

# Virtual Railroading

## Computer Modeling the West Side Lumber Co.



Rich Blake

Skagit Valley and Whidbey  
NMRA

# Overview

- Track Planning
- Rail simulators history and overview
- “*Trainz Railroad Simulator*” and relationship to model railroading
- Content creation (virtual scratchbuilding)
- Virtual WSLC Project
- Bonus material – artwork, 3d prototyping



# Track Planning

- Traditional methods
- Resources
  - John Armstrong style
  - MR Mags/Books/Prototype
  - Layout Design Elements
- Computer Aids
  - Static – 2d CAD diagrams
  - Dynamic – 3d CAD diagrams and operations
- Scenery and Operations

# Old School 2D and 3D



# CAD Track Planning Benefits

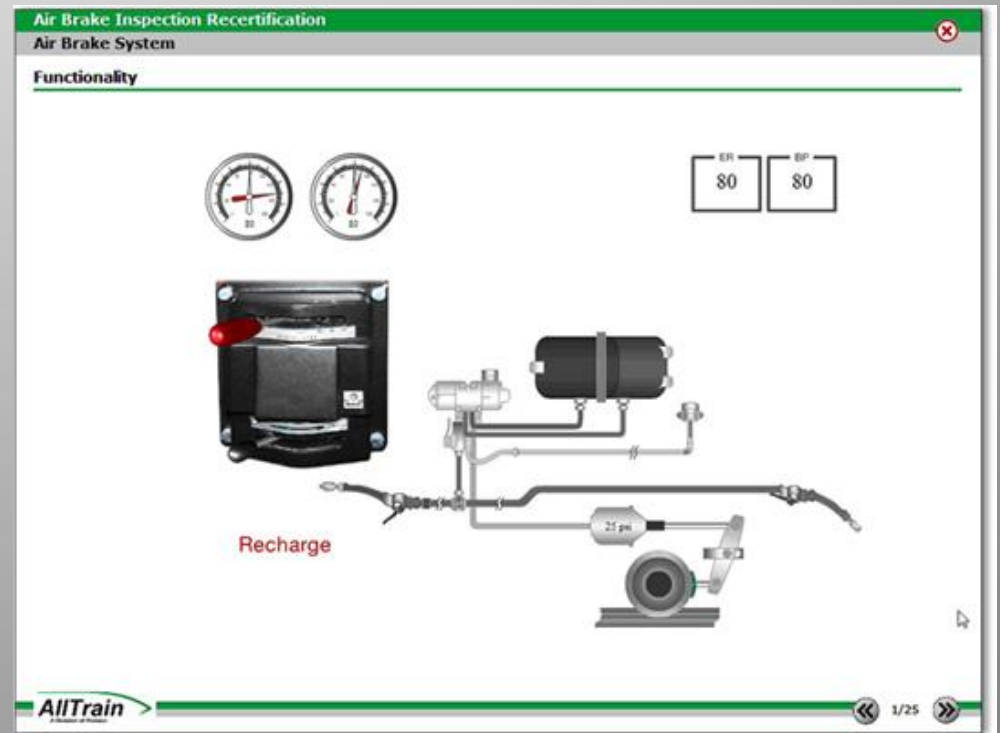
- Drawing the initial layout seems really hard in CAD compared to pencil and paper. So hard that one could wonder if it is worth it.
- Once the trackplan is made however changes are made easily whereas with a traditional paper drawing it may be extremely difficult to change.
- CAD drawings have the added benefit of computing track length, grades and amount of turnouts automatically saving a lot of time for creating a bill of materials.

# Railroad Simulators



# Simulators Definition

- Commercial Simulators
  - Used for training and qualification of actual railway personnel. Focus on functionality with various levels of quality in graphics and interfaces. Not normally available to public.





# Simulators Definition

- PC Simulators
  - Personal use. Glorified computer games with the “serious enthusiast” in mind. Mimics actual operations in the simulated environment. High graphics performance with many “bells and whistles” to enhance experience.



# Simulators and Model Railroading

- Pros
  - Freeworld environments
  - No limits to space or detail
  - Easy to build layouts
  - Prototype route study, operations study
  - Be the engineer
  - Caters to many different interests
  - Several types of equipment, structures, routes
  - Unlimited potential (content creation)
  - It's FUN

# Simulators and Model Railroading

- Cons
  - Track placement not as accurate as CAD
  - No benchwork or model railroad space specific tools
  - Requires steep learning curve to create custom content
  - Operational scenarios can be difficult to create
  - Limited multiplayer options (Trainz 2012 only)
  - Computer requirements for performance
  - Can be time consuming

# History of PC Train Sims

Train sims have been around as long as computers. Most were either small switching exercises or railroad empire strategy/management. Some notable releases:

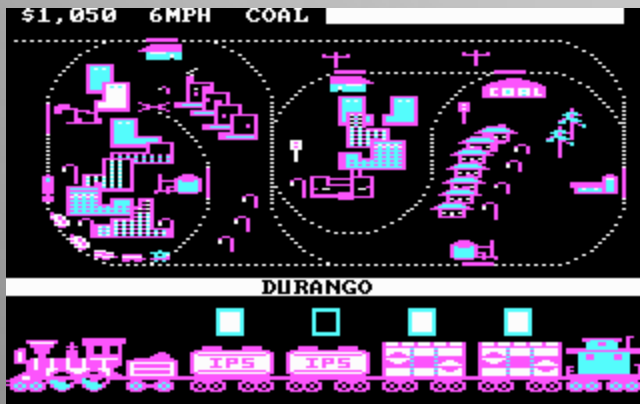
1983 "Trains" Commodore 64

1990 Sid Meier's "Railroad Tycoon" PC DOS

2001 Microsoft Train Simulator

2002 Auran's Trainz Railroad Simulator

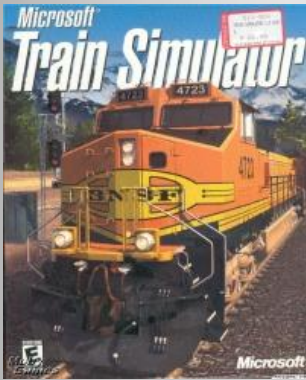
2009 Railworks



1983



1990



# Microsoft Train Simulator

Released July 2001

Developed by Kuju Entertainment for Microsoft, this game pioneered the 'virtual train engineer' genre, and spawned dozens off add-ons and expansion packs, featuring special locomotives and scenic track packages. Until MSTs, nothing else even came close to being considered as a “simulator” for operating a railroad.



# MSTS



Considering the time period, the graphics were quite good. Unfortunately MSTS did not last long and went out of publishing by 2004. A huge fan base kept it going and there are still folks developing routes and equipment for it.



# Railworks

Kuju Entertainment, the developers of the original MS Train Simulator, released Rail Simulator in 2008 and shortly after disbanded the Rail Sim team to work on other projects.

In 2009 former members of that design team banded together and released RailWorks, the latest and greatest continuation of the Rail Simulator and MS Train Simulator legacy. Current version is "Railworks 3 Train Simulator 2012".



Graphics quality is very high. Package comes with several US, UK and DE routes and equipment.

Operationally based scenarios are fun and interesting.

Changing environment and realistic driving challenges add to experience.

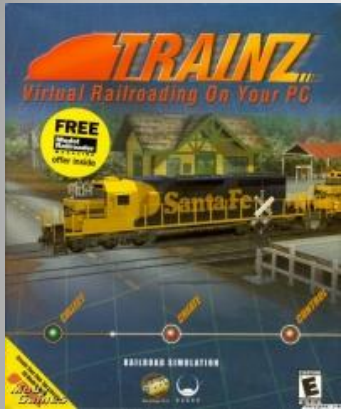
Realistic signalling.

Route building not as easy as Trainz.

# Railworks







# Trainz

Launched in 2002, the Australian Trainz series one-upped the MS Train Simulator franchise by not only making a good realistic train simulator, but incorporated a model railroading based environment allowing players to construct layouts and place their own trains before operating them.

Several versions have been released with each increasing graphics performance and adding new equipment, routes and scenarios. Current version is Trainz 2012.



Trainz 2004



Trainz 2009+

# Practical Application - Trainz



# Surveyor Mode

- Route building
- Track laying, grades, turnouts
- Measuring tools
- Topography tools
- Prototype routes
- Camera views
- Operation sessions building

[Birth of a Route video](#)

# Driver Mode

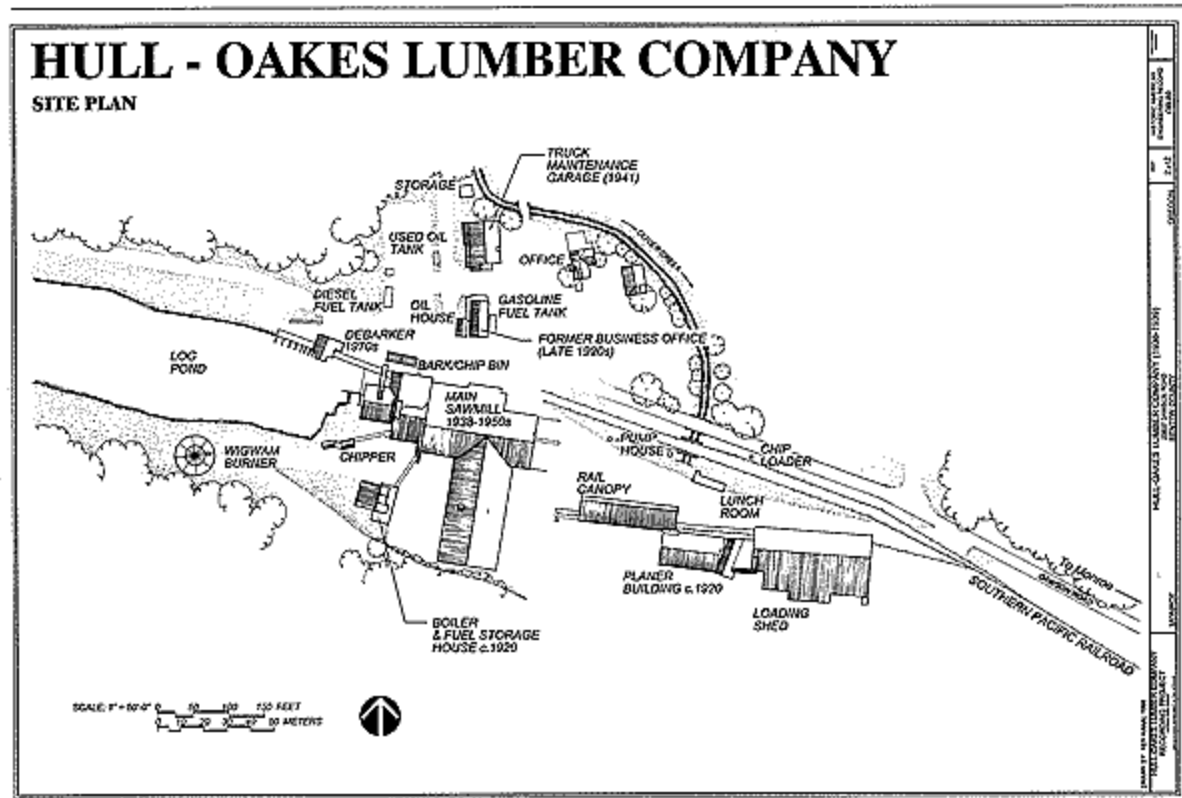
- Drive trains
- View options
- Operations
- Rules for automated trains
- Signaling

