TELEMETRY CLASSIC for GoPro

Instructions Manual

Warning: This product has been replaced by the much more feature-rich new version of Telemetry Extractor, which can be found in the link below. It supports many more camera and device brands, it can preview the video alongside clickable data, it computes new values from the existing strams, and much more. You can still use this one if it suits your workflow better.

https://goprotelemetryextractor.com/gopro-gps-telemetry-extract

Table of Contents

Hey, I'm Juan.

Welcome to Telemetry Classic for GoPro

This tool will allow you to extract the metadata present in GoPro cameras since the Hero5 (and potentially older GoPro models with metadata accessories and other cameras that implement the GoPro Metadata Format). It will also allow you to visualise those data and extract it to multiple formats, such as GPX, CSV, JSON, mgJSON, KML…

If you prefer a video tutorial, check out this one. For all the details please refer to this guide.

You can use one of two versions, **Lite** (free) and **Classic** (paid). The Classic version has some additional features that professional users can benefit from:

- Use it offline, hence:
  - No internet needed
  - No data charges
  - Faster processing on most computers
  - Enhanced privacy
- Loading multiple files at once for batch processing
- Merging the metadata of consecutive files
- Data smoothing to reduce signal noise
- More frequency options
- Extra data (Highlight tags, video settings…)
- Updates for 1 year
- Email support for one year (within reason, I'm a solo developer)
- Custom settings
- Preferred graph units
- No ads

Classic: https://goprotelemetryextractor.com/gopro-only-telemetry-classic
Lite: https://goprotelemetryextractor.com/free
Extractor (new version): https://goprotelemetryextractor.com/gopro-gps-telemetry-extract

This project is possible thanks to GoPro open sourcing their GPMF: https://github.com/gopro/gpmf-parser. It is designed to be compatible with current and future data streams. The most commonly found data streams are GPS (position and speeds), accelerometer and gyroscope. Recent cameras add some streams to the mix, some of which are ISO, shutter speed, timestamps, magnetometer, face detection, white balance, luma, hue, image uniformity and scene classifier. You might find other interesting streams in your video files, especially as new cameras and firmwares are released.

The GPMF often includes units and data labelling, but not always. This means some times the data will be easier to interpret than others. For example, the axis (x, y, z) of the accelerometer and the gyroscope have changed between cameras, and in older models they were not labelled. Some times understanding the data involves trial and error.

Minimum requirements

This software has versions for Windows and macOS. Both require a 64 bit system. Other than that, the software has been used on high and low end devices successfully. A Linux version is only available for the newer version of Telemetry Extractor.

