

Mobile Living

The objective: to create a mobile living space that reinforces and enhances the feeling of community between victims and volunteers in a disaster situation.

Community Oriented: build a sense of community through arrangements of smaller units.

Private Spaces vs. Public Spaces: make a distinction between smaller personal spaces and larger communal spaces.

Living, Organic Community: acknowledge that the populace/individuals of the community will change with time. As new people join, the community is made anew. As the community is made up of living, changing people, it too is a living entity.

Mutable, adaptable: allow for configurations to change depending on the environment as well as communal/personal needs and preferences.

Sustainable, eco-conscious: limit the impact that the structure will have on the environment around it and its creation.

Human Needs: provide for the basics: sink, shower, toilet, bed, table, seating, storage, food storage and prep, light, heating, and power.



Teammates: Ashley Roark, Graham Tuttle, Yuriy Skrinik

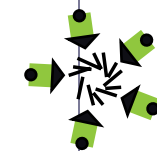
This was a group project in which we were given the task of creating an outdoor living structure to be transported by car and tested in the mountains of Syracuse, NY. Meeting these conditions meant designing a space that was lightweight while strong enough to endure the harsh winters of Upstate New York.

Our first step was to address the concerns of the people involved in a disaster situation, both victims and volunteers.

After some initial research, we found that besides altruistic motives, there were almost no incentives to help the victims of a disaster. Volunteers had little help when volunteering.

Volunteers for Habitat for Humanity, for example, ended up spending large amounts of money on transportation, housing, and food. Many people we talked to had wished it had not been so expensive for them to volunteer their time. Many others had declined helping out altogether because they lacked the funds to do so.

In order to address these concerns, we came up with a series of criteria to guide us with our design.

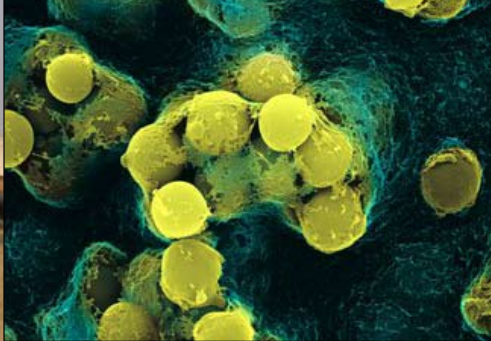




Nomadic communities are mobile and can group at will. An entire housing unit can be carried on the back of one animal. All domestic needs are met within the unit, while the unit itself is designed around communal activities.



Dandelion seeds are packed together for security and assured success. Each individual is attached to the whole until it is time to go it alone.



Bacteria naturally clusters to be more effective. Bacteria work as a unit to assure survival. They move around as units, though these groups are constantly changing as individuals move from cluster to cluster.

Bees tend towards groups for communication and efficiency purposes. Some bees act alone, but the community acts as one. This is an ever changing community.



This is Habitat at Expo '67 in Montreal designed by Moshe Safdie. Basic units connect together in an irregular pattern. This creates usable negative, exterior wall, and roof space.

