

After Effects Telemetry Extractor Template for GoPro

v 2.10

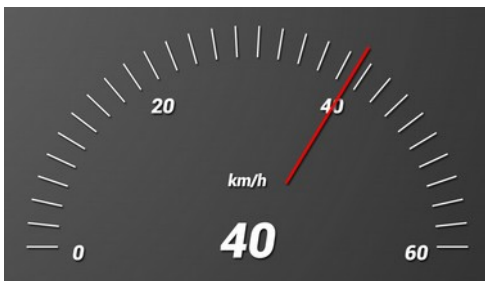
Important:

- You need to know Adobe After Effects well in order to use this template. You also need to have it installed in your system.
- This template works on Adobe After Effects 2020 and higher. The GoPro telemetry is present in every GoPro released since the HERO5. GPS data is only present if enabled manually and if a good signal is achieved before the recording starts.
- Some of the graphs are very demanding with the processor. Make sure you have a powerful system. This has been tested on a i7 processor with 16 GB of RAM. It should work on older systems but it has not been thoroughly tested. Often, the first rendered frame is the slowest.
- You will need the [Roboto](#) and [Roboto Mono](#) fonts.

If you need the full template, [get it here](#).

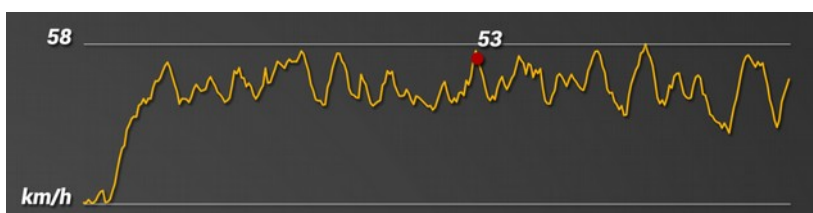
You can watch a [video tutorial here](#).

Gauges:



Speed: Shows velocity based on the GPS antenna data. As many other gauges, can be metric or imperial and colors, angles and sizes can be customized.

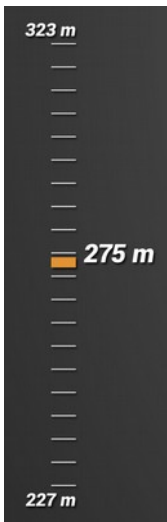
Speed Tracker: Shows velocity over time. Like the Speed gauge, it can be 2D (horizontal) or 3D speed (includes vertical) and units can be



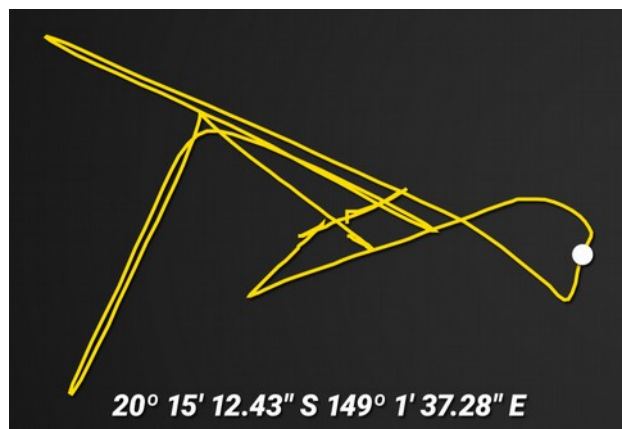
changed.



Distance: Shows current and total distance from the starting point, based on the GPS data.



Altitude: Shows the minimum, maximum and current altitude based on GPS information.



GPS Path: Draws a path with the GPS location data and the current position.

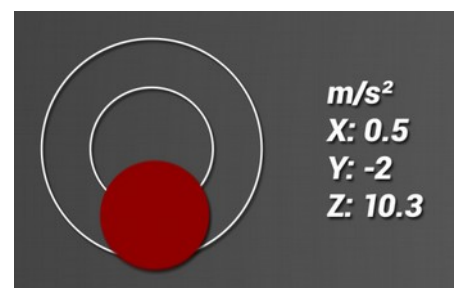


Altitude Path: Shows the altitude over time and the current altitude.