Inputs

Any video recorded with a GoPro HERO5 (Session or Black) or newer should include a metadata track. The track is embedded in the .mp4 video file. Often, .LRV (low resolution video) files are also recorded by the camera. These also include the metadata and are useful in some situations, due to their smaller size.
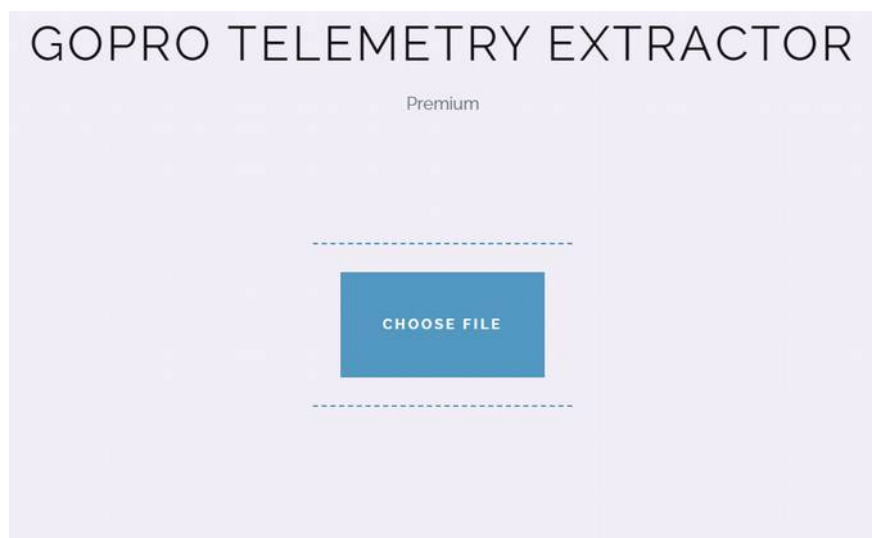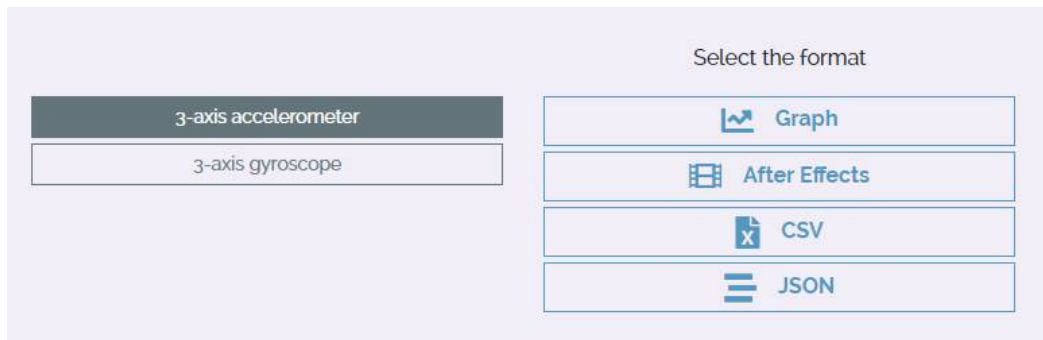

You can load a file to Telemetry Classic and it will show you the available data streams, usually one per sensor, but also computed streams (like face recognition).
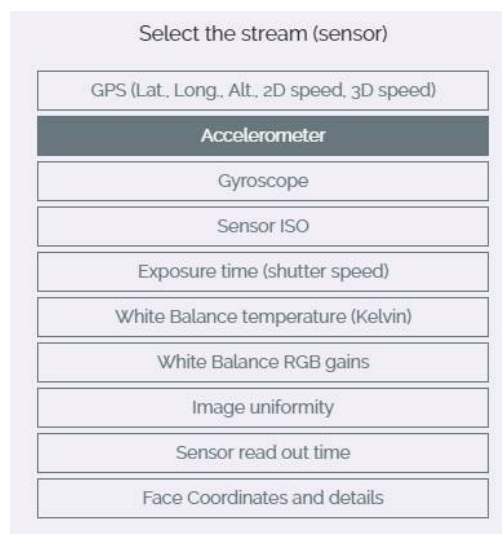
Processing

The quickest way to extract your data is to select the desired data stream and click on the desired export format (more on formats later).

In some cases, when using the Karma drone or other accessories that provide metadata, you will see more than one device available.

Options (and filters)

Once you have selected your desired stream, some options will appear on the left hand side of the screen (or at the top, in small screens).


