

Rockoon Altitude tradeoff study  
 2.3 in diaeter rocket , 300lbf average thrust,  
 7.3 lbs total wt, 0.5 lbs payload

Gary E Snyder Jr  
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| Sim Numbe | Apogee<br>Alt Ft | Time<br>Sec | Balloon<br>Alt ft | Total<br>Alt ft | Change in rockets performance<br>feet |
|-----------|------------------|-------------|-------------------|-----------------|---------------------------------------|
| 0         | 14932            | 22          | 0                 | 14932           |                                       |
| 1         | 17039            | 23          | 5000              | 22039           | 2107                                  |
| 2         | 19608            | 25          | 10000             | 29608           | 2569                                  |
| 3         | 22837            | 28          | 15000             | 37837           | 3229                                  |
| 4         | 27236            | 31          | 20000             | 47236           | 4399                                  |
| 5         | 33824            | 36          | 25000             | 58824           | 6588                                  |
| 6         | 43547            | 43          | 30000             | 73547           | 9723                                  |
| 7         | 58505            | 52          | 35000             | 93505           | 14958                                 |
| 8         | 79281            | 63          | 40000             | 119281          | 20776                                 |
| 9         | 105174           | 75          | 45000             | 150174          | 25893                                 |
| 10        | 133308           | 87          | 50000             | 183308          | 28134                                 |
| 11        | 161972           | 98          | 55000             | 216972          | 28664                                 |
| 12        | 190582           | 107         | 60000             | 250582          | 28610                                 |
| 13        | 213611           | 112         | 65000             | 278611          | 23029                                 |
| 14        | 233564           | 119         | 70000             | 303564          | 19953                                 |
| 15        | 248279           | 121         | 75000             | 323279          | 14715                                 |
| 16        | 260701           | 124         | 80000             | 340701          | 12422                                 |
| 17        | 277509           | 129         | 85000             | 362509          | 16808                                 |
| 18        | 288875           | 132         | 90000             | 378875          | 11366                                 |
| 19        | 299037           | 135         | 95000             | 394037          | 10162                                 |
| 20        | 307438           | 137         | 100000            | 407438          | 8401                                  |
| 21        | 314568           | 139         | 105000            | 419568          | 7130                                  |
| 22        | 319690           | 138         | 110000            | 429690          | 5122                                  |
| 23        | 325864           | 142         | 115000            | 440864          | 6174                                  |
| 24        | 330148           | 142         | 120000            | 450148          | 4284                                  |
| 25        | 332336           | 143         | 125000            | 457336          | 2188                                  |
| 26        | 335325           | 137         | 130000            | 465325          | 2989                                  |
| 27        | 338764           | 143         | 135000            | 473764          | 3439                                  |
| 28        | 341623           | 145         | 140000            | 481623          | 2859                                  |
| 29        | 343781           | 146         | 145000            | 488781          | 2158                                  |
| 30        | 345663           | 146         | 150000            | 495663          | 1882                                  |
| 31        | 347364           | 147         | 155000            | 502364          | 1701                                  |
| 32        | 348795           | 147         | 160000            | 508795          | 1431                                  |

For this particular case, the altitudes between 20k' and 110k' pay more in rocket performance than just balloon performance. IE raising the balloon from 65k' to 70k' adds about 25k' extra apogee altitude (5k' + 19953')