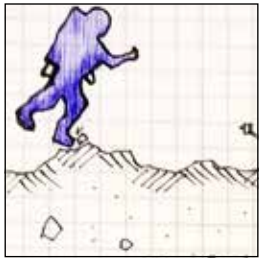
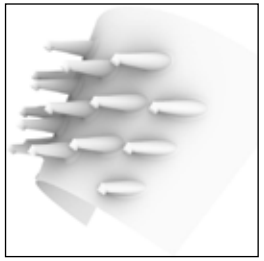
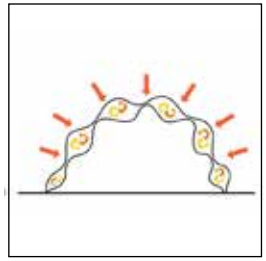
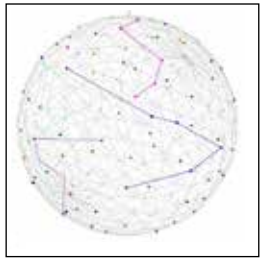
First Pitch

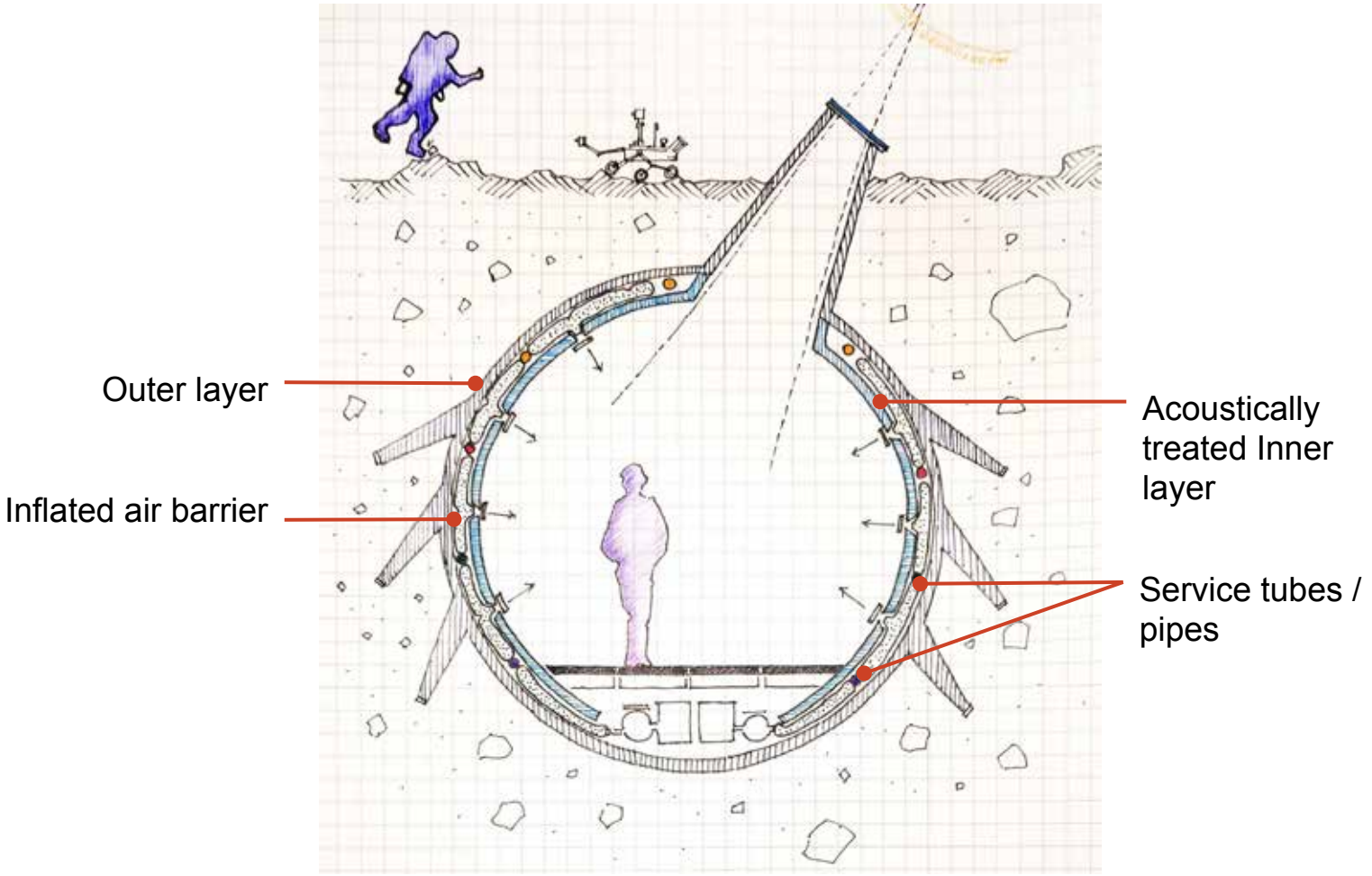
1. Overall Scheme
2. Subtractive Layer
3. Intermediate layer
4. Additive Layer
5. Breathable innermost Layer

1:1 Interactive Architectural Prototypes
Group 3

First Pitch

1. **Overall Scheme**
2. Subtractive Layer
3. Intermediate layer
4. Additive Layer
5. Breathable innermost Layer

