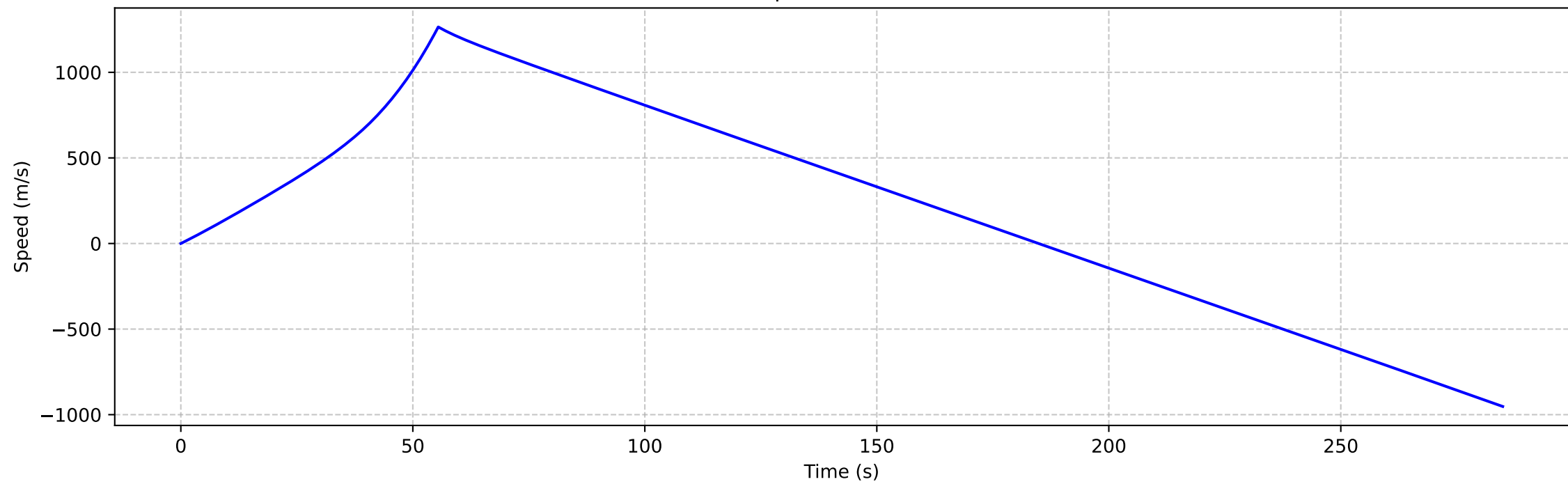
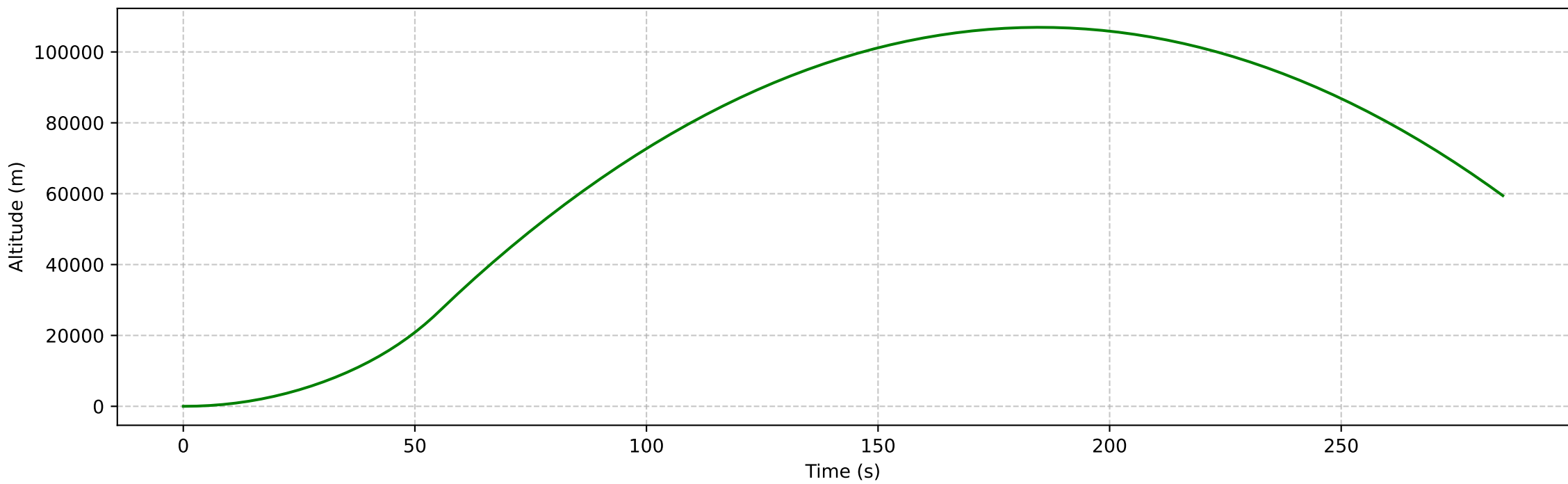


