

**MAE 434W/435**  
**Senior Design Project Fall 2014-Spring 2015**

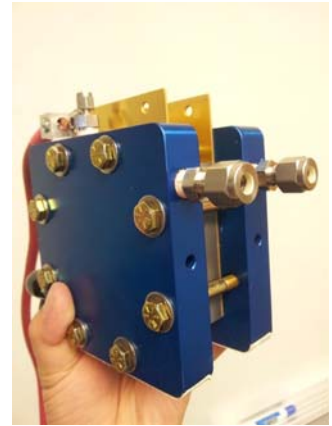
**Title:**

Fuel Cell Powered Unmanned Aerial Vehicle (UAV)

**Description:**

The goal of this project is to build and fly a fuel cell powered UAV. This project consists of three sub-objectives. The first is to investigate the feasibility of replacing battery with fuel cell to power UAVs. The second is to convert a battery-powered drone into fuel cell powered one. Differences in weight may be a major consideration. Eventually the fuel cell powered drone has to fly.

Fuel cell is an electrochemical device that converts chemical fuel into electricity. The duration of the fuel cell powered vehicle depends on its fuel capacity. That means that fuel cell has the potential for much longer flying endurance than batteries. Fuel cell was reported to at least double the endurance of UAVs that used to be powered by battery. Typical battery powered UAVs have an endurance less than 2 hours. As a comparison, Naval Research Laboratory demonstrated that their fuel cell powered Ion Tiger UAV flew for 48 hours.



Students are expected to have the following achievements at the end of this project:

- 1) Understanding the operating principles of different types of fuel cells;
- 2) Capability to operate fuel cells;
- 3) Experiences on market survey, UAV design and piloting.

Is this project multidisciplinary? If so, with what department(s) will you be collaborating?

Please note if you are looking for a collaborator.

It is multidisciplinary project, but it is within MAE's expertise.

**Number of students needed:**

4-6

**Suggested by (Faculty):**

Xiaoyu Zhang

Ayodeji Demuren

**Supervised by (Faculty):**

Xiaoyu Zhang

Ayodeji Demuren