- **Frequency**: By default, the program will give you the same amount of samples the camera records: about 18 per second (Hz) for GPS, 200Hz for the accelerometer, and so on. In some cases this amount of data can be overwhelming and produce large files. You can choose a low frequency if you want small files. The program will use the average values for each desired sample. A side effect of this is that the data will appear more smooth, less noisy. On the other hand, if you choose a high frequency the program will interpolate the data to create samples between the native ones. Finally, the option "frame rate" is useful if you want to match the samples to the frames of your video. This process can be slow, so use it carefully. The Classic version includes additional frequency options (1, 5, 10, 25, 50, 100, 200).
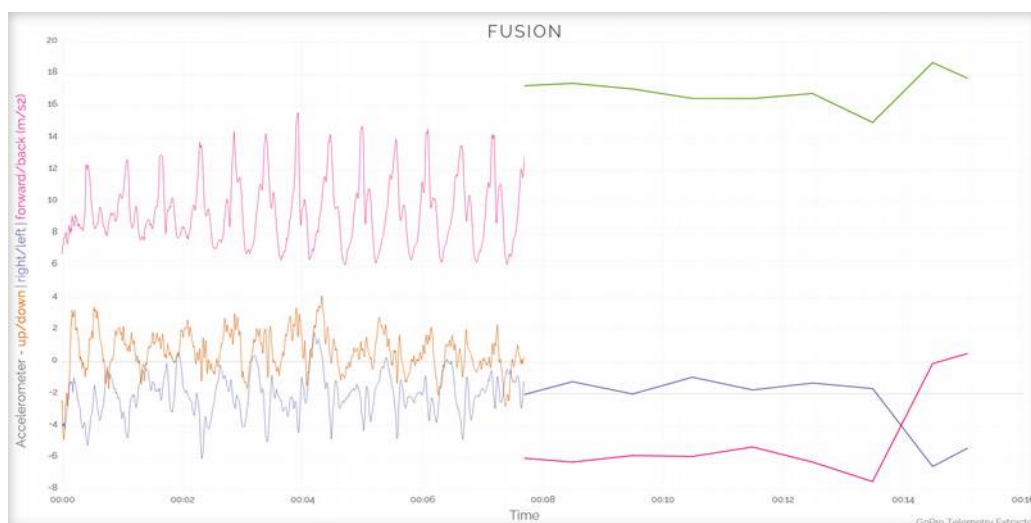
High frequency vs low frequency.

- **Base Time**: Many video files contain time information from both the video file (MP4) and the GPS signal. You can choose which one to use for your calcuations and time stamps (when microsecond time stamps are not available) or leave the decision to the software (usually MP4 for calculations and GPS for time stamps). For time lapses, MP4 can provide better results.

- **Smoothing** (not in Lite): Similarly, it converts each sample to the average of the adjacent ones. The result are much smoother signals/curves, with less noise. The value you choose represents the amount of samples you will take into account each side of the sample. As opposed to frequency, this does not reduce the amount of final simples, so it can be an even slower process. Use it carefully.
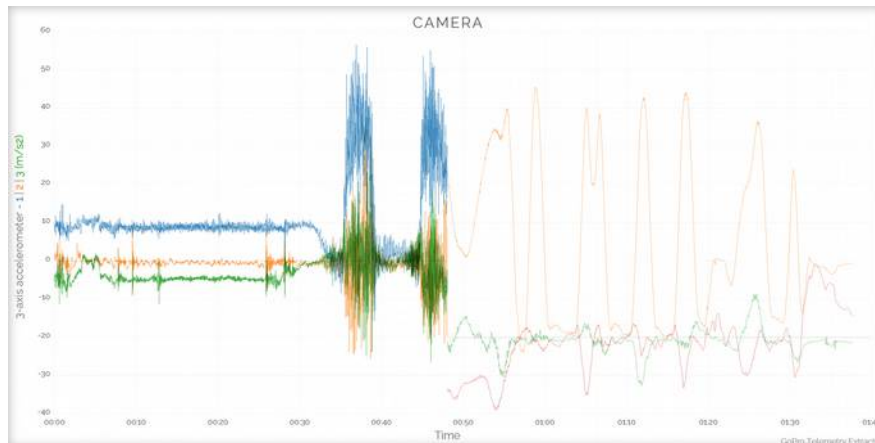
Native vs smooth signal

- **Duration** (not in Lite): The time you want a highlight tag to last, in milliseconds. In the camera, manual highlights are instantaneous. This setting extends them to the specified duration, when possible.

- **Altitude**: By default GoPro cameras record the GPS altitude based on WGS84 (World Geodetic System). This does not correspond to the common altitude we are often used to, which is relative to sea-level. The program will try to convert the altitude to the more intuitive EGM96 (Earth Gravitational Model 1996) in most output formats, but you can choose otherwise.

- **GPS Fix**: This will filter out GPS locations where the quality of the fix is lower than specified. 3D should be used when altitude data is important, but it can also help filter out dubious data.

- **GPS Precision**: It filters out data where the Dilution of Precision (x100) is larger than specified. 600 usually produces good values, but in some cases you might want to be more strict (smaller value) to filter out bad data, or be more tolerant (larger) to include good data that would otherwise be missed.