OVERALL SCHEME CONCEPT



1:1 Interactive Architectural Prototypes
Group 3

First Pitch

1. Overall Scheme
2. **Subtractive Layer**
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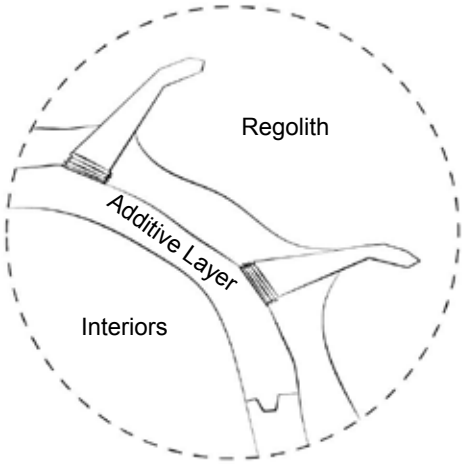
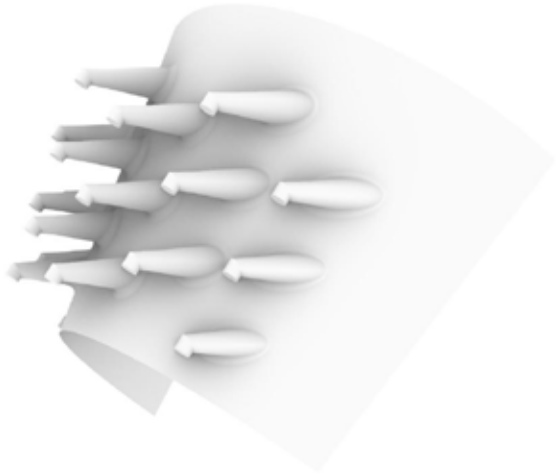
LOGIC FOR SUBTRACTIVE LAYER : ANCHORS WITH MODULAR PANELS

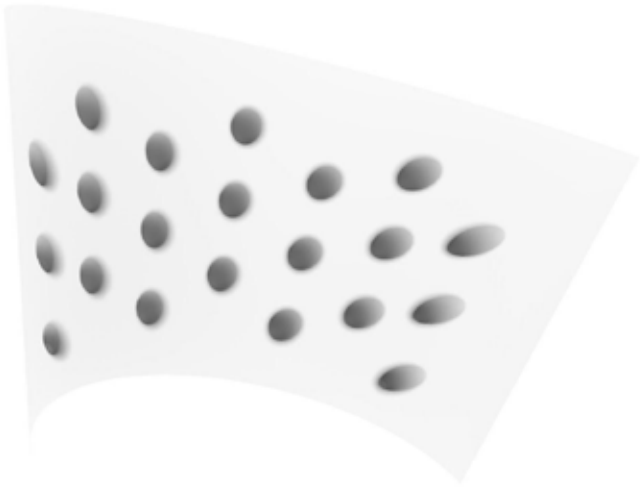
-Improved contact surface and anchorage.

-Anchor points determined based on gravity load and surface inclination.

-Anchor depth and interlocking geometry can also be determined parametrically.







1:1 Interactive Architectural Prototypes
Group 3

First Pitch

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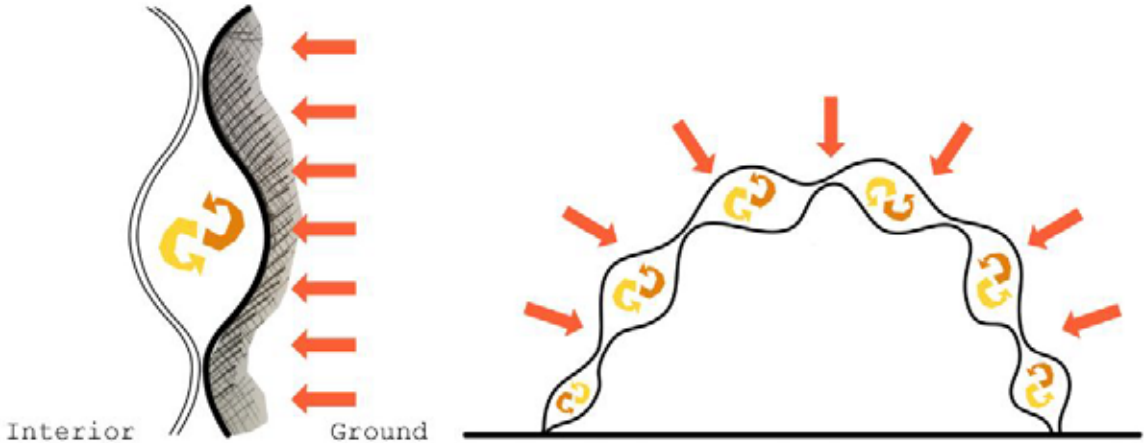
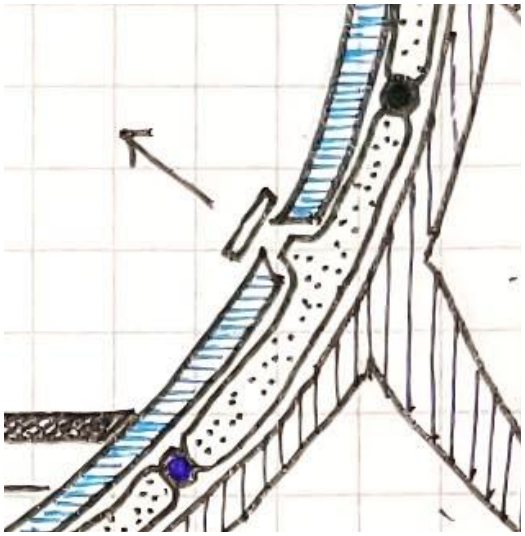
LOGIC FOR INTERMEDIATE LAYER : AIR CUSHIONS AS ACOUSTIC,VENTILATIVE AND THERMAL LAYER

