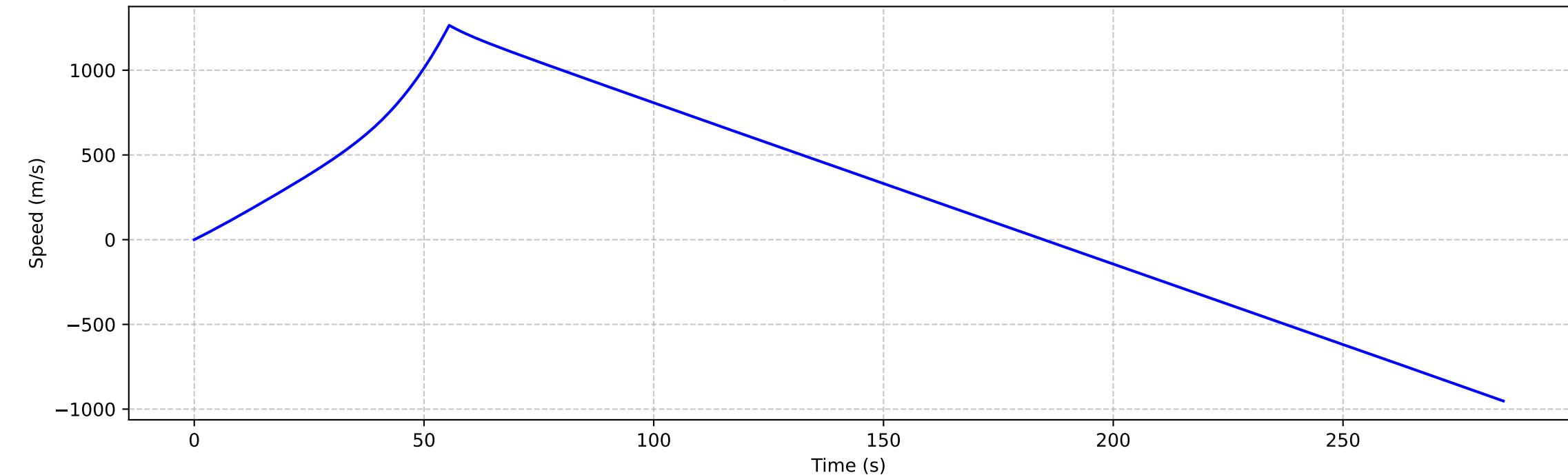
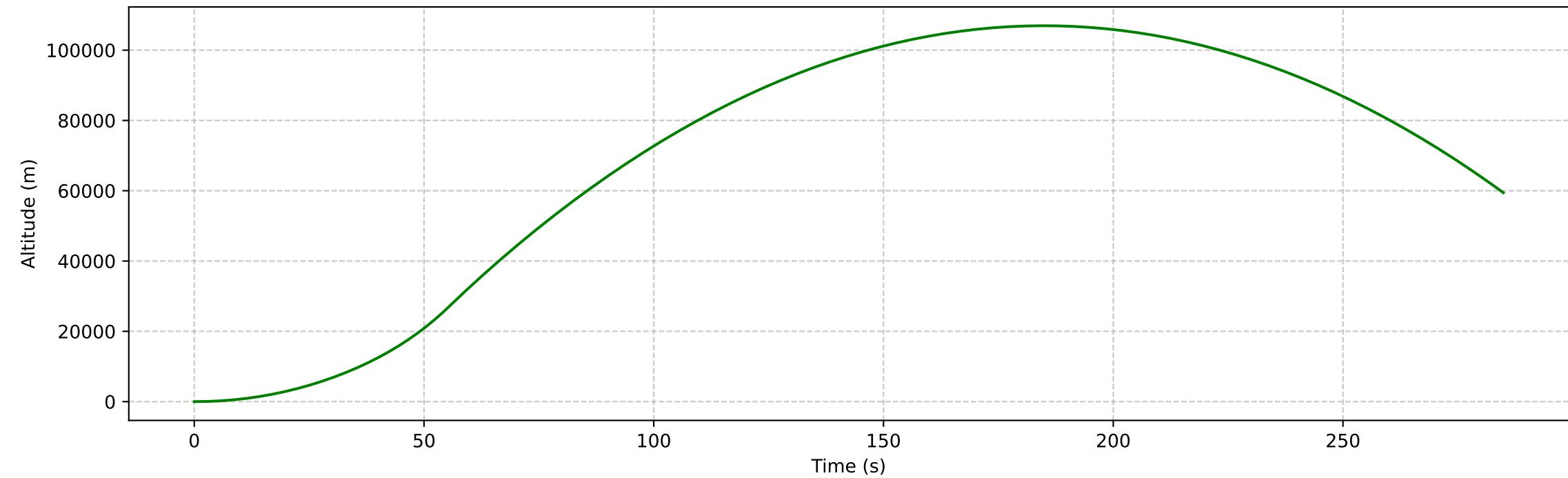


