

## Filming for Fulgaz, Haute Route, and IRONMAN – A How To Guide

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Document revision v3.0, 4 Nov 2021

<b>Introduction.....</b>	<b>3</b>
<b>Fulgaz, Haute Route, and IRONMAN .....</b>	<b>4</b>
Fulgaz .....	4
Haute Route and IRONMAN .....	4
<b>Equipment .....</b>	<b>5</b>
Camera.....	5
Cycle computer (GPS).....	5
MicroSD memory card .....	5
Ancillary equipment.....	6
GoPro Hero8 settings - Fulgaz only.....	6
GoPro Hero9 and Hero10 settings – Fulgaz, Haute Route, IRONMAN .....	6
Cycle computer (GPS) settings.....	6
Out-front mount – Fulgaz only.....	6
Custom mounts – Haute Route and IRONMAN .....	7
Horizon levelling – Fulgaz, Haute Route, and IRONMAN.....	9
Speed sensor – Filming from a bike only.....	9
A companion device .....	11
A video storage and playback device .....	11
<b>Before Filming – One-Time Device Set-Ups.....</b>	<b>12</b>
<b>Before Filming – Record some Test Footage (Check Camera Settings) .....</b>	<b>13</b>
<b>Before Filming – Record some Moving Test Footage (Check Vehicle Mount Settings) .....</b>	<b>15</b>
<b>Planning your ride or event .....</b>	<b>16</b>
What to film - Fulgaz .....	16
When to film - Fulgaz, Haute Route, IRONMAN .....	16
Where to film - Fulgaz .....	17
<b>Live Recording - Fulgaz, Haute Route, IRONMAN .....</b>	<b>18</b>
During your ride - Fulgaz .....	19
Whilst driving – Haute Route and IRONMAN cycling courses .....	20
Whilst riding – IRONMAN running courses .....	20
<b>After your ride or event .....</b>	<b>22</b>
Sending your footage to Fulgaz .....	23
Behind the scenes at Fulgaz Ride Engineering .....	25
Testing your ride - Fulgaz .....	26

## Introduction

This How To Guide presents a series of checklists to help you film your rides for Fulgaz, Haute Route, and IRONMAN (rides and running for IRONMAN). It has evolved from the very first release “Switch on Camera, Go for a ride” to this much more complete and far-reaching version, and comes from a wealth of experience of the Fulgaz team who have filmed rides, and more importantly for this guide, who have worked on hundreds of your contributed rides. We’ve seen the brilliant, the outstanding, the good, the just about acceptable, and at times, the very bad!

This is a One-Size-Fits-All document for all three platforms; the underlying guidance and principles are generally applicable and we recommend that you read/consult all of the sections. For example, “After your ride” applies equally to filming on a bike, a motorbike, from a car, on an eBike. Haute Route and IRONMAN exceptions are clearly marked.

Importantly, these are guidelines, not laws. You should find them helpful rather than restrictive. Please read them carefully and do your best to follow them. We want to showcase your best work. We recognise that no-one sets out to purposely film a bad ride, but we do reject rides which we judge to be unacceptable, especially if you deviate too far from these guidelines.

If you have questions or comments (or if you spot an error), please email the Fulgaz Ride Engineering team – either [aidan@fulgaz.com](mailto:aidan@fulgaz.com), [peter@thekettles.co.uk](mailto:peter@thekettles.co.uk), or [Rim.Fardiyev@ironman.com](mailto:Rim.Fardiyev@ironman.com).

Please note that some sections are Work-In-Progress and these will be updated in future releases of this document.

## **Fulgaz, Haute Route, and IRONMAN**

### **Fulgaz**

Our ride contributors are the lifeblood of Fulgaz. A steady flow of high quality ride videos from around the world helps us to attract and retain Fulgaz members, to extend the geographic coverage and content of our Fulgaz ride library, and to organise and support weekly challenges and virtual events. Riding on Fulgaz is fun. Contributing your own rides – your favourite local routes or alpine climbs – for others to enjoy is even more fun, and if you follow these guidelines carefully, you and your rides could soon be featuring in a Top-Up-Tuesday!

### **Haute Route and IRONMAN**

Filming for Haute Route and IRONMAN has different requirements than Fulgaz, because the routes are much longer than a typical Fulgaz ride, and the in-App riding experiences feature avatars. Filming an IRONMAN running stage is different again.

Haute Route rides are long and mountainous. For example, Haute Route Alps 2022 is a 7-day event with stages of 181Km/4100m, 118Km/3600m, 108Km/3200m, 152Km/4100m, 10Km/850m (TT), 138Km/3500m, and 99Km/2400mm.

An ironman triathlon distance (aka a “140.6”) is 226.2Kms/140.6 miles – a 3.8Km swim, a 180Km cycling stage, and a 42.2Km marathon-distance running stage. A half-ironman (aka a “70.3”) is 113Km/70.3 miles – a 1.9Km swim, a 90Km cycling stage, and a 21.1 Km half-marathon running stage.

Clearly, filming such stages is a step up from what we have previously been used to for Fulgaz, and in addition we are planning to film new IRONMAN cycling and running courses on the actual day of the event.

Plotting the avatars accurately and realistically for Haute Route and IRONMAN requires some (virtual) space in the front of the rider/runner, and for the far horizon to remain level when cornering.

Hence for the reasons above, Haute Route and IRONMAN filming of cycle stages is done either from a motorbike or a car, and IRONMAN filming of running stages is done from a bike or an eBike; all of these requiring special mounts and slightly different filming techniques compared to Fulgaz.

