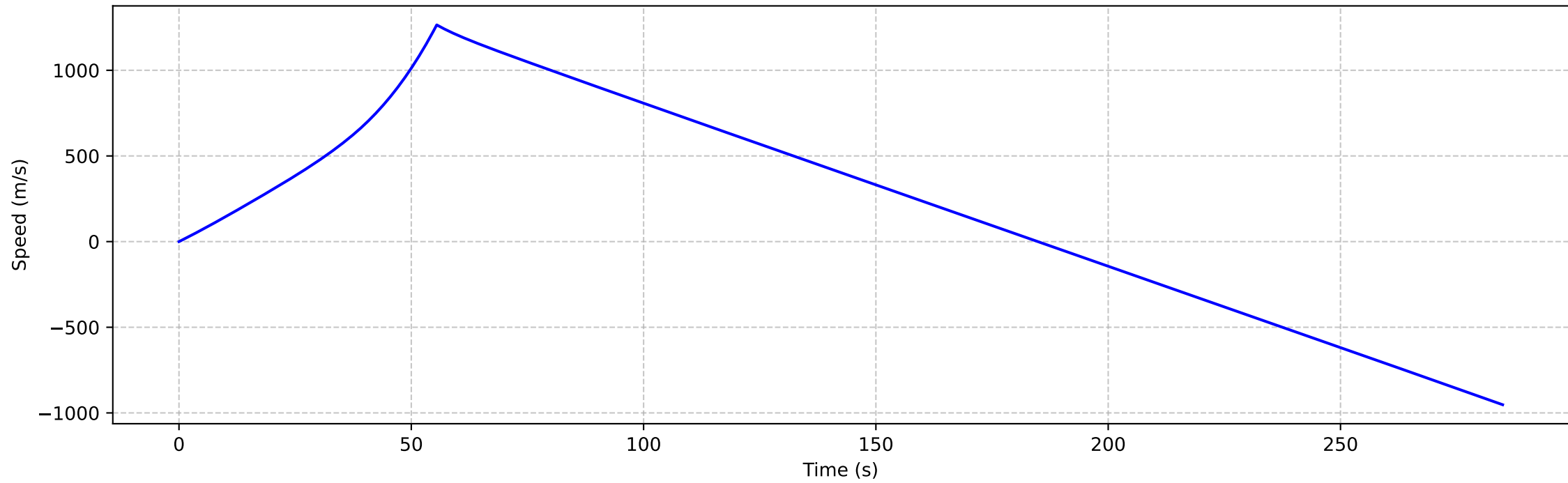
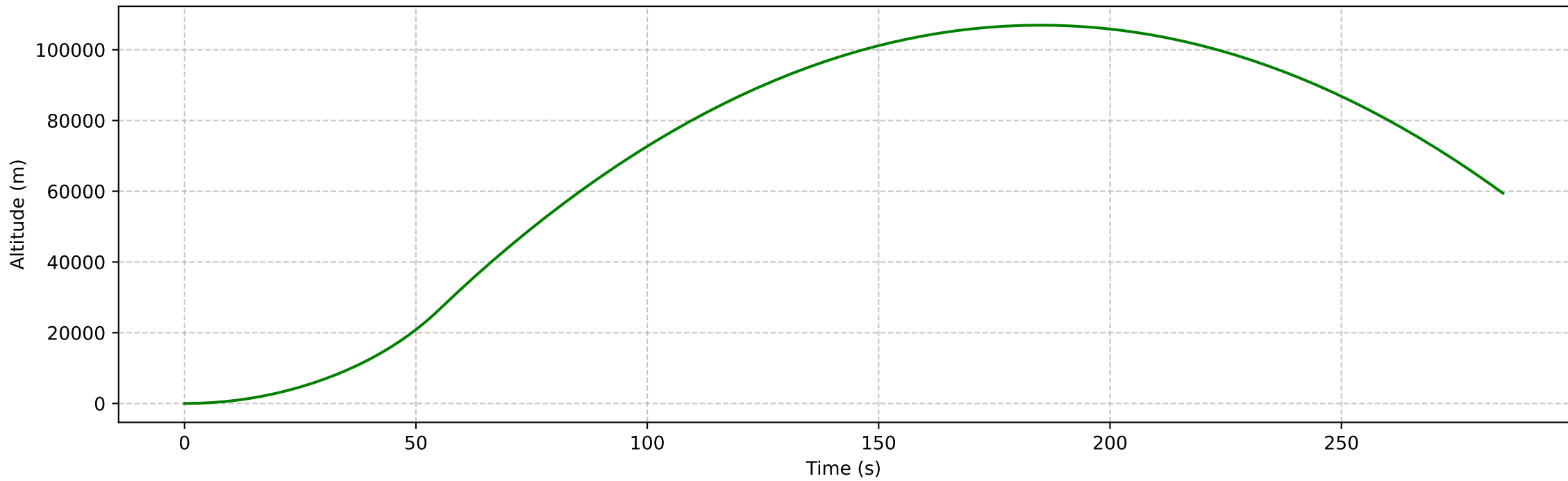


