

Sheet1

Materials and fuel costs estimate for 1 Saturn V sized basic proof of concept

M Diameter of Balloon	10.00	
M Radius of Balloon	5.00	
M Height Of Balloon	110.00	
Pi	3.14	
M ² Surface Area Of Balloon	3612.83	
M ³ Volume of Balloon	8639.37	
Kg Mass of square M of 120mu Mylar	0.11	
Kg of H2 per cubic meter NTP	0.09	
Kg Mass of H2 to fill Balloon	776.68	
Kg of 1 cubic M of Air at STP	1.29	
Kg Lifting of 1 Cubic M of H2 at STP	1.20	
Kg Lifting 1 H2 Balloon STP	10384.53	
Kg Total Lift	10384.53	
Kg of HTP & H2 Engine	110.00	
Kg of HTP fuel tanks & Pipework	50.00	
Kg of Electronics	5.00	
Kg of Payload if any	1000.00	
Kg of planned HTP	8832.23	
Kg of 1 Mylar 120mu Balloon	387.30	
		ISP@0G
£ Cost of H2 per KG	1.00	3519.00
£ Cost of He per KG	52.00	
£ Cost of 85% HTP per KG	5.87	1610.00
£ Cost of 120mu Mylar per M ²	1.17	
£ Cost of 1 Mylar 120mu Balloon	4227.01	
£ Cost of H2 to fill 1 Balloon	776.68	
£ Cost of planned HTP	51845.19	
£ Cost of HTP & H2 engine	5000.00	
£ Cost of HTP fuel tanks & pipework	1000.00	
£ Cost of electronics	5000.00	
Approx Total Dry Mass of prototype Kg	1552.30	
Approx Total Mass of prototype +H2 Kg	2328.97	
H2 Fuel Mass/Energy equivalent when LTA	7619.23	
HTP Fuel Mass equivalent when LTA	86644.18	
Fuel Mass equivalent when LTA	94263.41	
Approx Total Mass of prototype +H2 +HTP	11937.88	
Approx Total Cost of prototype	£67,848.88	
Dry Mass to fuel actual Ratio	6.2	
Dry Mass to fuel equivalent Ratio	60.7	
Note 110Kg HTP engine can give 4309Kg Thrust	42271.29 Newtons	
85% HTP Water to Oxygen ratio after catalyst 60:40		
Planned HTP would produce Kg of O2	3532.89	
Planned HTP O2 would burn Kg of H2	441.61	
O2 left over	-335.07	
Cost per kilo payload	£67.85	

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Total ISP seconds from H2	2733135.469
Total ISP seconds from HTP	14219891.15
Total ISP seconds	16953026.62
Delta V in meters per second	10921.2645