An open-code system that consists of an autonomous drone (nano quadrotor) that carries a radio camera and flies few meters on top and outside the car.

**SYSTEM OVERVIEW**

- The hardware of our system consists of the following commercial products:
  - Intel’s Galileo: A wearable mini-computer (“Internet of Thing” board), similar to Raspberry pie.
  - Walkerka’s Ladybird: A small toy drone (quadcopter). No sensors or data transmitters, only a receiver.
  - Transmitter: Walkerka DEVO 7E Transmitter for sending commands to the quadcopter (comes in the same package of the quadcopter).
  - Arduino Uno R3: Cheap that sends PPM signals to the remote control of the quadcopter and controls it.
  - TX5805: Analog radio low-weight FPV (split view) camera that is mounted on the quadcopter and sends radio 5.8 GHz video signal.
  - RC5805: 5.8GHz Video receiver that gets the analog streaming video from the TX5805.
  - Diamond VC500: Video grabber converts the analog composite video from the RX5805 to a digital video through a USB.
  - Cameras (Optitrack Flex 3 or Logitech C920 Web-cam): for tracking the quadcopter.
  - VUZIX m100: smart glasses for the driver.
  - Amazon’s web services: for running computer vision algorithms on the EC2 cloud.

**LOCALIZATION AND TRACKING**

- A novel tracking and localization algorithm that identifies the position and orientation of our quadcopter.
- 6 degrees of freedom (x, y, z, pitch, yaw, roll).
- The quad-copter is equipped with known colored markers.

**A PPM signal that is transmitted from the Arduino to the remote control**

**AUTONOMOUS QUADCOPTER**

- The streaming video data from the camera on the hovering quadcopter, the cameras on the car, the glasses, and the sensors on the Galileo board are transmitted to Amazon’s EC2 cloud for high performance computations.
- The result is a processed video image, possibly with additional markers and text, that is uploaded in real time to an http address.
- The glasses process this http content to the driver.
- Due to various reasons, the video captured from the quadcopter’s camera is unstable and shaky. Therefore, we run video stabilization code on the cloud and then present the output video stream to the driver for a better experience.

**REFERENCES**