SPECULATIVE FUTURES FOR THE H.E.S.T.I.A. ANALOG

THE UNIVERSITY OF ARIZONA

College of Architecture, Planning & Landscape Architecture

ARC 451B | FALL 2016

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SPECIAL THANKS TO CANAAN MARTIN, NASA.

" We cannot mentally survive in a placeless, scaleless, and meaningless physical space. We inhabit our physical world through structuring it into mental space; by turning infinite and uniform natural space into distinct places and giving these spaces specific cultural and mental meanings "

Juhani Pallasmaa

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INTRODUCTION

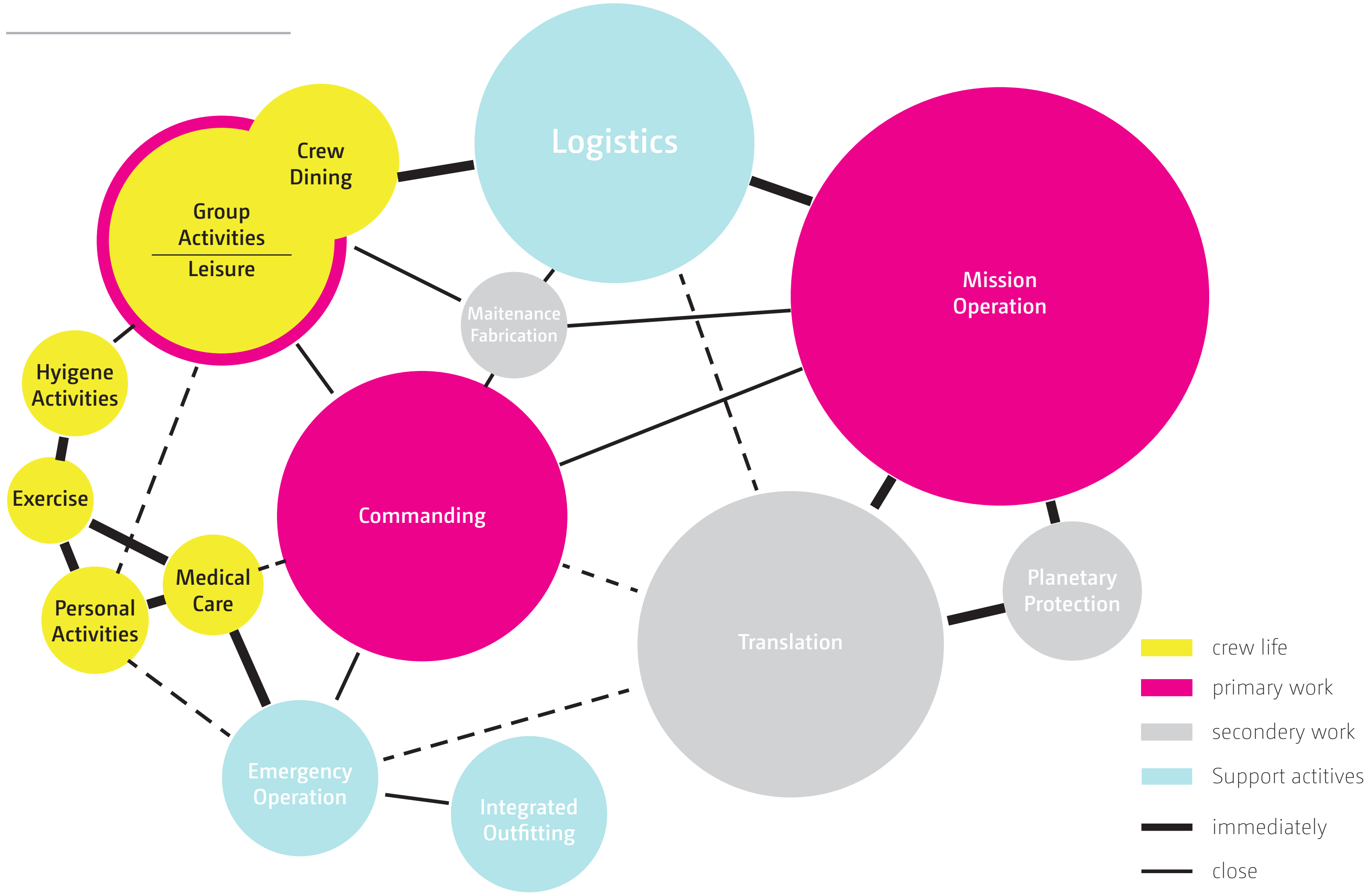
H.E.S.T.I.A. ANALOG

The Human Exploration Spacecraft Test-bet for Integration and Advancement is a 20 foot diameter, three story high chamber that will host four astronauts for 90 days. The purpose of this project is to design the interior architectural outfitting of the chamber that are required for a comfortable human habitation. Living in HESTIA for 90 days, the chamber needs to accommodate outfitting, living, and working comfortably.
As this is a live-in analog, the chamber needs to meet certain safety standards

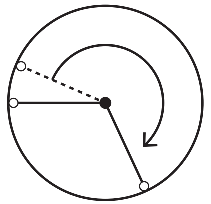
First Floor Interior Shot of Existing Hestia Chamber

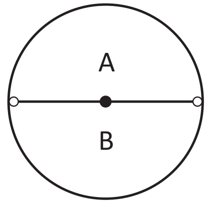
PROGRAMMING

SPACIAL RELATIONSHIP

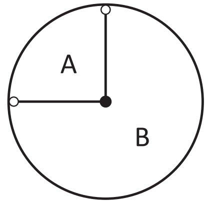


PROGRAMMING

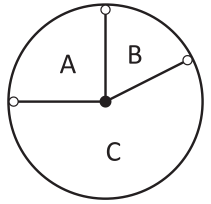




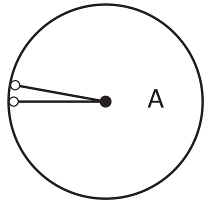
Divide the chamber as two equal spaces A & B



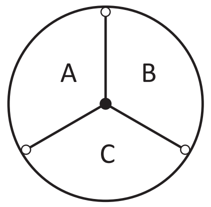
Divide the chamber as two spaces: a individual space A & a group space B



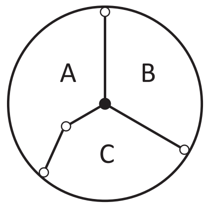
Divide the chamber as three spaces: two individual space A & B, one group space C



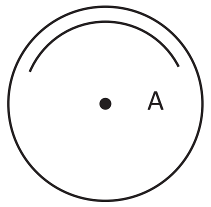
Use the chamber as a one big space



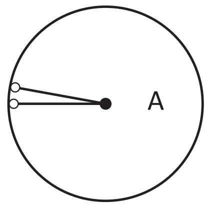
Divide the chamber as three equal spaces A, B & C



Divide the chamber as three spaces: a individual space A, B & C

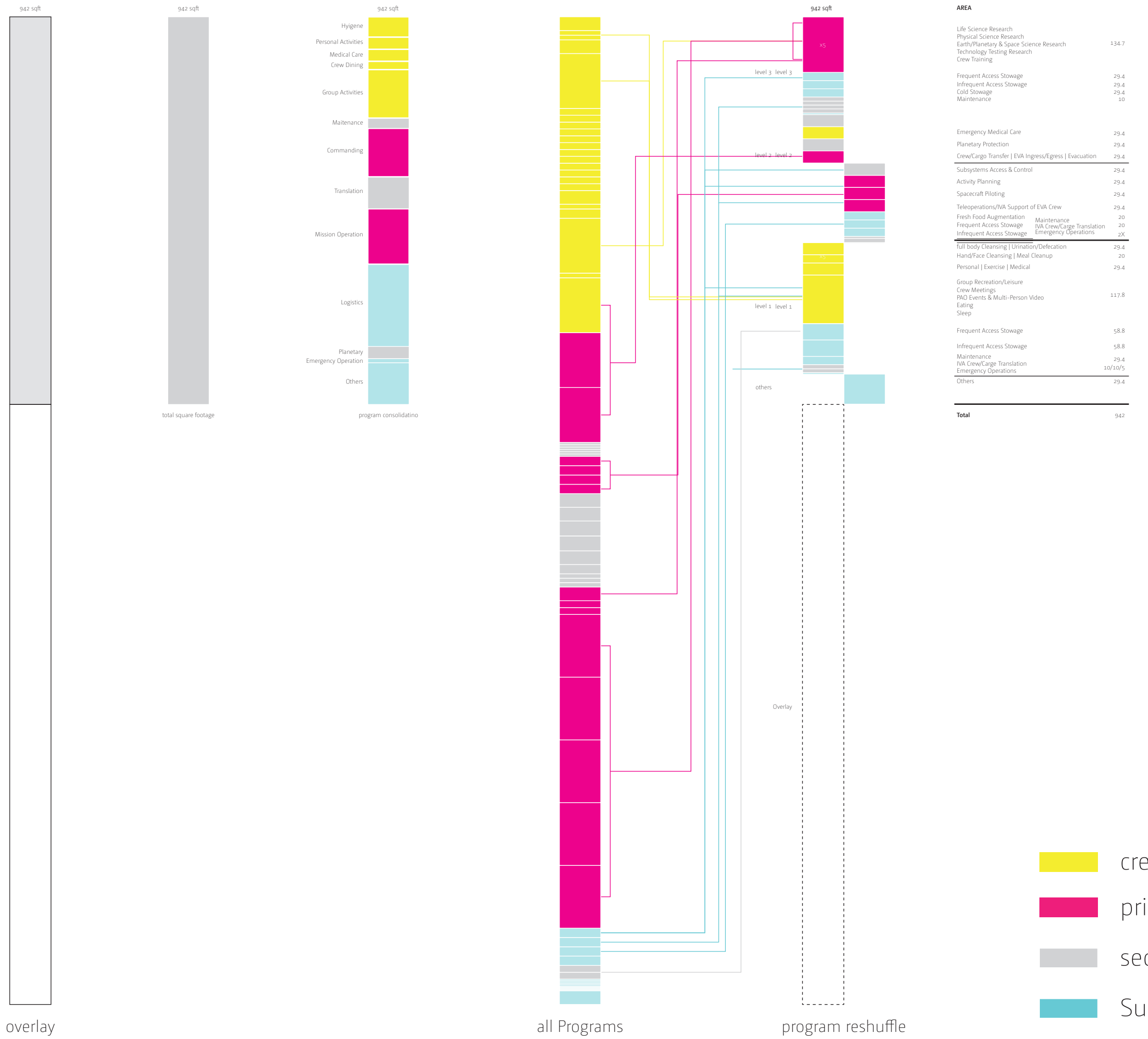


Use the chamber as a one big space



Use the chamber as a one big space

PROGRAMMING



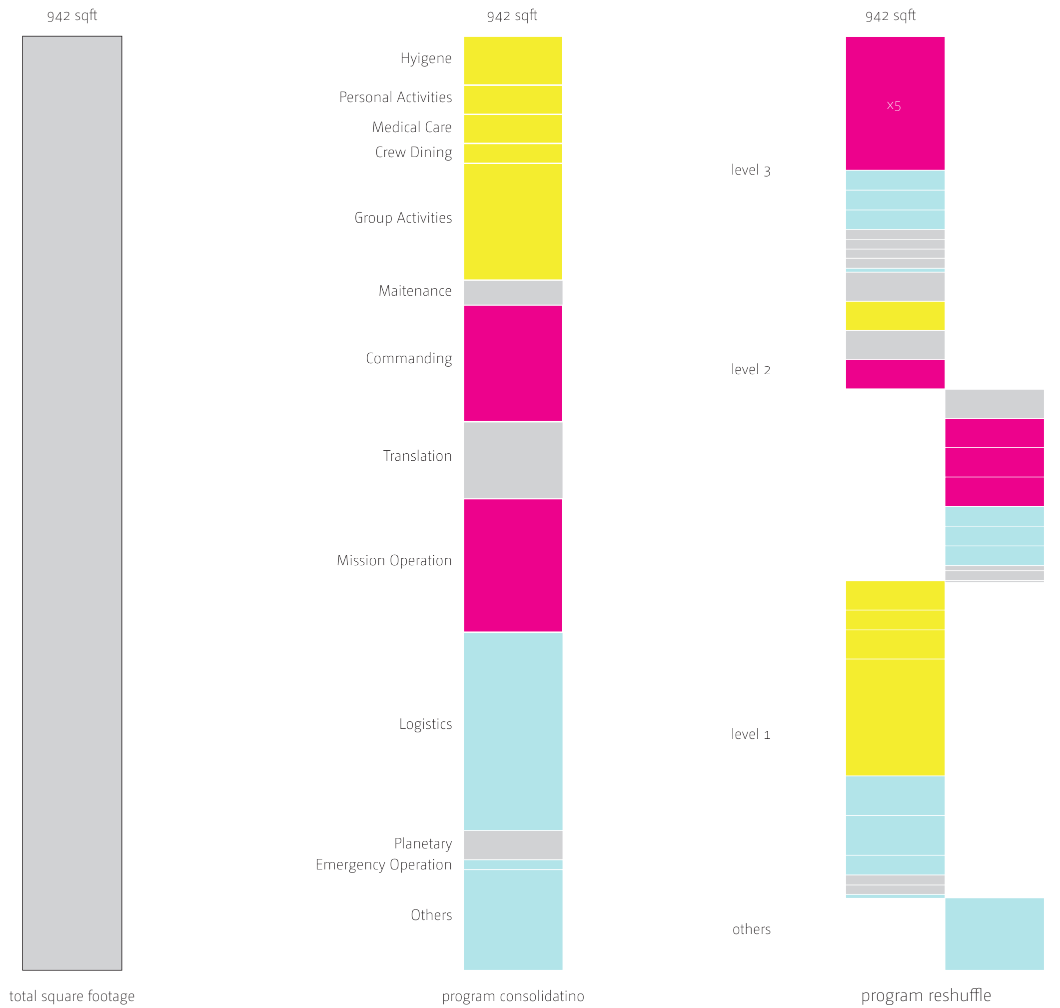
crew life

primary work

secondery work

Support actitives

PROGRAMMING



AREA		
Life Science Research Physical Science Research Earth/Planetary & Space Science Research Technology Testing Research Crew Training		134.7
Frequent Access Stowage Infrequent Access Stowage Cold Stowage Maintenance		29.4 29.4 29.4 10
Emergency Medical Care		29.4
Planetary Protection		29.4
Crew/Cargo Transfer | EVA Ingress/Egress | Evacuation		29.4
Subsystems Access & Control		29.4
Activity Planning		29.4
Spacecraft Piloting		29.4
Teleoperations/IVA Support of EVA Crew		29.4
Fresh Food Augmentation Frequent Access Stowage Infrequent Access Stowage	Maintenance IVA Crew/Carge Translation Emergency Operations	20 20 2X
full body Cleansing | Urination/Defecation		29.4
Hand/Face Cleansing | Meal Cleanup		20
Personal | Exercise | Medical		29.4
Group Recreation/Leisure Crew Meetings PAO Events & Multi-Person Video Eating Sleep		117.8
Frequent Access Stowage		58.8
Infrequent Access Stowage		58.8
Maintenance IVA Crew/Carge Translation Emergency Operations		29.4 10/10/5
Others		29.4
Total		942

crew life

primary work

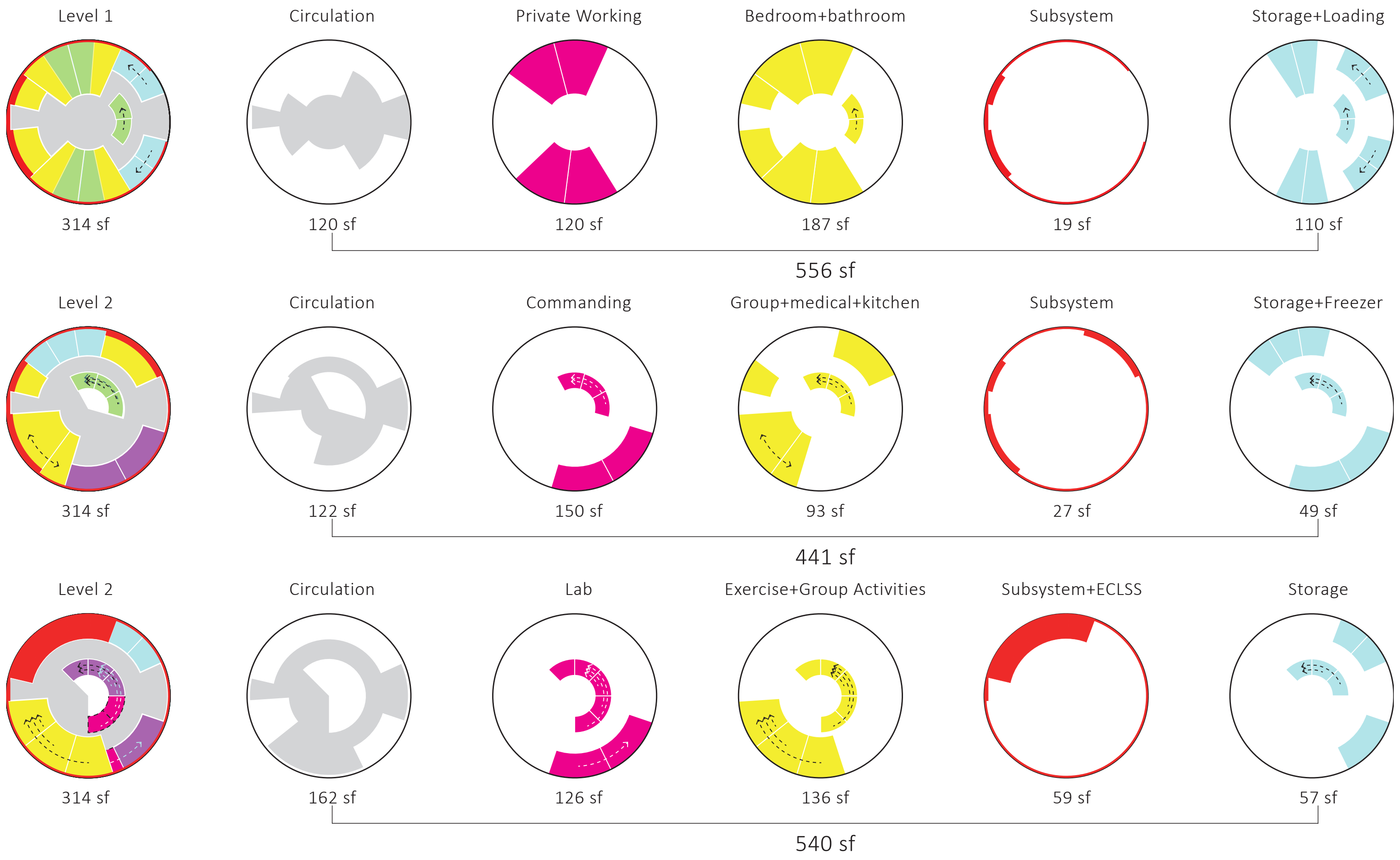
secondery work

Support actitives

LAYOUT DIAGRAM

PROGRAM DISTRIBUTION

Working | Crew living | Subsystem | Circulation | Storage



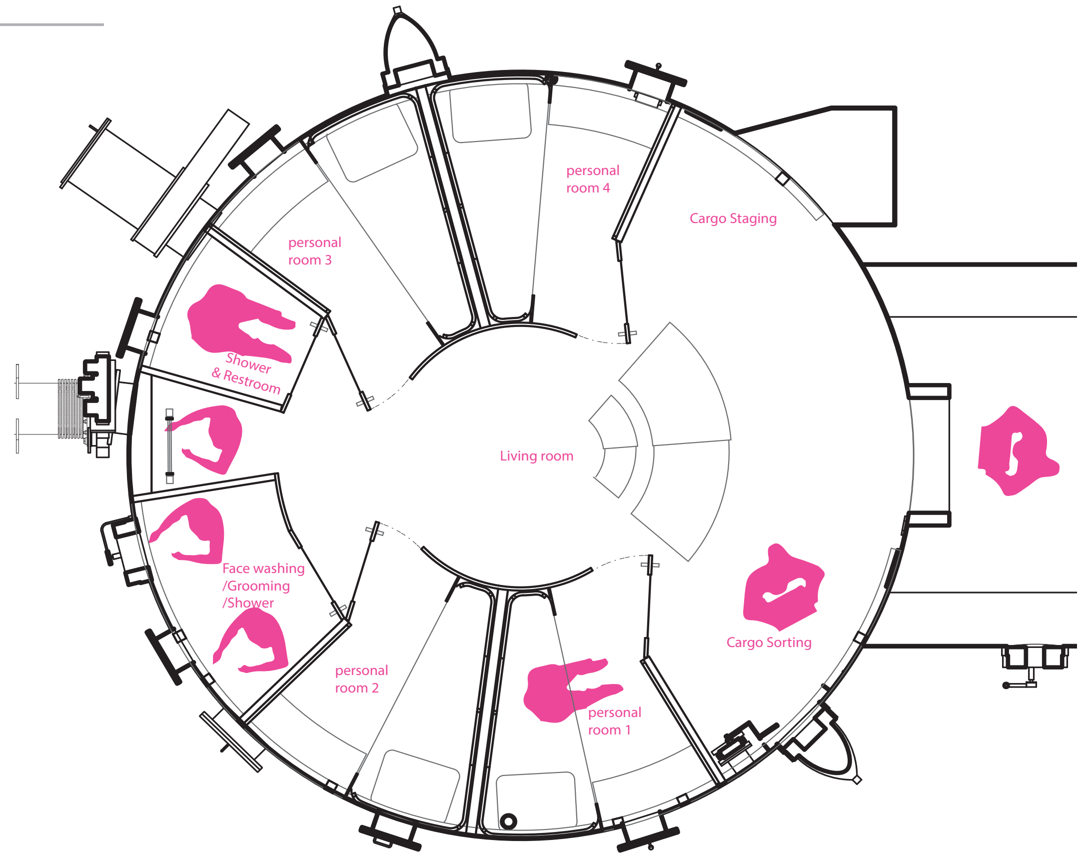
LAYOUT DIAGRAM

PROGRAM TRANSFORMATION

Transformable | Fixed

HESTIA ANALOG

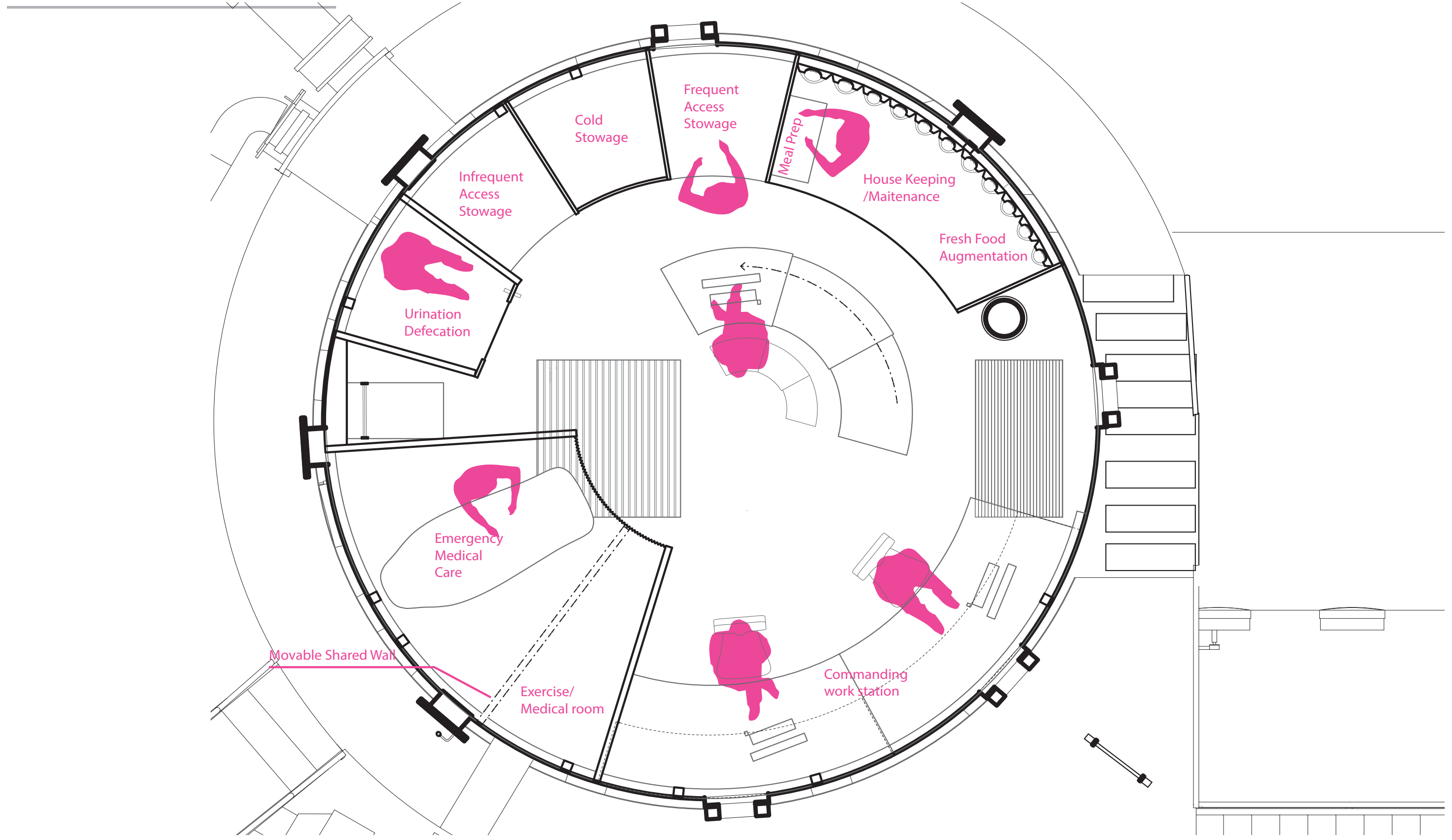
FIRST FLOOR PLAN



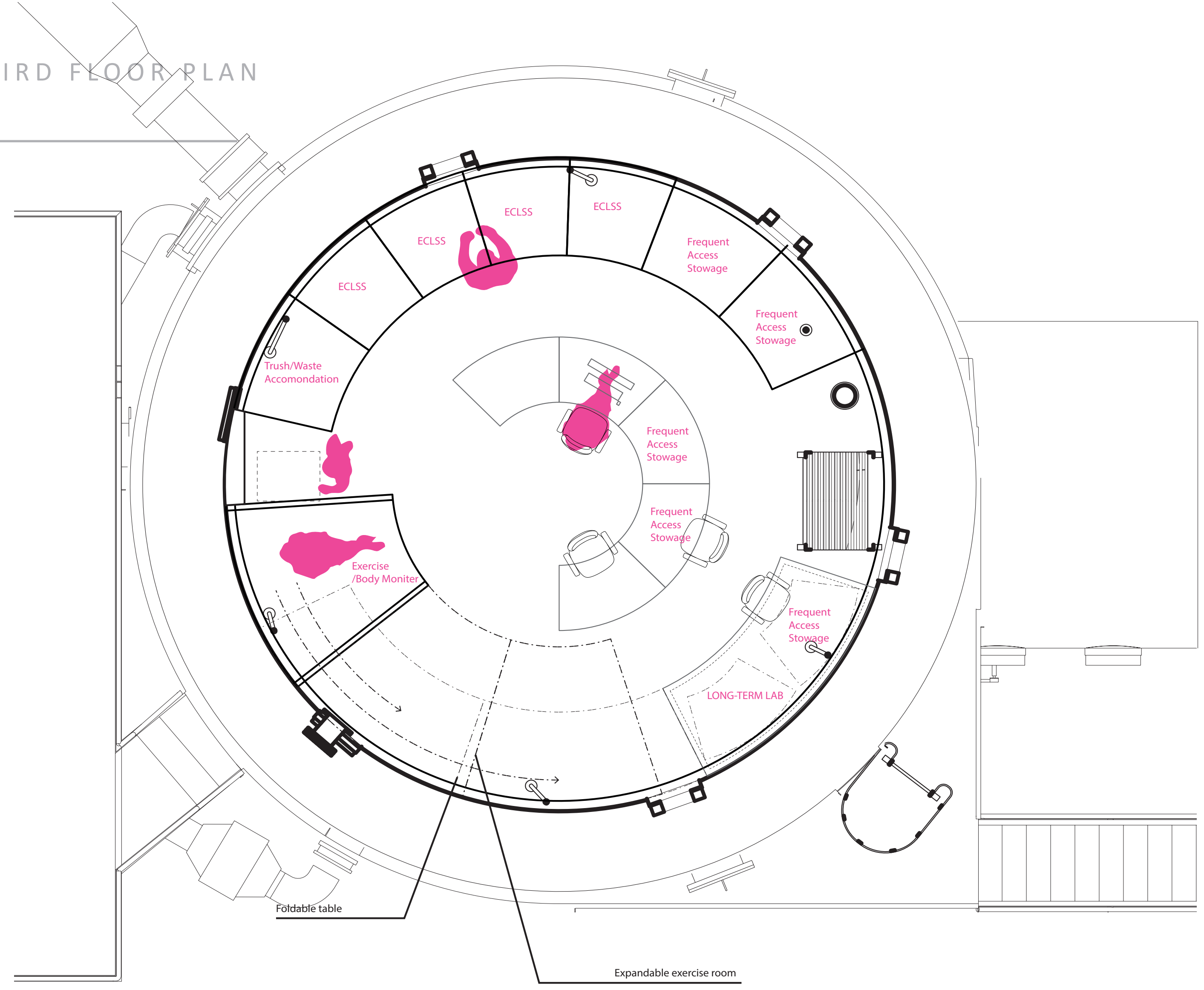
0'-1/4"=1'-0"

