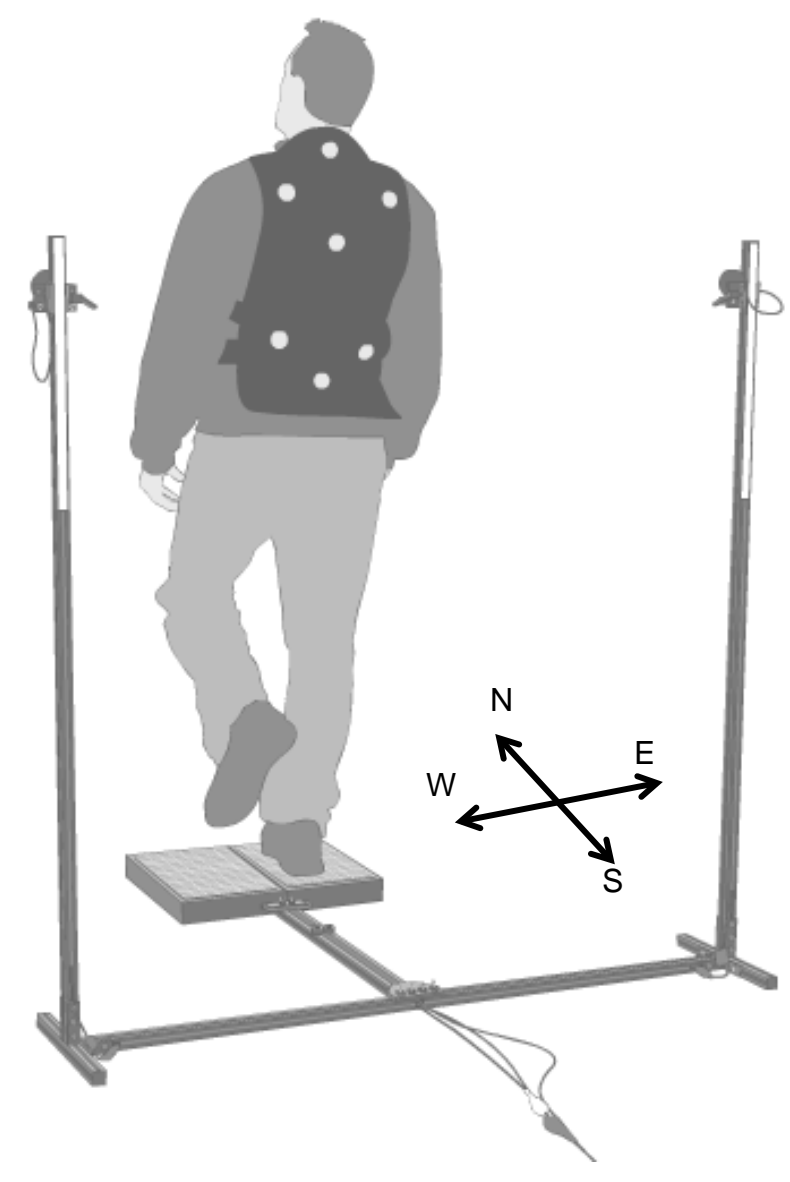


# Equilibrate Balance System Mechanical Upgrade Senior Design Project 12007



**Team Members:** Diana Rodriguez (ME), David Lahn (IE), Sado Borcilo (ME), Natalie Ferrari (ME)  
**Faculty Guide:** Elizabeth DeBartolo, Ph.D.  
**Project Sponsor:** Mike Compisi, President of Balance Engineering



**Current Product:**  
 The Equilibrate Balance system is a portable, clinical assessment, therapy, and data reference tool that is currently being sold to professional clinics nationwide. Patients step onto two foot pads equipped with force sensors while two cameras track upper body position. Using this data, a physician can analyze a patient's balance and prescribe corresponding therapies. The product was designed by Balance Engineering and more information is available on their website: <http://balancengineering.com/equilibrate-in-action>