# Track Planning and Operations

- Experimenting with scenery
- Try out switching moves
- Develop operational scenarios
- Layout design element testing
- Signal placement and testing

# Hull Oakes Case Study

- Using prototype to create layout design element
- Building and operating in Trainz



# Hull Oakes



Prototype

# Hull Oakes



N-scale Layout



# Hull Oakes



Trainz layout

# Hull Oakes



Trainz layout

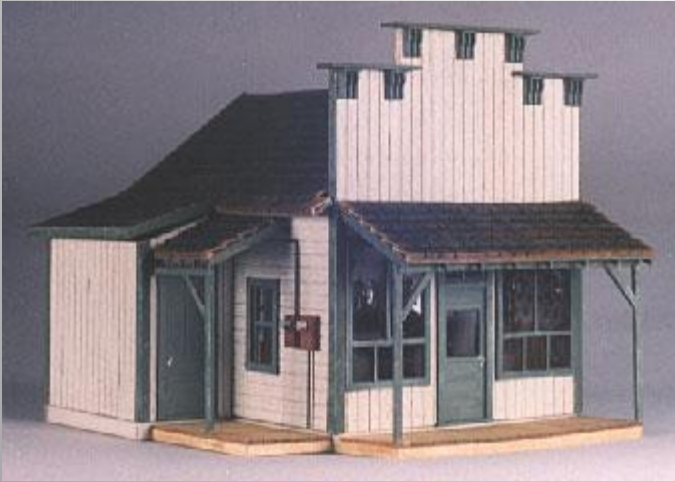
# Beyond the Basics

- Creating Content
- 3d modeling
- DEM topography
- Prototype modeling
- Using prototype to create model scenes or operations study

# 3d Modeling

- 3d programs
  - 3ds MAX
  - Gmax
  - Blender
  - Google Sketchup
- Texture work
  - Photoshop/Paintshop
  - Layering options required for best results

# Modeling

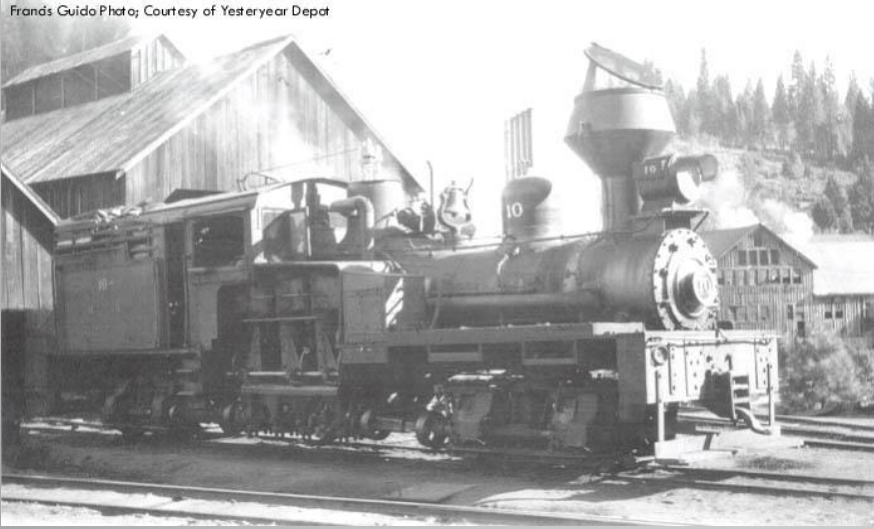


# Modeling



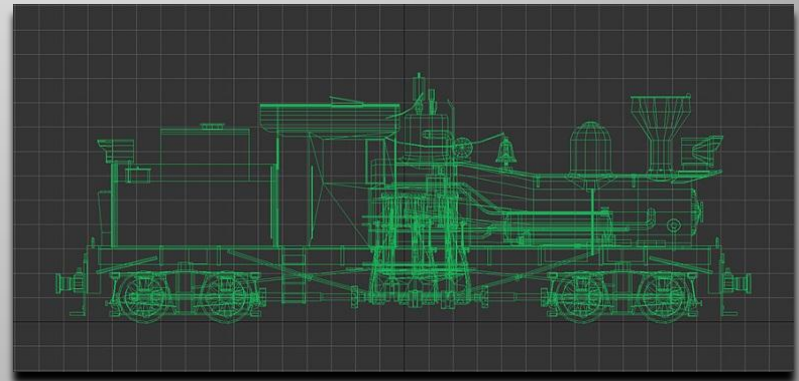
# Modeling

Frands Guido Photo; Courtesy of Yesteryear Depot



# 3dCG Modeling a Loco

- Plan/Drawing/CAD/Photo reference
- Developing shapes then details
- Develop texture and “skinning”
- Bogeys and animation
- Interior modeling
- Exporting
- Add sounds/smoke/whistles
- Enginespec for simulator
- Run and fun?
- *(3 months work time typical for one person)*