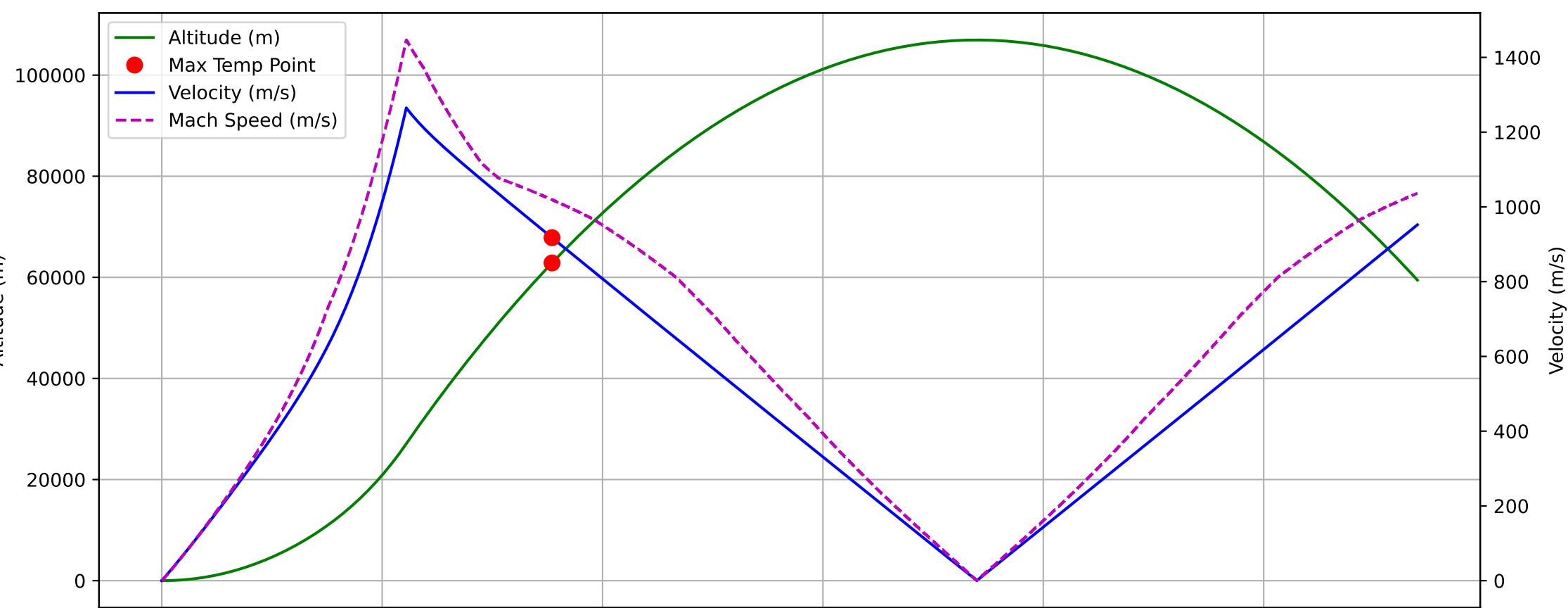