## Equipment

If you are filming for IRONMAN, we will provide a complete filming kit for you to use, including a set of custom mounts.

If you are filming for Haute Route or Fulgaz, please read the following list of requirements carefully. Fulgaz has a small pool of cameras for loan purposes – please ask.

### Camera

You will need one of the following cameras:

- A GoPro Hero8 – Fulgaz only
- A GoPro Hero9 – Fulgaz, Haute Route, IRONMAN
- A GoPro Hero10 – Fulgaz, Haute Route, IRONMAN
- A GoPro USB Pass-Through Door (Hero9, Hero10)

The GoPro Hero7 is 4K/30fps only, and we no longer accept 30fps footage.

Official GoPro USB Pass-Through Doors are not available for the Hero8. However, compatible doors are available on eBay, Amazon, etc

### Cycle computer (GPS)

You will need a GPS to record your riding/running, either a Garmin or a Wahoo:

- A Garmin 520, 520P, 530, 810, 830, 1000, 1030, or 1030P
- Or a Wahoo ELEMNT BOLT or ROAM

We do not accept FIT files from older Garmin devices (500, 800), GPS watches, or Smartphones. If you have a GPS device that is not listed (eg Sigma, Hammerhead), be sure to let us know when you send us your test footage.

### MicroSD memory card

You will need a compatible microSD memory card to store the recorded footage. Just 8 mins of 4K/60fps footage needs 4GB of storage space.

The 32GB card that is sometimes bundled with the GoPro has enough capacity for about 1 hour of 4K video. The largest capacity supported card is 512GB, about 16 hours of video. Here is a list of GoPro-recommended cards:

<https://community.gopro.com/t5/en/SD-Cards-that-Work-with-GoPro-Cameras/ta-p/394308>

See also Table 1, later in this document. If you are using a microSD card that is not listed, be sure that it has either v30 or UHS-3 write speed rating.

## **Ancillary equipment**

- For Fulgaz rides, a K-Edge “out-front” mount or a rigid alloy equivalent – see Figure 1 below
- For Haute Route and IRONMAN rides and runs, special mounts are required – see later
- For Fulgaz rides and IRONMAN runs (both filmed on a bike), a Speed sensor
- An external battery/power pack if you are filming for more than 1 hour – see Table 1, below
- USB data and power cables, cable ties, as required
  
- A companion device to run the GoPro App
- A video storage and playback device
  
- A Power meter (crank or pedals) is a nice-to-have but it is not essential, unless specifically requested by Fulgaz.

## **GoPro Hero8 settings - Fulgaz only**

Refer to the Hero8 manual. Save these settings into the camera’s Bike preset:

- 4K video at 60fps (H.264+HEVC video encoding)
- Wide Lens
- Hypersmooth 2.0 On
- Protune On, all defaults
- GPS on

## **GoPro Hero9 and Hero10 settings – Fulgaz, Haute Route, IRONMAN**

Refer to the Hero9 and Hero10 manuals. Save these settings into the camera’s Activity preset, or create a new preset:

- 4K video at 60fps (H.264+HEVC encoding)
- Anti-Flicker at 60Hz
- Wide Lens
- Horizon Levelling On (IRONMAN filming from motorbikes, bikes, and eBikes only – all filming platforms that will lean into corners)
- Hypersmooth 3.0 On
- Protune On, all defaults
- GPS on

## **Cycle computer (GPS) settings**

Refer to the GPS manual. Turn off Autopause (Garmin and Wahoo) and Smart Recording (Garmin only).

## **Out-front mount – Fulgaz only**

Mount the camera to your bike using a K-Edge out-front mount or a rigid alloy equivalent.

Your bike has a pivot point where the tyres touch the road, and any wobbling or swaying as you are riding along will be amplified according to the straight-line distance from the pivot point to your camera. So we prefer the camera to be positioned between the drops (hanging from the mount) rather than above them (on top of the mount).

Centre the camera lens over your front wheel.

Your GPS is best mounted on your stem, to reduce the weight on the out-front mount.

Figure 1 shows my GoPro mounted on a bent K-Edge out-front mount:



Figure 1. Example Camera and GPS Mount

### Custom mounts – Haute Route and IRONMAN

*This section is due an update, as we are reviewing our camera mount recommendations and the available mount options. For the most part, this section remains – temporarily - as the existing Ironman text. We need to cover bike courses and running courses.*

The Haute Route and IRONMAN App ride experience is at its best when the in-ride avatars appear positioned correctly on the screen from the point-of-view and perspective of the rider, relative to the road ahead and the ride surroundings such as buildings, trees, street furniture, other vehicles, and so on.

Hence the mount position of the camera is extremely important:

- Mount the camera **outside the vehicle** so that it is at least 125cm above the road surface, ideally 135cm and no more than 155cm. A high-fronted vehicle such as a minivan or an SUV is ideal. Use the suction cup mount.
- The camera should be mounted as shown in Figure 2, below (showing right- and left-hand drive vehicles). Do not block the driver's view – the mount point should be slightly offset from the centre line, on the passenger side. We also show a number of alternative mounts which have been used successfully and are included in our evaluation (Figure 4).

The GPS device **must also be mounted outside the vehicle**, using the second suction cup mount.

Once you are satisfied that the camera is correctly positioned, remove its battery and re-connect the camera to the Power Bank, which you can place inside the vehicle. Use the GoPro Pass-through door to keep the camera's internals dust proof and weather proof, or use Gaffer Tape if you don't have a Pass-through door. See Figure 3.



