Angelfire Flight Data

Event: OROC Summer Skies Launch
Date: June 16, 2007
Location: Brothers, Oregon
Elevation: 4528 feet MSL
Temp: 65F
%RH: unknown
Wind: light wind

Motor: Aerotech M1419W
LO weight: 51.9 lbs
Motor Works Mach delay set to 12 sec
Main chute set to deploy at 1000 ft
Backup charge for main set at 800 ft

Launch pad coordinates: N 43º 48.0189' W 120º 38.8985'
Distance pad to landing site: 0.86 miles

Landing site coordinates: N 43º 48.6687' W 120º 38.4012'

Comments:
- Boost looked pretty straight from the ground.
- Drogue deploy at apogee looked pretty good from the ground.
- Ejection charges were wired to both Missile Works altimeters.

Flight Event Timeline

<table>
<thead>
<tr>
<th>Time (Sec)</th>
<th>Event</th>
<th>Altitude</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>Motor Ignition</td>
<td>0 ft</td>
<td>0 ft/sec</td>
</tr>
<tr>
<td>3.0</td>
<td>Peak Acceleration = 5.4 G's</td>
<td>513 ft</td>
<td>449 ft/sec</td>
</tr>
<tr>
<td>4.0</td>
<td>Altitude = 1,000 feet</td>
<td>1,000 ft</td>
<td>600 ft/sec</td>
</tr>
<tr>
<td>6.5</td>
<td>Peak Velocity = 515 mph</td>
<td>2,669 ft</td>
<td>755 ft/sec</td>
</tr>
<tr>
<td>6.5</td>
<td>Acceleration drops to zero.</td>
<td>2,701 ft</td>
<td>755 ft/sec</td>
</tr>
<tr>
<td>7.0</td>
<td>Motor burnout</td>
<td>3,078 ft</td>
<td>743 ft/sec</td>
</tr>
<tr>
<td>23.1</td>
<td>Altitude = 10,000 feet</td>
<td>10,000 ft</td>
<td>198 ft/sec</td>
</tr>
<tr>
<td>30.0</td>
<td>Drogue chute ejection charge fires</td>
<td>10,049 ft</td>
<td>18 ft/sec</td>
</tr>
<tr>
<td>27.1</td>
<td>Barometric apogee detection</td>
<td>10,215 ft</td>
<td>90 ft/sec</td>
</tr>
<tr>
<td>30.5</td>
<td>Accelerometer apogee detection</td>
<td>11,164 ft</td>
<td>1 ft/sec</td>
</tr>
<tr>
<td>123.8</td>
<td>Main chute ejection charge fires</td>
<td>1,065 ft</td>
<td></td>
</tr>
<tr>
<td>159.0</td>
<td>Booster section touch down</td>
<td>56 ft</td>
<td></td>
</tr>
<tr>
<td>161.9</td>
<td>Body tube section touch down</td>
<td>0 ft</td>
<td></td>
</tr>
<tr>
<td>165.0</td>
<td>All parts at rest on ground</td>
<td>0 ft</td>
<td></td>
</tr>
</tbody>
</table>

Drogue chute sink rate 97.0 ft/sec
Main chute sink rate 17.6 ft/sec

Time to apogee 27.1 sec 0.45 minutes
Time on drogue 93.8 sec 1.56 minutes
Time on main 41.2 sec 0.69 minutes
Total flight time 165.0 sec 2.75 minutes

GPS Peak Altitude: 10,328 feet 1.11 %
ARTS Accelerometer Peak Altitude: 11,164 feet 9.29 %
ARTS Barometric Peak Altitude: 10,215 feet 0.00 %
MissileWorks Altimeter #1: 10,552 feet 3.30 %
MissileWorks Altimeter #2: 10,928 feet 6.98 %
Average: 10,637 feet
Peak acceleration = 5.4 G's (filtered)
Drogue ejection charge fired
Point of zero acceleration
Motor burn-out (approx)
Max Baro Alt 10,215 feet
Max Acc Alt 11,164 feet

Accelerometer Data
Barometric Data
Drogue ejection charge marker
Drogue ejection charge fires at 18 feet/sec

Peak Velocity = 755 feet/sec
(515 MPH)
Calculation of drogue parachute descent rate:
- 9,315 feet at 37 sec
- 3,206 feet at 100 sec
Sink rate = 97.0 feet/sec

Calculation of main parachute descent rate:
- 484 feet at 137 sec
- 255 feet at 150 sec
Sink rate = 17.6 feet/sec

Main chute deployment charge was set for 1000 feet. This shows it fired at 1064 feet.
- Peak Acceleration = 5.4 G's (averaged value)

- Motor Burnout (Approx)