0 2 4 8'

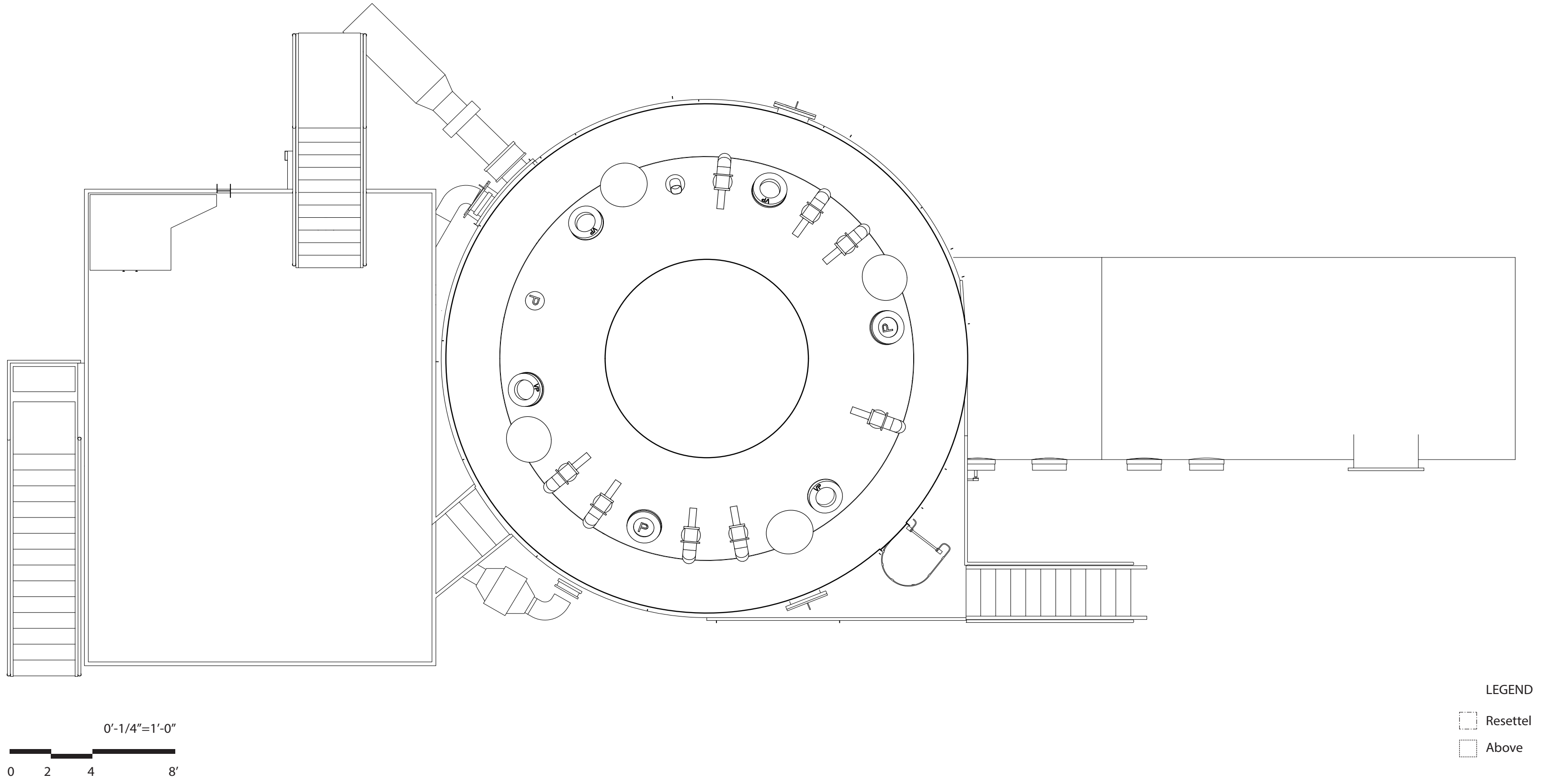
SECOND FLOOR PLAN



THIRD FLOOR PLAN



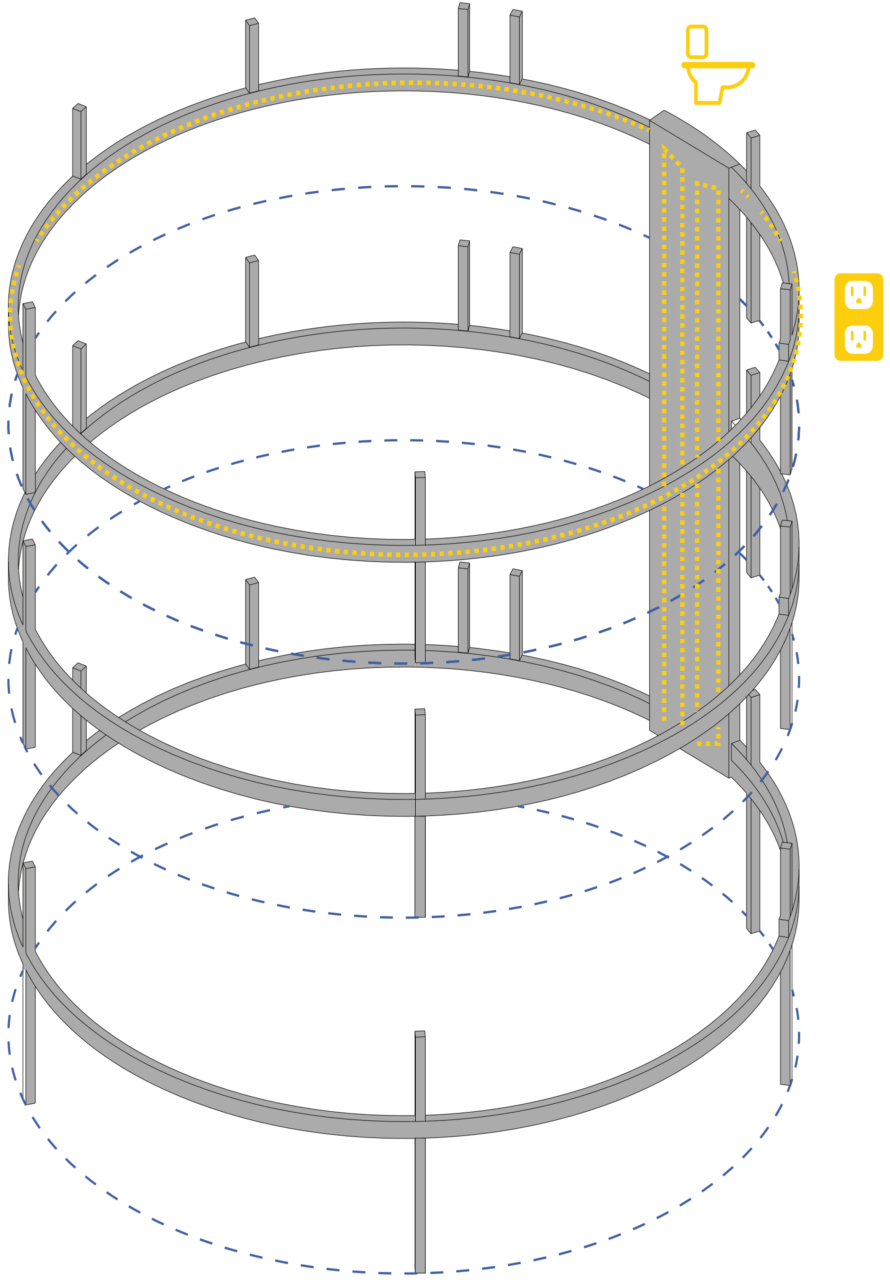
ROOF PLAN

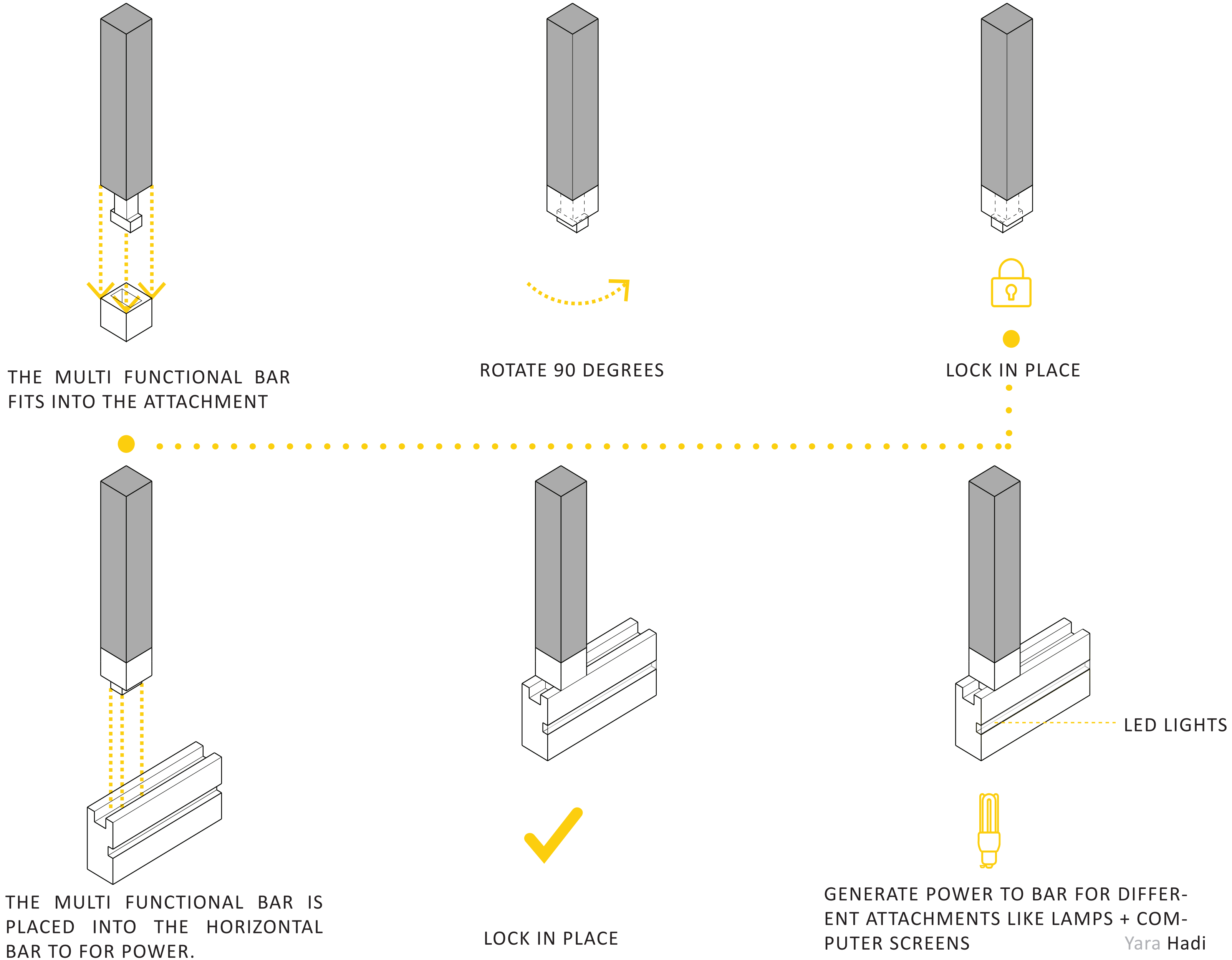


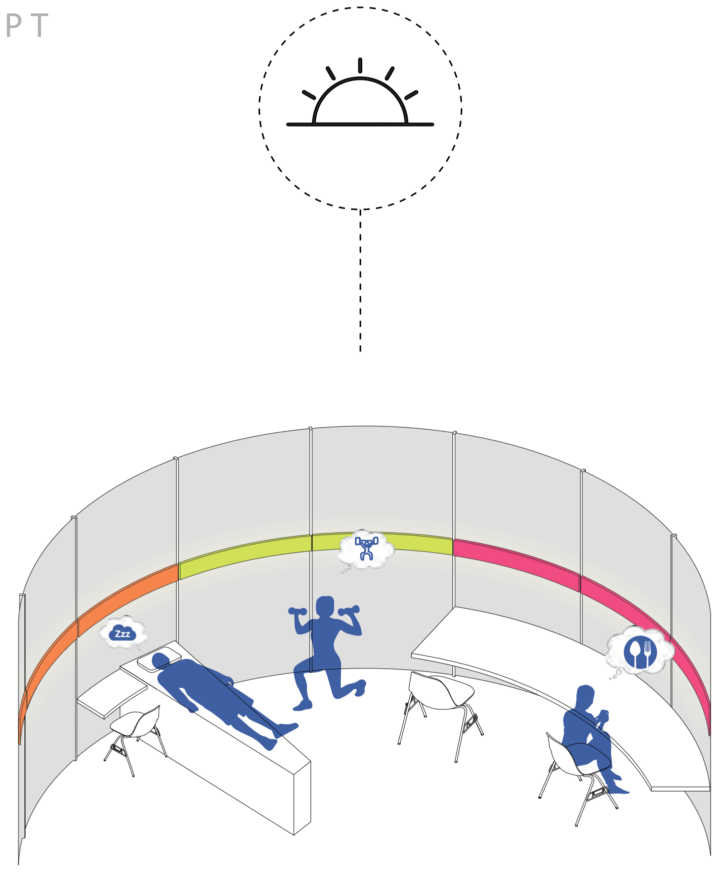
SUBSYSTEM CONCEPT

PERIMETER SHELL

The secondary shell surrounds the perimeter of the chamber. The shell also acts as a frame for the subsystems which includes electricity, fire, water, and waste pumps. The horizontal rings hold the electricity cables which can be accessed through outlets throughout the chamber. The horizontal rings hold colorful LED lights that light up rooms based on the users mood. The vertical members are a multi-functional bar that can fit into the horizontal rings. The vertical bars allow the user to attach whatever they please based on the space they are using. Objects include lamps, laptops, and i pads.

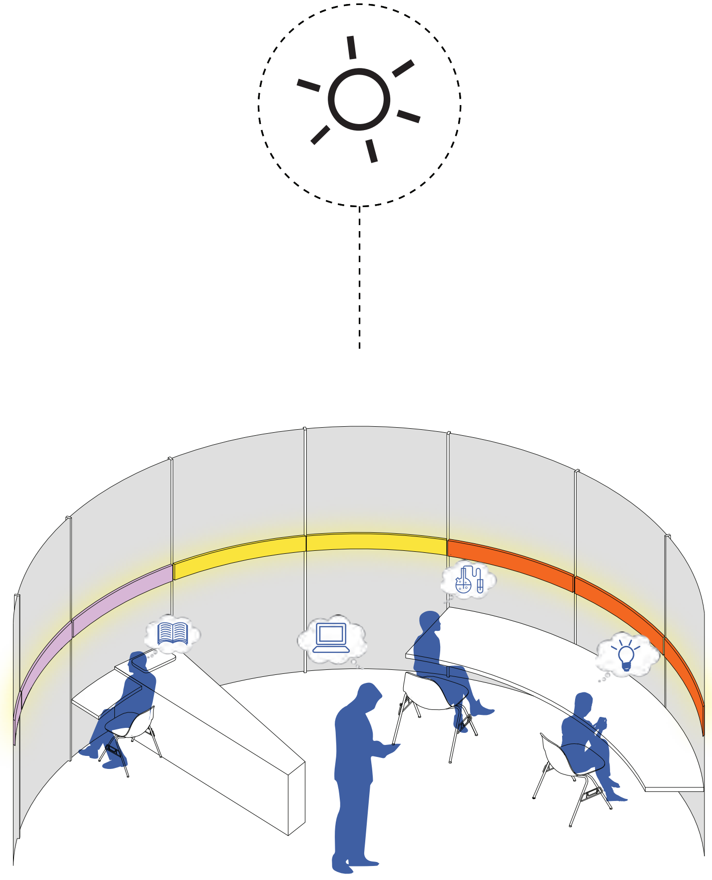






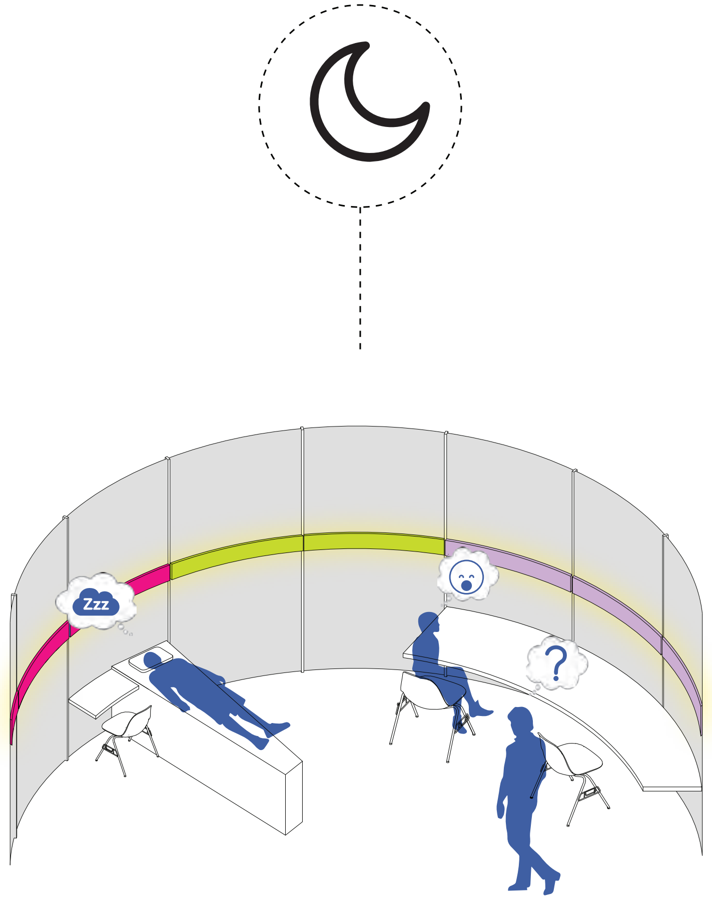
Lighting Moods in the Morning

- Creative Thinking, Enthusiasm, Assimilates New Ideas
- Balance + Harmony, Soothing Influence on the Body
- Energizes all the Organs and the Senses



Lighting Moods During the Day

- Soothes Mental Emotional Stress, Brings Sleep
- Energizes the Muscles,Helps Awaken the Mind When Nervous
- Creative Thinking, Enthusiasm, Assimilates New Ideas

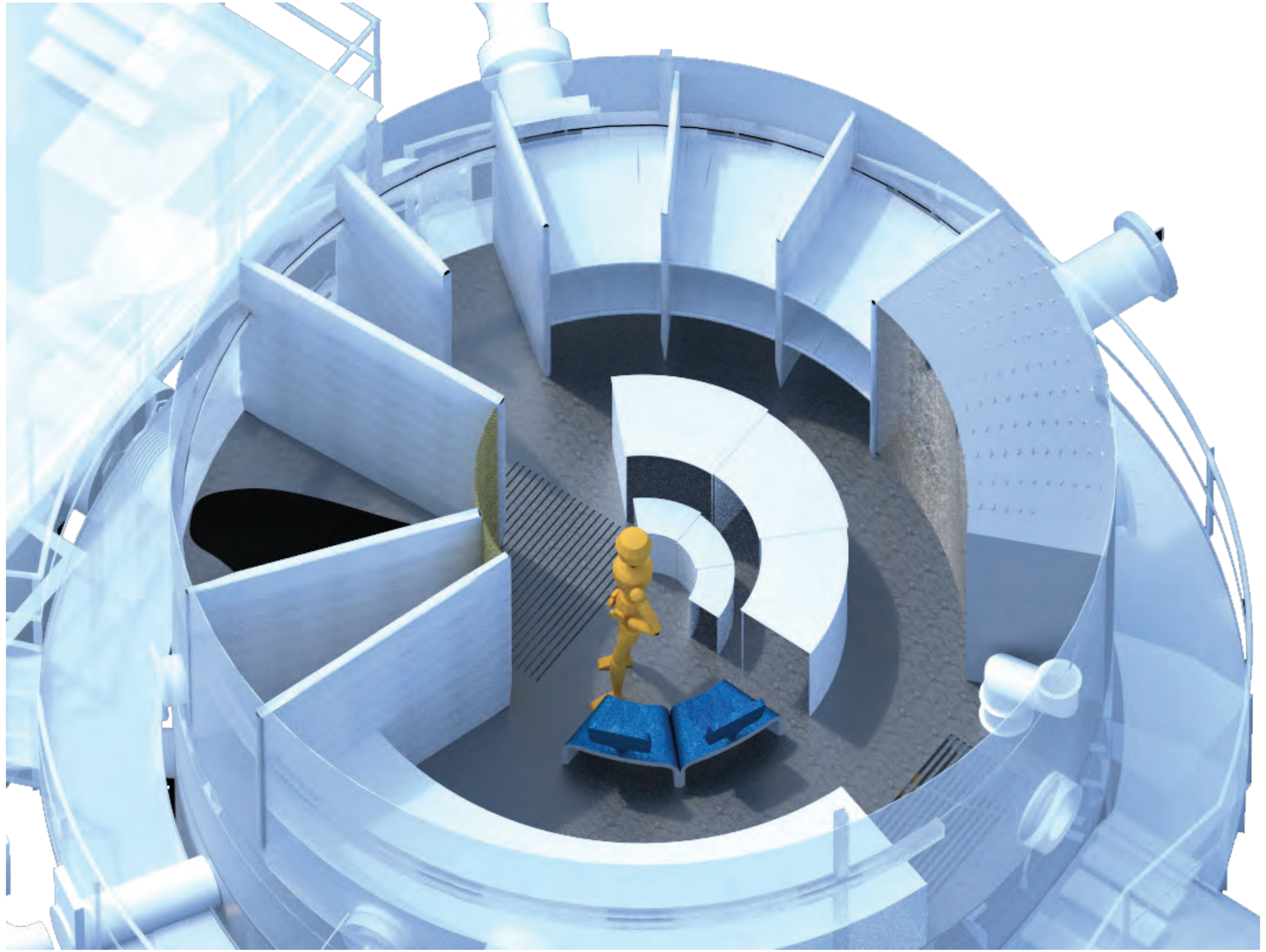


Lighting Moods During the Day

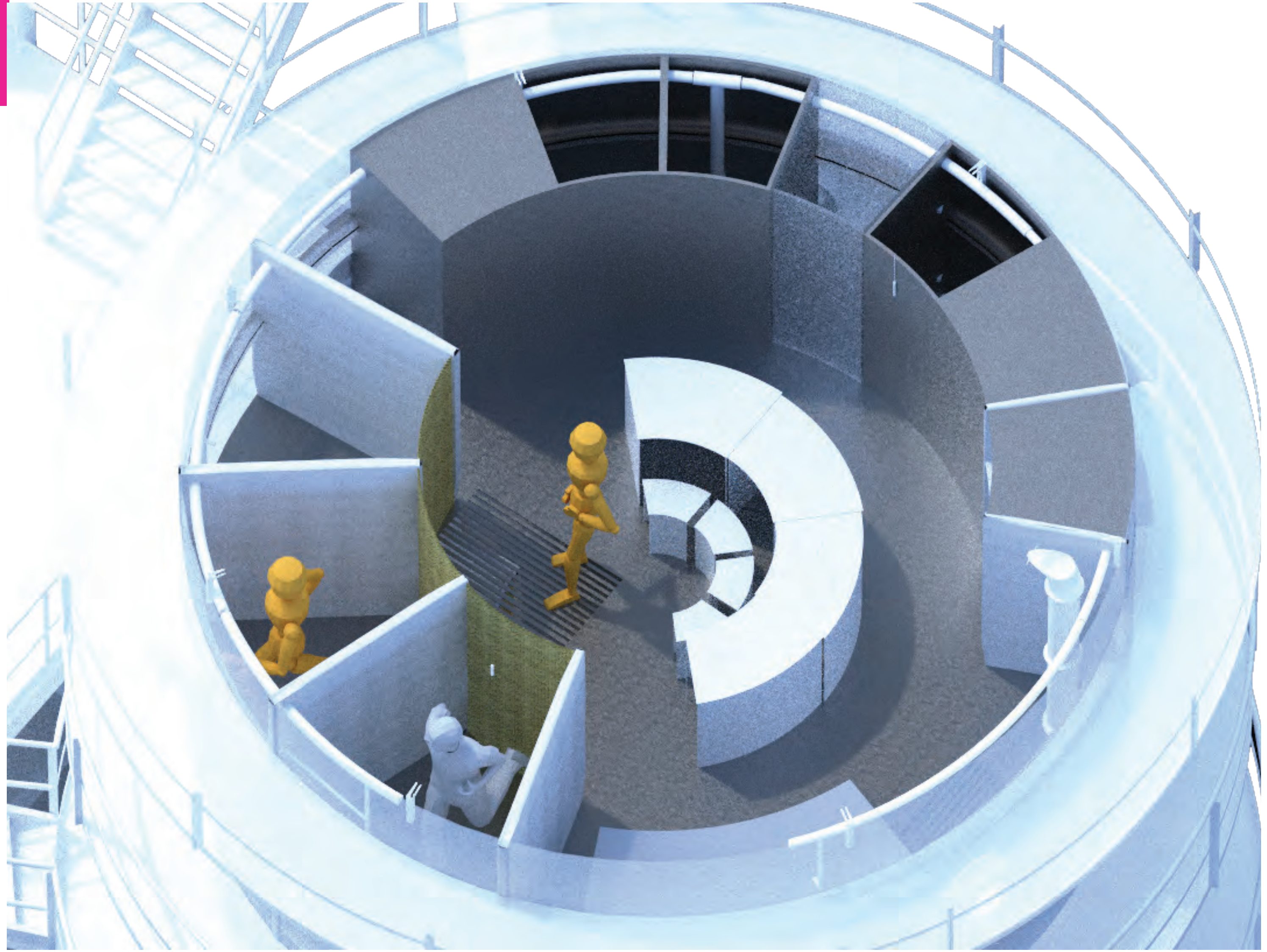
- Calming, Tones the General System, Relaxes Stress Sensations
- Balance + Harmony, Soothing Influence on the Body
- Soothes Mental Emotional Stress, Brings Sleep

FIRST FLOOR RENDERING

SECOND FLOOR RENDERING

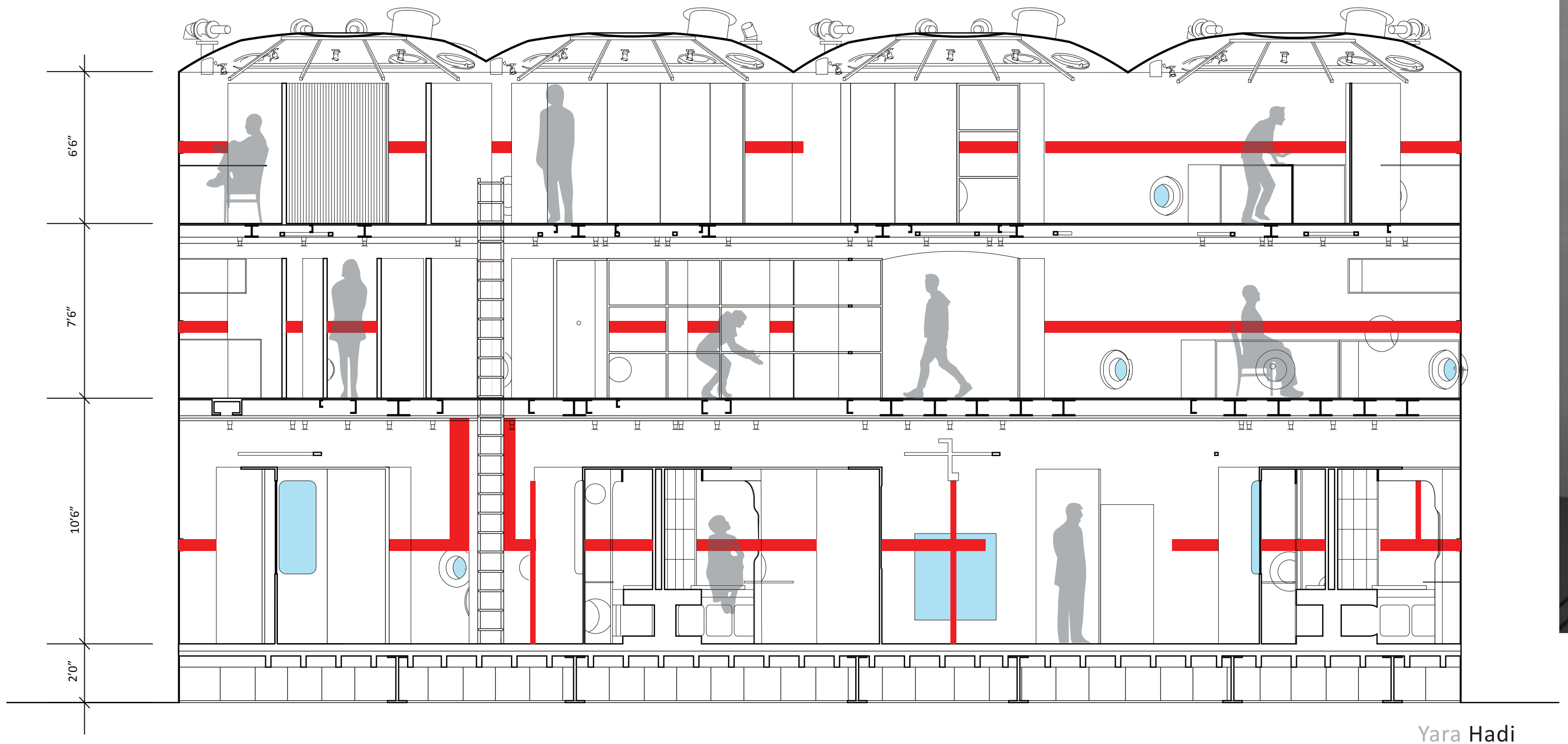


THIRD FLOOR RENDERING



MOOD LIGHTING RENDERING

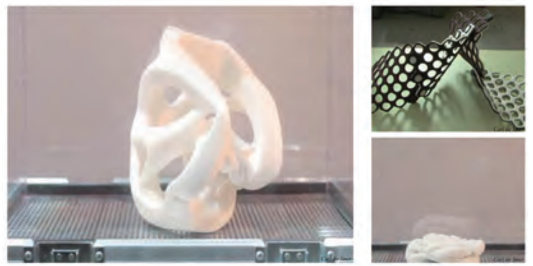
UNROLLED SECTION

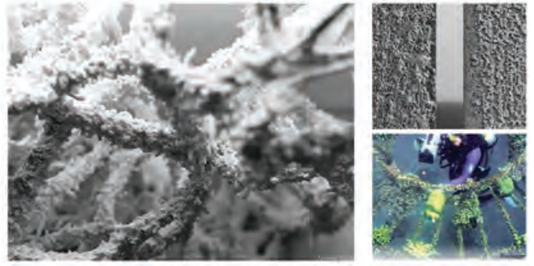
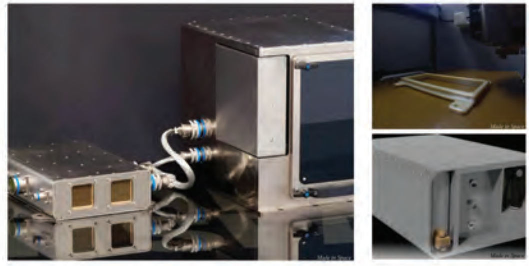


SECOND LEVEL RENDERING

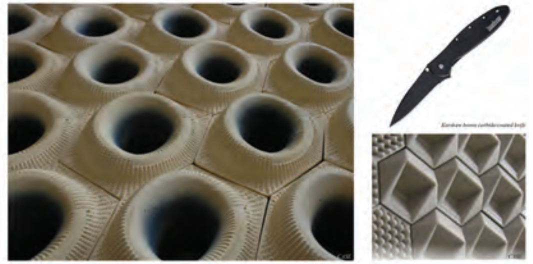
Materiality

Exploring Options and Constructibility.







