

## MSD - P19105 Customer Interview:

- 1) What do you think were the issues with the previous design?
  - Engineers only focused on the actual thrust stand and structure, rather than other factors such as sensors and run time for recording data.
  - Did not take into account all possible failures of the rocket, and how to prevent them.
  
- 2) Did the test stand fail during any particular testing? (such as cold test, hot fire test etc.)
  - Failed during the initial hot fire test.
  - It exploded from a clot in the actual combustion chamber and caused an explosion.
  - Cold fire testing was successful and had no problems.
  
- 3) What were the maximum & minimum temperatures recorded during last semesters testing?
  - The maximum temperature inside the combustion chamber is 3000K or 5000 Degrees Fahrenheit.
  - The minimum temperature for the cold flow test was -50 Degrees Fahrenheit.
  
- 4) Is there any particular reason as to why the engine was not mounted vertically? (such as size limitations)
  - No harm in mounting the engine horizontally.
  - Besides, mounting the engine vertically would cause air circulations issues.
  - Large safety factors make it much more feasible and ideal to mount and test is horizontally.
  
- 5) What was the maximum engine vibration recorded during last semester's testing?
  - Maximum engine vibrations recorded were around 2000Hz.
  - Should plan for around that type of vibration frequency again.
  - Impulse of 9,209 lbs-sec.
  
- 6) What material was used to construct the test stand & why was it selected?
  - Aluminum, since it was light with high structural stability and it can withstand the exterior temperature of the nozzle and combustion chamber mounting.
  - Looking into steel and other types of material for the test stand is not a bad idea, but it can begin to get expensive.

- 7) Was the previous engine easily mounted & dismantled on the existing test stand design, and what did you do to make it easy to mount?
- Yes, by using simple clamps and bearings, this held the rocket in place and allowed for it to be easily mounted and dismantled.
  - Problems from last year's design include abnormal rotation of the rocket around the x axis.
- 8) Were there any particular areas of the stand that you think experienced abnormal stress forces?
- Not in particular. Stress analysis was only conducted on a single axis.
  - Forces should not be greater than 1300 lbs in any direction.
- 9) Project Stakeholders:
- RIT Launch Initiative
  - ESRA and IREC
  - RIT Environmental Health and Safety
  - Kate Gleason College of Engineering
  - MSD
- 10) Actioned Items for Next 2 Weeks:
- Lessons learned database
  - Risk management database
  - Crash Course on rocketry