

RockSim Stability Conventions

Complex parts are described by mass and center of gravity.

Mass is rounded down for components in the upper part of the rocket and rounded up for components in the lower part of the rocket to make calculations more pessimistic.

CG position is rounded up for components in the upper part of the rocket and rounded down for components in the lower part of the rocket to make calculations more pessimistic.

An "open class" payload carrier is modeled. It's more pessimistic than the divided carrier.

The BeeLine GPS and shock cords are not included in the calculations. Since these components are in the upper part of the rocket, the stability calculation will be more pessimistic.

Sustainer RockSim Parts

Nosecone section:

Positions are from top of section unless otherwise noted.

Mass (g)	CG (in)	Position (in)	Length (in)	
945	19.25	0	24	Nosecone, body insert is 5.4"
0	0	0	0	Shock cord & parachute omitted
1615	2.125	1.5	0.125	Dummy payload; position from bottom of nosecone used only when no payload is installed.
<u>62</u>	0.063	29.4	0.125	Bulkplate
2622				5.8 lbs

Upper Airframe section:

Positions are from top of section.

Mass (g)	CG (in)	Position (in)	Length (in)	
2250	26	0	52	Body tube
565	8.125	5.65	11.875	Open class payload carrier Divided carrier has M=855,CG=7
97.5	1.825	17.525	3.65	Top av spacer
2035	3.875	21.175	7	Avionics compartment including flight computers and batteries.
43	0.5	28.175	1	Thrust ring
<u>475</u>	3	37.625	6	R-9 parachute (scrunched toward rear)
5466				12.0 lbs

Lower Airframe:

Positions are from top of section unless otherwise noted.

Mass (g)	CG (in)	Position (in)	Length (in)	
1340	11.5	0	24.375	Body tube, including thrust ring
670	3	-8.375	6	R-12 parachute (scrunched toward rear)
985	4.75	-5.875	10.5	Coupler assembly, including bulkplate & screws
173	0.175	4.625	0.35	Top centering ring
8	0	4.8	0	Launch rail button
1280	7.875	0	12.625	Fin frame, incl. motor retainer, position from bottom M=1034g; CG=6.75; without retainer
8	0	1.5	0	Launch rail button; from bottom
<u>820</u>	6.375	1	16	Fin set, four shortened ARLISS fins; position from bottom
5284				11.6 lbs
				29.4 lbs sustainer without motor & payload
20533				45.2 lbs including motor & dummy payload