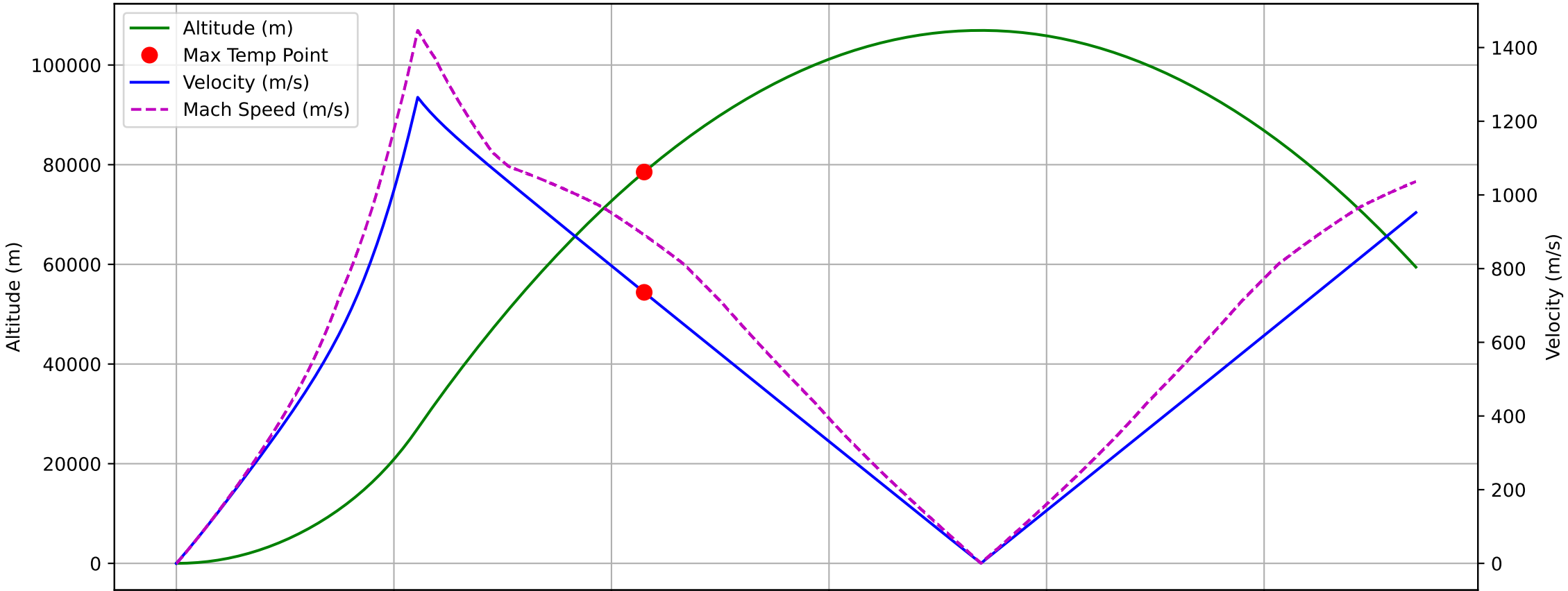