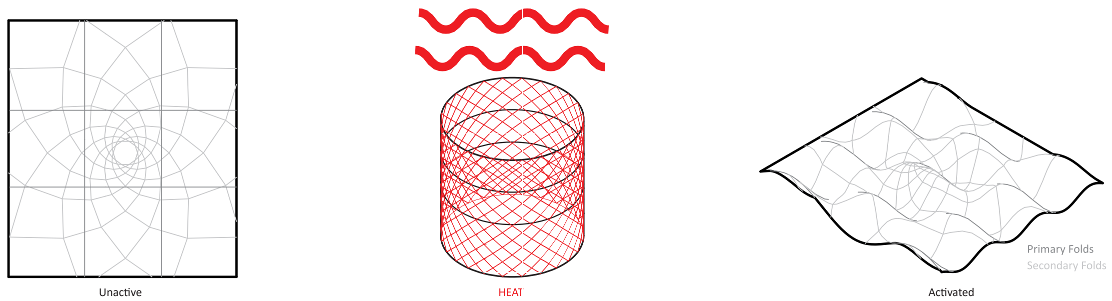


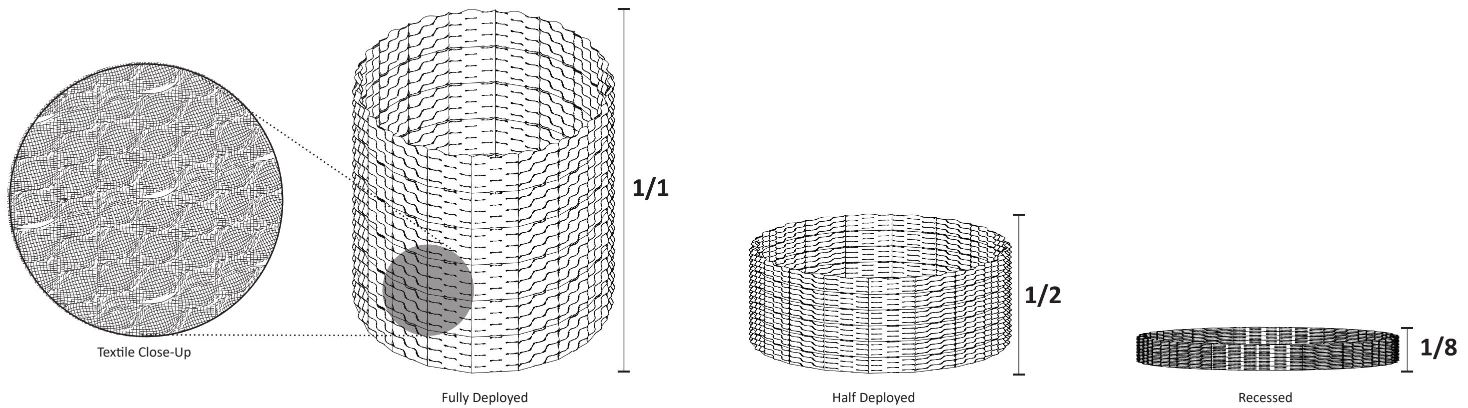


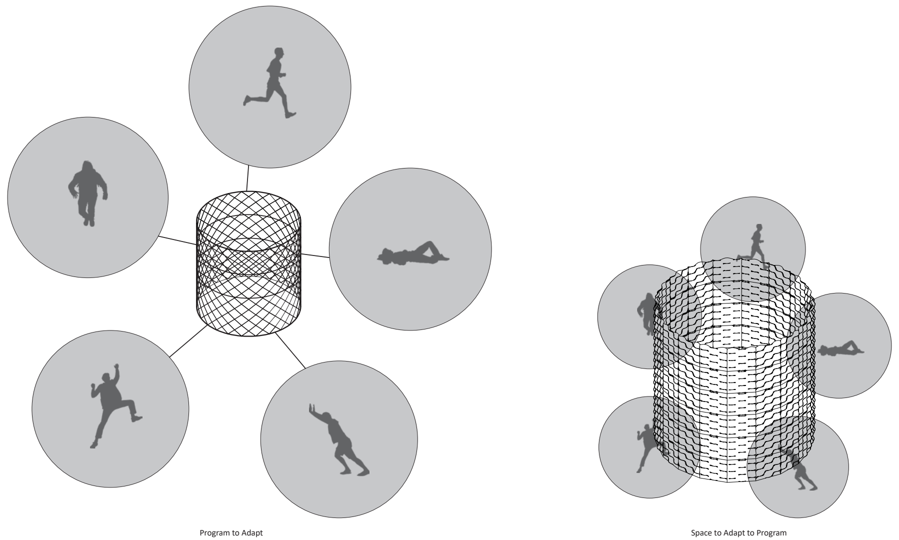
Asher Caplan

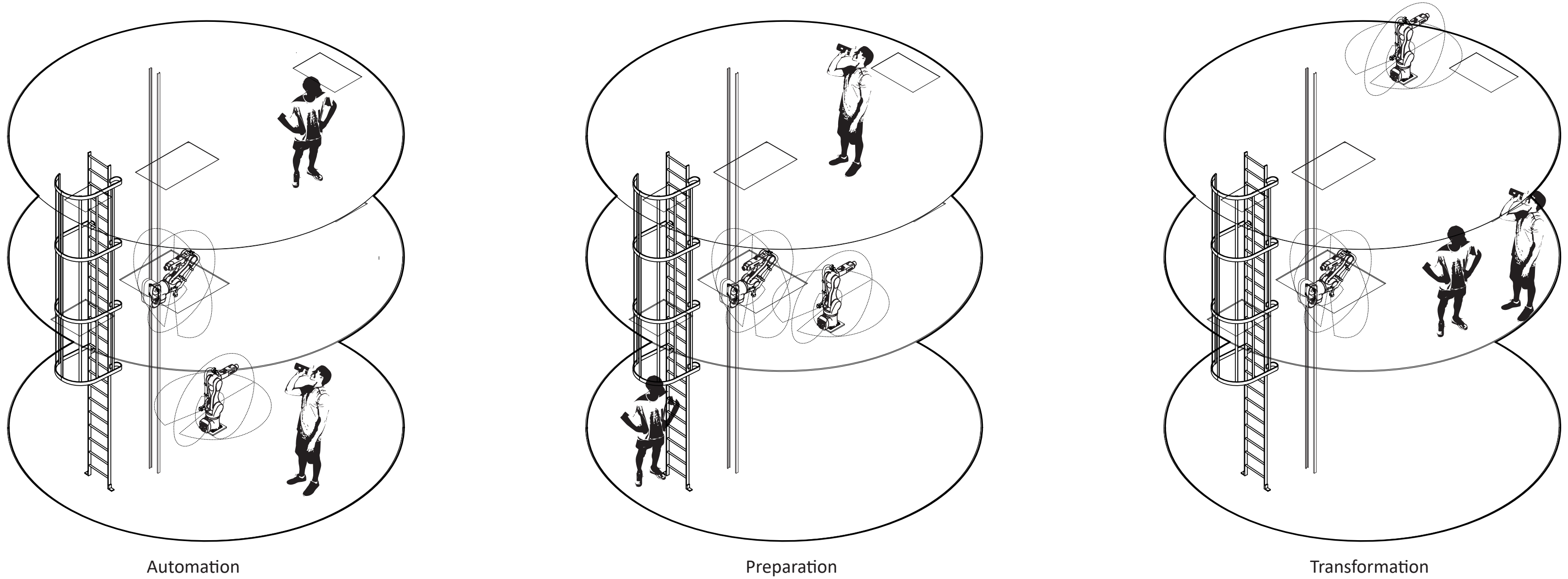
Expandability

Systems of Dividing Space







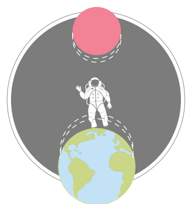


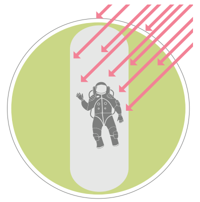
Asher Caplan

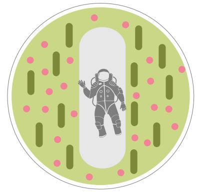
HUMAN COMFORT

RESEARCH

THE HUMAN BODY IN SPACE


Gravity Fields

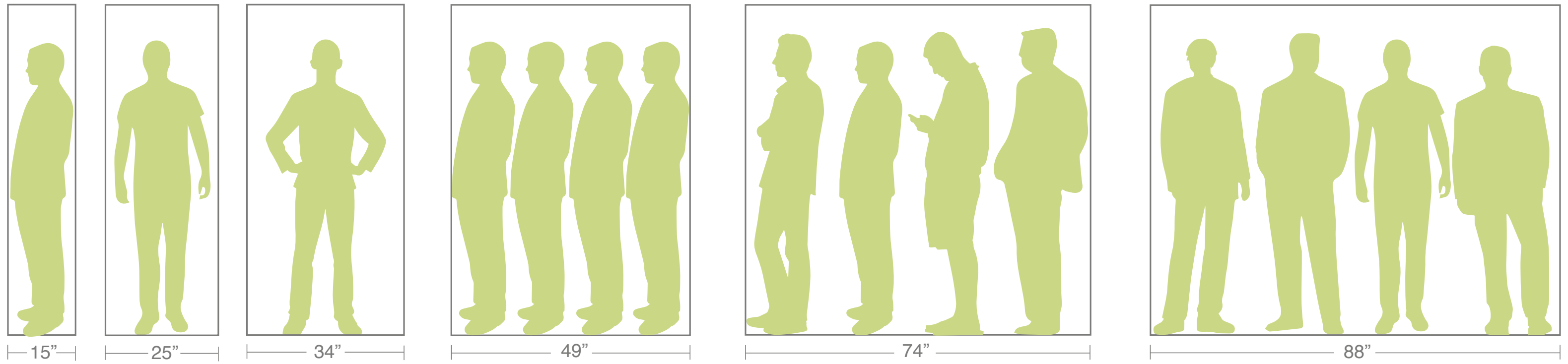

Space Radiation


Hostile/ Closed Environments

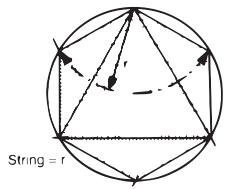

Isolation/ Confinement

HEALTH RISKS:

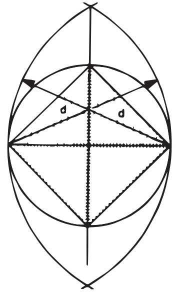
Musculoskeletal:
Long-Term health risk of Early Onset Osteoporosis. Mission risk of reduced muscle strength and aerobic capacity.
Sensorimotor:
Mission risk of sensory changes/ dysfunctions.
Behavioral Health:
Mission and Long-term behavioral risk.
Nutrition:
Mission risk of behavioral and nutritional health due to inability to provide appropriate quantity, quality, and variety of food.
Radiation:
Long-Term risk of ccarcinogenesis and degenerative tisue disease due to radiation exposure. - Largely addressed with ground based research.



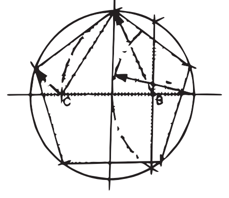
DIMENSIONAL BASICS AND RELATIONSHIPS:

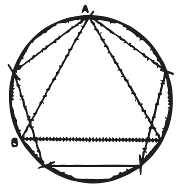


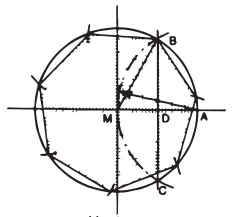
Equilateral Triangle, Hexagon


Square

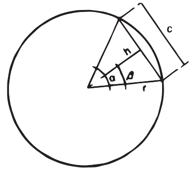
a) Geometric shapes named by Plato and Virtuvius are of critical importance: Circle --> Hexagon --> Triangle --> and Square from which polygonal traverses can be constructed. Different shapes can be derived from other shapes creating more comfortable and efficient spaces.

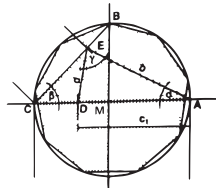

Pentagon

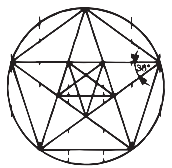

15 - Sided Polygon


Heptagon

b) The Pentagon has a natural relationship to the golden section. Polygonal travereses are necessary for the design and construction of so-called round buildings. Straight edges that interfere with round-shaped buildings can be beneficil in adding more storage and creating comfortable spaces for the user.

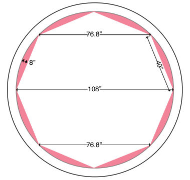

Polygonal Traverse

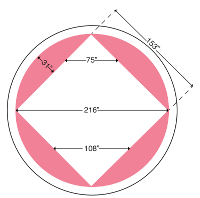

Nonagon

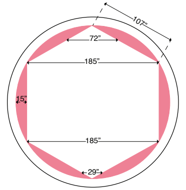

Pentagon + Golden Section

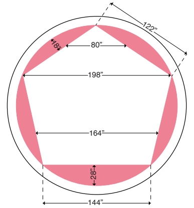
Citation: Neuferts' Architecture Data, Fourth Edition 2007

POTENTIAL DESIGNS:


Octagan


Square

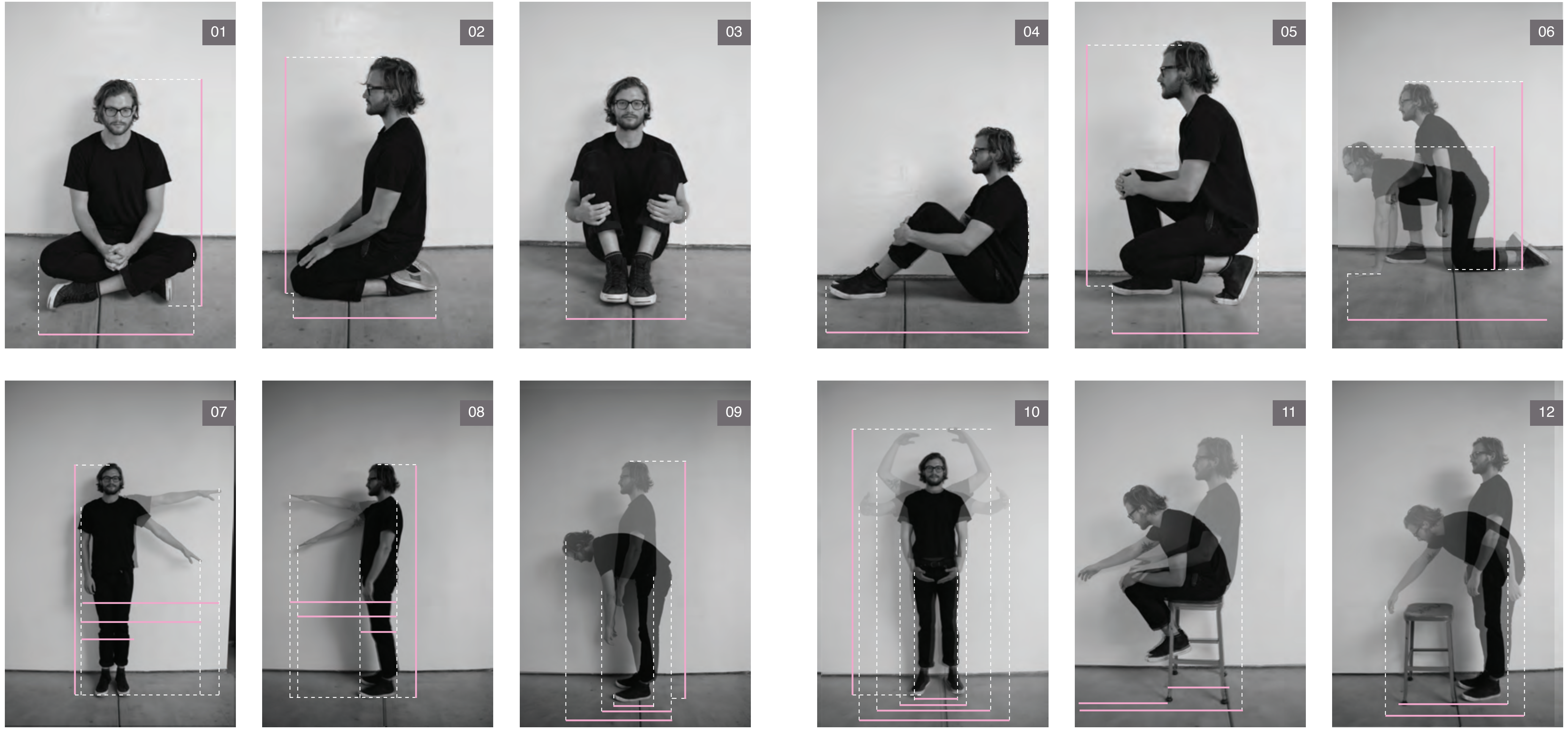

Hexagon


Pentagon

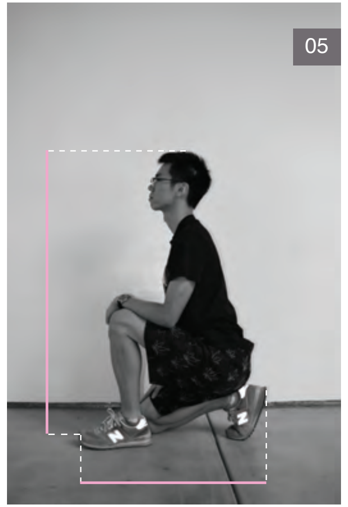
HUMAN COMFORT

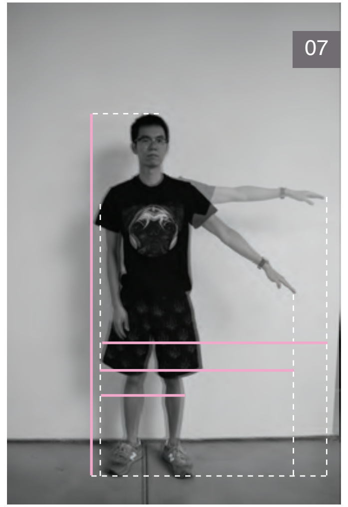
ASHER CAPLAN

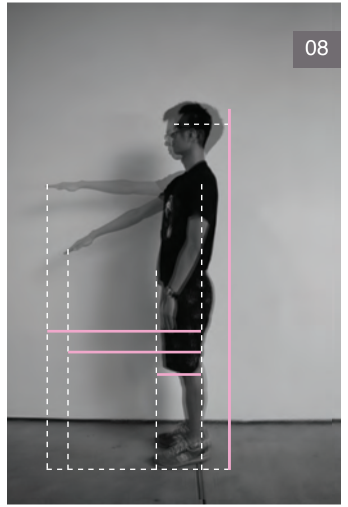
The photographs are based as a standard work in architecture from the German architect Ernest Neufert (1939). This deals with the measurability of the ideal human being in terms of spatial variables. To date Neufert's work is considered as a fundamental principle of standardized construction of space. The photographs are a series of how a human body defines space. This study will allow us to start defining certain spaces based on program for the HESTIA chamber, since there are no ADA requirements .