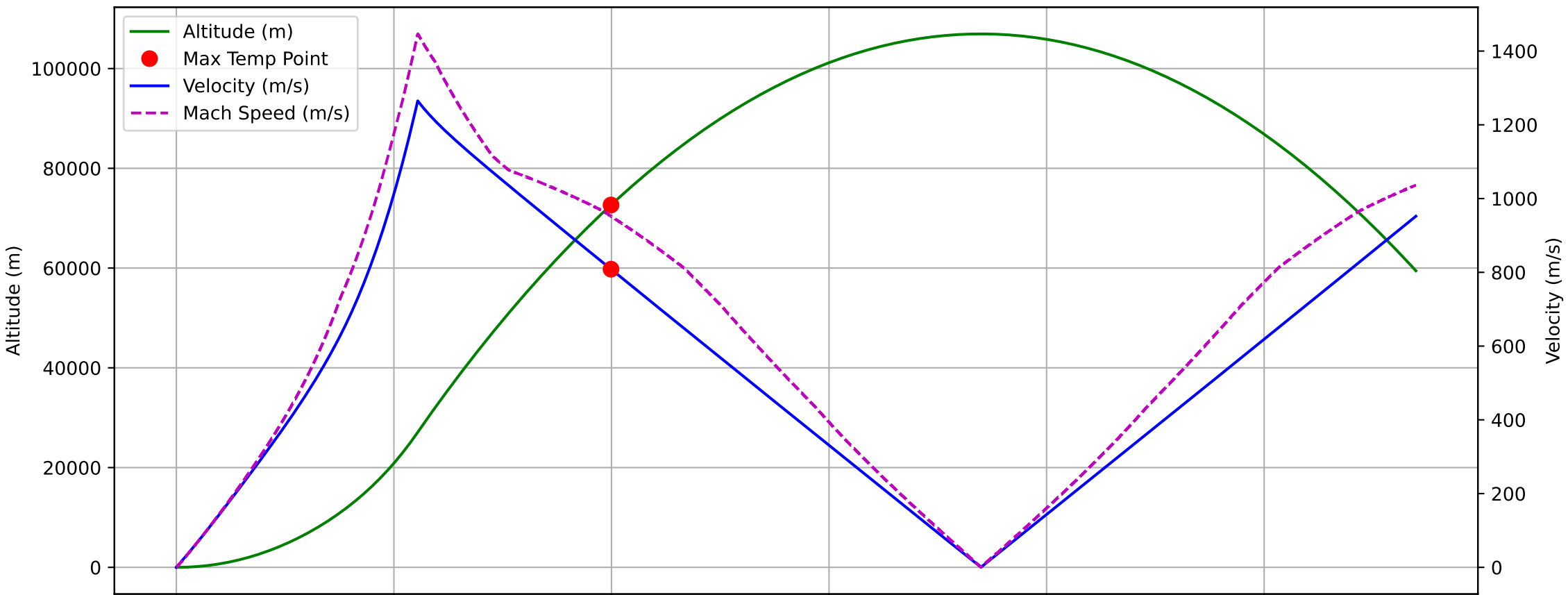
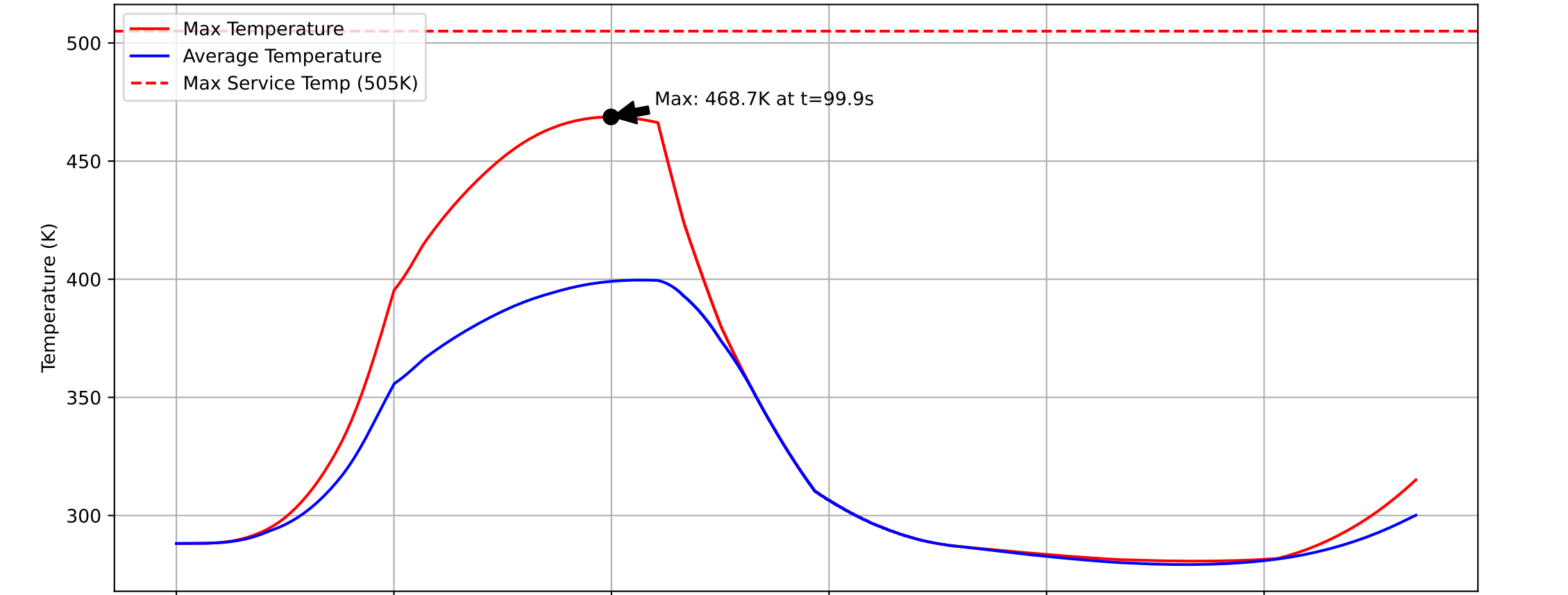
Speed vs Time



