AIAA Region II Student Conference
03/10/2021

Letter of Intent

University Name: University of Memphis

Department: Herff College of Engineering – Mechanical Engineering

Faculty Advisor: Dr. Jeffery Marchetta

Team Leader: Matthew Sale

Team Members: Zhibo Liu, Emma Hill, James Bay, David Boers

What is to be designed:

The purpose of this project is to design test systems for a Spaceport America Cup capable rocket. Specifically, to design a test system for the recovery systems and test system for the motor. The rocket must be capable of reaching an apogee of 10,000 feet and recovered using a dual deployment recovery system.

The motor test will be used to determine if the actual thrust from the selected motor will be sufficient to launch a rocket carrying an 8.8 pound payload to an apogee of 10,000 feet. Using a load cell and designed static launch stand, the team will be able to determine the actual thrust of the motor and calculate a trajectory for the rocket.

The recovery system test will be designed to mimic the atmospheric pressure across the flight of the rocket. This will allow the altimeters and dual deployment systems to be tested at an accurate replication of flight. Testing in this manor will insure against failure during actual launch.

Approach:

For the recovery system test, the team designed and constructed a vacuum chamber capable of withstanding the pressure changes that will mimic in flight situations of the rocket. The motor test system is designed to be used in conjunction with a launch stand of the team's design. By allowing for a modular

static launch test to be conducted on an actual launch stand, the thrust calculation should mimic the actual thrust during the firing of the rocket.

Deliverables:

By the end of April, the team will have tested both systems and run the calculations to determine if the rocket is ready for competition.