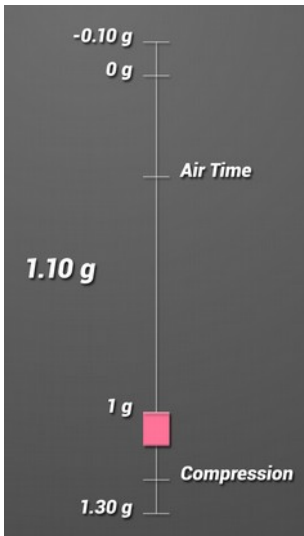
Course Direction: Points at the cardinal direction the device is moving to, not necessarily the direction it is looking at.

Acceleration: Displays the acceleration the camera is under, divided by axes (x, y, z).





G-Force: Shows the total amount of force exerted on the camera, I.E., its acceleration, including gravity.



Air-Time: Tries to identify air-time, microgravity and compression moments by analyzing the vertical axis of acceleration.

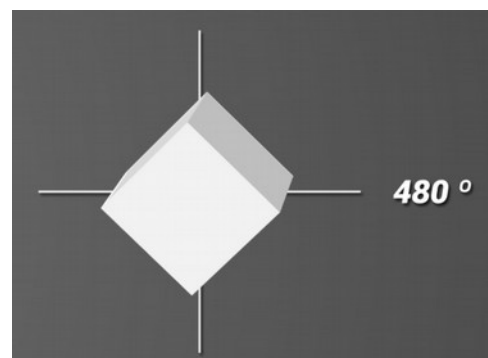


G-Force Path: Shows the evolution of G-Force over a set period of time, which is constantly updated.



Rotation: Shows instantaneous rotation or angular speed at every given moment in a 3D 3-axis gauge.

Total Rotated: Shows accumulated rotation in a 3D 3-axis gauge.

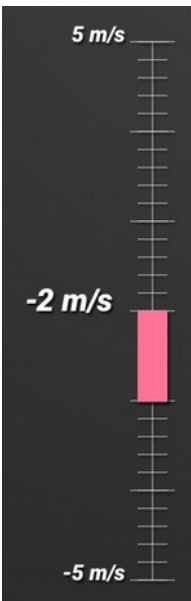
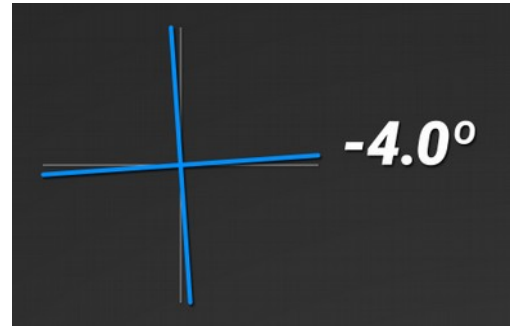


Camera Settings: ISO sensitivity and shutter speed of every frame (needs two mgJSON files).



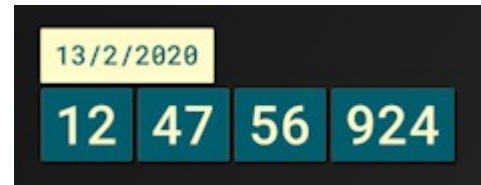
Slope: Shows path angle based on previous and next altitude values.

Lean Angle: (Experimental) Tries to indicate the camera angle in relation to the horizon. You will need both the Accelerometer and the Gyroscope streams. Note that, unfortunately, this seems to work best when the GPS antenna is off.



Vertical Speed: Shows the vertical speed of the path, or rate of ascent.

