**Chapter 4: Multidisciplinary Aspects**

The design, development, and manufacture of a UAV is supported by the study area of mechatronics. This area involves three engineering disciplines: ME, COE, and EE. This type of project also requires the use of systems engineering to properly identify and structure the UAV system and sub-systems to be designed. Additionally, the implementation of systems engineering will ensure adequate project progression. The following points briefly specify the roles that were given to each of the mentioned disciplines:

**Systems Engineering:**

This area of study was necessary due to Honeywell’s requirement to present project progress according to the NASA Systems Engineering Handbook (NASA/SP-2007-6105, Rev1).

**Mechanical Engineering:**

This area of study was necessary to create the UAV’s frame and to execute the analysis of the mass and structure of the UAV with its selected mechanical and structural components.

**Computer Engineering:**

This area of study was necessary to develop software through which the UAV’s missions would be entered and stored. Also, users had to be able to monitor mission progress through this software. In general, the software had to ensure the following:

* Air vehicle takeoff and landing
* Interface to input mission coordinates
* Calculation of path from user input

**Electrical Engineering:**

This area of study involved multiple sub-disciplines in EE which are controls, power, electronics, and communications. The following points describe the application of each sub-discipline:

* Controls: Design the UAV’s control system to ensure stable flight
* Power: Execute load analysis on the UAV system.
* Electronics: Evaluate electronic components to be added to protect the system.
* Communications: Establish communication link between UAV, ground control station, and radio controller.

**Test Engineering:**

This area of study was necessary to be able to properly assess the performance for each selected UAV component and evaluate the designed UAV system after integrating developed software with hardware.

**Software:**

The design of the UAV required the use of the following software:

* Fusion360
* MATLAB/Simulink
* Mission Planner