Mobile Computer Cart

Progress Report

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January 21, 2015
Overview

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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 a mobile computer cart capable of traveling outside to perform experiments.
  – Must be adjustable
  – Weather proof
  – 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 a mobile computer station that is less expensive than available marketed products, which can be operated in outside conditions.
# Objectives

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Measurement Basis</th>
<th>Criteria</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexpensive</td>
<td>Cost prototype production</td>
<td>Cost</td>
<td>Dollars</td>
</tr>
<tr>
<td>Be able to hold CPU, Monitors, and testing equipment</td>
<td>The amount of the storage area</td>
<td>Volume</td>
<td>ft³</td>
</tr>
<tr>
<td>Should be adjustable for multiple users</td>
<td>Able to change the height of the station</td>
<td>Height</td>
<td>ft</td>
</tr>
<tr>
<td>Should be easily maneuverable</td>
<td>Time it takes to transport inside and outside easily</td>
<td>Time</td>
<td>Minutes</td>
</tr>
<tr>
<td>Weather Resistant</td>
<td>Ability to resist weather conditions</td>
<td>Water accumulation</td>
<td>in</td>
</tr>
<tr>
<td>Reasonable size</td>
<td>Fit through a door and is light</td>
<td>Volume and Weight</td>
<td>ft³ and lbs</td>
</tr>
<tr>
<td>Remain functional after transported</td>
<td>Material not deformed after rolling outside</td>
<td>Material Strength</td>
<td>Psi</td>
</tr>
</tbody>
</table>

Table 1: Objectives
Constraints

• Yes-No constraints
  – Support two screen monitors.
  – Hold a CPU, keyboard, and a mouse.
  – Move through rough terrain.
  – Easily transported with only one individual.
  – Weather resistant.

• One-sided inequality constraints
  – 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
## Parts Ordered

<table>
<thead>
<tr>
<th>No.</th>
<th>Parts</th>
<th>QTY.</th>
<th>Vendor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8ft Frame Tubing 1</td>
<td>6</td>
<td>Online Metals</td>
<td>0.75&quot; x 0.75&quot; x 0.065&quot; square tubing A513 HOT ROLLED MILD STEEL</td>
</tr>
<tr>
<td>2</td>
<td>8ft Frame Tubing 2</td>
<td>7</td>
<td>Online Metals</td>
<td>0.5&quot; x 0.5&quot; x 0.065&quot; square tubing A513 HOT ROLLED MILD STEEL</td>
</tr>
<tr>
<td>3</td>
<td>Sheet Metal</td>
<td>6</td>
<td>Online Metals</td>
<td>24&quot; x 48&quot; x 0.03&quot; steel</td>
</tr>
<tr>
<td>4</td>
<td>Plexiglass 1</td>
<td>1</td>
<td>Mc Master Carr</td>
<td>12&quot; x 24&quot; x 1/8&quot; Polycarbonate</td>
</tr>
<tr>
<td>5</td>
<td>Plexiglass 2</td>
<td>1</td>
<td>Mc Master Carr</td>
<td>12&quot; x 48&quot; x 1/8&quot; Polycarbonate</td>
</tr>
<tr>
<td>6</td>
<td>Telescope Tubing</td>
<td>1</td>
<td>Mc Master Carr</td>
<td>1.5&quot; x 1.5&quot; x 4ft Telescoping tubing</td>
</tr>
<tr>
<td>7</td>
<td>Hinge</td>
<td>1</td>
<td>Mc Master Carr</td>
<td>2 ft long piano hinge</td>
</tr>
<tr>
<td>8</td>
<td>Monitor Mount</td>
<td>1</td>
<td>Amazon</td>
<td>Tyke Supply Dual LCD Monitor Stand</td>
</tr>
<tr>
<td>9</td>
<td>Leveling Mounts</td>
<td>2</td>
<td>Machine Shop</td>
<td>Swivel Leveling Mounts</td>
</tr>
<tr>
<td>10</td>
<td>Latches</td>
<td>2</td>
<td>Mc Master Carr</td>
<td>Draw latches</td>
</tr>
<tr>
<td>11</td>
<td>Door latch</td>
<td>2</td>
<td>Mc Master Carr</td>
<td>Magnet latches</td>
</tr>
<tr>
<td>12</td>
<td>Door Handles</td>
<td>2</td>
<td>Machine Shop</td>
<td>Door Handles</td>
</tr>
</tbody>
</table>

Table 2: Parts Ordered
Mobile Cart Design

• Two wheeled dolly Design
  – Adjustable monitors
  – Large wheel for rough terrain
  – Interior storage space
  – Weather proof
    • Retractable lid
    • Collapse everything inside
    • Windows
  – Fits through doors
  – Handle for easy maneuverability
Dimensions / CAD
Frame

• Modifications
  – Top door removed

• Progress
  – All framing material arrived
  – Square tubing measured and cut
  – 90 % welded together
  – Beginning to attach sheet metal
  – Grinding and sanding weld beads smooth
Manufacturing Process
Manufacturing Process
Next Steps

• Order remaining material
• Grind and sand outside for paint
  – Electric grinding wheel
  – 600 grit sand paper
• Continue Assembly
  – Wheels
  – Plexiglas windows
  – Storage
  – Computer stand
  – Wiring
Project Progression

Table 3 : Gantt Chart
Summary

• Project Background: Mobile computer cart for Dr. Srinivas Kosaraju
• Going to perform a field test once complete
• Purchased equipment: 80% of the material has been ordered from Online metals or McMaster Carr
• Currently only 1 design modification to the upper door, which was removed
• Frame is 90% complete
• Sheet metal is currently being welded on
• Continue working in the machine shop to meet March completed date
• UGRADS on April 24th
References

• http://www.onlinemetals.com/merchant.cfm?id=845&step=2&top_cat=849
• http://www.amazon.com/Tyke-Supply-Dual-MonitorStand/dp/B002R9HQLI/ref=sr_1_3?ie=UTF8&qid=1415760377&sr=8-3&keywords=monitor+mount
• http://www.mcmaster.com/#piano-hinges/=uk3rjo
• http://www.mcmaster.com/#standard-lid-supports/=vjfgqv