Time: Can either show the current date and time or become a stop watch (trim the mgJSON layer to set start and stop)



Instructions:

- Make a copy of the template for your project and keep the original as a backup.
- Extract the metadata from your video to After Effects format (mgJSON) with the [Telemetry Extractor](#). Choose your stream based on the gauges you want to use:

| Stream (mgJSON file) | Gauges (compositions) |
|---------------------------|--|
| GPS | Speed, Distance, Altitude, GPS Path, Altitude Path, Course Direction, Speed Tracker, Vertical Speed, Slope, Time |
| Accelerometer | G-Force, Acceleration, Air Time, G-Force Path |
| Gyroscope | Rotation, Total Rotated |
| ISO + Shutter Speed | Camera Settings |
| Accelerometer + Gyroscope | Lean Angle |

- Hide the gauges you are not working with for better performance.
- Create a new composition based on your video.
- Drop the desired gauges on top of the video footage.
- Double click on each gauge composition and place your mgJSON file(s) inside them.
- Use the effect controls of the Control layer to select your mgJSON file layer as the data source.
- Tweak other values as needed, but keep in mind that some graphs (GPS path, altitude...) take a while to generate after any changes.
- Tweaking other parts of the templates has to be done carefully and only if you know what you are doing. Changing text size and hiding layers will be fine.
- If you want to rescale a gauge, the recommended way is by rescaling it in the main composition. If scaling more than a 100% use the Collapse Transformations (little sun) option. You can also move or rescale each graph from inside its composition by transforming the Control layer.
- If you want to trim a graph to include only a portion of the data (for example a shorter GPS Path), trim the mgJSON layer and the content will adapt.
- Trimming will also improve performance.
- If you want to offset the timing of a gauge in relation to the video (for example to fix synchronization issues) move the whole composition. Moving the mgJSON layer will not have the result you expect.
- You can modify or delete keyframes in the data by right-clicking on the mgJSON layer and selecting Keyframe Assistant -> Create Keyframes from Data. Then open the desired data value and modify as you would in other After Effects layers.

Controls:

These are the available settings in the Control layers:

- **mgJSON Source:** Choose the layer that contains your data.
- **Imperial / American:** Metric vs imperial or american units.
- **Nautical:** Shows knots and nautical miles. Could override other units.
- **Large Units:** Choose miles over feet, kilometers over meters, and so on.
- **Ticks:** Number of tick marks in the graph.
- **Text / Ticks / Gauge / Path / Position Color:** Pick a color for the elements.
- **Width / Height:** Dimensions of the main element of the graph, in percentage.
- **Gauge Width / Height:** Dimensions of the main indicator element of the graph, can be pixels or percentage.
- **Tick Width / Length:** Thickness and length of tick marks.
- **Tick / Position / Cube / Ball / Shutter / Gauge Size:** Sets the overall size of the element.

- **Text Distance:** Separation in pixels between the labels and the main element.
- **Margin:** Distance between the main element and the borders of the composition. Usually percentage.
- **Bottom Padding:** Inner margin between an elements border and its contents.
- **Text Smoothing:** It makes values change slower. Sets the number of samples to average to at both sides of a value. 2 would get the average of 5 samples. If "Text" is specified, only the text value is smoothed, not the graph (for performance reasons).
- **Decimal Places:** Figures to show after the period of a number.
- **G Force:** Express acceleration as G-Force instead of meters per second.
- **X / Y Range:** Expected range of values, to create a meaningful visualization.
- **Position / Rotation Exaggeration:** Increases the range of movement of a gauge.
- **Dot Minimum Size:** Sets the smallest size for the lowest value in the range.
- **Index X / Y / Z / Vertical Axis:** Allows to change where the axis information is taken from (indices 0, 1 or 2), because some camera models store that data in a different order. You can check the right order in your mgJSON layer data. Be aware that the the axes of the camera are not like you would expect in other systems like screens. See a visual representation [here](#).
- **Invert X / Y / Z / Axis:** Allows to invert an axis, for example, if the gravity appears to pull up instead of down in a visualization.
- **Single Axis:** Whether to use a single axis for the gauge or merge them all and use their absolute magnitude.
- **Minimum / Maximum / Air Time / Compression G:** G-force corresponding to that event. Either a range or where an event tick will be placed.
- **Up / Down Color:** Specifies how a gauge color changes depending on its value.
- **rpm:** Use revolutions per minute instead of radians per second.
- **Maximum / Minimum Speed:** Sets the range of values the gauge can show properly.
- **Gauge Angle:** Sets the angle that the gauge will cover for the specified range.
- **3D Speed: / Distance** Whether to use 2D (latitude and longitude) or 3D (+ altitude) calculations.
- **Base Angle:** The starting angle of the entire visualization.
- **Needle / Tick Distance:** Distance from the element to the needle.
- **Needle Width / Length:** Dimensions of the needle.
- **Shutter Border:** Thickness of the element border.
- **Path Thickness:** Thickness of drawn path.
- **Memory Points:** How many values to show in the graph. The more values the slower the render.

