1.4 Target Summary

The metric for the Attract function was found by trying to figure out how the device is going to attract victims and traffickers for the victims to seek help. Since a sub-function of attract is to target younger children, a lenticular lens will be used to attract the younger crowd. The sign will be able to attract children that are 4 feet 3 inches or shorter, which are around the age of 8 years old or younger. This target was determined by researching into the ANAR lenticular lens campaign to determine the maximum height of the child that can see their lenticular sign. In order to test this metric, we will need a lenticular sign (which is outside of the scope of our project, but its incorporation into the design is pivotal). We will implement the sign in public and see how many children approach it and read it. This target is critical because its function is the first step for the device to be able to help children seek for help. If the child is not able to read the sign, they will not know that they can use the device to get help. Additionally, the device should be able to attract the traffickers in order to bring the child closer to the device. Since this function is more so related to the appearance of the lenticular sign, which is outside of our scope, there is not a target associated with it.

Furthermore, it was found from the customer needs that there is a need to design specifically for children between the age of 12-15. This age range was determined from our work with the Tallahassee Police Department's Special Victims Unit, who reported that this is the most common age that children will be trafficked in the Tallahassee area. While this need is not a function and it makes the foundation of the project (the lenticular sign) obsolete, there is a need to develop a target percentage of children within the age range of 12-15 who are able to identify that the device can help them. The device should be able to attract 75% of the population that are in the age range of 12-15 years old. The target for this device has to take into account that not everyone is going to be able to see the device, as this age range often experiences growth spurts that make it more difficult to account for changing heights. For this reason, the target for this need is to be able to attract 75% of teenagers within the age range of 12-15. In order to test this metric, we may need an eye tracking camera to see whether or not the method of attracting the teenager is effective.

The metric for the Surveillance function was determined by researching data acquisition. The Surveillance function is comprised of three sub-functions: surveillance, recording audio, and recording video. All of these sub-functions have similar targets, and therefore are grouped together. The metric that the device must hit is that it should be able to record and store a certain size of footage once the device has been used (in GB).   The target for this metric was determined to be that the device should be able to record at 480p resolution for 5 minutes once the device is activated. This means that the device should be able to record and store at least 2.25 GB worth of information. This number was determined by analyzing the resolution at which an image is visible, comparing it to the possible duration that the child may be in the vicinity of the device, and acknowledging that the smaller the size of the information, the faster it can travel to the authorities. In order to validate this metric, we will record a situation at a 480p resolution for 5 minutes, and then identify the size of the resulting information. This will then be sent out to a third party to see how long it takes for the information to be transferred. This will require us to have a camera and SD card for testing.

The metric for the Communication function was determined by acknowledging the minimum time it takes to initiate communication while incorporating human factor. The communication function consists of one sub-function which is allowing two-way communication. In order for the Communication function to perform effectively, the time it takes for the device to initiate

communication with the child is 3 seconds. This target was determined by factoring in the time it takes for a second party to be alerted to an incoming call, while factoring in the human aspect of answering the call. Once the child reaches the device, the child will be able to interact with it through a technology that has not been specified yet, but we know it will have a rapid reaction so the device can alert the authorities as soon as the device has been activated. In order to test the target, we will display the device and we will interact with it and supervise how long it takes to communicate with it. In order to validate this target, we will need to establish some sort of cellular connection.

Furthermore, there is a need to help communicate to the community faster in order to let the community know of the dangerous situation the child is in. An alert will be sent to the community once the device has been activated. The target for sending the alert to the community would be 30 seconds after the device has been activated in order to give the authorities time to verify that the situation is not a false alarm. This need will be validated by testing on a smaller scale, and seeing if the activation of the device can alert a smaller number of people in the community, such as the members of team 523. In order to validate this, we will need to establish some sort of app or system that is able to send out mass messages to the community. This will likely require an understanding with the cellular companies to be established.

