

Themed Ride Vehicle Concept Design

Ryan Alletag

California Polytechnic State University
Liberal Arts and Engineering Studies
Created November, 1, 2011
© 2011 Ryan Alletag

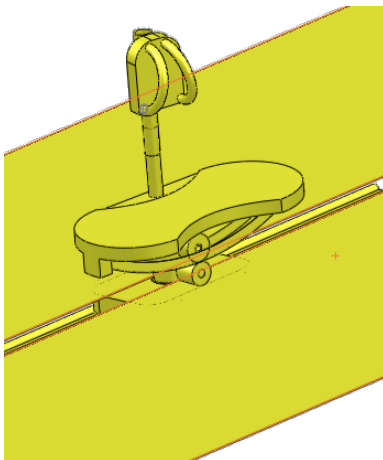
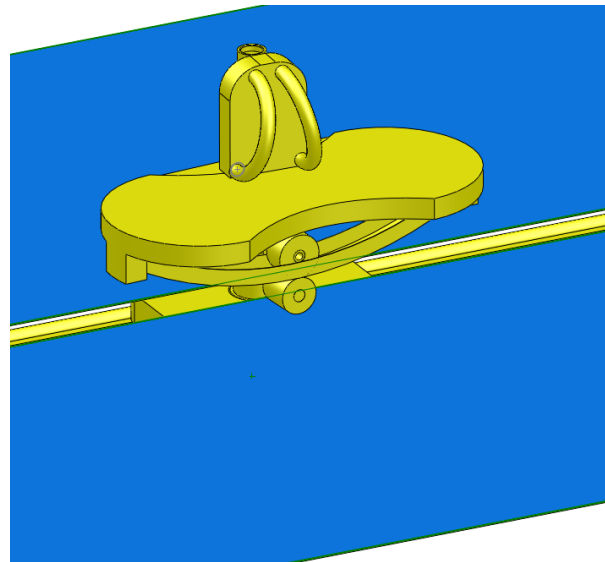
Story Driven Design

Wouldn't it be cool if...There was a way to not just tell a story but experience it, and the experience would leave you with another story to share, one that you were a part of. For my senior project I designed a ride vehicle that would allow you to be a part of the story. Many challenges came with fulfilling both the operational and story element requirements placed on the ride vehicle. I will walk you through some of the key design concepts that make the vehicle unique and allow it to bring the story to life in such a vivid and experiential way.

Imagine you are at a ski resort snowboarding with your family. You expect pristine snow covered faces, a beautiful wood lodge, chairlifts, snow flocked trees, and runs full of fellow snow chasers gently whooshing down the slopes. That means there cannot be bulky transformer like machines screaming down some rails making sharp mechanized movements and a lot of noise. So how do you make a ride seem like a day at the resort?

Appearance

Our beautiful mountain is one that is home to a ski resort. The runs are wide open and snow covered. To achieve that image our ride rails, controls, and mechanics, would need to be under a façade and only the drive shaft of the vehicle would extend past the façade through a slot. The slots and rails could be disguised in such a manner that it would not distract from the story and possibly from a distance not even be visible. The shaft extending past the façade would remain directly underneath the ride vehicle, however it too could be disguised if necessary.



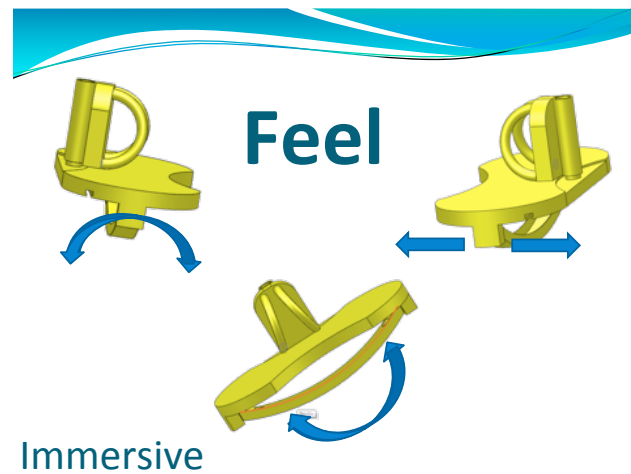
The story calls for families and friends to carve down the mountain on snowboards, the ride operation requires that these snowboards provide a safe and comfortable restraint system to keep all guest along for the ride. The creative solution was to combine two existing thrill ride restraint systems: the butterfly chest restraints that can be experienced on the 'X2' at Six Flags in Valencia, California and the telescoping pole or height adjusting restraint systems found on many stand-up style coasters. Combining and refining the two technologies it is feasible that a safe and comfortable

restraint system could appear as a simple backpack that any all day mountain goer might use to carry his lunch and extra gloves.

