

Project 18: TranzVolt 2.0
User Needs, Functions, and Constraints

User Needs

1. The product should meet or exceed a 1.5 ft/sec average lifting speed
2. The product should be able to lift a payload of at least 275 lbs on top of the deadload.
3. The product should be able to lift a load from the ground to rooftops. (32 ft.)
4. The product should have an emergency system that brakes the load in free fall if the rope snaps
5. The product should have a deadload less than 20 lbs.
6. The product should have a user-friendly control system
7. The product should have a simple operating manual
8. The product should have a simple warning system
9. The product should be portable
10. The product should be durable
11. The product payload should be secure
12. The product should be easy to maintain

Functions

1. The product can detect the weight of the secured payload
 - a. The product will not operate when overweight
 - b. The product will produce a visible warning when overweight
 - c. The product will produce an audible warning when overweight
2. The product can detect the angle of the aluminum track
 - a. The product will not operate outside a range of angles
 - b. The product will produce a visible warning when at an improper angle
 - c. The product will produce an audible warning when at an improper angle
3. The product can detect battery percentage
 - a. The product will display battery status
 - b. The product will produce a visible warning when low on power
 - c. The product will produce an audible warning when low on power
4. The product can be operated remotely (wireless)
 - a. A remote is associated with the product for user control
5. The product can detect significant weight imbalance
 - a. The product will not operate when weight is significantly imbalanced
 - b. The product will produce a visible warning when imbalanced
 - c. The product will produce an audible warning when imbalanced
6. The product climbs a ladder
7. The product can secure a payload
8. The product has a modular attachment for non-solar panel payloads

Constraints

1. The product uses Tie Down standard aluminum track section
2. The product uses Tie Down standard wheels/pulleys
3. The product is made from sheet metal/tube components manufacturable at Tie Down