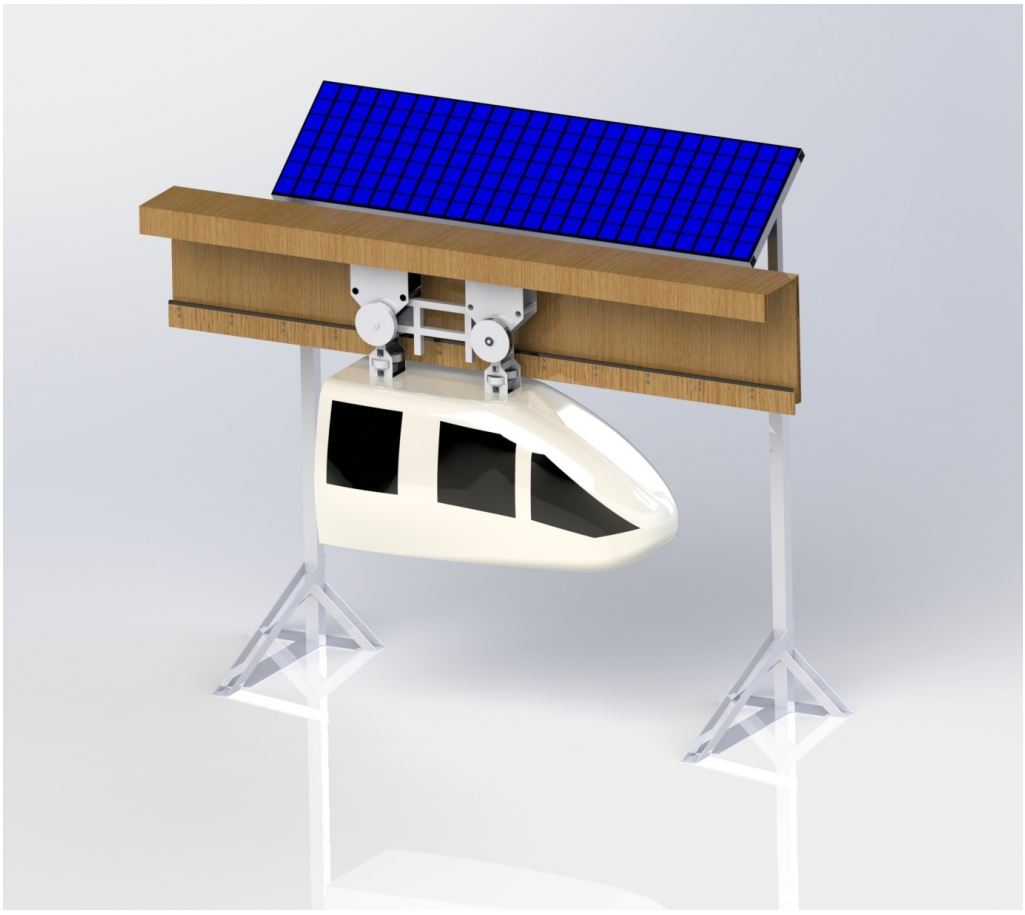
SPARTAN SUPERWAY

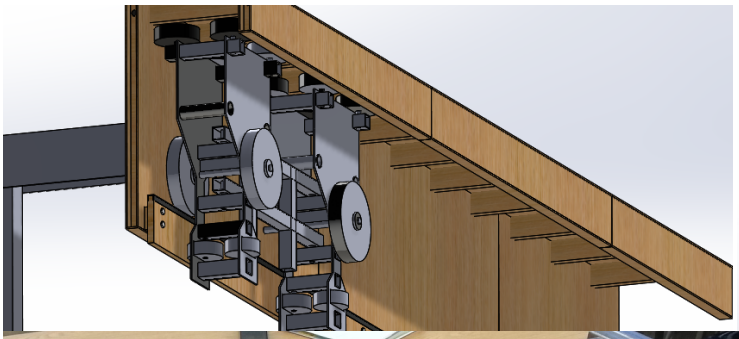
Summary Report
April 2014

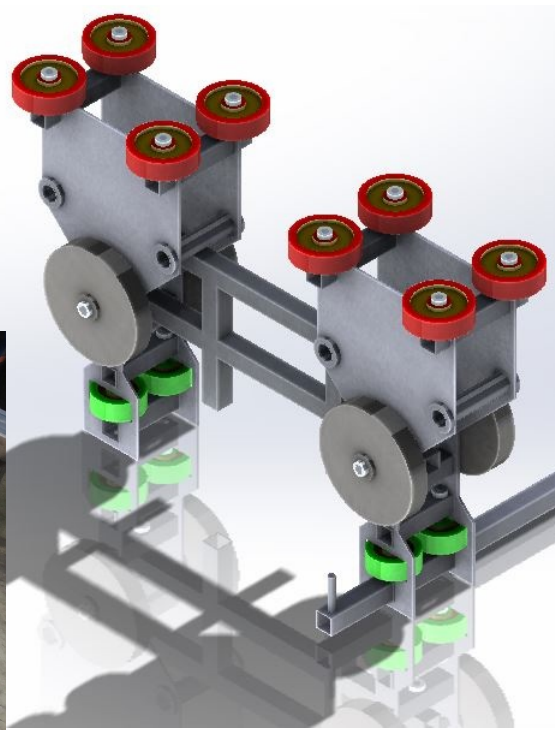


SAN JOSÉ STATE
UNIVERSITY

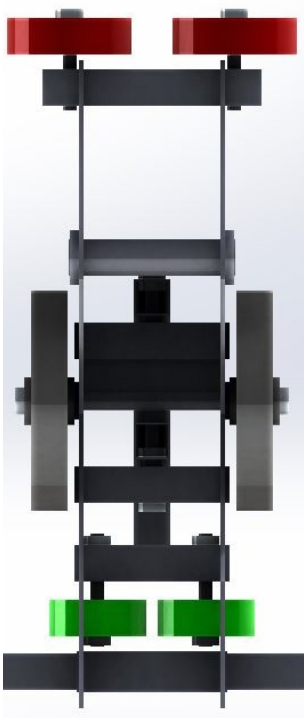
SPARTAN SUPERWAY

Bogie Team





The Bogie Team is responsible for the chassis and running gear for the pod car vehicle. These components are located above the cabin in a structure called the Bogie. The Bogie rolls along the guideway with the cabin suspended beneath it.

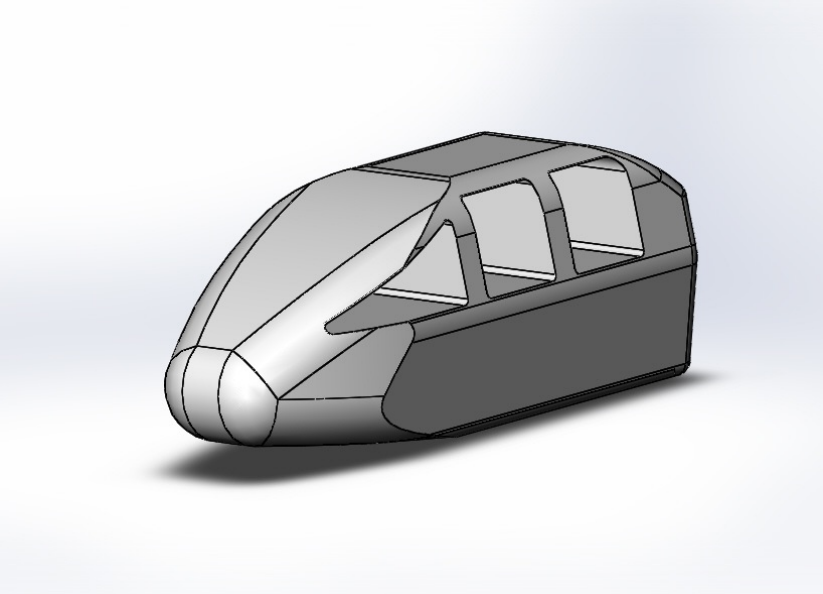


The design we are currently working on is a collaborative effort with Bengt Gustaffson of Beamways. It is designed to work in an exceptionally narrow guideway in order to minimize the aesthetic impact of the guideway.

For safety reasons, ATN podcars must mechanically select their own direction at a guideway junction. The guideway itself must be static. The Beamways-Superway guideway and bogie design allows for a simple and elegant transition at junctions. The lower support rail can engage either side of the symmetrical bogie. By gripping one rail or the other, the bogie can select its direction at a junction. During most guideway sections, only one rail is present.