-Air cushions to act as springs for dampening the vibrations

-Also use this buffer to moderate air temperatures within the space

-Balance pressure based on sensors detecting movement/proximity





1:1 Interactive Architectural Prototypes
Group 3

First Pitch

1. Overall Scheme
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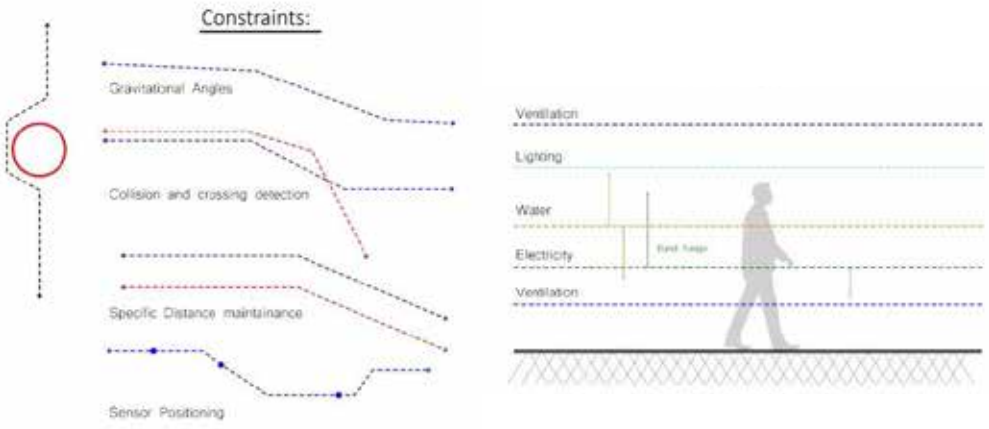
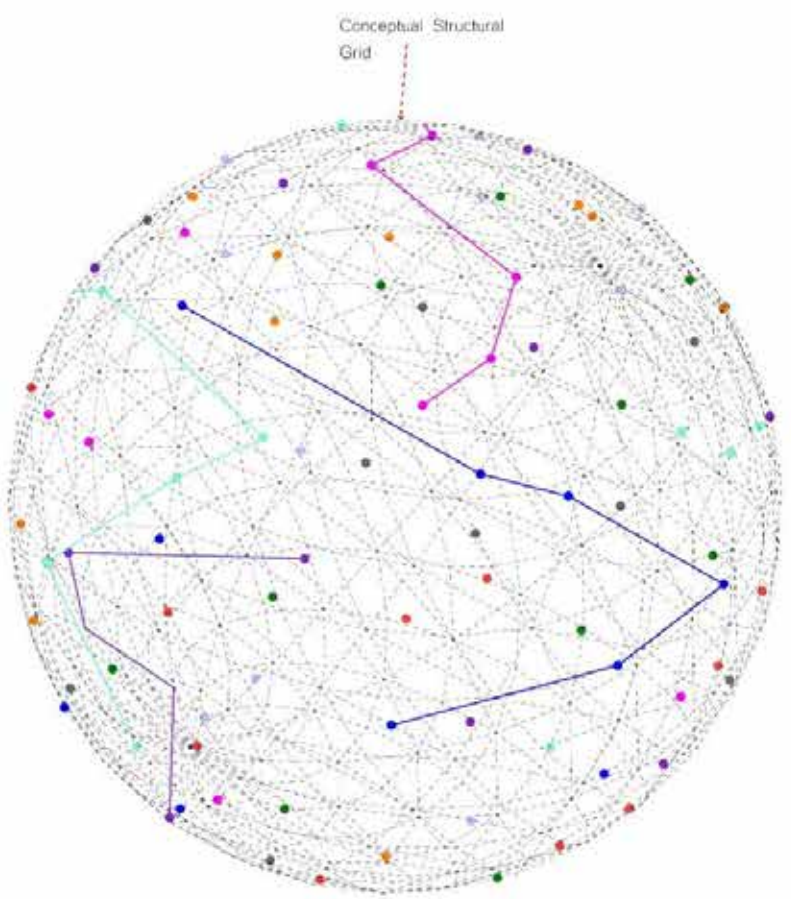
LOGIC FOR ADDITIVE LAYER

- Additive layer to act as pathways for service lines.
- Ventilation will be a key aspect.
- The form and material is informed by acoustic principles
- The form can include varying layer thicknesses
- While the material itself can provide for good absorption to decrease echos





1:1 Interactive Architectural Prototypes
Group 3

First Pitch

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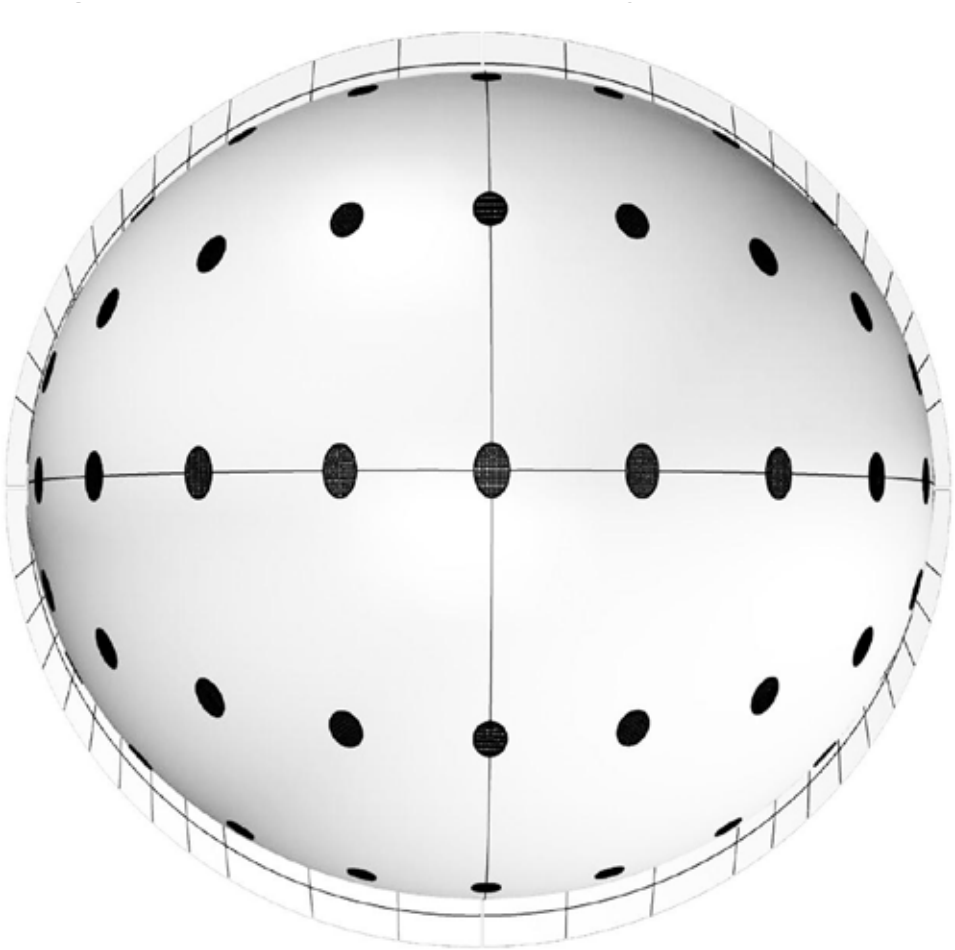
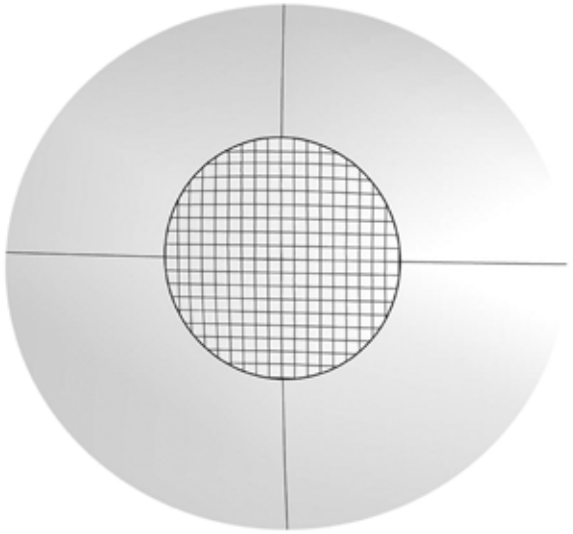
LOGIC FOR BREATHABLE INNERMOST LAYER



