



SoutheastCon Hardware Competition

Team No: 29/1A

Nils Bjerer, Donovan Carey, Christopher Lewis, Kurt Marsman,
James Pace, Ryan-David Reyes, Julian Velasquez



Aim: To design and build a robot to win the 2015 SoutheastCon Hardware competition.

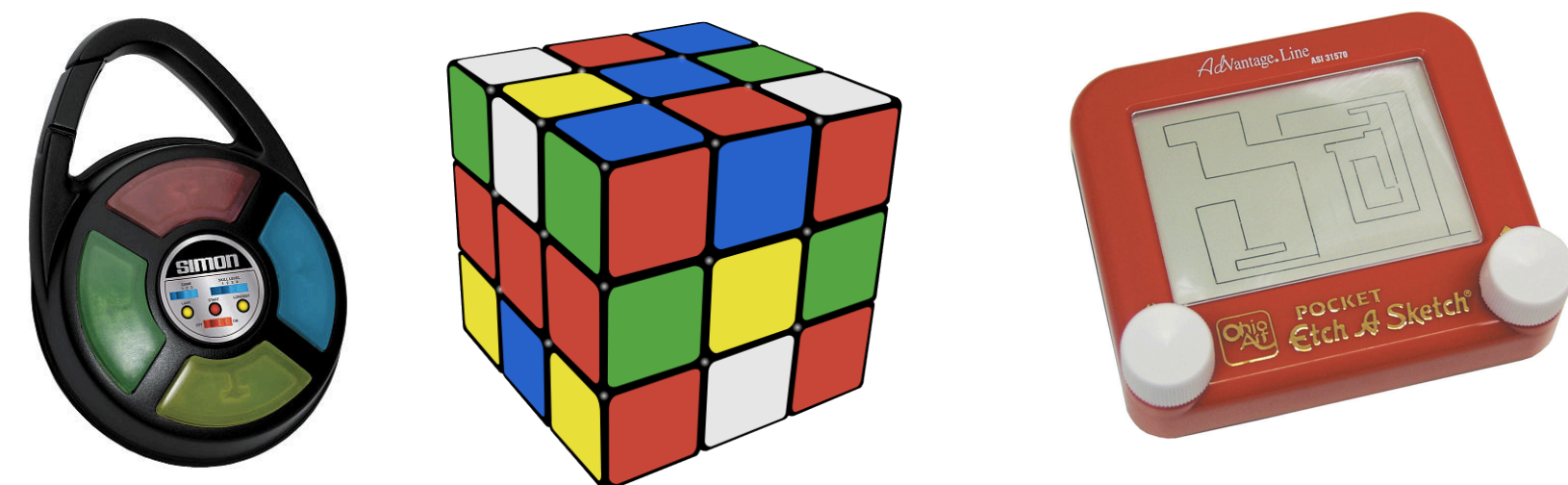
Introduction

Purpose:

To win the SoutheastCon 2015 Hardware competition.

Points in the competition are awarded for:

- Drawing IEEE on an Etch-A-Sketch
- Turning one row of a Rubik's Cube
- Playing Simon for 15 seconds
- Picking-up a single playing card
- Following white lines to get to the challenges.
- Completing the tasks quickly.



Approach

Team focused on robustness, which manifested itself in a simple design. Of the robots at the competition, the team had one of the simplest mechanical designs.

Because there were four different challenges and it is non-economical to try to build four different end-effectors, the team looked at synergies between challenges to combine challenges together.

Results

Team Placed:

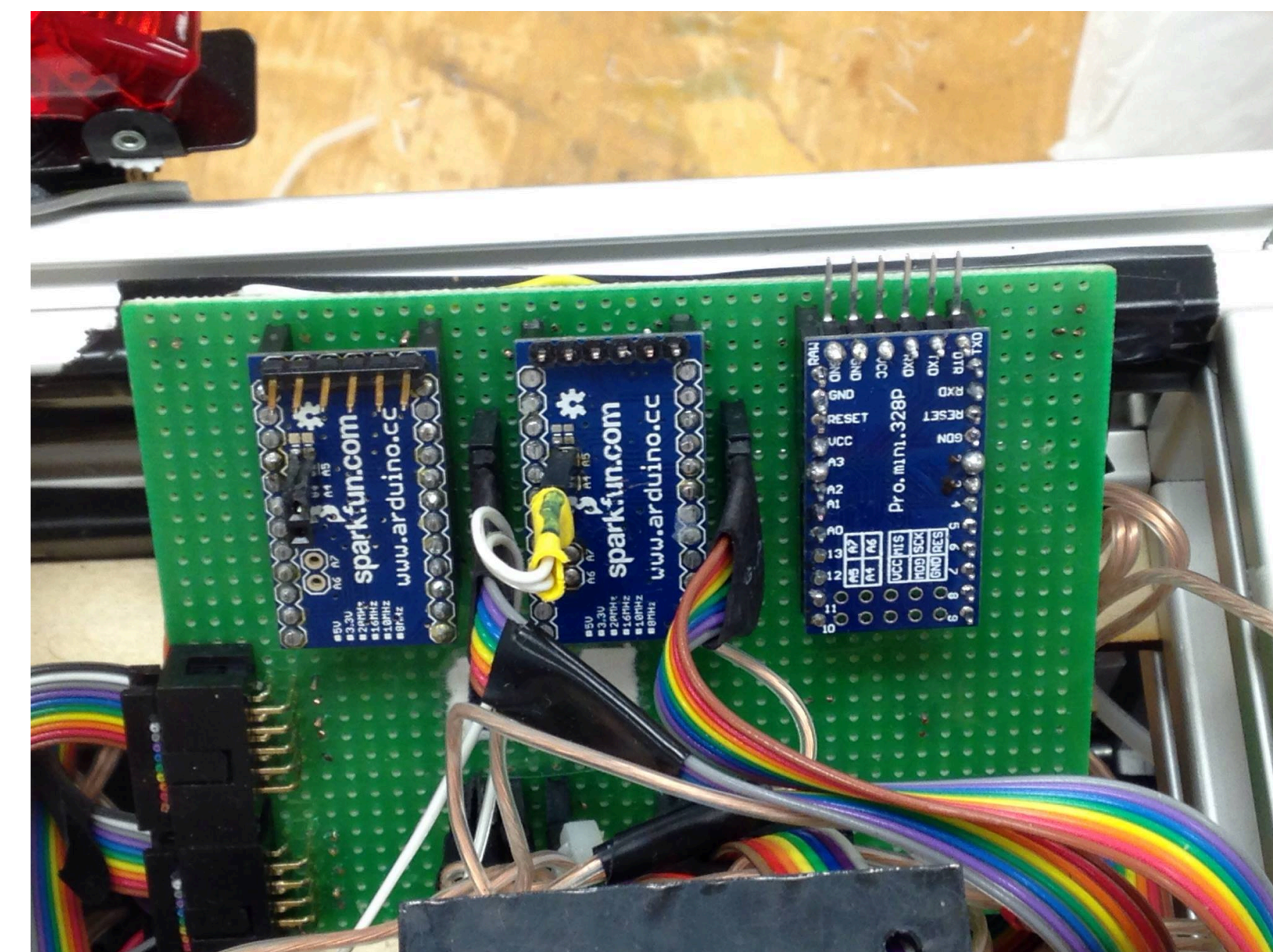
- 7th out of 39 teams present
- 2nd of teams from the state of Florida

One of the simplest mechanical and software designs present.

Future Work

- Work on the aesthetics of the design.
- Get detection for Simon working.
- Improve performance by improving the speed of line following code.
- Investigate the use of Smaller Mecanum wheels to improve performance.
- Investigate the use of smaller drive motors and resulting changes to the chassis.