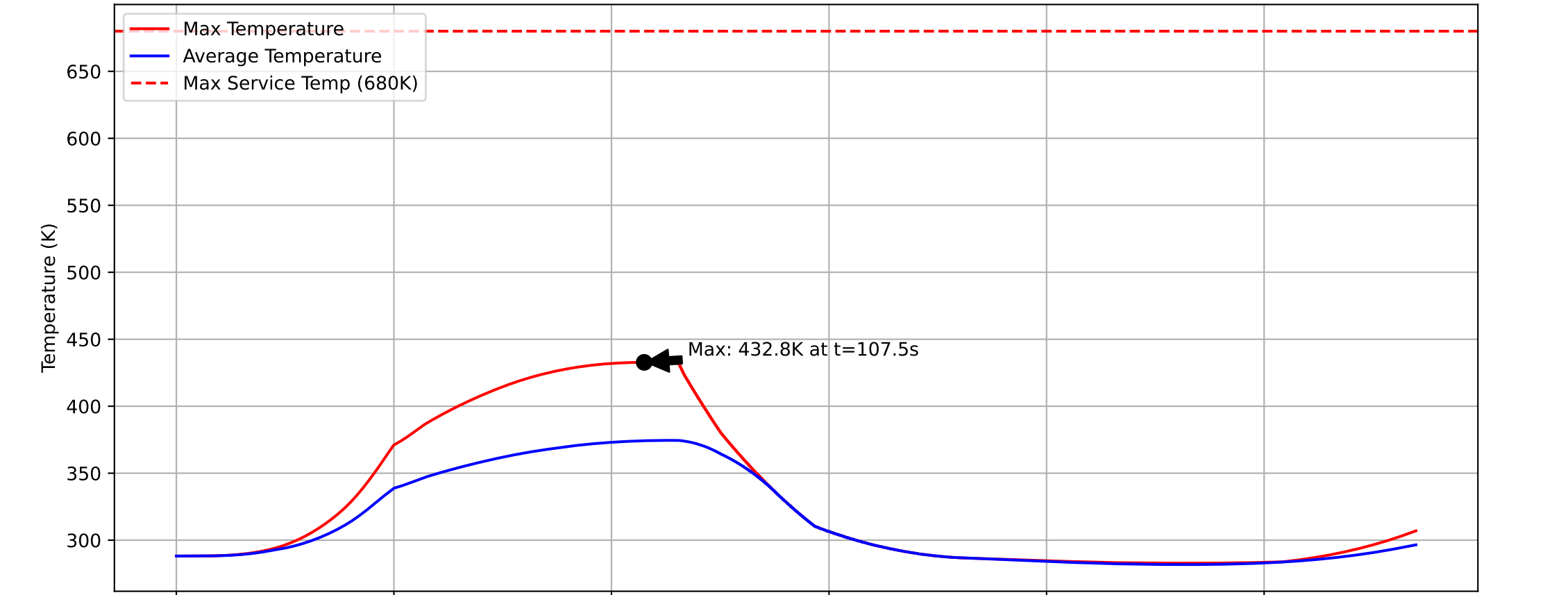
Speed vs Time