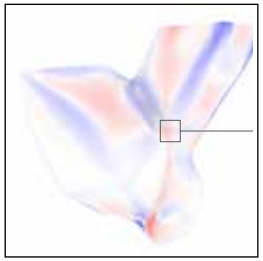
- Position informed by the additive layer

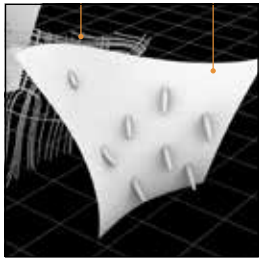
-Cavities that are activated by sensors to modulate the rate of ventilation (based on human presence)

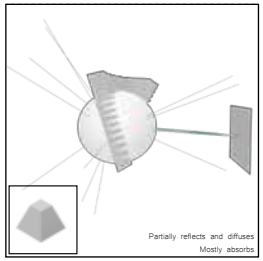
- Layer porosity changes as per need

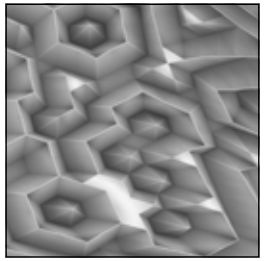


Second Pitch









1. Overall Scheme
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6. Connecting concepts
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1:1 Interactive Architectural Prototypes
Group 3

Second Pitch

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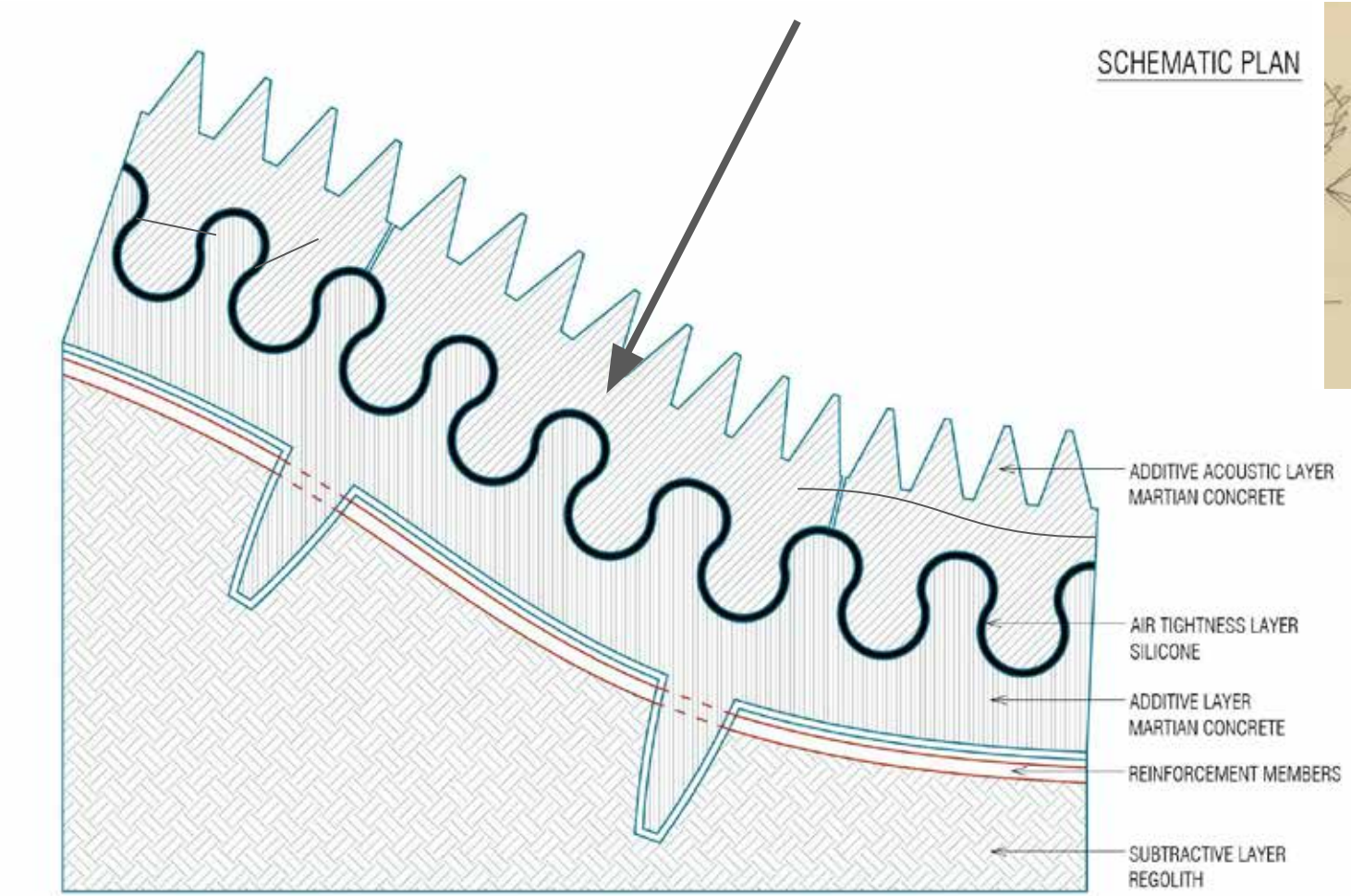
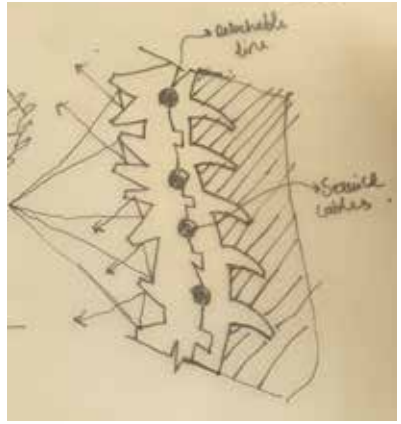
OVERALL SCHEME CONCEPT





