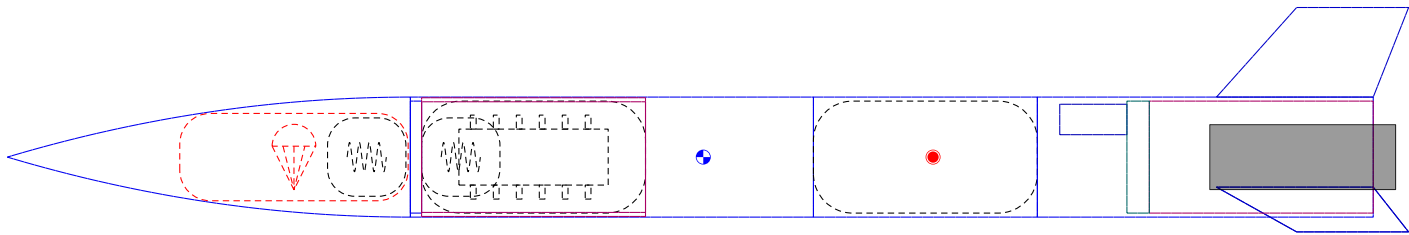


Rocket Design



Rocket  
Stages: 1  
Mass (with motor): 985 g  
Stability: 1.91 cal  
CG: 311 mm  
CP: 413 mm

G74W-4

|                        |          |       |            |           |            |               |              |               |          |
|------------------------|----------|-------|------------|-----------|------------|---------------|--------------|---------------|----------|
| Altitude               | 274 m    | Motor | Avg Thrust | Burn Time | Max Thrust | Total Impulse | Thrust to Wt | Propellant Wt | Size     |
| Flight Time            | 91.5 s   | G74W  | 76.2 N     | 1.12 s    | 91.2 N     | 85.3 Ns       | 7.89:1       | 39.3 g        | 29/83 mm |
| Time to Apogee         | 7.85 s   |       |            |           |            |               |              |               |          |
| Optimum Delay          | 6.7 s    |       |            |           |            |               |              |               |          |
| Velocity off Pad       | 12.2 m/s |       |            |           |            |               |              |               |          |
| Max Velocity           | 75.6 m/s |       |            |           |            |               |              |               |          |
| Velocity at Deployment | 14.8 m/s |       |            |           |            |               |              |               |          |
| Landing Velocity       | 3.47 m/s |       |            |           |            |               |              |               |          |

F37-6

|                        |          |       |            |           |            |               |              |               |          |
|------------------------|----------|-------|------------|-----------|------------|---------------|--------------|---------------|----------|
| Altitude               | 85.5 m   | Motor | Avg Thrust | Burn Time | Max Thrust | Total Impulse | Thrust to Wt | Propellant Wt | Size     |
| Flight Time            | 31.2 s   | F37   | 32.6 N     | 1.55 s    | 46.5 N     | 50.7 Ns       | 3.31:1       | 28.2 g        | 29/99 mm |
| Time to Apogee         | 4.89 s   |       |            |           |            |               |              |               |          |
| Optimum Delay          | 3.39 s   |       |            |           |            |               |              |               |          |
| Velocity off Pad       | 7.75 m/s |       |            |           |            |               |              |               |          |
| Max Velocity           | 35.5 m/s |       |            |           |            |               |              |               |          |
| Velocity at Deployment | 10.5 m/s |       |            |           |            |               |              |               |          |
| Landing Velocity       | 3.33 m/s |       |            |           |            |               |              |               |          |

E15-7

|                        |          |       |            |           |            |               |              |               |          |
|------------------------|----------|-------|------------|-----------|------------|---------------|--------------|---------------|----------|
| Altitude               | 34.6 m   | Motor | Avg Thrust | Burn Time | Max Thrust | Total Impulse | Thrust to Wt | Propellant Wt | Size     |
| Flight Time            | 15.2 s   | E15   | 15.7 N     | 2.53 s    | 28.8 N     | 39.8 Ns       | 1.68:1       | 20.1 g        | 24/70 mm |
| Time to Apogee         | 3.67 s   |       |            |           |            |               |              |               |          |
| Optimum Delay          | 1.1 s    |       |            |           |            |               |              |               |          |
| Velocity off Pad       | 5.65 m/s |       |            |           |            |               |              |               |          |
| Max Velocity           | 19.8 m/s |       |            |           |            |               |              |               |          |
| Velocity at Deployment | 16.4 m/s |       |            |           |            |               |              |               |          |
| Landing Velocity       | 3.29 m/s |       |            |           |            |               |              |               |          |

