

# FLIR Duo Pro R Capture System

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## Product Overview

ZoomR is a wireless video capture system that connects the FLIR Duo Pro R camera to an interface monitor that allows the user to:

- Record data on top of a moving car
- Switch between infrared and visible view

ZoomR is an important step towards the future of artificial intelligence, but more specifically self-driving cars. As opposed to other data collecting competitors, ZoomR makes for a speed data collection while providing wireless connectivity between the monitor and camera system. By featuring the Duo Pro R, users will be able to collect both *visible and infrared* video which will serve as powerful datasets for the training of autonomous driving cars in night-time scenarios.

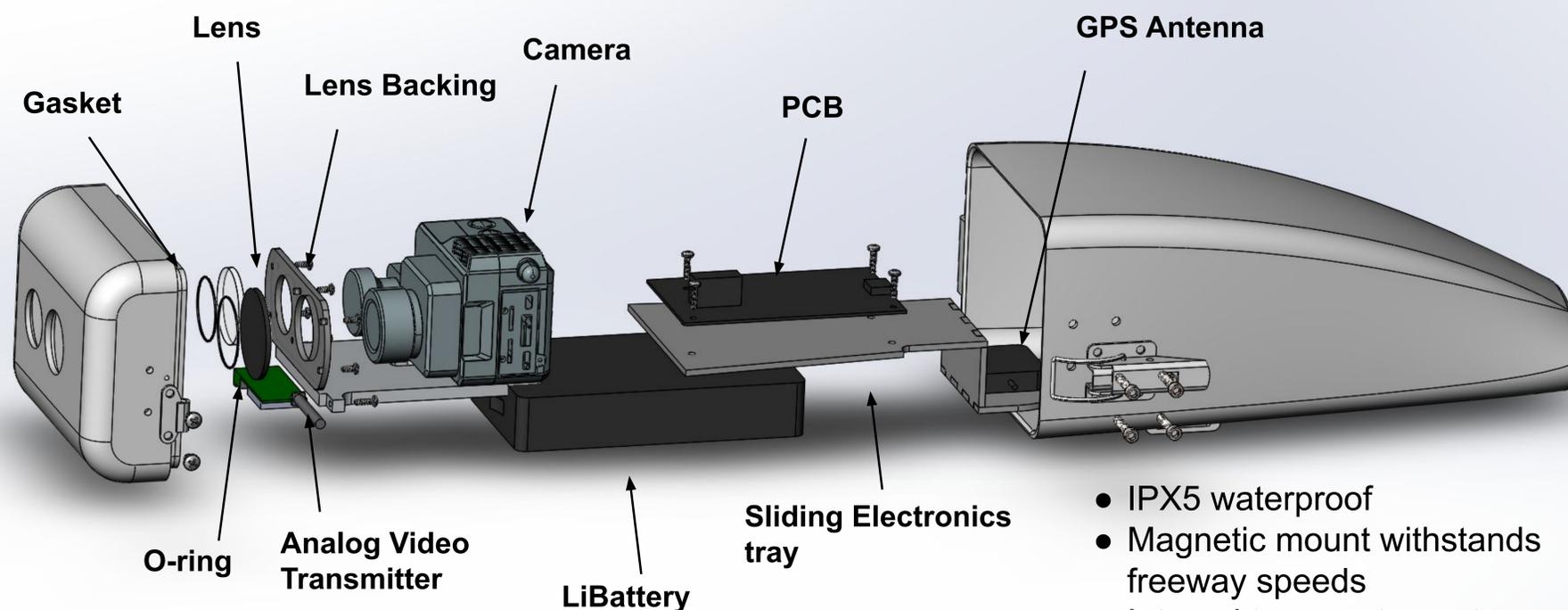


The ZoomR consists of 2 separate systems, the exterior camera enclosure and the internal control monitor. (Above) The ZoomR camera enclosure can be seen resting on a car roof, and the monitor can be seen through the passenger window.

## ZoomR System



## Monitor System



- IPX5 waterproof
- Magnetic mount withstands freeway speeds
- Internal temperature stays below 50°C during operation

### Acknowledgements:

Thank you to our professors Tyler Susko, Ilan Ben-Yaacov, Ted Bennett, our FLIR mentors Louis Tremblay, Marcel Tremblay, Sean Tauber, Alex Wolff, as well as Ekta Prashnani, Paige Sullivan, Trevor Marks, and Greg Dahlen

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## FLIR Duo Pro R

The FLIR Duo Pro R is capable of capturing video feed in both *infrared* and *visible light*. Although initially modeled for the use on drones, our ZoomR capture system adapts it to be used on any car roof.