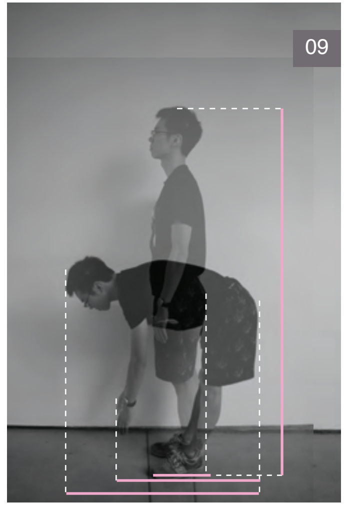


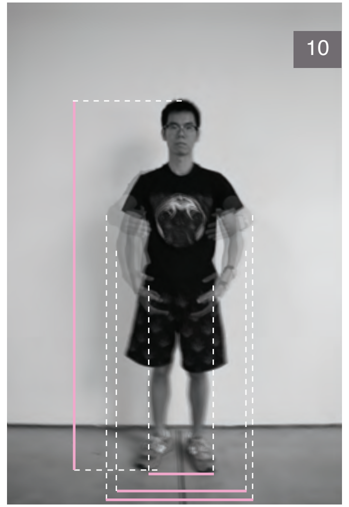
Yara Hadi







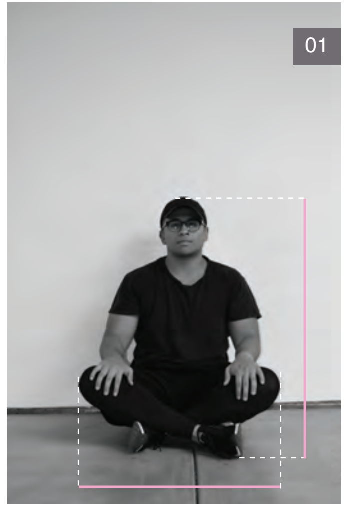


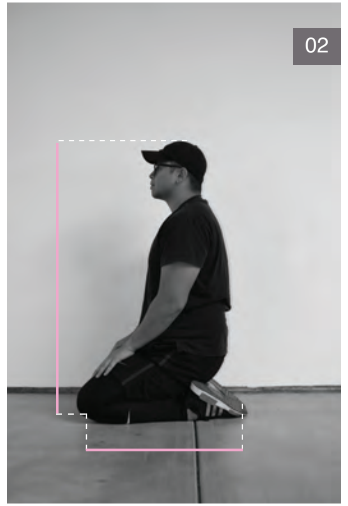


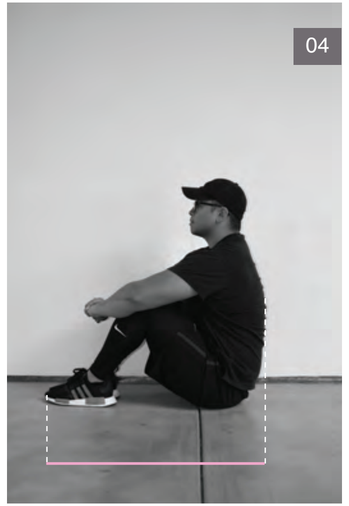
Baisen Jin

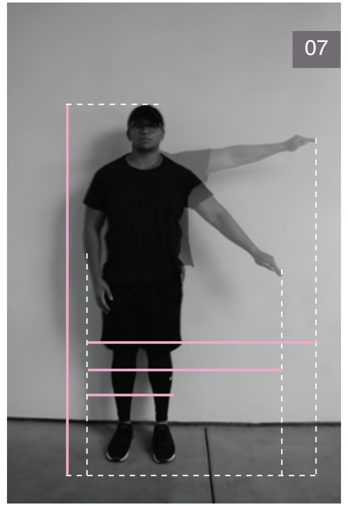
HUMAN COMFORT

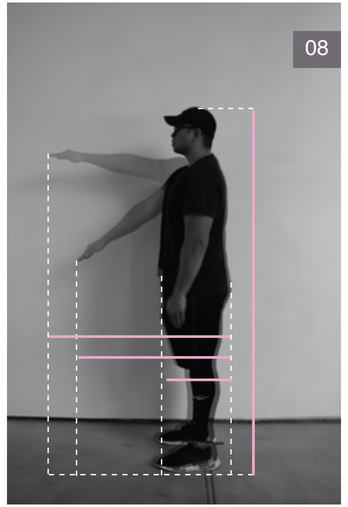
SEAN JACKSON

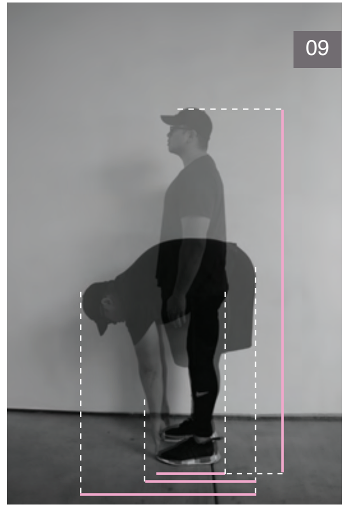


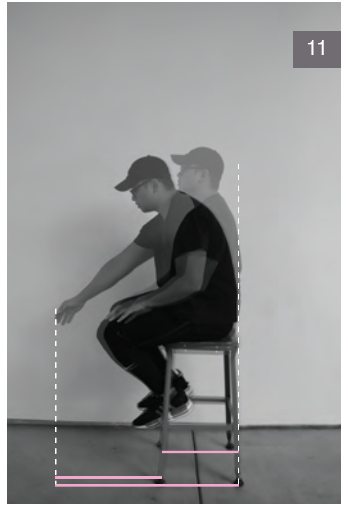


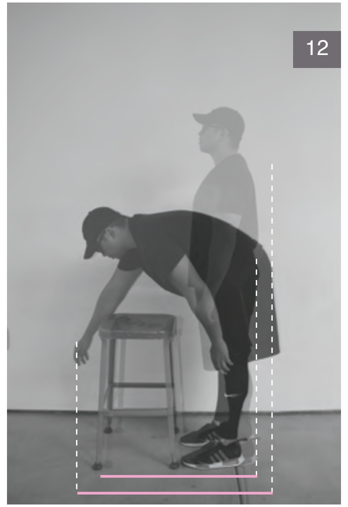




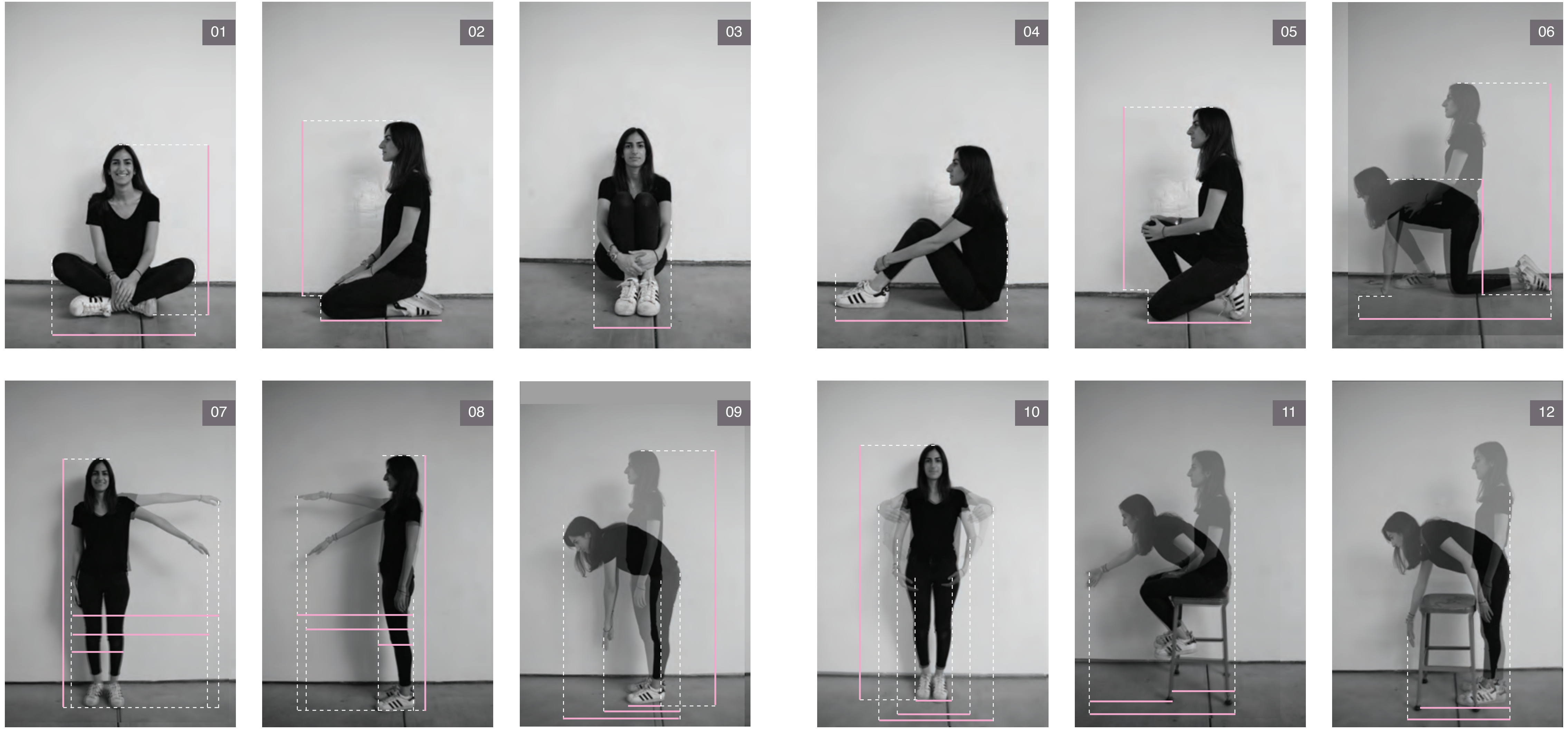








Yara Hadi



Yara Hadi

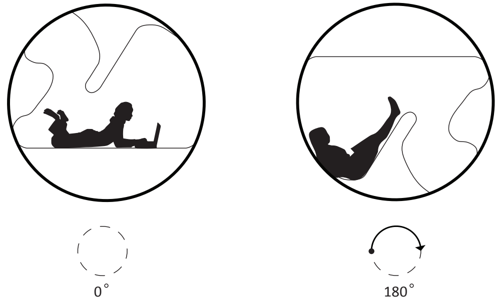
NANO HOUSES

ROLL IT EXPERIMENTAL HOUSING
Institute fur Entwerfenund Bautechnik
2011 161 sq ft

The cylindrical design is a modular prototype that provides flexible space within a minimum unit.

The design is broken up into 3 different zones that respond to different functional needs, and they are an exercise space, bedroom space and a kitchen space.

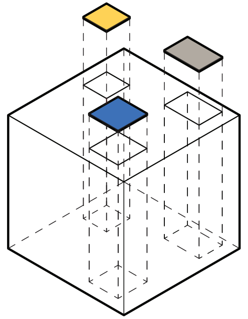
The curvature of the rings have carved out shapes that can re-adjust to the human body. These spaces are transformed as the cylinder is rotated.



PACO 3m3
Jo Nagasaka + Schemata Architecture Office
2009

“We want to make it independent, as a stand alone object. In order to achieve this, we need to make it technically infrastructure-free. It is technically possible, but not really practical in our society today. We as a designer present our vision as the first step to go beyond the gap.”

The diagram shows the carving out of voids of the cube, and it represents the decisions the architects made when designing these nano house. BY carving out these areas, it allows for the ability of a small space to hit its full potential as shown in the images.



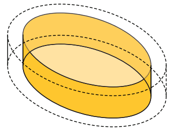
Sean Jackson

BLOB vB3
DMVA Architecten
2009
215 sq ft

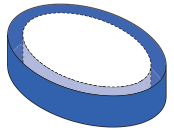
The blob has cubes within the interior of the blob that can be used for storage, for sleeping, and for privacy.

The perimeter is occupied by the program while the central space is flexible and acts as the circulation space, allowing for the space to have an open plan.

The occupied perimeter maximizes the possibilities of utilizing the space.



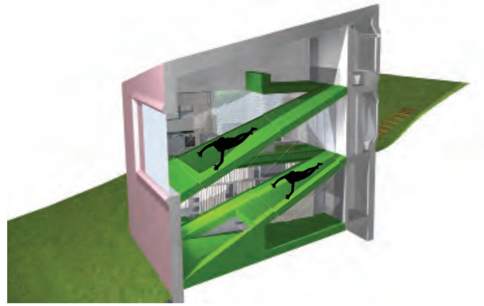
occupied by the user for circulation



occupied by the program

VILLA HERMINDA
HSH Architekti
2009
635 sq ft

“However, the use of the sloping floor is not purposeless - it is there on investors request to accommodate movie projections as a small movie theatre. Windows and other openings are placed with respect of the external facade - each of the walls only has one opening. For thermal and water insulation a polyurethanes spray with pink coat is used.”



Sean Jackson

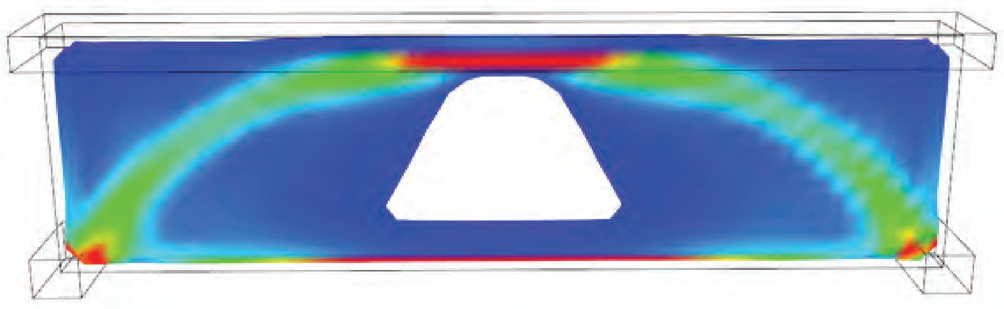
DESIGN CONCEPT

TOPOLOGICAL OPTIMIZA-TION

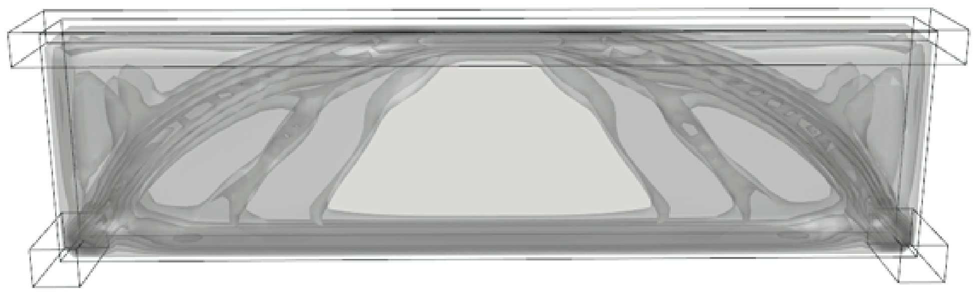
Topology optimization is a mathematical approach that optimizes material layout within a given design space, for a given set of loads and boundary conditions such that the resulting layout meets a prescribed set of performance targets.

[top]: Setup of boundary conditions for simple bridge that main volume + supports at the two lower corners and distributed load at the top. **[Middle]:** stress distribution and topology optimization contours. **[Bottom]** Inner contours represent regions where stronger material is required.

Frame Setting



Stress Distribution Analysis

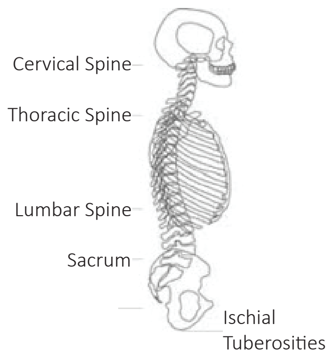


ERGONOMICS

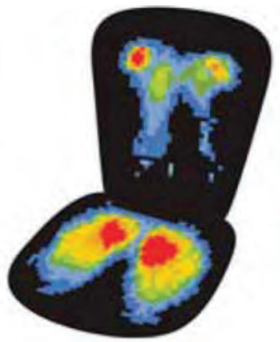
SCIENCE OF PRESSURE DISTRIBUTION

A chair should be topographically neutral. It should conform equally well to all body shapes, sizes, and contours without applying circulation-restricting pressure anywhere. While people of different body weights and builds distribute their weight on a chair in similar patterns, they are different when it comes to pressure intensity; this varies from person to person. The challenge is to engineer a chair so its structure and materials provide dynamic support. This allows the sitter's body, rather than the chair's structure, to dictate pressure distribution. (**See Human Skeleton Diagram**)

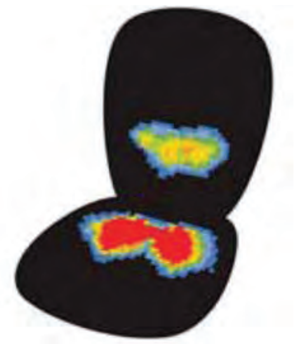
Pressure mapping shows how seated body pressure is distributed. **Red** indicates peak pressure areas; **orange**, **yellow**, **green**, **blue**, and **purple** indicate decreasing pressure areas.



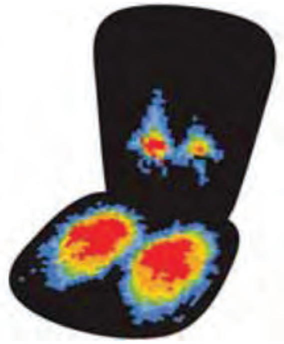
Human Skeleton Diagram



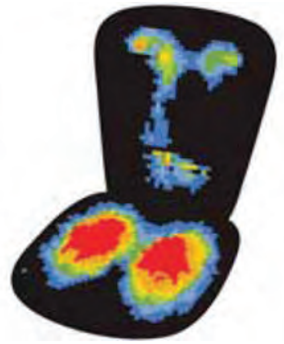
1. Good pressure distribution in a chair focuses peak pressure under the sitting bones in upright postures and in the lumbar and thoracic areas in reclined postures.



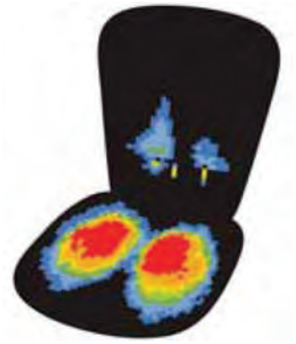
2. Sitting in a sling-type chair puts pressure on the gluteus maximus muscles at the sides of the buttocks as well as on the heads of the femur bones and sciatic nerves.



3. Sitting in an upright position in a chair with lumbar support shows bands of pressure
Where the lower back comes in contact with the lumbar support



4. Sitting in an upright position in a chair with postural support distributes pressure
Across the sacral-pelvic, lumbar, and thoracic areas.



5. Sitting in an upright position in a chair without postural support limits the distribution of pressure across the sacral-pelvic, lumbar, and thoracic areas.

Baisen Jin

COMPARATION

THE FURNITURE FOR EARTH AND MARS

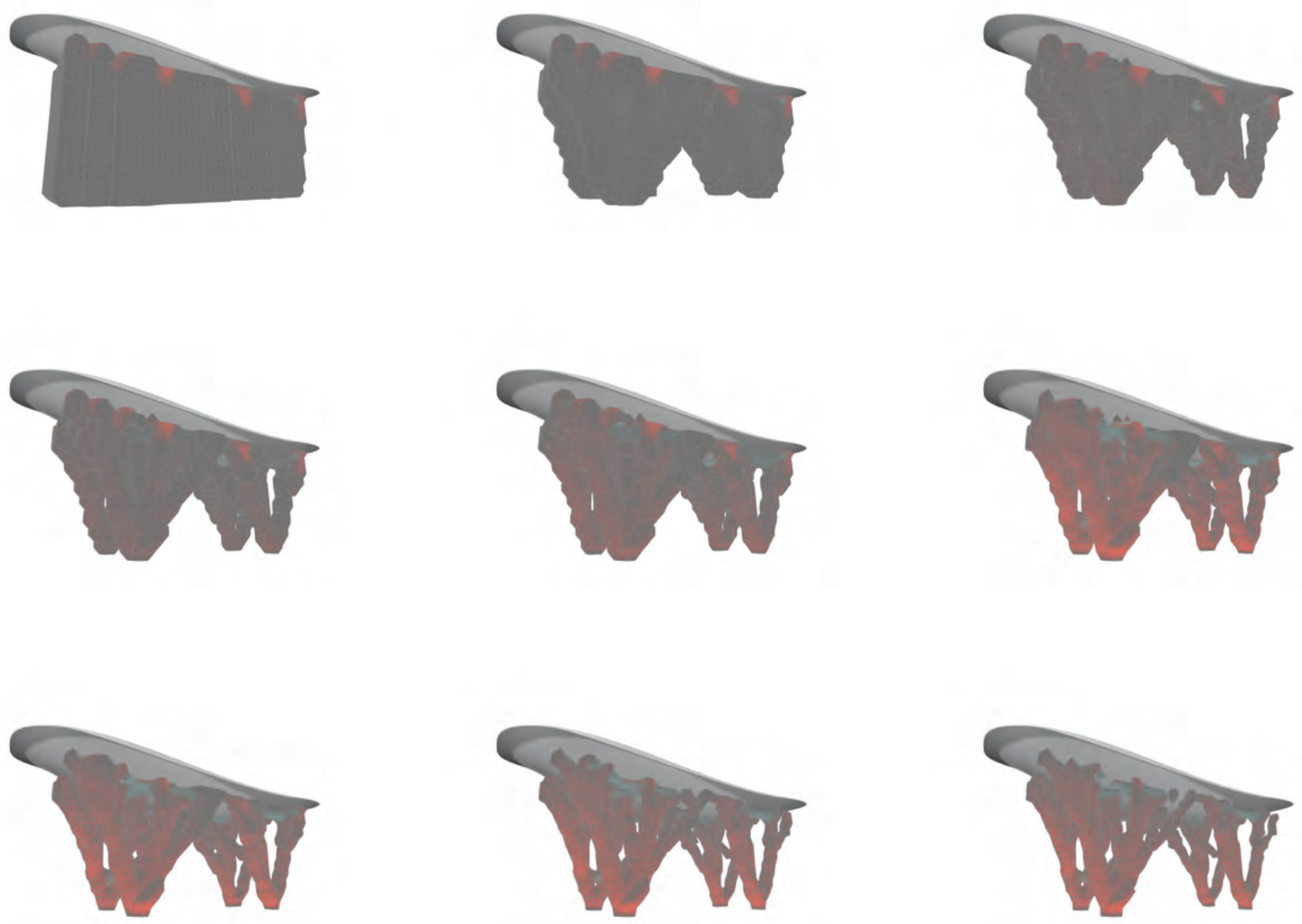
Since Mars has less mass than Earth, the surface gravity on Mars is less than the surface gravity on Earth. The surface gravity on Mars is only **about 38% of the surface gravity on Earth**, so if you weigh 100 pounds on Earth, you would weigh only 38 pounds on Mars.

The Topological Optimized Bed should be designed **62% lighter** on Mars than on Earth based on Gravity.

Optimized Chair on Earth

Optimized Chair on Mars

OPTIMIZATION



SELF-ASSEMBLY

THE 1000-ROBOT SWARM

Through commands, autonomous devices arrange selves into vast, complex shapes

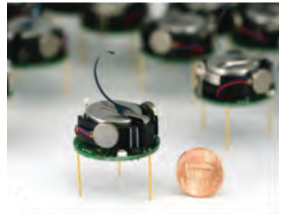
Wyss Institute, SEAS, at Harvard

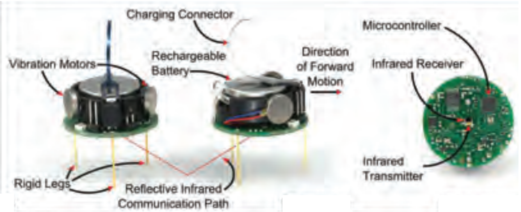
http://news.harvard.edu/gazette/story/2014/08/the-1000-robot-swarm/

Most notably, the Kilobots require no micromanagement or intervention once an initial set of instructions has been delivered. Four robots mark the origin of a coordinate system. All the other robots receive a 2-D image to mimic, and then, using very primitive behaviors — following the edge of a group, tracking a distance from the origin, and maintaining a sense of relative location — they take turns moving toward an appropriate position. With co-author Alejandro Cornejo, a postdoctoral fellow at Harvard SEAS and the Wyss Institute, the researchers demonstrated a mathematical proof that the individual behaviors would lead to the right global result.

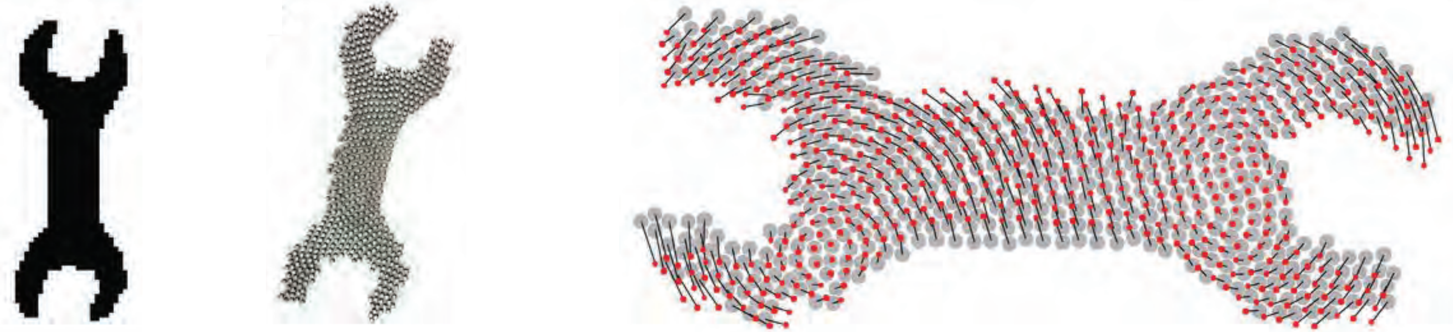
Mimicry

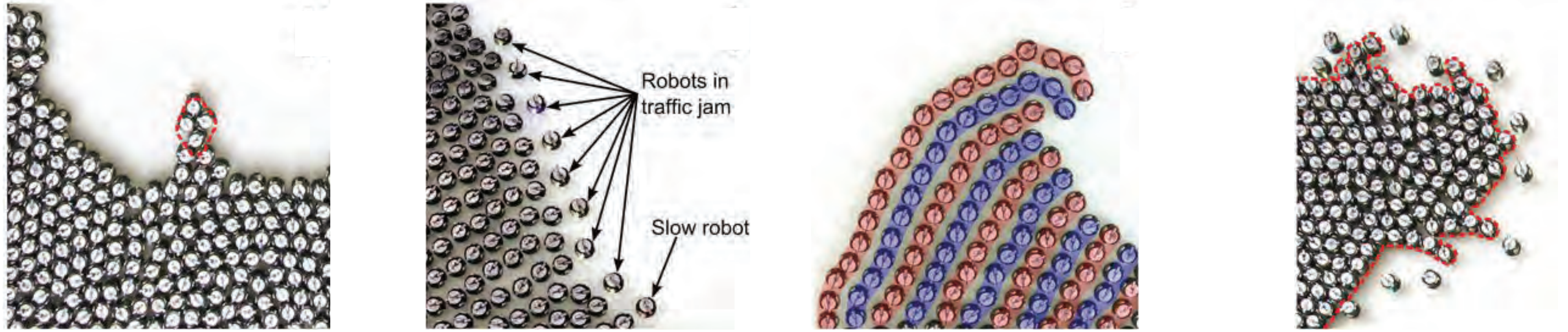
1000 Robots





SELF-ASSEMBLY



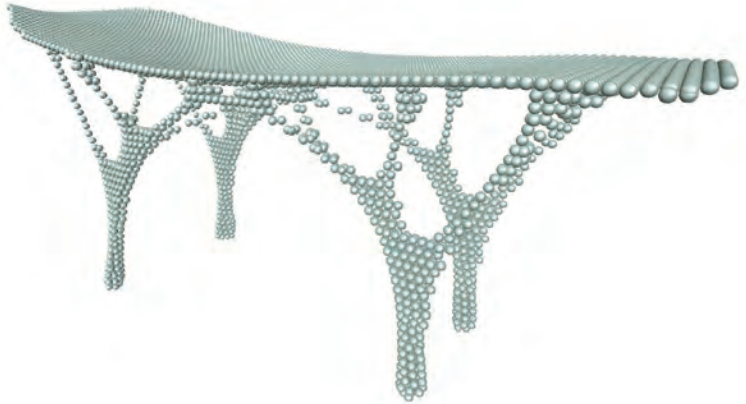


APPLICATION

THE SELF-ASSEMBLY ROBOTS FURNITURE

Taking the **self-assembly robots** idea from **Harvard Research**, I am projecting this “2-dimensional” idea into a **3-dimensional coordination** system, the **modularized robots** will **swarm** to a **designated geometry**, to self-assembly the furniture as needed. For carrying a certain amount volume of the mini robots into **space/Mars**, which can shape all kinds different furnitures, exercising equipments, saving both a large amount of **volume** and **weight** for **space missions** instead of carrying a bunch of different heavy equipments and furnitures.