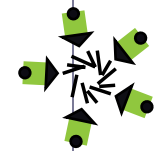


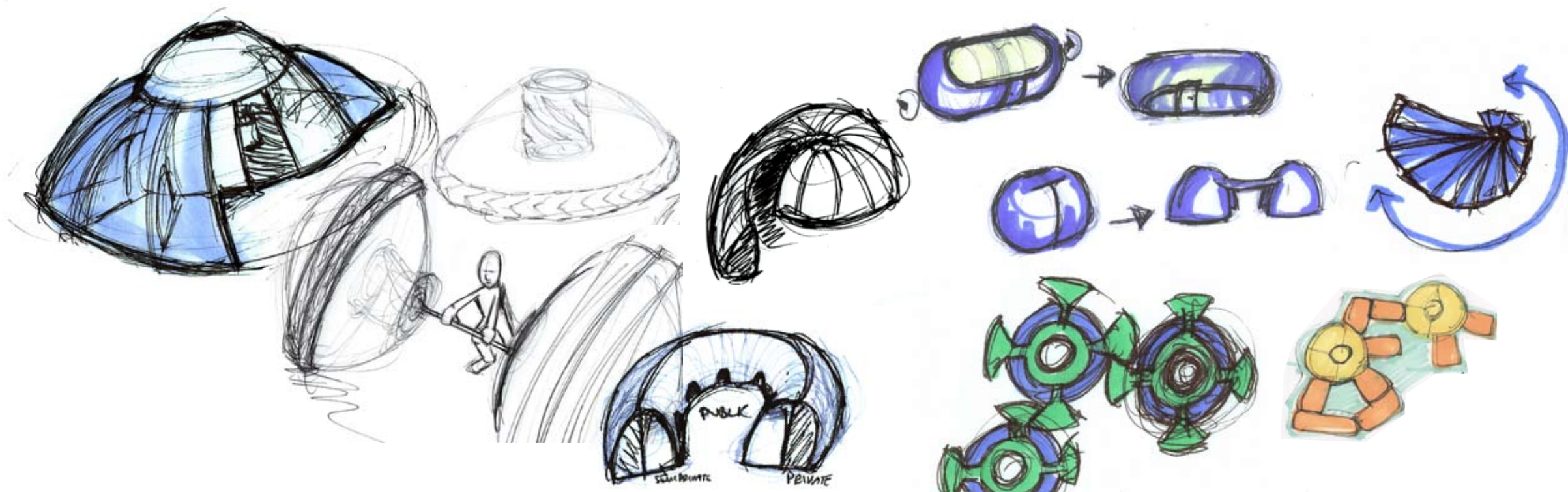
Central to our concerns was the idea of community. We wanted a space that would evolve organically according to the needs of that community. Having a space that promoted a sense of community by the way it was structured was key to our designs.

Looking at nature, nomadic cultures, and modern architecture, we were inspired by the way in which nature clusters and groups individuals for strength and efficiency.

Nomadic cultures tend to use highly mobile and easy-to-set-up circular-shaped structures that center around a fire. These are spaces for the family and the group.

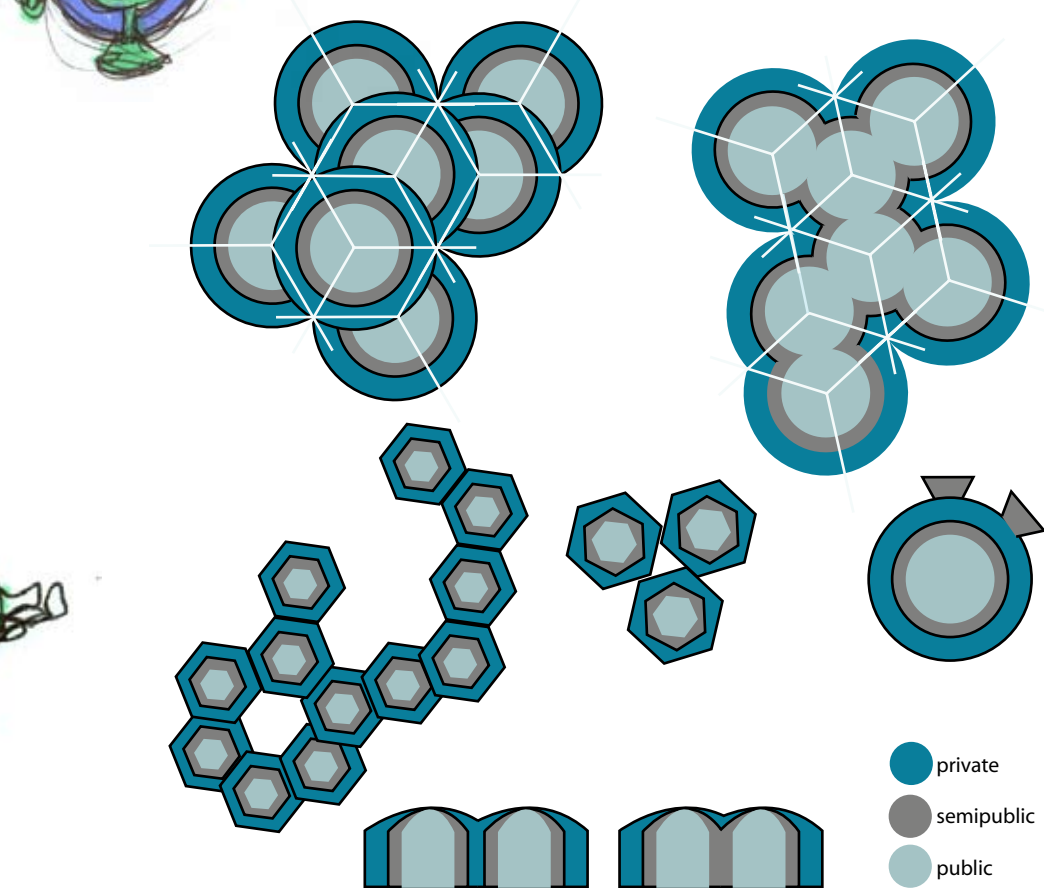
In architecture, we see the strength of the dome shape and the intriguing possibilities of positive and negative space.





