

**Use Case 1: Monitor Pre-Launch Activities**

**Scope:** Launch Simulator

**Level:** Flight Controller Goal

**Primary Actor:** Flight Controller

**Secondary Actor:** Astronaut, Engineer/Technician

**Related Use Cases:** None

**Stakeholders & Interests:**

- Flight Controller: wants to monitor the Pre-Launch Data
- Flight Controller: wants to monitor the Countdown Time
- Flight Controller: wants to assess the validity of the Countdown
  - Continue the Countdown
  - Hold the Countdown
  - Abort the Countdown
- Engineer/Technician: wants to monitor selected Pre-Launch data to ensure the System is working properly and advise the Flight Controller
- Astronaut: wants to monitor Countdown Time
- Astronaut: wants to monitor Pre-Launch Data for System awareness

**Pre-Conditions:** All the parts of the System are ready to begin the Countdown, the Launch Simulator is running

**Post-Conditions:** The Countdown is at zero, the System transitioned from Pre-Launch to Initiate Launch

**Main Success Scenario:**

Flight Controller	System
1. Start the Pre-Launch Sequence	
	2. Request Countdown Time Entry
3. Enters the Countdown Time	
	4. Returns Countdown Time
5. Starts the Countdown	
	6. Displays Countdown Time to all actors
	7. Repeats 6 for the entire countdown
	8. Monitors Pre-Launch Data
	9. Returns Pre-Launch Data to all the actors
	10. Repeats 7,8 for the entire Countdown
	11. Alerts actors when Countdown reaches zero
12. Initiate Launch Sequence	
	13. Transitions out of Pre-Launch into Initiate Launch
	14. Informs the actors of the transition

#### Alternative Flows:

- \* At anytime, the Flight Controller can hold the Countdown if conditions arise that warrant that.
  - \* At anytime, if the Countdown is on hold, the Flight Controller can resume the Countdown if the State of the System warrants such a transition; the Countdown continues at the time stopped
  - \* If the Countdown is on Hold, the Flight Controller can choose to abort the Countdown. The System responds by abandoning the Countdown, alerting the Actors of the Abort
- 5c. The Flight Controller can change the Countdown Time as desired prior to starting the Countdown. The System changes the Countdown time, reflects the change to the Flight Controller. The Flight Controller Starts the Countdown as typical
- 9c. If the System detects an anomaly in the Pre-Launch Data, then the System alerts the Users of the anomaly for the Flight Controller to determine if the anomaly warrants a hold in the Countdown
- 9d. If there is a Countdown hold, and the System continues to detect an anomaly in the Pre-Launch Data sent to the Users, then the Flight Controller can choose to abort the Launch, the System indicates the Aborted Launch

- 9e. If there is a Countdown hold, the Flight Controller will resume the countdown if
  1. The Anomaly is fixed and there are no other anomalies
  2. The Flight Controller determines the Anomaly is not a threat to the mission integrity
  3. The Anomaly is determined to be errant

The System alerts the Users the Countdown hold is lifted

- 9f. If the System is automated at Countdown and the System detects an anomaly, then the System can hold the Countdown, alerting the Users; the Flight Controller can override the hold and resume the Countdown
- 12c. If the System is automated at Countdown, then the System will initiate the Launch Sequence at the discretion of the Flight Controller

#### **Special Requirements:**

- There is only one point of Decision for the Countdown Hold/ Countdown Abort. That currently rests with the Flight Controller. The Engineers/Technicians and Astronaut can advise the Flight Controller, in addition to the System: all based on Pre-Launch Data.

#### **Technology & Variations List:**

- \* All actors can chose to view all the Pre-Launch data at once, or chose to view selected pre-launch data. This is very useful for the Engineers/Technicians for monitoring Their individual System responsibilities
- 6c-14c If the System is automated, once the Flight Controller inputs the Countdown Time, the System could Initiate the Launch, hold the Countdown, abort the Countdown. The Flight Controller would have final authority.

**Frequency of Occurence:** Almost continuously: based on the frequency of desired Launches.

#### **Open Issues:**

- What about a fully automated System?
  - The Flight Controller would need to maintain ultimate control?
- Can the Countdown be Aborted without the Hold?
  - Currently goes Countdown-Hold-Abort for a Countdown Abort
- What happens if the Countdown Timer fails?