Figure 2 – Mount the camera slightly off-centre, on the passenger side



Figure 3 – Ensure the camera is dust proof and weather proof



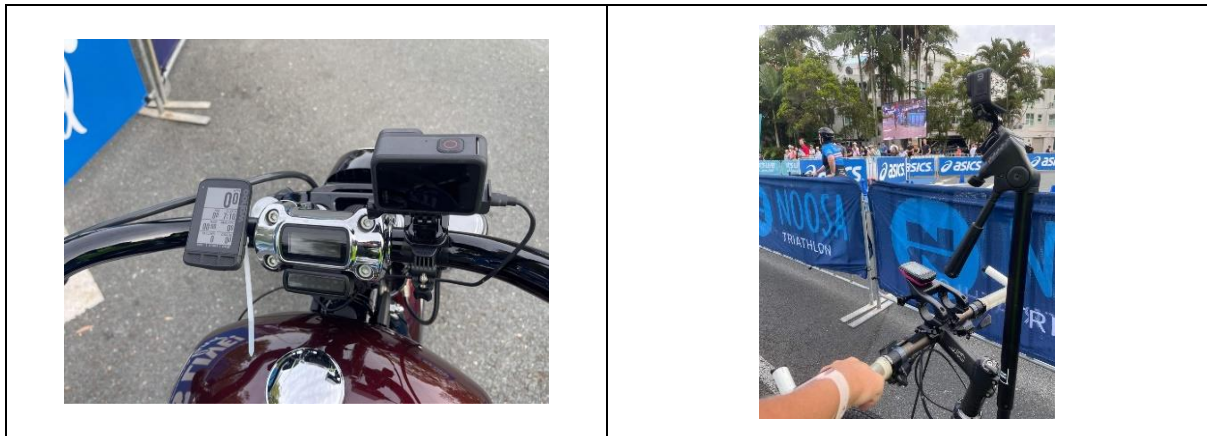
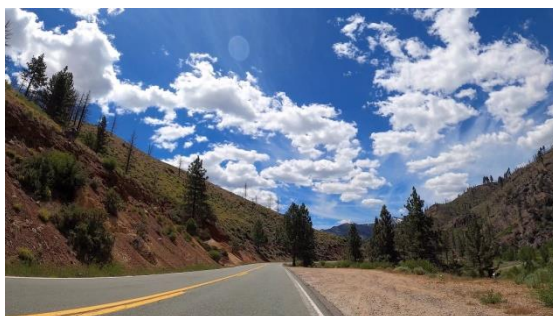


Figure 4 – Alternative mounts. The right-hand set-up is for running

### Horizon levelling – Fulgaz, Haute Route, and IRONMAN

Adjust the camera's tilt on the mount so that the far horizon (eg the end of a long, level street) is centred vertically in the viewfinder (you can use the GoPro App's **Enable Preview** function as a virtual viewfinder).

The following pictures show the view through a camera which is tilting upwards (Left, too much sky) and the view when correctly centred on the far horizon (Right, a 50:50 split of sky and road where the road meets the horizon):



The far horizon is too low; too much sky



The far horizon is centred

Figure 5. Centring the Horizon

Check that you have a clear view and check that you have a clear view - no drops, cables, tyres, bonnet/hood, mirrors, etc.

### Speed sensor – Filming from a bike only

Attach a Speed sensor (eg Garmin, Wahoo) to the front or rear axle and pair it to your GPS device. This will improve the accuracy of the GPS data, and help to improve the gradient accuracy in the App. This is because gradient data is not stored on the GPS device; we calculate it from the speed and elevation data during the Ride Engineering step (see later).

In challenging GPS environments such as under a forest canopy, in steep gorges or next to cliffs, or when filming “downtown rides” near to high buildings where the GPS signal may be lost momentarily, a speed sensor definitely improves the accuracy of the in-App experience.

## External battery

A fully-charged camera battery will record about an hour and 10mins of video. The majority of Fulgaz rides are around an hour, but Haute Route and IRONMAN rides are much longer.

If you are planning to film for longer than the internal battery will allow, use an external battery pack instead, and remove the internal battery before filming. For Fulgaz rides, a modest device such as an Anker Astro E1 Power Bank is fine. This has a 5200 mAh capacity (later versions have 6700mAh), approx 4x more than the internal battery, enough for around 4 hours/100Kms of riding. You can sheath the battery pack in a section of old inner tube, and wrap it to your top tube with some cling film; this dampens any vibrations and helps to avoid any sticky tape residue on the frame. Larger battery packs can be placed into a saddle bag, a drinks bottle, etc.

Remove the camera door (it easily pops off and back on to its hinge) and replace it with the GoPro USB Pass-Through Door or equivalent, so that you can connect the power cable running from the external battery pack.

The following table summarises Duration vs Capacity. Always “Go large” to allow for unexpected incidents. A puncture and a few stops for traffic could easily add 30 mins to your planned ride. And remember that Haute Route and IRONMAN courses can be up to 180Km and more.

Ride duration	Ride distance at 25Kmh	MicroSD card	Power
30 mins	12Km	16GB	Internal battery
1 hour	25Km	32GB	Internal battery
2 hours	50Km	64GB	3500mAh external
3 hours	75Km	96GB/128GB	5250 mAh external
4 hours	100Km	128GB	7000 mAh external
6 hours	150Km	192GB/256GB	10500 mAh external
8 hours	200Km	256GB	14000 mAh external
10 hours	250Km	320GB/512GB	17500 mAh external

Table 1. Video duration vs Capacities

## **A companion device**

Some first-time set-up operations for brand-new cameras are most conveniently carried out via the GoPro Quick App, available in Apple's App Store or on Google Play. If necessary, install the App onto your favourite device, most likely your phone. See ***One-Time Device Set-Ups*** later in this document.