Topological Optimized Bed



Robots Self-Assembled Bed

PROCESS

MODEL

THE MODEL OF OPTIMIZED BED

Aerial view

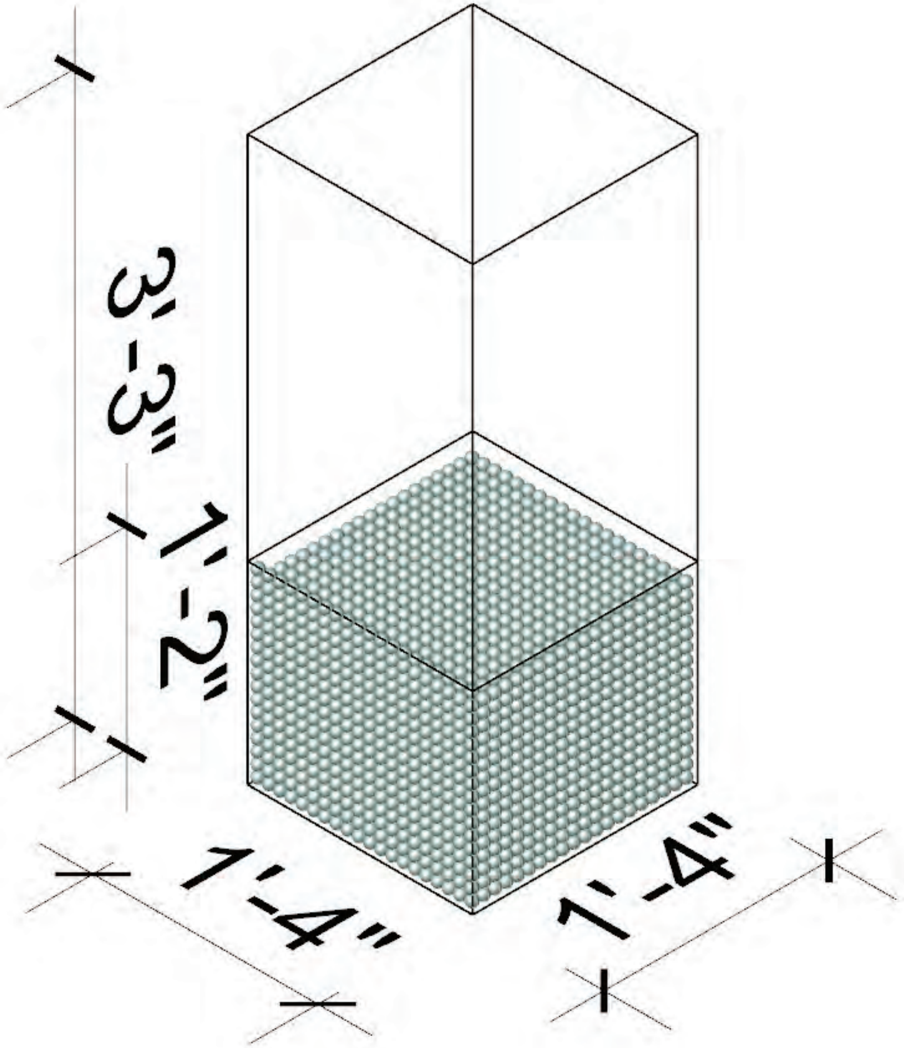
Side view

Front view

Back view

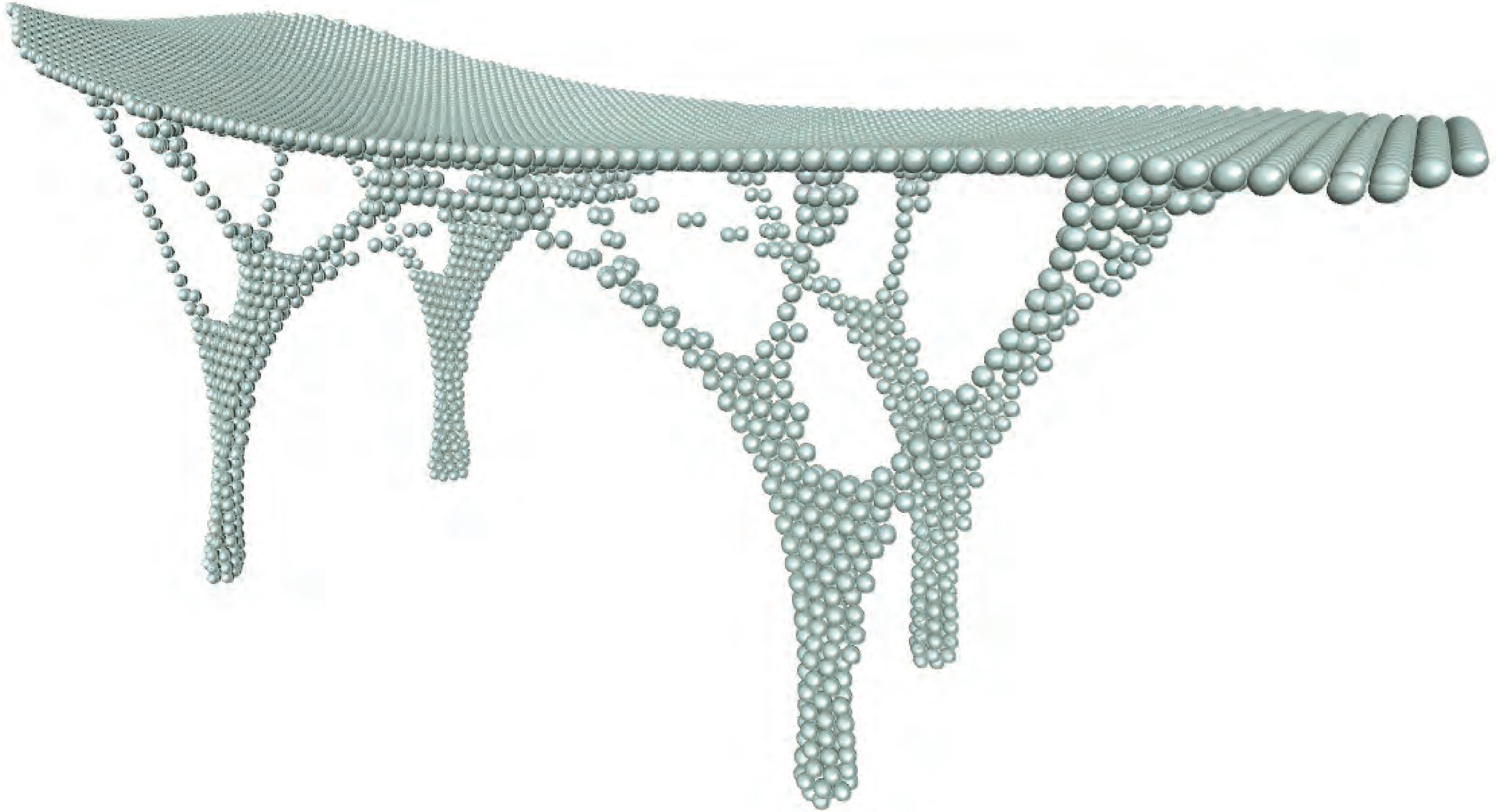
MEASUREMENT

THE VOLUME OF ROBOTS TO SHAPE A OPTIMIZED TABLE



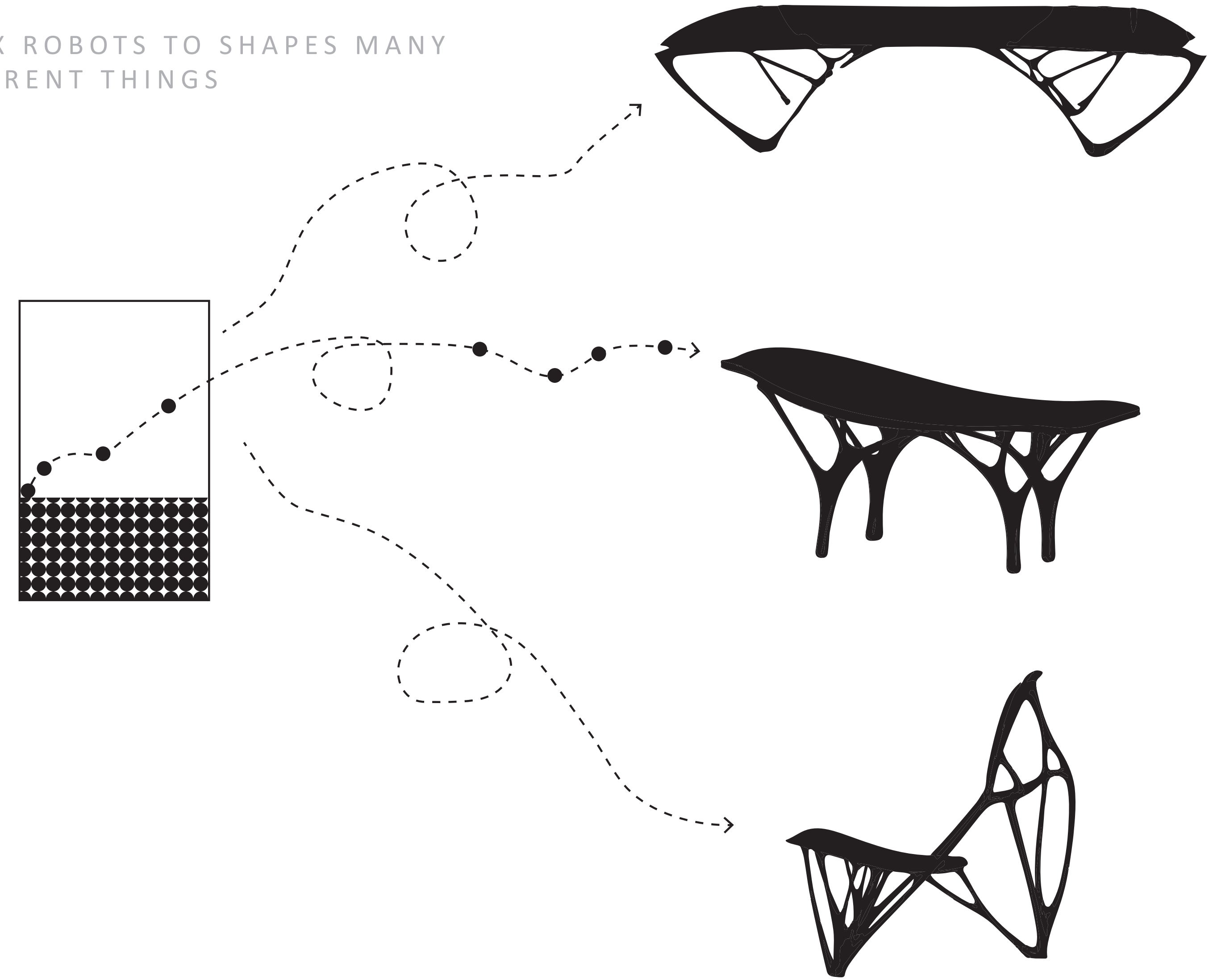
MEASUREMENT

THE VOLUME OF ROBOTS TO SHAPE A OPTIMIZED TABLE



CONCEPT

A BOX ROBOTS TO SHAPES MANY DIFFERENT THINGS



CONCEPT

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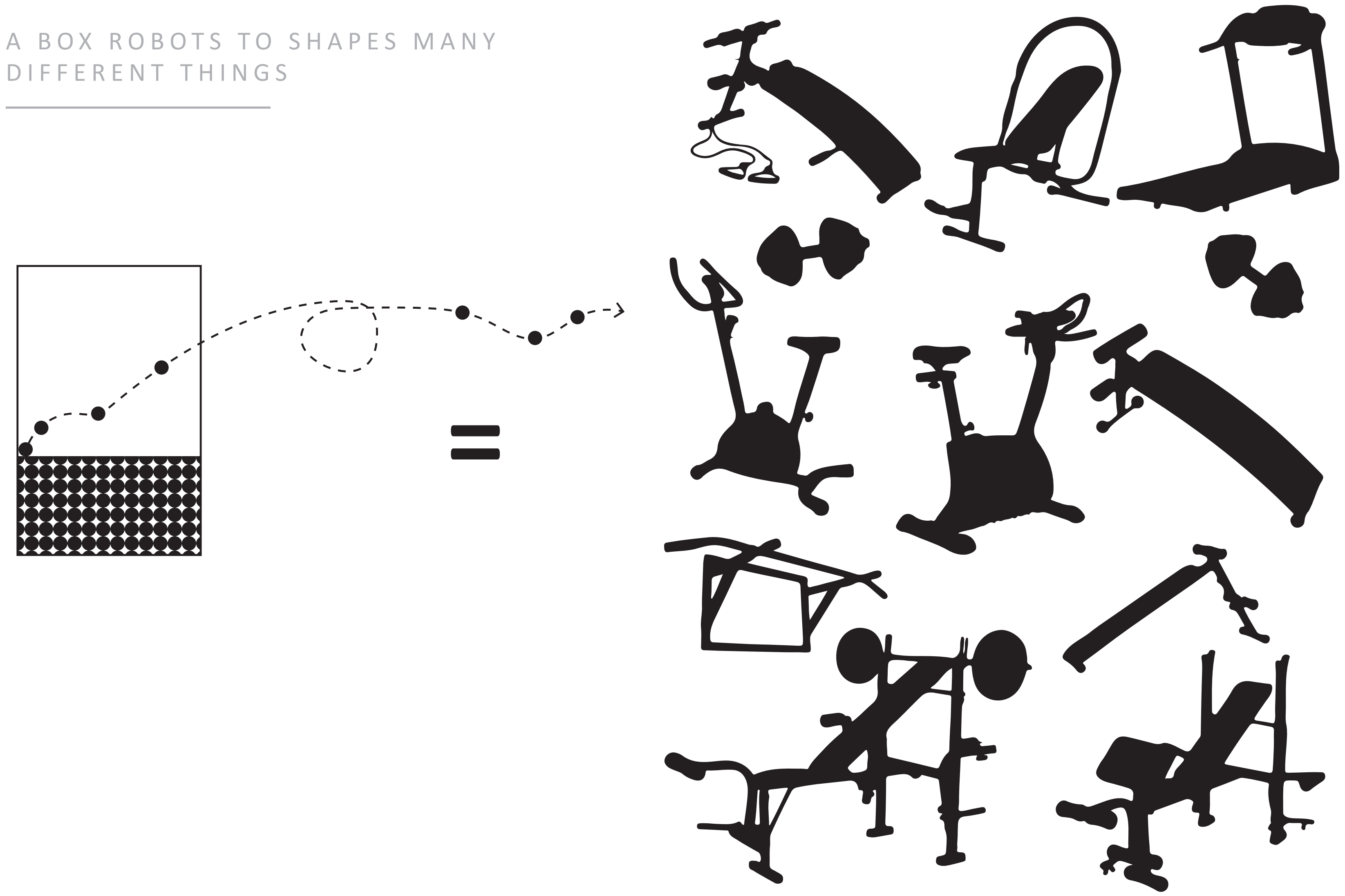
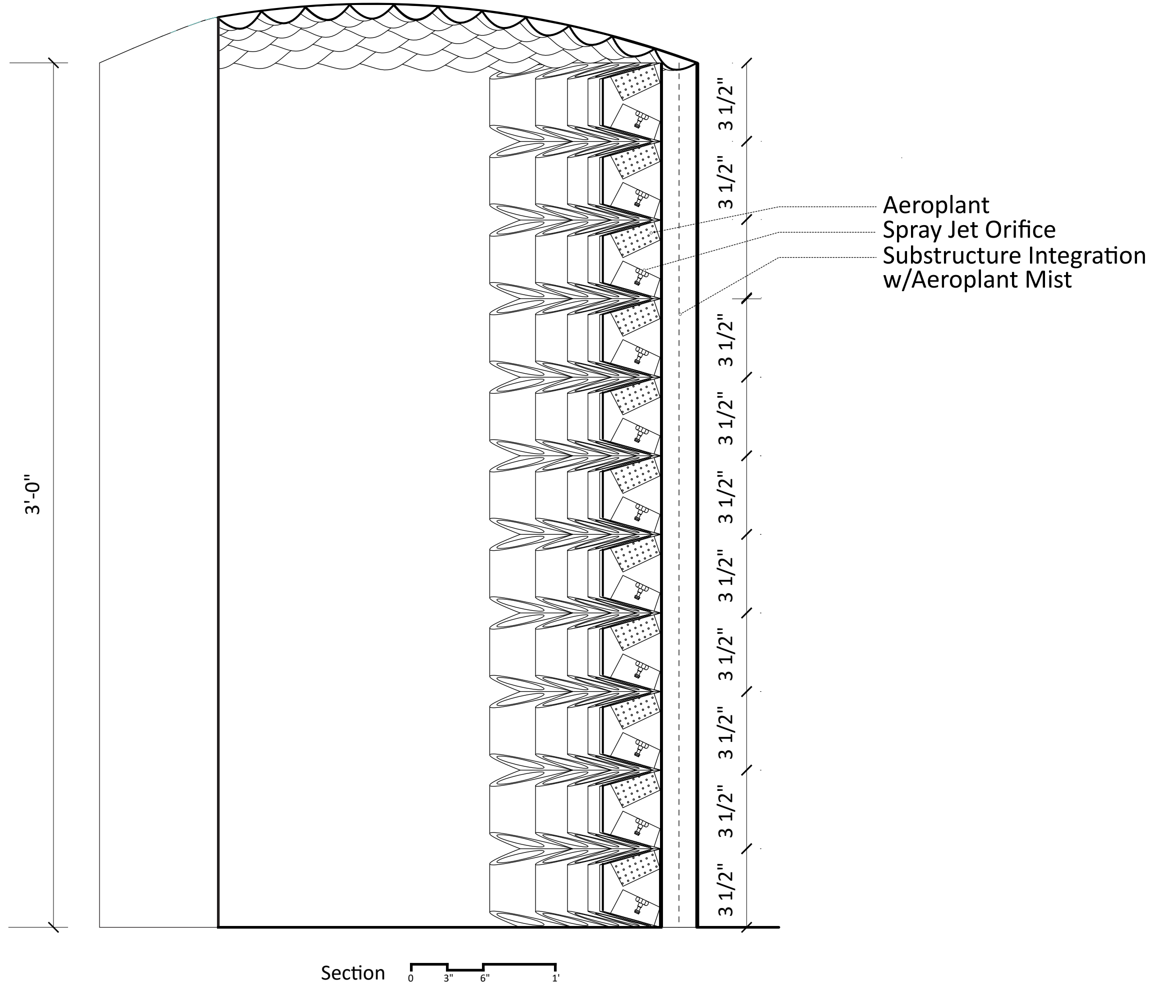
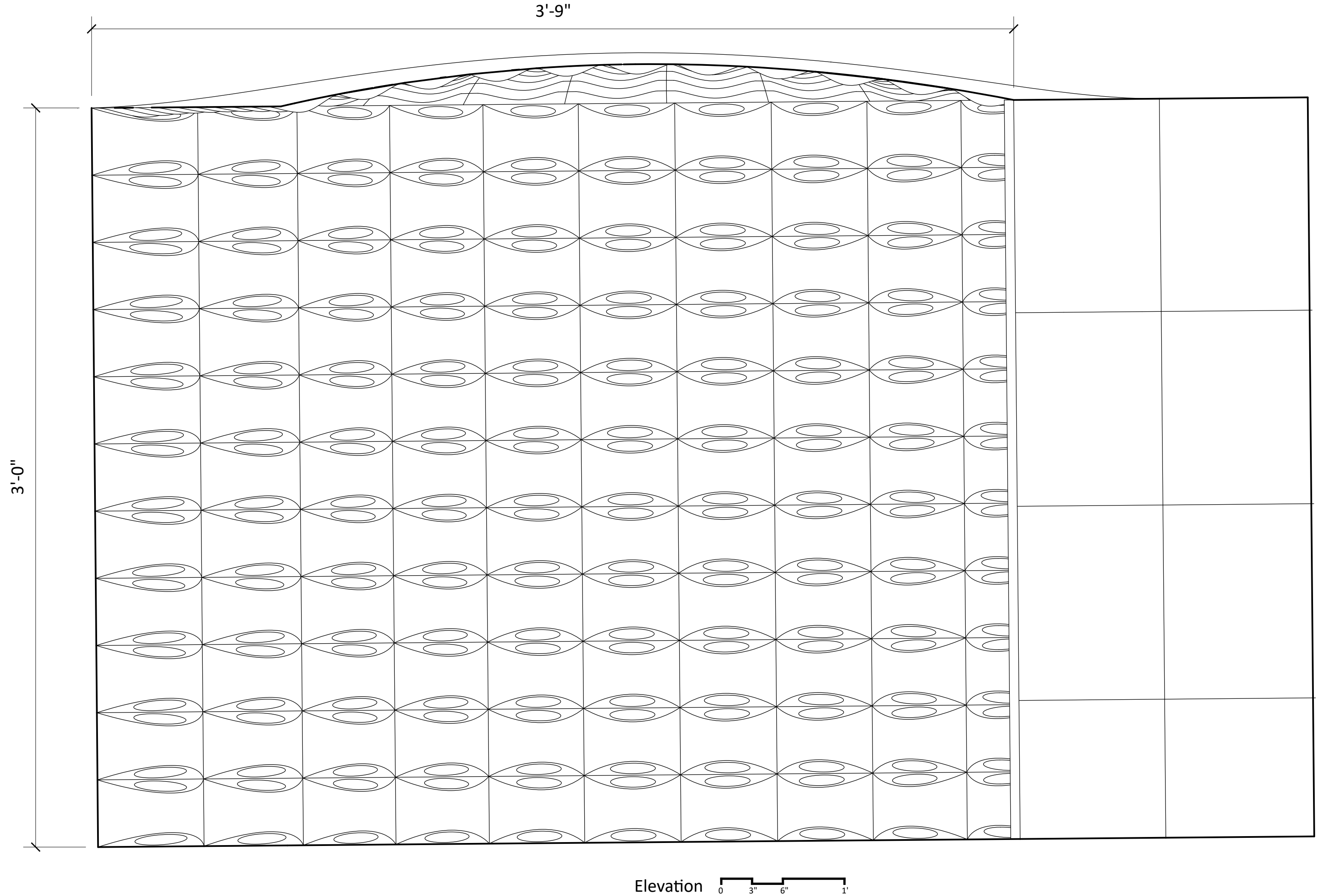


SPACE GARDEN

SECTION + ELEVATION



Section

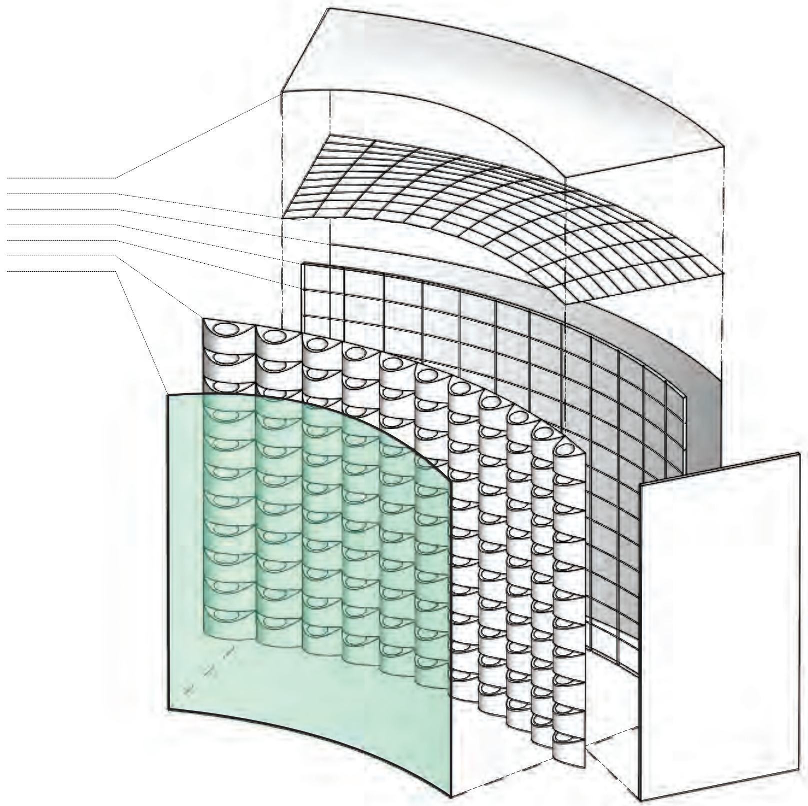


Elevation

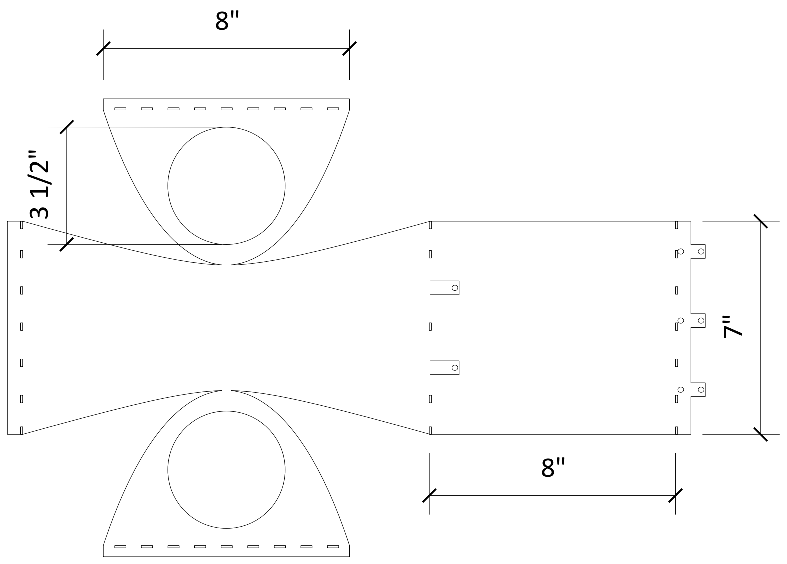
Asher Caplan

SPACE GARDEN

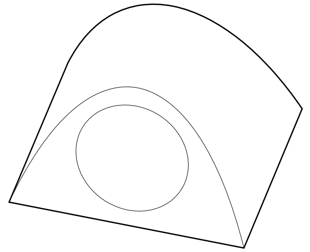
DETAILS



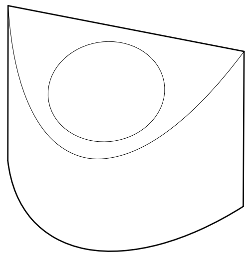
Explode Axon



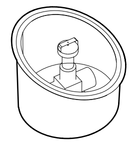
Unfolded for Lasercut Plastic



Spray Jet Recess

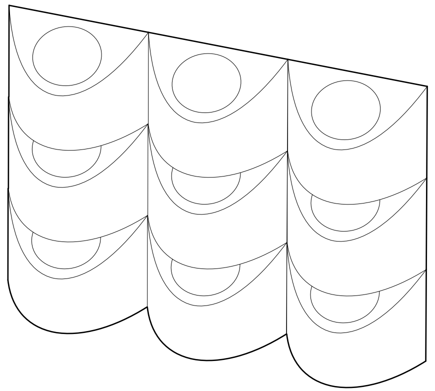


Aeroplant Void

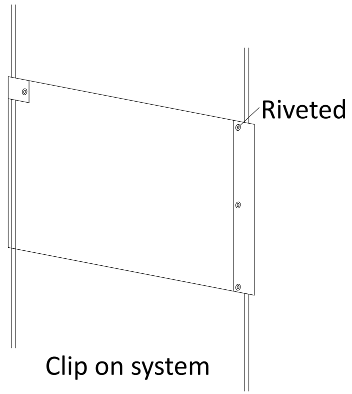


Spray Jet Orifice

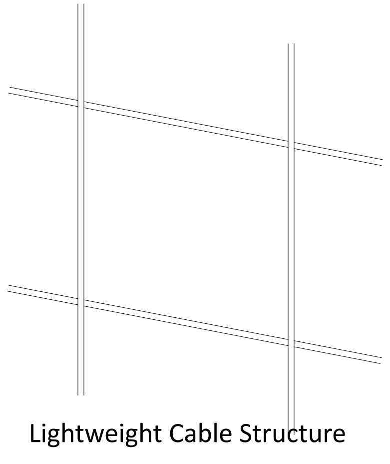
Aeroplant Void



Self-supported Weight Distribution



Clip on system

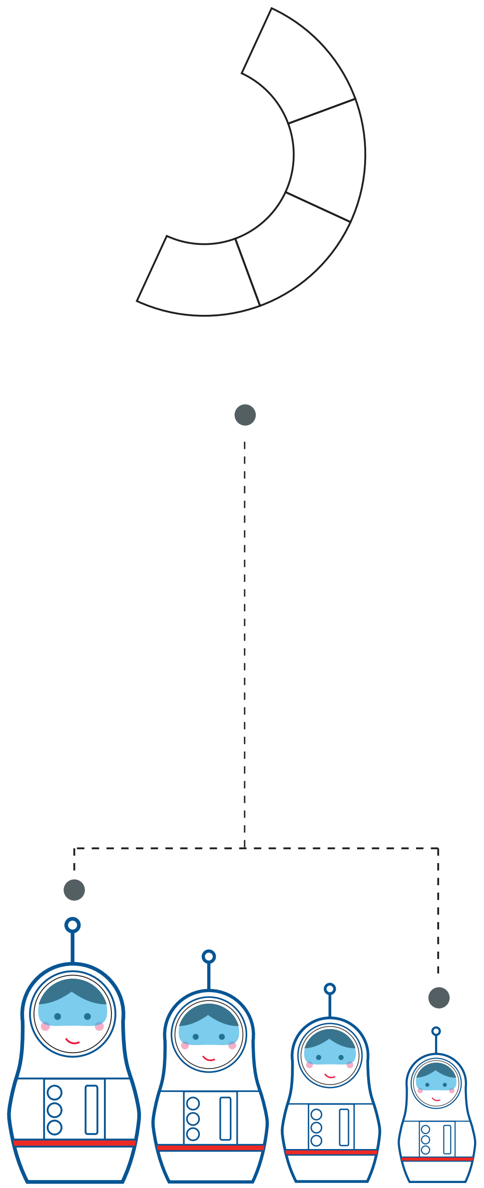


Lightweight Cable Structure

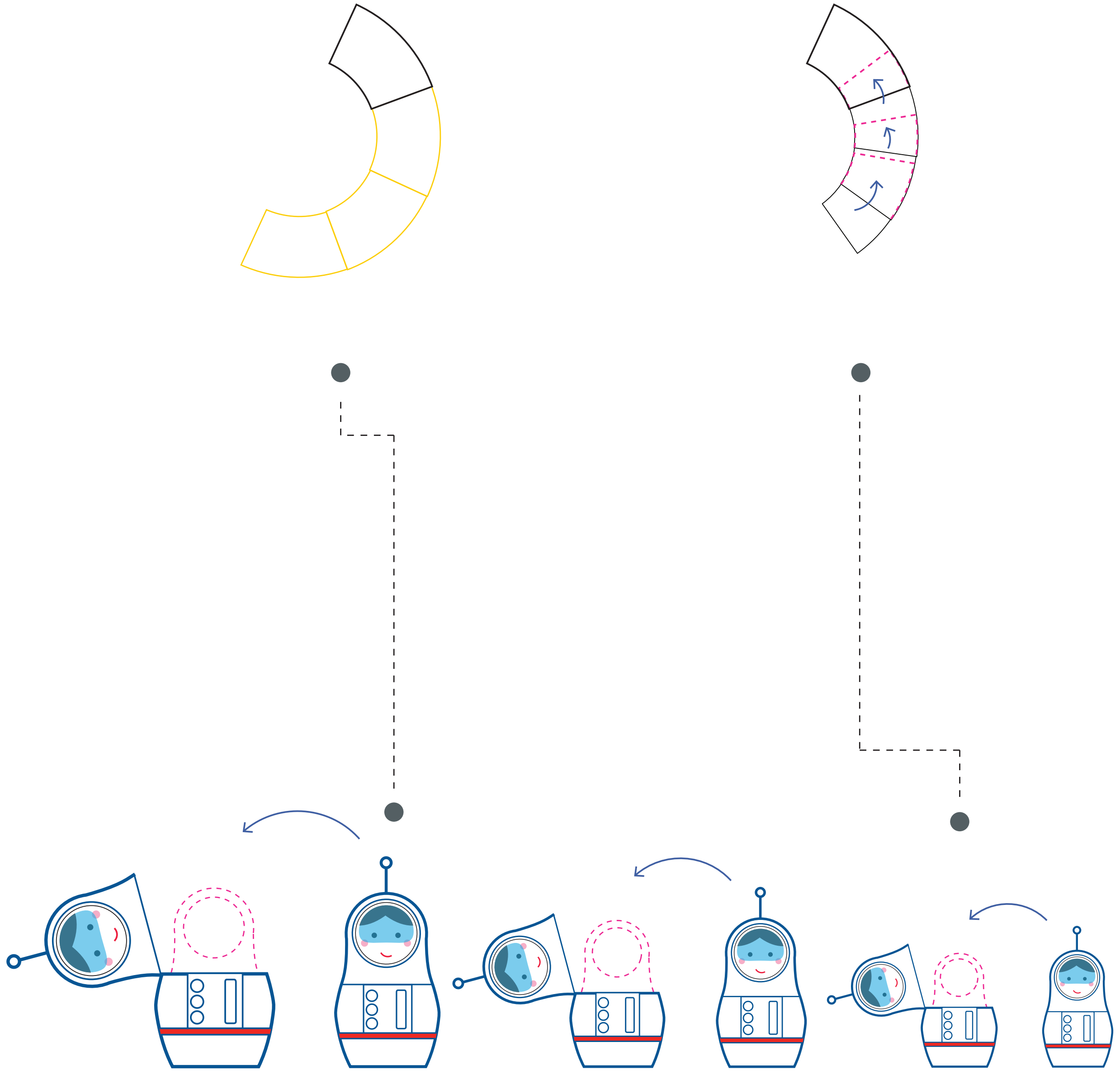
CENTRAL TABLES

RUSSIAN DOLL CONCEPT

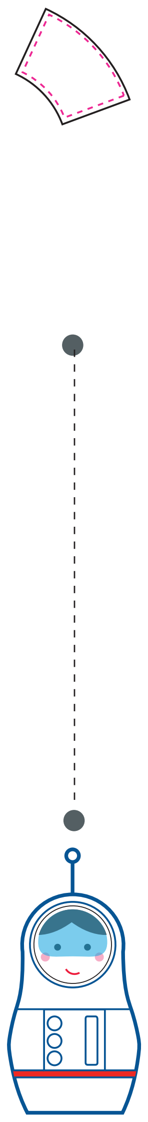
The russian doll concept is a concept to save and make use of a small space. The rounded edged tables follow the outline of the of the chamber as well as the design scheme, keeping it consistant. Each table is a quarter inch smaller to allow for them to fit into each other. This allows the user more freedom with shaping the space they want to work in as well as relax and have fun in. The same concept is used for the stools. Three tables and four stools can all fit into the largest table to allow for a larger central space.



