



# Cameras & Cycling

## *A Personal View*

*Surveillance NOT Film Making*

No recommendation – Experience, preference & understanding only



# 7 years camera use

2015	2017	Today
Contour £180	Aldi Special buy - £40	Chilli Technology £69 (£47/£41)
<b>High End Brand</b>	<b>Brand copy</b>	<b>Generic</b>
Film Making	Surveillance	Surveillance



*Hampshire Constabulary Cycle Club*  
*Facebook "Hantspol CC"*  
*YouTube Blogger "Ride with Roy"*  
*British Cycling Ride Leader*



# Take aways

1. Reason to use & benefits
2. Features & cameras
3. Camera resolution & Image detail
4. Reading number plates
5. Video examples
6. Reporting RTI's & Outcomes



# Motivation to use a bike camera



- Collect evidence: serious accident
- YouTube & friends/family ride videos
- Report (deliberate) hazardous driving
  - Controversial: vigilantism
  - Becoming acceptable?
    - Dash-cams
    - On-line submission



# Who benefits?

**College of Policing  
Study 2022-23**

*Role of dash cam footage  
in policing road safety*



Benefit to wearer (Insurance):

- No benefit ride-to-ride **cf. helmet**
- Peace of mind
- May subdue the angry party (unlikely?)

Community benefit (Road Safety):

- ID of an RTI perpetrator
  - viz. number plate
- Provides evidence for RTI reports
  - Not processed if no video & number plate

*RTI : Road Traffic Incident aka deliberate hazardous driving*



# Camera - features

## Surveillance vs Film Making

### IMPORTANT

- Wide angle-of-view (AOV)
- Long battery life
- Replaceable battery
- Infinite memory
- Loop recording
- Water/splash resistant

### NOT SO IMPORTANT

- Screen
- Sound
- Film making features
- Connectivity & apps



# Camera - other considerations

## Use - Mounting - Shape

### Incidents:

- Many start at the back finish in the front

### Herts Police:

- Front & rear video

### Helmet mount:

- BBC reports safe



### Front camera

Close pass: front  
Vehicles moving across your path  
Vehicles turning out/in

### Rear camera

Close pass: rear  
Herts Police suggest  
Drivers face – possible  
Position on road

### Helmet mount

Sees what you see  
Camera follows you off your bike

### Handlebar mount

Sees where handlebars are pointing

### Bullet camera

Easier helmet mounting  
Less bulky

### Cuboid camera (GoPro)

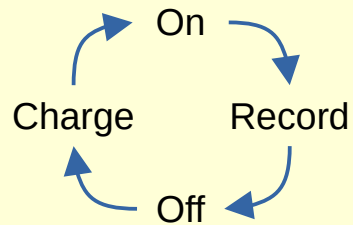
Bulky esp helmet mount  
On average slightly heavier







# Not many bike “surveillance” cameras



- *Never view video*
- *Storage : maintenance free*
- *Settings : maintenance free*

- *Adequate battery life*
- *Cycle specific (not all)*
- *More economic (maybe)*

FRONT or REAR	RRP	Resolution	Battery Hours
Cycliq - Fly 12	£299.00	4K	7
Drift Ghost <i>motorbike</i> (4K £249)	£121.00	1080	5
Contour - Roam (Ebay only)	£180.00 in 2015	1080	4
<b>Chilli Tech (Generic)</b>	£69.00 (£47/£41)	1080	4.5

REAR only	RRP	Resolution	Battery Hours
Cyclic - Fly 6	£209.00	1080	4-5
ETC - Watchman	£69.00	1080	6
Aldi - Cycliq Fly 6 copy (sold out)	£40.00	1080	5-6