## **A video storage and playback device**

As soon as possible after the end of your ride, save your valuable footage and the GPS's FIT file by uploading them to a PC, laptop, Mac, etc, and then review them before sending them to Fulgaz.

Throughout, this document assumes you will be using a Windows PC; you may need to adjust some of the guidance appropriately, according to your own preferred device.

Your PC's native Video Player should be fine, although the 4K/60fps High Efficiency Video Coding (HEVC) format requires hardware support either on the CPU or on the GPU in order to play the video smoothly. If the video playback is jerky or the image is blocky/contains interference, check your CPU's or your GPU's hardware spec; all Intel Kaby Lake (7<sup>th</sup> gen) and later support HEVC.

## **eBikes and other Motorised Vehicles**

FULGAZ/HAUTE ROUTE/IRONMAN MERGING TBC; THIS SECTION AND FOLLOWING MAY MOVE

We are happy to accept footage filmed from eBikes, but please try to your ride your eBike as though it is a normal bike, to deliver a realistic Fulgaz experience:

- Ride at "normal bike speed"
- Acceleration and braking like a normal bike
- Realistic speed transitions from level to gradients
- Not too fast when climbing hills

The whirring sound of your eBike's motor and gearbox will be audible on the Fulgaz ride.

## **Motorbikes, other vehicles**

With the exception of eBikes, we do not accept Fulgaz footage from powered vehicles.

## Before Filming – One-Time Device Set-Ups

If you are new to filming, or new to the GoPro range of action cameras, we recommend that you read this section as a familiarisation exercise. If you are a seasoned and experienced user, you can skip this step.

### Format the microSD card

Switch the camera on and then format the microSD card by navigating through the pull-down menu on the back of the camera. You may need to recharge the camera before doing this.

### Pair the camera to your companion device

Install the GoPro Quik App onto your companion device. You'll find it on Apple's App Store or on Google Play. You can read about the App here:

<https://gopro.com/en/us/shop/quik-app-video-photo-editor>

GoPro change the App often – seemingly a few times a year – so it is impractical for us to provide detailed instructions here. However, in summary:

- Start the App and if prompted, either log in to your existing GoPro account or create a new account
- Switch the camera on
- On the App's home screen, look for and then click the camera icon (eg at Top Right) to navigate to the App's Cameras page
- Then look for and click the +Camera icon to search for your camera.
- Follow the App's prompts. This can be quite a laborious, hit-and-miss process, so you must be patient. At times you will be wondering whether your camera has a mind of its own and is refusing to engage in conversation.

If all goes well, you should eventually be able to **Enable Preview** in the App to see a live feed from the camera. Note that **Enable Preview** doesn't record any footage onto the micro SD card.

This is a good moment to check the camera's Time of day, Date, and Date Format. These will not be correct if the camera's battery has either been either left to discharge. You can set them up from the App.

## Before Filming – Record some Test Footage (Check Camera Settings)

You're now all set to practice using the App to record a short piece of test footage which you can use to check your camera settings. As with the previous section, if you are a seasoned and experienced user, you can skip this step.

Make sure that the camera is sufficiently charged, and that there is space on the microSD card:

- Pair the camera to your device (see above)
- In the App, click **Control Your GoPro**
- Do not click **Enable Preview**, but instead click the App's Record button (the white circle).
- You will hear the camera beep as it starts recording; the Record button will change to a Stop button (a rounded red square)
- The App will display an incrementing duration
- Pick the camera up, move it around, film your cat eating his breakfast, etc
- Click the Stop button

Note that App (as at Nov 2021) is not able to play 4K/60fps footage from the camera during **Preview**, live recording (here), or post-recording. You can view footage directly from the camera, but to check the camera settings, you must upload the footage to your Windows PC, which will enable you to inspect the MP4 file properties. The equivalent procedure is similar if you have a non-Windows device such as a Mac:

- Connect your camera to one of your PC's USB ports
- If any GoPro software automatically launches, dismiss it
- The camera will appear as a device in File Explorer
- Navigate to the camera's **100GOPRO** folder, see Figure 3, and identify the MP4 file containing your test footage (check the MP4 timestamps).

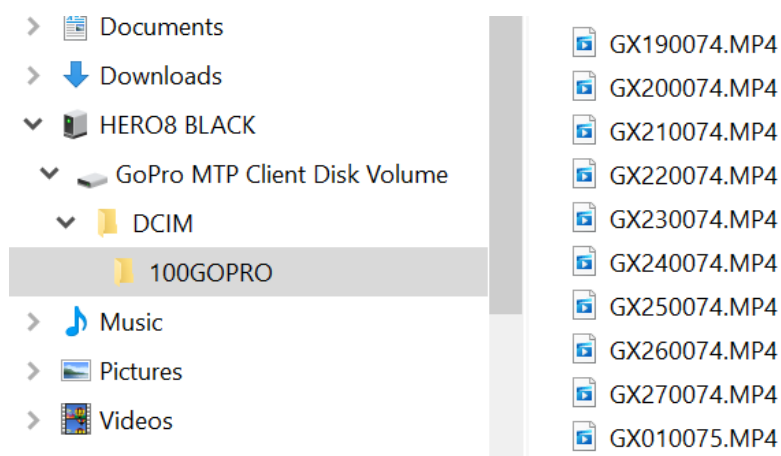


Figure 6. File Explorer and MP4 files on the camera's micro SD card

- Copy the MP4 to a folder on your PC.
- Optionally, double-click to play the MP4 using your PC's default video player (double-clicking to play directly from the camera folder will copy the MP4 to a temporary folder on your PC; it's best that you copy it first)
- Right click and then select Properties > Details to confirm the Frame width and Frame height (4K is 3840 x 2160) and the Frame rate is 60 frames/second. See Figure 4.

