P08541 – Detailed Design Review Summary

1. **Meeting Customer Requirements and Design Specifications**

   -Each subsystem was broken down and evaluated more in detail.

   Emphasis was made on the mechanical system, whether or not the paper loading system will guarantee the needed depth accuracy. On further review, it was clarified that the loading system will provide us with accuracy within the focal length of the camera.

   Another issue that arose, with regards to meeting the engineering specifications was the angular precision of the rotating polarizer. It was identified that some consideration had to be taken to account angular displacements along the x-y plane and y-z plane. During the review, the displacement in the y-z plane was discussed as not being a problem due to the design, but the displacement in the x-y plane raised some concerns. It was determined that we had to achieve an angular accuracy with a deviating angular range of 3 degrees.

   Other needs were discussed and plans to meet those needs were elaborated.

2. **Engineering Analysis**

   Some engineering analysis was done on the mechanical system. Key things were discussed and analyzed: Temperature, vibrations, glare resistance and stability. However, it was pointed out that not enough work was done in our engineering analysis and plans are being made to assess the design thoroughly. Some analysis has been shifted to a later time, once we have a model partly ready. This will allow us to observe the device in real time and clarify it meets the customer requirements. Test plans and mitigation plans are being made, to fix any issues that arise if the tests do not meet our predictions. A test plan being worked on is to analyze the temperature output of the subsystems and how they affect other components. A mitigation plan for the scenario that the temperature is an issue would be to include a proper cooling system is a fan proves insufficient.

3. **Feasibility Analysis**

   Since the decision was made to go towards the high risk solution, which involves automating the whole system. Discussions were made to analyse if this can be attain with in the given time frame. The main issue arising was the use of the USB interface. This is new territory for both the electrical and computer engineers working on the device. However, we have been talking to faculties and we are more comfortable with making this work. In the scenario, that the design was not completed, we have a fall back design, which still meet some of the customer requirements. The prototypes were shown and was viewed as generally feasible.

4. **Risk Assessment and Mitigation**

Some key risk issues were identified and some issues were not fully covered by the team.

A risk identified was whether or not the servo motor will provide us with the accuracy desired. More tests are being made and other solutions are being explored. The mitigation plan would be including mechanical stops and from a software stand point, allow the user to modify the rotation algorithm of the motor remotely to meet the desired movement.

Some discussions were also made on whether or not the system will be able to produce a consistent result**.** It was identified that the vibrations in the system would be negligible, but should not be ignored. Extra considerations would be put to effect to ensure the camera pixel positions do not change.

Unfamiliarity with using USB might lead to some time loss, so more effort is being put to catch up to speed with the interface and integrate it into the system.

5. **General Comments/ Things to be considered for the future**

- USB interface may need more attention due to the unfamiliarity and we are going to get as much help needed.
- It was pointed out that we have not found the limiting factor for our temperature range
- Considerable time was spent getting specs for the polarizing filter offset.
- It was hinted that not enough work was done getting detailed specifications from the customer.