

## Stabilized Infrared Camera Gimbal for Drones

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**Sponsored By:** FLIR Systems

As the popularity of drones and quad-copters rise and their uses become more widespread, it is apparent that this popularity stems from its capabilities as a flying camera. Many users are not buying them solely to fly them around; they are buying them for their aerial camera and video capabilities. Although there are pre-existing products tailored to these users, our product focuses on a different niche in the market. The first of its kind, the FLIR hummingbirdIRd is an actively stabilized gimbal system that attaches the FLIR Quark II infra-red camera to any standard quad-copter, remotely providing stable infra-red video to the user via radio frequency while also storing its digital video data into a micro SD card for later viewing. Utilizing the FLIR Quark II's small size (comparable to a wine cork), the hummingbirdIRd's light weight and small size minimizes the power drawn from the drone battery. This product would be great for the surveillance industry; it allows the user to identify heat signatures in very dim or inaccessible places, like someone hiding in the dark, or a gas leak along a remote pipeline.

Figure 1 shows a CAD model of our final product. Our system allows for stabilization in all three axes; there is a motor on the base, the yaw arm, and the camera back which control the yaw, pitch, and roll, respectively. It is designed to hold the Quark II, in its center of gravity and can be adjusted for different lens configurations. This protects the camera from oscillations and other extraneous forces, ensuring that the captured video will be as smooth as possible. The electronics will be housed in two units, the CameraBack unit and the YawArm unit. These units contain the electrical components such as the gyroscope, microprocessors, and motor drivers. The video transmitter, which transmits via RF signals, is a separate unit that will be attached onto the bottom of the drone. The analog video signal is wired from the camera, through the two boards, and into the transmitter where it transmits stable IR footage to the remote user, as shown in the system block diagram in figure 2.

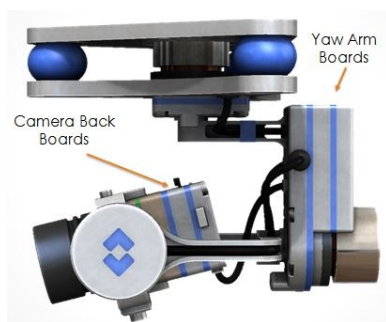


Figure 1: Hummingbird CAD Model

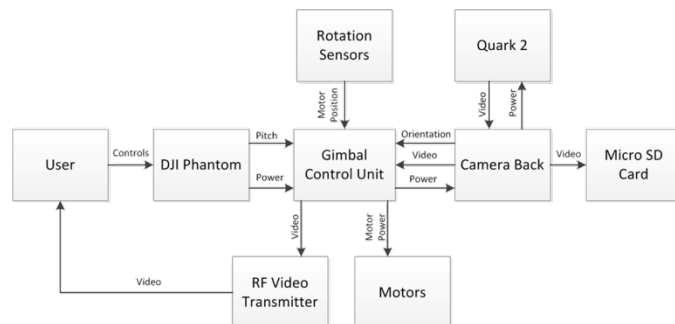


Figure 2: Block Diagram