# CAMERA: resolution needed

## To read a number plate

### THE QUICK *Subjective* ANSWER

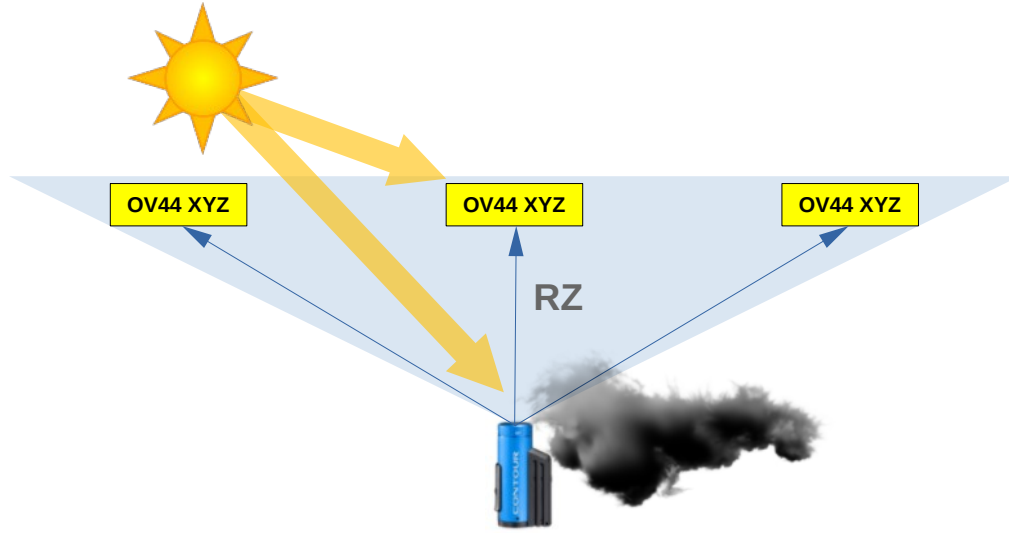


Plate not readable in a moving video

- 2-3 seconds to read
- A series of stills: sort through to find the best image

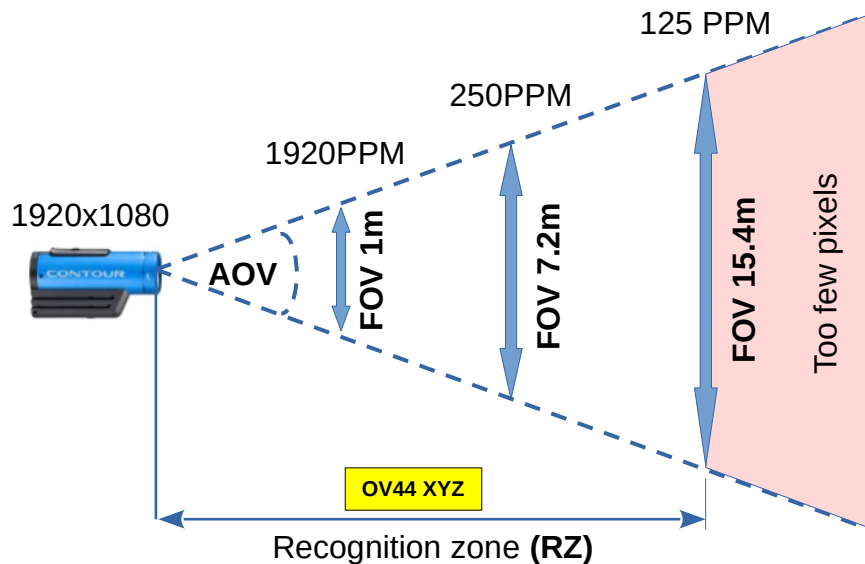
- **1080 30fps has been adequate**
  - Unless you want to make/show videos
  - Never experienced a problem
- Resolution not the only factor
  - Camera angle
  - Direct sunlight, reflections
  - Road muck - dirty lens
  - Small in frame – distant (52x11cm)
  - Not in **Recognition Zone (RZ)**
  - **Time in RZ:** 25 mph, 11 meters per second
    - Approx. 2-3 car lengths