1:1 Interactive Architectural Prototypes
Group 3

Second Pitch

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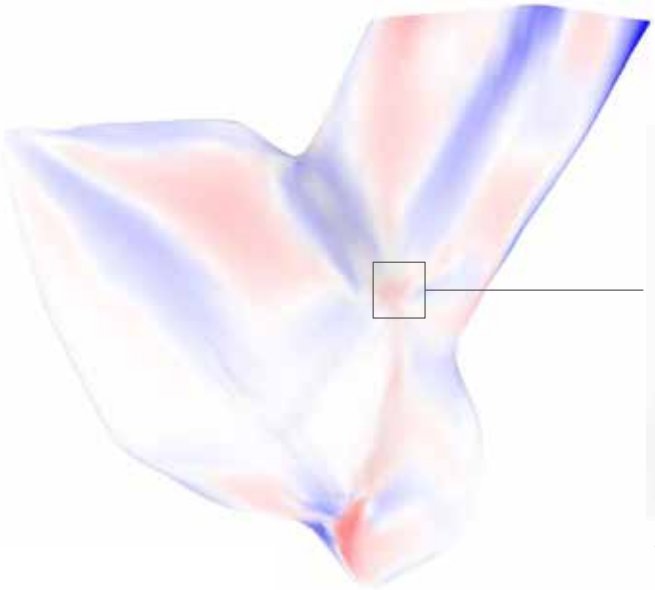
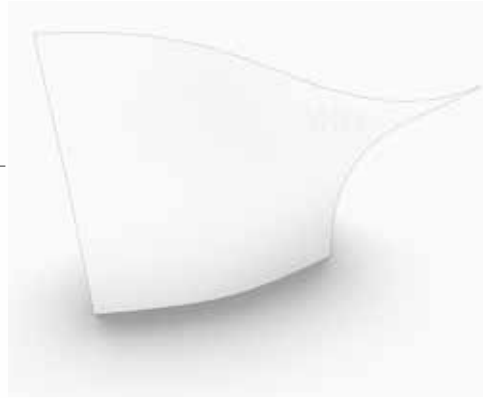
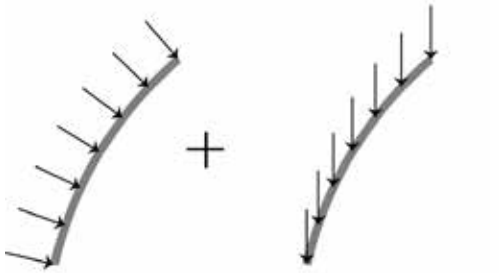




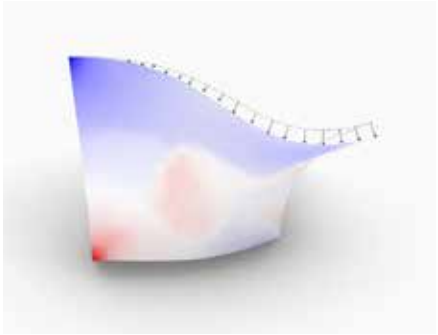
3mX3m Fragment



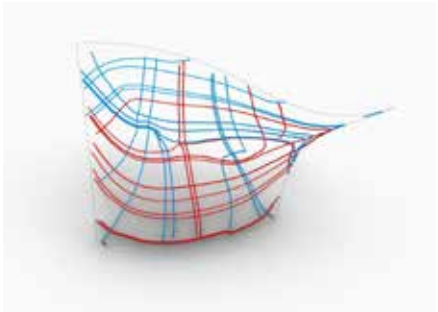
Soil Pressure

Gravity

Deformation



Stress lines



1:1 Interactive Architectural Prototypes
Group 3

Second Pitch

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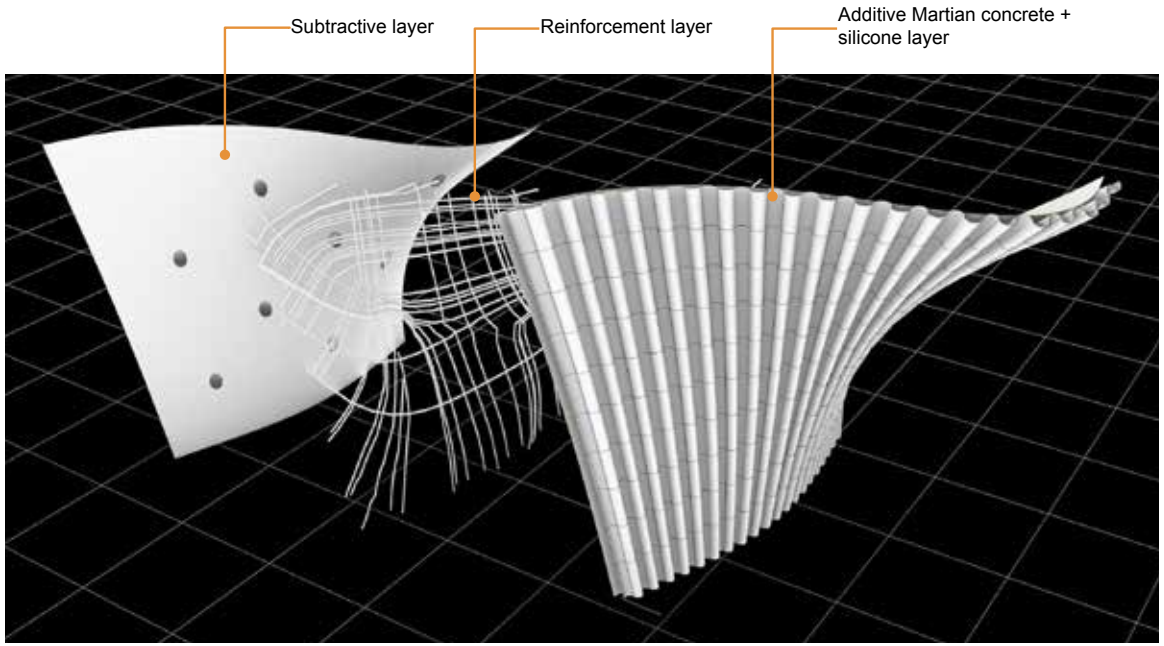

