

## How to Choose the Best Video Camera For your application

There are three choices of video camera: Canon Elura (standard), Troubleshooter 1000 (high speed), or Casio Ex-F1 which is a Digital SLR with a video mode.

### 1. Frames per second and resolution

The canon shoots 30 frames per second (fps) at 640x480 resolution.

The troubleshooter has an adjustable frame rate with a constant sensor resolution, although you can half the sensor resolution if you need to double the record time.

Frame Rate fps	Sensor Resolution	Total Frames	Time (s)
125	640 x 480	2184	17.5
250	640 x 480	2184	8.7
500	640 x 480	2184	4.4
1000	640 x 480	2184	2.2

With the Casio, the frame rate is related to the image size...higher framerate→lower resolution

Frame Rate fps	Image Size (pixels)
300	512 x 384
600	432 x 192
1200	336 x 96
30-300	512 x 384

If your action is happening very fast, or you need to distinguish between small changes in time, a higher frame rate is better. You need to think about what time resolution you might need.

### 2. Length of video

So why not always use a high-speed camera at 1000 fps?

#### a. Time duration

The high-speed camera at 1000fps can only shoot 2.2 seconds of video. If your action lasts longer than 2.2 seconds, you will be out of luck. The standard camera can shoot as long as the tape is...much longer than you would ever need. You need to think about how long your experiment will last in time.

#### b. Number of frames

Lets say you shoot 1 second of video with the standard camera. You would then have 30 frames of video to analyze in order to extract your data. If you shoot 1 second of video with the high-speed camera you would need to look at 1000 frames of video.

The time it will take you to extract your data from the video goes up by a factor of 33.

### 3. Environment

#### a. Lighting

All cameras perform best with lots of light. When using the high-speed camera, you will notice that the higher the frame rate, the more light you will need.

#### b. Mobility

The high-speed camera can not be removed from the building. It must be plugged into a wall outlet. It can be used on a microscope. The standard camera can be brought to the gym or anywhere outside and can operate on batteries. The casio, however, is portable.

#### c. Background

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Be aware of the background in your image. You need enough contrast between your object and background. You will need to locate the object of interest in each frame of the video. If you don't have enough light, or a high enough frame rate (object gets blurry), or a uniform background, this task becomes much more difficult.