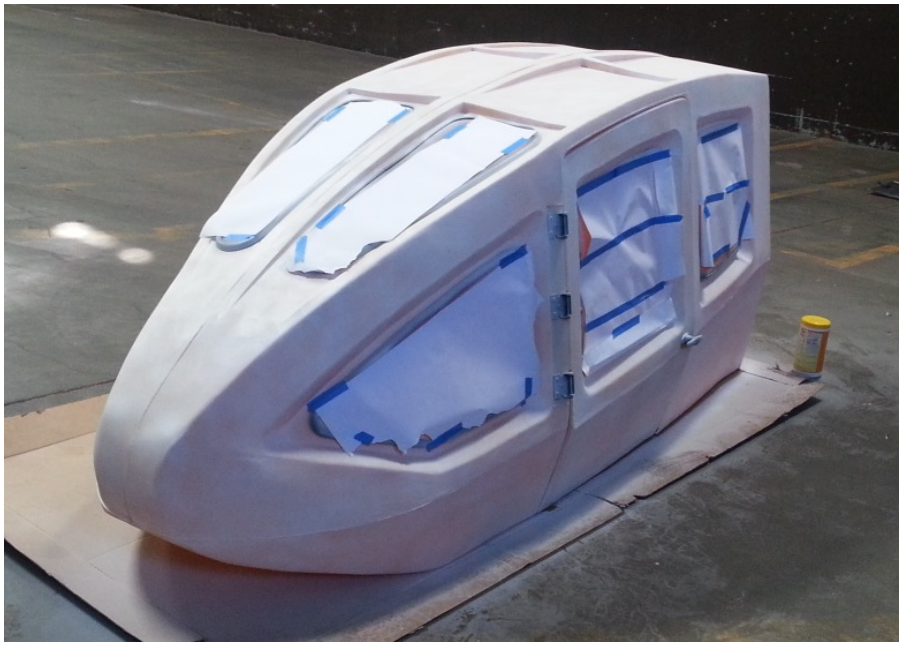
The Maker Faire model is a proof of concept for this Bogie geometry. The steering arm, which would pivot in a finished Bogie, can be manually removed and inserted on the other side of the bogie to simulate a functional steering arm. The model is capable of reproducing all wheel configurations present for the Bogie design, except for the propulsion system.

Cabin Team



The cabin of the Superway pod car is designed to hold 4-6 passengers, but should be comfortable for 1-3 passengers during off-peak traffic operation. Several concept designs for the pod car were developed at San Jose state by the Cabin Team and by Industrial Design students.

The cabin of the maker faire model is being modified from a donated snow mobile. It will be painted white with the Superway logo on either side. It will have an interior design to demonstrate the user experience. The cabin will be attached to the bogie and suspended below the rail.