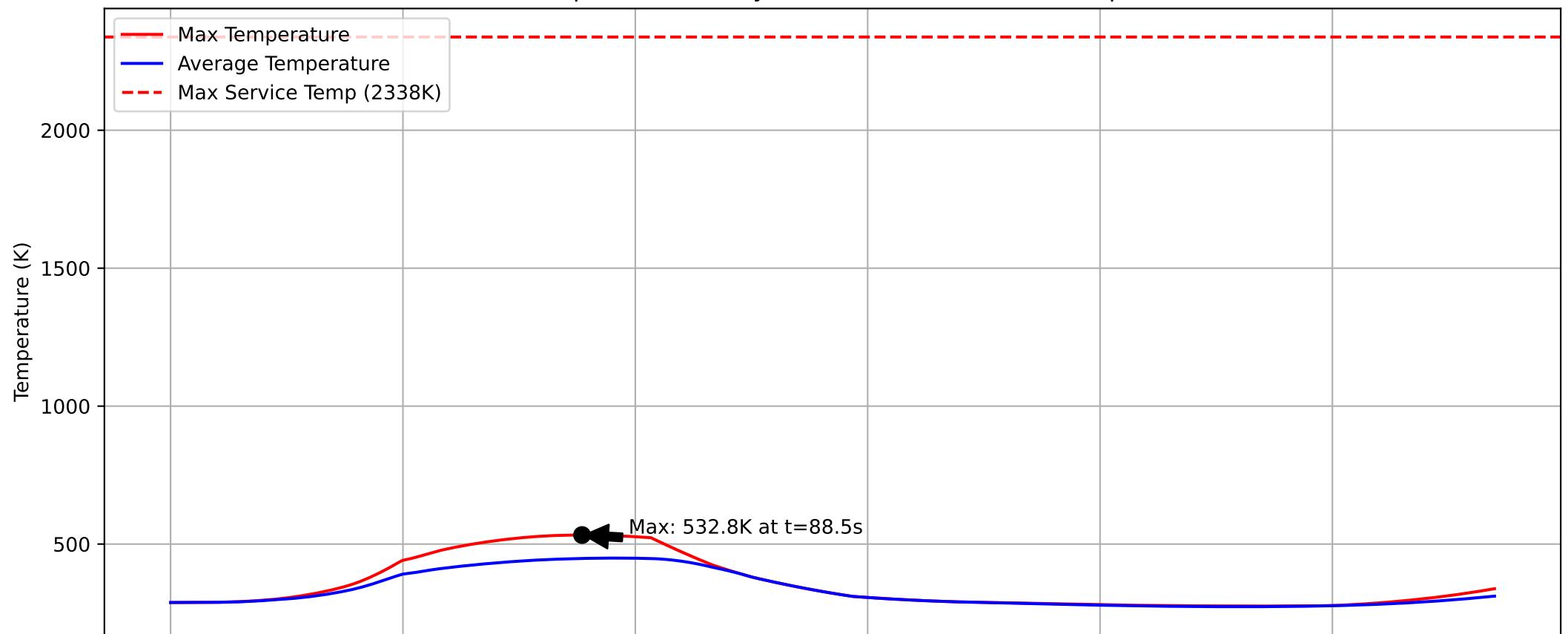
Speed vs Time



