

Use Case 1: Monitor Pre-launch

Scope: Launch Simulator

Level: Flight Controller Goal

Primary Actor: Flight Controller

Secondary Actors: Astronaut, Engineer/Technician

Related Use Cases: *Use Case 2: the Flight Controller Shall Monitor the Countdown*

Stakeholders & Interests:

- Flight Controller: wants to control the Pre-Launch Activities
 - Control the Countdown Time *See Use Case 2: the Flight Controller Shall Monitor the Countdown*
 - Monitor the Rocket
 - Monitor all the Stages in the Rocket
 - Monitor the Engines for each Stage
 - Monitor the Fuel System for each Stage
 - Monitor the Launching Mechanism
- Engineer/Technician: wants to monitor Pre-Launch Data
- Astronaut: wants to monitor Pre-Launch Data

Pre-Conditions: An appropriate Countdown Time is Entered *See Use Case 2: the Flight Controller Shall Monitor the Countdown*

Post-Conditions: The Launch is Initiated

Flow of Events:

Flight Controller	System
1. Starts the Countdown <i>See Use Case 2: the Flight Controller Shall Monitor the Countdown</i>	
	2. Periodically Monitors Pre-Launch Data
	3. Returns Launching Mechanism Pre-Launch Data
	4. Returns Rocket Pre-Launch Data (all Rocket Stage Data)
	5. Returns Capsule Pre-Launch Data
	6. Countdown equals zero <i>See Use Case 2: the Flight Controller Shall Monitor the Countdown</i>
7. Initiate Launch Sequence	
	8. Transitions to Launch Initiation
	9. Initiate Launch State

Alternative Flows:

- 2a-5a. If the System detects an anomaly in the Pre-Launch Data, then the System alerts the Flight Controller of the anomaly
- 2b-5b. If the System alerts the Flight Controller of a Pre-Launch anomaly (*See Alternative Flow 2a.*), then the Flight Controller can choose to hold the Countdown
- 2c-5c. If there is a hold in the Countdown and the anomaly is resolved, then the Flight Controller can choose to resume the Countdown, the Countdown continues at the stopped time *See Use Case 2: The Flight Controller shall Monitor the Countdown*
- 2d-5d. If there is a hold in the Countdown, then the Flight Controller can choose to abort the launch: the System indicates an aborted launch

Special Requirements:

- There is only one decision point for the Abort: the Flight Controller

Technology & Variations List:

- 4a. The Pre-Launch Data is Rocket Model Dependent—hence, the monitoring data and anomalies is Rocket Model Dependent

Frequency of Occurrence: Almost continuously: based on the number of desired Launches and Countdowns

Open Issues:

- What is considered “anomalous” Countdown data?
- Is “anomalous” Countdown data depend upon the type of Launch Vehicle and System (Launching Mechanism)?