

# Minutes

Facilitator: Nikki Imanaka

Date: 9/26/2018

Minutes Recorder: Emily Chambers

Time: 2:30-3:00

Attendees: Emily, Nikki, Davis, Jaime, Dr. Beyerlein, Jonathan, Sally Place: MindWorks Office

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## Meeting Called to Order at 2:31pm

Time:	Topic:
2:31	<ul style="list-style-type: none"><li>• Preliminary ideas</li><li>• Idea 1 - Nikki<ul style="list-style-type: none"><li>○ Once the rail is no longer in contact with the pins it is resting on the</li><li>○ Do the arms need to be that long?<ul style="list-style-type: none"><li>▪ It can be shorter and move the entire thing forward towards the user</li></ul></li><li>○ Swing arm stops</li><li>○ They think it will work from a kinematic standpoint</li><li>○ Doesn't need assistance all the way in, just that last little bit</li></ul></li><li>• Idea 2 - Jaime (rack and pinion)<ul style="list-style-type: none"><li>○ Simple - materials?</li></ul></li><li>• Idea 3 - Jaime (rubber grip surface)<ul style="list-style-type: none"><li>○ They aren't too familiar with rubber</li><li>○ Might have too much friction from rubber<ul style="list-style-type: none"><li>▪ Could add to the force total to overcome</li></ul></li><li>○ They aren't as excited about this one as idea 2</li><li>○ Need a stop point for exit and entry<ul style="list-style-type: none"><li>▪ It has to have a defined position when the tray goes in</li><li>▪ The customer shouldn't have to think about that step</li><li>▪ Springs could be considered</li></ul></li></ul></li><li>• *Position matters for Ideas 1,2,3</li><li>• Idea 4 - Davis (lead screw)<ul style="list-style-type: none"><li>○ Adds a lot of "height" to build - Davis</li><li>○ Would lock the tray in place<ul style="list-style-type: none"><li>▪ They don't have an issue with that</li></ul></li><li>○ S&amp;J Concerned about space</li><li>○ Most expensive</li><li>○ Their least favorite idea</li></ul></li><li>• Idea 5 - Davis (Puzzle piece)<ul style="list-style-type: none"><li>○ 2-step process<ul style="list-style-type: none"><li>▪ Pull latches out (to pull past card slot)</li><li>▪ Lift the tray out</li></ul></li><li>○ Unless you can put a pin that will allow the arm to go past 90 deg. Getting the tray out would be an issue<ul style="list-style-type: none"><li>▪ Extending past the plane of the chassis would not be ideal</li></ul></li><li>○ Theory is good, but it would need some development</li></ul></li><li>• Idea 6 - Davis (L-arm)</li></ul>

- S-shape idea presented
- If it isn't too big then it is similar to the other concepts we have seen
  - Similar problems
  - How to target that little pin?
- Idea 7 - Davis (slotted tray)
  - Clearance issue
  - 2 - one on each side
  - Would have to reach in to complete the action
- Idea 8
  - Likes over center mechanisms
    - Handles well in
  - Fretting corrosion
    - Plated contacts in tuning fork shaped contacts
    - Reduces conductivity of contact
  - Wouldn't have to limit the tolerance
  - He likes the idea
  - Don't limit to off-the-shelf part
    - Might be better to machine or tool our own part

3:00

- Decision Matrix
- Try and throw in a dumb idea and check if it works the way we think it should
- They use a pole-based matrix
  - "Is effectiveness more or less important than cost? If so then by how much?"
    - Ask comparison between everything
    - Ask key people
      - Group spreadsheet
  - They can share their sheet with us
  - Makes the assessment less biased
- Do we actually agree with the values we got?
- Final part cost is questionable
  - Iterate on that further
  - Involve a tooling cost
  - Lead screw = 2
- Effectiveness
  - Will it work - what we are assessing
    - Does the customer have to do more than one step
    - If someone does it wrong will it damage the part
    - Is it two-year-old proof?
- Break apart some of the matrix
  - Make it as meaningful as possible
- Say our goal is to create it for under \$2
  - If your given design can't fulfill that, then you fail that column
- Early numbers, but we will definitely have to move forward with that

3:10

Were there ideas that weren't included in the presentation?

- Jaime - confirmed with gears idea
- Include those ideas in our list!

	<ul style="list-style-type: none"> <li>• There will be ideas that don't work, but at least it doesn't keep you in one track for too long</li> <li>• It might fall off the list, but we will know exactly why</li> </ul>
3:17	<p>Develop way to test</p> <ul style="list-style-type: none"> <li>• Davis Pulleys and weight system</li> <li>• Invest more time in test apparatus</li> <li>• Physical achievable force on design matrix then yes create one</li> <li>• They don't think there is a minimum</li> <li>• Go gather how much people are comfortable pushing <ul style="list-style-type: none"> <li>○ If you can reduce to 20 and people still aren't comfortable then you haven't achieved the goal</li> </ul> </li> </ul>
3:26	<p>Input from Jonathan and Sally</p> <ul style="list-style-type: none"> <li>• Suggestion - create a "living list" of constraints <ul style="list-style-type: none"> <li>○ Continue to modify it</li> <li>○ Include that you have a pivot max - physical constraints</li> </ul> </li> <li>• Open it up and try every one of these ideas</li> <li>• Make no assumptions while brainstorming <ul style="list-style-type: none"> <li>○ Go to the outskirts of possibility</li> <li>○ We don't have a wide range of creativity</li> </ul> </li> </ul>

#### Action Items:

- **Jaime** will continue to work on the Project Deliverables document
- **Emily** will format and distribute meeting minutes for this meeting
- **Jonathan** will send team comparative decision matrix spreadsheet
- **Everyone** will continue to research ideas

#### Upcoming Important Dates

- Sept 27<sup>th</sup> – Project requirements due
- Oct 4<sup>th</sup> – Logbook (w/review form) and Portfolio review
- Oct 9<sup>th</sup> – Snapshot Day #1

**Meeting Adjourned at 3:07pm**