- **Wrong Speed**: Any location that produces speeds higher than the specified amount will be ignored. It is recommended to use a generous safety margin. For example, if you know a vehicle has a top speed of 120 km/h, set the Wrong Speed slider to 200 or more, rather than 121. Otherwise you may be removing coordinates that are only slightly inaccurate, but useful.


GPS path before and after filtering out bad locations

- **Remove gaps between clips** (not in Lite): When merging the data of multiple clips, if clips are not consecutive the data will have missing sections in between valid ones. Use this option to try to skip the empty sections.

- **Disable interpolation** (not in Lite): If you choose a Frequency that is higher than the one in the selected stream data, the program creates intermediate samples by default. Enable this option to prevent that.

Data visualisation
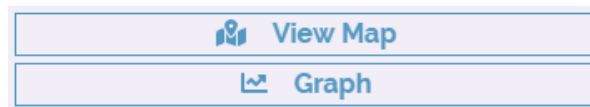
One quick way to analyse the data of your GoPro video is to visualise it. Telemetry Classic offers a Graph output option that allows you to quickly see the peaks and dips or your session for most data streams (sensors). It can also be useful for testing what every option/filter does to the data.
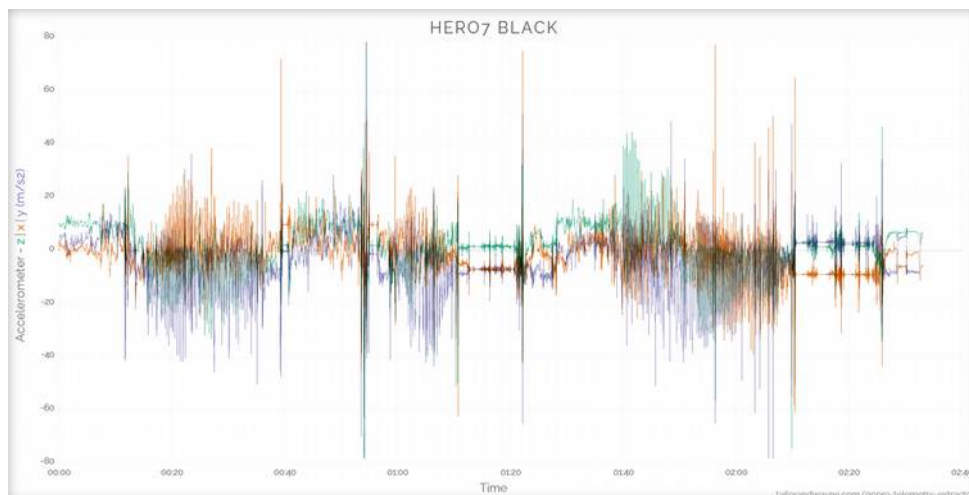

If you select the GPS stream, you can also load the "View Map" option, an interactive tool where you can appreciate your GPS path along with the speed and altitude values and the map and satellite images of the location (not in Lite, only when connected to the Internet).
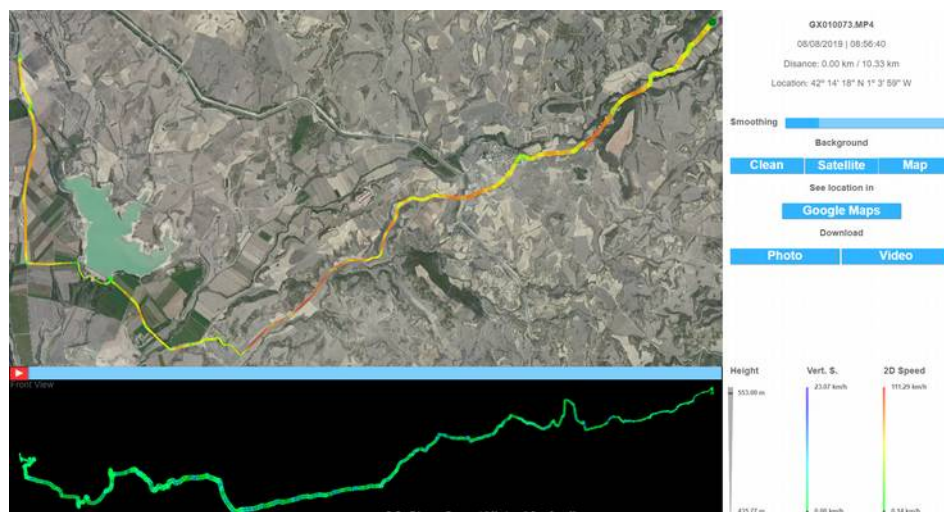
Within the "View Map" window, you can also save screenshots ("Photo" button) of your visualization or create (webm) "Video" files of the whole timeline animation and review them later in a browser (Chrome, Firefox, Edge) or video player (VLC).

