

Fifteen Hundred Dollar Shave Club

Capstone Design

Product Requirements Document

1. Desired Function of System
 - a. Shave bone or cartilage in the knee, repair fibers within the knee, robust design with easy sanitation measures, conducive for use in minimally invasive surgery, easy to disassemble for autoclaving yet reusable for separate surgeries via disposable attachment heads
2. Define Inputs and Outputs
 - a. Input: mechanical pressure placed upon variable motor actuator (trigger), electrical power input into motor, on/off switch that controls power access to motor, software takes readings from trigger and readings from on/off switch
 - b. Output: angular rotation of shaft with output rpm of 900-6000, shear force from shaver head, device must not produce enough heat to burn skin, electrical power converted to motor use, turn on and off the device from mechanical switch controlling the power access, software must output electrical value to motor based on trigger
3. Outline operating environment
 - a. Material: surgical grade stainless steel, biocompatible polymers, titanium
 - b. Finish: nonaffected during autoclaving, corrosive resistant
 - c. Waterproof, dustproof, must be fit for surgical use
 - d. Ergonomic requirements: pistol grip suited for hand control, shaft angle rotation, trigger must be operatable using human force, trigger lock
4. Identify customer expectations
 - a. Reliability: 99.99% reliability for complete system, cannot have catastrophic failure during use
 - b. Useful life: 8 year surgical use, 16,000 hours of use
 - c. Cost: \$10,000 for consumer