From our initial sketches, we decided that our space should allow for:

- The ability to be part of a group or be an individual.
- Ease of transport.
- Ease of setup.
- A central core to house the necessary appliances and furniture.
- Expanding spaces.

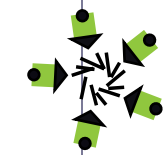


Taking the idea of changing community forward, we began sketching structures with expanding spaces and defined spaces. Generally speaking, private individual spaces are important for the happiness of the inhabitants.

Our goal was to make our structure some blending of a tent and a house: easy to move and set up while achieving a feeling of security and stability.

Eventually, we settled on creating a mobile structure that expands around a central core. The parts that expand would become the private spaces, while the central core would stay available for communal use.

This would be a community of communities, as one unit housing several people could then connect to many more units housing many more people. In this way, the community could change and grow to suit the demands of its residents.



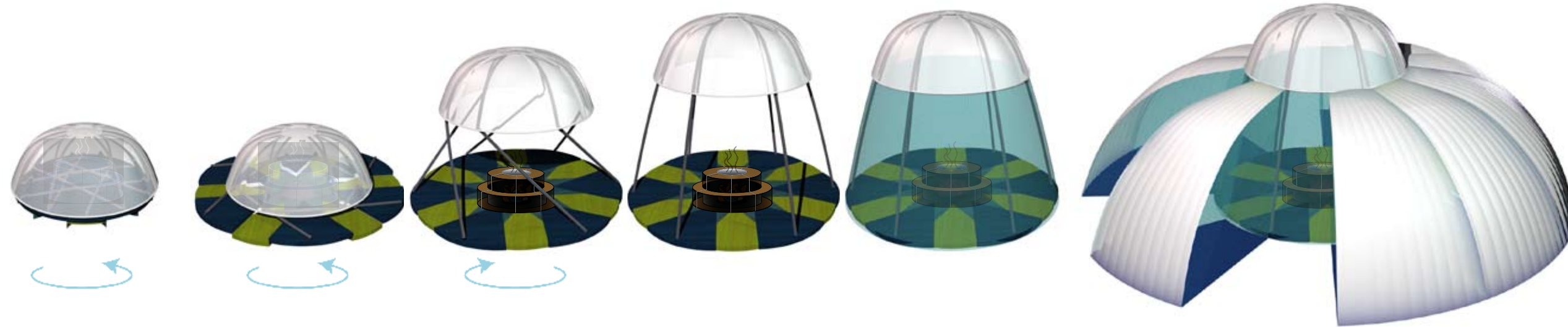


In the end, we decided on a dome for its structural integrity and community-provoking shape. It definitely had the most potential to meet our needs.