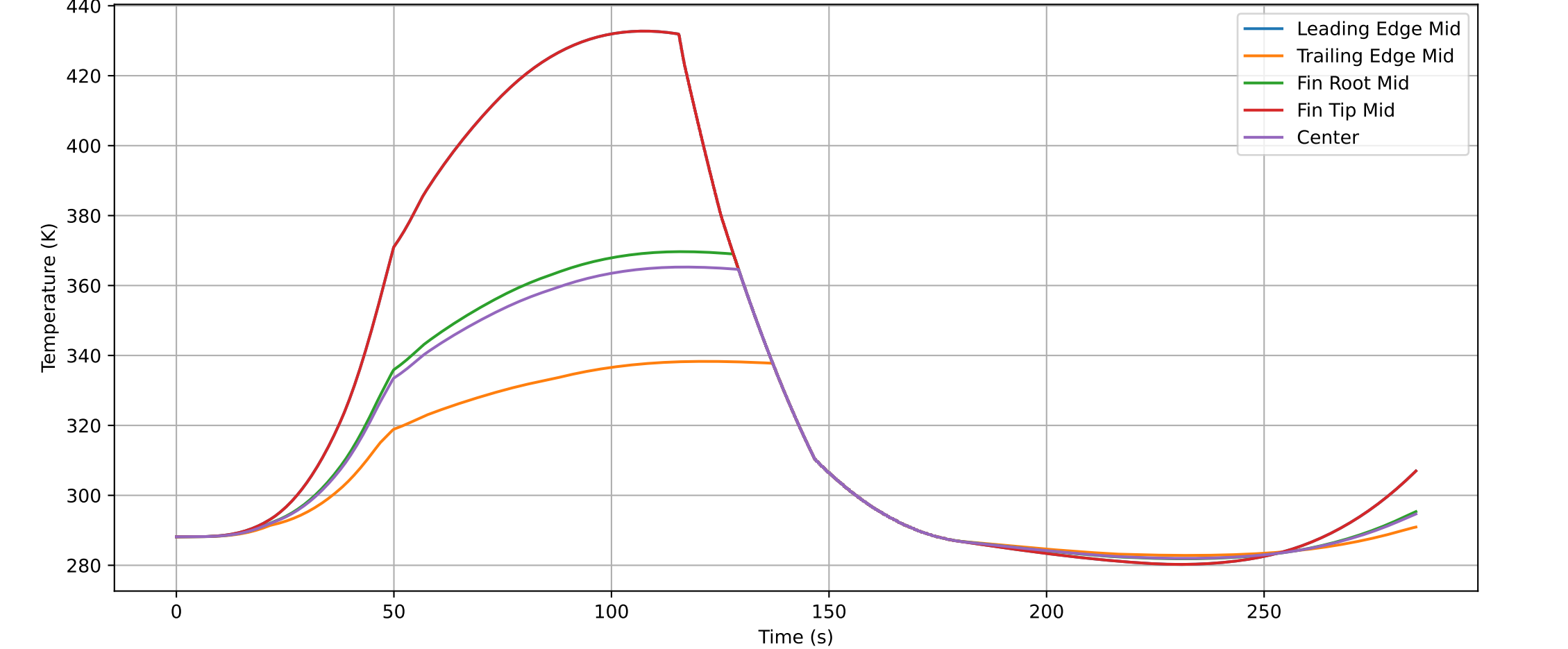
Altitude vs Time



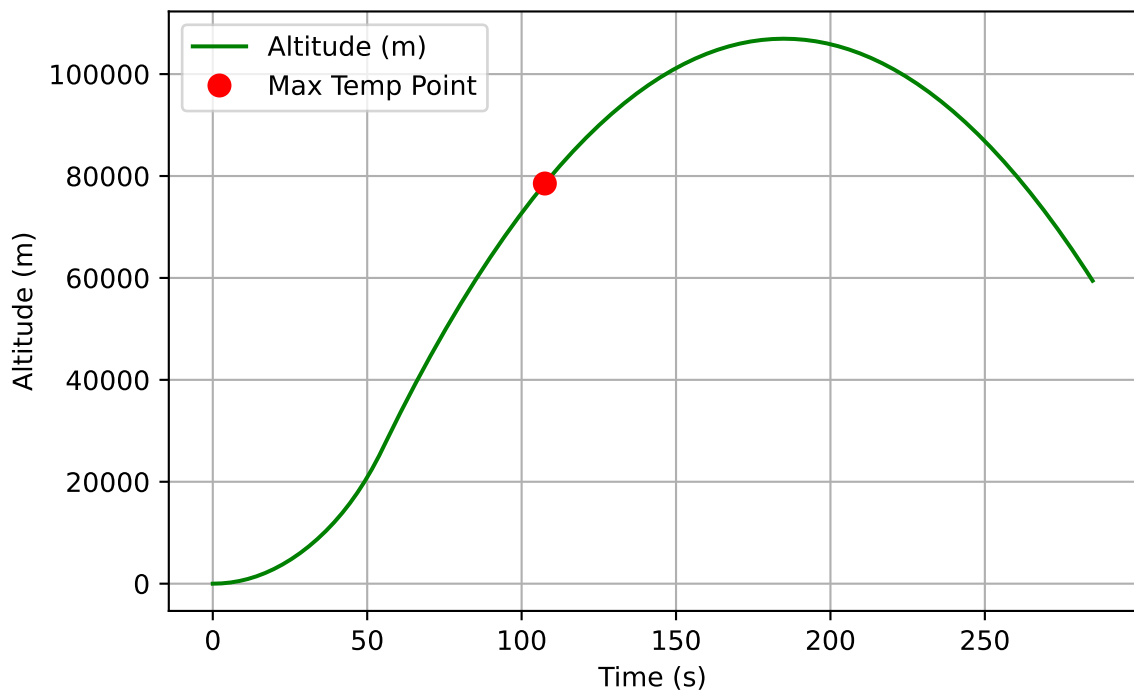
Fin Temperature History - Beryllium



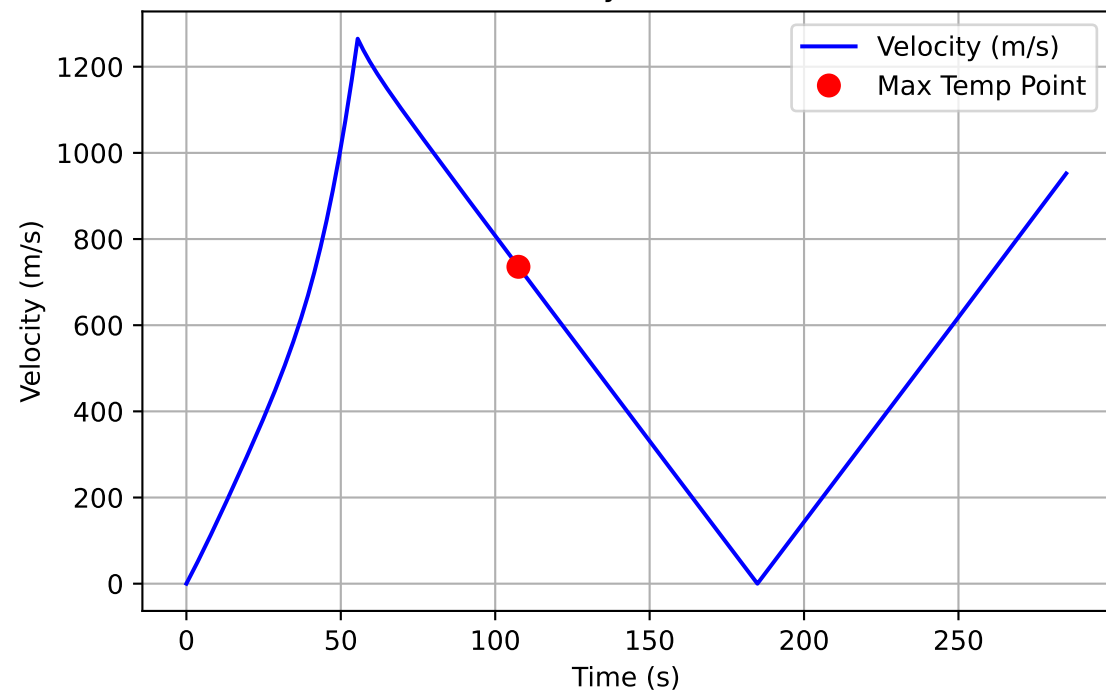
Temperature at Track Points



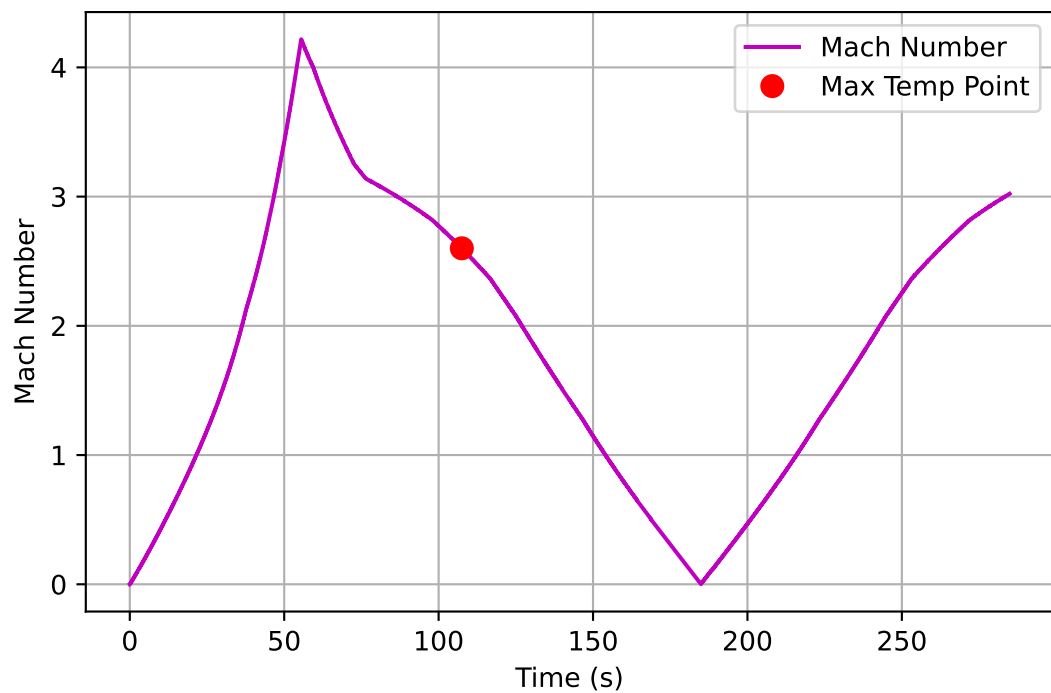
Altitude vs Time



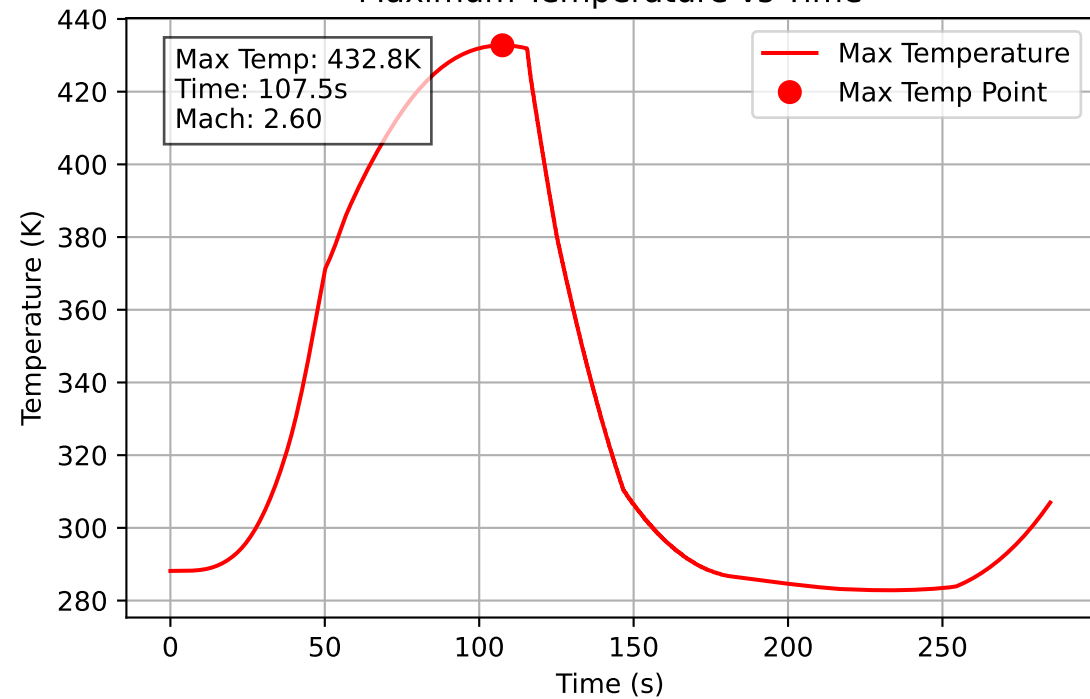