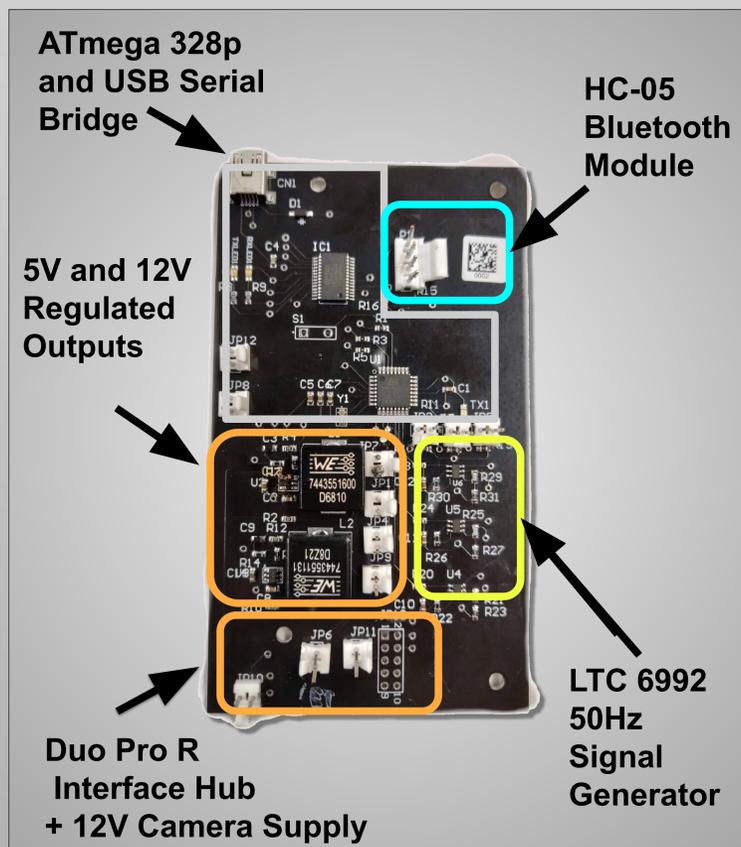


### Features

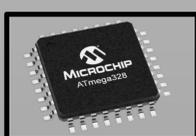
- 10-Pin Control Interface
- GPS Monitoring
- Visible and Infrared Video
- Bluetooth App: FLIR UAS

| Design Specification   | Outcome |
|--|---------|
| <ul style="list-style-type: none"> <li>• Enclosure is easily detachable to the roof of a car</li> <li>• Camera enclosure is IPX5 waterproof</li> <li>• Ability to pan and tilt</li> </ul>                          | ✓       |
| <ul style="list-style-type: none"> <li>• Car mount can withstand freeway speeds (65mph)</li> <li>• Anti fog lens</li> </ul>  | ✓       |
| <ul style="list-style-type: none"> <li>• Systems is powered by a single replaceable battery source and is operational for at least one hour.</li> </ul>  | ✓       |
| <ul style="list-style-type: none"> <li>• Wireless communication between camera and user monitor for video feed and commands</li> <li>• Internal temperature of camera stays below 50°C during operation</li> </ul> | ✓       |

## Embedded Design

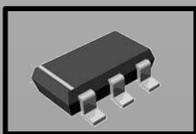


## Key Electronic Components



### ATmega 328p

The MCU communicates with all peripherals, interfacing with the HC-05 and LTC 6992 chips



### LTC 6992

This IC receives a DC value from the MCU to generate pulse width modulated square waves at 50Hz



### HC05 Bluetooth Module

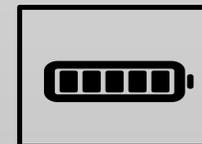
The HC-05 module communicates control signals from the user controller to the Duo Pro R enclosure



### A/V Transmitter

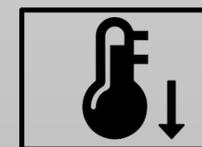
This transmits analog video wirelessly at 5.8GHz with output power of 600mW

## Key Features



### Battery Life

Plug and play style battery that allows for 2+ hours of wireless recording.



### Temperature Regulation

Aluminum front half serves as a heat sink that keeps electrical components within operating temperature.



### Magnetic Mount

Six switchable magnets that hold entire system on top of any car going freeway speeds with a safety factor of 6.



### Waterproof

Enclosure is sealed with o-rings and gaskets that allow for an IPX6 waterproof rating.



### Pan and tilt

Hinge and mount design allows for  $\pm 22.5^\circ$  pan from center and  $\pm 30^\circ$  tilt from horizontal position



### Button Interface

This allows for users to cycle through various functionalities including: Zoom, Record, and/or video feed



### Wireless

Wireless communication standard for transmitting video as well as communication for the user

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