Formats

Telemetry Classic can export the data to a number of popular formats:

▦ After Effects
🎛 GPX
🖼 Virb Edit
🗋 CSV
☰ JSON
</> KML
☰ GeoJSON
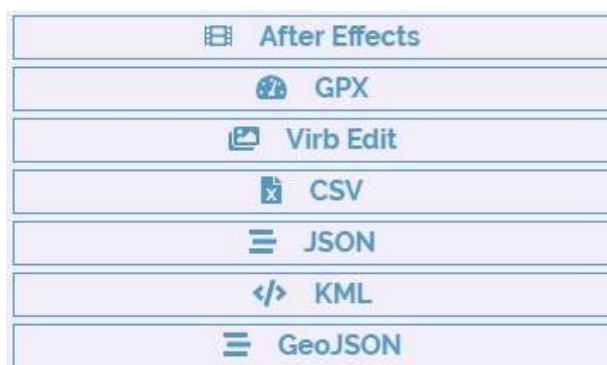
- After Effects (mgJSON): Probably the easiest way to get your data into After Effects and create animated visualizations with it. Can contain almost any data stream. For easy telemetry overlays you can try the official templates.
- GPS Exchange Format (GPX): Contains the GPS track data. Can be imported by several GPS-related software.
- Virb Edit (GPX): This file is just a GPX optimized for compatibility with Garmin's Virb Edit, a very common video editing software where one can create custom gauges very easily.
- Comma Separated Values (CSV): Can be imported in Excel and similar spreadsheet software. Can contain almost any of the data streams. Useful for making calculations with the data, creating simple graphs, or importing the data in other software that supports the format.
- JavaScript Object Notation (JSON): This format is common in browser-server communication and is supported by many programming languages and frameworks, not just JavaScript. Can contain any data stream.
- Keyhole Markup Language (KML): Used to display geographic data in many programs, notably including Google Earth.
- GeoJSON: Open standard format designed for representing simple geographical features, along with their non-spatial attributes. It is based on JSON, the JavaScript Object Notation.

Process multiple files (not in Lite)

Classic users can load multiple files at once by selecting them all in the "Choose file" dialog or by dragging and dropping them. Once loaded, you will see the available devices and streams for all your files. If a stream is available for only some of the files, its containing box will have a dashed-border.

If you select a stream that is only present in some files, only those files will be converted.

When multiple files have been loaded the data visualization options will be disabled, except when the metadata of such files is consecutive and will be merged (see next section).

Merge consecutive metadata (not in Lite)

After importing multiple files, if the files are somewhat compatible (for example when GoPro splits very long videos in multiple files), a link icon will appear between the file names. Clicking such icon will enable metadata joining. This way you can visualise an entire GPS track or evaluate the metadata of the whole video, despite the cuts.