Russian Doll Concept



Each Russian Doll is Able to Fit to the Next Russian Doll

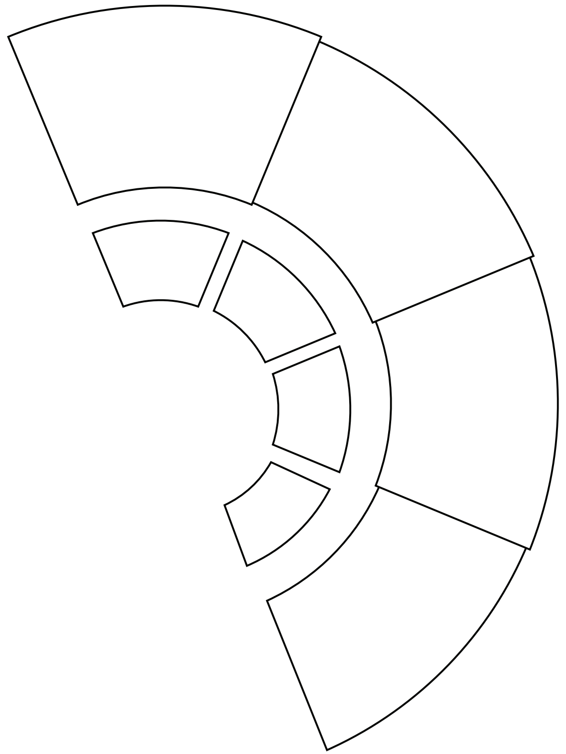


Ending up with One Russian Doll

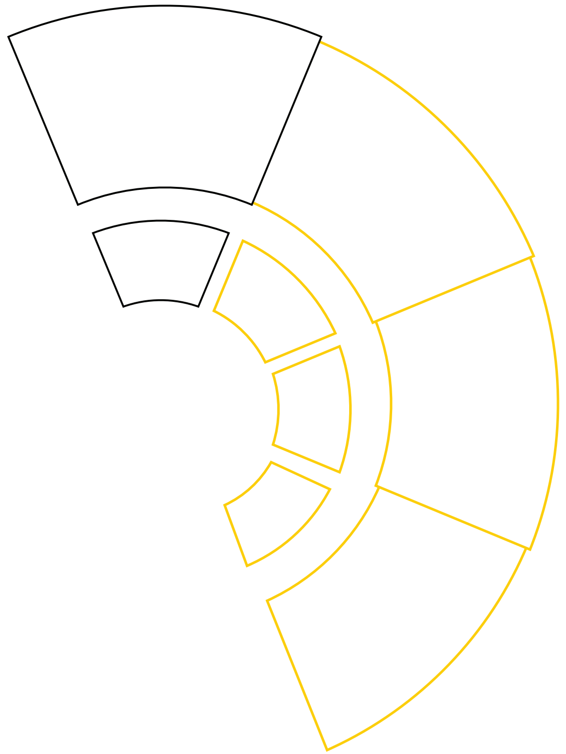
Yara Hadi

CENTRAL TABLES

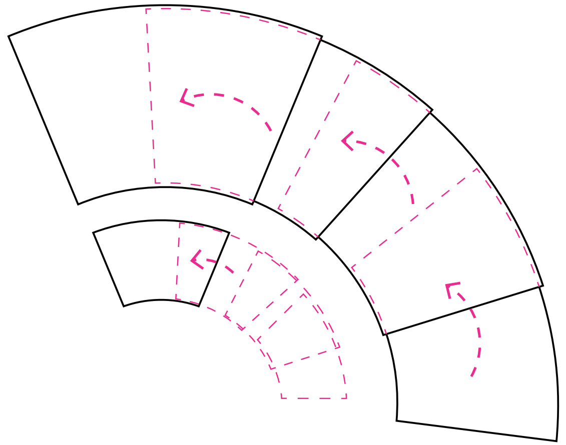
CHANGES THROUGH TIME



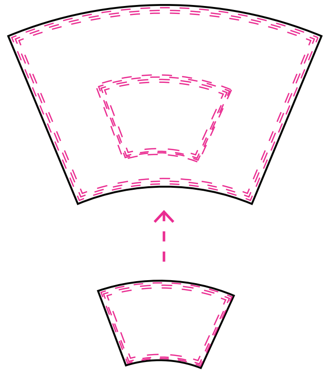
Roof Plan of all Four Tables and Chairs



Adjustable Tables and Chairs Based on Users Needs



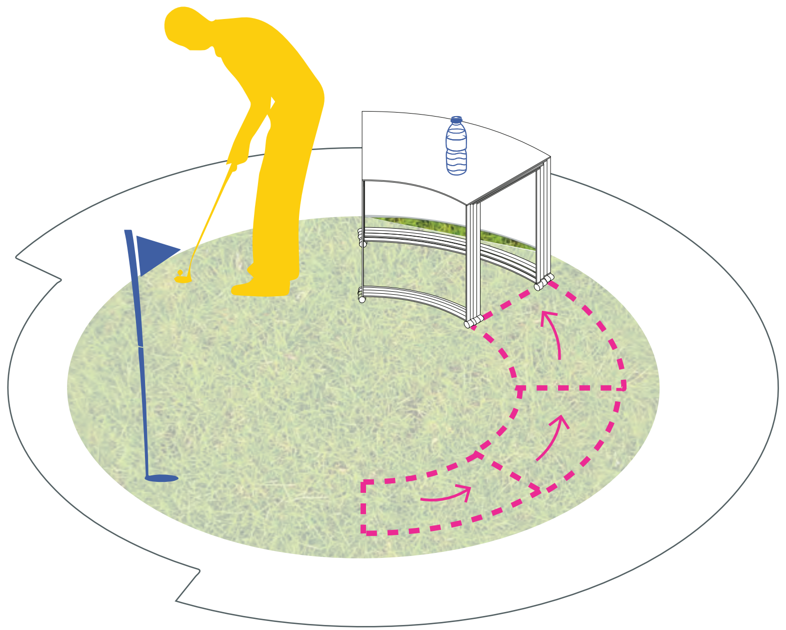
Each Table and Chair Fits into the Adjacent Table



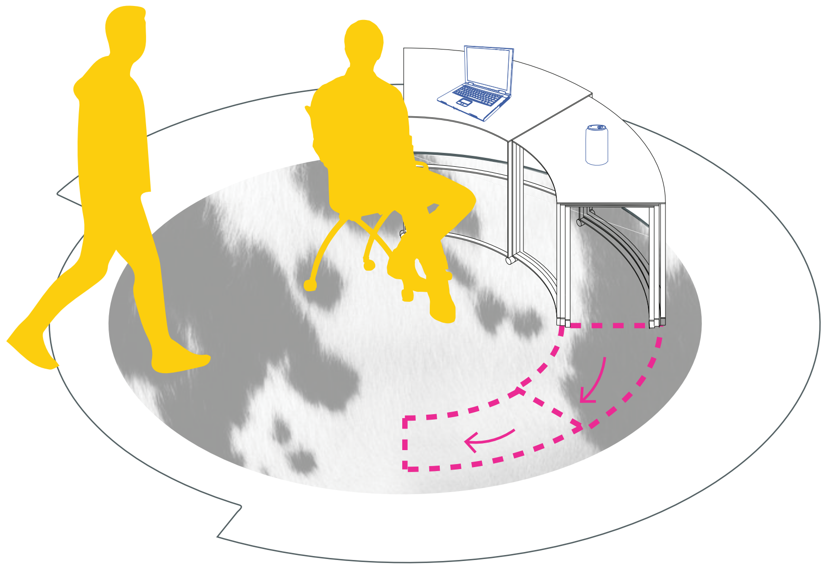
All Tables and chairs can Fit into the Largest Table

CENTRAL TABLES

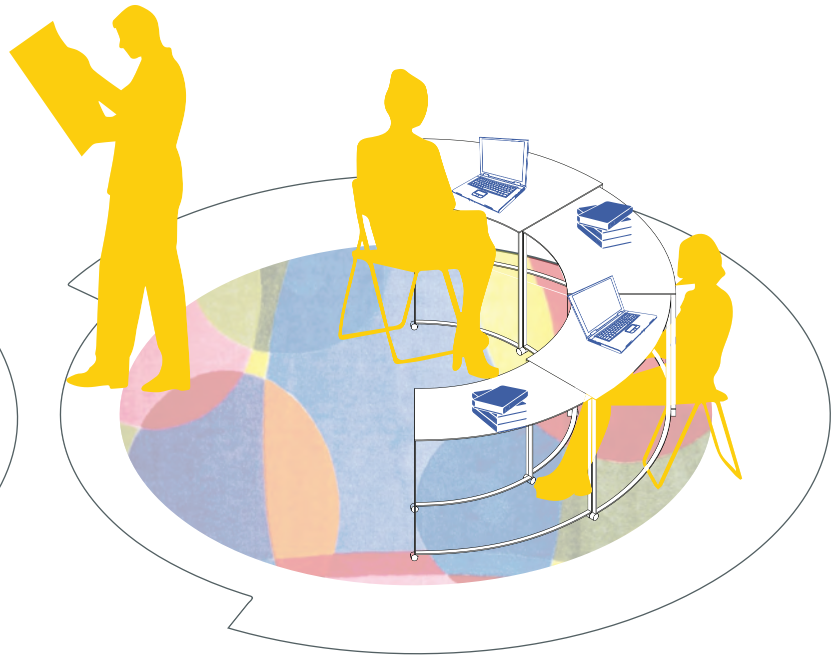
RUSSIAN DOLL CONCEPT



THE SQUARE FOOTAGE IN THE CENTER CAN BE EXPANDED BY THE MOVEMENT OF PUSHING THE MODULAR TABLES. THIS ALLOWS FOR MULTIPLE ACTIVITIES IN THE CENTRAL ACTIVITIES.



THE SPACE CAN ALSO BE TRANSFORMED INTO A PLACE FOR GATHERING AND DINING BY PULLING OUT THE MODULAR TABLES.

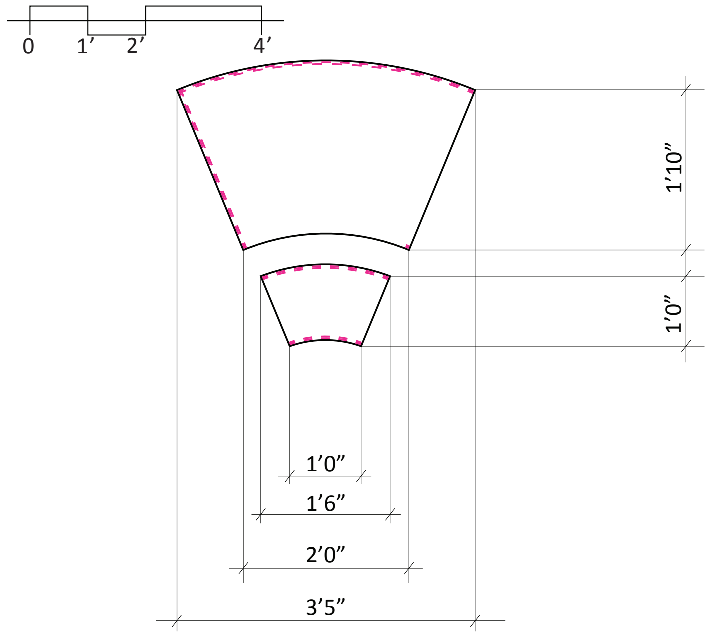


THE CENTRAL SPACE CAN BE OCCUPIED BY ALL INDIVIDUALS FOR LAB, RESEARCH, AND WORK SPACE. THE MODULAR TABLES ALLOW FOR A TRANSFORMABLE SPACE.

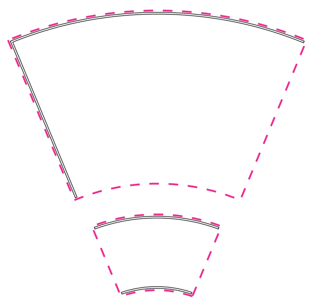
TABLE + CHAIR DESIGN A

TABLE A

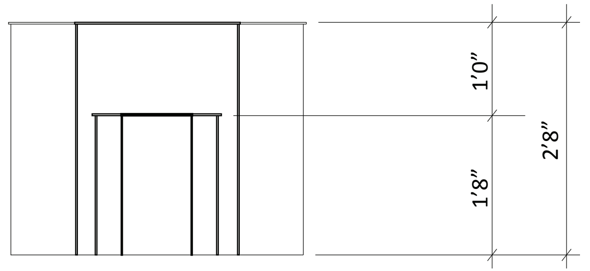
SCALE 1/2” = 1’



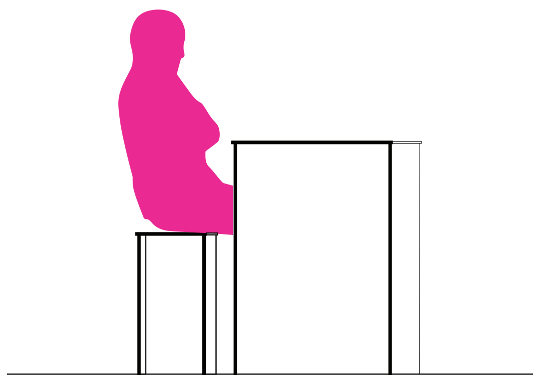
Roof Plan



Plan

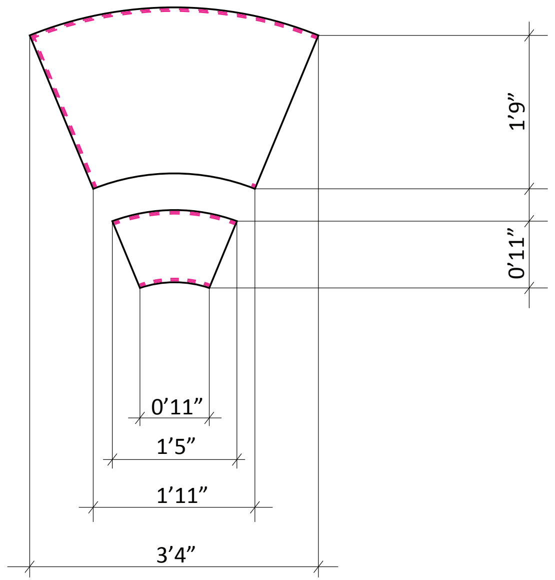


South Elevation

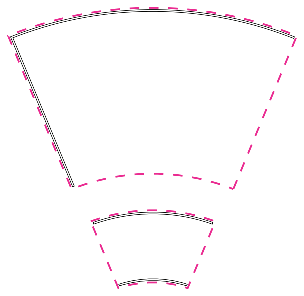


East Elevation

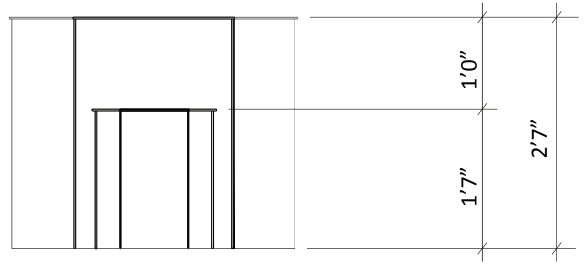
TABLE B



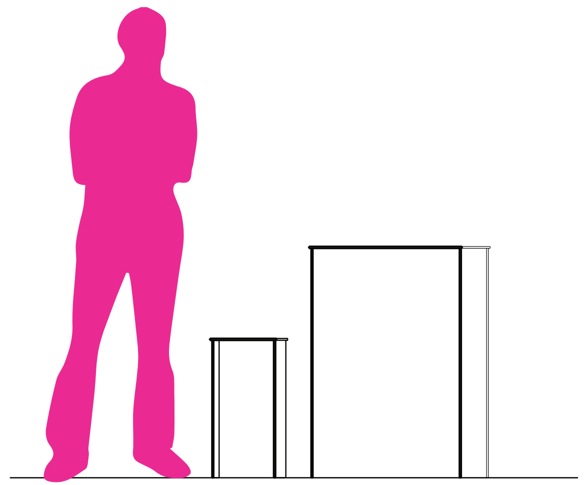
Roof Plan



Plan



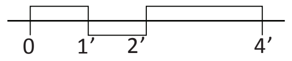
South Elevation

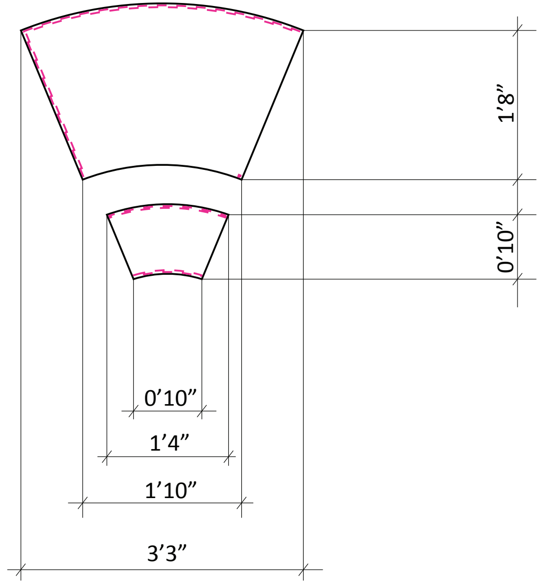


East Elevation

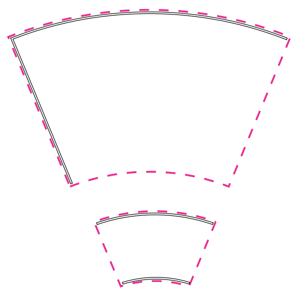
TABLE C

SCALE 1/2” = 1’

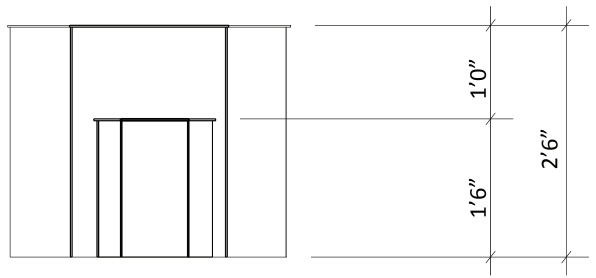




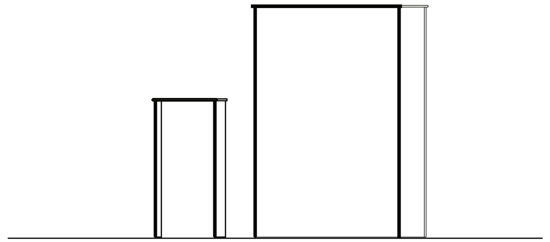
Roof Plan



Plan

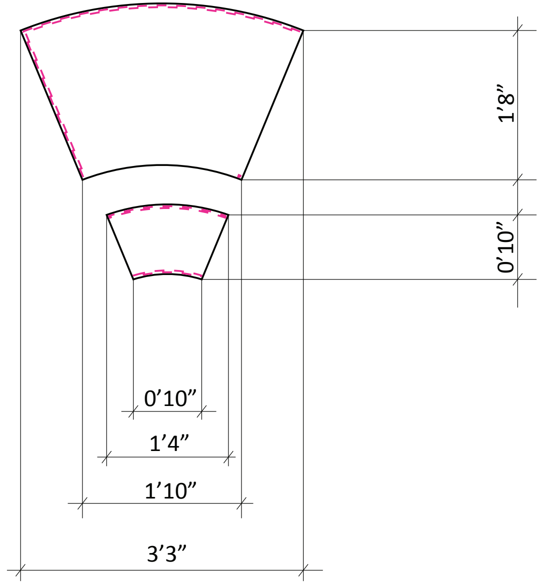


South Elevation

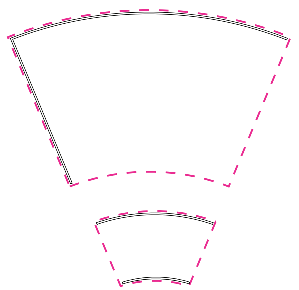


East Elevation

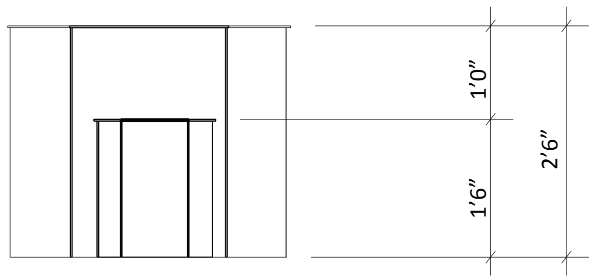
TABLE D



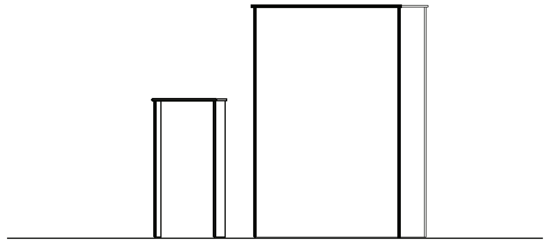
Roof Plan



Plan



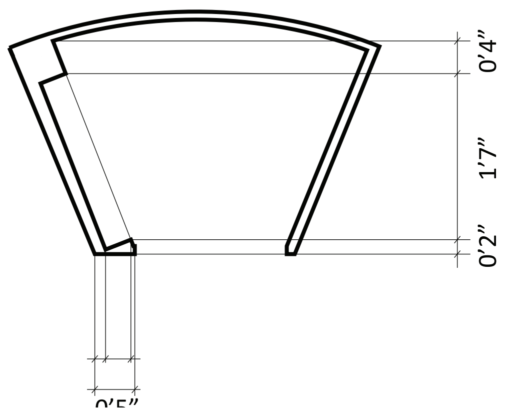
South Elevation



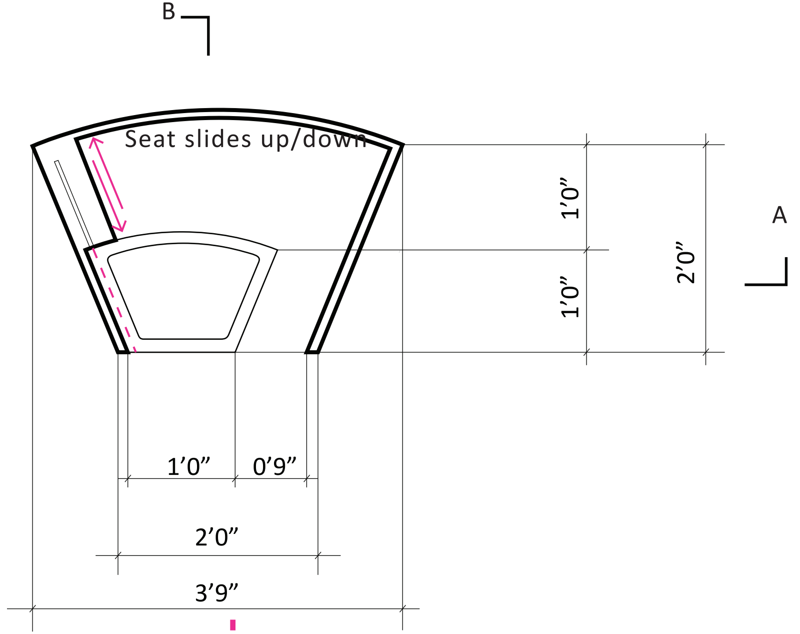
East Elevation

TABLE + CHAIR DESIGN B

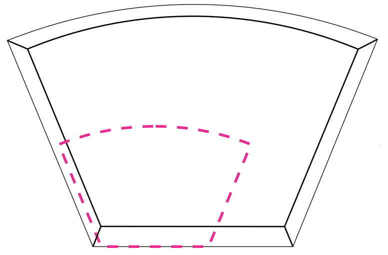
PLANS



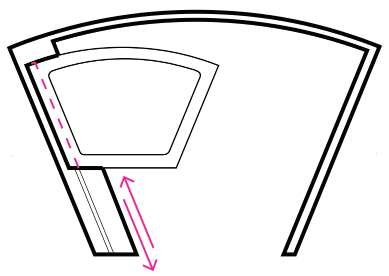
Plan at 18"



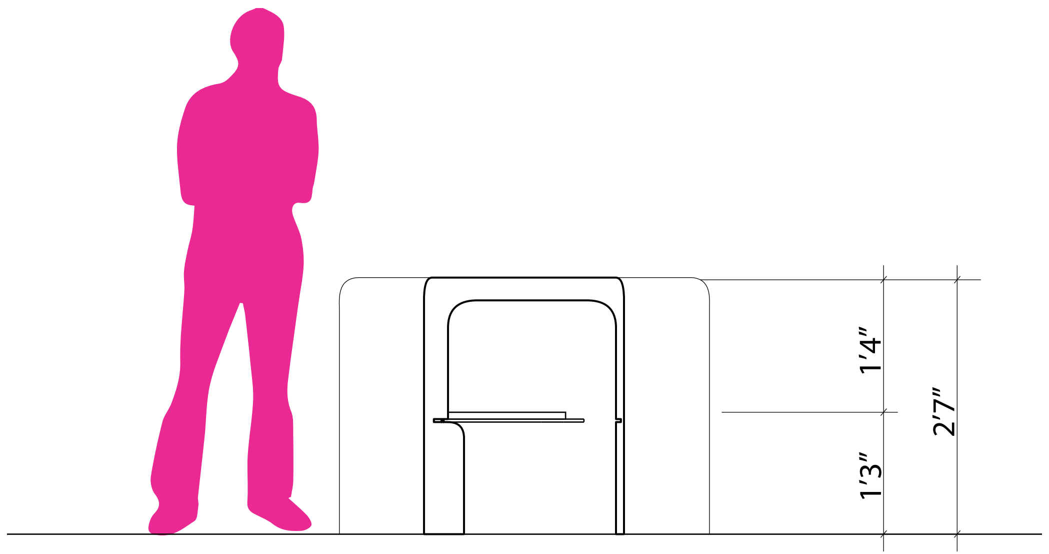
Plan at 10"



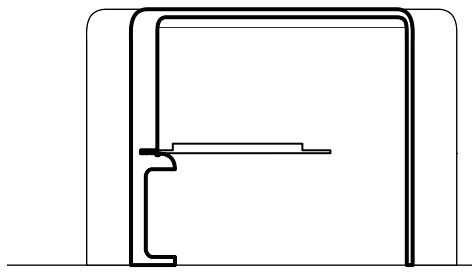
Plan at 18"



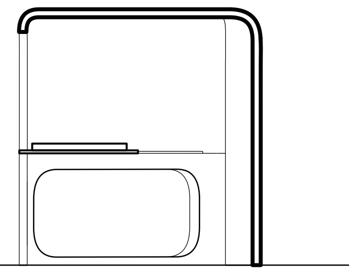
Plan at 10"



