Interim Design Outline

Executive Summary (1/2 page)
1. Introduce project
2. Discuss key features
3. Talk about overall results of the project
4. Talk about how the project is meeting or exceeding needs

Report Body

Background (1/2 page)
1. Explain current starting methods (what is available on market)
2. Discuss shortcoming of these
3. Discuss where our product could differentiate itself (no physical device to start bike)

Problem Definition (1 page)
Define specs and discuss purpose behind them.
1. Design must support up to two operators
2. Design must be able to handle harsh outdoor conditions (sun, rain, snow, high temps, and low temps)
4. Operational on stock or custom bikes.
5. On bike power supply (battery) must be regulated to power onboard electronics.
6. Must give a reliable scan of figures (work even if finger has cut or is dirty)
7. Onboard electronics must be packaged to survive environmental factors.
8. Completed design must be easy and hassle free to install on bike.

Project Plan (1/2 page)
1. Discuss different technologies in finger print recognition
2. Discuss learning interface for ATMEL AVR and the code to program it
3. Knowledge to interface all the components (scanner with AVR and relay for ignition)
4. Various data sheets from all the components that were referenced to gain the proper knowledge of each device.

Concepts Considered (3 pages)
1. Various scanners and modules
   a. Type: Thermal, E-field, capacitive, or optic
   b. Stand alone scanner connected to different processor for algorithm or embedded module containing both.
   c. Temp specs required for harsh environment
2. Secure training and override techniques (incase of scanner failure)
a. Key fob (RF)
   b. Key pad
   c. Smart Card
   d. Blue tooth

3. Size of ATMEAL AVR chip (number of I/Os needed and memory)
   a. Tiny
   b. Mega
   c. X-mega

4. Physical structure of device
   a. Location on bike
   b. Packaging

5. How to start the bike
   a. Physical wire to relay
   b. RF relay
   c. Implementation with harness controller

6. Voltage control (need to regulate 12 V to 3.3 V +0.3 V)
   a. Purchasing voltage regulator off the shelf
   b. Building simple zener diode voltage regulator.

**Concept Selection (1 page)**

Will discuss why we chose the following options.
1. Suprema SFM3010 Thermal Scanner with embedded algorithm
2. Keypad to train the system
3. Need 14 to 16 I/O’s which will determine AVR that is selected
4. Some type of epoxy weather resistant case with only piece to be seen on the bike is the scanner. The rest will be stored under the seat.
5. Leaning towards the RF relay due to ease of installation however looking into cost and if it is feasible.

**System Architecture (2 pages)**

1. Discuss how all the pieces work together to create a secure fingerprint scanner which will start the motorcycle along with the training and override systems.
2. Discuss the installation of the device onto a motorcycle.
3. Discuss testing that needs to be done to verify the product can withstand the harsh road conditions and temperatures.
4. Verify that all the specifications for the project are meet and device will function properly.

**Future Work (1/2 page)**

1. Discuss issues which are unresolved
   a. Relay control
   b. Wires connecting scanner to Suprema chip and if the length of wire can be extended.
   c. Connection with harness controller
APPENDICES

1. Flow charts for overall system, override system, and training system.
2. Diagram of keypad wiring
3. Timing data captured on the oscilloscope for the different functions of the scanner (enroll, identify, delete)