# 3D Printed Tactile Map for Children with Visual Impairment Design Brief

The original problem statement was that children who are visually impaired run a higher risk of injury on playgrounds due to lack of visual cues, and positional awareness. Our goal was to lower the risk of injury and provide the children with spatial information on their position while on a playground. Our goal was broken down into three different objectives. Our first objective was to design an inexpensive 3D printed tactile map that could be printed for specific playgrounds that would help children who are blind and visually impaired to navigate them. The second objective was to add an auditory element to help students identify objects that the map alone couldn't convey completely. The third objective was build an enclosure around the map and auditory components that would protect them from the elements. We used a community-based design approach that focused on collaboration with our partners at the Louisiana School for the Visually Impaired (LSVI). At every point in our design, we consulted with LSVI faculty and staff for ideas; we also built the design to include features that they wanted, including a hole in the front of the housing so that a stool could be added underneath so that smaller children could access the map, and a Braille legend that described the different textures on the map (which represent different surfaces on the playground). We tested the prototype with children who attend LSVI (with IRB approval) to determine the proper height and angle at which the tactile map should be placed. After designing the 3D tactile map, the first design team passed the project to the second team and handled installation at LSVI and follow up. Once installation was complete, we looked at functional performance (how well does the map work), temperature and humidity inside the enclosure, wear and tear, and suggestions from the caretakers, and staff. Overall, the product was well received and we are now designing modifications for the second-generation prototype, which include more durable map materials and electronics; a holding area for canes while children use the map; and different sizes and complexities of the maps for preschool-aged children and school-aged children.

Currently the cost of materials for the prototype ran $595. The current goal of the 2nd group is to improve the first generation prototype to make it commercially feasible but to machine this professionally and have a working marketable prototype by the end of 2021.

*Figure 1: Group 1 with LSVI partners posing in front of the test playground.*

*Figure 2: Generation one protype map with wooden case.*

*Figure 3: Group 2 in front of completed Gen 1 prototype.*

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