Record Breaker (Defiance) Preliminary Design Flow

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Design Credit to Carl Pigeon, Mitchell Passarelli, and Zeping Sun

Input Parameters

- Target Altitude (18288m)
- 0/F (4.5)
- Pcc (3447 kPa)

Design Variables

- Outer Diameter (141.3 mm or 168.28 mm)
- Thrust (~12 kN)

Iterative parameters

- Drag Loss (most important)
- Burnout Altitude
- Dry Mass
- Total Length

Constrained parameters

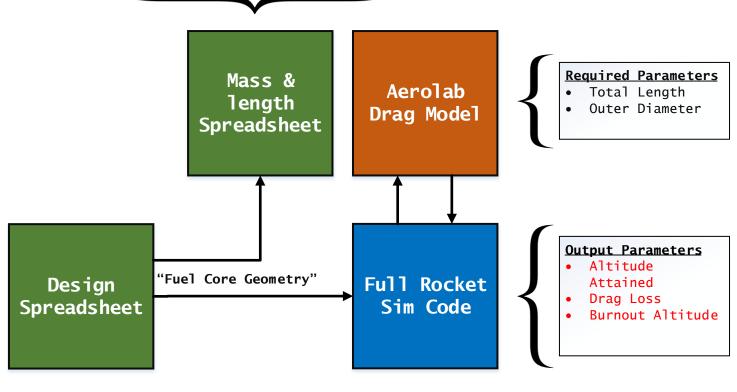
 Oxidizer Flux (350-700 kg/m^2·s) must satisfy fuel core final diameter constraint!

Output Parameters

- Dry Mass
- Total Length

Required Parameters

- Fuel mass
- Fuel Core Inner Diameter
- Outer Diameter



Major Assumptions

- Half Power Nose Cones scaled with respect to new outer diameter, length to diameter ratio conserved
- Fins scaled with respect to new length and diameter