Designing an Effective Wheel Chair Table Mount

Overview
Students from Penn State, Chonnam National, and Seoul National Universities have been tasked with redesigning a wheelchair attachment for Dr. Sang-Mook Lee, a professor at Seoul National University. Dr. Lee suffers from quadriplegia and has requested a folding desk that can store and deliver a variety of objects with the push of a button. The teams must coordinate their efforts to design and deliver a coherent and effective solution that meets the customer’s needs in a 13 week timeframe.

Objectives
The team had to design from scratch a desk attachment which folds using an electromechanical system. An existing prototype was disclosed to the team as a benchmark to surpass in design.

Approach
- Gather customer input and quantify using AHP Pairwise Comparison
- Speak with sponsors and professors about any existing ideas
- Develop ideas and conduct external search for existing products
- Brainstorm system-level solutions based on patents, sponsor input, and problem statement
- Create basic CAD and descriptions for each idea
- Use preliminary screening to reduce number of candidates for further development
- Use Pugh Chart to determine the best solution
- Develop BOM while creating Alpha Prototype
- Use Alpha Prototype to confirm Beta Design and BOM
- Order Parts and assemble beta prototype
- Test for functionality, speed, and weight capacity
- Model validated by placing weight on table and timing motion with video

Outcomes
- Sponsor saved $1800 from $3000 assigned budget to all teams
- Team prototype was faster and more stable than benchmark model
- Opportunity for further development