Motion

The most complex challenge was to create a system that would allow the ride vehicle to perform the various and complex movements required by the story. The vehicle would need to be free around all three axes. The movements would have to be rolling or sweeping and not sharp direct movements. Many of the movements around the axes would have to be done simultaneously and at precise times. The system responsible for all

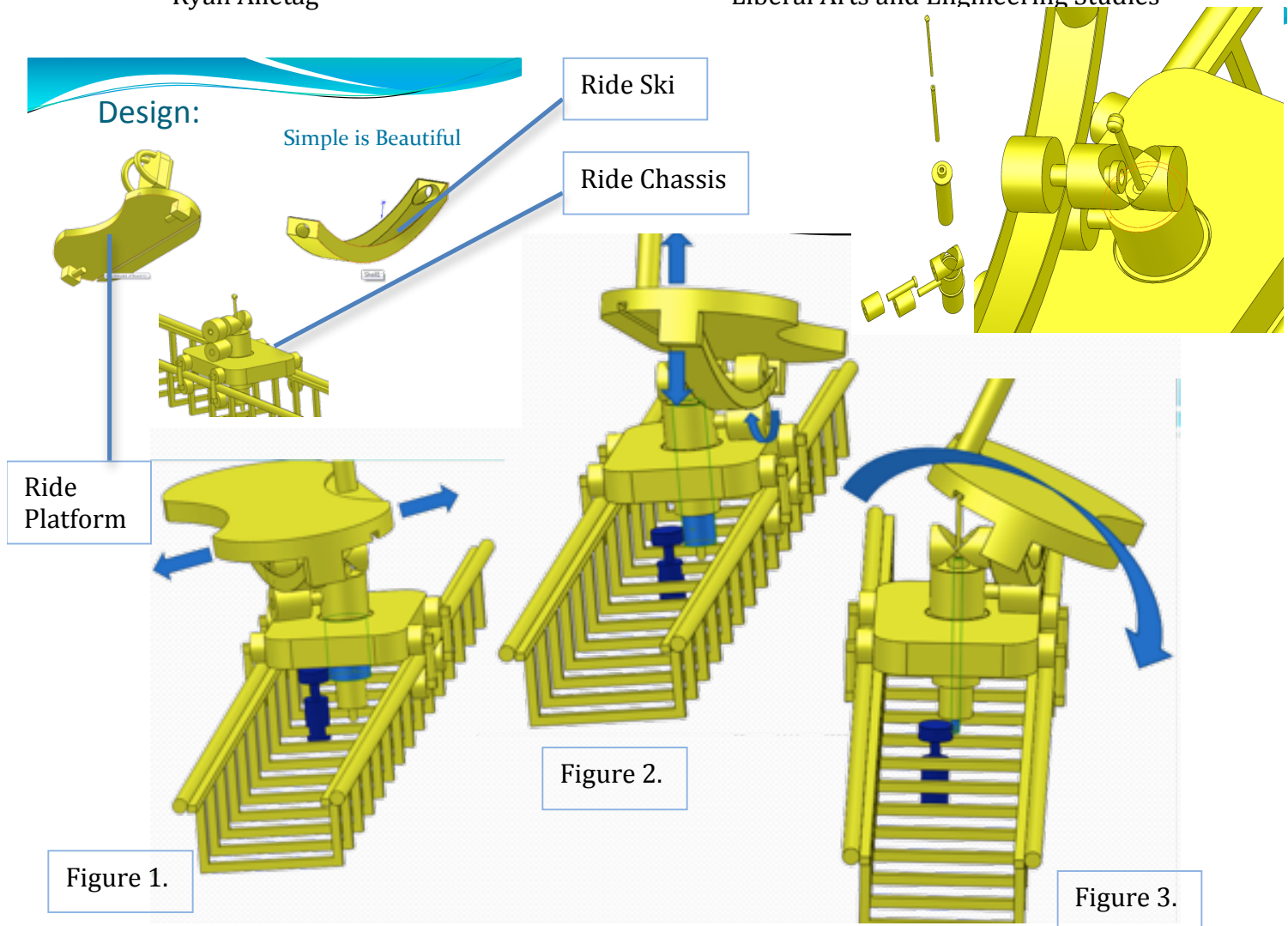
these movements would have to be reliable enough to maintain extremely high use and long run times, while being simple and easy to maintain. Also with each guest being on an individual ride vehicle the system would need to be cost effective.