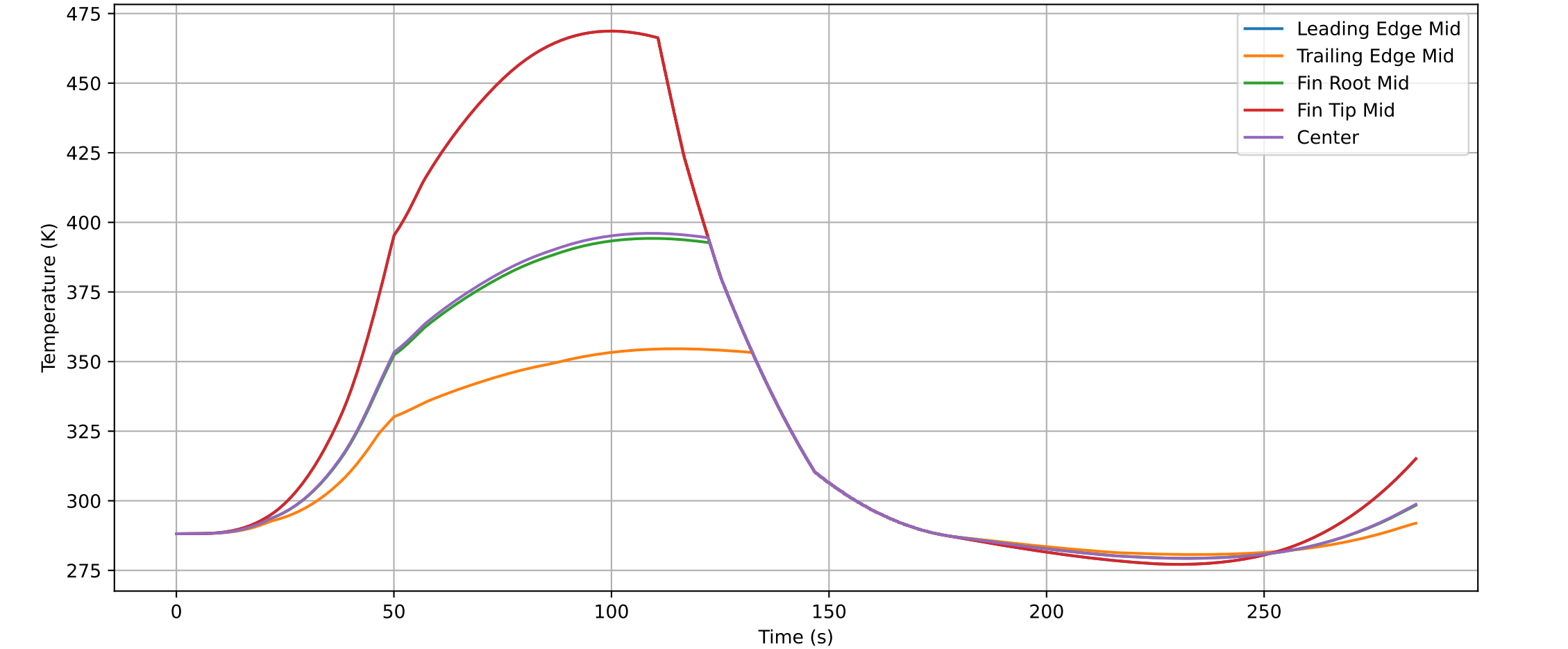
Altitude vs Time



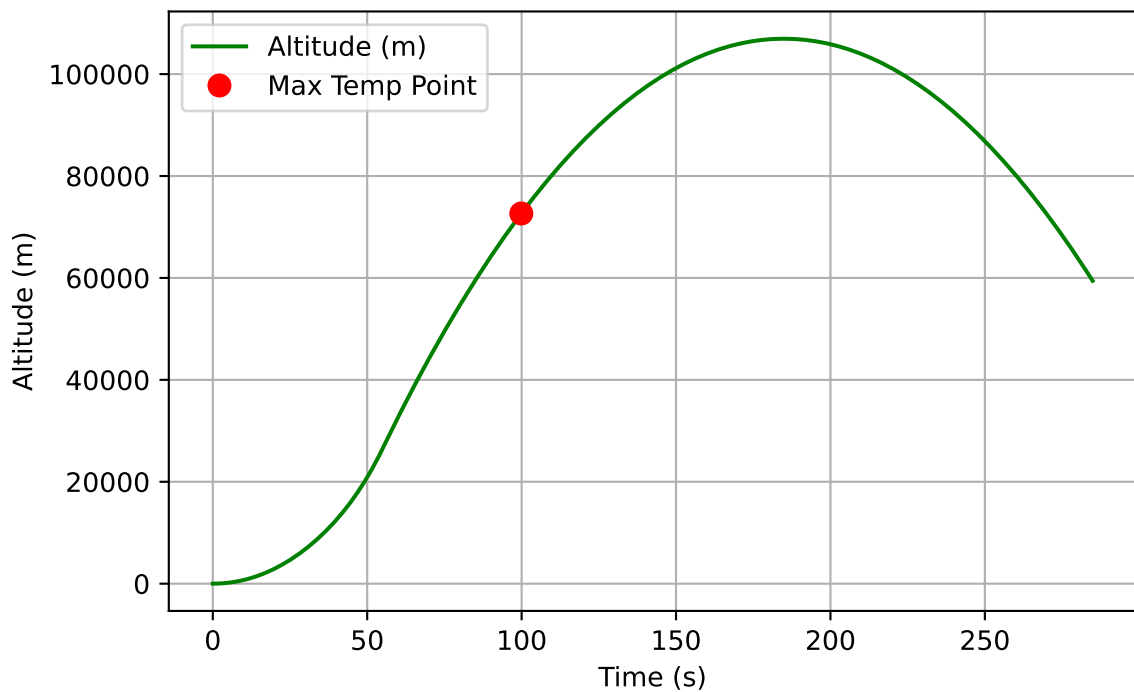
Fin Temperature History - Titanium Ti-6Al-4V