Inspired by D.B. Fletcher's Capstan Table, we designed the floor of our dome to be the main expanding unit. The floor rotates outward around a central point, enabling expansion and lift.

Once erect, the structure can then be expanded further by the addition of individual "pods."

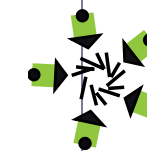
We built a full scale model out of cardboard to illustrate how the dome might expand. Interestingly, as the dome collapsed, it spun counterclockwise to the floor. This natural motion of the cardboard dome reinforced our hope that we could achieve this effect in our design.



A central pivot point acts as an axle and houses a cooking unit/firepit. The dome is transported in its 8ft-diameter compact form by truck. It is then rolled off the truck and rolled on its side to the site of setup.

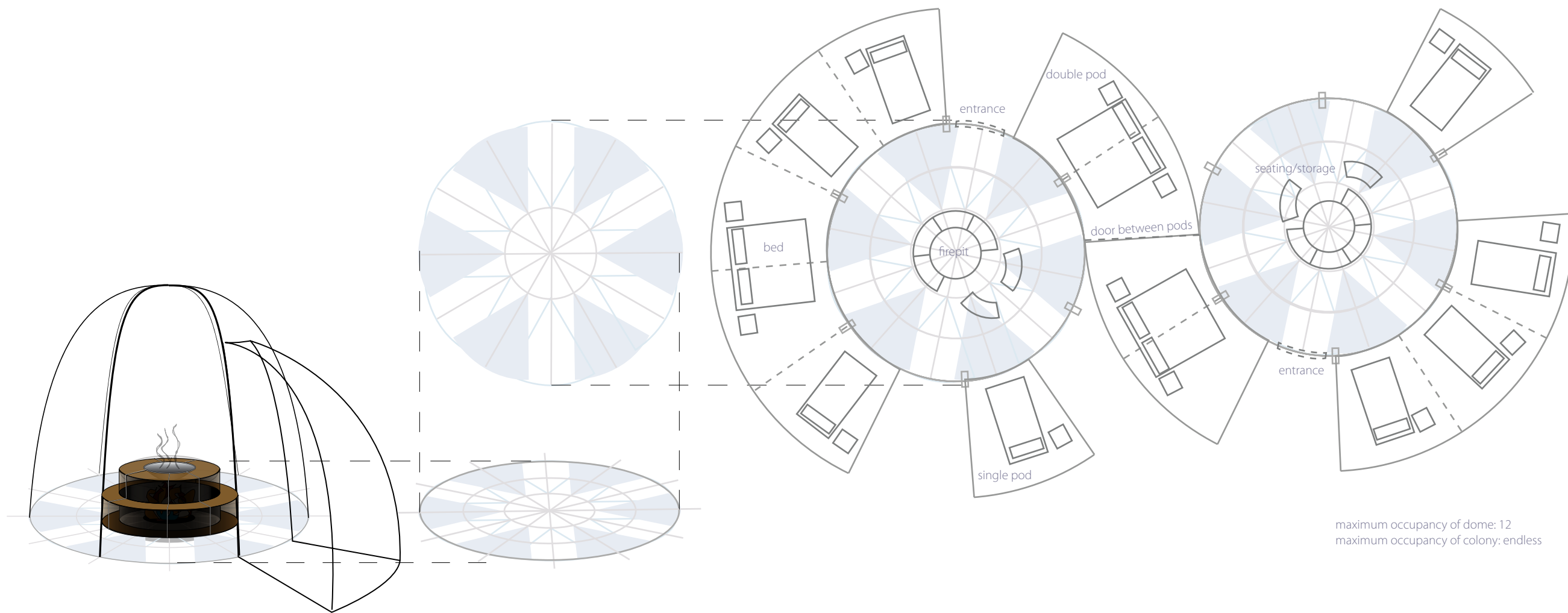
The user **rotates the floor out** as leg supports extend and lock into place. The floor will expand from about an 8ft to 12ft diameter, a very comfortable 113 sq ft of communal space. The unit is then **rotated in the opposite direction**, and the structure begins to rise. Once locked into place, fire retardant ripstop nylon side pieces can be rolled down and attached.

full-scale mockup and design concept



The dome is divided into 12 sections. **Personal pods** are issued out to each individual to carry on his back and **attach at will to any of the 12 sections**. Pods are meant to be sleeping zones for 1-2 people, but they can also contain separate bathroom or kitchen units. By removal of common walls, these **pods can attach to each other or be hallways between 2 domes**.

