PDR Action Item #4

**4. What are the relative merits of the various “classes” of configurations considered?**

**(linear, 2-D array, curved, etc.) How will the location of the system in the security**

**checkpoint influence the final selection?**

Since our project is going to be implemented in the baggage claim area instead of the security checkpoint, our ideas must change. That being said, we still need to consider the merits for different configurations of arrays. The three configurations we were considering were linear, two-dimensional, and curved. But as a group, the consensus was to aim for a two-dimensional array.

1. The first configuration to consider is simply the linear array. To make a two-dimensional array, you start with a line of them, so it’s possible just the linear array would meet our needs. Considering our budget and a maximum amount of cameras we could buy, if we were to use the complete budget and use the same amount of cameras for each array, the benefit of having a linear array is a larger plane of view. Depending on how we choose to space them out, a linear array could be a pretty long array, and also depending on the lenses we choose, even the cameras on the ends could share common points with cameras in the middle. The downside of linear arrays is the absence of another view to see things from. It would be very beneficial to us if we had cameras above, as well as below, a central line of cameras. There could very easily be occlusions that could only be seen past by cameras up higher or down lower than others. This is where we think a two-dimensional configuration meets our needs.
2. A two-dimensional array has the side-to-side coverage as well as coverage of height. Depending on how we space the cameras out, and what lenses we use, our array could be smaller, or pretty large. There are also a lot of possibilities for different shapes of two-dimensional arrays, i.e. cross-shaped, rectangular, triangular, circular, x-shaped, etc. Narrowing down which one we choose will be a product of a lot of testing and reconfiguring. The downside to using a 2-D array is the price for all the cameras. Having another row or column of cameras takes a chunk out of our budget which can be used for other things.
3. The third type of array we showed was a curved array. A curved array has some benefits that are absent in the other two types of arrays, but with our situation and needs, a curved array does not fulfill what we want. A concave array can much more easily see around occlusions, but what you focus on has to be in or near the center of the array. This type of array in a large room would not be as efficient as our other options. The idea for a convex array has been brought up, and depending on where we put it, it could be a pretty efficient system.

The way we plan to figure out which type of array is best suited to our needs, we have begun developing a predictive model of the baggage claim room with its’ permanent fixtures. With a computer model of the room, we can virtually put in a camera array configuration, positioned exactly where we want it in the room. This provides a really quick and easy way to change the parameters of the system, without buying new equipment. Also, having a 3-D model of the room, and a camera array inside the model links the hardware groups and the software groups, allowing them to work in parallel. The camera array inside the model can give the software group video data to use with the stitching software to analyze the effectiveness of the tested camera array. The process of inputting one type of camera array configuration into the model, then using the video data collected from it to test the synthetic aperture effect in the software group, and comparing its effectiveness to other configurations will narrow us down to the best configuration we can use.