



INITIAL CONDITIONS AND PARAMETERS

TRAJECTORY SIMULATION

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TRAJECTORY OPTIMIZATION PARAMETERS

Target Altitude: 100 km (100000 m)
Analysis Type: Trajectory optimization

OPTIMIZATION ANALYSIS CATEGORIES

1. Mass Reduction Analysis
2. Aerodynamic Improvements
3. Propellant Optimization
4. Staging Considerations
5. Trajectory Shape Optimization

BASELINE SIMULATION PARAMETERS

Material Used: Titanium Ti-6Al-4V
Fast Mode: True
Time Step (dt): 0.01 s
Max Dynamic Pressure: 82800.0 Pa

CURRENT ROCKET CONFIGURATION

Total Mass: 442.375 kg
Dry Mass: 198.295 kg
Propellant Mass: 244.080 kg
Mass Ratio: 2.231

Component Breakdown:

propellant	244.080 kg (55.2%)
fuselage_shell	60.250 kg (13.6%)
fuselage_oxi	55.330 kg (12.5%)
helium_tank	43.500 kg (9.8%)
combustion_chamber	12.830 kg (2.9%)
nose_cone	10.230 kg (2.3%)
fins (calculated)	8.162 kg (1.8%)
nozzle	7.993 kg (1.8%)