Analysis of the Bereshit Landing Simulation

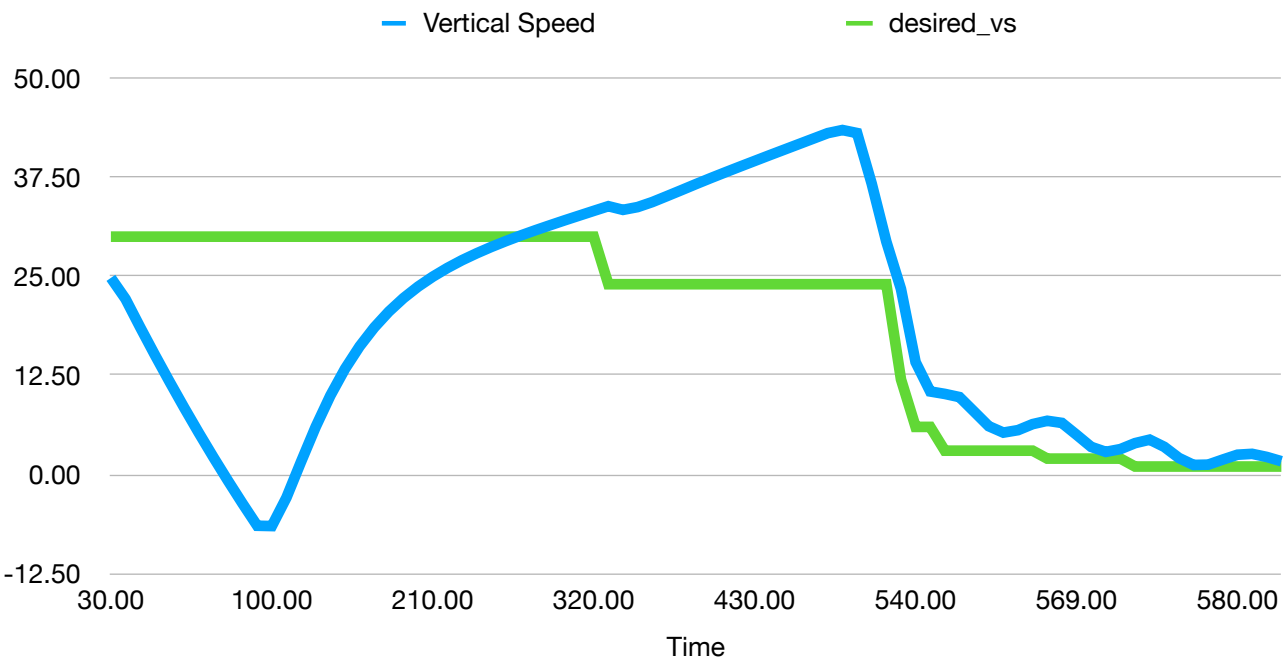
The code is a simulation of the Bereshit lunar lander's descent and landing sequence, implemented in Java. Here's a breakdown of the key components:

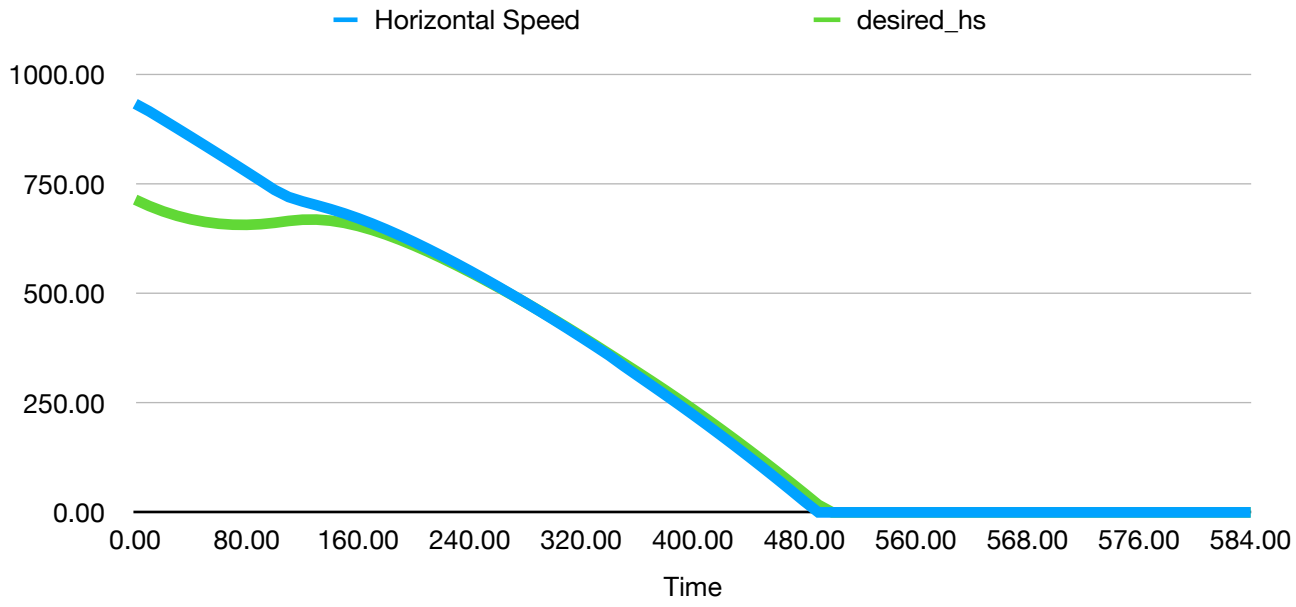
Main Components:

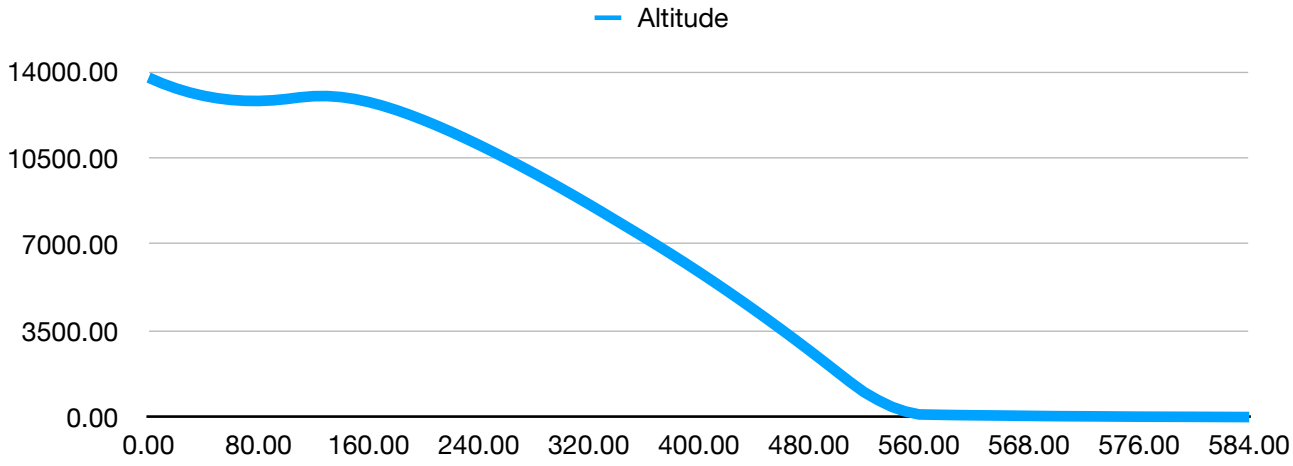
1. **Main Class**: The entry point that initializes the simulation with starting parameters and runs the landing sequence.
2. **Moon Class**: Contains physical constants about the moon (radius, gravity) and calculates effective gravitational acceleration based on horizontal speed.
3. **PIDController Class**: Implements a Proportional-Integral-Derivative controller used to adjust thrust and angle during descent.
4. **Bereshit_101 Class**: Contains all the spacecraft parameters and the main landing logic.

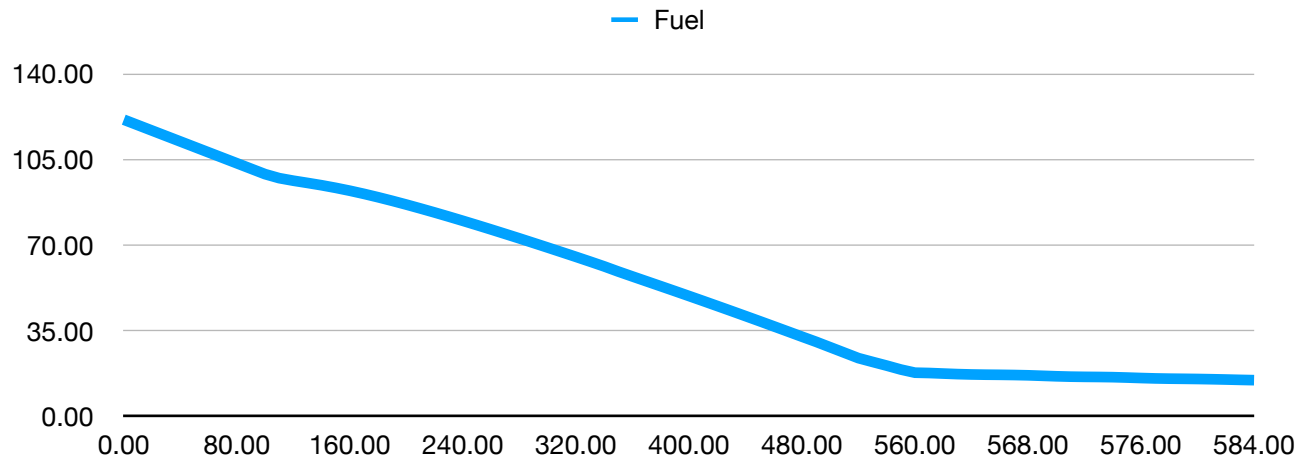
Key Simulation Parameters:

- Initial vertical speed (vs): 24.8 m/s
- Initial horizontal speed (hs): 932 m/s
- Initial distance to landing site: 181,000 m
- Initial altitude: 13,748 m
- Initial angle: 58.3 degrees
- Initial fuel: 121 liters
- Total weight: 165.0kg + fuel




Horizontal Speed
desired_hs
1000.00
750.00
500.00
250.00
0.00
0.00
80.00
160.00
240.00
320.00
400.00
480.00
560.00
568.00
576.00
584.00
Time


Altitude
14000.00
10500.00
7000.00
3500.00
0.00
0.00
80.00
160.00
240.00
320.00
400.00
480.00
560.00
568.00
576.00
584.00


Fuel
140.00
105.00
70.00
35.00
0.00
0.00
80.00
160.00
240.00
320.00
400.00
480.00
560.00
568.00
576.00
584.00