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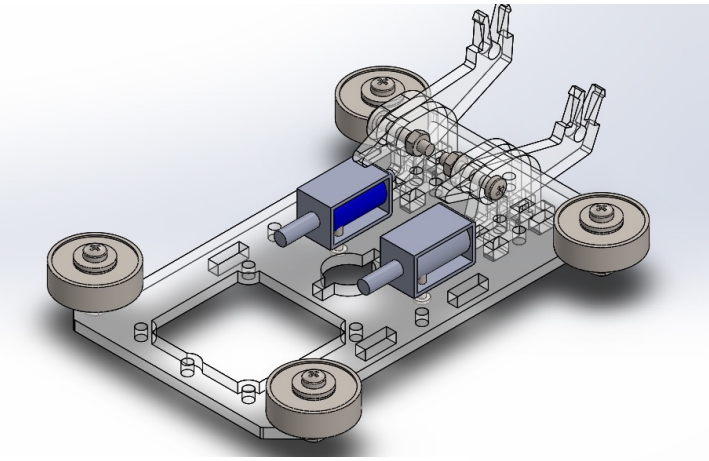
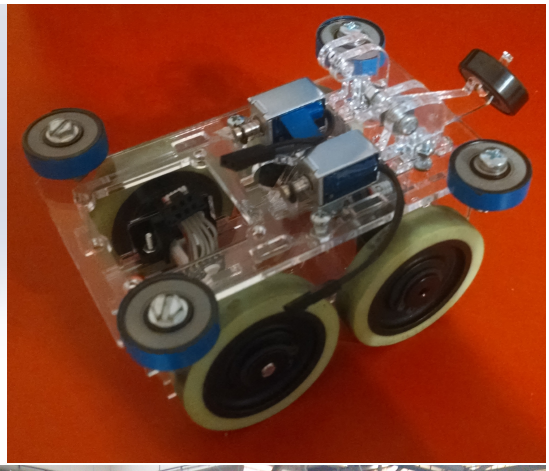
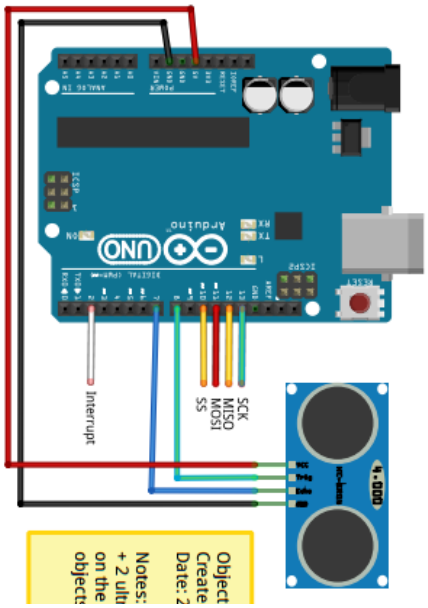
Controls Team







The Controls System is what represents the "A" in ATN. The Controls team is responsible for turning the vehicle and guideway components developed by the other sub-teams into an automated transit network. This involves integrating all the moving parts of the pod with sensors and interfacing them with a computer that can communicate with a city-spanning network. This network coordinates all the consumer requests and pod destinations to provide an efficient, reliable, and safe means of on-demand transportation.

The Controls team is working on the 1/12 scale model developed last year, adding power and micro controllers, which will enable the model to demonstrate the controls software which has been written to dictate the movement of the pods.

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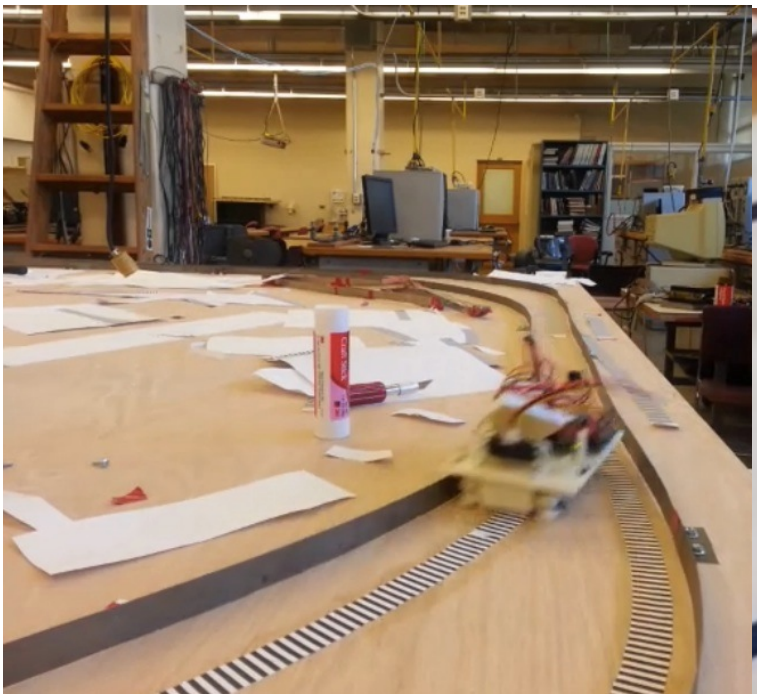
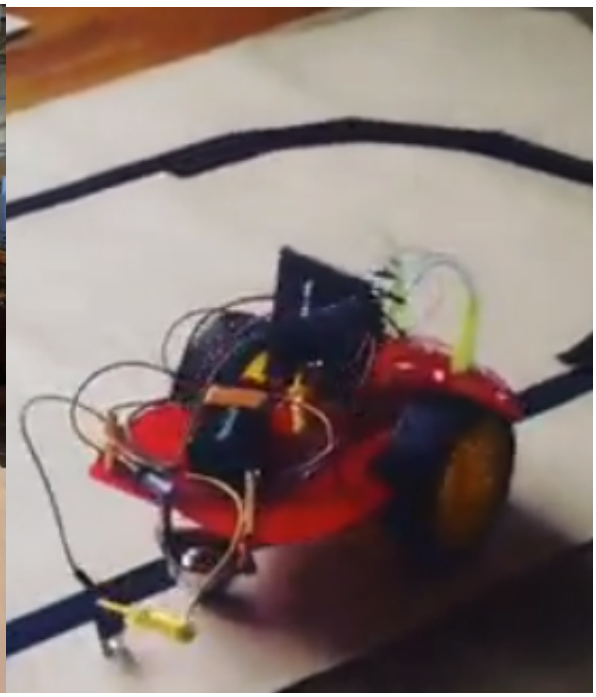
CmpE Team





