Gap Analysis

**Musts:**

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| **Requirement** | **Current State** | **Action Required?** |
| Use Project 1 HCS12 board | We are using a very close to fully functional board. Everything but the accelerometer is functional. | No |
| Use a PC running Linux as the platform supervisor | We are using Alan’s laptop that is using Linux as the platform supervisor. | No |
| Use an RS 232 link to connect the platform controller and host machine | We are using an RS232 link between Alan’s laptop and the board. | No |
| Use faculty-supplied platform | We are using a functioning platform. | No |
| Draw DC power from umbilical cord | We are doing this. | No |
| Defined and documented communication protocol for RS232 communication between the host and platform | We have a document that summarizes the commands that we are using. | No |
| The joystick software must have:   * The ability to control direction and speed of the motion of the platform. * The ability to point the camera. * The ability to trigger the capturing and processing of an image by one button press. * The ability to trigger the capturing and processing of audio by one button press | We have all of these abilities available, as in the software will execute the appropriate code upon pressing the button. However, the audio capture has not been tested, but is most likely non-functional. | No, the joystick software does not have to be changed. |
| Detect the presence of a DTMF tone in an audio sample and identify a tone as one of the 16 tones. | We have the ability to detect a tone in an audio sample when we know which tone we will be looking for. However, we may need to check if our code is capable of detecting the correct tone when a random DTMF tone is played. | Double check the DTMF code to see if it is capable of identifying the DTMF tone(s) present in a signal when the DTMF tone used could be any one of the 16 available. |
| The host must be capable of:   * Capturing an image form the webcam, display it and save it to a file * Process the image to create a thresholded binary image * Differentiate between the different target shapes | Yes | No |

Platform software:

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| **Requirement** | **Current State** | **Action Required?** |
| Written using C or assembly language? | Yes | No |
| Communicate with Linux host via RS232? | Yes | No |
| Interpret and respond to commands that:   * Reset the platform * Move the platform * Point the camera | Yes | No |
| Perform closed-loop speed control of the DC drive motors using the encoders for feedback? | We are currently using closed loop control, however, there is a bug where sending a speed of 0 from the host machine will not always stop the motors completely | Yes, the control law logic needs to be re-examined and it must be determined what is causing the issue. |
| Perform platform operations asynchronously of the commands received? | Yes | No |

Host software:

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| **Requirement** | **Current State** | **Action Required?** |
| Communicate with the platform controller software via RS-232? | Yes | No |
| Interface with a joystick to provide various controls that will send commands to the platform? | Yes | No |
| Interface to the USB webcam on the platform? | Yes | No |

**Shoulds:**

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| **Requirement** | **Current State** | **Action Required?** |
| Use the LCD on the platform to display system status and diagnostic information | We currently do not have an LCD module installed, but previously we did have system status displayed on the LCD | Install an LCD module and confirm that it is operational and displays system status. |
| Read, record and report data from the accelerometer on the platform | The current board we are using does not have an operational accelerometer and there is no software written at all to read from it. | No, at this point it would require far too much work to bring this section up to full functionality, especially since it is only a should. |
| Use accelerometer data to determine the tilt of the platform in its direction of forward motion and adjust the webcam so that it still points horizontally forward if the MCP is going up or down a ramp. | No progress at all to report, since the accelerometer is completely non-functional. | No, see above point. |

**Wonts:**

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| **Requirement** | **Current State** | **Action Required?** |
| The webcam and joystick will not interface directly with the platform controller | Neither are directly connected to the platform controller. | No. |
| The platform controller will not interpret and audio or image data directly | All audio and image capture and processing is done on the host machine. | No. |