

Data Feeder Design Writeup

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1 History

Simulations (mechanical & computerized) are an essential part of the modern development process. It is often done for

1. Cost of Effectiveness
2. Safety
3. Proof of Concept
4. Ease
5. Speed

A full prototype does not need development: allowing for all of the above

2 Abstract

The System is to be tested in Simulation Mode. Simulation mode, is to model real events and data in as accurate a model as possible. Since the System is data driven, that means a Simulation must emulate real events via data. Hence the Simulation is Data Driven, in addition.

3 Concept

Create a Data Feeder that emulates data for all components in all phases (states) of the System to the point the System and Stake Holders are ignorant to the fact the data is simulated and not an actual mission.

4 Intent

Create a Data Feeder specifically designed to work with the Lunar Simulator. The purpose of the Data Feeder is to Feed Data (actually be the Simulator for the Lunar Simulator/System) When data from actual hardware is not available.

Feed all the data related to the Lunar Sequence in all the Phases (States) to the System.

While the System is running in Simulation, the Data Feeder will feed the appropriate data to the System via System Requests of the desired Data. Future development may require the System is alerted to the State Changes so as to ensure the System and Stakeholders are agnostic to the source of the incoming data.

The data modeled by the Data Feeder is independent of System Request.

The Data Feeder will calculate all the needed System Data for the aggregate components for every phase (State) in the System.

5 Stakeholders & Interests

1. Flight Controller–Want System Data related to the particular Phase (state) of the mission. Want accurate simulation to possible events and occurrences.
2. Engineers/Technicians–Want System Data for their component(s) of interest in the target Mission Phase (state). Want data accuracy in relation to possible Mission Type Events.
3. Systems Engineers–want accurate simulation for cost effectiveness.

6 Typical Success Scenario

1. The (Lunar Mission) System Administor Starts the (Lunar Mission) System
2. The (Lunar Mission) System is running
3. The (Lunar Mission) System Administrator requests the (Lunar Mission) System to run in simulation: sending the path to the Mission Parameters and System/Components file to the Data Feeder
4. The (Lunar Mission) System is running in Simulation Mode
5. The Data Feeder is started
 - (a) The Mission Parameters File is loaded
 - (b) The System/Components File is loaded
6. The Data Feeder Continuously Calculates the System Mission Data
7. The Data Feeder Independently Calculates the System Mission Data

8. The System Periodically requests Mission Data
9. The Data Feeder returns requested Mission Data

7 Special Notes

- The Data Feeder works independently and asynchronously from the (Lunar Mission) System.
- Mission Data is based on what the (Lunar Mission) System monitors
 - Based solely on the System incarnation
 - Subject to change
 - Pertinent Data dependent on Mission Parameters
- In the current incarnation, the System monitors and requests data from the Feeder
 - While this allows both loose association, there is a stronger association as opposed to implementing the *Publish/Subscribe* design pattern
 - Should be considered for future development and work