Project Deliverable C - Part 1: **Conceptual Design**
GNG 2101 – Intro. to Product Dev. and Mgmt. for Engineers
Faculty of Engineering – University of Ottawa

GNG2101, Section # Z **Date:** May 30th, 2019
Team # Z2

Functional Decomposition

Main function: Guide visually impaired employees around the first floor of 785 Carling Avenue.
Sub-functions:

- Identify rooms
- Identify staircases
- Identify emergency exits
- Identify furniture/obstacles
- Make the pathway from the entrance to room 118B (especially) clear and easy to follow

Generated Concepts (Brainstorming)

Team Member	Generated Concepts
1	A. Touch map that will have an audio component that speaks the room numbers when they are pressed. B. Foldable and portable pamphlet style map with elevated text. C. Simple map layout with all braille indications.
2	A. Booklet style map, pages are thinly 3D printed with colour plastic and linked together using large rings. B. Portable (one-time use) map. C. Stationary metal map.
3	A. Simple map with a vertical legend on the right-hand side. B. Map with a slot containing the legend. The legend can thus be pulled out or tucked back into the map. C. A map made with different 3D printed textures with the legend on the back instead of on the front.
4	A. Two-part tactile map: the map itself and the legend are separate

	parts. B. Basic tactile map with elevated textures and a legend at the bottom indicating what each texture represents on the map. C. Braille only tactile map where everything is identified in braille (rooms, staircases, fire exits, etc.).
5	A. Map with an audio component. B. Map labelling the directions. C. A map that labels obstacles in rooms.

Concept Analysis and Evaluation Based on Target Specifications

Team Member 1

	Concept Options		
Selection Criteria	Folding map	Audio map	Braille map
Durability	0	+	-
Clarity	0	-	0
Portability	0	-	-
Weight	0	-	0
Writing Size	0	0	0
Eaze of Fabrication	0	+	-
Number of +	0	2	0
Number of 0	6	1	3
Number of -	0	3	3
Total score	0	-1	-3

Team Member 2

	Concept Options		
Selection Criteria	Booklet-style map (Reference)	one-time use	Stationary metal map
Durability	0	-	+
Clarity	0	-	0
Portability	0	0	-
Weight	0	+	-
Writing Size	0	-	0
Eaze of Fabrication	0	+	-
Number of +	0	2	1
Number of 0	6	1	0
Number of -	0	3	3
Total score	0	-1	-2

Team Member 3

	Concept Options		
Selection Criteria	Map with vertical legend (reference)	Map with pullout slab as legend	Map with back as legend
Durability	0	0	+
Clarity	0	+	0
Portability	0	+	0
Weight	0	-	0
Writing Size	0	+	-
Eaze of Fabrication	0	0	+
Number of +	0	3	2
Number of 0	6	2	3
Number of -	0	1	1
Total score	0	2	1

Team Member 4

	Concept Options		
Selection Criteria	Basic Tactile map (reference)	Braille on tactile map	Two tactile map
Durability	0	+	-
Clarity	0	0	+
Portability	0	0	-
Weight	0	0	-
Writing Size	0	0	+
Eaze of Fabrication	0	0	0
Number of +	0	1	2

Number of 0	6	5	1
Number of -	0	0	3
Total score	0	1	-1

Team Member 5

	Concept Options		
Selection Criteria	Labelling Obstacles	Audio Component	Labelling Direction of Doors
Durability	0	0	0
Clarity	+	+	+
Portability	0	-	0
Weight	0	-	-
Writing Size	-	0	-
Eaze of Fabrication	-	-	-
Number of +	1	1	1
Number of 0	3	2	2
Number of -	2	3	3
Total score	-1	-2	-2

Chosen Concepts to be Further Developed

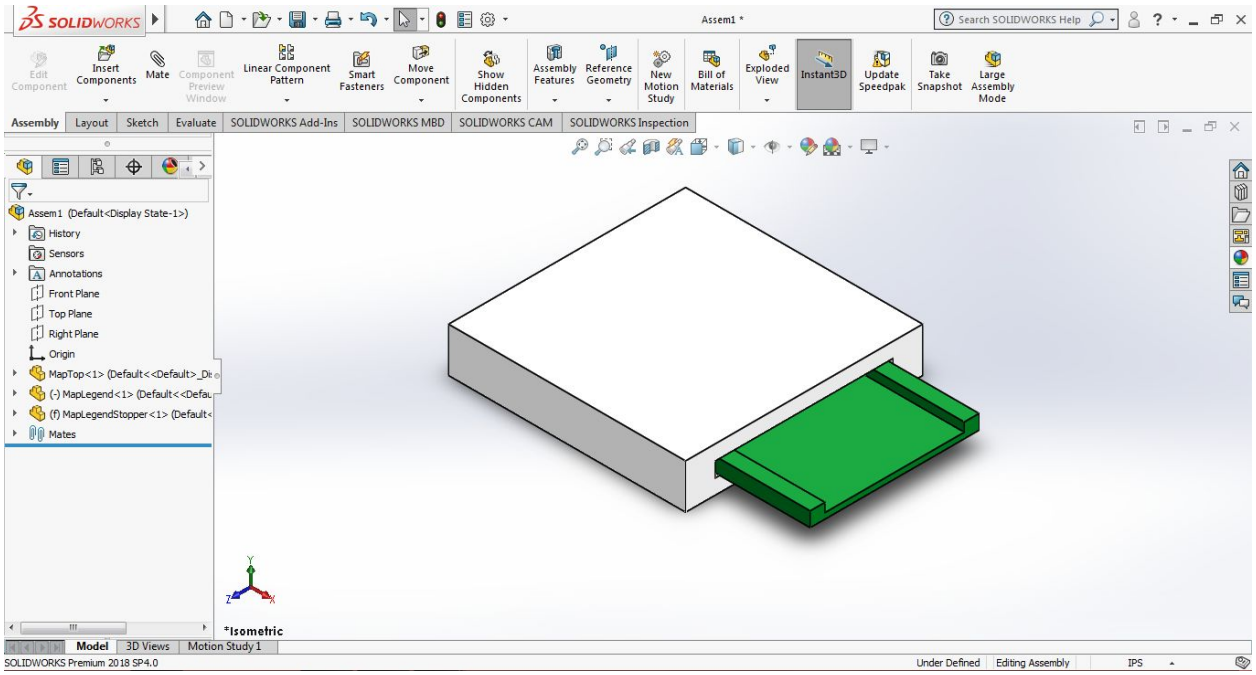
1. Map with a slot containing the legend that can be pulled out or tucked in.
2. Booklet-style map where the pages are thinly 3D printed with colour plastic and linked together using large rings.
3. Foldable and portable pamphlet style map with elevated text.
4. Regular stationary map with a vertical legend on the side.

