning of a new survey activity, or at the start of each day’s startup activities. This procedure is simply a housekeeping procedure and does not affect any current survey data or information.

The “System test info” link includes detailed information about the system, including the instrument’s current latitude and longitude if the GNSS receiver is able to calculate a location.

### Added sensor/GPS offset option in Quick Conversions

The quick conversion function in Survey Manager offers a new option: to use the standard magnetometer sensor offsets from the GNSS antenna, or to set those offsets to zero. Those offsets, which describe the location of the magnetometer sensors relative to the GNSS antenna (the point for which the GNSS reports a location), are used to calculate the locations that are reported in data exported from Survey Manager and from the command line converter. The offsets constitute a vector that is added to the original GNSS location.

This offset vector has become important as MagArrow’s GNSS readings become more accurate (MagArrow II supports RTK-quality location acquisition) and as customers fly the MagArrow closer to the ground in search of smaller magnetic anomalies.

### Additional information in the status page

The status page includes information about the SD card and includes a link to a detailed status page for additional information about the instrument.

## MagArrow 1kHz version 3.0.2070 and

## MagArrow 2kHz version 3.0.2071

### Summary of Improvements

This version includes these features and changes:

- Continued support for MagArrow 1kHz (the original instrument in the MagArrow series)
- Support for MagArrow II 1kHz (the successor to the original MagArrow)
- Support for MagArrow II-2kHz
- Improved handling of anomalous GPS data and behaviors

- Several user interface changes in run-time systems as well as in Survey Manager.
- References to SuperMag have all been changed to Combined Mag
- Serial number now appears in Admin page as well as in internal pages.
- UI rearrangement, to accommodate MagArrowII-2kHz
- Additional MagArrowConverter parameters, to include 2kHz.
- Additional logging during import of MagArrow data files
- Improved reliability during acquisition

### Components

- Geometrics MagArrow Embedded version 3.0.2070
- Geometrics MagArrow II 2kHz Embedded version 3.0.2071
- Geometrics Survey Manager version 3.0.1385
- Geometrics MagArrowConverter version 1.0.112

Customers must upgrade to the latest versions of all three of these programs. These versions include important fixes, and they are not separately compatible with versions of any of these softwares prior to package 1947-1941.

### Release details

#### Support for MagArrowII-2kHz

MagArrowII-2kHz collects 2000 magnetic samples /second (2kSPS). The instrument is intended for 2kSPS collection only; the lower-rate, decimated exports that are available from the standard, 1kSPS MagArrow are not available from the 2kHz model.

This model uses different embedded software as well as different features in Survey Manager, compared with the standard 1kSPS instrument. The 2kHz embedded software is not compatible with 1kHz hardware.

For more information about this instrument and its uses, please contact your Geometrics account manager.

#### Improved handling of anomalous or corrupt GNSS data and behaviors

Some anomalous behaviors have been observed in a few customers' GNSS (GPS and Glonass) receivers:

- A small number of instruments observe extra, or spurious, PPS signals (Geometrics has reports of 2 instruments doing this). These spurious measurements are discovered and fixed during import into Survey Manager, without notice to the user,
- A GNSS may "change its mind" about the time, either jumping forward or backward multiple seconds during a single, 1-second interval. This is not the same as the normal delays that sometime appear in data, but a true change in calculated time by the GNSS receiver. Survey Manager can generally calculate the correct handling of these unusual data, but because this is very unusual behavior (observed by Geometrics in data from only one customer), and because these anomalies aren't easy to understand, when they are found they are reported to the customer. See the Geometrics Forum for more information about these anomalies.

### User interface

- Some navigation paths in Survey Manager have changed, in order to accommodate the use of the 2kHz MagArrow and other new instruments.
- References to “SuperMag” have been removed from all user interfaces, and replaced with the correct terms “Combined” or “Combined Sensor”.
- The instrument serial number appears on the Admin Page in MagArrow and on other pages accessible to users and to Geometrics staff, in order to make customer questions and customer support focus more quickly on the specific instrument and its attributes.

### Additional MagArrowConverter parameters

To accommodate MagArrowII-2kHz, additional parameters have been added to MagArrowConverter. These parameters can be discovered by running the program without any any parameters. Customers who have been using this program to convert 1kSPS data will need to update their script also.

### Additional logging during import of MagArrow data files

Some useful information is recorded during the import of MagArrow data files. This information may be useful for customers and for Geometrics staff.