***Important – be sure that you are viewing the MP4 properties on your PC and not on your camera, otherwise you will see misleading/incorrect Details***

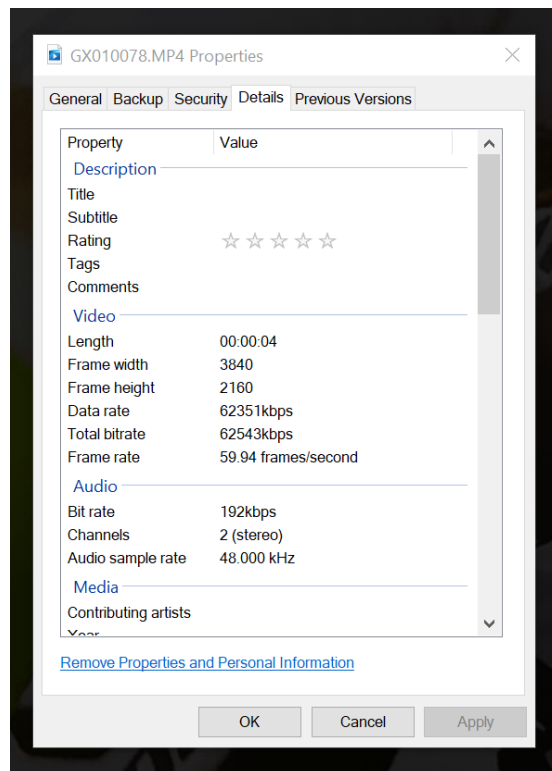


Figure 7. MP4 Details confirming 4K (3840 x 2160) and 60fps

That's it, your camera is correctly configured, ready to film.

## **Before Filming – Record some Moving Test Footage (Check Vehicle Mount Settings)**

The final step before filming an Haute Route or IRONMAN course is to check the vehicle mount settings and the recorded footage whilst driving.

This is an important test because the camera's Hypersmooth function cameras can introduce distortion at the edges of the image, especially when the camera is yawing (the bike/vehicle is turning left or right). A clear view straight ahead doesn't guarantee that your bike's handlebars or vehicle's bodywork will not appear in the image when turning, especially if the background is busy (lots of buildings, for example).

Drive around – at cycling speed – and record some footage. Check that your vision is not obstructed by the camera or GPS. Make some slow, sharp turns as you would when out on the course; cornering at cycling speed will ensure that the vehicle and the camera remain level.

Review your test footage using the camera's video playback controls. Check that all is well, and make any final adjustments to the mounting as necessary. In particular, review your slow, sharp turns and check that the vehicle's left and right front corners do not appear in the frame.

## Planning your ride or event

Before your first ride, please send us some test footage, just a few minutes, so that we can make a cross-check of all of your settings.

### What to film - Fulgaz

- What are your favourite rides in real life? Would they look good on the App?
- What are the attributes of your favourite rides on Fulgaz (hilly, scenic, short, long, loop, sightseeing, solo, group, road, trail, race)? Think about that when choosing your route.
- Is there somewhere where you'd like to go to film where you have never ridden before?
- We are always pleased to receive:
  - Local "hidden gems"
  - So-called iconic rides such as Grand Tour mountain passes
  - Rides from new countries and geographies
  - Sunny versions of existing rides
  - 4K versions of existing 1080P rides
  - 4K versions of rides from our Archives
  - New Official Climbs from the UK
  - Sightseeing rides with scenic views
  - "Downtown rides" passing famous buildings and landmarks

Whatever you choose, please check with us beforehand in case we have the same ride already filmed and waiting in our backlog.

- The Fulgaz community consensus is that "butt rides" are not very enjoyable. So if you are filming a group ride, be sure to maximise your time at the front or at the side of your fellow riders, rather than close behind them
- Post into the Fulgaz Facebook group if you need some inspiration or suggestions
- There are no obvious preferences either way whether to film the downhill return after a long climb; that's up to you

### When to film - Fulgaz, Haute Route, IRONMAN

- Choose a dry day. Sunny days with blue skies and wispy white clouds give the best results. Overcast days with grey clouds are OK, but be wary of rain showers.
- The light is best from mid-morning to early evening. A high sun means plenty of light and short shadows.
- A low sun means longer shadows, dark areas and a loss of definition. Riding next to hedgerows or under trees can create a "flashing" effect as sunlight finds its way through gaps in the foliage. If you are riding with a low sun, try to keep it behind you rather than riding towards it, as a low sun will amplify any grime or specks of dust on your lens
- Avoid filming in wet or foggy weather, or after rain showers when the roads are likely to be wet, or after prolonged rain when there are likely to be puddles. Your front wheel will throw up a fine mist and/or drops of water, this is guaranteed to land on your camera lens and it will cause blurred areas and smears to appear in the footage.
- If you get caught by a rain shower, all bets are off. You might be lucky with just a spot or two of rain hitting your camera lens and being quickly cleared away by the wind.
- Avoid blustery conditions, these can wreak havoc with your GPS altimeter which relies on air pressure to measure your elevation
- Avoid times when the traffic is likely to be busy – especially the morning and evening rush hours, and school drop-offs and pick-ups.