The metric for the Alarm function, which has the sub-function of Avoid False Alarms, was determined as a percentage of valid positives to false positives to ensure the device does not waste any police resource. It was decided that the device will have an accuracy of at least 98%. 98% was chosen as the target, instead of 100%, due to the unlikelihood of producing such an accurate device. However, the device should still have a high enough standard in order to keep a good reputation with the police department and ensure that the data sent from the device is taken seriously. While the device can not actually be tested for false alarms, the statistics from the device can be monitored and used to determine how many false alarms are triggered. From these statistics, the appropriate measures can be taken to improve the accuracy of the device.

The metric for the Alert function was determined by researching into the speed that data can be transferred. The Alert function is comprised of three sub-functions determined during functional decomposition: alert authorities, alert paired devices, and alert the community. Since all work on the basis of conveying information is elsewhere, these sub-functions were grouped together in the analysis of their respective targets and metrics.   It was determined that, in order to fulfill the Alert function, information must be transferred from the device and reach its target destination in 2 seconds. This target of 2 seconds was determined by testing the local cellular network as a basis. We timed how long it took to transfer information over cell phones; we dialed a number, initiated the call, and timed to see how long it would take until the receiving phone began to ring. By doing this, we determined that the target in order to transmit information from the device to authorities was 2 seconds. Once we establish the device's ability to connect with a network (and thus send out information), we will be able to validate this target by using the connection to contact the police department and record the time it takes for the department to be alerted. This will require some sort of cellular network component to the system. The Alert function has a critical target because it is one of the few functions that *must* be accomplished in order to meet our goal. If the device is unable to alert authorities, paired devices, or the community in a quick fashion, the child could leave the vicinity before they can receive help and thus our device is merely an expensive paperweight.

Furthermore, there is a need for the system to address that is not necessarily a part of the capabilities of the device. It was determined that the authorities must be able to respond to a situation in 6 minutes. Since the response time of the authorities is not a factor that can be accounted for in the physical device, it is not listed as a function. However, since the device will be used under critical situations, it is pivotal that the response time of authorities be accounted for. The time needed for response, 6 minutes, was determined as a target based on our findings with local Tallahassee Police. After conferencing with one of the sergeants apart of the Tallahassee Police Department, it was found that the local police department is able to respond to a situation of this urgency in an average of 6 minutes. While it is difficult to validate the target associated with this need (because it would be a waste of police resources, never mind the legalities of the situation), this target will be validated based on response time statistics of the Tallahassee Police Department.

The metric for the Location function, which has the sub-function of Locate the Victim, was determined by acknowledging that a trafficker or victim's location is deemed more useful if it is more accurate. For example, some GPS devices are more expensive than others because they offer better accuracy. For this reason, distance is chosen as the metric for the Location function. The more accurate the location of the victim can be determined, the more successful the function. The target for this metric was determined to be 16 feet because this is the accuracy of common cell phone GPS units. This target will be validated by recording the exact location of the final device and referencing that to the location given to the receiving end. In order to test the accuracy of the tracking device, we will need some sort of device that allows for tracking, as well as a computer and software that will be able to see the location of the tracking device. This target was considered a critical target because of the importance of locating a victim and the likely locations the device will be placed. Locations of the device are more likely to be in highly populated areas and so the accuracy of location needs to be tight so that authorities experience less confusion when searching for a victim. If the location of the victim is not accurate, the authorities would not be able to save the victim.

The targets and metrics described in the preceding sections are tabulated in Appendix C. The critical functions, Attract, Alert, and Location are marked with an asterisk (*) in the table and are deemed critical due to necessity of these functions for the device to be successful. 75% of victims must be able to see the connection between the device and the solution to trafficking. The data needed to alert authorities must be sent and received in 2 seconds. The location of the victim must be accurate within 16 feet. If these functions fail, then the remaining functions will not be able to operate or are irrelevant to the victim. The other functions are not considered critical but will improve the overall functionality of the device to ensure safety and to gather critical information on the situation at hand.