If the selected stream is not present in all the linked files, the conversion will fail.
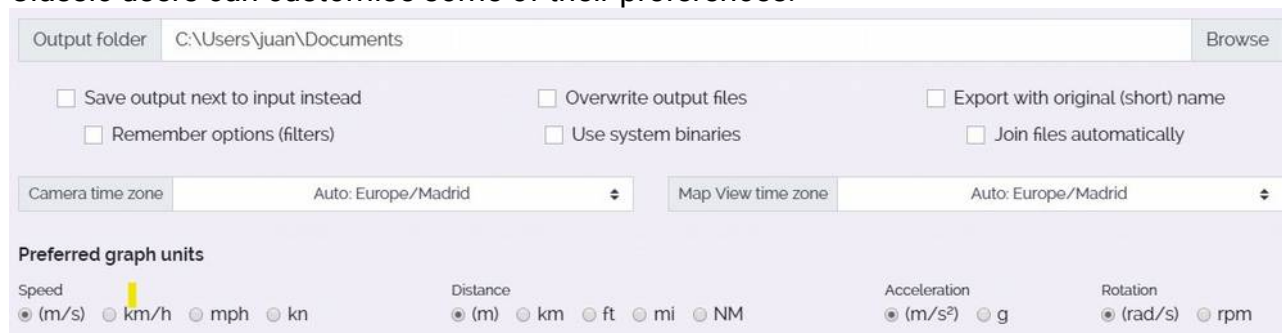
Extra Data (not in Lite)

Classic users will see an "Extra Data" button that will contain other data found in the file. This will vary between camera models and video files, but often include Highlight tags and video settings like firmware version, field of view, color style...
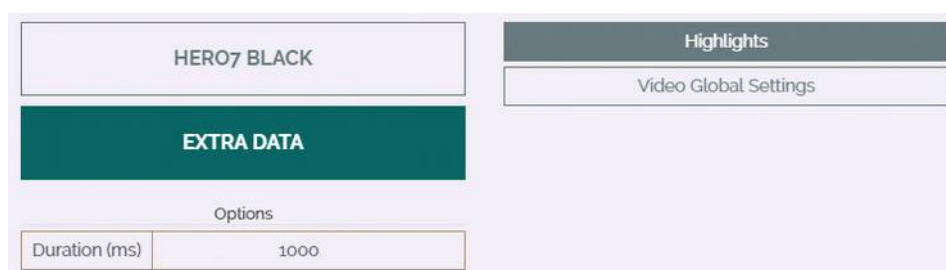
Settings (not in Lite)

Classic users can customise some of their preferences:

- **Output folder**: Choose the folder where your converted formats will be saved
- **Save output next to input instead**: Save output files next to their originals instead of the specified "Output folder"
- **Overwrite output files**: Choose to overwrite old files when exporting new ones with the same name
- **Export with original (short) name**: Export files with only the orignal file name (shorter than the default)
- **Remember options (filters)**: Remember and reuse the last options (filters) after closing the program
- **Use system binaries**: Some antivirus might block parts of the program or slow it down. If your system has ffmpeg, ffprobe and AtomicParsley installed, you can use the system binaries to avoid this problem
- **Join files automatically**: This will enable consecutive file joining (or merging) by default. You can still disable the link between files manually
- **Camera time zone**: Specify the time zone of your camera so that MP4 times are interpreted correctly (will apply to the next file you import).
- **Map View time zone**: Specify the time zone you want to display in the View Map option. Useful if you have travelled and want to see the time at the filming location instead of your current one.
- **Preferred graph units**: Change some preferred units for the built-in graphs and map

Support

One of the support options is the Facebook group. Using this channel allows other users to learn from your questions and the proposed solutions.

[Facebook Community](#)

Classic users also get a year of email support (within reason) since their purchase date.

[app@prototyping.barcelona](#)

If you encounter a bug or your GoPro video file is not being processed properly, please send me the file for analysis. The easiest way is to send the .LRV file that is usually saved

alongside the MP4 file. It contains the metadata but takes up much less space.

Contribute

You can contribute to this project in many ways:

- Purchase a product: https://goprotelemetryextractor.com
- Contribute with code to the core tools behind the program: https://github.com/JuanIrache/gopro-telemetry
- Share your metadata-based creations on YouTube or other social networks
- Make a donation: https://www.paypal.com/paypalme2/JuanIrache

To stay up to date with the latest in telemetry news, discounts, tutorials and tips, both for GoPro and DJI devices, subscribe here.

I hope you find this tool useful and have fun with your videos and telemetry.

Juan Irache Duesca
Independent Software Developer