With all these considerations many different delivery techniques were examined. Simulator motors were ruled out due to cost and reliability. Ride vehicle and guest controlled movements were ruled out because of the potential drop in show quality and loss in delivery of the story. After some time researching other three axes mechanisms, playing with models, strapping on a board and jumping around, brainstorming, designing, drawing, and collaborating with others, I developed a design that I am very excited about.

The Design

The design allows the track to dictate and deliver the movement to the ride vehicle through mechanical means. Along the track would be motors, wheels, or bars that would engage any of the three different drive shafts descending down from the main ride chassis. These three shafts are located at different heights relative to the ride chassis and at different distances from the rails of the track allowing the drive shafts to be engaged independently making simple movement around one axis or simultaneously in any sequence necessary to deliver complex movement around multiple axes at once.



A Closer Look at The Design

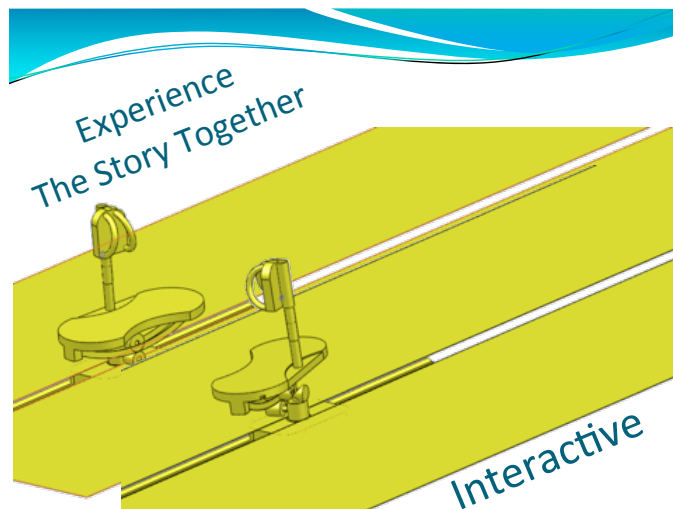
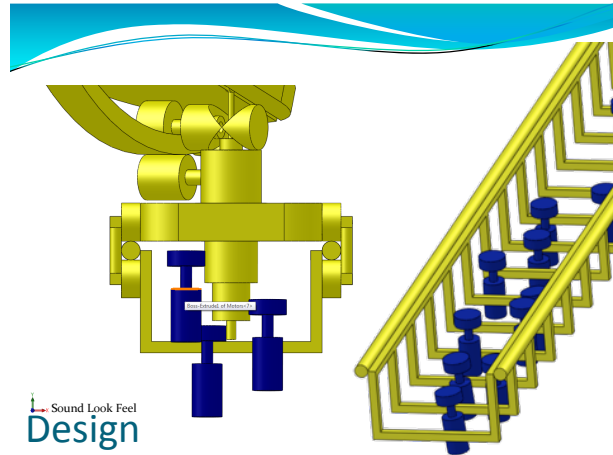
The closest drive shaft to the chassis and the largest in diameter (Highlighted in Figure 1) controls the yaw of the vehicle, and would create a spinning motion for the rider. This is achieved by the direct connection between the shaft and the ride platform. The next drive shaft (Highlighted in Figure 2), is the middle in distance from the chassis and the middle in diameter size. It is seated within the outer shaft by a bearing and controls the pitch and gives the rider a sense of rolling onto the nose or tail of the board. This motion is achieved by the drive shaft's spinning motion being translated by a perpendicular gear to a drive wheel that rolls a curved ski. As the drive shaft is spun below the track the movement turns a gear connected by a shaft to a drive wheel, which makes contact with the ski and as the ski is rolled between the drive wheel and a stationary wheel, the ride platform pitches. The final drive shaft (Seen in Figure 3), greatest distance from the chassis and smallest in diameter, once again seated within its preceding shaft by a ball bearing, controls the roll of the ride vehicle and would give the rider the sense of rolling onto their heels or toes to carve through the snow. This motion is accomplished by the third and smallest shaft having a threaded hole with a threaded rod within it, as the smallest