## Where to film - Fulgaz

- Make sure that your route is navigable by bike. Stay off footpaths, stairways, verges and other pedestrian-only areas. When you are riding, be on the lookout for “No Cycling” signs, “No Entry” signs, “One Way” signs, and so on.
- Try to avoid tunnels with gradients (admittedly, this can be very difficult if you are in the mountains). There isn’t enough light in a tunnel for the camera to capture a good quality image, so unless they are very short, we will edit them out. That can result in a steep ramp in the gradient to deal with the elevation difference between the tunnel entry and exit.
- Especially bumpy routes do not work so well on the Fulgaz ecosystem. Gradient and resistance data is sent to trainers at 1Hz, and there are mechanical limitations on trainers which tilt such as the Wahoo Bike. It is impossible to accurately reproduce the experience of a rough MTB trail where the bike might be pitching violently several times in only a few seconds.
- If you are filming a loop, it’s very important that you end the ride within a few metres of your starting point, and that you are facing the same direction as when you started.

## Live Recording - Fulgaz, Haute Route, IRONMAN

In the days and hours before filming:

- Charge all of your devices (GPS, internal camera battery, external battery pack).
- Check all other devices are working and connecting to your GPS (Speed sensor, RPM sensor, Power meter, HRM).
- Check that you have Autopause turned off (Garmin and Wahoo) and Smart Recording turned off (Garmin only) on your GPS device.
- Format the microSD card.
- Check your camera settings including the date and time, which can go AWOL if you remove the internal battery
- Clean the camera lens
- Your GPS has a tiny hole which allows the ambient air pressure to reach the GPS altimeter, which measures your elevation. Check that this hole is not blocked.
- If you are on a bike, clean and lube it so that it won't squeak during your ride.

Immediately before filming:

- Switch on your GPS at least a few minutes before you start filming, to allow it to lock on to some satellites and to obtain an elevation fix from its built-in altimeter. A ride video without accurate GPS or elevation data available at the very start is tricky for us to recover. If you're going on a longer ride but filming only a part of it, it's OK to record the whole ride on your GPS (for example, for your Strava upload). We can easily find the GPS data that we'll need to match your ride video.
- Give the camera lens a wipe with a dry cloth, eg the sleeve of your jersey, to remove any specks of dust or finger-marks.
- Switch your camera on and check that the correct preset is selected (eg "Bike").
- Check that the far horizon is level and split 50:50 sky/land in the camera's viewfinder or in the Quik virtual viewfinder, see Figure 5.
- If you're on a bike, check that your drops and front wheel are not visible, and that all cables are routed safely out of sight. If you're in a car, check that your vehicle's bodywork is not visible.
- If you are going to film a loop, make a mental note of your start point and remember to stop at the same place, facing the same way. Use a lamppost, a street sign, a drain cover, a gate, etc, as your start/end ride marker
- Set your camera recording (use the GoPro Quik App if that is convenient); it will beep and you will see the elapsed time running in the viewfinder.
- If you're on a bike, try to have it perfectly upright; you may need to unclip and get out of the saddle; if so push off gently and clip in once you are rolling.
- Wait for a gap in the traffic before setting off.
- If you are near to some traffic lights, set off so that the lights will be green when you reach them
- A dropped or waved hand in front of the camera just before you set off is helpful for us to synchronise the GPS and the ride video.

You may feel nervous and awkward during the first few minutes of filming on a bike, but that will soon wear off and you'll be able to enjoy your ride as usual.

## During your ride - Fulgaz

Try to ride as smoothly as possible; the most important objective is to produce the highest quality and stable video with minimal swaying. It is not to show everyone how fast you can ride, or to set new segment PRs; save that for a day when you are not filming.

- Always leave all your devices running, all of the time, even if you make a wrong turn or stop for refreshments or repairs. By implication, do not stop to change batteries during a ride.
- Stay in the saddle at all times. If you are grinding uphill, change to an easier gear rather than getting out of the saddle and/or swaying or weaving.
- Ride smoothly at about 85% of your usual speed; remember that the App adjusts the speed of the video according to the rider's power.
- Keep chatter with other riders to a minimum. The GoPro built-in stereo microphone will pick up your personal conversations and any abusive language which you may regret.
- Try to keep your hands at/towards the outer ends of your bars, rather than towards the stem; this helps for smoother control.
- If you have to stop (eg junctions, traffic lights, pedestrian crossings), stay calm and don't panic:
  - Slow to a smooth stop and then accelerate away gently afterwards.
  - Stay stationary if you can, try not to creep forwards in slow moving traffic; that makes it very hard for us to make a clean edit.
- At junctions, it's always better to make a clean stop rather than wobbling and weaving along the road, hoping not to unclip.
- If you miss a turning, stay calm and don't panic:
  - Leave all the devices running
  - Turn around, retrace your route to approx 200-400m before you made the mistake.
  - Ride through again at the same speed as previously, and at the same positioning in the road.
  - We'll make a seamless edit to remove the wrong turning, as best as we can.
- Similarly, it's OK if you do want to stop for refreshments or repairs:
  - Restart from approx 200-400m before your stop
  - Ride through again at normal speed.
- If you need to wipe the lens, slow to a smooth stop first, rather than attempting to do it whilst you are riding. Check the lens and the viewfinder before setting off; it's easy to make matters worse and leave smearing on the lens. Ideally, restart from approx 200-400m before your stop.
- Do your best to observe Fulgaz cycling etiquette:
  - Obey the local rules and laws (in the UK we have the Highway Code).
  - Stay safe and respect other road users
  - Do not take any undue risks that endanger yourself or others
  - Stay off footpaths, verges, and other pedestrian-only areas that are not navigable by bike
  - Avoid stairways completely; although we can edit these out, we cannot reconcile the abrupt difference in the elevation
  - Do not ride on private property without the owner's permission.
  - When you are riding, be on the lookout for "No Cycling" signs, "No Entry" signs, "One Way" signs, and so on
  - Give way to pedestrians, horse riders, children
  - Do not jump red lights
  - Keep personal conversations to a minimum

- Please, no abusive language

### **Whilst driving – Haute Route and IRONMAN cycling courses**

Try to drive as smoothly as possible, at cycling speed.