### Improved software and hardware version management

Earlier release of Geometrics magnetometer software followed relaxed rules about component compatibilities. It was possible to acquire data into a survey that was intended for another instrument. Customers who have been careful will not see any changes; other customers may see warnings or be asked to approach a feature through a different menu choice. These changes do not involve any reduction in available functionality for any instrument or customer.

## Version 1947-941(B)

### Summary of Improvements

This version includes these improvements:

- Fixes issue with Quick Conversions of large MagArrow Surveys
- Fixes and error in reading command-line argument in MagArrowConverter
- Improves handling of delayed and missing GNSS records in MagArrow surveys

### Components

- Geometrics MagArrow Embedded version 3.0.1947-941 – This software has not been changed in this release
- Geometrics Survey Manager version 3.0.1319
- Geometrics MagArrowConverter version 1.0.86

Customers must upgrade to the latest versions of all three of these programs. These versions include important fixes, and they are not compatible with versions of any of these softwares prior to package 1947-1941.

## Release details

### Quick Conversions

In some large MagArrow surveys, the Quick Conversion process reported that zero records had been imported, and would create an export file with zero records. Those surveys can now be converted correctly.

### Command-line converter

The command-line converter did not correctly read the “includeInvalid” argument; this command-line argument was always interpreted as “yes” or “true”. Even when set to “no”, invalid records were included in converted data. When this argument is set to “no”, those records are now correctly excluded.

### Delayed and missing GNSS data

In some cases, if GNSS (GPS or GLONASS) location records were delayed or missing in the communication from the GNSS receiver, exported data showed incorrect interpolated location and time information for some records. Those cases, and cases similar to them, are now handled correctly by the export programs.

## Version 1947-941

### Summary of Improvements

This version includes these improvements:

- Expanded video library with tutorials and help for the latest features and versions
- Improved Survey Manager workflow and user interface

### Components

- Geometrics MagArrow Embedded version 3.0.1947-941
- Geometrics Survey Manager version 3.0.1314
- Geometrics MagArrowConverter version 1.0.82

## Release details

### Video Library

Visit our YouTube channel with instructions and explanations from the Geometrics engineering team: <https://youtube.com/@GeometricsDev>. Bookmark the “Surveying with MagArrow” playlist; the videos are short and focus on the important workflows and most efficient uses of the MagArrow. These videos often include more up-to-date information than the user manual.

### Survey Manager Improvements

The user interface in Survey Manager is reorganized to make it easier to find and use the functions you need:

- Main menus are based on product lines, including the MagArrow.
- Project/survey naming convention now agrees with the instrument web pages. In prior releases data was organized by survey/acquisition; the names now match industry practice.
- Some survey parameters can be edited even after data has been collected.

- Export functions can filter invalid records and records without GPS locations.
- Quick conversions now use the offset of the sensors from the GPS antenna to calculate more accurate measurement locations.
- Survey parameters are now all part of the survey rather than the project.

### MagArrowConverter

- Export conversions can be filtered to omit lines with invalid magnetometer readings.

Exports now use the offset of the sensors from the GPS antenna to calculate more accurate m

## Version 3.0.1915-881

### Software Included in this release

- Geometrics MagArrow Embedded 3.0.1915-881 – the software running in the instrument.
- Geometrics Survey Manager 2.3.1170 – Windows software to manage surveys and import and export data in various formats,
- Geometrics MagArrowConverter 1.0.71.0 – Windows command line utility to export MagArrow data files to other formats.

Customers must install the new versions of both MagArrow Embedded and Survey Manager. Installation of MagArrowConverter is optional; further information about this program can be found below.

### Changes

#### New names

In the browser interface, surveys and acquisitions have been renamed as projects and surveys, to match industry terminology and in response to customer feedback. This change has not been made in the current release of Survey Manager, where the old names are still used. The difference will be resolved in a future release of Survey Manager.

### Instrument Status Information

The Status page in the browser UI includes new information about the instrument:

- A “Compass” entry describes whether the instrument compasses are working correctly (see additional notes about the compasses in further notes below).
- A “GPS Fix” entry reports GPS location quality, with one of these values:
  - “No position” – The GPS has not yet calculated a location.
  - “Autonomous” – This is the name for a “normal” GPS fix, based on the reception of satellite information sufficient to calculate a location.
  - “RTK float” – An improved fix obtained during use of NTRIP or other enhanced GPS technology. Please contact Geometrics for information about whether this feature is available on your instrument.
  - “RTK fixed” – A very high-quality fix obtained by using NTRIP or other enhanced GPS features.
  - “WAAS” – Similar to Autonomous, but with some improvement from additional satellite features in some locations.

