

# When Surfing Meets Surgery: Using Off-The-Shelf Action Cameras to Create a Wireless, Portable, HD Point-Of-View Surgical Recording System without Breaking the Bank



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**Submission:** October 02, 2017; **Published:** November 13, 2017

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## Abstract

There is increasing interest in adapting point-of-view (POV) action cameras for medical education, especially in surgery. Although these consumer POV action cameras are considerably cost effective compared to other methods of recording surgery, they are limited by battery life and storage capacity. We innovatively combined a number of consumer products to create a cost-effective, wireless HD POV recording system that is scalable and portable.

**Keywords:** Medical education; Point-of-view camera; Surgery

## Introduction

There is interest in adapting consumer, point-of-view (POV) action cameras for medical education. We have previously reported on using POV cameras for studying surgical ergonomics [1], scleral buckle surgery [2], as well as a dual camera system [3]. However, consumer POV cameras off the shelf have a number of limitations. There is limited battery life and storage capacity. There is also difficulty in transmitting a live video feed in high definition. Faced with this conundrum, we combined semi-specialized consumer equipment to evaluate a wireless, point of view HD surgical video recording system that overcomes many of these challenges

## Methods

The surgeon's kit comprises a POV camera with an HD wired output (GoPro, San Mateo, CA), which is fed to a wireless HD transmission system (NYRIUS, Niagara Falls, ON). Both the camera and transmission system are powered by a portable USB power source, commonly used to charge mobile devices. The POV camera can be either mounted on the head for sterile procedures, or chest-mounted for clean procedures. The wireless transmitter and USB power source can be carried in the surgeon's pocket.

The recording station comprises the wireless HD receiver (NYRIUS, Niagara Falls, ON) which receives the live HD video feed from the camera. This feed is directed to an HD capture system (Elgato, San Francisco, CA), which records the footage on the connected laptop's hard drive. The cost of the entire system is under \$2000 USD (Table 1) and an instructional video for setup may be accessed online [4].

**Table 1:** Wireless HD POV Recording System.

Component	Example of Manufacturer	Cost (USD)
POV Camera	GoPro	\$600
Wireless HD Transmission System	Nyrius	\$200
USD Battery Power Supply	Patriot	\$50
HD Capture System	Elgato	\$200
HD Monitor	Samsung	\$400
Laptop	Acer	\$400
Total Cost		\$1850

Discussion



**Figure 1:** HD Wireless POV Camera on a headmount used to record oculoplastic surgery.

In a world where dedicated medical recording devices are expensive and impractical, and handheld smartphone recordings are of limited educational value, this described system is optimized for intuitive video recording. The system is

cost-effective, scalable, and portable, allowing one to use a single system for multiple operating rooms. This system may also be used outside of the hospital in ambulatory clinics, humanitarian missions, and field hospitals. Finally, the wireless HD transmitting capability allows one to demonstrate live procedures to a large audience, allowing the surgical team to respond to questions in real time providing an exceptional educational tool.

Conclusion

Our system illustrates that a number of off-the-shelf consumer products may be combined to create a wireless, point of view HD surgical recording system that is accessible and cost-effective.

Conflict of Interest

No conflicts of interest exist in the publication of this paper.

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 DOI: [10.19080/JOJO.2017.05.555664](https://doi.org/10.19080/JOJO.2017.05.555664)

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