

Mobile Computer Cart

Problem Definition and Project Plan

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Overview

- Needs Statement
- Goal Statement
- Objectives
- Constraints
- QFD
- State of the Art
- Gantt Chart
- Summary
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Project Description

- Client : Dr. Srinivas Kosaraju
- Dr. Kosaraju is currently managing multiple student teams for capstone classes at Northern Arizona University. He is requesting for two mobile computer carts capable of traveling outside to perform experiments.
 - Must be adjustable
 - Weather proof
 - Each cost under \$500

Needs Statement

“The current available mobile computer carts are too expensive and are not designed for outside use.”

Goal Statement

- The project goal is to design two mobile computer stations that are less expensive than available marketed products, which can be operated in outside conditions.

Objectives

Objectives	Measurement Basis	Criteria	Units
1. Inexpensive	Cost for 2 prototype production	Cost	Dollars
2. Be able to hold CPU, Monitors, and testing equipment	The amount of the storage area	Volume	ft ³
3. Should be adjustable for multiple users	Able to change the height of the station	Height	ft
4. Should be easily maneuverable	Time it takes to transport inside and outside easily	Time	Minutes
5. Weather Resistant	Ability to resist weather conditions	Water accumulation	in
6. Reasonable size	Fit through a door and is light	Volume and Weight	ft ³ and lbs
7. Remain functional after transported	Material not deformed after rolling outside	Material Strength	Psi

Table 1 : Objectives

Constraints

- Yes-No constraints
 - The mobile cart has to support two screen monitors.
 - The mobile computer cart has to hold a CPU, keyboard, and a mouse.
 - The mobile computer cart has to move through rough terrain.
 - The mobile computer cart must be easily transported with only one individual.
 - The mobile computer cart must be weather resistant.
- One-sided inequality constraints
 - The cost of each mobile computer cart must be less than \$500.00.
 - The storage space must accommodate 2 ft^3 .
 - The width of the cart must be less than 3 ft.
 - The height of the cart must be less than 7 ft.

Testing Environment

- Field Test
 - Terrain
 - Rocky, grass, dirt
 - Function properly
 - Undamaged during transportation
 - Simulate rain
 - Transport with no assistance
 - Fit through door, weight, maneuverability, time it takes to transport

QFD

		Engineering Requirements									Bench Marks		
		Yield Strength	Max Deflection	Weight	Time to transport	Force	Material thickness	Cost	Volume	Center of Gravity	Wheel Diameter	Deluxe Diagnostic Fusion Cart	Ergotron WorkFit-C
Customer Requirements	Holds Dual Monitors	X		X				X				O	
	Aesthetics						X				O	O	
	Inexpensive			X			X	X					
	Adjustable height	X				X		X			O		
	Storage space			X				X	X	X			
	Mouse and keyboard platform							X	X	X	O	O	
	Hold CPU							X	X		O	O	
	Portable				X	X				X	X	O	O
	Light weight			X			X	X	X	X	X	O	O
	Easy to transport			X	X	X		X			X	O	O
	Weather proof			X			X	X					
	Durable	X	X	X		X	X	X			X		
	Move through rough terrain	X	X				X	X		X	X		
Units	psi	in	lbs	min	lbs	in	\$	ft^3	ft	in			
							500 x2						
Table 2 : QFD		Engineering Targets											

Benchmarking

Deluxe Diagnostic Fusion Cart

- Pros
 - Cost = \$459.00
 - Adjustable monitor
 - Holds CPU
- Cons
 - Only one monitor
 - Inside use only
 - No storage



Figure1 : Deluxe-D fusion Cart

Ergotron WorkFit-C

- Pros
 - Dual monitors
 - Adjustable monitor
 - Mouse/keyboard platform
- Cons
 - Inside use only
 - Cost = \$854.99
 - No Storage



Figure 2: Ergotron Cart

State of the Art (SOTA)

- Braking cart system
 - Foot activated and released.
 - Keep the cart from rolling downhill.

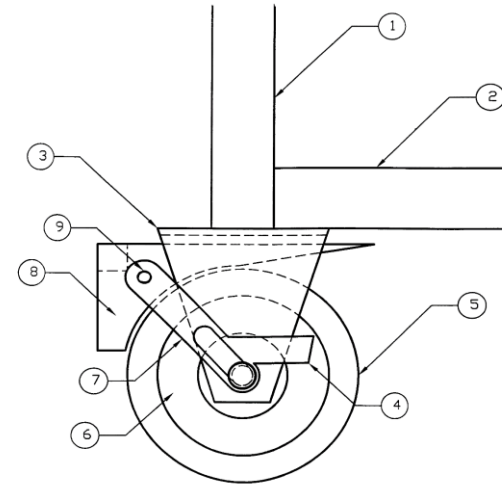


Figure 3: Braking system

- Mobile flat panel monitor and computer cart
 - A wheeled base
 - A support structure above the base
 - A shelf coupled to the support structure
 - A bracket above the shelf
 - A flat panel monitor mounted to the support structure.