- Others – a few other listings may appear momentarily during instrument operation. They will normally be quickly replaced by one of the preceding values in this list.

### Re-starting the magnetometer from the browser

The Admin page includes a button labeled “Restart MagArrow”. This button restarts both the main instrument CPU and the magnetometer sensor, without requiring the user to open the instrument battery door to cycle the power. This feature is the next-to-last resort (before manually cycling the power) for resetting an instrument that is not functioning properly.

### File system cleanup

The Admin page includes a button labeled “Clean Old Files”. Deleting a survey in the Data page moves the survey information to a recycle bin in the instrument’s file system. The “Clean Old Files” button permanently removes survey information from that location, to create additional free space on the file system.

### MagArrowConverter command-line conversion program

MagArrowConverter is a command-line program that runs in Windows 10 and 11, to convert a “.magarrow” file to CSV format, for import into visualization and analysis tools. For some customers this feature eliminates the requirement to use Survey Manager; some customers will not need to use this program. Additional information is found below, in the installation instructions for MagArrowConverter.

### Reliability Improvements and logging

In addition to some internal improvements, this version includes the following changes:

- If an internal compass error is detected during startup, the sensor system will be restarted. If the compass continues to malfunction, the UI reports the anomaly (see the note above about Instrument status information) but allows data acquisition to proceed; not all users require the compass information for all surveys. The compass detection and resolution doesn’t require user intervention. The instrument startup period is now several seconds longer.
- Information about the startup process (including compass detection) and standard events (start and stop, etc.) is logged to a file named “geometrics.log” on the instrument’s USB drive. Customer support may ask customers to send a copy of that file to Geometrics to help troubleshoot some instrument behaviors.

### Changes in Survey Manager

This version of Survey Manager does not include any visible changes. It does include some changes relating to reliability and performance.

### Power management and monitoring improvements

This version includes improved management and monitoring of batteries and other system resources. Users may notice longer available survey times. Because battery performance may vary from one battery to another, it can be helpful to estimate an individual battery’s lifetime by conducting a static test: Without flying a drone, start collecting data with a fully charged battery, and then note the elapsed time until the calculated battery capacity (on the Status page) is at 20%. That elapsed time is a good starting point for estimating the total flying time for a MagArrow survey.

### GPS Fix Quality

This version includes a new item on the status page, reporting GPS location fix quality. The reported qualities are as follows:

- No position – The GPS has not yet calculated a location.
- Autonomous – This is the name for a “normal” GPS fix, based on the reception of satellite information sufficient to calculate a location.
- RTK float – A higher quality fix obtained during use of NTRIP or other enhanced GPS technology. Please contact Geometrics for information about whether this feature is available on your instrument.
- RTK fixed – A very high quality fix obtained by using NTRIP or other enhanced GPS features.
- WAAS – Similar to Autonomous, but with some improvement from additional satellite features in some locations.
- Others – a few other listings may appear momentarily during instrument operation. They should be quickly replaced by one of the preceding values in this list.

### Distribution

This version is mandatory for all new MagArrow instruments and is recommended for existing customers and instruments. Because this release includes significant changes, including important reliability and usability improvements, customers with earlier versions who have support questions should be asked to upgrade to these new versions immediately.

### Version 2.2-1585.502

This release package consists of 2 softwares:

1. Geometrics *MagArrow Embedded* version 2.2-1585-502 – This is the embedded software running in the MagArrow instrument
2. Geometrics *Survey Manager* version 2.3.1164.4 -This is the survey management software running on the Windows PC

MagArrow customers should install and use these versions of both of these softwares.

### Changes in these versions:

*MagArrow Embedded* now supports the use of WiFi passwords and channel selection for communication between the instrument and the user’s phone, tablet, or PC. The use of the password prevents unauthorized equipment from grabbing the MagArrow’s WiFi access point and preventing access to the instrument by the user. The password and channel are both selected during installation of the software.

### Feedback and questions

If you have questions or feedback about the descriptions or instructions in this document, please contact Geometrics.