SEDS Rocket Design Challenge Rules

Participates can chose to compete either through Kerbal Space Program (KSP) or OpenRocket. You can choose to participate in both events but will only receive the higher score for your club score. The goal is to design a rocket to complete a mission based on the program picked. Each program will have its own winners. Participates will have until Thursday 8am to submit an entry to William.elliott@ubseds.org. Please state your name and club you are representing. Need help in KSP or OpenRocket?, join our discord server and use eweek-design-challenge-help channel https://discord.gg/gU5RCXHXnB

KSP:

Your task it to land a Kerbal on the moon using the fewest pieces possible. For judging you must submit a screenshot of your rocket and lander before launch and a screenshot of a Kerbal on the moon next to your lander. A video of the mission can also be submitted. Additionally, a bill of materials must be submitted showing all the parts and quantities used to get to the moon. Parts added by mods are not allowed and will be disqualified. Submissions will be ranked by the number of parts used once it is confirmed the mission was completed successfully.

OpenRocket:

Your task is to design a stable rocket that can reach the highest altitude possible on any motor up to H class in the program in OpenRocket, a free java based rocket design tool found at https://openrocket.info/ As an added bonus the design you make could possibly be built and used for a NAR L1 certification at a later date and with help from our club! For help learning the software a quick getting started guide is included as well as some YouTube tutorials in a second document. The following values must be set in the simulation setup:

- Set average wind speed to 0 mph
- Checkmark Use International Standard Atmosphere
- Latitude 28.6N -80.6E, altitude 0ft
- Launch rod length 10ft, angle 0deg

The rocket must also meet the following requirements:

- Have a parachute that provides a descent rate of less than 20 ft/s(use ripstop nylon as material and default elastic cord for shroud lines, leave Drag Coefficient at 0.80)
- Shock cord 3x length of rocket made out of 9/16in (14mm) tubular Nylon
- Fins and bulkheads made out of Plywood (birch)(minimum 1/8in thickness), aluminum, or carbon fiber
- Use a nosecone from the database
- Use body tubes from the database (note length can be shortened from stock, a coupler is required if you want a tube longer than one stock tube selected)

- Motor must be mounted in a tube with the same inner diameter as the outer diameter of the motor and have an engine block to secure the motor from moving forward in the tube. Inner tubes must also be selected from the data base of parts
- Motor must be H class or lower. **Motors higher than H will be disqualified.**
- Have a minimum stability margin off the rail of 1.3
- Subsonic flight, Mach number < 1
- Ejection charge time set to be near apogee (your sim will reach a higher altitude by doing this)
- Clustered or staged rockets may not exceed 640 Ns of total impulse

To participate you must submit your OpenRocket design file using this naming scheme: FirstName_LastName_ClubYouRepresent and will be scored as follows: base score will be the max altitude the rocket simulated, 200ft will be deducted for every requirement stated above broken (stacking for each component found out of line). Use of a motor higher than H will be disqualified. The winner will be whoever has the highest score.