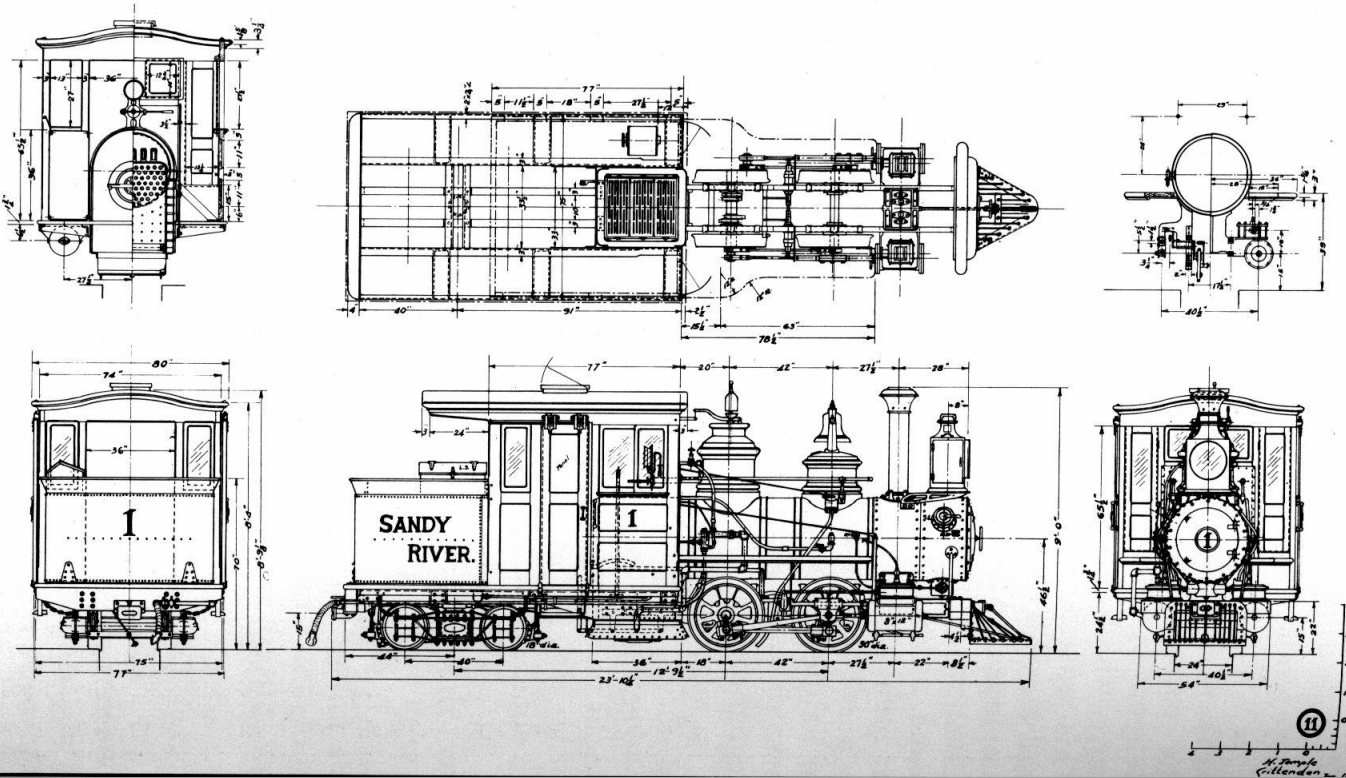




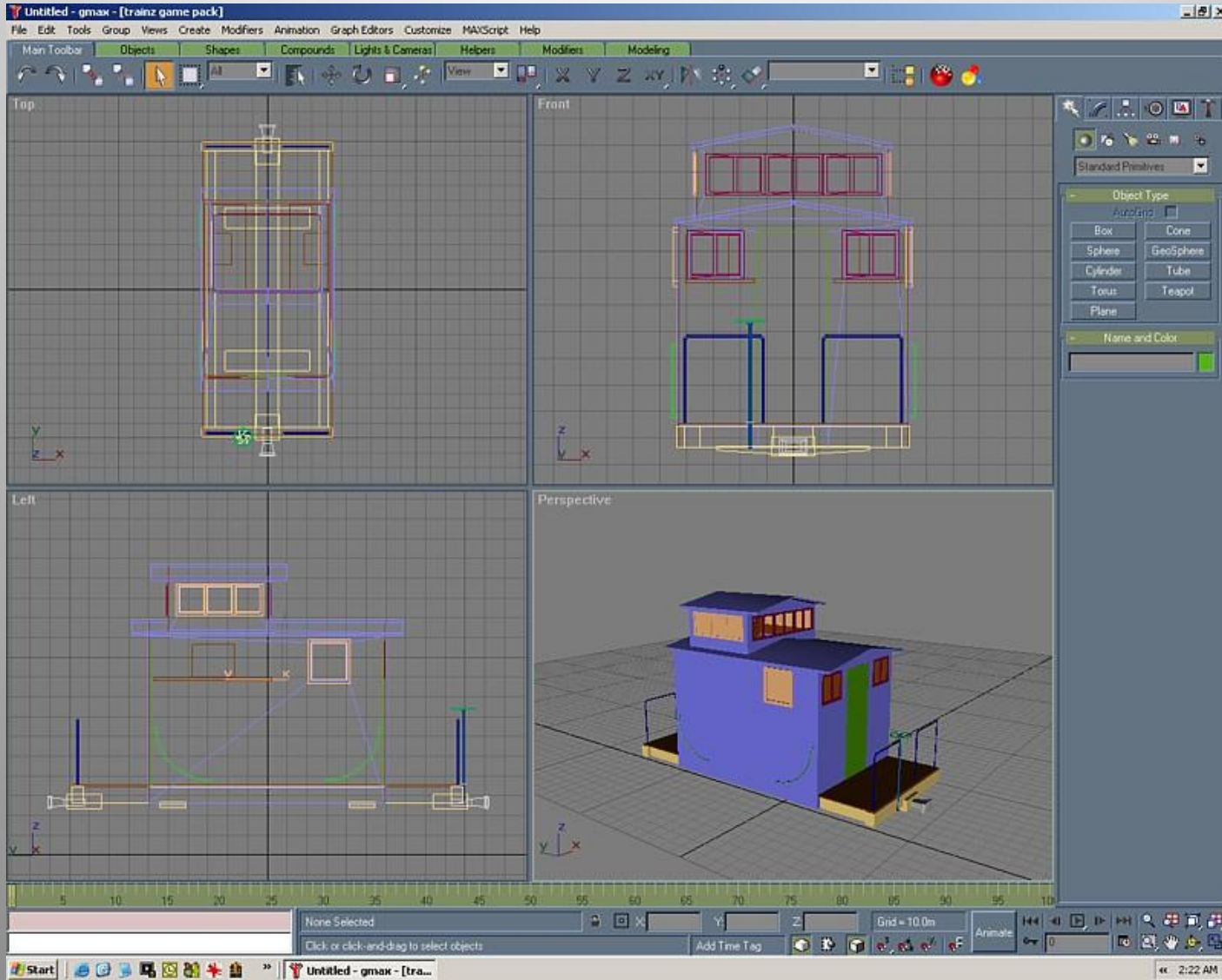
# Planning

## SANDY RIVER & RANGELEY LAKES RAILROAD - LOCOMOTIVE NO. 1

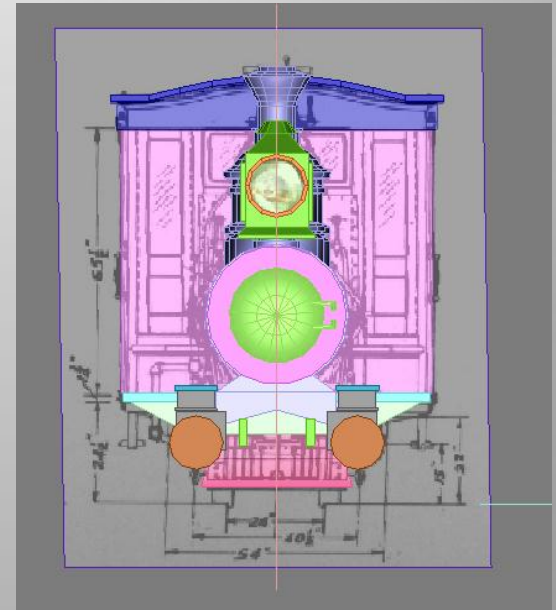
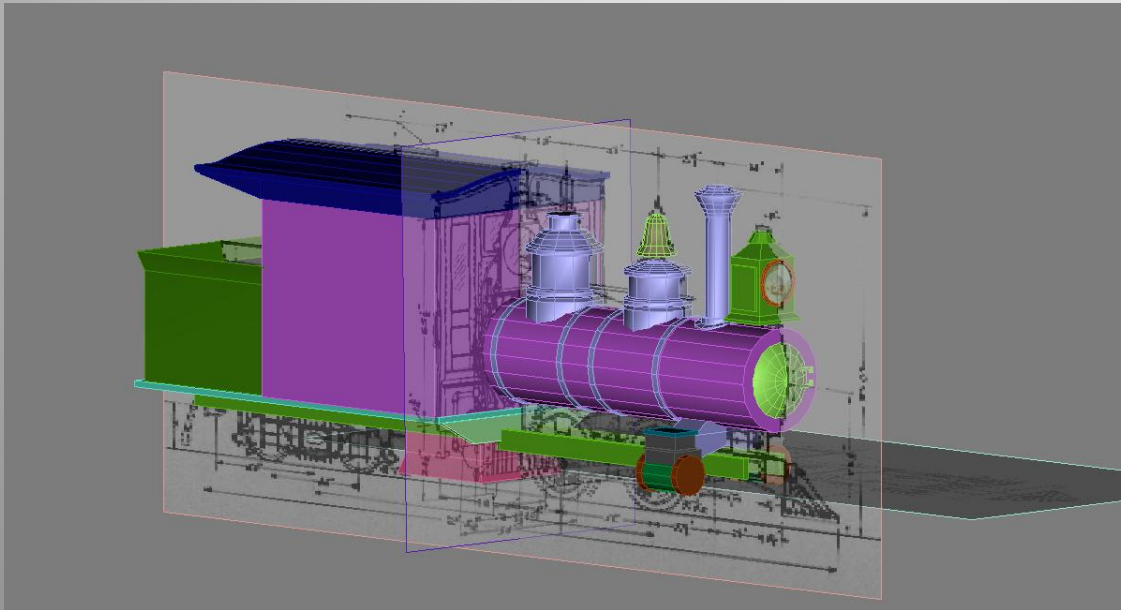
BUILT BY THE HINKLEY LOCOMOTIVE WORKS, BOSTON, MASS., ORDER NO. 1251, 1877, FOR THE BILLERICA & BEDFORD RAILROAD AS THE "ARIEL".  
CONVERTED TO STANDARD GAUGE BY HINKLEY WHEN SOLD IN 1879 TO THE SANDY RIVER RAILROAD. RENAMED "DAWN" NO. 1.  
REBUILT IN THE PHILLIPS SHOPS BY THE SANDY RIVER RAILROAD IN 1882.



