The Lunar Mission Launch Simulator Initial Writeup

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1 History

Launching Simulators pose a unique challenge in implementation of physics and real-time monitoring of:

1. Current Speed
2. Current Altitude
3. Current Drag Coefficient
4. Current Position relative to Earth
5. Current Fuel Content
6. Current Stage
   (a) When Staging should occur
7. Current End of Lauch Sequence
   (a) When the Capsule is in stable orbit?
   (b) When all of the Stages are completely finished?
   (c) When the Capsule is actually in space?

All of these pose particular issues as related to accurately simulating a launch.

2 Abstract

Part of the entire Mission Simulation is the Launch. The Launch is a sequence computer simulated. Modeling the launch sequence is symbiotic to an actual launch of a rocket sent on an actual space mission.

3 Concept

To gain understanding in all aspects of development of a Mission Launch Simulator.
Including:

1. Physics
2. Software Development Life Cycle
   (a) Analysis
   (b) Design
   (c) Development
   (d) Deployment
   (e) Continuous Development
   (f) Iterative Development
3. Software Concurrency
   (a) Mainly centered around the multple software modeling objects aggregate to the simulator

4 Intent

Develop the Launch Simulator as part of the Lunar Mission Simulator.

5 Stakeholders & Interests

Anyone interested in using the Launch Simulator.

- Space Crews–who want to monitor the launch
- Mission Planners–who want a successful Launch Simulator
- Engineers/Technicians–who want to view/assess the launch in real-time as part of the overall Mission.

6 Typical Success Scenario

The capsule(s)/payload successfully delivered into space. A successful launch is considered:

1. Successful ignition of the Launch Vehicle
2. Successful and complete staging of all the stages of the Launch Vehicle
3. Obtaining the correct Orbital Altitude

4. Obtaining the correct Orbital Trajectory
5. Obtaining the correct Orbital Velocity
6. Successful separation of the last stage of the Launch Vehicle from the capsule(s)/payload