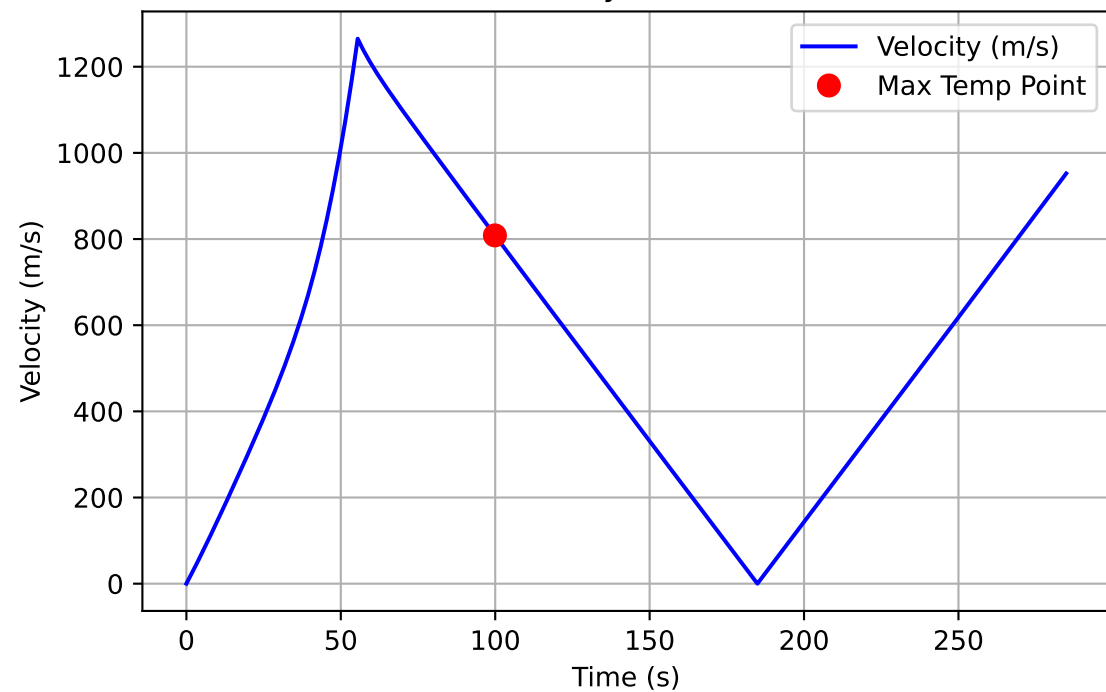
Temperature at Track Points



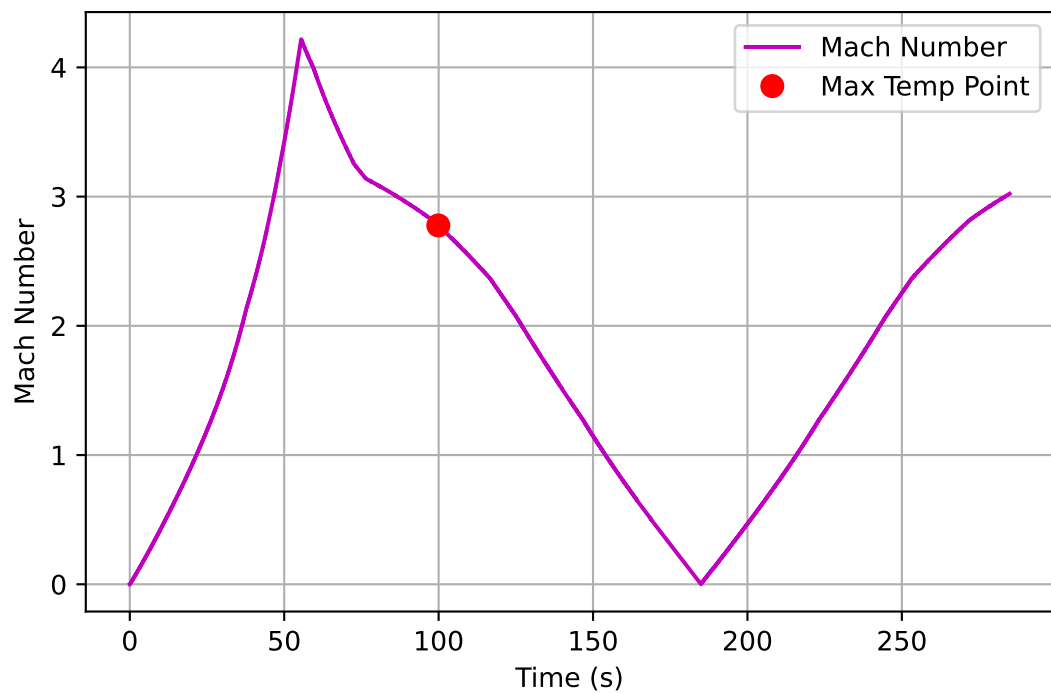
