# Non-research thoughts

Possible Issues for Passengers:

* Temperature
* Oxygen Levels
* Humidity
* Air exchange/filtration (dispose of CO2)
* Pressure changes
* Emergency Escape (into vacuum tube)
* Crash Event
* Positive and negative acceleration limits (More mechanical)
* Light
* Noise
* Motion Sickness
* Luggage (Not electrical)
* What is the temperature in the tube?
* Danger of motor failure
* Pod going too fast? (Speed limit)
* Passengers compromising system

# Pressure sensing

Sensors:

Types

* Absolute Pressure Sensor (Relative to perfect vacuum)
* Gauge Pressure Sensor (Relative to atmospheric pressure)
  + No application since the tube is vacuum, atmospheric pressure should not be present at any time throughout the duration of the trip
* Vacuum Pressure Sensor (Relative to atmospheric pressure – negative)
* Differential Pressure Sensor (Difference between 2 pressures – cabin and tube)
* Sealed pressure sensor (can be used to have atmospheric pressure as the sealed pressure for reference.

Transducing

* Piezoresistive – Commonly Used – nanofabrication compliant
* Capacitive – viable – larger than piezoresistive
* Electromagnetic - larger
* Piezoelectric – for high pressures
* Optical – immune to EM intereference
* Potentiometric – deflection of wiper, likely vulnerable to reflect false changes
* Resonant – very stable over time
* Thermal – A lot of electronics, complex and relatively large
* Ionization – large

# Oxygen System

Production:

* Electrolysis – Oxygen for breathing, Hydrogen for a fuel cell maybe?
  + Water for fuel/oxygen allows humidity control from same reservoir
* Stored Oxygen
* Oxygen Candle – indefinite shelf life – used in commercial airlines – explosion of candle has been documented to kill 2 sailors

Sensing

* Lambda Probe – needs to be heated to 316 C power consumption
* Zircona Sensor
* Wideband Zircona Sensor
* Titania Sensor

Temperature Sensing

* Advanced technology, likely use thermocouple because of common use
* Thermistor maybe
* Silicon temperature sensor for small and cheap