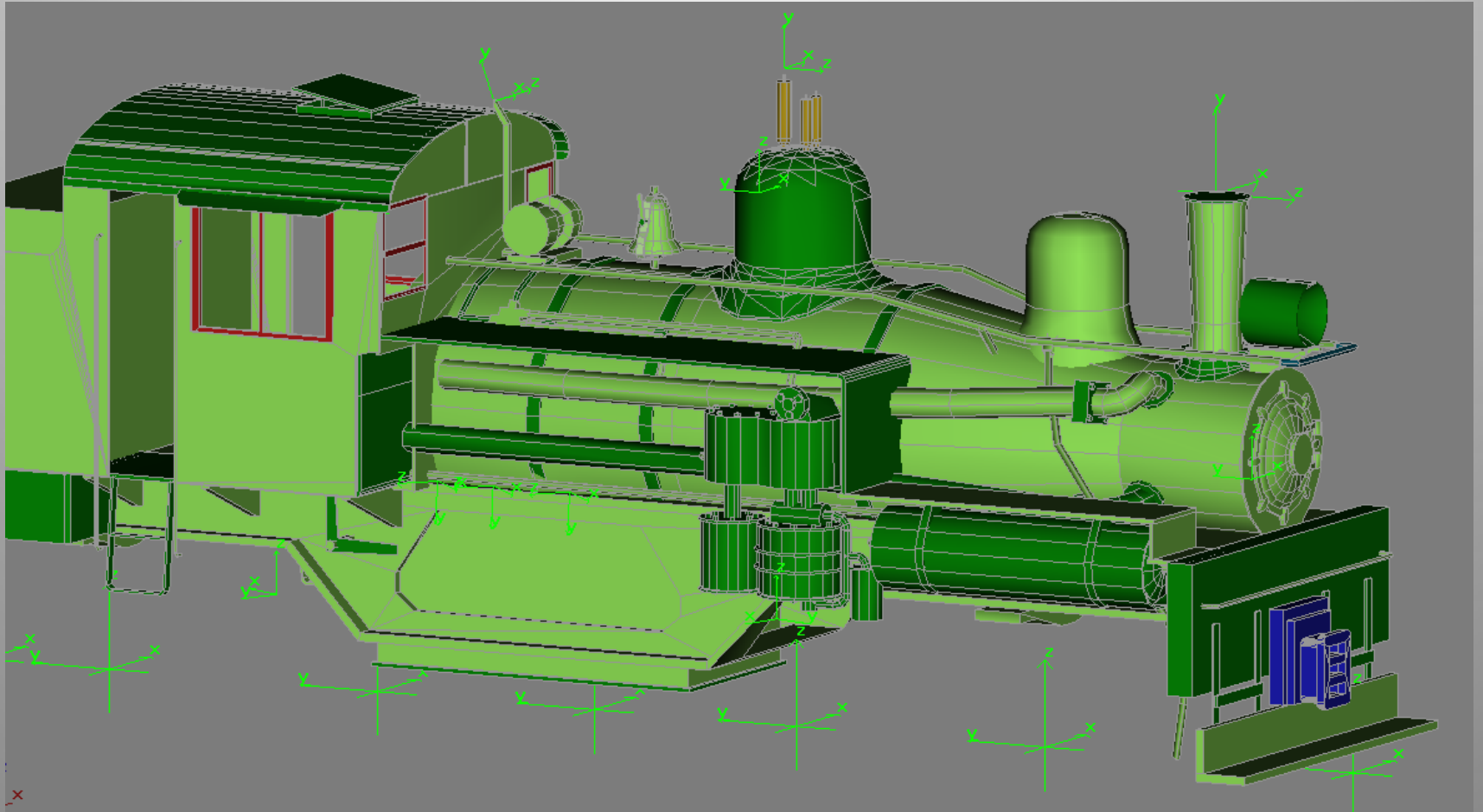
# Import drawing via CAD



# Import line drawing, create shapes



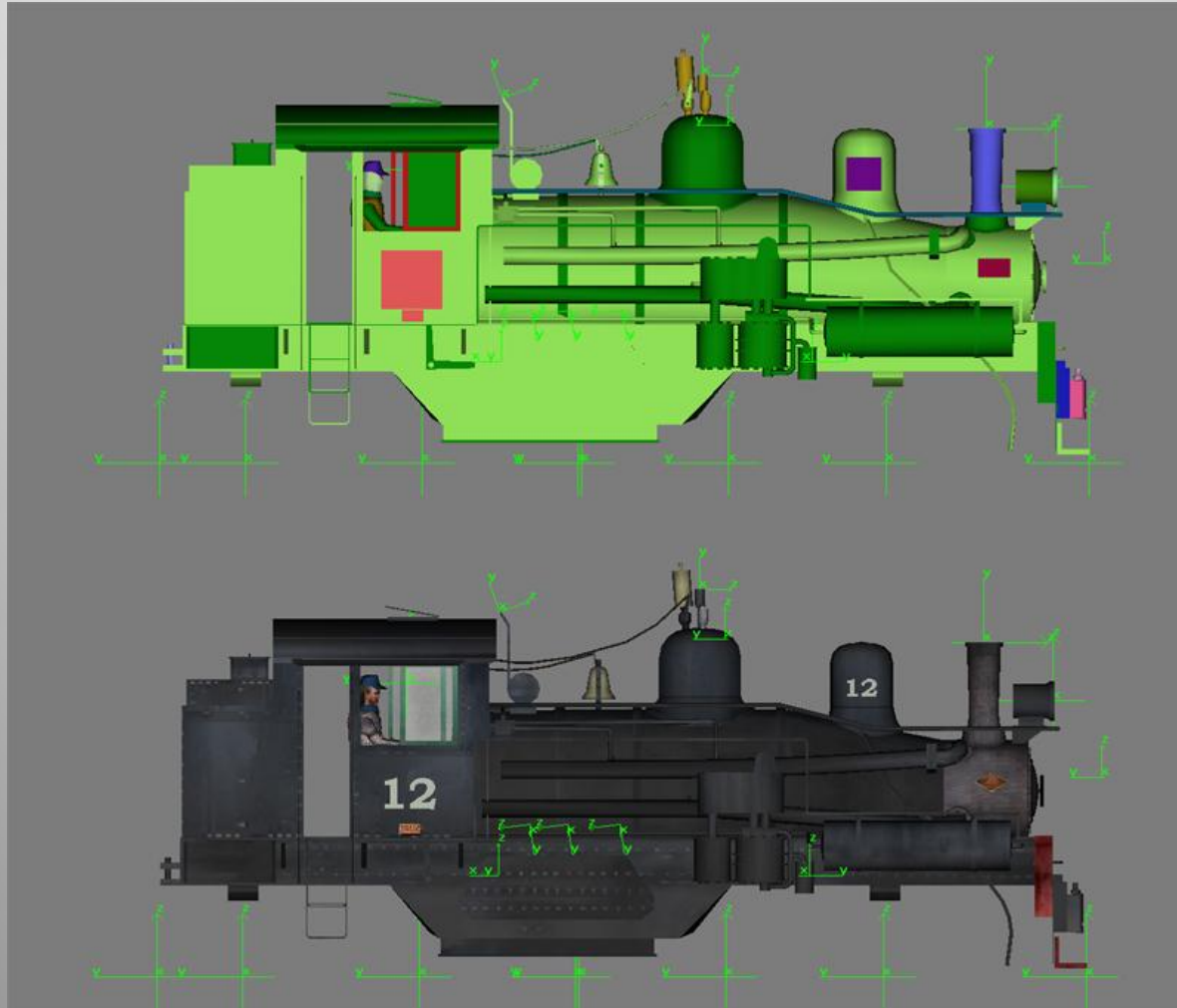
# create shapes



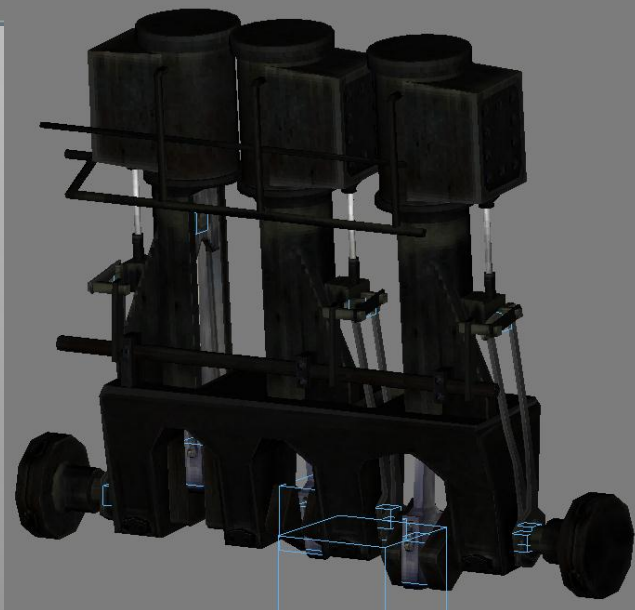
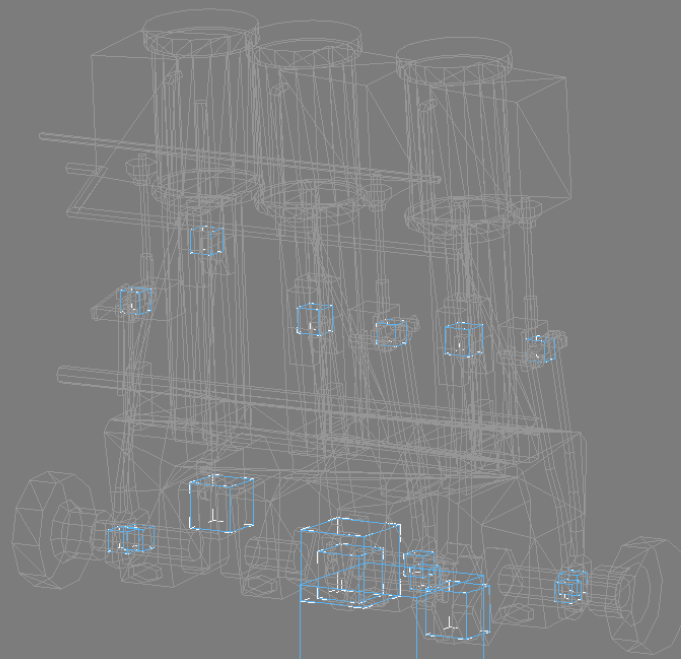
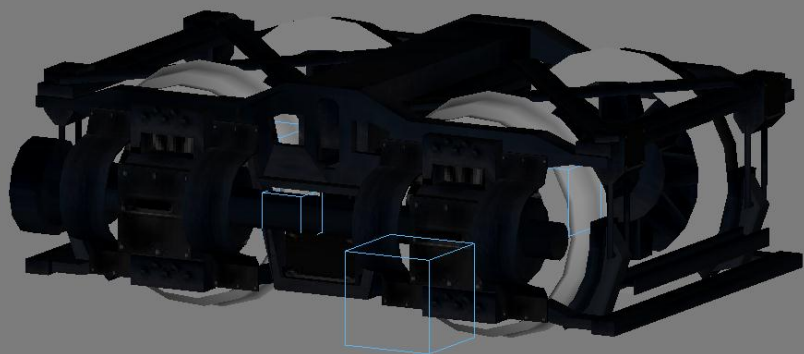
# Develop textures