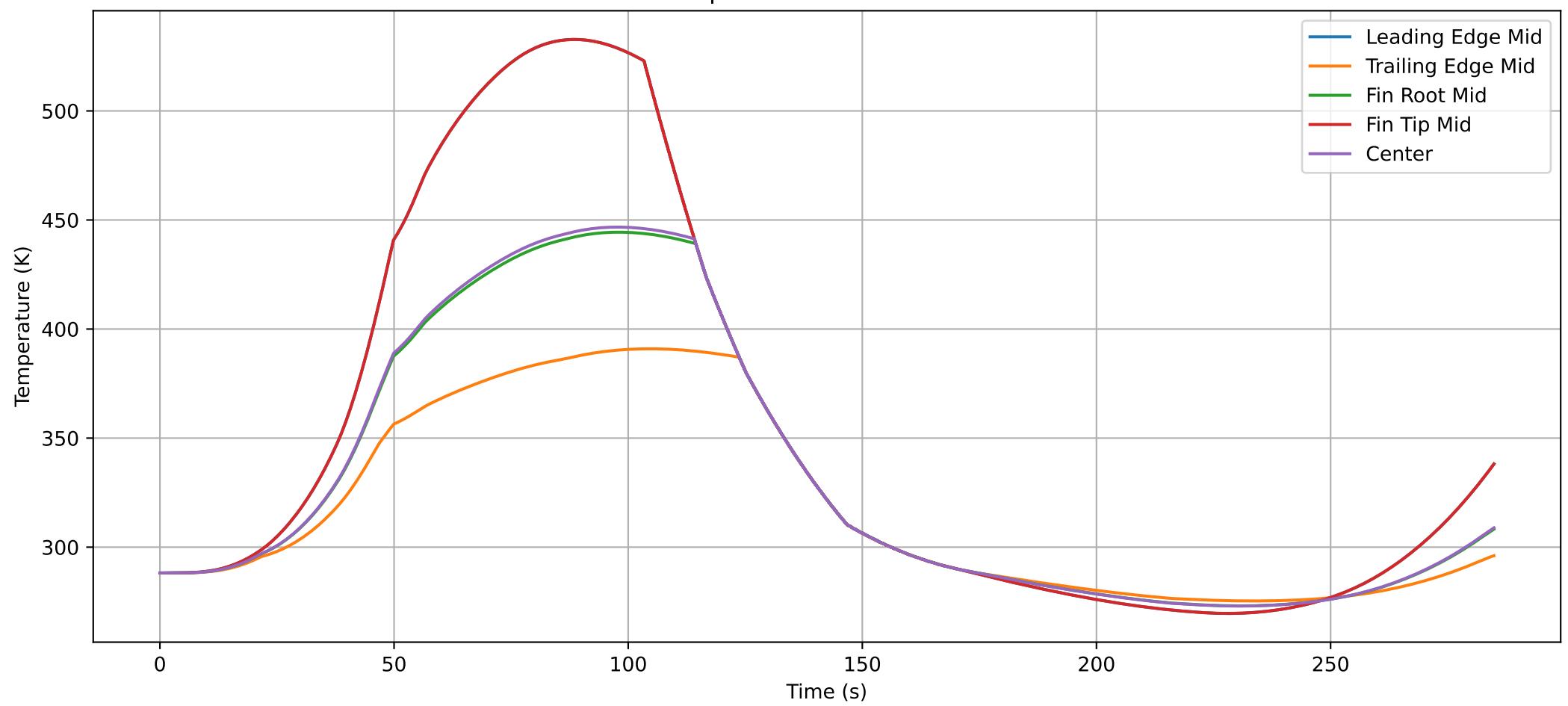
Altitude vs Time



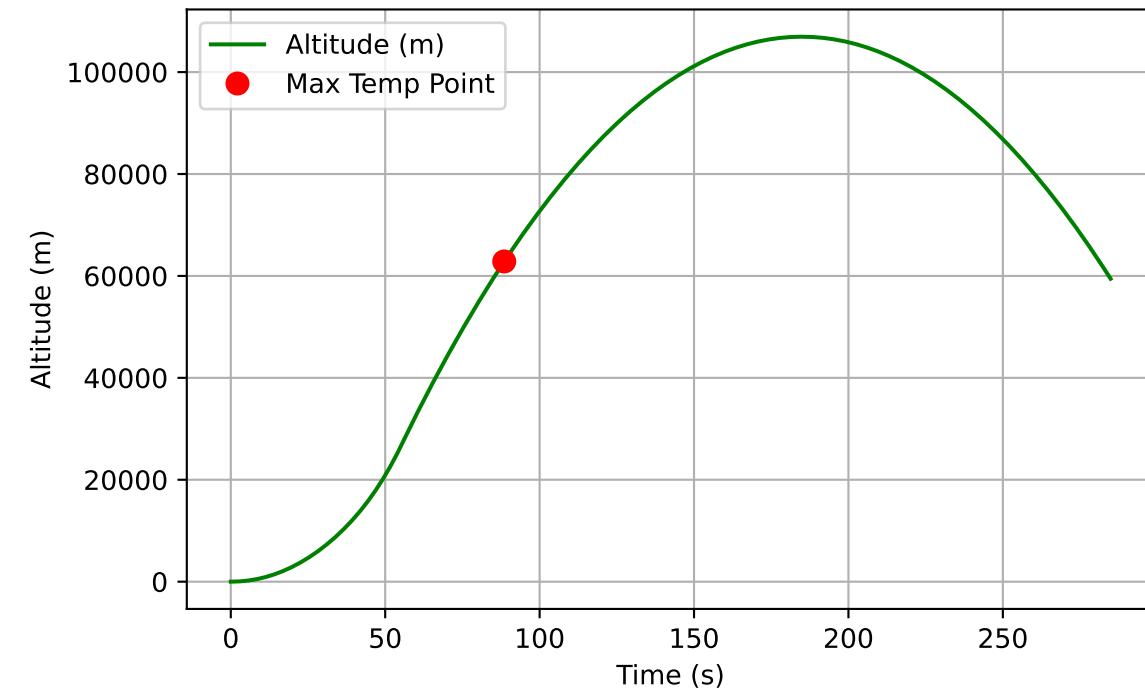
Fin Temperature History - Carbon carbon matrix composite