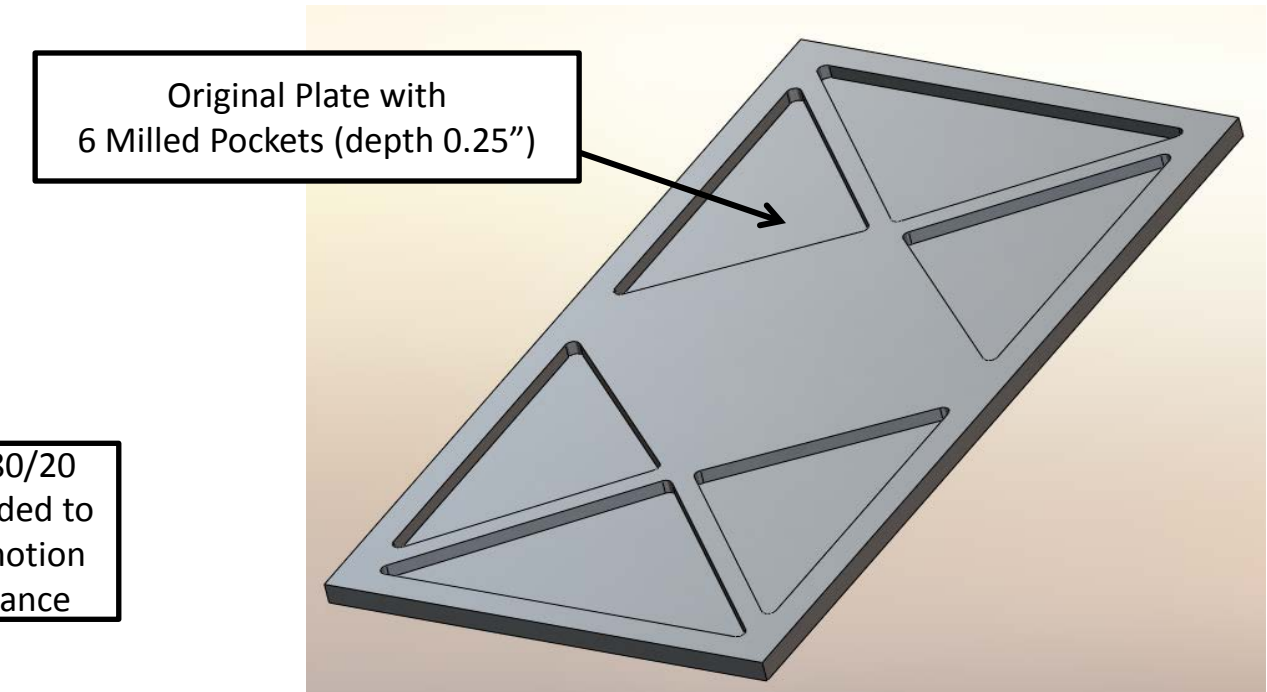
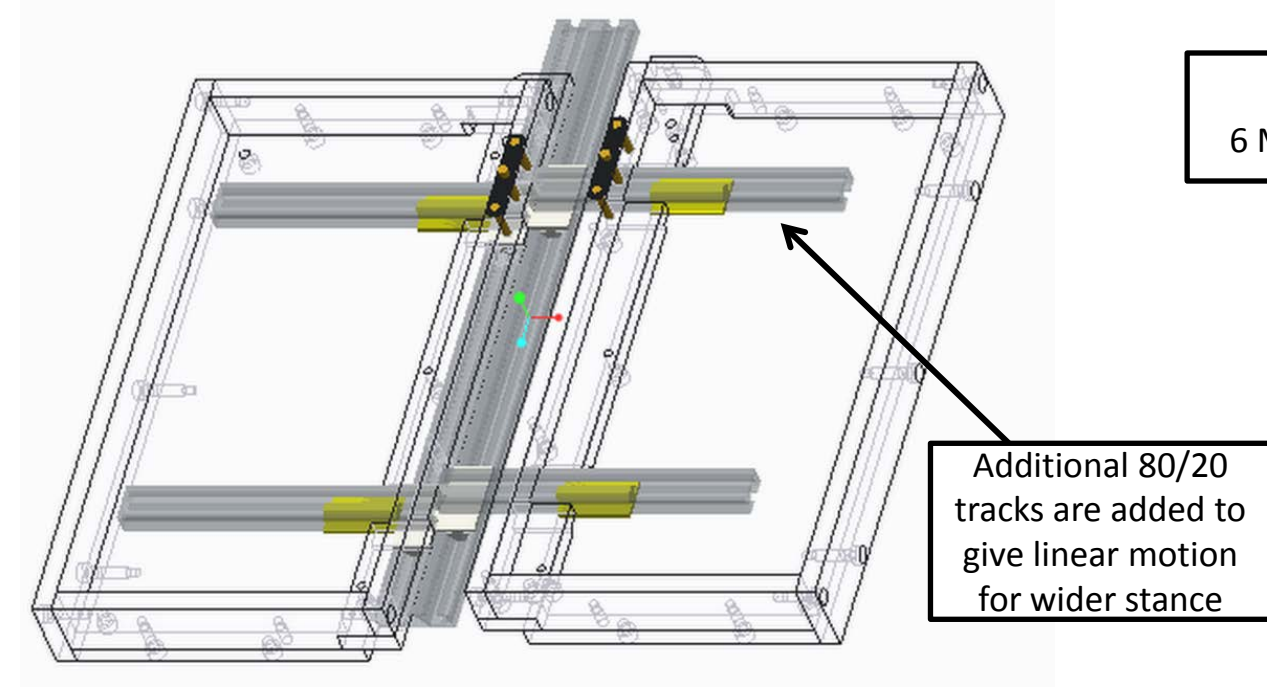
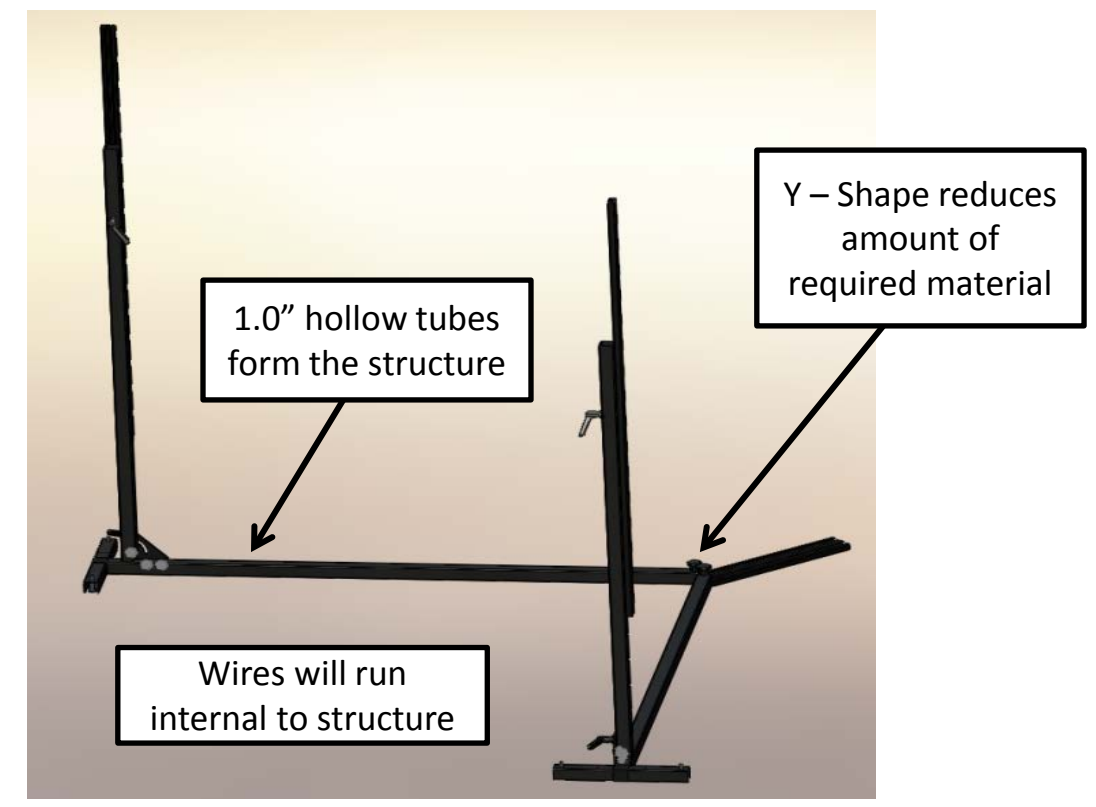
**Problem:**  
 The current product is intended to be highly portable. The total weight including carrying case is 44lbs, doable but heavier than what most health care professionals would like to carry around. The structure itself has visible wires and looks very industrial. Our primary goal is to reduce the weight and improve the aesthetics while maintaining all current functionality. The customer also requested investigation into increased adjustability of the foot pads. The foot pads currently move in a north-south direction and an east-west adjustability was requested.