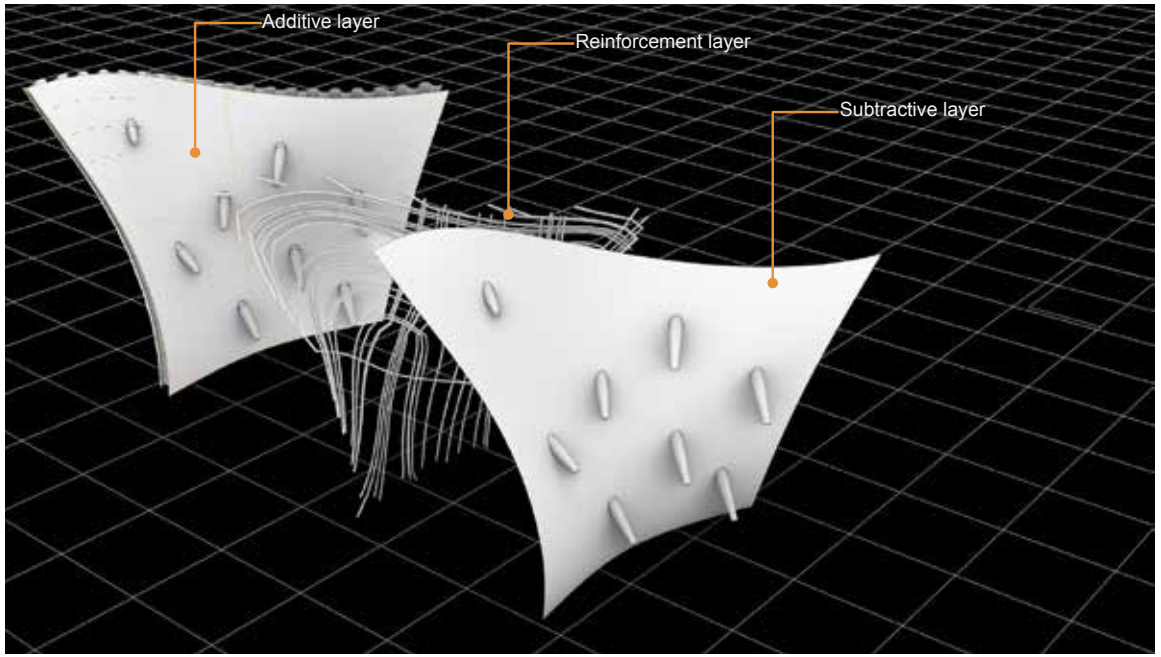

1:1 Interactive Architectural Prototypes
Group 3

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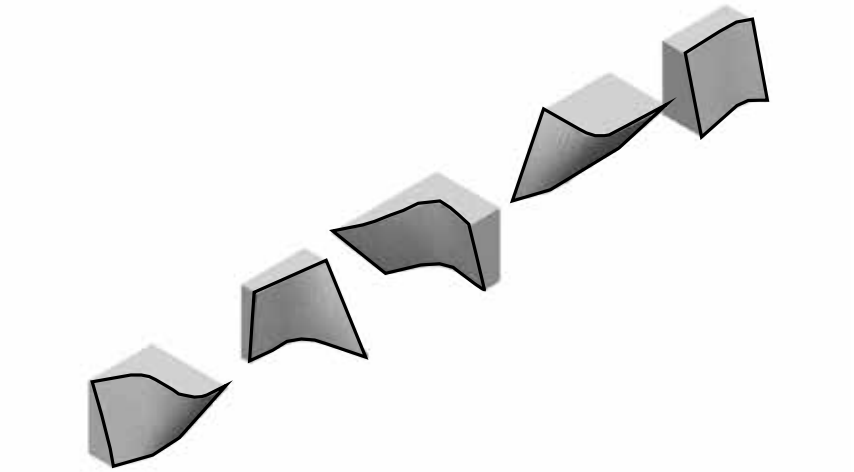
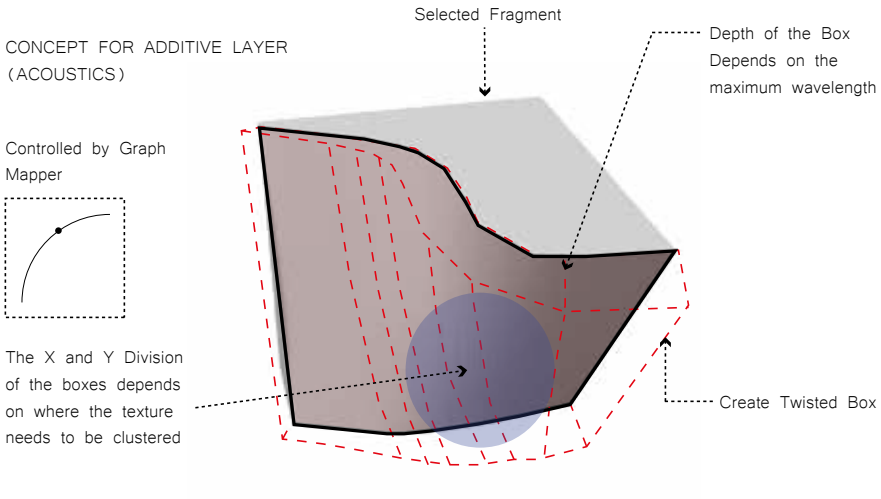
Results