Electronics



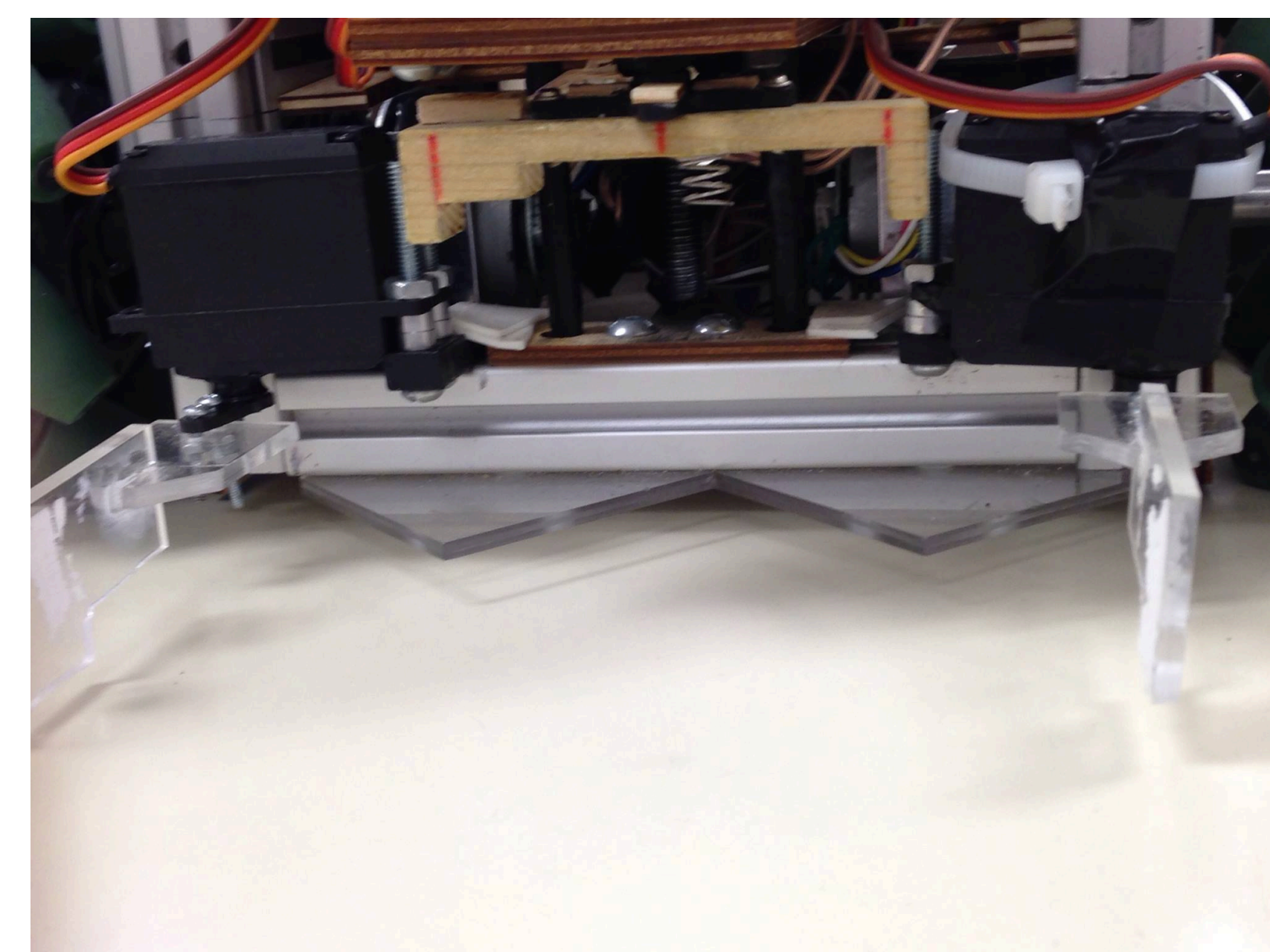
Multiple Arduinos allowed for clean separation of concerns and parallelization of tasks.

Mecanum wheels allow for omnidirectional steering, easier line following, and gives more freedom in determining alignment strategies.