## Component #1: Camera Structure

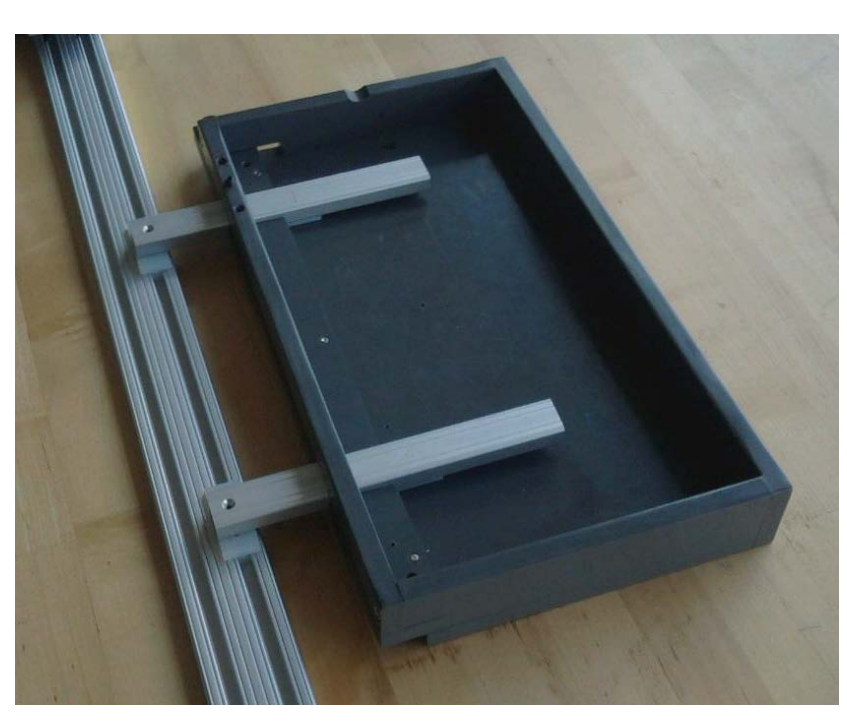
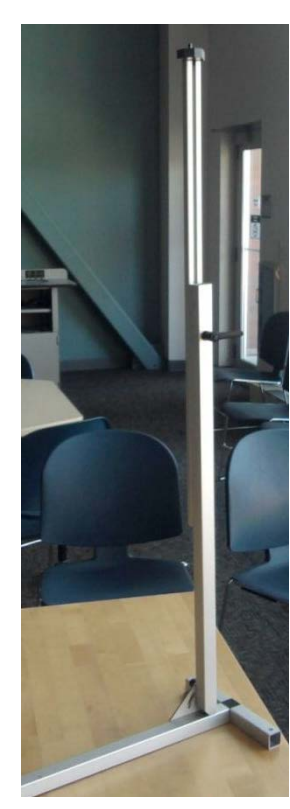
## Component #2: Foot Track Adjustability

## Component #3: Aluminum Foot Plate

### Proposed Design



### Prototype



### Results

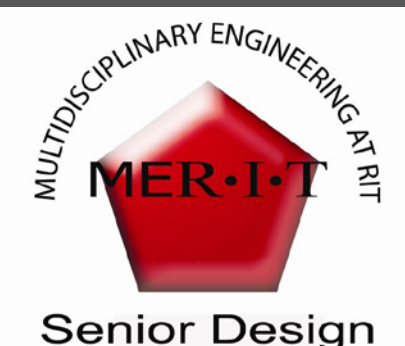
Camera Structure Data			
Design	Cost (\$)	Weight (lb)	Max Deflection (in)
Current	587.64	15.97	0.65
Proposed	231.3	8.91	0.70

Foot Track Data			
Design	East-West Motion?	Weight (lb)	Max Deflection (in)
Current	N	11.3	0.10
Proposed	Y	12.8	0.34

Foot Plate Data			
Design	Plate Thickness (in)	Weight (lb)	Max Deflection (in)
Current	0.375	4.55	0.0181
Proposed	0.375	2.95	0.0288

### Outcome

Our team was able to increase the functionality of the system while taking more than 50% off the total cost and more than 20% off the total weight.



**Team 12007 would like to thank the following:**  
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 Dave Hathaway and Rob Kraynik, John Bonzo and Brinkman Lab Team