# IMAGE: detail needed

*To read a number plate*

## THE *Objective* TECHNOLOGY ANSWER



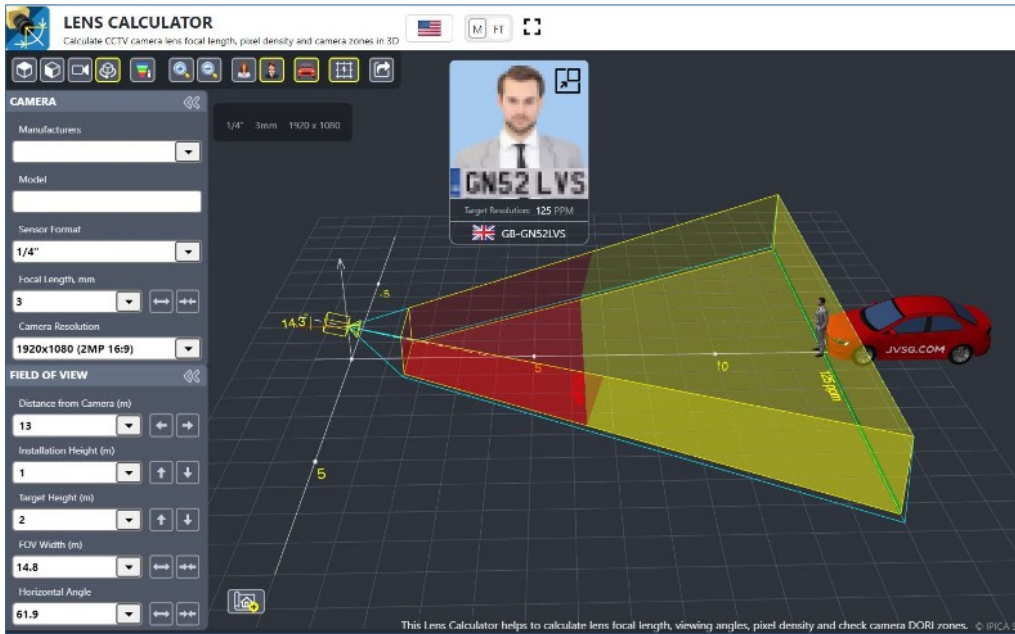
- Pixels per meter (PPM) in the IMAGE
  - Image detail at a given distance from camera
  - Divide resolution by “field of view” (FOV) width
- A **min 125 PPM** to see a number plate clearly
- RZ distance depends on:
  - **angle of view** (AOV) viz. **focal length**,
  - **resolution**
  - **sensor size**



# Recognition Zone Distance – 125 PPM

## “Typical” action cam & GoPro specs

JVSG SOFTWARE – Pixel Density Calculator



Sensor size 1/4 Focal length 3mm  
Sensor size 1/ 2.5 Focal length 2.9mm  
(GoPro 1/2.3 2.92mm)

***“You cannot beat the physics”***

**1280x720**

– 8m (GoPro 5m) (1-2 car lengths)

**1920x1080**

– 13m (GoPro 8m) (2-3 car lengths)

**4K: 3840x2160**

– 26m (GoPro 17m) (4-6 car lengths)

- 4K: battery & storage penalty
- Is it needed to read plate 4-6 lengths away?
  - Most incidents occur in close vicinity
  - ID captured as vehicle passes
- Small in image – video editing app needed
  - 4K: 1/60 of image - 1080: 1/30 of image



GN52 LVS

# Reading a distant number plate

Point at which  
plate is just  
readable

14/15 Kerbstones  
92cm

**12.9-13.8m**

**2-3 car lengths**

Typical action  
camera  
**125 PPM ?**



Plate small in  
image

Not readable

Must use video  
(editing?) app to  
zoom in



**GENERIC Camera 1080**  
Chilli Technology





# Reading a distant number plate

Point at which  
plate just  
readable

Zoomed in using  
video editing  
app



2 cars  
8.28-9.2m



2-3 cars  
12.9-13.8m



3-4 cars  
14.7-15.6m



calc

***“You cannot beat the physics”***

**GENERIC Camera 1080**  
Chilli Technology



# Real world examples

## 1080 cameras

2015	2017	Today
Contour £180	Aldi Special buy - £40	Chilli Technology £69
<b>High End Brand</b>	<b>Brand copy</b>	<b>Generic</b>



## Reading number plates



**High end brand**  
Contour



**Generic**  
Chilli Tech

## Wide angle side view

Rear close pass



**Brand copy**  
Aldi

Front close pass



**Generic**  
Chilli Tech

## Helmet vs. Handlebars

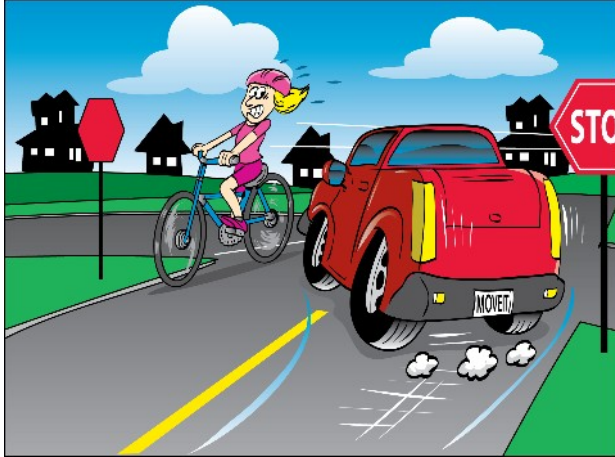


**Generic**  
Chilli Tech





# Reporting Hazardous Driving



## 2016 – Deliberate close pass

- Attended in person
- PC visited house to view & collect video
- Did not bother again