Drive System



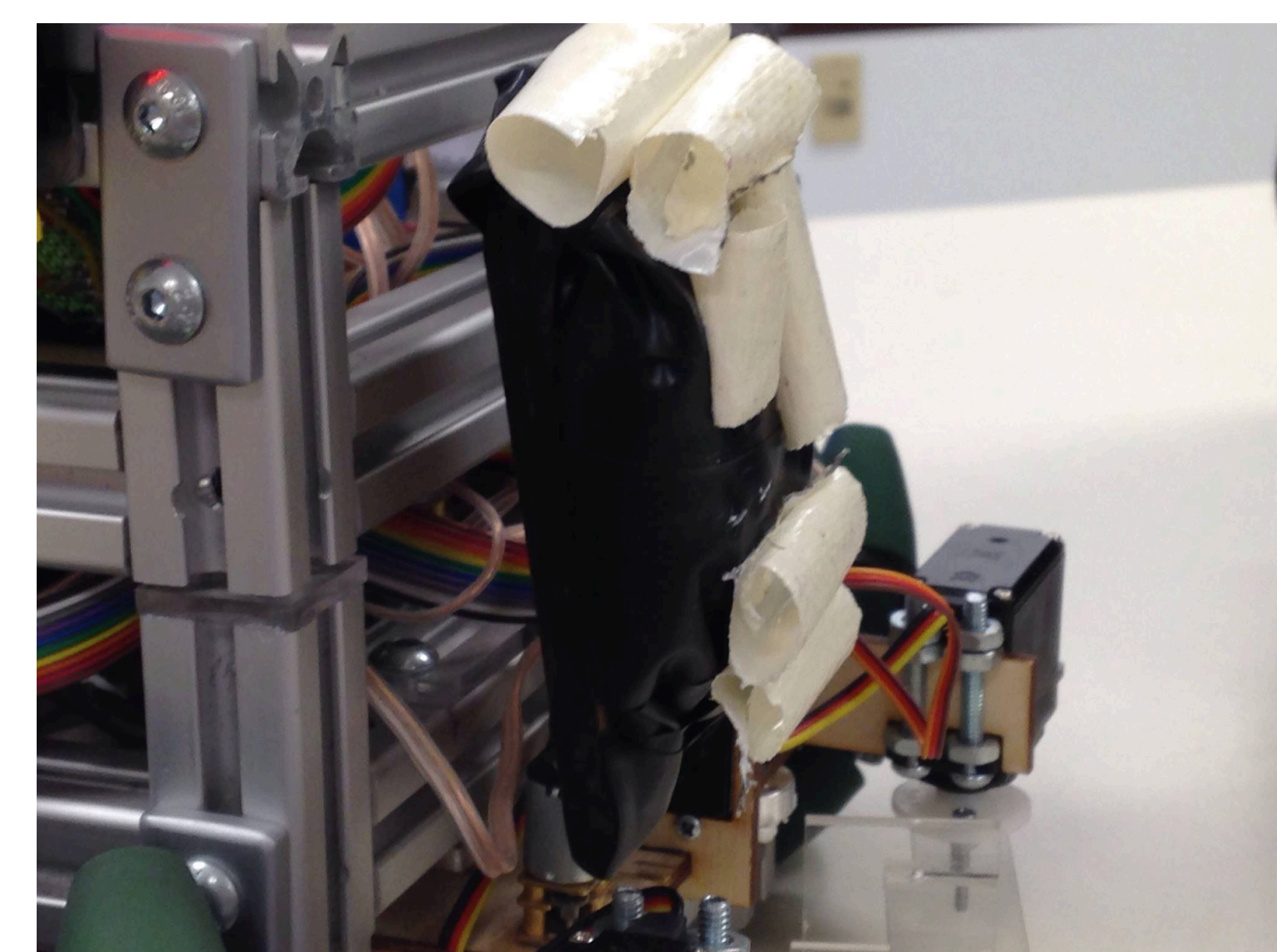
Simon and Rubik's Cube Arms



- Triangle base aligns and hold Rubik's cube and Simon.
- Design uses the fact that both toys are roughly the same size to its advantage.

- Rotating end effector can both spin Rubik's cube and hit Simon Game.
- Power screw gives vertical motion needed for both games.

Etch-A-Sketch/Playing Card Arm



- Arm grabber design guarantees mechanical alignment.
- Using sticky tape for friction gives a simple design which minimizes slip.

- Playing card uses a very simple mechanism, that does not fail.
- The contact surface is compliant, so the arm can hit at many different angles and still work.
- Compliance means arm never relies on a single point of contact with the card.