Altitude vs Time



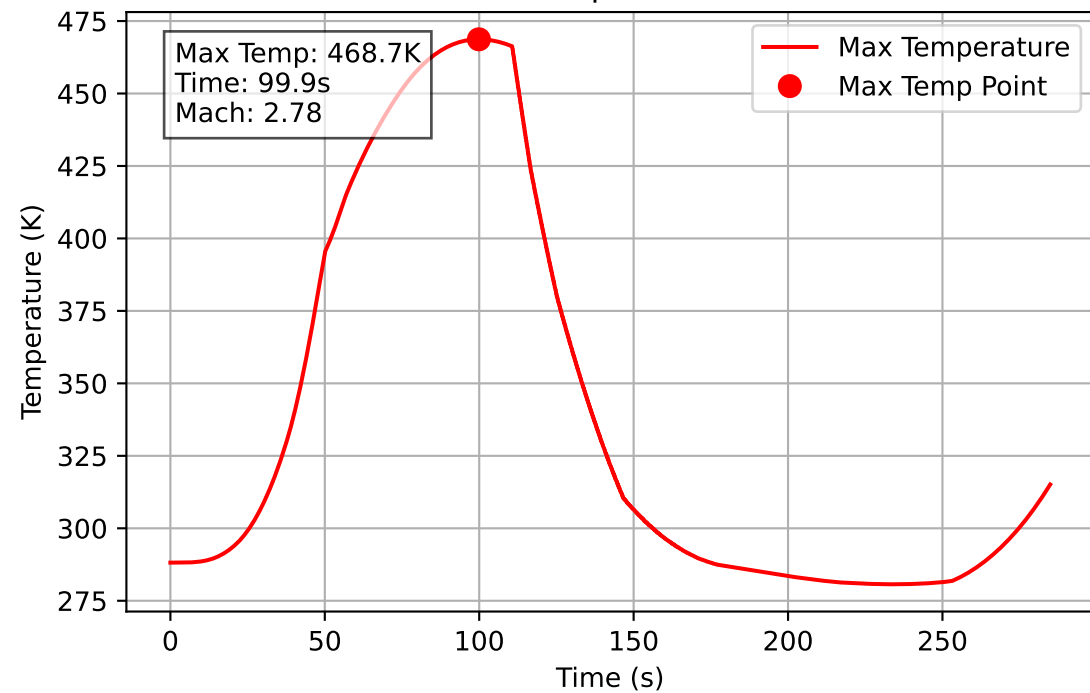
Velocity vs Time



