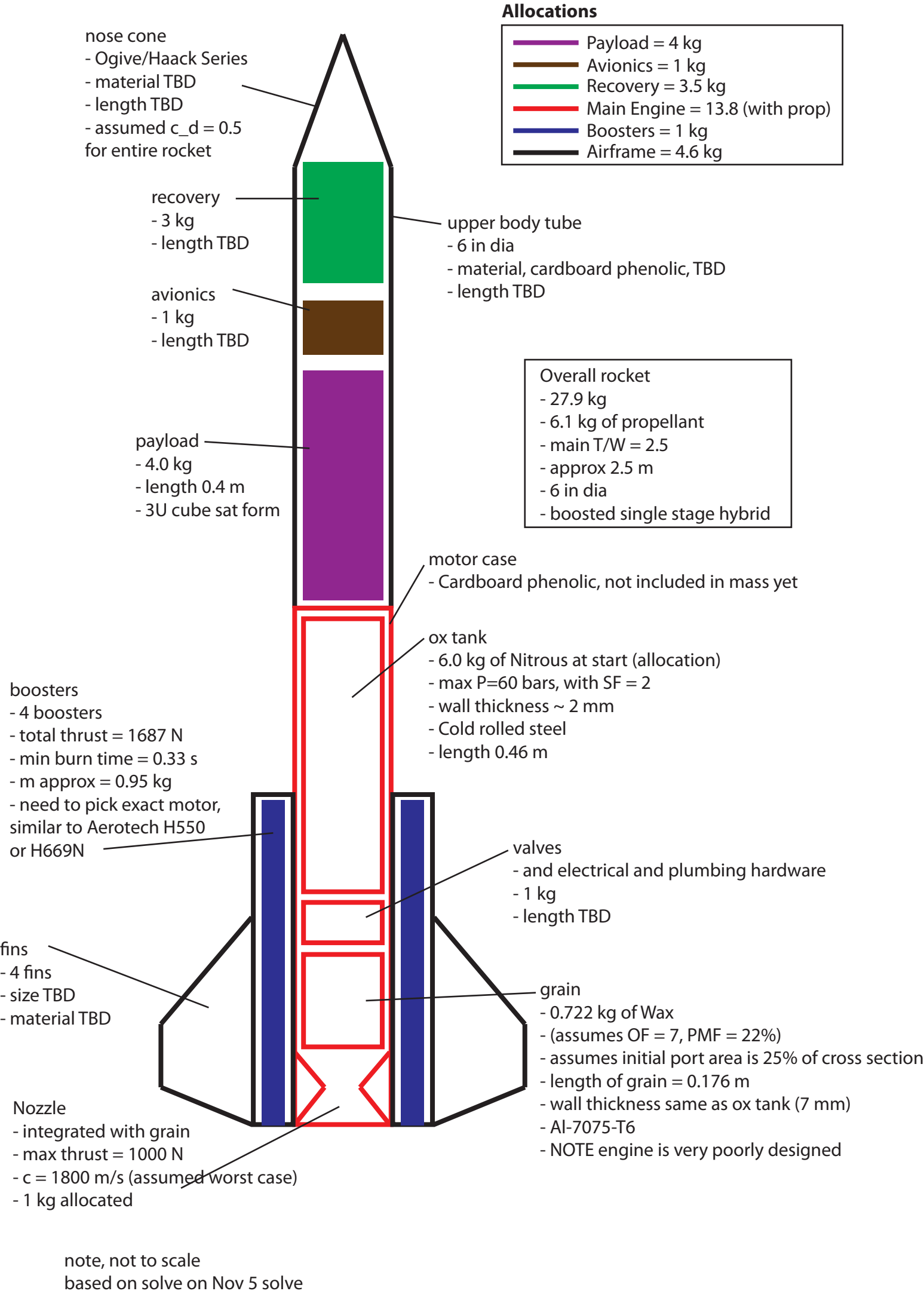
Allocations
Payload = 4 kg
Avionics = 1 kg
Recovery = 3.5 kg
Main Engine = 13.8 (with prop)
Boosters = 1 kg
Airframe = 4.6 kg
nose cone
- Ogive/Haack Series
- material TBD
- length TBD
- assumed c_d = 0.5
for entire rocket
recovery
- 3 kg
- length TBD
upper body tube
- 6 in dia
- material, cardboard phenolic, TBD
- length TBD
avionics
- 1 kg
- length TBD
Overall rocket
- 27.9 kg
- 6.1 kg of propellant
- main T/W = 2.5
- approx 2.5 m
- 6 in dia
- boosted single stage hybrid
payload
- 4.0 kg
- length 0.4 m
- 3U cube sat form
motor case
- Cardboard phenolic, not included in mass yet
ox tank
- 6.0 kg of Nitrous at start (allocation)
- max P=60 bars, with SF = 2
- wall thickness ~ 2 mm
- Cold rolled steel
- length 0.46 m
boosters
- 4 boosters
- total thrust = 1687 N
- min burn time = 0.33 s
- m approx = 0.95 kg
- need to pick exact motor,
similar to Aerotech H550
or H669N
valves
- and electrical and plumbing hardware
- 1 kg
- length TBD
fins
- 4 fins
- size TBD
- material TBD
grain
- 0.722 kg of Wax
- (assumes OF = 7, PMF = 22%)
- assumes initial port area is 25% of cross section
- length of grain = 0.176 m
- wall thickness same as ox tank (7 mm)
- Al-7075-T6
- NOTE engine is very poorly designed
Nozzle
- integrated with grain
- max thrust = 1000 N
- c = 1800 m/s (assumed worst case)
- 1 kg allocated
note, not to scale
based on solve on Nov 5 solve