- Always leave your devices running, all of the time, even if you make a wrong turn.
- Avoid unnecessary slowing down or acceleration. The App will speed up/slow down the ride video according to the rider's power output and the best experience is when the ride video plays at between 75% and 150% of the original recording:
  - On flat, level roads, aim for 20mph/32kph
  - On ascents, aim for 10mph/16kph
  - On descents, aim for a maximum of 30mph/48kph
- Leave a gap of at least three car-lengths between yourself and anything in front of you, so that there is space in the App for the avatars. If other cars turn in front of you, or pull in after an overtake, maintain the gap by either coasting or gently slowing down.
- If you need to stop (for example, at a junction, at traffic lights), leave all the devices running. Fulgaz Ride Engineering will make the necessary edits.
- Similarly, if you miss a turning, stay calm and don't panic:
  - Leave all the devices running.
  - Turn around, retrace your route to approx 200-400m before you made the mistake.
  - Drive through again at the same speed as previously, and at the same positioning in the road.
  - We'll make a seamless edit to remove the wrong turning, as best as we can.
- Do your best to observe common-sense driving etiquette:
  - Obey the local rules and laws (in the UK we have the Highway Code).
  - Stay safe and respect other road users
  - Do not take any undue risks that endanger yourself or others
  - Give way to pedestrians, cyclists, horse riders, children
  - You may feel safer if you set your hazard lights flashing.

If possible, film the complete course (for example, two laps). Drive through the finish line at cycling speed, stopping shortly afterwards when/where it is convenient, and then stop the camera and the GPS.

### **Whilst riding – IRONMAN running courses**

*4 NOV 2021 THIS SECTION IS WORK-IN-PROGRESS*

There are multiple options for filming the run course.

1. If the run course is fully accessible with a car, then use the same vehicle & method as the bike course filming
2. If the run course is fully accessible with a motorbike, then use a motorbike following the same method as bike course filming
3. If neither of the above options are possible, please follow the below method

#### **E-bike**

Choose a similar model to this or this

- 20-inch wheels with a suspension fork
- Motor power about 1kw

- Battery pack about 50 miles
- Max speed regulated to max 20-25 mph
- Use golf cart if appropriate/available, or if e-bikes are not available

**Camera installation** *MOVE THIS TO THE MOUNTS SECTION*

- Camera should be mounted tightly and securely on a rod attached to the 'Top Tube'
- Camera height should be between 140-160cm off the ground
- It is important that the rod is connected to the frame and not to the handlebars or front steering rod or any part of the bike which moves together with the steering rod
- The camera must be facing forwards at all times
- The mount can be created with products such as this hook clamp, and a selfie stick or any tube. The holder itself is U shaped Alu profile enforced by Alu tube, see pics. There you can see the GoPro "sockets" mount on the rod as well. All is bolted together
- Please see images below

## **After your ride or event**

- At the end of your ride, slow to a smooth stop and try to keep your bike upright. You may need to unclip and get out of the saddle. This is especially important if you are at a viewpoint; distant mountains and lakes look much nicer if they are level!
- Wait for a few seconds before stopping the recording.
- If you've filmed a loop, remember to stop within a few metres of your starting point, and make sure that you are facing the same direction as when you started.
- If you have filmed a climb, ride through the summit rather than stopping; that helps us if we want to make a Fulgaz segment.
- Leave your GPS switched on for a few seconds (just count to 10 slowly) or you can leave it running for your ride home.

## Sending your footage to Fulgaz

Your footage and GPS's FIT file are unique and very precious! We recommend that you save them to another device as soon as possible after your ride. See Figure 6. You will need to find and save:

- The MP4 files from your camera; each will be 4GB (except for the last one), about 8 mins of footage in each. We do not need the LRV or THM files; you can delete these.
- The FIT file from your GPS. Please do not send us a GPX file or any post-processed version of the FIT file (eg, a download from Strava or Garmin Connect).

Consult your Cycle Computer's manual to locate the FIT file, or you can use Windows Explorer to search for it.

Save the MP4 files and the FIT file into the same folder, check that all of the MP4 files are present, and check that the dates and times all match. Do not re-name the MP4 files and do not try to edit them or apply any filters before sending them to us. If you have more than one ride, create separate folders for each ride. If the rides share a FIT file (two or more ride videos filmed in one session with a FIT file spanning them), make a copy of it for each ride.

Please do not name any of your folders "Fulgaz" or similar.

And before you forget the details, create a short text file (MS-Notepad, MS-WordPad) containing any helpful information about your ride. It is useful for us to know:

- Its approximate duration and distance
- Its approximate starting point; ideally a geographic location and a start time. "Starts in Low Wath Rd, Pateley Bridge. Look for the hand-drop after approx 20 secs in 0230001.MP4"
- A list of any stops or near-stops, wrong turns, and so on. "Traffic lights at about 10 mins", "Wrong turn in Otley, at about 32 mins", "Brief stop/near miss with a truck at around 57 mins".

