

**Project Title: Locked and Loaded**  
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**EECS 149/249A Project Charter, Fall, 2014**

**Project Goal**

This project will be a preventative smart lock.

**Project Approach**

The project will model arrival and departure from the lock as a state machine governed by a combination of sensor inputs, focusing on the security of the owner and strategic offense against intruders. The goal will be to accurately detect arrival at the lock and to take action based on the situation.

**Resources**

Our plan is to use the mbed FRMD KL25Z from Freescale as the processor core driving servos (either Bioloids from the stock in 204 Cory or servos from the Invention Lab supply) inserted into a door or object that requires locking. The first step in the project will be to identify a suitable wireless network and wireless sensors to use. One candidate is XBee (see <http://developer.mbed.org/cookbook/XBee>). The first goal will be to integrate a Bluetooth Low Energy sensor communicating wirelessly with the mbed. A second input will be a motion sensor attached directly to the mbed processor. A drone will be perched atop a nearby location. The drone will be outfitted with a firing mechanism and camera to detect the person in pursuit.

**Schedule**

- October 21: Project charter (this document)
- October 28: Choice of platform finalized after discussion with GSIs.
- November 4: Statecharts simulation model with logic and timing for controllers.
- November 4: Project review with GSIs
- November 11: Installed software for development, hello world servo control
- November 18: Mini project update: Demonstrate sensor comm and servo action.
- November 25: Measure sensor accuracy, modify simulation model.
- December 2: Actuation in response to door sensor, timing of network measured.
- December 9: System testing, measure false positives, assess proximity effectiveness.
- December 16: Demonstration video made, powerpoint prepared.
- December 17: Final presentation and demo.
- December 19: Project report and video turned in.

**Risk and Feasibility**

There are many unknowns. Servos may be hard to control for natural movement. Parts leading to the easiest solution may exceed the budget. Network interfaces may be difficult to control, particularly the timing. Software may not port easily to the chosen platform.

The system may sometimes be too aggressive and will require an override in the case of a false positive.