1. Introduction
The Quadcopter and the Micromouse, as part of the Autonomous Robotic Systems Research Project of the Minds2CREATE Research Team with the support of the Projects Division for the I.E.E.E. Control System Society (C.S.S.). The project team is composed of students from three engineering majors, and provides undergraduate level students a platform, in the form of a UAV (Unmanned Aerial Vehicle) and a land robot, to put into practice all the knowledge developed in courses with hands-on work. The team is currently working into coupling various robots to solve a mission.

2. Problem & Hypothesis
Problem: Engage two autonomous vehicles: an aerial vehicle (quadcopter) and a land vehicle (micromouse), to work simultaneously to complete the mission of solving an unknown maze.
Hypothesis: It is possible to position an aerial vehicle over a maze and take aerial images of it, transmit the images to a computer to process them and guide the micromouse to a computer to process the images to a computer.

3. Objectives
• Establish communication between an aerial vehicle and a land vehicle connected to a central computer.
• Develop a computer program that allows the use of aerial images to give instructions to the micromouse.
• Solve an unknown maze with the cooperation of both robotic systems.

4. Methodology
The students are divided in two groups: one group will be working with the habilitation of an existing quadcopter while the other will be working with the modifications and additions needed by the micromouse. The quadcopter group will be adding a digital camera to the quadcopter, along with the required hardware needed to send the live image to a computer. The quadcopter will be also provided with altitude sonar to avoid ground collisions. For the moment, the quadcopter will be flown outdoors where GPS signal is available, this way, the quadcopter will fly through waypoints directed by a user. The computer engineering students will provide a software capable of displaying the gathered images and present it to a user. The best route will be marked by the user as waypoints and this information will be sent to the micromouse with a module that enables the communication between the robot and the computer.

5. Results
During the past term, an altitude sonar to avoid ground collision was being added to the quadcopter; this sensor is currently being configured. Wi-Fi communication was also being established between the quadcopter and a computer. The connection was successful, however telemetry data acquisition is part of the current work. Ultrasonic and infrared sensors to avoid lateral collision and frontal distance measurement were added to the micromouse. During the past term, the robot was able to solve a known maze.
Research on wireless connection between the robot and a computer was also begun, and it remains part of the current work.

6. Timeline

References