11/15/2016

Rocket Capstone

Target altitude of 100km

Build a hobby rocket that will go to space

Rocket equation

Tank Prototype

* Small scale test tank that demonstrates the design
* Not responsible for plumbing
  + There is help available
  + We do need a fill valve and purge valve
  + Machine endcaps with gasket
* We have an idea
  + On diameter (about 10”)
  + Flow rate
  + Volumes
* Rocket equation
  + The only change in mass is in the tank
* Without the fuel pump we would need about 700 psi
  + Shoot for at least 50 psi (more is better)
* End caps do not need to be a composite
  + Bolted on maybe, or something else any ideas?
* Low tech
* Composites are stronger and lighter
* Hydrotesting will need to be done
* We will also need to do a cryo fill
  + We can observe the behavior of our lining and its interaction with the composites
* Internal geometry
  + Baffles
    - Slosh
    - Vortex
* Make lots of prototypes and test them
* Lots of materials properties data has been collected
* We want a 2.5 factor of safety
  + We will need to estimate the in flight loading

BIG PROBLEMS

* Epoxy is not LOX safe
  + We will need some sort of liner
    - No diffusion or leaks or bad things will happen
    - Watch the interfaces for leaks
* Account for thermal contraction and expansion
  + Perhaps have a slightly larger liner than shell to allow for shink

Document everything

* Open source project
* We want to leave something that future generations can benefit from

This is not a project for someone who wants an easy one. Lots of time will need to be put into this

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