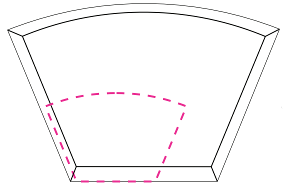
South Elevation



Section A



Section B



One Table Vs. Four Tables

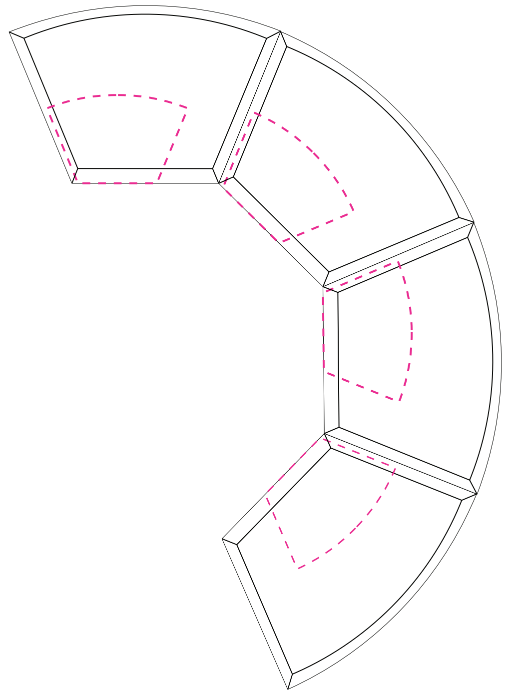
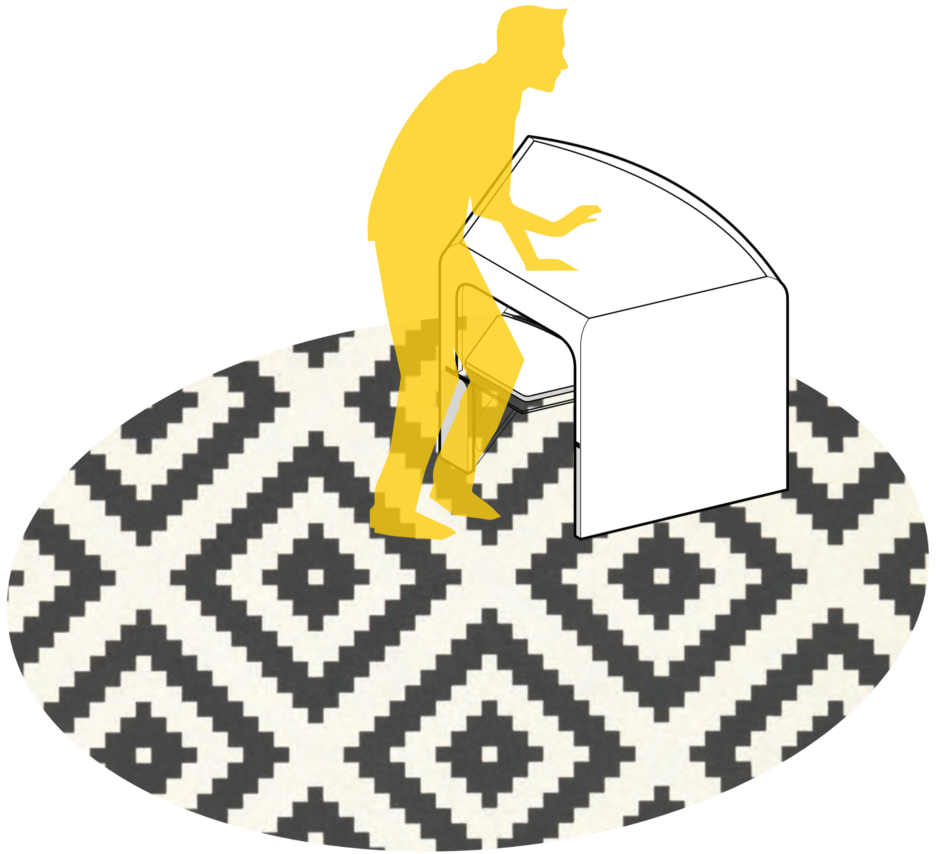
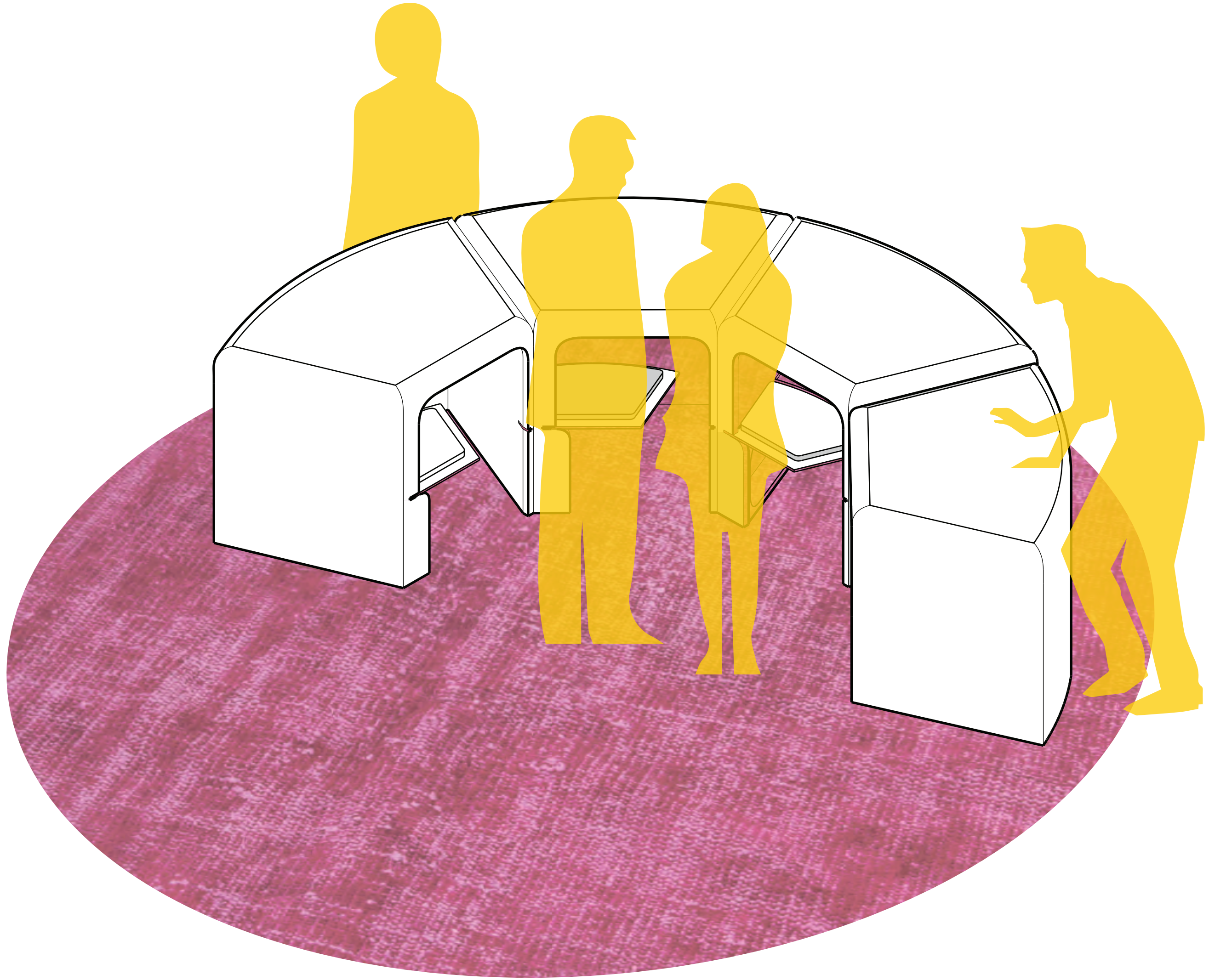


TABLE + CHAIR DESIGN B

ISOMETRIC

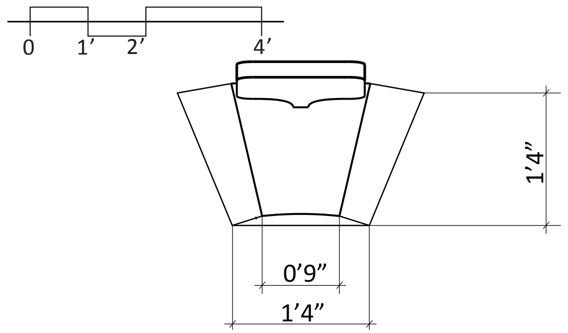




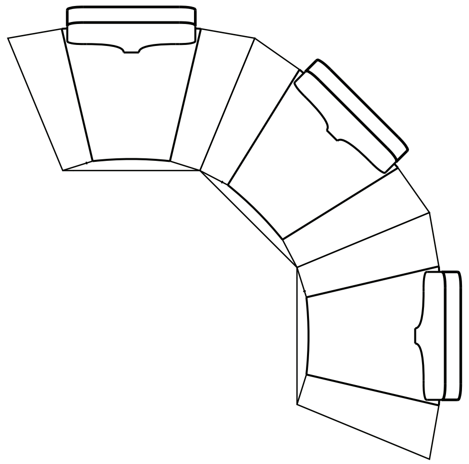
BLUE CHAIR

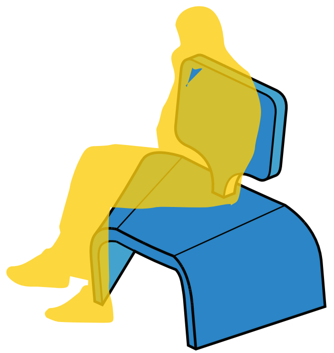
PLANS + ISOMETRIC

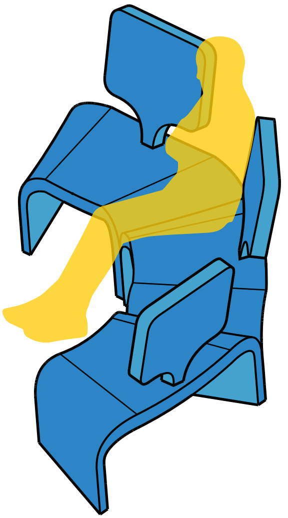
SCALE 1/2" = 1'

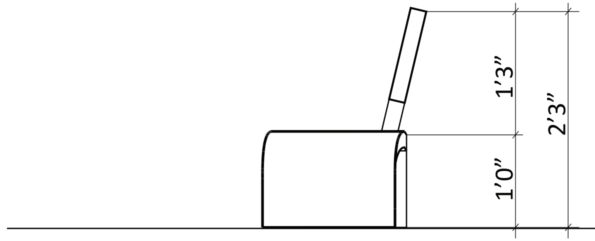


Top View

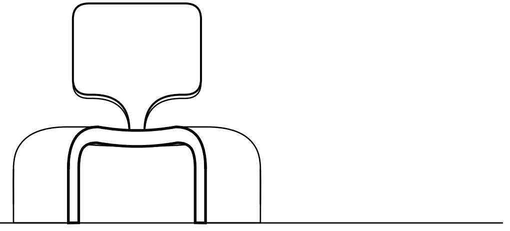




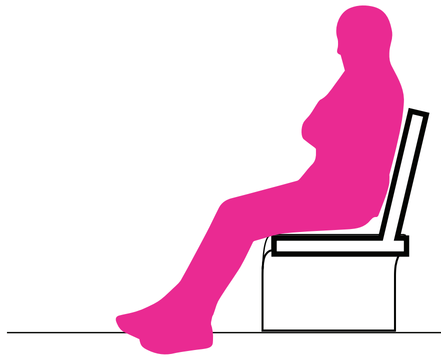




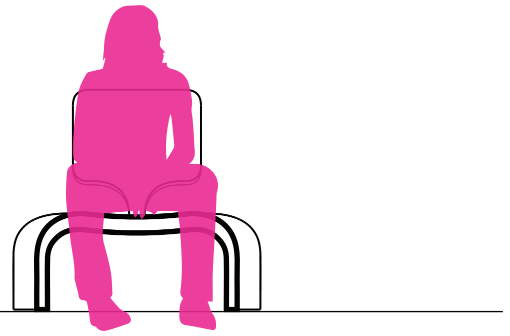
East Elevation



South Elevation



Section A



Section B

BEDROOM PODS

CONCEPT

The focus of the bedroom pod was simply asking the questions of “how can we can expand the usage of a personal room?” and “How can we design a space that is both comfortable, entertaining and can be used as a working environment?” By answering these questions, a conclusion was made in which a result would lead to a hybrid bedroom pod that incorporates all of these needs and makes this personal space well used to its full potential.

COMFORTABILITY

LEISURE

WORKING

PRECEDENT ANALYSIS
JAPANESE HOTEL CAPSULE

A SPACE THAT FITS TO THE PROPORTIONS OF A HUMAN

COMBINATION OF A WORKING ENVIRONMENT SPACE AND A SPACE USED ENTERTAINMENT

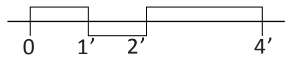
SPACE FOR RELAXATION

Sean Jackson

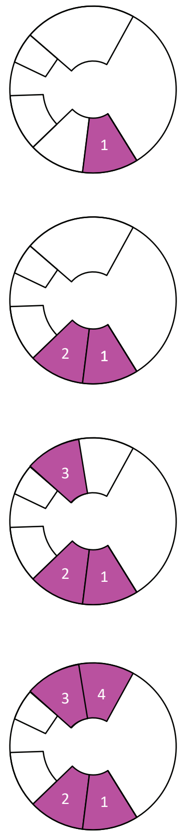
BEDROOM PODS

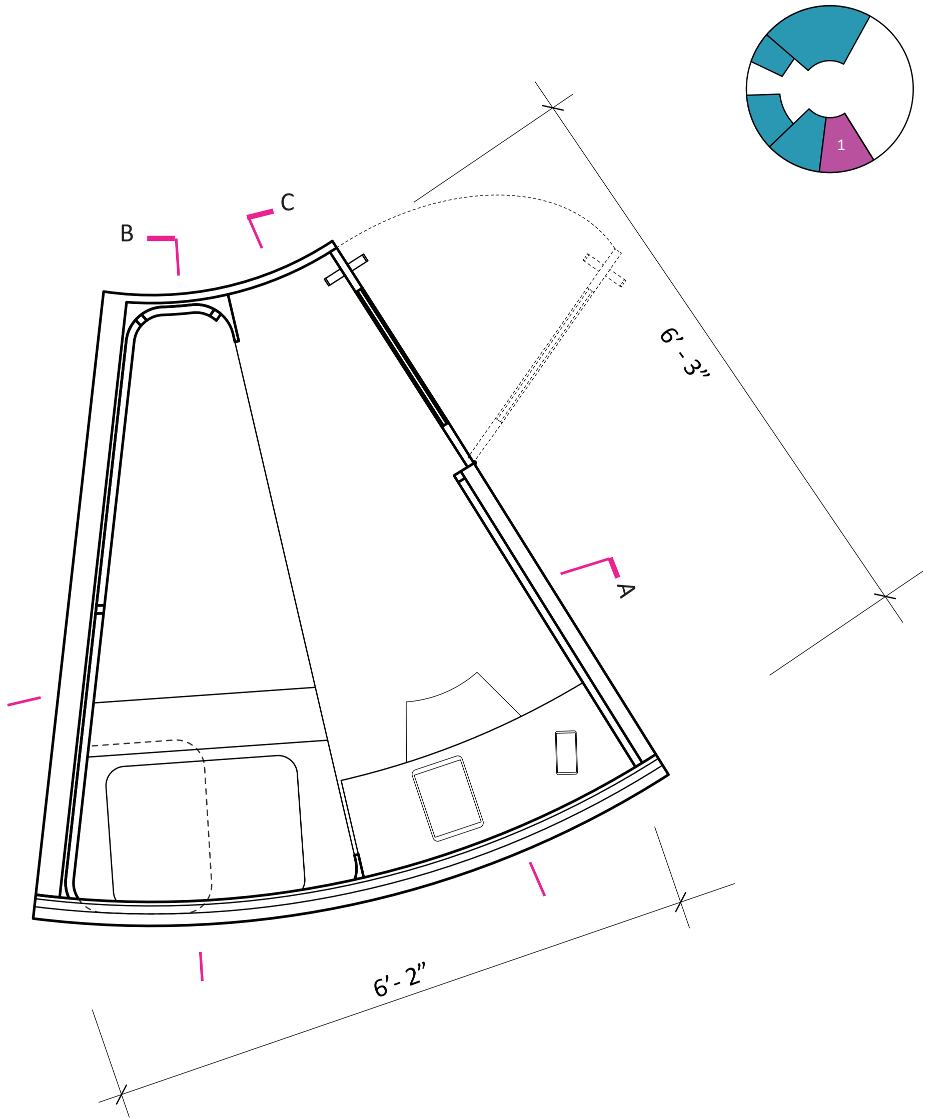
PLAN & SECTION A

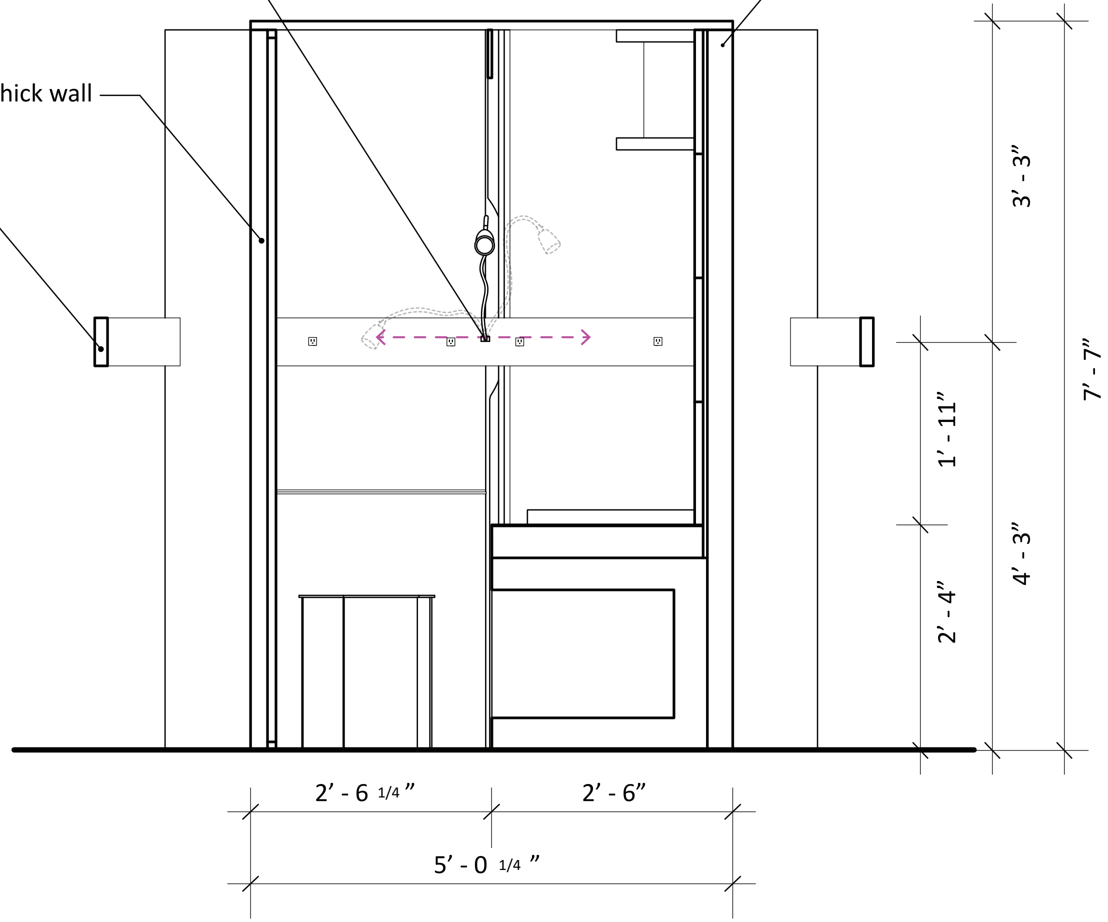
SCALE 1/2” = 1’

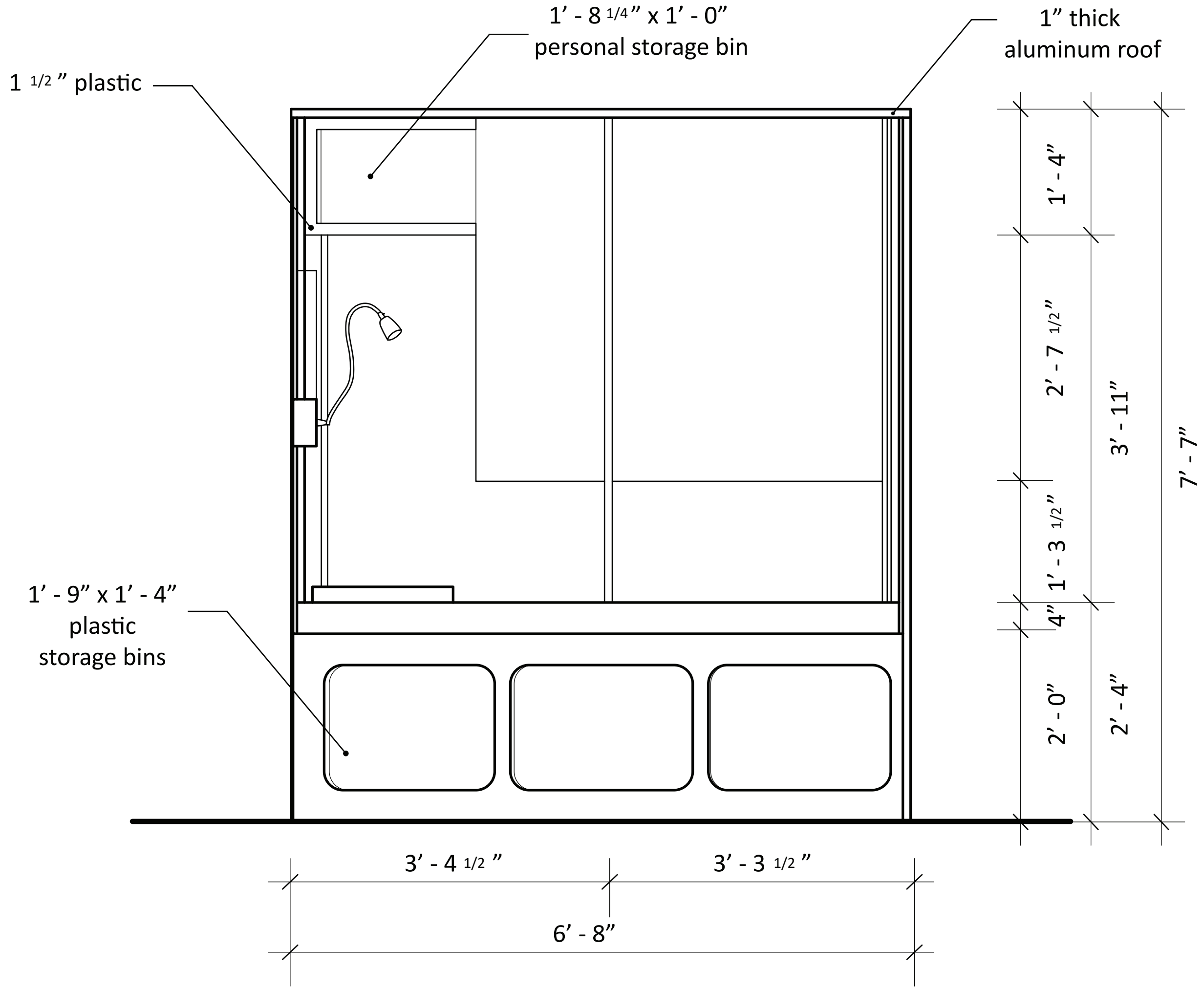


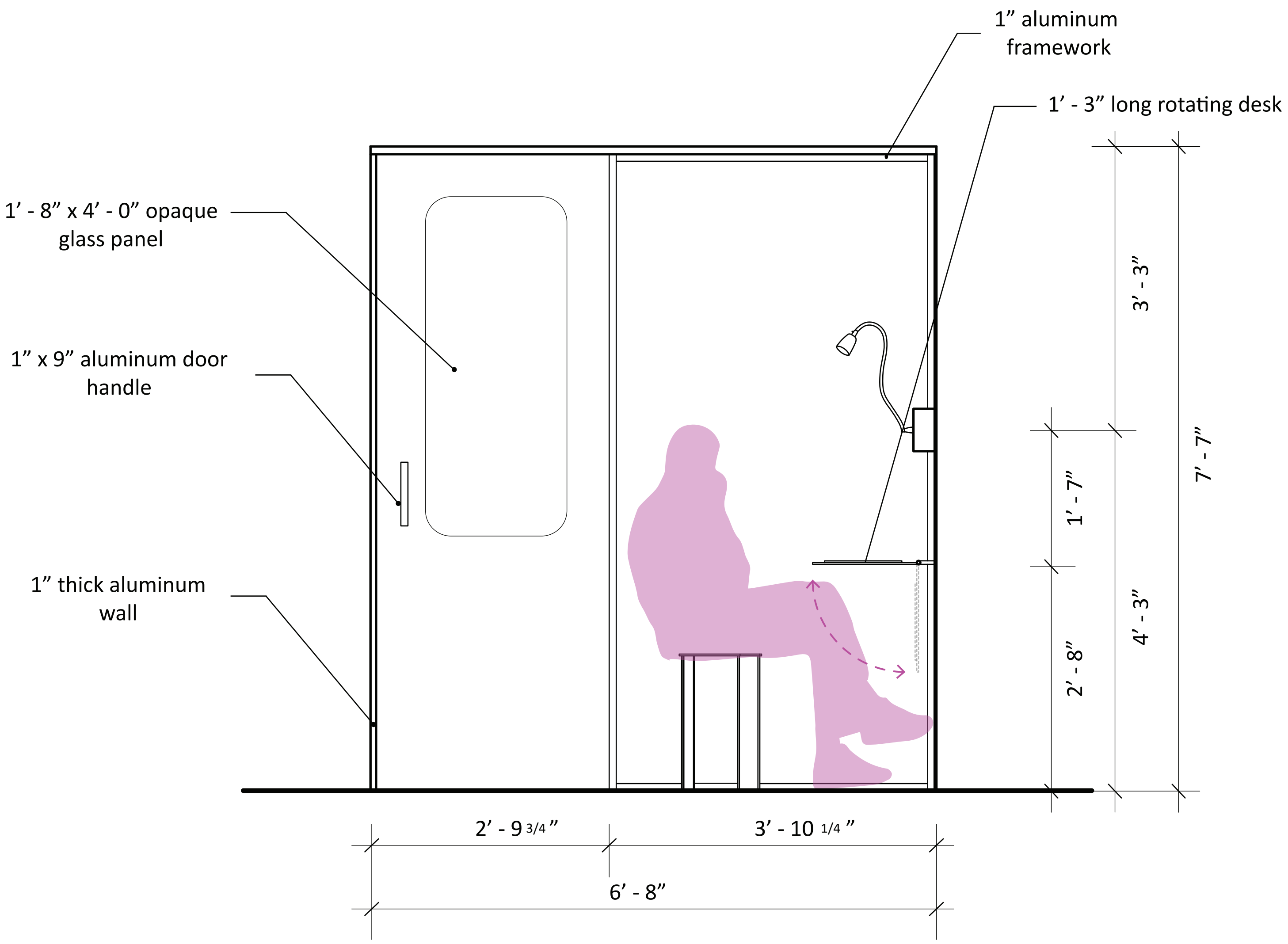
The 4 space pods
(ground level)







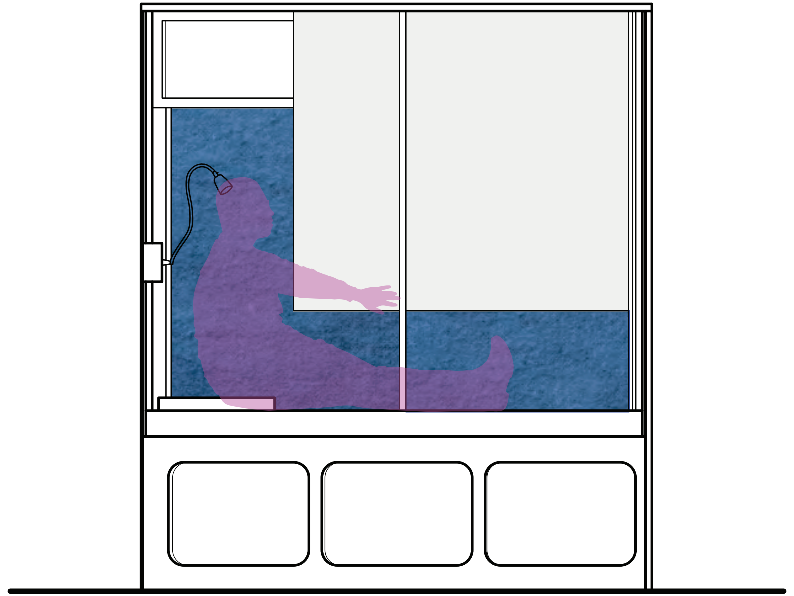

1′ - 8 1/4″ x 1′ - 0″
personal storage bin
1″ thick
aluminum roof
1 1/2 ″ plastic
1′ - 9″ x 1′ - 4″
plastic
storage bins
1′ - 4″
2′ - 7 1/2″
1′ - 3 1/2″
4″
2′ - 0″
3′ - 11″
2′ - 4″
7′ - 7″
3′ - 4 1/2 ″
3′ - 3 1/2 ″
6′ - 8″


1″ aluminum
framework
1′ - 3″ long rotating desk
1′ - 8″ x 4′ - 0″ opaque
glass panel
1″ x 9″ aluminum door
handle
1″ thick aluminum
wall
3′ - 3″
1′ - 7″
2′ - 8″
4′ - 3″
7′ - 7″
2′ - 9 3/4″
3′ - 10 1/4 ″
6′ - 8″

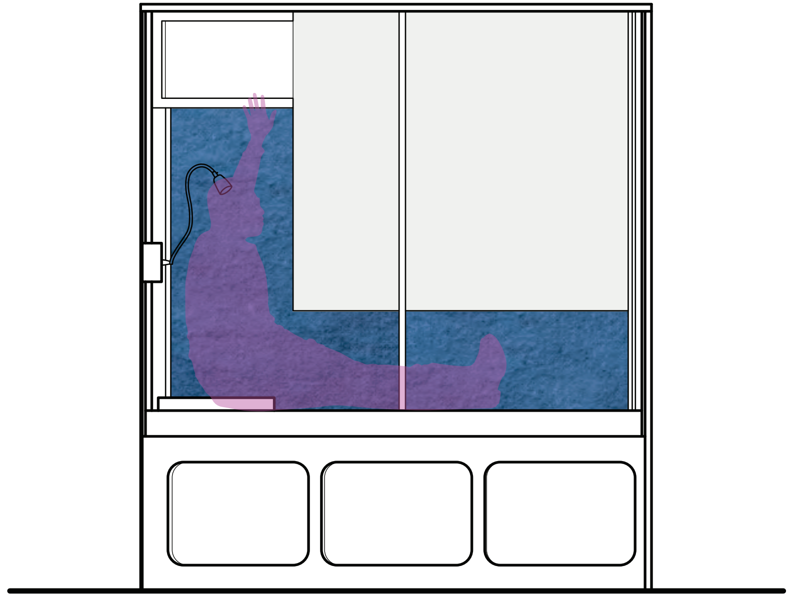
BEDROOM PODS

COMFORTABILITY

In terms of focusing on designing a sleeping space and working space that is currently under uncomfortable conditions due to its awkward geometry, the question that was asked about these decisions were, how can you make this space comfortable? By adding a softer cushion (the blue material) within the sleeping pod, it allows for the astronauts to be in more comfortable condition when they are sleeping or during their research. By incorporating a personal storage in the sleeping pod that is above the astronaut, the astronauts have the ability of storing their personal items in their pod.