## 2022 – Now, On-line reporting

- Hertfordshire police [www.herts.police.uk](http://www.herts.police.uk).
  - **“Report”** ---> **“Road Traffic Incident”**



# Herts Constabulary - Comments



- Front and rear cameras preferred.
- Cameras fixed to the bike provide the best view.
- Camera view should show the cyclist's position on the road
  - This helps ascertain how near the close pass was.
- Footage only of the incident and a minute before and after
- Accurate as possible with times and dates and the location of offences.





# Reporting a Close Pass

What is the process?



# RTI on-line reports - Outcomes

5 months Jan-May 2022



**7-8 / 10**

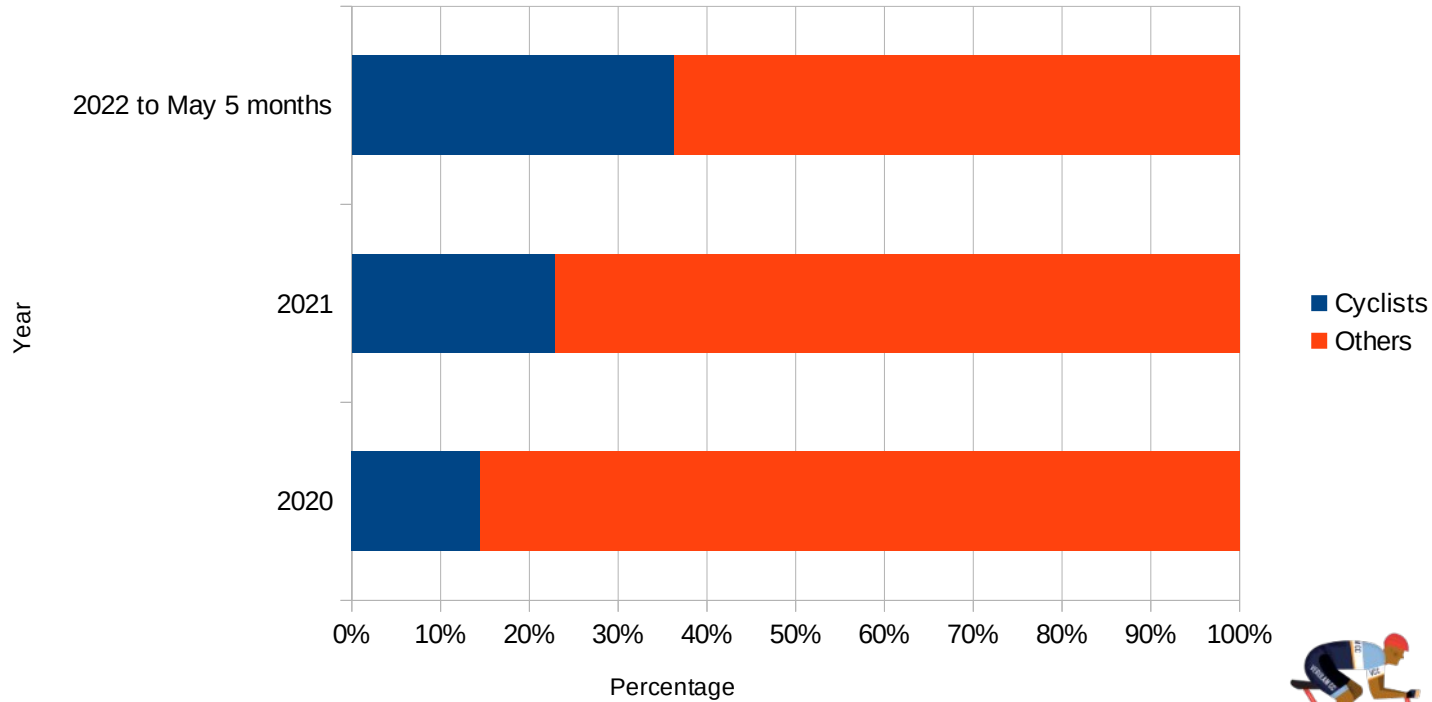
- 592 incidents reported
- 36% (215) involved a cyclist.
- 71% of those involving a cyclist taken forward for action
- Action included:
  - Warning Letter (72.5%),
  - Course Offer (13.1%),
  - Points and Fine (5.9%),
  - Court (0.7%).