The CmpE team has developed software for pods, such that it can self-navigate a track when given a source and destination point. This is done with a path forming algorithm already in place.

We have also developed wireless capabilities such that pods are able to communicate with other pods within the system. The wireless may be used to determine right of way at an intersecting point within the track.

Finally, we have implemented a line follower to simulate our code. The lines represent a guideway and the line follower is loaded with our control system software to navigate from one station to another. This allows us to simulate our control system's autonomous capabilities with a dynamic track design.

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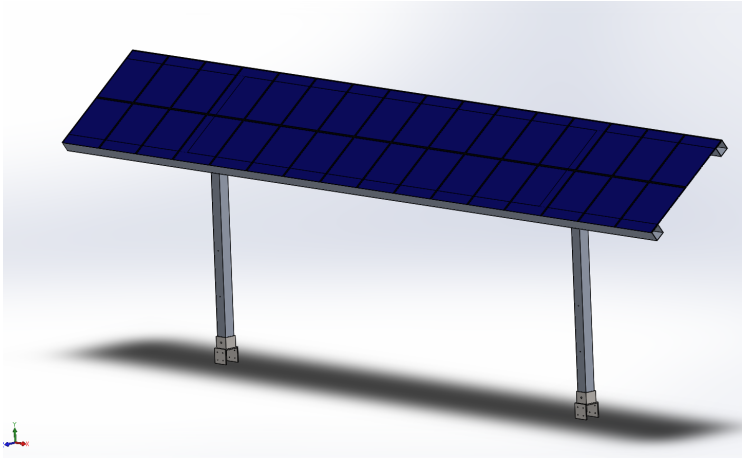
Solar Team



For the Last 8 months the Solar Power Team has been working on the design of a full scale power system that can power our future transportation system.

The goal of our team is to integrate an a aesthetically pleasing solar power system design into the overall transportation system of the future. A design for Maker Faire Bay Area is in the prototype/manufacturing phase. The team decided to focus on efficiency, ease of manufacture and installation.

In order to maintain a strong yet light weight design, the frame is composed of 6063-T52 Aluminum square aluminum tubing. A simple double 'H' design was decided upon in order to keep welding and cutting to a minimum. Only four simple weldments are needed to have a complete frame.

Two simple bracket mount designs are all that is required to integrate the frame into the overall guideway structure/design.

The light weight materials and simple design keep the overall weight under 100 pounds. The prototype system incorporates two Uni-Solar PVL 128 Watt Thin Film panels, an Enphase M250 micro-inverter, and a Morningstar ProStar PS-15M-48V. With less than 30 days until Maker Faire 2014 our team is excited (and sleepless) to see the end product of our hard work.