Velocity vs Time



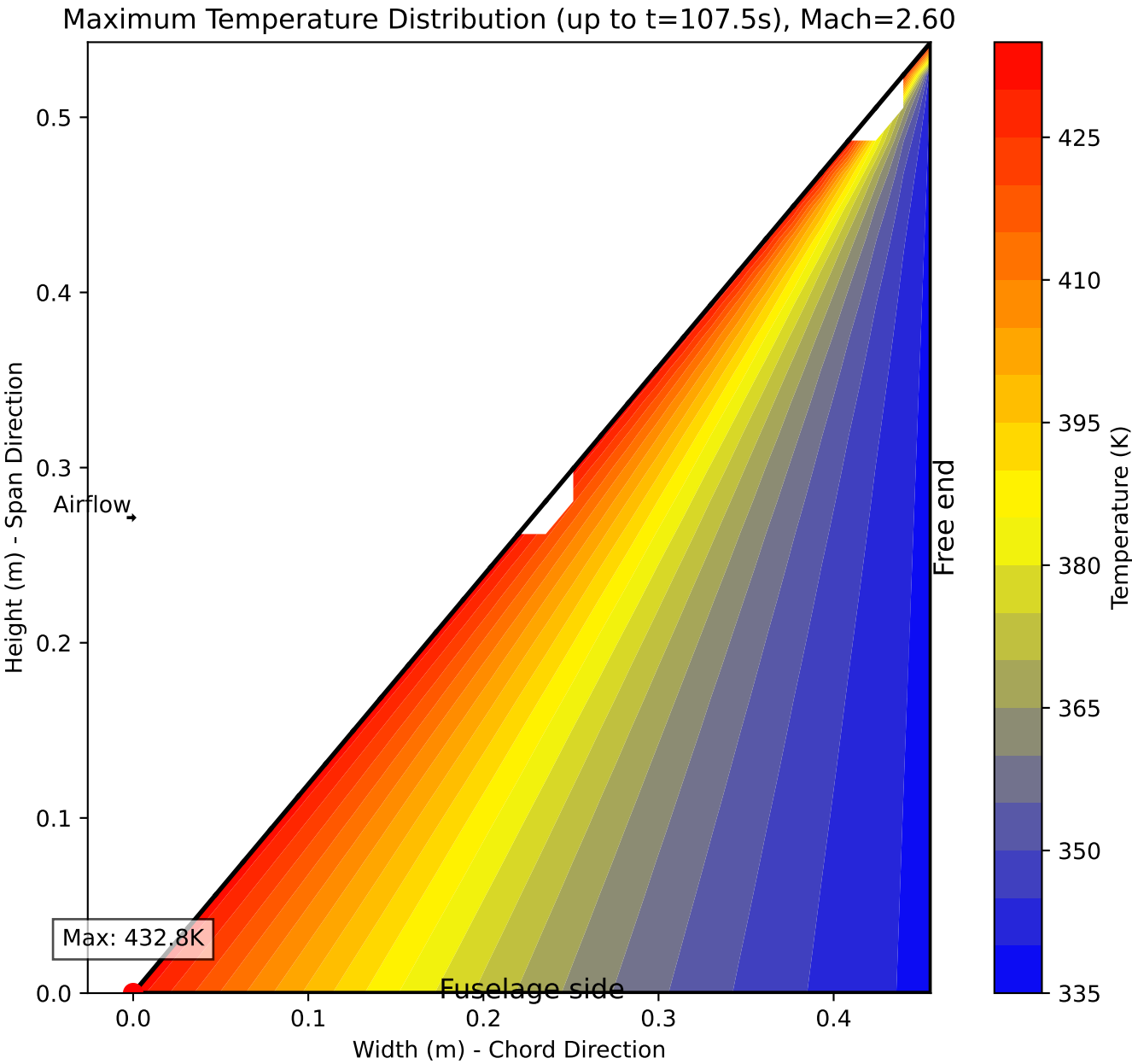
Mach Number vs Time



Maximum Temperature vs Time



# Temperature Distribution at Maximum Temperature

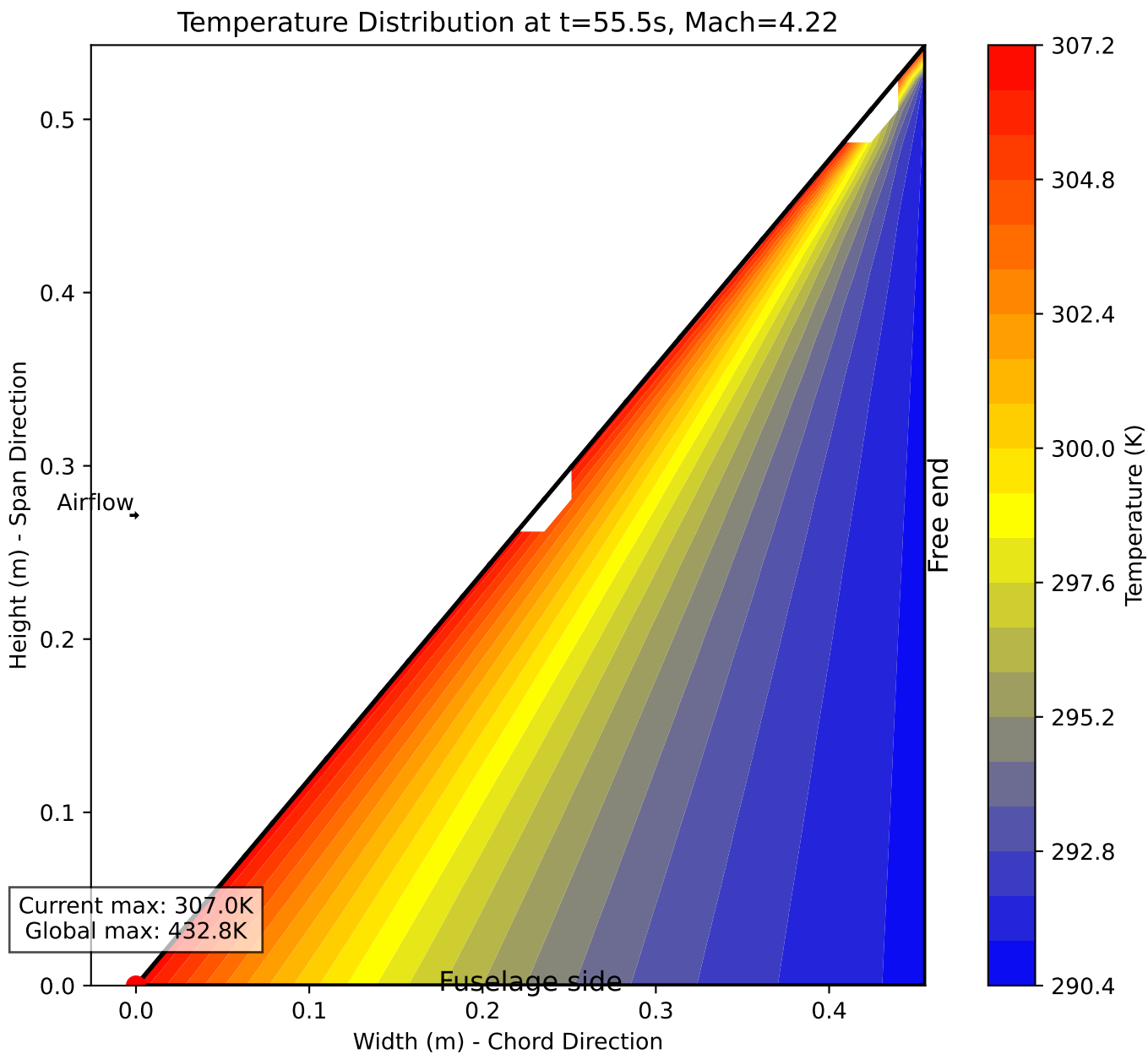


Flight Conditions:

Time: 107.5 s  
Velocity: 735.6 m/s  
Altitude: 78529.6 m  
Mach: 2.60

Material: Beryllium  
Max Service Temp: 680 K  
Peak Fin Temp: 432.8 K  
Safety Margin: 247.2 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: Beryllium  
Max Service Temp: 680 K  
Peak Fin Temp: 432.8 K  
Safety Margin: 247.2 K

# INITIAL CONDITIONS AND PARAMETERS

## FLIGHT SIMULATION

Generated: 2025-11-12 08:27:32

### SIMULATION PARAMETERS

Fin Material: Beryllium  
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)	3.660	2.100	aero
Total Dry Mass	193.793		
Total Propellant	244.080		
Total Mass	437.873		
Mass Ratio	2.259		

### 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: 455.51 mm  
Fin Mass (single): 0.914936 kg  
Total Fin Mass: 3.659745 kg  
Wall Thickness: 4 mm  
Fin Set CG Position: 2.1 m

#### MATERIAL PROPERTIES

Thermal Conductivity: 208 W/(m·K)  
Density: 1850 kg/m<sup>3</sup>  
Specific Heat: 1880 J/(kg·K)  
Max Service Temperature: 680 K  
Yield Strength: 247 MPa  
Thermal Expansion: 1.14e-05 1/K  
Emissivity: 0.2