All reports – supported with video evidence



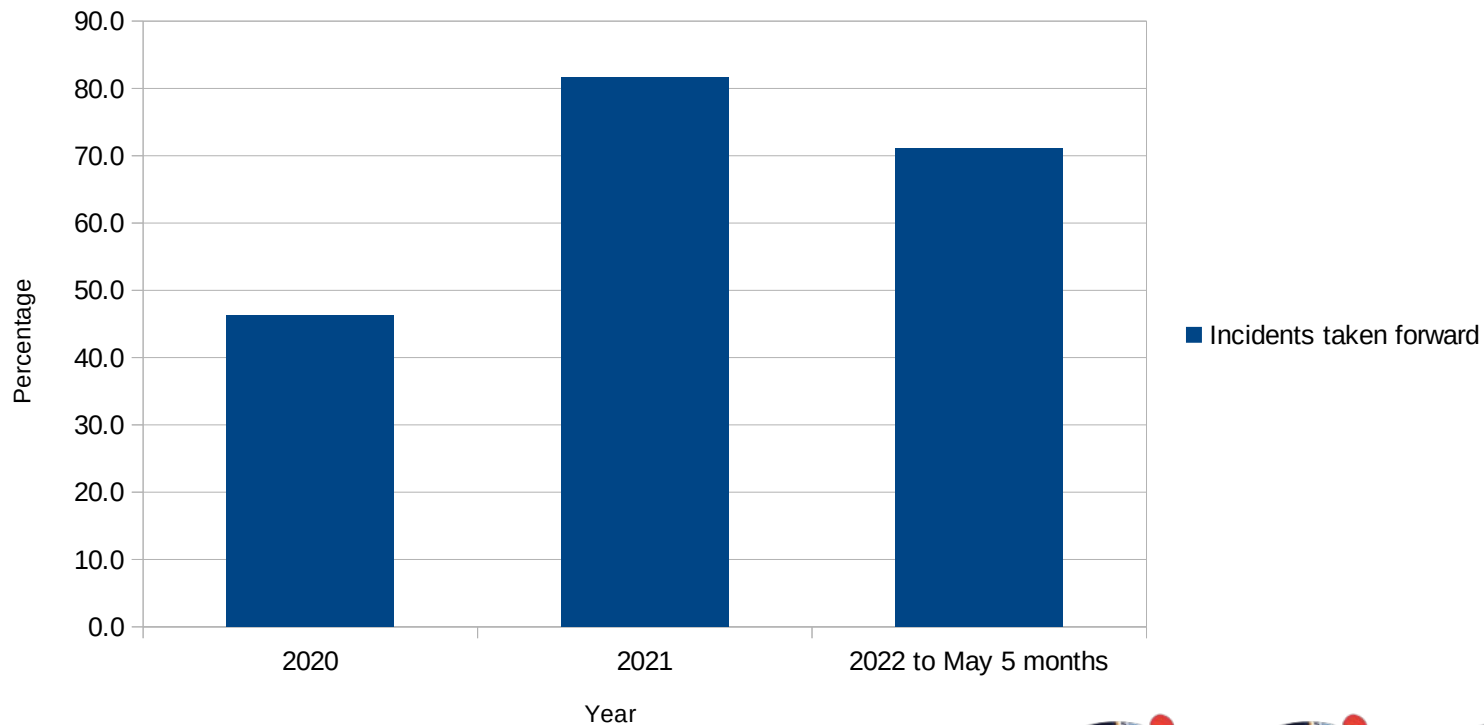
# RTI's reported using the on-line service