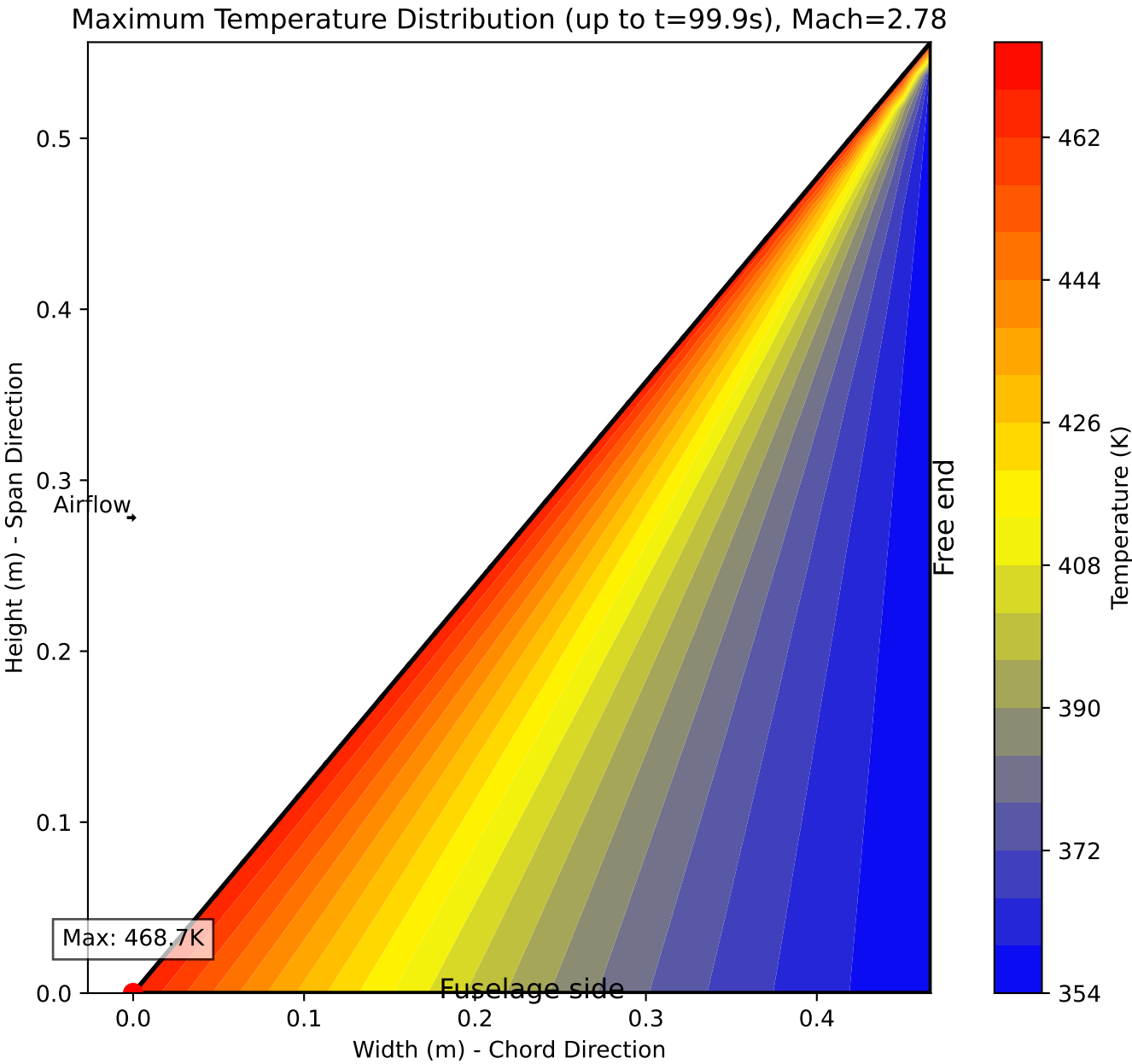
Mach Number vs Time



Maximum Temperature vs Time



