

Step 1. Outline
Problem Definition

What	Problem(s)	Delay of space shuttle launch
When	Date	Delayed until at least November 30, 2010
	Different, unusual, unique	Bad weather, gas leaks, electrical glitches
Where	State	Florida
	Facility, site	Kennedy Space Center
	Unit, area, equipment	Space Shuttle Discovery
	Task being performed	Launch preparations

Impact to the Goals

Safety	None	
Mission		
Cust. Service	Delay of mission (~1 month)	
Production-Schedule		?
Property, Equip, Mtl's	Repairs to shuttle	
Labor, Time		?
	This incident	?
Frequency	Launches frequently delayed	
	Annualized Cost	?

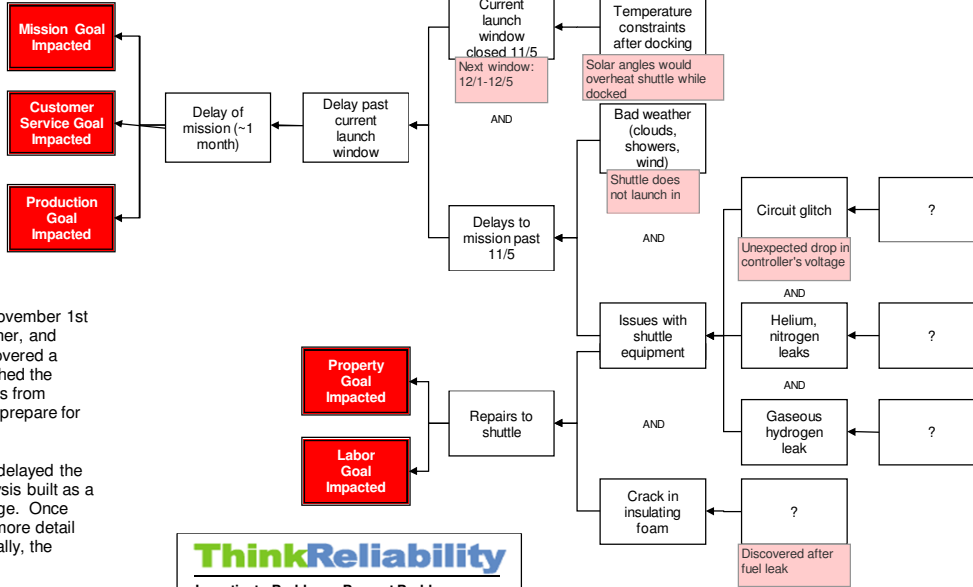
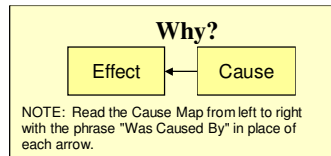
Space Shuttle Launch Delayed
Kennedy Space Center
November, 2010

Timeline

Date	Time	Description
November 1, 2010		Launch delayed to repair helium and nitrogen leaks
November 2, 2010		Launch delayed to fix a circuit glitch to a backup system that controls a main engine
November 4, 2010	5:30 a.m.	Launch delayed due to bad weather
November 5, 2010		Shuttle managers start fueling the shuttle's external tank
		Gaseous hydrogen leak discovered
		Launch delayed until at least November 30, 2010
November 30, 2010	4:05 a.m.	Next launch window begins

Launching a space shuttle is a complicated process. Not only is the launching process complex, finding an acceptable date for launch is also complex. There are discrete windows during which a launch to the International Space Station (which is the destination of this mission) can occur. At some times, the solar angles at the International Space Station would result in the shuttle overheating while it was docked at the Space Station. The launch windows are open only when the angles are such that the overheating will not occur.

Step 2. Cause Map
Problem Analysis



The previous launch window was open until November 5th. The launch was delayed November 1st for helium and nitrogen leaks, November 2nd for a circuit glitch, November 4th for weather, and November 5th for a gaseous hydrogen leak. After the November 5th delay, crews discovered a crack in the insulating foam, necessitating repairs before the launch. These delays pushed the shuttle launch out of the available November launch window. The next launch window is from December 1st through 5th, which gives the shuttle experts slightly less than a month to prepare for launch, or the mission may be delayed until next year.

Although not a lot of information has been released about the specific issues that have delayed the launches, we can put what we do know into a Cause Map. A thorough root cause analysis built as a Cause Map can capture all of the causes in a simple, intuitive format that fits on one page. Once more information is released about the specifics of the issues that delayed the launch, more detail can easily be added to the Cause Map to capture all the causes for the delay. Additionally, the