# Develop textures



# Bogey develop and animation

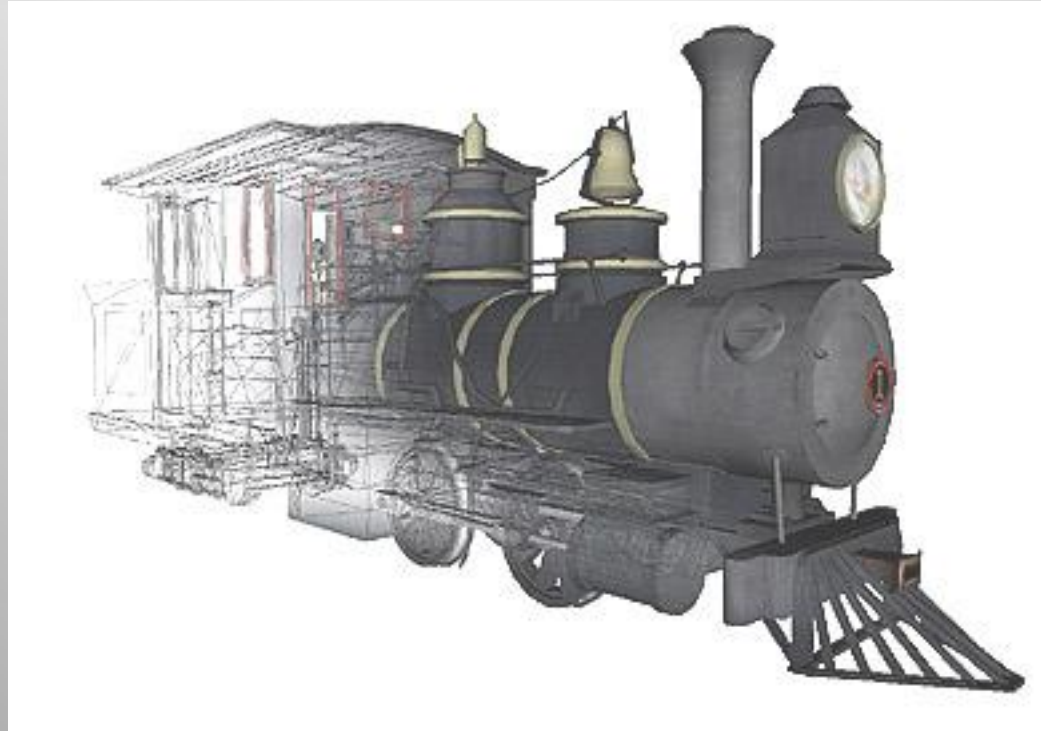


# Interior development





# Compile and export



Final stages – develop sounds, enginespec and testing...lots of testing

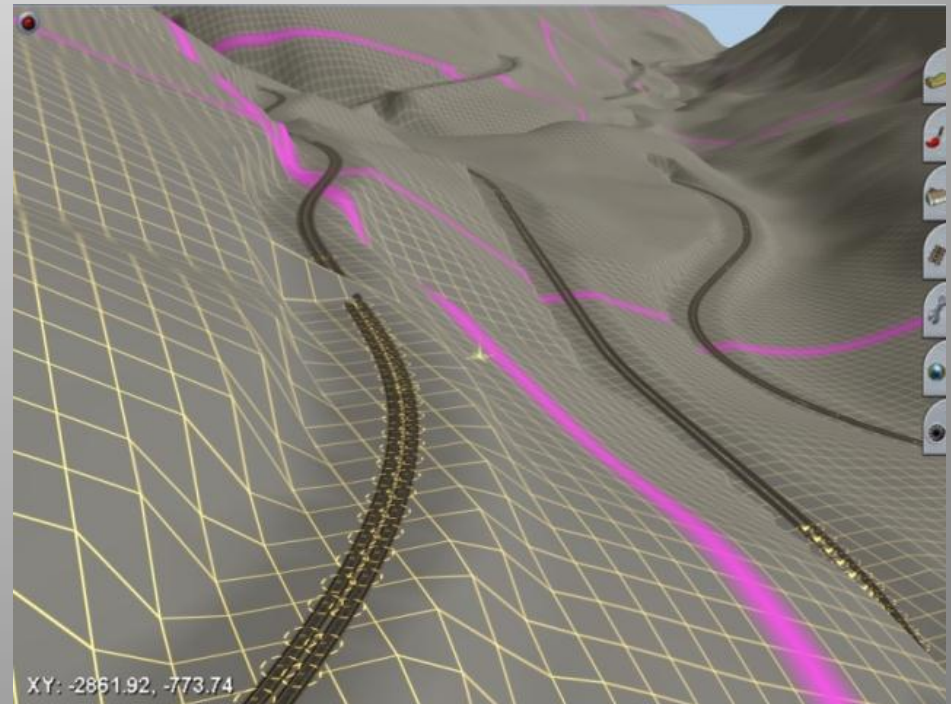
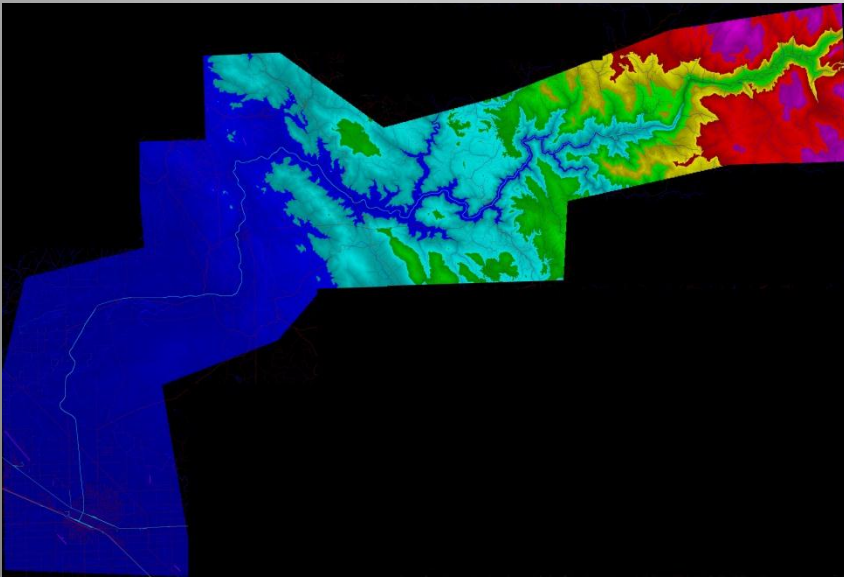
# Compile and export



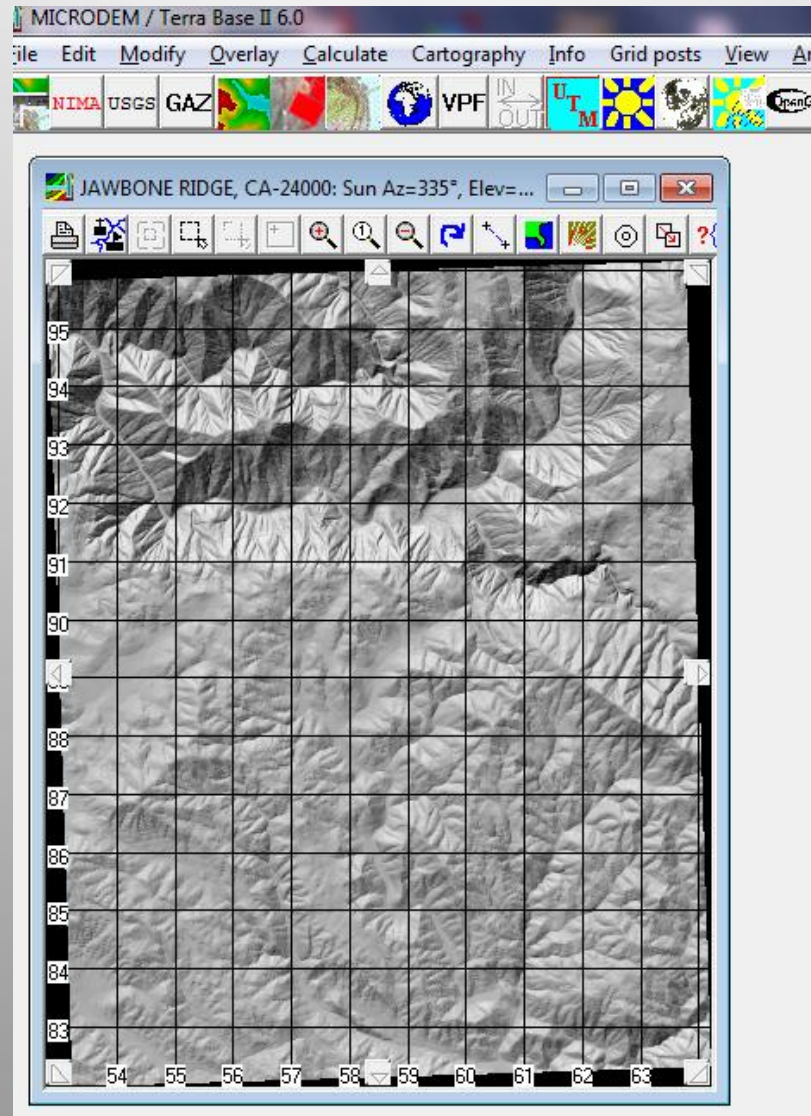
In game action shot of WSLC 12

# Digital Elevation Model

DEM import function allows use of spacial imaging data to create terrain in Trainz. Exact duplicates of actual prototype track layouts with topographical features can then be created in the virtual world. DEM data is available from the USGS.