diameter shaft is spun under the tracks, the threaded rod within it rises or falls and pulls or pushes on the ride platform where the rod travels within a slot.

Advantages of the Design

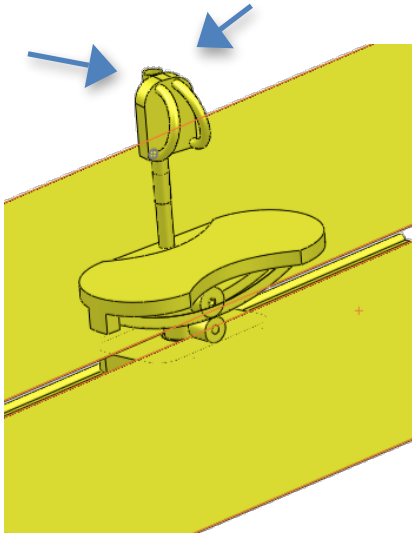
With this design the ride vehicle is a slave to the track. This means that every time the ride vehicle rides a specific section of track it will respond the same way, but the ride vehicle does not have to carry all the drive components it is only required to carry the components necessary to react to the track. This allows for a slim and clean design, a reliable story delivery, and a maintainable ride system. The different tracks can provide similar feels but different

motions and paths introducing variety and re-ride-ability. It also has the added advantage of potentially enhancing the feeling of reality as the board reacts to the track. To the rider, the reactions to and from the track on the ride vehicle may give a sense of genuine interaction with the ski surface. When the board turns the rider will be feeling not only the turn but possibly the inertia change that went into creating that movement. The rider's body may pick up on the inertia change and that sense would add to the realistic feeling of the board movements controlling the path of travel.



the same funicular railroad together to experience freedom and togetherness like never before possible on a ride.

Inspired by steeplechase style roller coasters, this ride would allow guest to be aboard their own individual vehicle but experience the ride together. They would be able to make their own tracks down the mountain while being right alongside their family and friends watching as they too take advantage of the wide-open runs. The groups however would still be able to crash through the same double doors of the lodge and ride up



With the story driving the design it is important that the ride vehicle not just provide the physical elements of the story, but also help with setting the mood and creating those feelings that go along with the story. Since music has a profound ability to bring about feeling, within the backpack restraint system would be speakers. These speakers would provide music synchronized to the story and ride movements to create complete feelings of uneasiness and enjoyment while learning to snowboard, a sense of being out of control when things go bad, a sense of slight embarrassment, a sense of change and clarity, a sense of mastery and peace, and finally a sense of joy, excitement, and fulfillment.

I believe this design concepts meets and exceeds the requirements necessary to tell and deliver the story to the guest and will be instrumental in creating a great experience for the audience.

Future Work

I intend on using the story, images, and experiences created during this senior project to present my ideas to others who may be capable of building upon the idea and bringing it to life. As part of my project requirement I presented this material in front of a panel. The feedback I received following the presentation was that I should explore the details of the concept more in depth. By looking at materials for the design and running test on the stresses and strains the vehicle would experience I could begin to turn my concept into a working design. If given access to the proper software programs I would like to pursue that challenge.

Annually there is a Disney ImagiNations Design contest where you can submit themed entertainment ideas to be reviewed by Walt Disney Imagineering. I would like to assemble a team consisting of an architect, artist, and a composer, to use the same story that created this ride vehicle to develop the rest of the story elements so we could tell our story to Walt Disney Imagineering.

Using the skills I learned during this creative process, I have begun to play around with other creative concepts that I also hope to someday share with those who could bring those ideas to life.