Team 31 - Overall CDR Deliverables

Project: Mail Gobbler 9000 (MG9K - Smart Mailbox/Dropbox) Team members: Luan Vo, Adam Cytrynowski, Jackie Chan, Brendan Truong

Section I: Overall CDR Deliverables

Our Overall CDR deliverable checklist is as follows Dropbox:

- 1. Planned Design of Dropbox (2ft tall 2ft across 1.5ft deep)
 - a. Blueprint designs of dropbox planned. Dropbox will be made out of cardboard to simply demonstrate basic operations, and so that the team may focus functional aspects. Concept of all physical interactions and mechanical components will be prepared (angled hinges, positioning of circuits, wires, and all components, physical backdoor, etc.

Hardware:

- 1. At least a blank PCB (or Integrate circuit to PCB [Soldering])
- 2. Integrate Barcode Scanner with Wi-Fi module
 - a. Scanner able to scan a physical barcode and transmit data to AWS.
- 3. Integrate subcomponents into full end to end system

Backend/Software:

- 1. Backend can iterate instructions to solenoid via wifi (via a successful barcode scanned and existed within AWS database)
- 2. User can propagate unlock instructions through backend to solenoid via wifi (via an unlock button press on the mobile application)

Website:

- 1. Create skeleton website via HTML
- 2. Implement a styling touch ups via CSS
- 3. Fully functional website that meets submission requirements

Our focus (or namely, our definition of CDR's prototype) for CDR will be the completion of MG9K's Dropbox blueprint design which will plan for all functionality and how they will physically operate. We will strive towards having at least the PCB, however, our main objective will be showing that the hardware and software can be integrated within the real mailbox. This means that in case we cannot get the PCB soldered on time, we will use what we made during the MDR process (i.e. breakout boards and Arduino) and integrate those within the mailbox to ensure that the subsystems are able to work in the real world application. We chose this approach as, in case any mishaps take place, we will have a mostly ready and functional mailbox for kickstarting FDR phases. In summation, our CDR will focus on the preparation of our physical

dropbox, at least a plain PCB, and integration of MDR's subsystems into one complete end to end system.

We will integrate our separate subsystems so that our hardware components may communicate with our backend within the cloud, and our mobile application is able to receive and transmit data to the cloud and vice versa. When the system is powered on, our scanner will be able to detect barcodes and the pressure pad will be able to check weight resistance. Both pieces of data will be transmitted by the ESP to our AWS backend. The AWS backend will have complete functionality, to update our database within the backend, and return barcode validation back to the ESP such that the hardware may interpret it and unlock if true. Lastly, our mobile application will be able work with the backend, to query our database and display data, upload new barcodes to be stored within the database, and send unlock requests such that when the system is on, the ESP may receive this message and hardware may unlock the solenoid. We will gradually migrate our hardware onto the PCB, and will at least have a blank PCB by CDR.

Stretch Goals before CDR:

- 1. Learning and programming Altium
- 2. Starting the planning the dropbox design
- 3. Finalizing team website

Section II: Individual CDR Deliverables Brendan's CDR Deliverable Portion

- AWS integration with other subsystems
- Dropbox Design and Prototype
- Team Website
- 1. Brendan will integrate the backend with the front end hardware and mobile application, checking if there are any issues and resolve them accordingly. He is responsible for constant management of the backend and upgrading it as needed in response to any dynamic changes.
- 2. Brendan will also work with other members on the team to devise a viable dropbox design for CDR.
- 3. Lastly, Brendan will work with Adam and create a team website to display all required documents and information regarding the team's project.

Jackie's CDR Deliverable Portion

- Maintenance and Improvements on Mobile App
- Dropbox Design and Prototype

- 1. Jackie will finish the final touches to the application but will continue to improve it if there are any to be made. He will constantly monitor the app to ensure that it works with AWS at all stages of development.
- 2. Since Jackie is budget manager, he will have to allocate adequate funds from the budget to make certain that the material chosen for dropbox is sturdy, modifiable, and cost-efficient. He and alongside his teammates will design a cardboard prototype for CDR.

Luan's CDR Deliverable Portion

- Leading the team in making a blank PCB.
- In charge of dropbox's internal design and wiring.
- Finalizing the circuitry and troubleshooting any circuitry errors.
- 1. Luan will focus on taking the lead and the making of the PCB board for the CDR. As well as working on finalizing the circuitry and reviewing advice given on hardware prospects during the MDR process. Ensure that Luan's subsystem can be integrated into the real mailbox (i.e. solenoid, power button, DC/DC converter and battery).
- 2. As lead hardware and PCB design of the group, I will be in charge of getting the team ready and working on making the plain PCB from our MDR's circuitry, as well as overseeing the mailbox's internal wiring.

Adam's CDR Deliverable Portion

- Integrating WiFi Module and Barcode Scanner subsystems to one board
- Assist in PCB design
- Dropbox Production
- Team Website
- User Manual
- 1. Adam will focus on integrating the WiFi Module and Barcode Scanner onto one board. From there, he will coordinate with Luan to get all the subsystems onto one board. After those steps are completed, Adam will assist Luan in the development and production of the PCB.
- 2. Adam will coordinate with Brendan and Jackie to develop a working prototype of the Mail Gobbler 9000. As the most important part of our project, it is worked on by all group members.
- 3. Adam and Brendan will work on the Team website, which will showcase our project as well as the documentation for our project.
- 4. Adam will create a user manual for the MG9K, showcasing the setup of the product, any features that it may have, as well as how to operate the product.