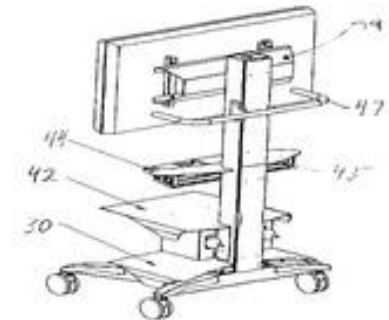


Figure 4: Cart patent 1

State of the Art (SOTA)

- Material selection and design effectiveness
 - Calculate stress and strain on design
 - Insure adequate material strength
- Mobile Storage and Computer Cart
 - High clearance wheeled base
 - Enclosed area for computer/storage
 - Keyboard/mouse tray

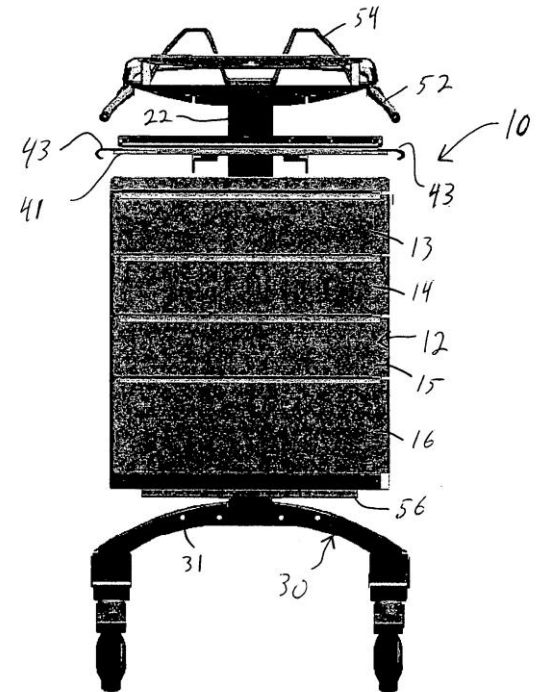


Figure 5: Cart patent 2

Gantt Chart

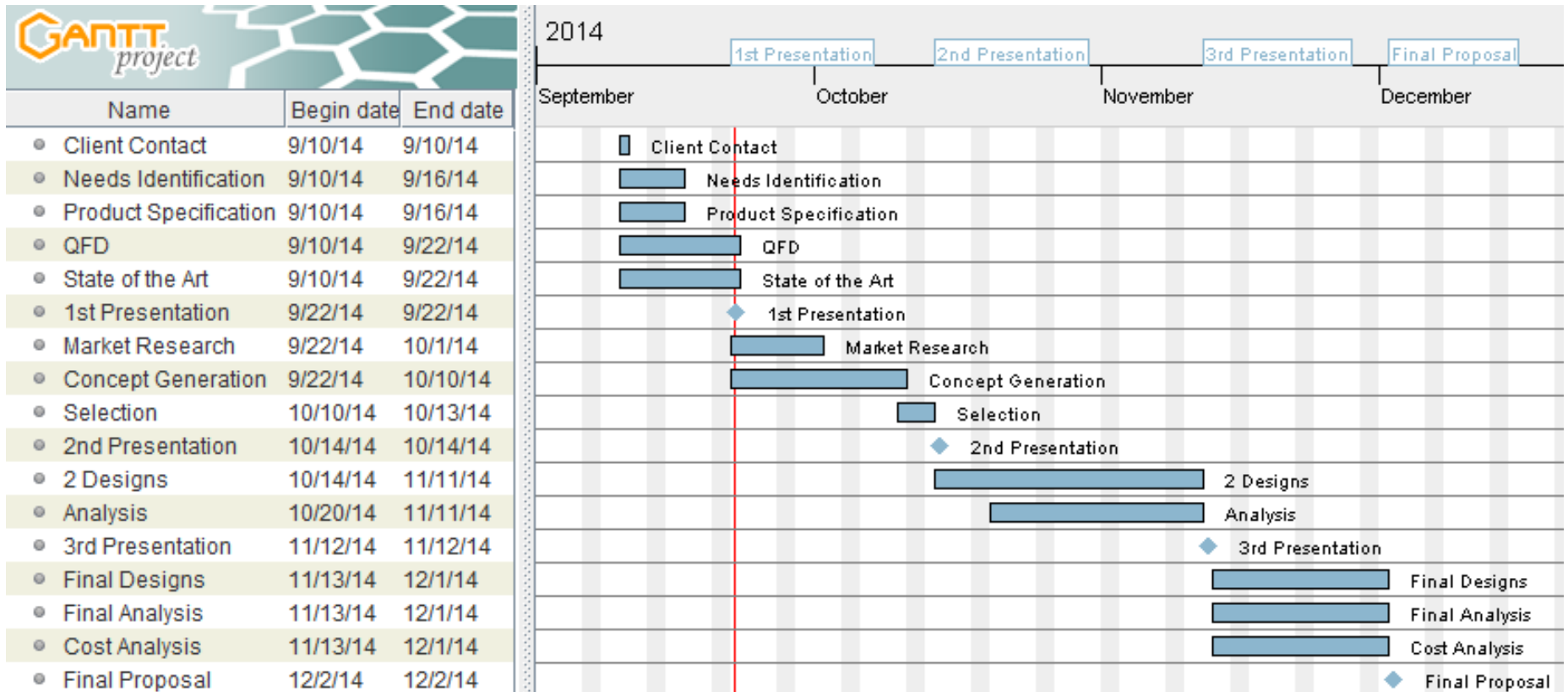


Table 3 : Gantt Chart

Summary

- The client is Dr. Srinivas Kosaraju
- Need statement : The current available mobile computer carts are too expensive and are not designed for outside use
- Going to design two mobile computer carts that can be function outside
- QFD concluded cost, weight, and material thickness will be an important engineering requirement.
- Benchmarking and SOTA provided evidence that a new innovative design will be required.
- Next step will be concept generation and selection

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