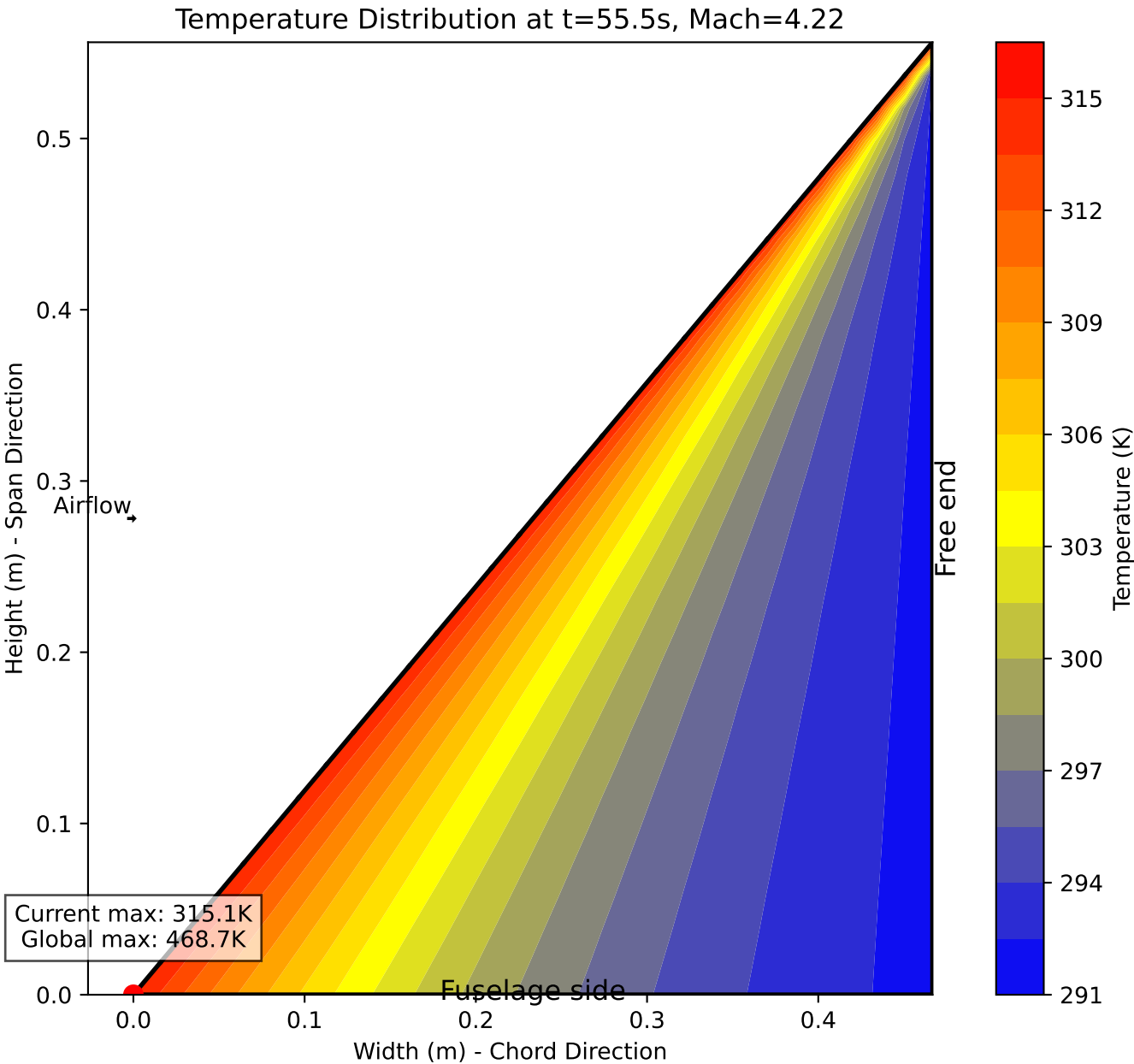
Temperature Distribution at Maximum Temperature