# Digital Elevation Model – MicroDEM



# Prototype – Tehachapi Loop



Trainz

Google



# Prototype – Tehachapi Loop

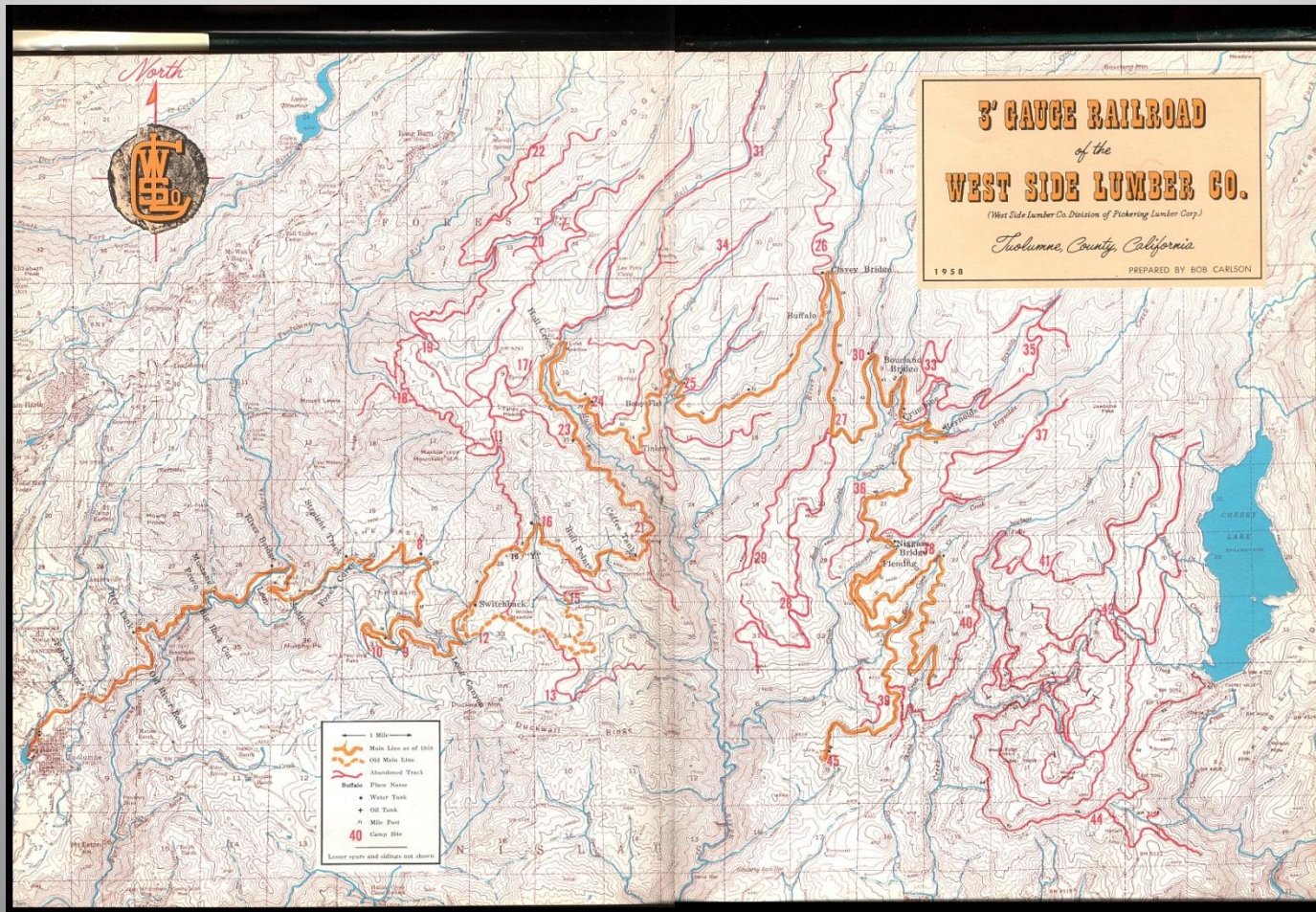


Trainz

Proto



# Prototype WSLC

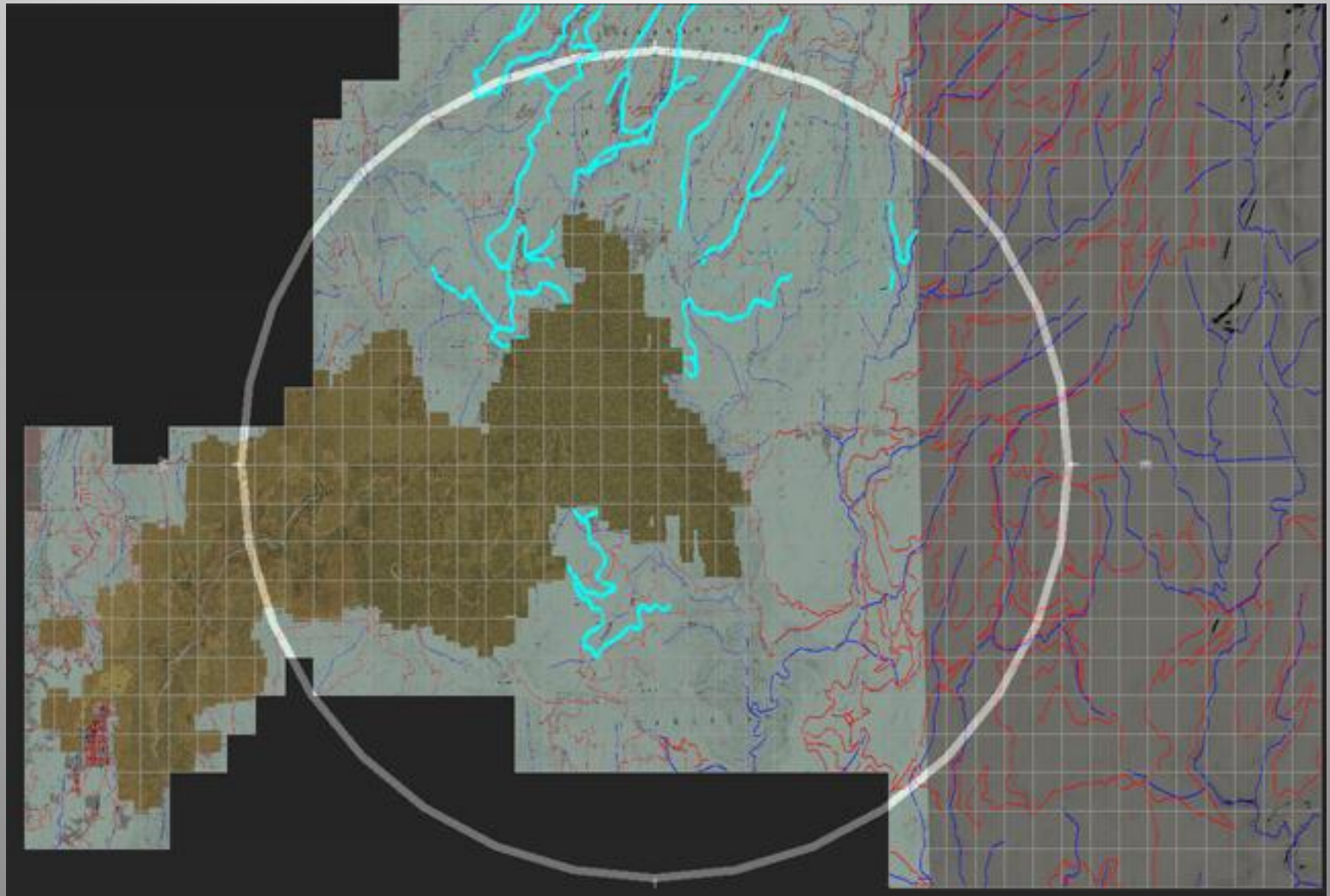


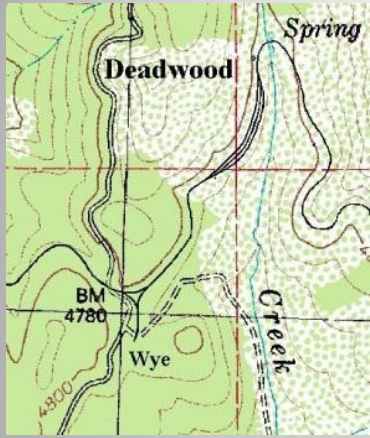
# Prototype WSLC



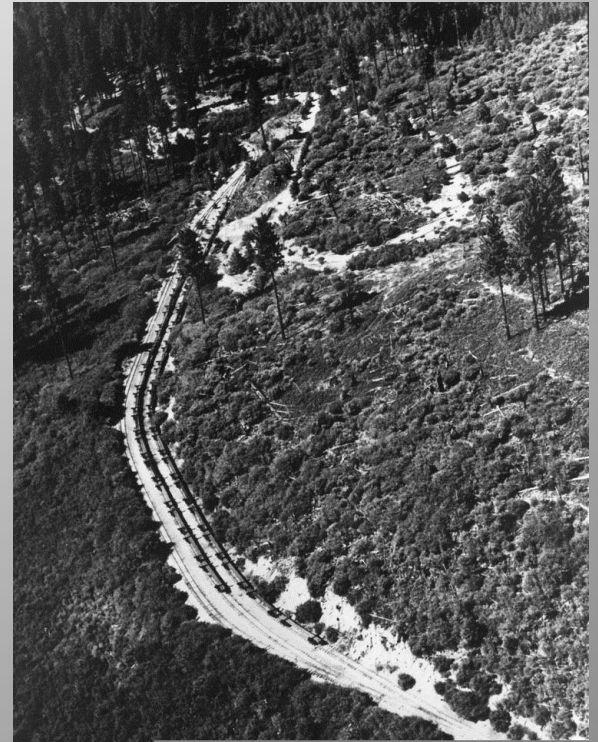


# WSLC – DEM import





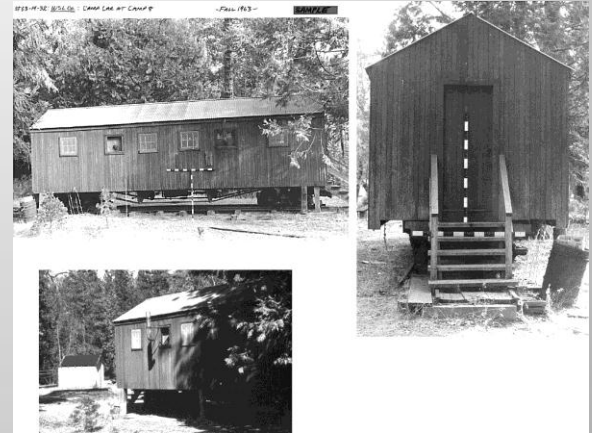
# WSLC - Deadwood



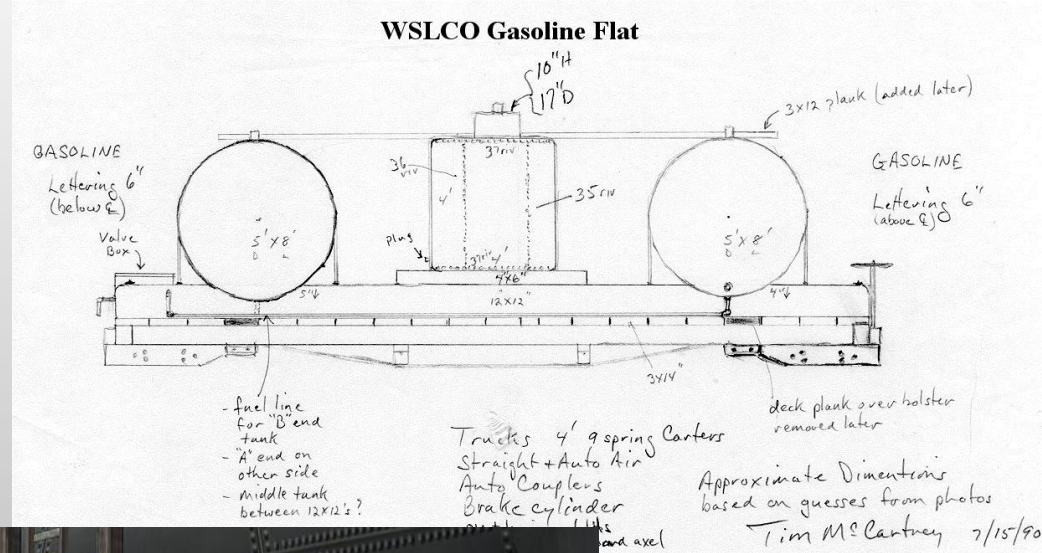
# WSLC - Deadwood



# WSLC – Camp 8 Linen Car



# WSLC – Gas Car



# WSLC – Flume Area



# WSLC – River Bridge



# WSLC – Camp 45 structures in work



Demo



Demo

# Review/Conclusions

- Track Planning and CAD
- Rail simulators overview
- “*Trainz Railroad Simulator*” and relationship to model railroading
- Content creation and prototype modeling
- WSLC Project
- Simulators enhance model railroading and provide a means to study track plans, scenes and develop operational scenarios
- Educational and provides a realistic experience on prototype routes for railfans

# WSLC Inspiration

A vintage steam locomotive pulling a train of wooden passenger cars through a wooded area. The locomotive is emitting a large plume of white steam from its tall smokestack. The train is moving along a track that curves through a dense forest of tall, thin trees. The scene is captured in a sepia or warm-toned photograph, giving it a historical and nostalgic feel.