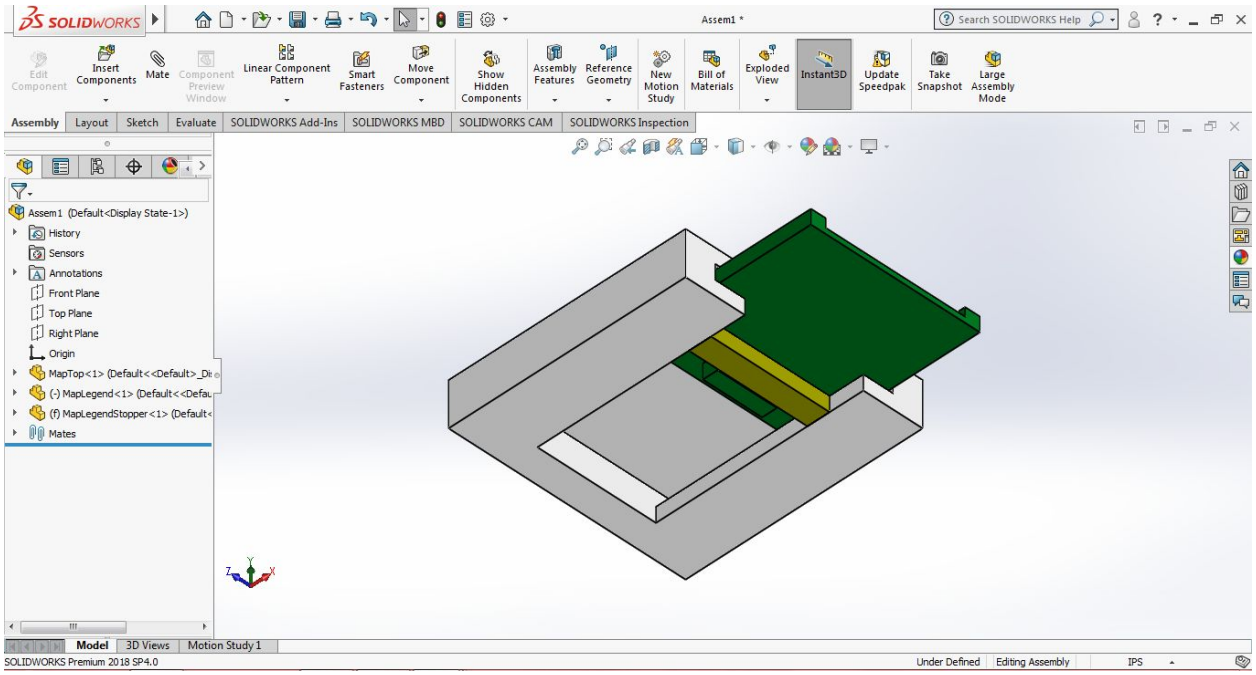
Group Design Concept

We have decided to further develop the idea of a portable tactile map with an integrated legend that can be pulled out or tucked in via a slot in the map itself. We feel that this

design is more practical and compact; while still allowing us to integrate an elaborate legend that will not take up a lot of mapping space.

CAD Sketch of Chosen Concept





Concept's Relationship to the Target Specifications, as well as its Benefits and Drawbacks

This design will easily allow us to reach our target specifications. Since the legend will not appear on the map itself, the entire 50 x 60 cm dimension is available to us for mapping. Our map will also be big enough to contain writing that is big and easy enough to read (≤ 15 mm). Our slot and legend will be integrated within the depth of the map but we can easily integrate these two elements without making our map any thicker than 3 cm. We successfully did so in our first prototype pictured above. Finally, since our map will not be too thick, its weight should respect the 5 kg limit set by our specifications.

Using this concept, our map will be of a good size, detailed, compact, portable and durable. The only true drawback is that by adding the legend inside the map rather than printing it onto it, we will be increasing the map's thickness.