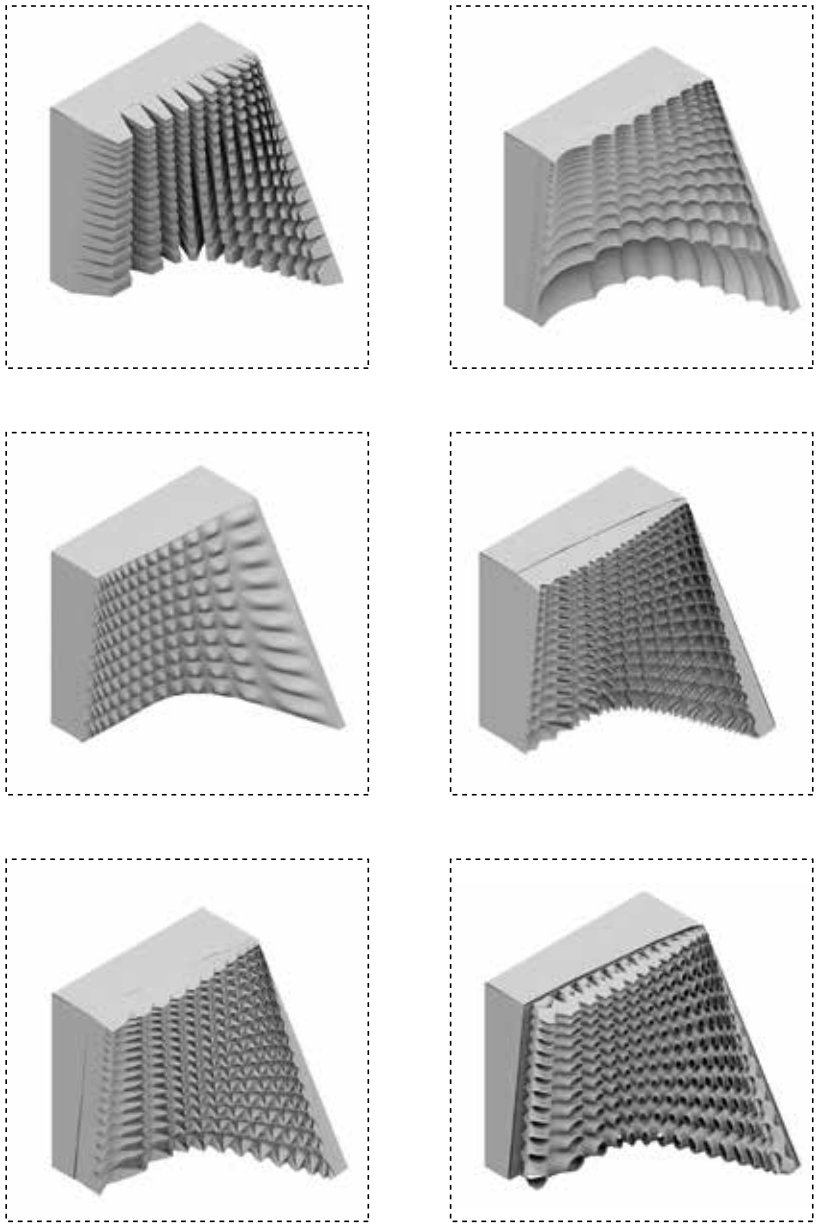
SELECTED FRAGMENTS FROM THE POD TO BE USED FOR ACOUSTIC SIMULATIONS



CONCEPT FOR ADDITIVE LAYER (ACOUSTICS)



FINAL MORPHED GEOMETRIES



1:1 Interactive Architectural Prototypes
Group 3

Second Pitch

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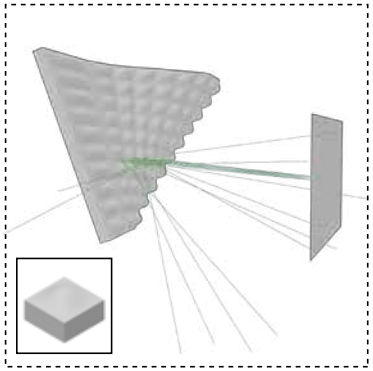
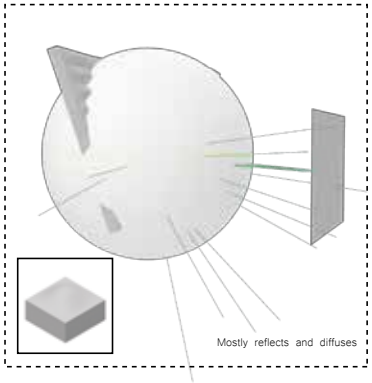
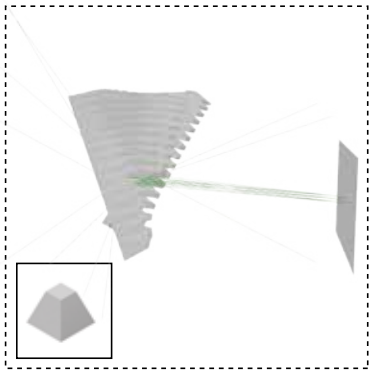
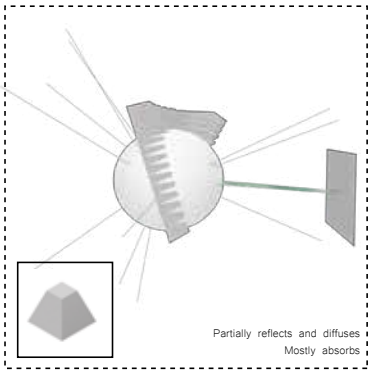
Results