- WSLC Yahoo Group
- Tim McCartney
- Hart Corbett
- Ken Larson
- Bob Poli
- Mallory Hope Ferrell
- Allan Krieg
- Trainz Partners
  - David Drake – trees, foliage and ground cover
  - Ben Neal – skeleton cars
  - Linda Tingvik – camp 45 structures

# Questions



# Bonus material

Virtual Railroading as applied to  
artwork and 3d prototyping

# Outside the Box - Art

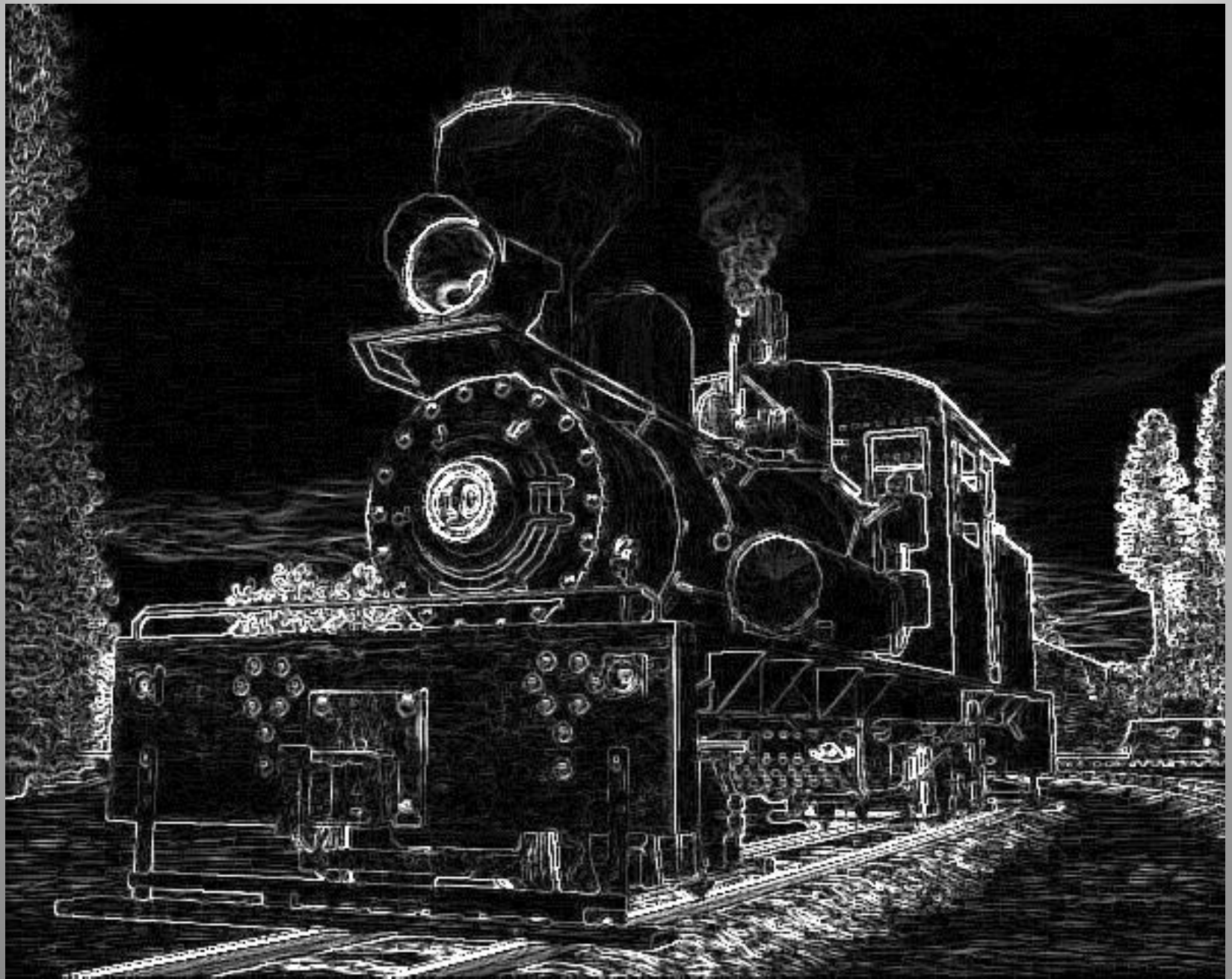




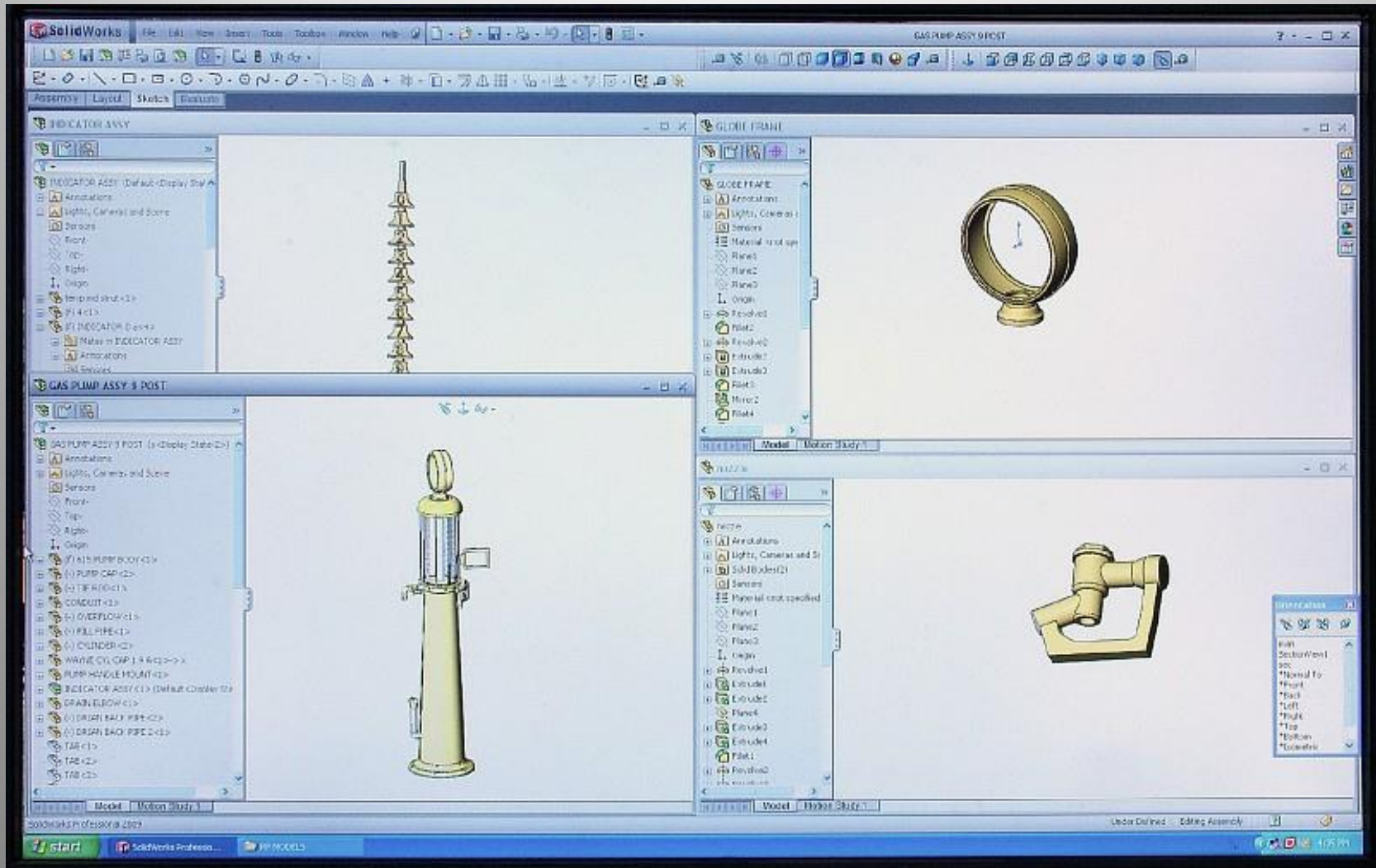




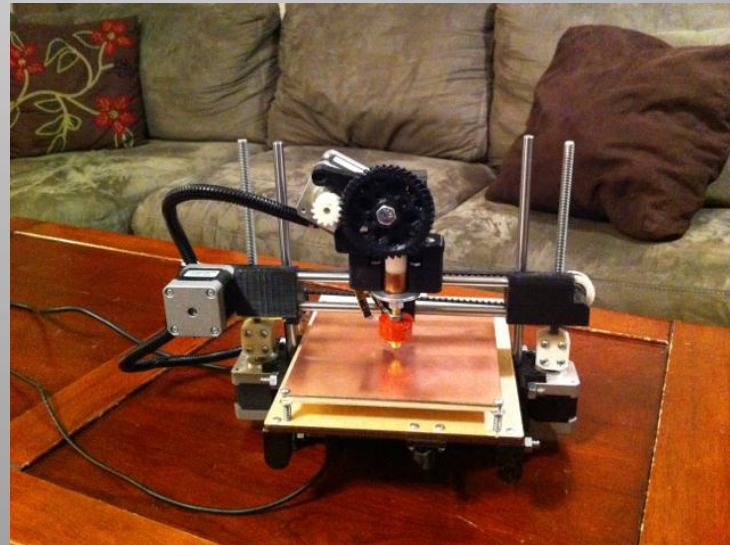