## B1-P

|                        |        |       |            |           |            |               |              |               |          |
|------------------------|--------|-------|------------|-----------|------------|---------------|--------------|---------------|----------|
| Altitude               | 0 m    | Motor | Avg Thrust | Burn Time | Max Thrust | Total Impulse | Thrust to Wt | Propellant Wt | Size     |
| Flight Time            | 2.91 s | B1    | 1.88 N     | 2.42 s    | 3.87 N     | 4.61 Ns       | 0.19:1       | 24 g          | 24/40 mm |
| Time to Apogee         | 0 s    |       |            |           |            |               |              |               |          |
| Optimum Delay          | N/A    |       |            |           |            |               |              |               |          |
| Velocity off Pad       | N/A    |       |            |           |            |               |              |               |          |
| Max Velocity           | 0 m/s  |       |            |           |            |               |              |               |          |
| Velocity at Deployment | N/A    |       |            |           |            |               |              |               |          |
| Landing Velocity       | 0 m/s  |       |            |           |            |               |              |               |          |

## Parts Detail

### Sustainer

|   |                         |  |   |             |              |
|---|-------------------------|--|---|-------------|--------------|
|    | Nose cone               | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Parabolic series                                      | Len: 180 mm | Mass: 47 g   |
|    | Parachute               | Ripstop nylon<br>(67 g/m <sup>2</sup> )          | Dia <sub>out</sub> 1782 mm                            | Len: 102 mm | Mass: 174 g  |
|   | Shroud Lines            | Elastic cord<br>(flat 6 mm, 1/4 in)<br>(4.3 g/m) | Lines: 8  | Len: 200 mm |              |
|    | Shock cord              | Tubular nylon<br>(25 mm, 1 in)<br>(29 g/m)       |   | Len: 200 mm | Mass: 5.8 g  |
|    | Body tube               | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Dia <sub>in</sub> 50 mm<br>Dia <sub>out</sub> 53.6 mm | Len: 180 mm | Mass: 68.5 g |
|    | Shock cord              | Tubular nylon<br>(25 mm, 1 in)<br>(29 g/m)       |   | Len: 200 mm | Mass: 5.8 g  |
|    | Altimeter               |  | Dia <sub>out</sub> 50 mm                              |             | Mass: 300 g  |
|    | Electronics bay         | Cardboard<br>(0.68 g/cm <sup>3</sup> )           | Dia <sub>in</sub> 49.4 mm<br>Dia <sub>out</sub> 53 mm | Len: 100 mm | Mass: 19.7 g |
|   | Extra tube              | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Dia <sub>in</sub> 50 mm<br>Dia <sub>out</sub> 53.6 mm | Len: 100 mm | Mass: 38.1 g |
|  | Tolerance               |  | Dia <sub>out</sub> 50 mm                              |             | Mass: 100 g  |
|  | Tail                    | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Dia <sub>in</sub> 50 mm<br>Dia <sub>out</sub> 53.6 mm | Len: 150 mm | Mass: 57.1 g |
|  | Trapezoidal fin set (3) | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Thick: 3.6 mm   |             | Mass: 33.7 g |
|  | Launch lug              | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Dia <sub>in</sub> 10 mm<br>Dia <sub>out</sub> 13.6 mm | Len: 30 mm  | Mass: 2.6 g  |
|  | Motor bracket           | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Dia <sub>in</sub> 48 mm<br>Dia <sub>out</sub> 50 mm   | Len: 100 mm | Mass: 20 g   |
|  | Engine block            | PLA<br>(1.3 g/cm <sup>3</sup> )                  | Dia <sub>in</sub> 0 mm<br>Dia <sub>out</sub> 50 mm    | Len: 10 mm  | Mass: 25.5 g |

