

Failure Modes

Hazard	Likelihood (Cause)	Severity (Effect)	Risk	Mitigation
Failure To Launch	2 (Lack of continuity)	1 (Recycle launch pad)	2, Minimal	Check for continuity prior to attempted launch
CATO	1 (Motor defect, assembly error)	5 (Partial or total destruction of vehicle)	5, Low	Inspect motor prior to assembly and closely follow assembly instructions
Instability	1 (Stability margin of less than 1.00)	5 (Potentially dangerous flight path and loss of vehicle)	5, Low	Measure physical center of gravity and compare to calculated center of pressure
Motor Expulsion	1 (Improper retention methods)	5 (Risk of recovery failure and low apogee)	5, Low	Use positive retention method to secure motor
Premature Ejection	1 (Altimeter programming, poor venting)	5 (Zippering)	5, Low	Check altimeter settings prior to flight and use appropriate vent holes
Loss of Fins	1 (Poor construction or improper materials used)	5 (Partial or total destruction of vehicle)	5, Low	Use appropriate materials and high powered building techniques
Ejection Charge Failure	4 (Not enough power, electrical failure)	5 (Ballistic trajectory, destruction of vehicle)	20, High	Ground test charge sizes at least once before flight
Altimeter Failure	3 (Loss of connection or improper programming)	5 (Ballistic trajectory, destruction of vehicle)	15, High	Secure all components to their mounts and check settings
Payload Failure	3 (Electrical failure, program error, dead battery)	4 (Disqualified, objectives not met)	12, Medium	Test payload prior to flight, check batteries and connections

Heat Damaged Recovery System	2 (Insufficient protection from ejection charge)	4 (Excessive landing velocity)	8, Medium	Use appropriate protection methods, such as Kevlar blankets
Broken Fastener	1 (Excessive force)	5 (Ballistic trajectory)	5, Low	Use fasteners with a breaking strength safety factor of 2
Destruction Due To Drag Forces	1 (Poor construction or improper materials used)	5 (Partial or total destruction of vehicle)	5, Low	Use appropriate materials and high powered building techniques
Airframe Zipper	2 (Excessive deployment velocity)	5 (Partial destruction of vehicle)	10	Properly time ejection charges and use an appropriately long tether
GPS Lock Failure	2 (Interference or dead battery)	5 (Loss of vehicle)	10	Ensure proper GPS lock and battery charge before flight
Excessive Landing Speed	3 (Parachute damage or entanglement, improper load)	5 (Partial or total destruction of vehicle)	15, High	Properly size, pack, and protect parachute