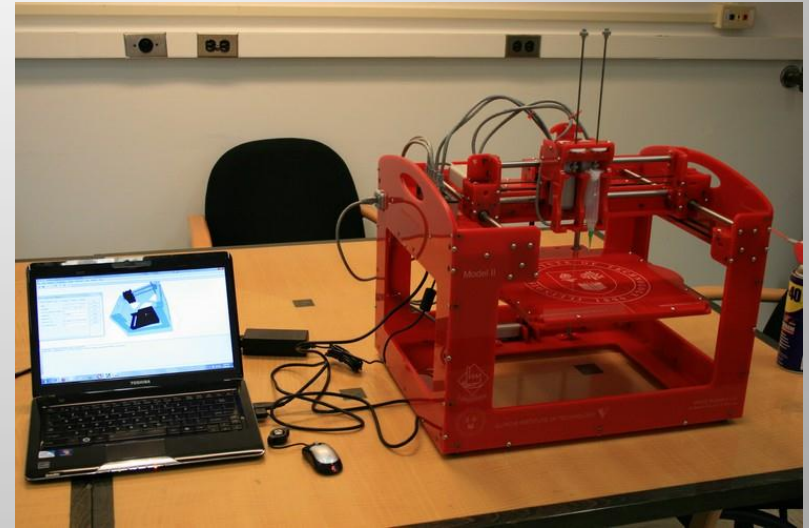
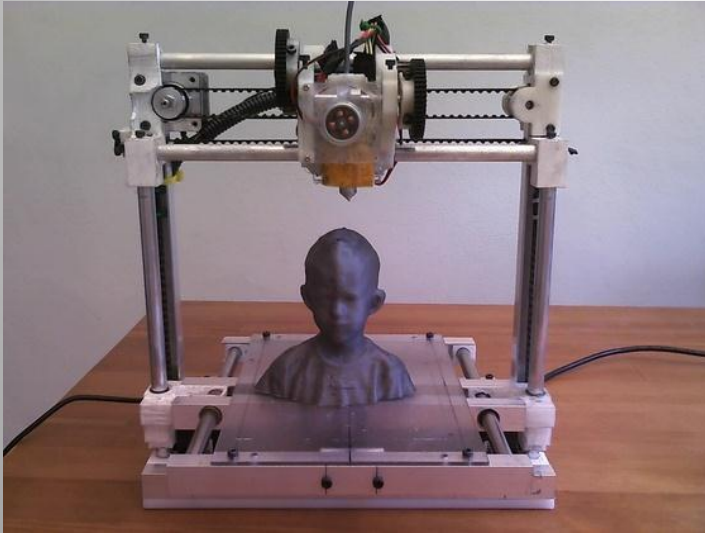




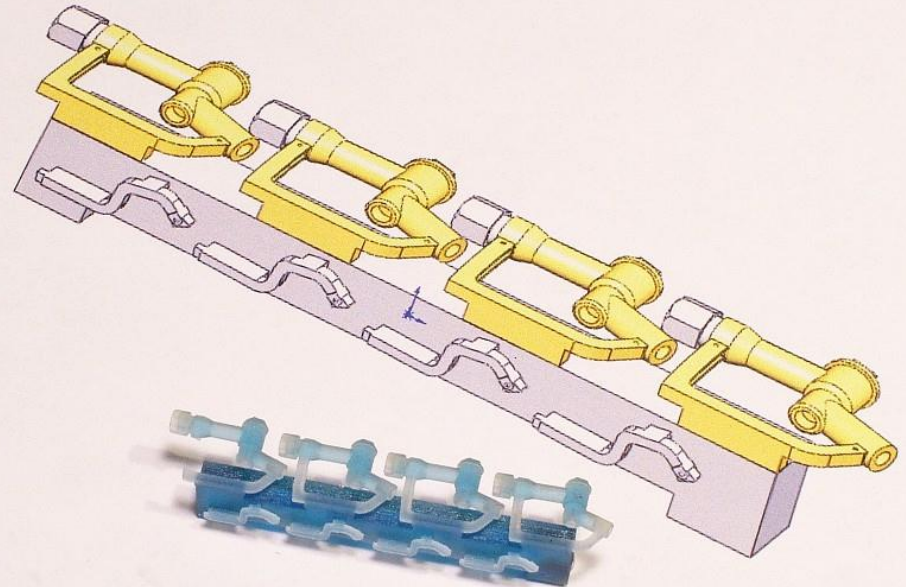
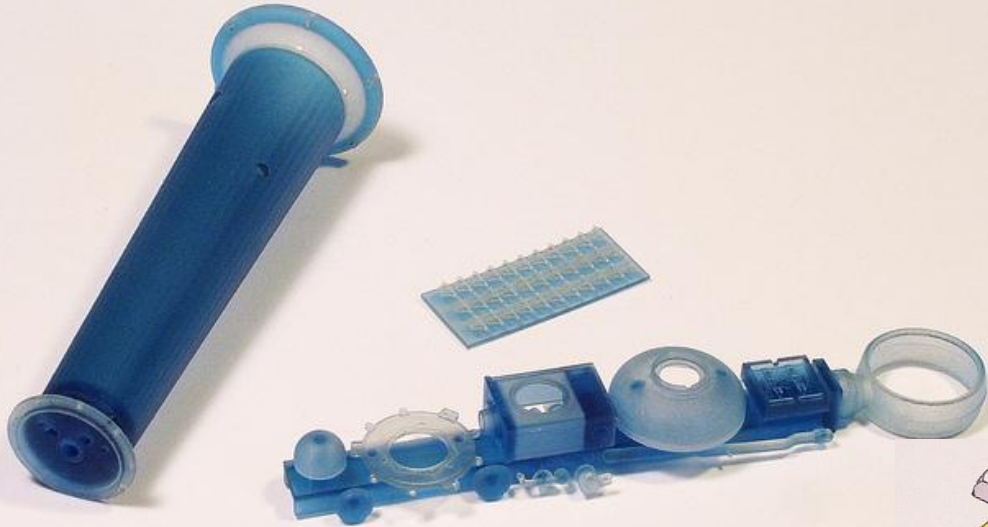
# Outside the Box – 3d Prototyping



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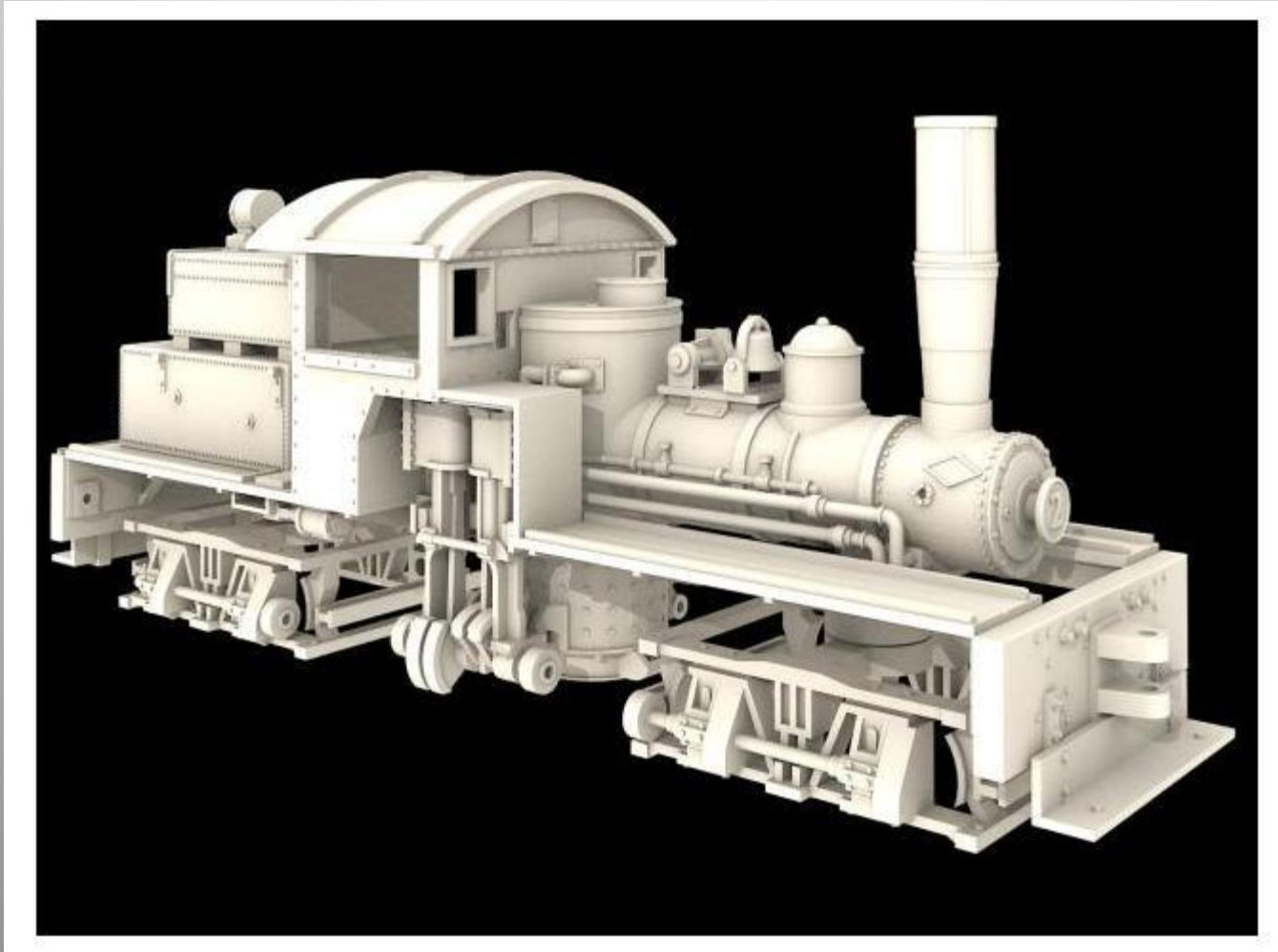


# Outside the Box – 3d Prototyping



Model and screenshots by  
Chuck Doan

# 3d Prototyping



3d printed model available from Shapeways  
The future is here