The ability to feel different textures that are under the categories of softness and hardness



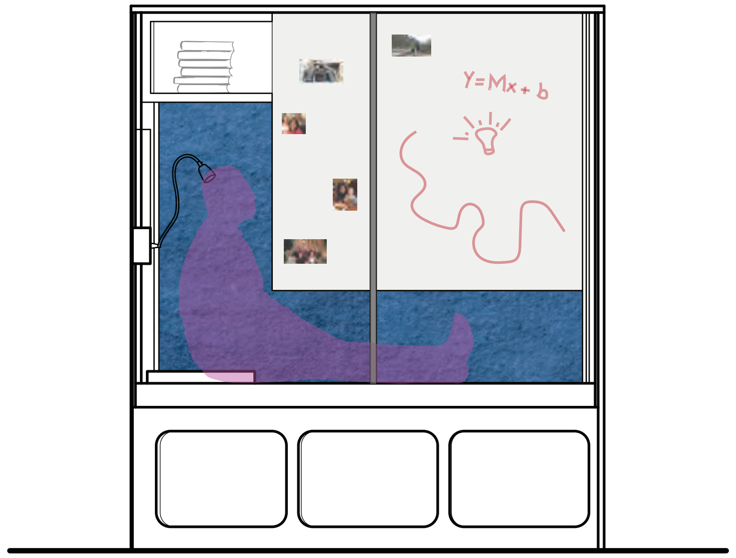
The ability to reach and feel the overhead personal storage

Sean Jackson

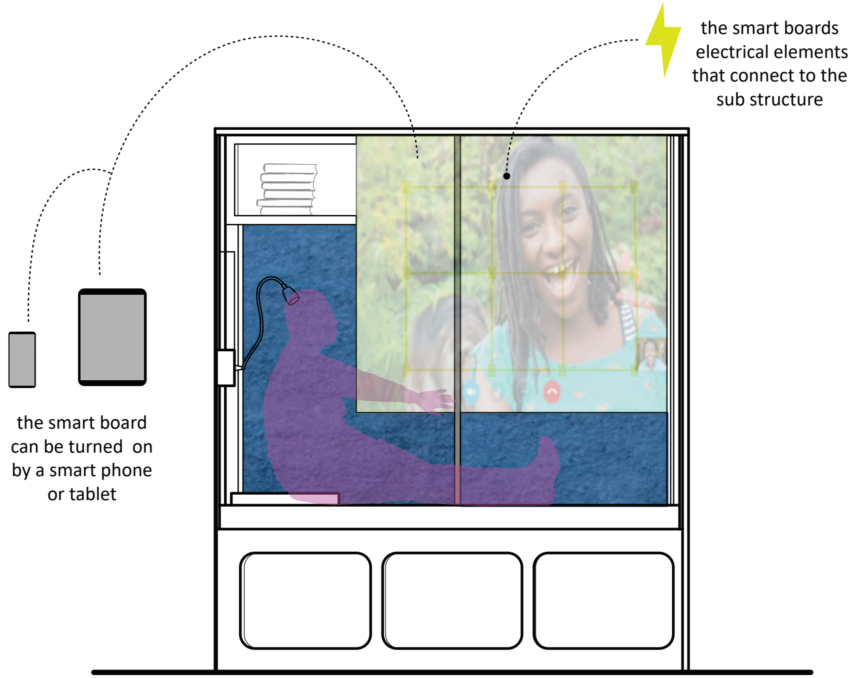
BEDROOM PODS

MAGNETIC SMART-BOARD CAPABILITIES

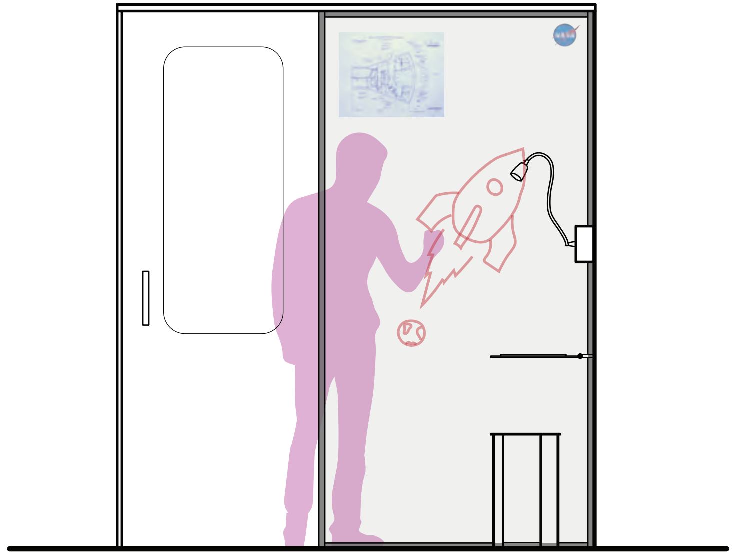
The magnetic smart-board wall allows for the astronauts to expand the usage of their space. This bedroom space now can be used as both a work space and a space for relaxation with the incorporation of the magnetic smart-board. The board allows the user of the space to customize it to their desire. Due to the fact that the wall is magnetic, therefore the user has the ability to pin photographs on the wall to create a more private experience as well as draw on the board and express their ideas.



The magnetic smart-board can be used in various different ways. The board can be used to pin up photographs or it can be used to draw on as well.



The magnetic smart-board can also be used as a holographic screen, where you can activate the board with the use of a tablet or smart phone which allows you to use the board for entertainment, skyping, or business calls with their colleagues.

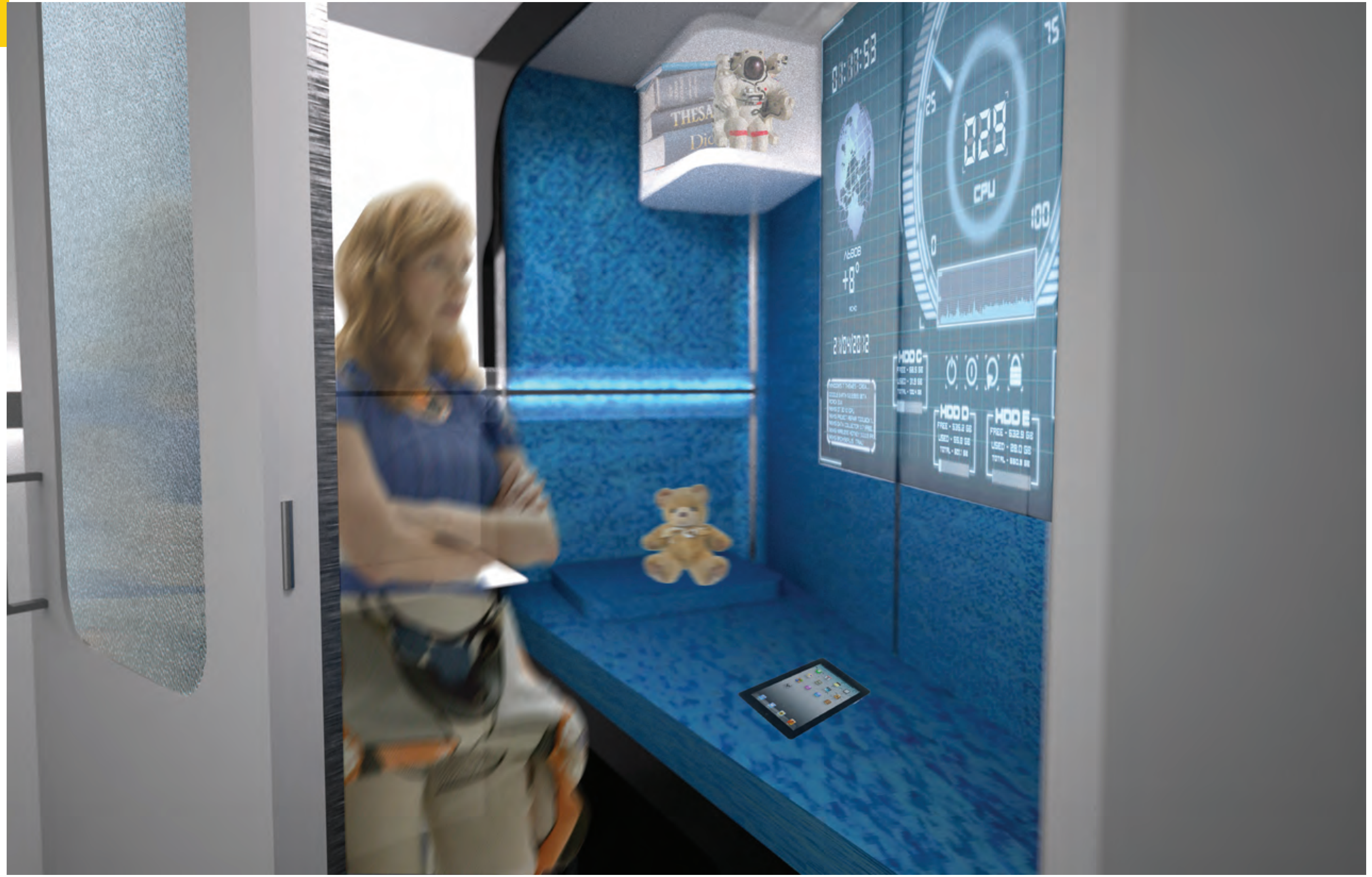


This magnetic board can be use to brainstorm ideas and pin up blueprints, or any documents with the user of a magnetic pin

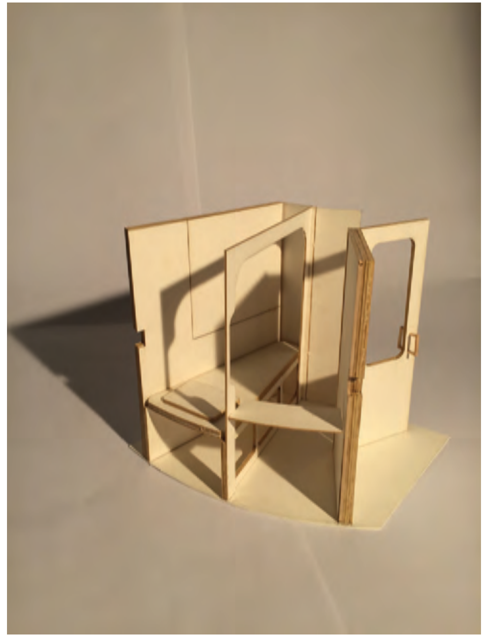
Sean Jackson

BEDROOM PODS

VIEW INTO SLEEPING QUARTERS



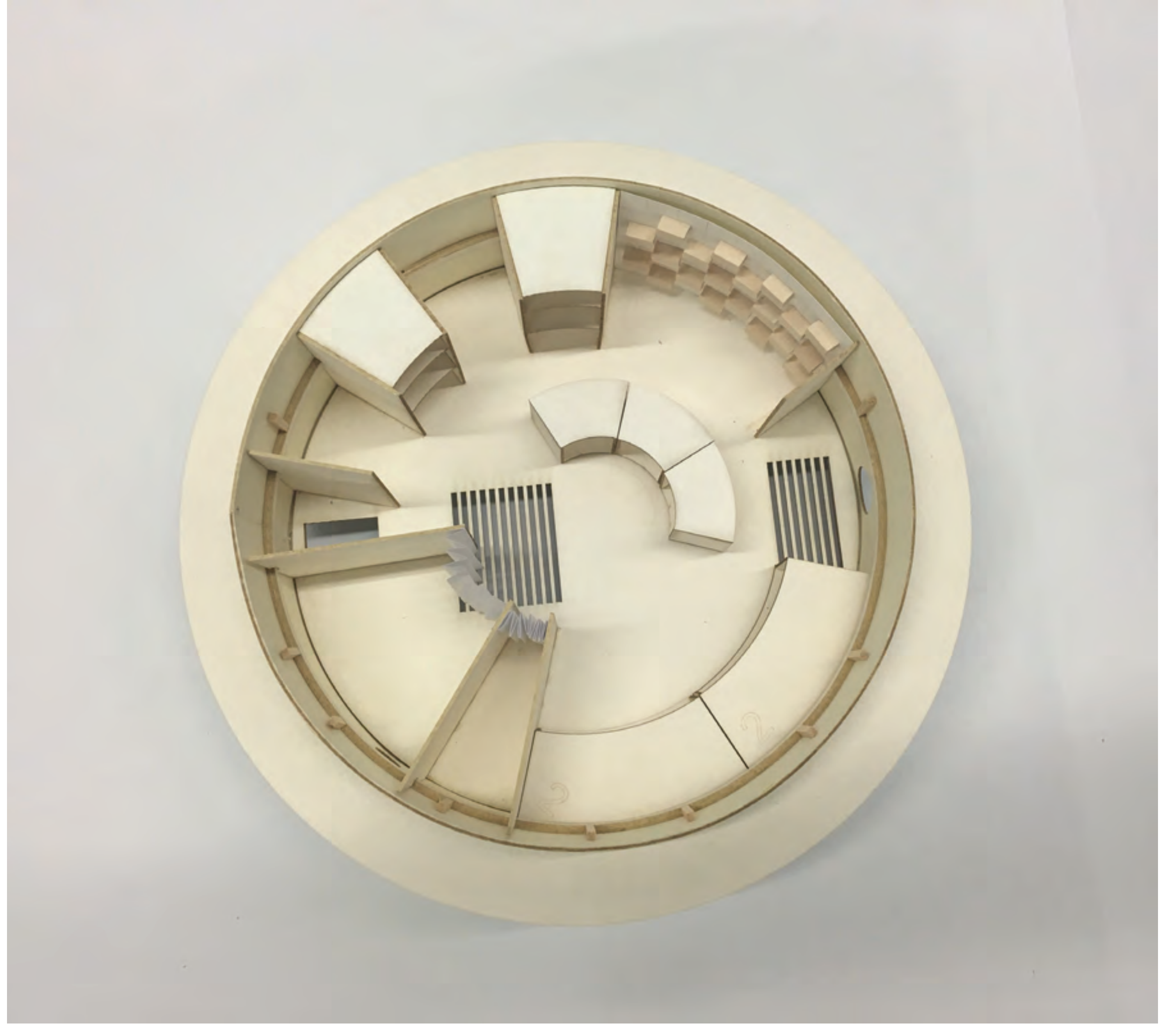
MODEL PHOTOGRAPHS



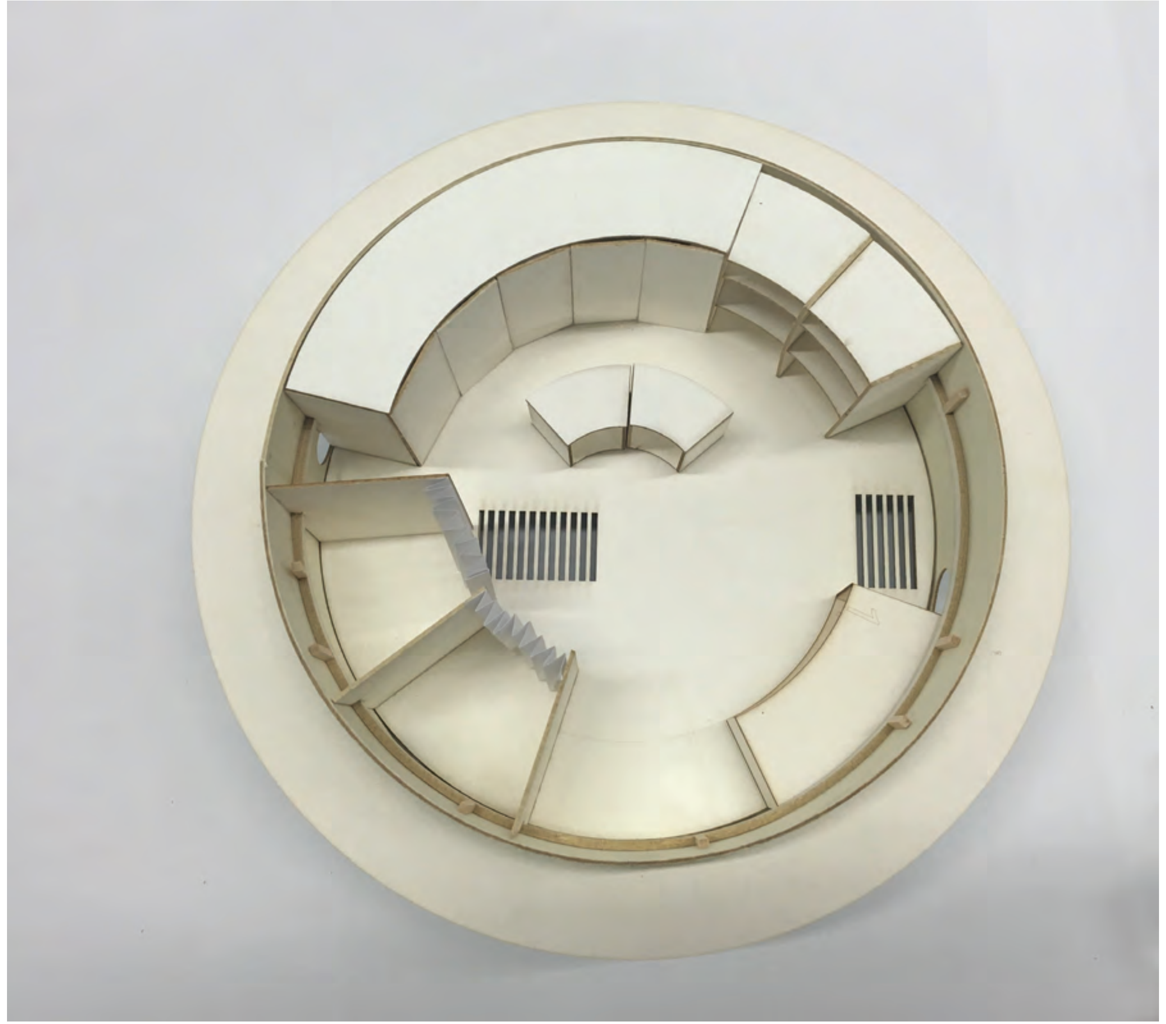
MODEL PHOTOGRAPHS

H.E.S.T.I.A. CHAMBER
LEVEL 1

H.E.S.T.I.A. CHAMBER
LEVEL 2

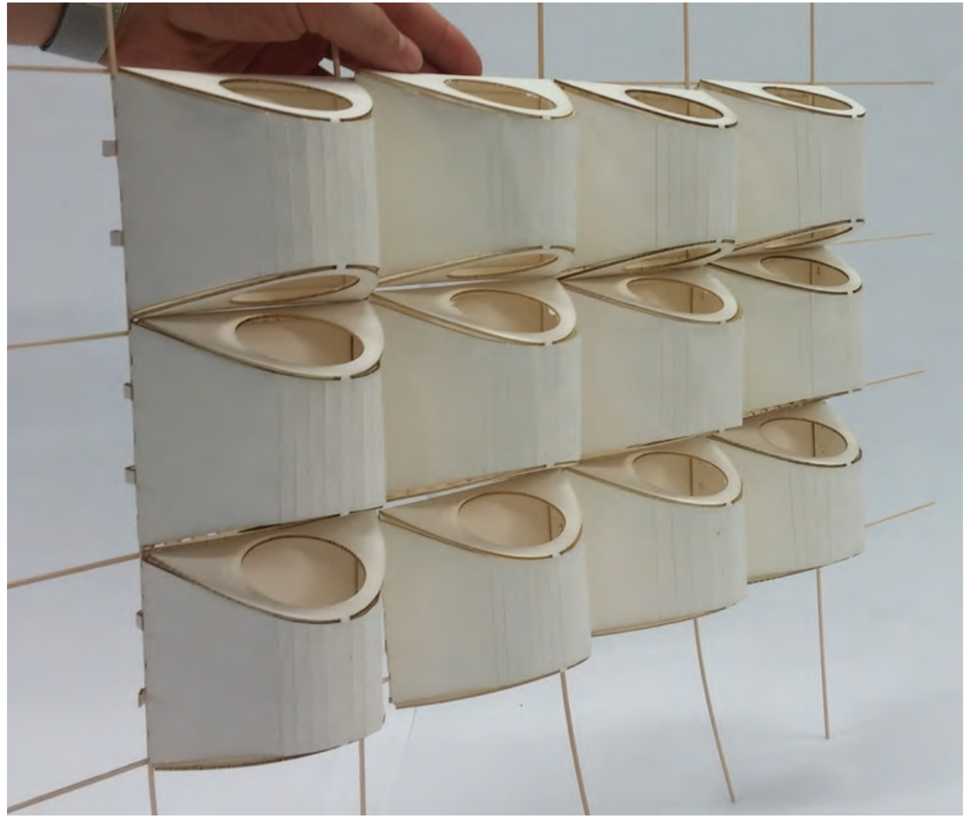


H.E.S.T.I.A CHAMBER
LEVEL 3

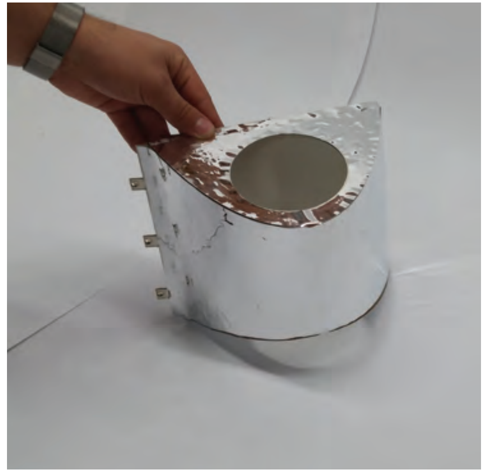


MODEL PHOTOGRAPHS

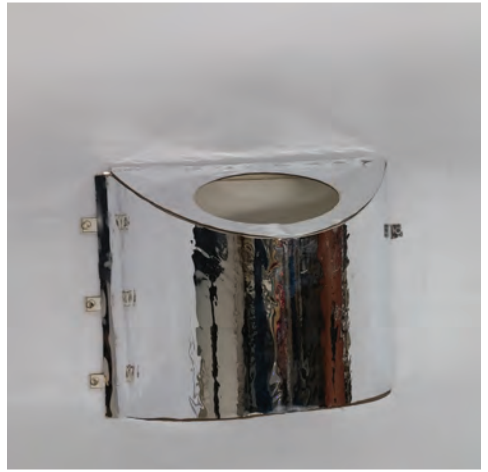
LIVING WALL



Partial Model of the Living Wall

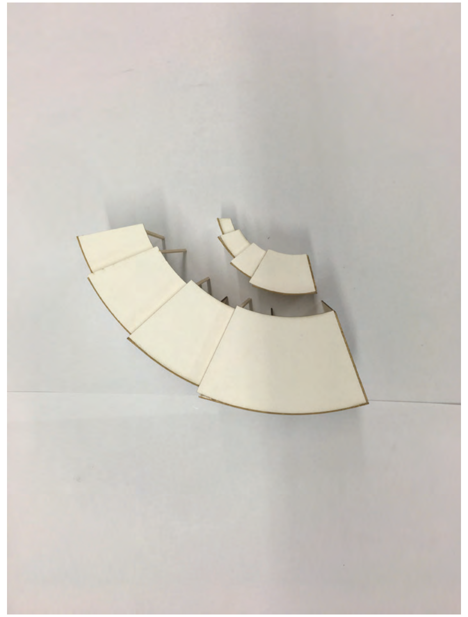


Living Wall Module



MODEL PHOTOGRAPHS

CENTRAL TABLES



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NASA BIO:

Asher Caplan, 5th year undergraduate at the University of Arizona. From Tucson originally, I am also a business student. I hope to run my own business someday, regardless of the size. Architecture for me is to improve people's everyday lives. I want to work in areas such as urban and developing countries to bring safety and inspiration into the world outside of those who can afford private homes. After graduation this means traveling extensively and hopefully working abroad temporarily.

With the Hestia design I was mainly focused on materiality and construction feasibility. I focused on how materials could be lightweight and structural efficient while also producing more comfortable environments. This parlayed into studying growing food in space. Taking existing research I provided a way in which to construct modules for aeroponic gardening in a space that mirrors the greenery. This effect is reproduced via geometry and ultimately leads to an experiential way of sustaining crew nutrition.

LinkedIn: https://www.linkedin.com/in/asher-caplan-4097a354

My name is Baisen Jin, a 5th year architecture student in University of Arizona. I am interesting in the theory of Biomimetic Architecture and Parametricism, attempting to create the architecture with liquid space and open to the nature from inside and outside.

Information about your part:
I studied how to minimize both the space structure’s material and mass by Topological Optimization;and how to arrange the self-assembly robots, to shape any kind furnitures needed in space, improving the efficiency of space usage through the liquidity and variability of the robot swarms.

Contribution:
Programming and analysis, spacial strategies and concepts, Floor plan layouts, the topological optimization structure furniture and the self-assembly robot furnitures.

Linkedin:
https://www.linkedin.com/in/baisen-jin-235933106

Name: Yara Hadi

Website: www.yarahadi.com

LinkedIn: https://www.linkedin.com/profile/preview?locale=en_US&trk=-prof-0-sb-preview-primary-button

Biography: Fifth architecture student at The Univeristy of Arizona. I am originally from Kuwait, but have been living in the U.S. since 2011. To me, Architecture needs to be an experience the human body should never forget. After graduation, I plan getting a masters degree in architecture to focus on my interest in residential design. I would like to work in the U.S. for a years but eventually bring back my knowledege of what I've learned back to the Middle East.

Contribution: With the H.E.S.T.I.A Analog I primarly focused on human based design and human comfort. I foucsed on how the human body can feel more comfortable in an analog as is they were at home. I did a study of ergonomics through the use of the our group individual body, since we all had different body types. The series of images show how much space the human body takes up. This helped us control each space to fit every human body and its ergonomics.

NASA BIO:

My name is Sean Raphael Jackson and I am a current 5th year undergraduate student at the University of Arizona pursuing a Bachelors of Architecture degree. I am a native of Oak Park, Illinois and some of my hobbys consist of working out, reading articles on the fashion industry and photography. My main post graduation goal would be getting a job at a firm and becoming a designer in the West Coast region. My goals further down the line of my career would consist of working at a firm that special-lizes in model making because it gets in to the fine details and takes alot of craft to expert in this category. Traveling different parts of the world and becoming an architecture photographer is another dream of mine as well.

Position in the Project:

My part of the project first started off focusing on nano houses, and understanding how these small spaces fit under the category of comfortability and can create spaces that can be designed to its maximum potential. These ideas were integrated into the design of the personal sleeping quarters which was my main focus of this HESTIA design. This multi-use personal space that responds to the ergonomics of everyday movement has spaces that consist of a sleeping capsule for relaxation and a working station, allowing for this personal room to be flexible for the astronaut. The integration of smartboards and magnetic drawing boards allows for opportunities of communication, saving ideas and displaying pictures of family or friends and etc, creating an opportunity for the astronaut to customize the space.

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