

Senior Design Project Description

Company Name	Mechanical Engineering	Date Submitted	08/05/2020
Project Title	Solid Fuel Rocket Motor Test Stand - Phase 2 (UNCC_TEST2)	Planned Starting Semester	Fall 2020

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	4	Electrical	
Computer		Systems	
Other ()			

Project Overview and Requirements:

The intention is to either construct a new high powered rocket motor test stand, or update the existing test stand, which was designed, built and test in 2013 to support the UNCC Student Launch Competition Team. The existing test stand (as seen in Figure 1) is disassembled and stored in the Motorsports Research Lab.



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING



Figure 1: UNCC Solid Fuel Rocket Motor Test Stand

The motor testing is no longer allowed on campus and must be conducted under the supervision of NAR or Tripoli personnel at a designated launch site. The requirement for testing to be conducted at launch site means the design must have an independent power source, which can be transported with the test stand and be capable of running numerous tests.

The test stand must be capable of testing motors ranging in size from A (13 mm diameter, .3126 N-s impulse) up to L (54 mm diameter, 5,120 N-s impulse). Data acquisition must run from 5 seconds before motor ignition until 5 seconds after motor burn out.

Expected Deliverables/Results:

Deliverables include:

- The full design package of a new or updated solid fuel, high powered rocket motor test stand to include CAD drawings, wiring diagrams, data acquisition and analysis code, and



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

appropriate calculations.

- The construction of the new test stand will be in the Motorsports research shop.
- A users manual with step by step instructions to include safety procedures.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Familiarity or interest in design, procurement, fabrication, and assembly.