- **Max Path Complexity:** This allows to simplify paths in order to get faster renders. Lower values render faster, higher values are more accurate. After Effects 2018 cannot handle more than 1000.
- **Angular Speed:** Show rotation speed instead of total rotated angle.
- **Zero Based Altitude:** Subtracts the lowest altitude so that the range goes from zero to the total elevation difference.
- **Frame Rate:** Base frame rate to base some aspect of the gauge on.
- **Fix Arrow:** Keep the arrow straight and rotate the rest of the gauge.
- **Hide Coordinates:** Don't show the coordinates text.
- **Set min / max:** Manually override the default or automated value.
- **Min / max:** Minimum and maximum values of the gauge.
- **Large Tick Every:** Include a larger tick for reference every N normal ticks. 0 for none.
- **Value Tick:** Include an additional tick to highlight where in the graph a value is being measured.
- **Time Window (s):** The duration of the sample taken for a graph.
- **Update Rate (s):** How often is the gauge value updated.
- **Degrees:** Use degree units instead of others (like percentage).
- **Path Completion:** Show the portion of the path that has been completed. You might want to increase the Memory Points to show a more fluid progress, but that will increase render times.
- **Remaining Path:** Outline the remaining portion of the path.
- **Vertical / Horizontal:** Enable the visualization of portions of the gauge individually.
- **Offset:** Apply a set positive or negative offset to a gauge value. Can be combined with keyframes.
- **Accel Weight (%):** Decide how much a value is influenced by a specific sensor/stream instead of another one.
- **Positive Graph:** Always draw the graph on the positive side.
- **Offset:** Add the specified amount to the desired property.
- **Stopwatch:** Show time starting from 0 instead of the recorded time. Trim the mgJSON layer to set the start and stop points.
- **Show:** Whether to display an element or not.
- **Roundness:** Style the border of an element.
- **Speed Factor:** Multiply the Speed value by a certain amount. Useful when bad calculations in a time lapse or Time Warp produce wrong speed values.
- **Line Break:** Separates values in multiple lines.

Performance

The template can be slow to render, depending on the amount of gauges you add and their settings. Here are some tips to improve render times.

- Disable "motion blur" (See AE instructions)
- Disable "collapse transformations" (See AE instructions)
- Enable CUDA graphics acceleration if available (See AE instructions)
- Maximize the amount of RAM AE can use (See AE instructions)
- In gauges that have a smoothing control, set smoothing to a low value
- Set the work area of each gauge to the section you want to render, especially for gauges that have paths (GPS Path, Altitude Path...)
- In gauges that have controls like Time Window, Update Rate, Memory Points and Max Path Complexity, set those values to low numbers, as long as the gauge still looks good
- If possible, have your raw footage in an SSD hard drive and render to a different one

Note: You might receive a warning like "The structure of the data file for the layer has changed". This is expected in some After Effects versions and you should not worry about it.

If you encounter any bugs or need assistance, please contact app@prototyping.barcelona

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

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