**Objective**

**General Need For Product**
- The ability to lock all external doors with a convenient click of a button

**Estimation of Market Size**
- Middle-class homeowners, property managers
- Approximately 740,000 homes in Maryland

**CTQ Engineering Characteristics**
- Maximum Electromagnetic Force
- RF Signal Strength
- Power Source and Life
- Bolt Travel Distance
- Package Size and Location

**Customer Requirements**
- Security
- Cost
- Ease of Use
- Battery Life
- Appearance
- Ease of Installation
- Latch Functionality

**Concept Generation**

**Concept 1**
- Pro: Simple design
- Con: Fitting package into door (AHP: 0.197)

**Concept 2 (Final Concept)**
- Pro: Electric/manual control
- Con: Complications with 2 bolts (AHP: 0.648)

**Concept 3**
- Pro: Package simplicity
- Con: Too many components
- AHP: 0.155

**Reason for Final Design**
- Have the highest AHP

**Physics**
- Linear actuators move the lever to open/close the door

**Prototype and Testing**

**Parameter Tested**
- Battery Life tested from its current

**Test Results and Future Work**

**Design Process Summary**
- Utilizes the part of the actuator stroke when the force is maximized
- Translates 4mm of linear motion by actuator into 38mm of linear motion of the rf activated deadbolt

**Future Work**
- Use op-amps to amplify voltage supplied by Arduino to eliminate spacing
- Use a micro-controller customized for the circuit which could be manufactured to a smaller size
- Manufacture deadbolts out of steel for added security

**Reflection**
- AHP helped choose the best of preliminary designs
- Building the designs and testing them lead to the final working design,