Potentially, 12 or more people can live in one dome which can then be connected to another group of people. These units can be easily dismantled and moved from place to place to meet the needs of a changing community.



maximum occupancy of dome: 12
maximum occupancy of colony: endless

This is the conceived floor plan of our dome. The circular common space is a place for eating, cooking, keeping warm, and interacting.

The firepit in the middle of the dome acts as a heater, a gathering point, and a cooking unit. Not relegated to the inside, the firepit can be moved outside for any situation. The structure has an oculus in the top of the dome for ventilation.

Surrounding the communal space are personal pods that attach to the dome by removal of common walls. These pods are given out to individuals to attach at will to any dome of their choosing. Once linked to the larger dome, pods can then connect to each other to act as larger rooms or as portals between domes.

For harsher climates, insulated panels can replace the nylon side pieces.

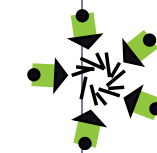


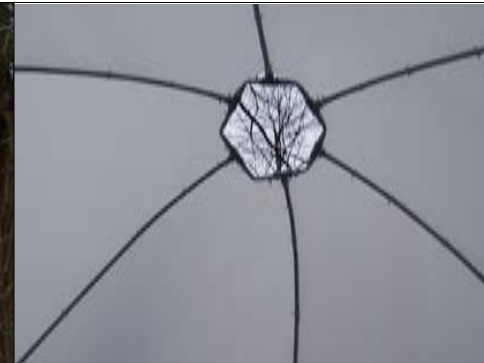


Our budget for this project was \$800. We had to make a decision of what materials to purchase for our prototype. While we would have liked to build a model as close to our concept as possible, it was beyond our means and abilities for such a short time.

Planned Materials	Purchased Materials	Cost
4mm Coroplast for the dome top.	3 sheets 4mm clear Coroplast	\$ 24
Rip stop nylon for the dome walls and personal pod walls	32 yd white fire retardant silicone-impregnated ripstop nylon 26 yd navy silicone-coated ripstop nylon	\$296
Thin plastic, possibly HDPE, for the personal pod ceilings	4 sheets 4mm clear Coroplast	\$ 32
Zippers	125 ft white velcro	\$ 77
Foam rubber for the sleeping pads	2 packs carpet foam	\$ 50
1/2" Aluminum tubing for the frame of the dome	210 ft 1/2" electrical conduit and connectors	\$ 65
1/4" Aluminum tubing for the personal pod frames	64 ft 1/2" pvc	\$ 11
Wood for the floor	blue tarp repurposed plywood	\$ 15 \$ 0
Fire ring	stolen garbage can	\$ 0
Concave skillet or wok	26" carbon steel wok	\$ 35
	clear zipties	\$ 5
		\$610

materials





As scheduled, we tested our prototype in the mountains at Highland Forest State Park. It was a very memorable trip.

Our structure went up very fast. Wind was bitterly cold and strong. However, once we got everything up and together, our dome seemed impervious. Sitting inside, we were bathed in white light and reveled in the silence of winter.

The weekend trip proved our firepit to be far more valuable than we had anticipated. It saved the day when we brought it outside around the communal fire. Not only did it channel the smoke up and out of our eyes, but it also kept the fire easy to manage. Once we put our cooking surface over the pit, heat immediately started radiating outward. Bonus: a perfectly cooked dinner.

In our attempt to keep warm, we found that three people can comfortably fit in each pod. We also found that the dome is quite comfortable to sleep in, especially with its raised floor.