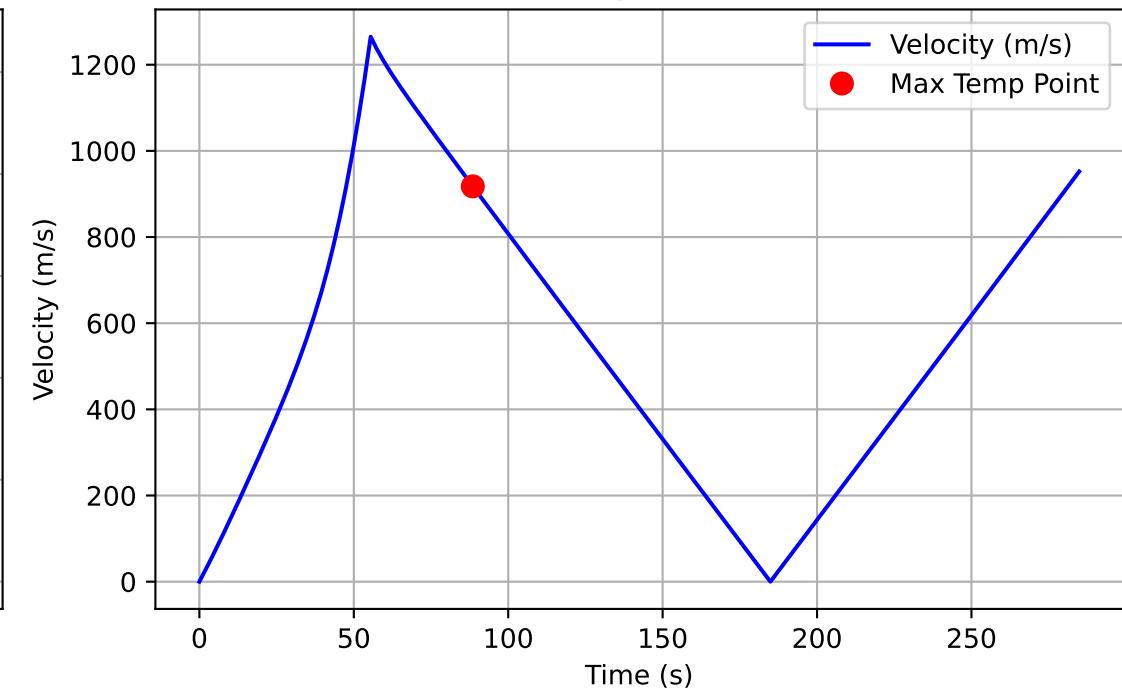
Temperature at Track Points



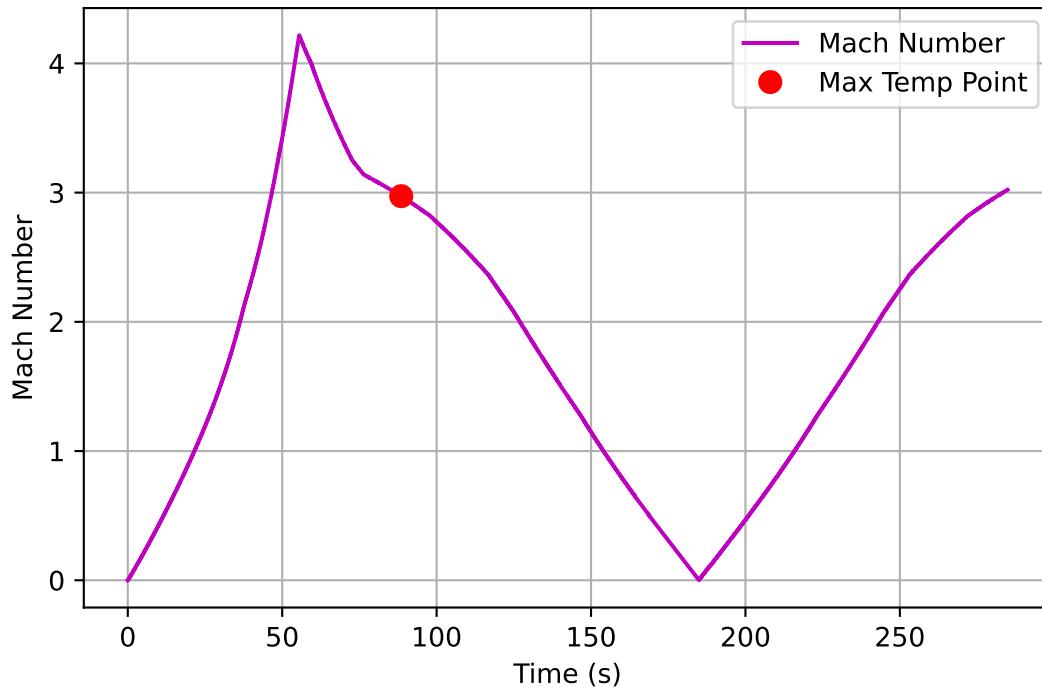
Altitude vs Time



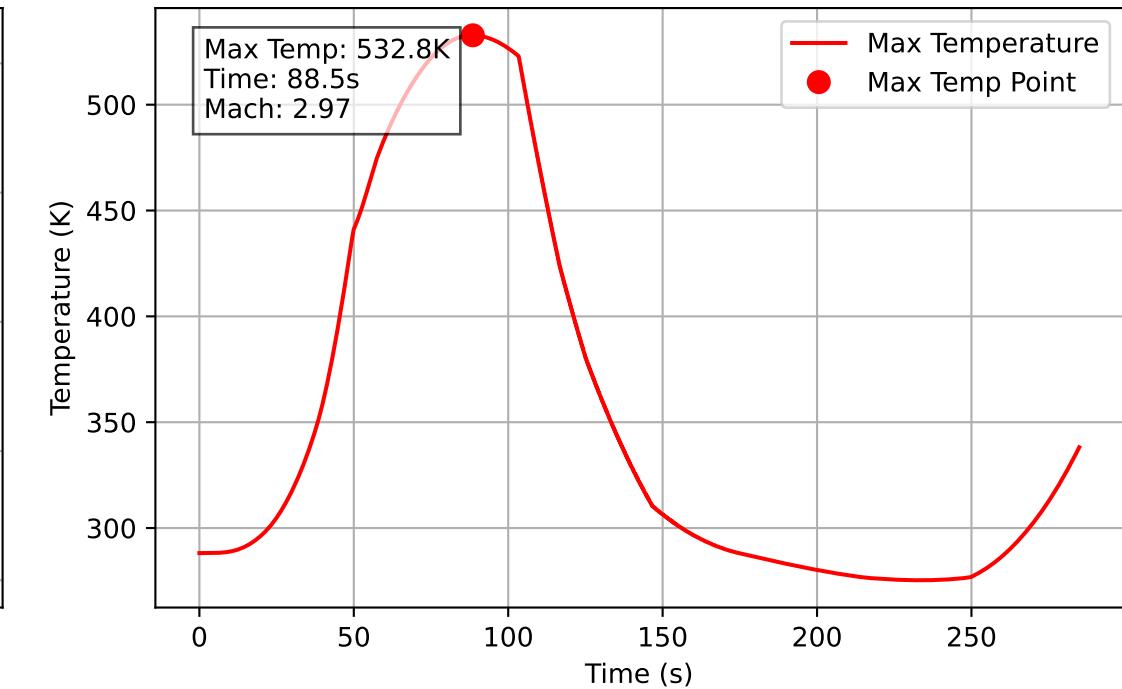
Velocity vs Time



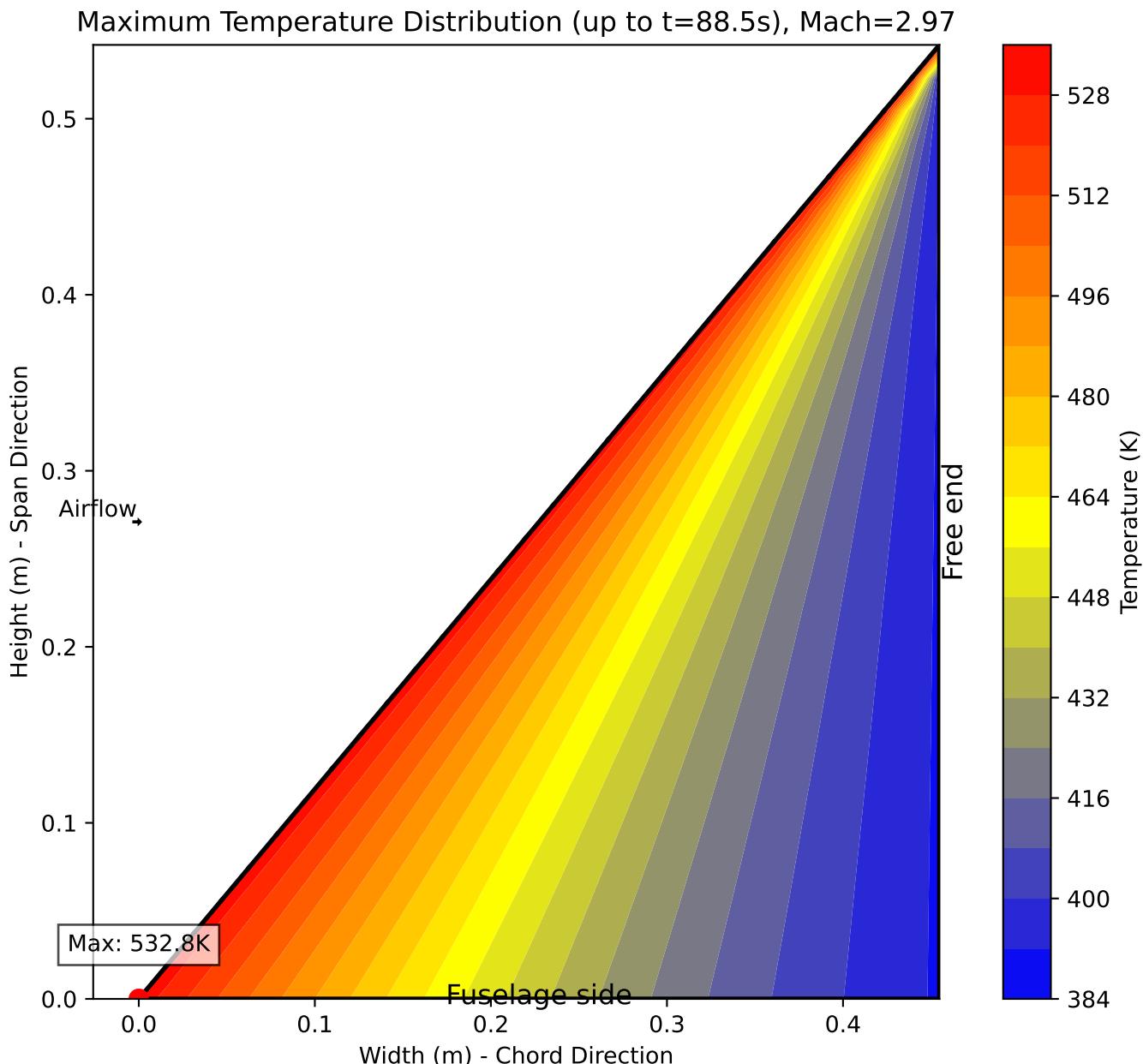
Mach Number vs Time



Maximum Temperature vs Time



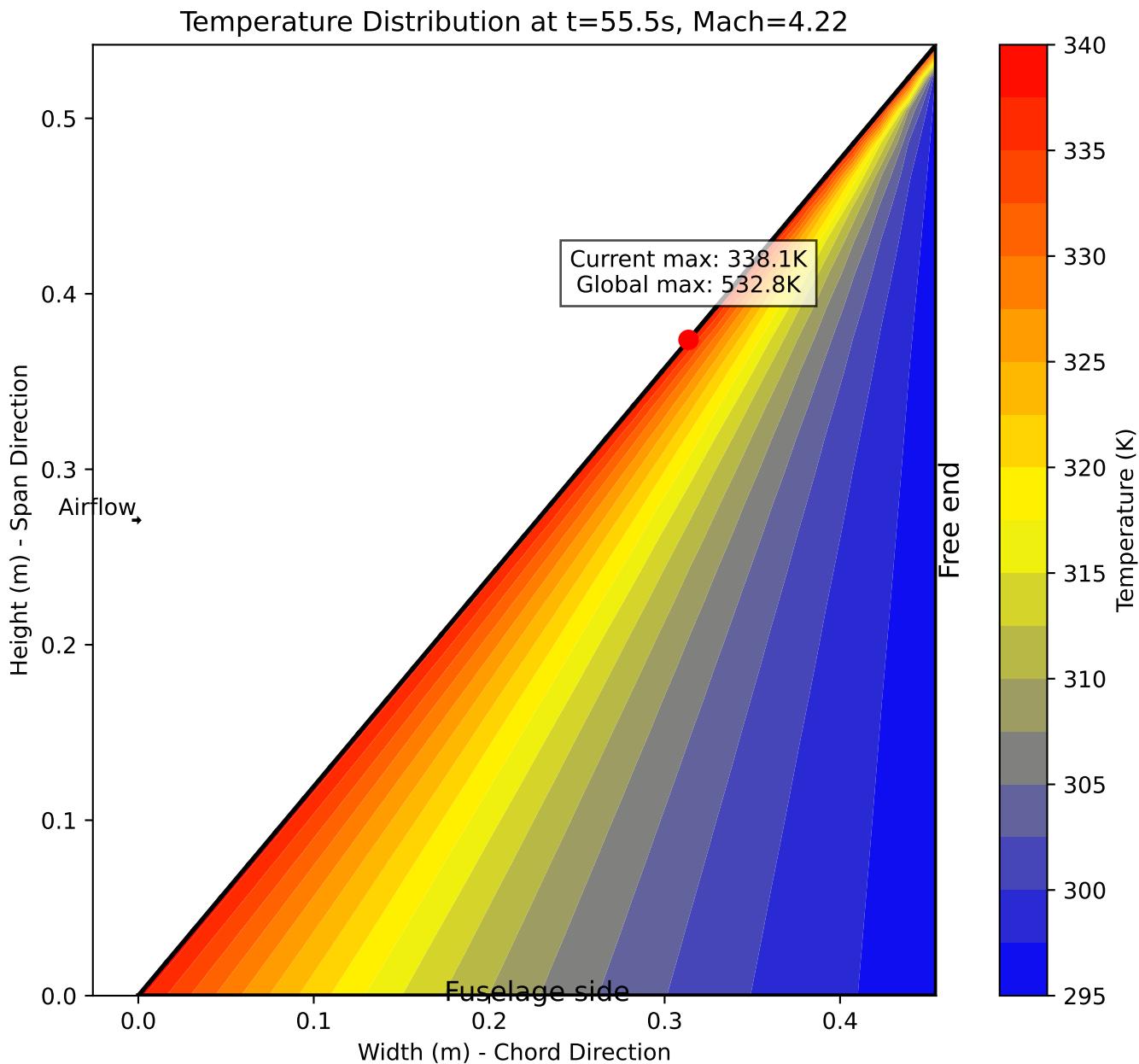
Temperature Distribution at Maximum Temperature



Flight Conditions:
Time: 88.5 s
Velocity: 917.6 m/s
Altitude: 62843.0 m
Mach: 2.97

Material: Carbon carbon matrix composite
Max Service Temp: 2338 K
Peak Fin Temp: 532.8 K
Safety Margin: 1805.2 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: Carbon carbon matrix composite
Max Service Temp: 2338 K
Peak Fin Temp: 532.8 K
Safety Margin: 1805.2 K

INITIAL CONDITIONS AND PARAMETERS

FLIGHT SIMULATION

Generated: 2023-11-15 00:51:51

SIMULATION PARAMETERS

Fin Material:	Carbon carbon matrix composite
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)	3.352	2.100	aero
Total Dry Mass	193.485		
Total Propellant	244.080		
Total Mass	437.565		
Mass Ratio	2.261		

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

Page 1 of 2

AERODYNAMIC PARAMETERS

Drag Coefficient:	0.5
Max Dynamic Pressure:	82800.0 Pa

INITIAL CONDITIONS (CONTINUED) - PAGE 2

FLIGHT SIMULATION

Fin Width: 454.75 mm
Fin Mass (single): 0.837935 kg
Total Fin Mass: 3.351739 kg
Wall Thickness: 4 mm
Fin Set CG Position: 2.1 m

MATERIAL PROPERTIES

Thermal Conductivity: 40 W/(m·K)
Density: 1700 kg/m³
Specific Heat: 756 J/(kg·K)
Max Service Temperature: 2338 K
Yield Strength: 500 MPa
Thermal Expansion: 4e-06 1/K
Emissivity: 0.9