Flight Conditions:
Time: 99.9 s
Velocity: 808.5 m/s
Altitude: 72646.8 m
Mach: 2.78

Material: Titanium Ti-6Al-4V
Max Service Temp: 505 K
Peak Fin Temp: 468.7 K
Safety Margin: 36.3 K

Temperature Distribution at Maximum Velocity



Flight Conditions:

Time: 55.5 s
Velocity: 1265.0 m/s
Altitude: 27079.4 m
Mach: 4.22

Material: Titanium Ti-6Al-4V
Max Service Temp: 505 K
Peak Fin Temp: 468.7 K
Safety Margin: 36.3 K

INITIAL CONDITIONS AND PARAMETERS

FLIGHT SIMULATION

Generated: 2025-11-15 00:52:40

SIMULATION PARAMETERS

Fin Material: Titanium Ti-6Al-4V
Fast Mode: False
Time Step (dt): 0.01 s
After Top Reached: 10000 cycles
Animation Enabled: False

COMPONENT MASSES AND POSITIONS

Component	Mass (kg)	Position (m)	Team
nose cone	10.230	0.450	aero
fuselage_oxi	55.330	4.500	fuselage
propellant	244.080	3.000	fuselage
helium_tank	43.500	1.400	fuselage
fuselage_shell	60.250	4.000	fuselage
combustion_chamber	12.830	5.500	fuselage
nozzle	7.993	7.349	nozzle
fins (calculated)	8.162	2.100	aero
Total Dry Mass	198.295		
Total Propellant	244.080		
Total Mass	442.375		
Mass Ratio	2.231		

ROCKET GEOMETRY

Rocket Length: 2.5 m
Rocket Diameter: 0.5 m
Rocket Radius: 0.175 m
Nose Cone Length: 0.3 m
Nose Cone Shape: ogive

ENGINE PARAMETERS

ISP Sea Level: 235 s
ISP Vacuum: 300 s
Fuel Flow Rate: 4.4 kg/s

INITIAL CONDITIONS

Initial Velocity: 0 m/s
Initial Altitude: 0 m
Initial Dynamic Pressure: 0 Pa

AERODYNAMIC PARAMETERS

Drag Coefficient: 0.5
Max Dynamic Pressure: 82800.0 Pa

INITIAL CONDITIONS (CONTINUED) - PAGE 2

FLIGHT SIMULATION

Fin Width: 466.72 mm
Fin Mass (single): 2.040431 kg
Total Fin Mass: 8.161724 kg
Wall Thickness: 4 mm
Fin Set CG Position: 2.1 m

MATERIAL PROPERTIES

Thermal Conductivity: 25 W/(m·K)
Density: 3930 kg/m³
Specific Heat: 610 J/(kg·K)
Max Service Temperature: 505 K
Yield Strength: 1050 MPa
Thermal Expansion: 6.6e-06 1/K
Emissivity: 0.63