And please include:

- Your email address or your Fulgaz login ID/Fulgaz email address
- A draft Ride Description to appear in the App alongside your ride. We'll edit it to fit in the available space.
- Suggestions for any notable segments that you'd like to see appear during the ride; upload your FIT file to Strava and then simply copy and paste the segment URLs from your browser's address bar. We'll use these to create equivalent virtual segments in Strava.
- Whether your ride is a loop.

We'll try to include up to 4 segments, according to the length of your ride.

Please review all of your footage and the FIT file before you send it to us. Use this extensive How To guide as a post-ride checklist. It's more agreeable for everyone if you make the responsible decision to reject a poor quality ride video, rather than waiting to hear the bad news from us. Remember, we want to showcase your best work.

Use a FIT file viewer such as **GPXSee** to check your FIT file. In particular, check that there is elevation data present at the start of the ride. Did you remember to switch on your GPS a few minutes before setting off?

Use Google Drive, Dropbox, or your preferred alternative to upload your MP4s, FIT, and accompanying text files into the cloud.

You can expect each MP4 file to take a minimum of 30 mins to transfer into the cloud; this is dependent on your ISP's upload speed. This is task that is best run overnight when you are not using the internet for your usual browsing and movie streaming.

When the upload has finished, share the folder(s) with ***aidan@fulgaz.com***.

So far, we have not been able to set up a publicly accessible folder for everyone to use, but we are keeping this under review.

A checklist summary:

- Save the MP4 files from your camera; we do not need LRV or THM files. Do not edit them, apply filters, etc.
- Save the FIT file from your GPS device
- One folder for each ride; copy the FIT file if it is shared by multiple rides. Avoid naming folders "Fulgaz" or similar
- Check that the dates and times match (MP4 files and the FIT file)
- A text file containing any important ride notes, your Fulgaz login ID, a draft Ride Description, suggestions for segments, and whether your ride is a loop
- Please review the footage and the FIT file before you send them to us
- Google Drive, Dropbox, or similar to upload; allow a minimum of 30 mins per MP4
- Share the folder(s) with ***aidan@fulgaz.com***



## **Behind the scenes at Fulgaz Ride Engineering**

We aim to have your ride ready for you to test within 3 months of receipt, although we can usually complete the work much sooner, depending on the length of our ride backlog (we are especially busy after the northern hemisphere summer), how much manual effort is required to create an accurate Ride Control file (see below), and higher priority projects jumping to the head of the queue.

We expect an "average" ride to need between 10 and 25 hours of effort; this can be much longer if there are lots of edits required, or if the GPS data is especially poor.

The Fulgaz Video Engineering team will download your ride from the cloud, and after reviewing the footage, will apply any necessary edits and then create the compressed 4K, 1080P, and 720P ride videos; these are what you'll actually ride in the App.

Once the ride videos are ready, the Fulgaz Ride Engineering team will create the Ride Control file using the different components from your ride:

- The (edited) ride video
- The elevation and gradient profile in the FIT file
- The speed profile in the FIT file

We apply a combination of smoothing filters and manual adjustments to align the ride components, in particular making multiple cross-checks against the ride video to ensure that the gradients are accurate as possible, before adding the segments and final tests with our in-house Fulgaz robot rider.

There is a phrase "Garbage In, Garbage Out". If your ride video deviates too far from our filming guidelines, and/or if the GPS data is too bad for us to work with, we will abandon your ride.

## Testing your ride - Fulgaz

We aim for a 3-month or earlier better turnaround from receiving your ride video to having it ready for you to test. Usually, we do much better than this, but please contact us if you think we've forgotten you.

You will be contacted by the Fulgaz Ride Engineering team when your ride is ready for you to test; you'll find it in the Test Rides section of the App.

No amount of automated testing can replace a thorough and careful real-world test by the ride contributor, who usually has intimate local knowledge of the ride's particular quirks. This is the final opportunity for you to check that the ride is good enough for general release to the Fulgaz community.

Download your ride, and test it in Reactive mode. Check for, and make notes ideally on a distance scale:

- The ride start and end points are correct
- The gradient alignment is correct; the gradient read-out in the App, the on-screen ride video, your trainer's resistance, and your trainer's tilt are all in sync
- The gradients match the real world; they're not too steep or too shallow
- There are no unexpected or missing slopes
- The segment(s) pop up at the correct place(s)
- There are no unexplained "Benny Hill" sections where the ride video is playing too quickly
- And anything else that you think is odd

For example, you might discover "The gradient is too steep at 6.7Km", "The ride video seems to slow down at 14.5Km", "The gradient near the top of the hill at 15.6Km starts to unwind too early", "There is a spelling mistake in the 3<sup>rd</sup> pop-up segment"

All being well, and perhaps after a retest if necessary, your ride will be queued for a Fulgaz Top-Up-Tuesday and you can look forwards to receiving lots of congratulatory and well-deserved comments from the Fulgaz Facebook group 😊

oOo

## **Author's Notes**

### **To Do**

- Complete the Merge (Mounts, Filming Runs)
- Needs a How To Film Transitions section
- Final decision on Haute Route IRONMAN mounts, incl mount height
- Who supplies Haute Route and IRONMAN filming kits; Loaner program and administration?
- A shared MP4 upload repository (eg Google Drive, Dropbox, etc)
- Who/how is going to “test” Haute Route and IRONMAN videos?
- Haute Route logo
- Rim OK as a contact?