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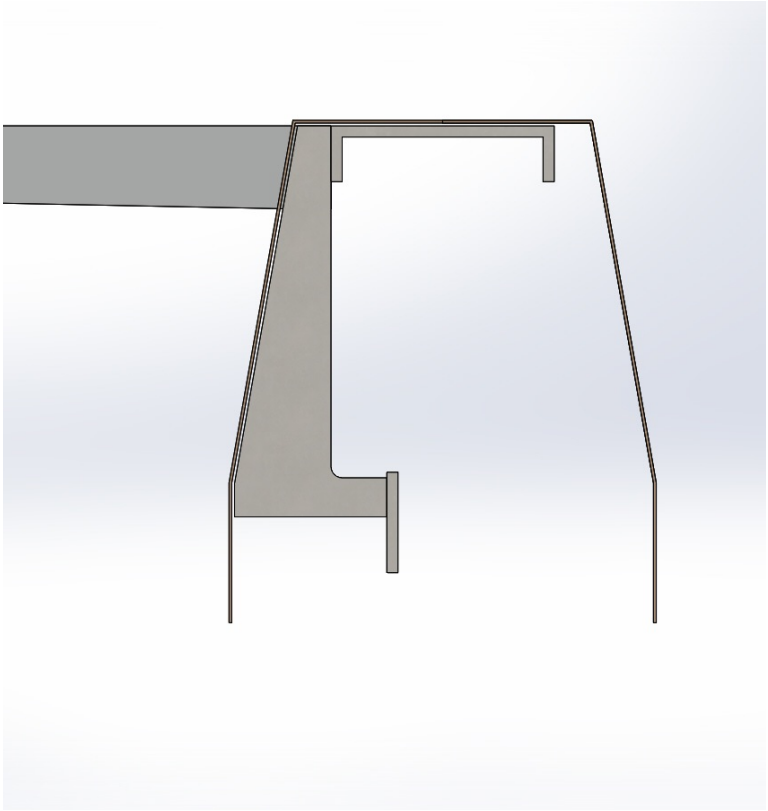
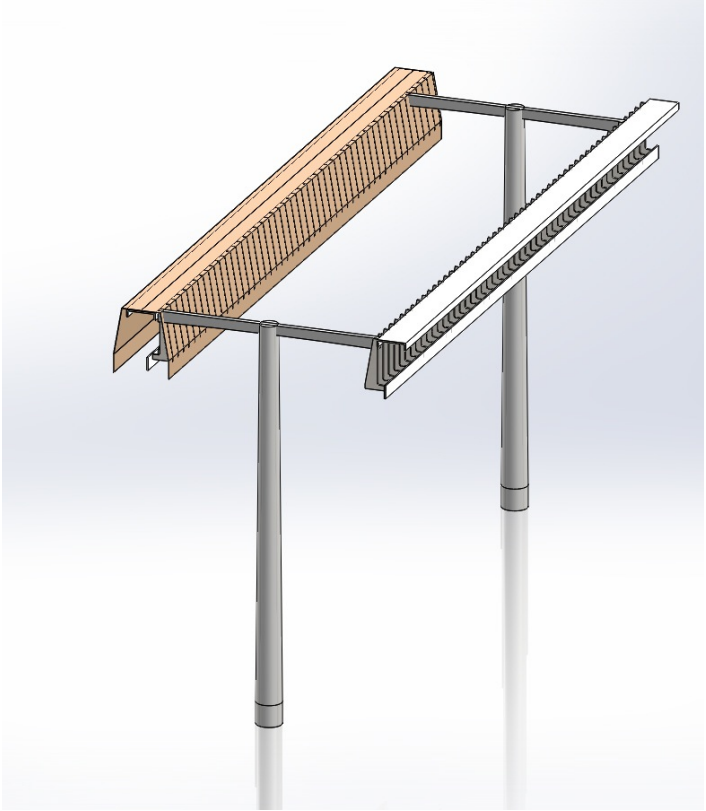
Guideway Team





The guideway provides the structural backbone of the PRT system. The bogie rides along the guideway, so it must support the bogie and cabin. In addition, it supports the solar power system. The current iteration of the guideway is based on the design created by Beamways AB of Sweden. The asymmetric guideway supports the bogie with a single steel rail, with guides to keep it on track. Using CAD programs, a theoretical model was created and analyzed. FEA was used to ensure that the model will be able to support the weight of the cabin and bogie.

The guideway team focused on creating a full-scale model to display at Maker's Faire this year. For cost, manufacturing, time, and transportation reasons, a full steel model is not feasible for display at Maker's Faire. Instead, a wooden guideway is used as a substitute. Again using CAD programs, an acceptable substitute was created to showcase the design intent of the guideway. The wooden model was analyzed to ensure it would be able to support the weight of the bogie and cabin models. To preserve the atheistic of the original model, steel support columns are used to support the wooden model. The track portion of the guideway was assembled in the 7th Street workroom, while the supports are currently under construction at San Jose State.