Road traffic incidents reported using on-line RTI service



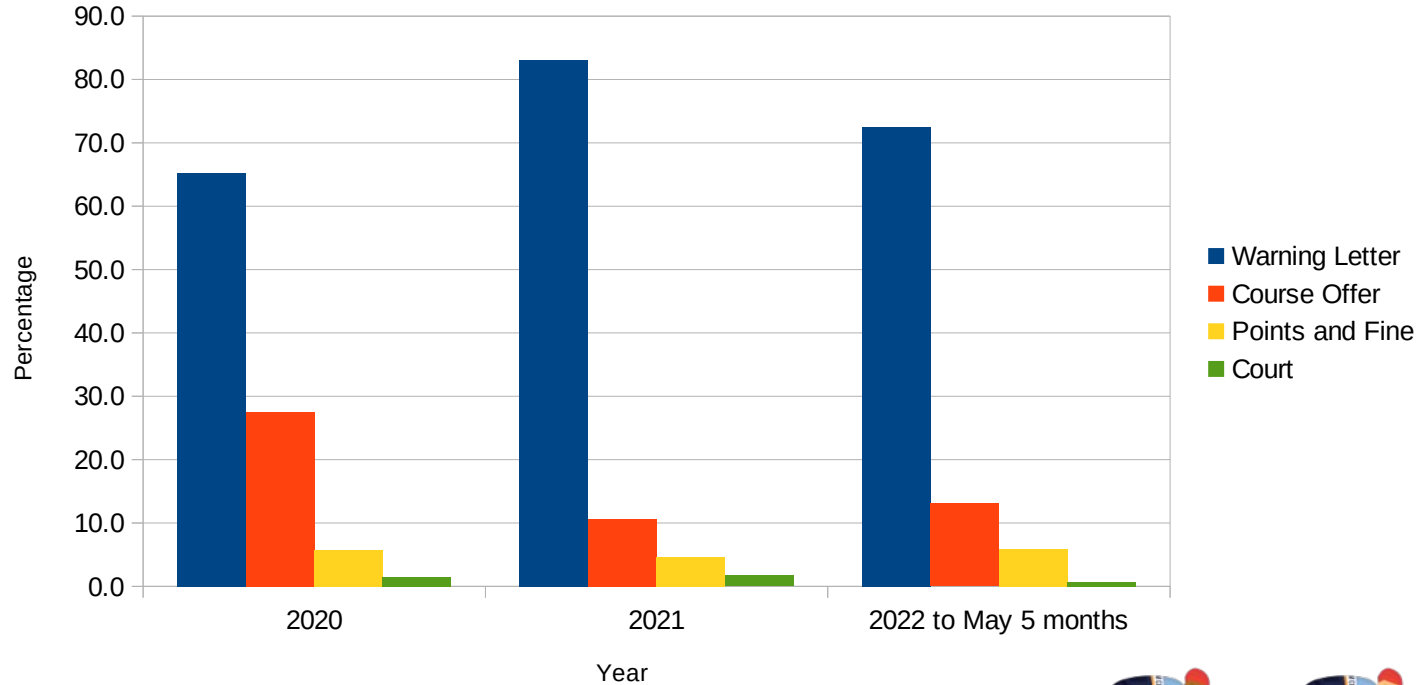
# Percent of RTI's involving a cyclist taken forward

Percent of reported incidents involving cyclists taken forward



# Outcome of RTI reports involving a cyclist

The consequences of RTI reported involving cyclists and taken forward



# Summary

- 1) “Film making” action cameras not ideal
  - *Unless you want to make and show video shorts of your rides*
- 2) “Surveillance” cameras with basic features more suited
- 3) 4K nice to have but cost, battery & storage issues
- 4) Rear facing cameras as useful as front facing cameras
- 5) Number plates cannot be read in a moving video
- 6) Submitting an RTI report makes a difference
  - *Cameras may have a role in policing road safety*





**QUESTIONS**  
**ANSWERS**



# Bibliography & More

RTI web page

Report a Road Traffic Incident - Herts Police web page.

## Articles

- 1) Safety Cameras for Cyclists. The best cycling head cams.
- 2) Can 1080p IP Security Cameras Be Enough for Identification of License Plate and People?
- 3) PPM (Pixels Per Meter)
- 4) Best bike and helmet cameras 2022 reviewed
- 5) Best cycling cameras 2022 — capture your ride and relive it later
- 6) Best action cameras for cycling 2022 – Capture and share the highlights of your ride

## Software apps

Pixel Density Calculator - JVSG SOFTWARE

Video editor – DaVinci Resolve (free)

Video Player – VLC Media player (free)

Example statement



How to report