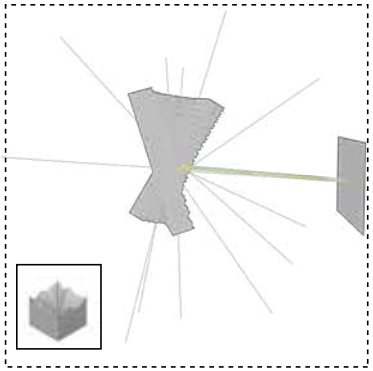
ACOUSTIC BOUNCE SIMULATIONS

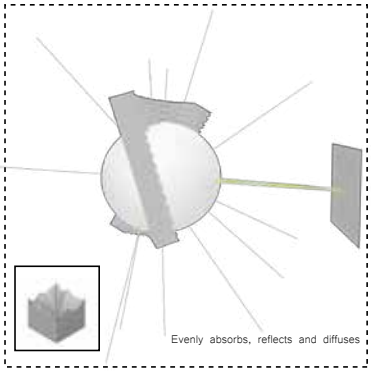




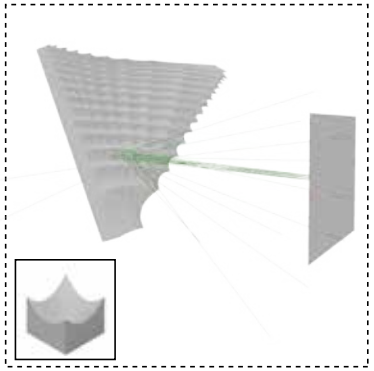


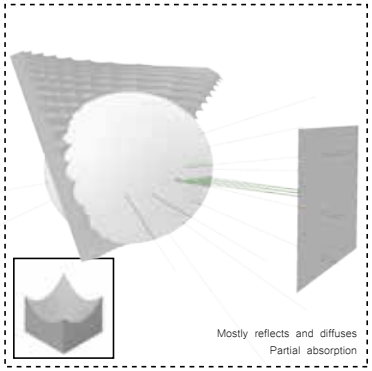


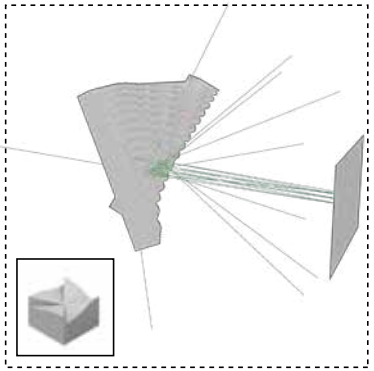


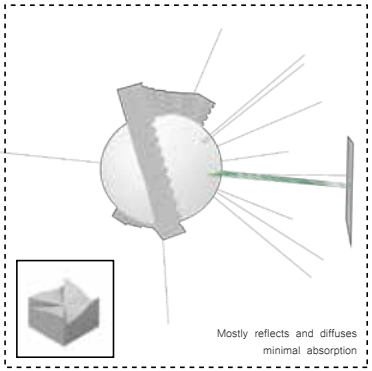


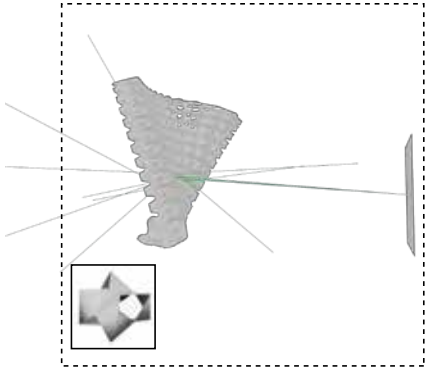
ACOUSTIC BOUNCE SIMULATIONS

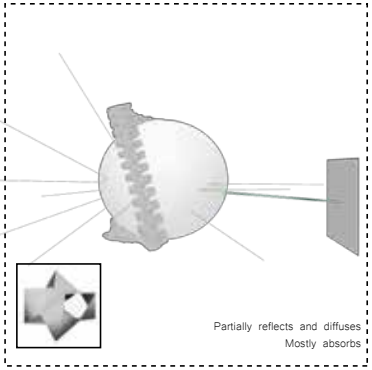












1:1 Interactive Architectural Prototypes
Group 3

Second Pitch

1. Overall Scheme
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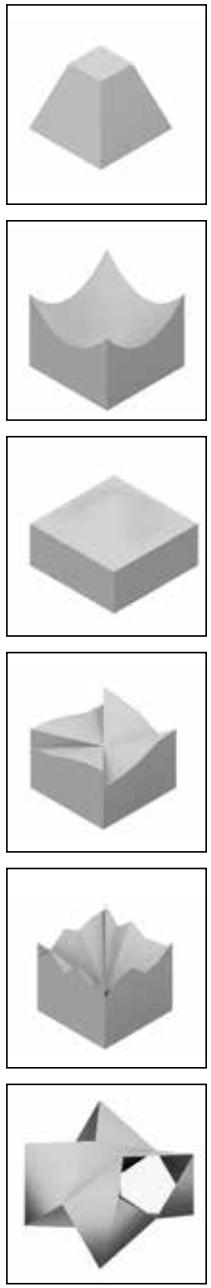
Results

GEOMETRIES TO BE MORPHED

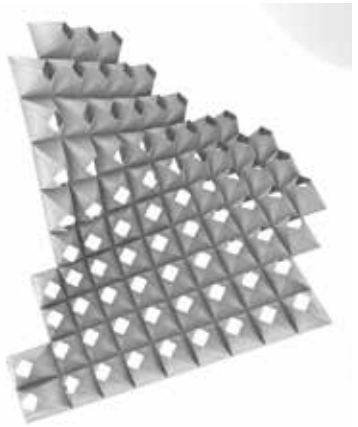


ACOUSTIC QUALITY

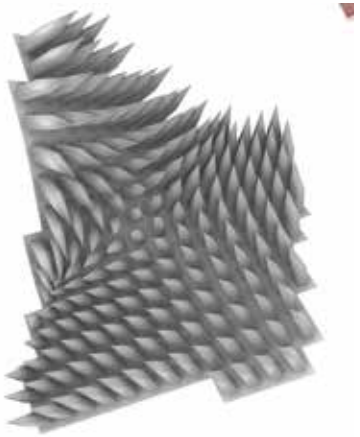
PRINTABILITY

CLEANABILITY

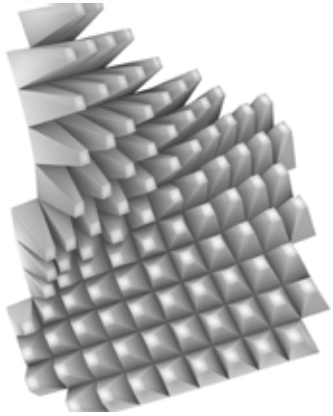
Translation into design



Test3 combination egg with perforation



Test2 hairy acoustics



Test1 Anechoic Chamber

1:1 Interactive Architectural Prototypes
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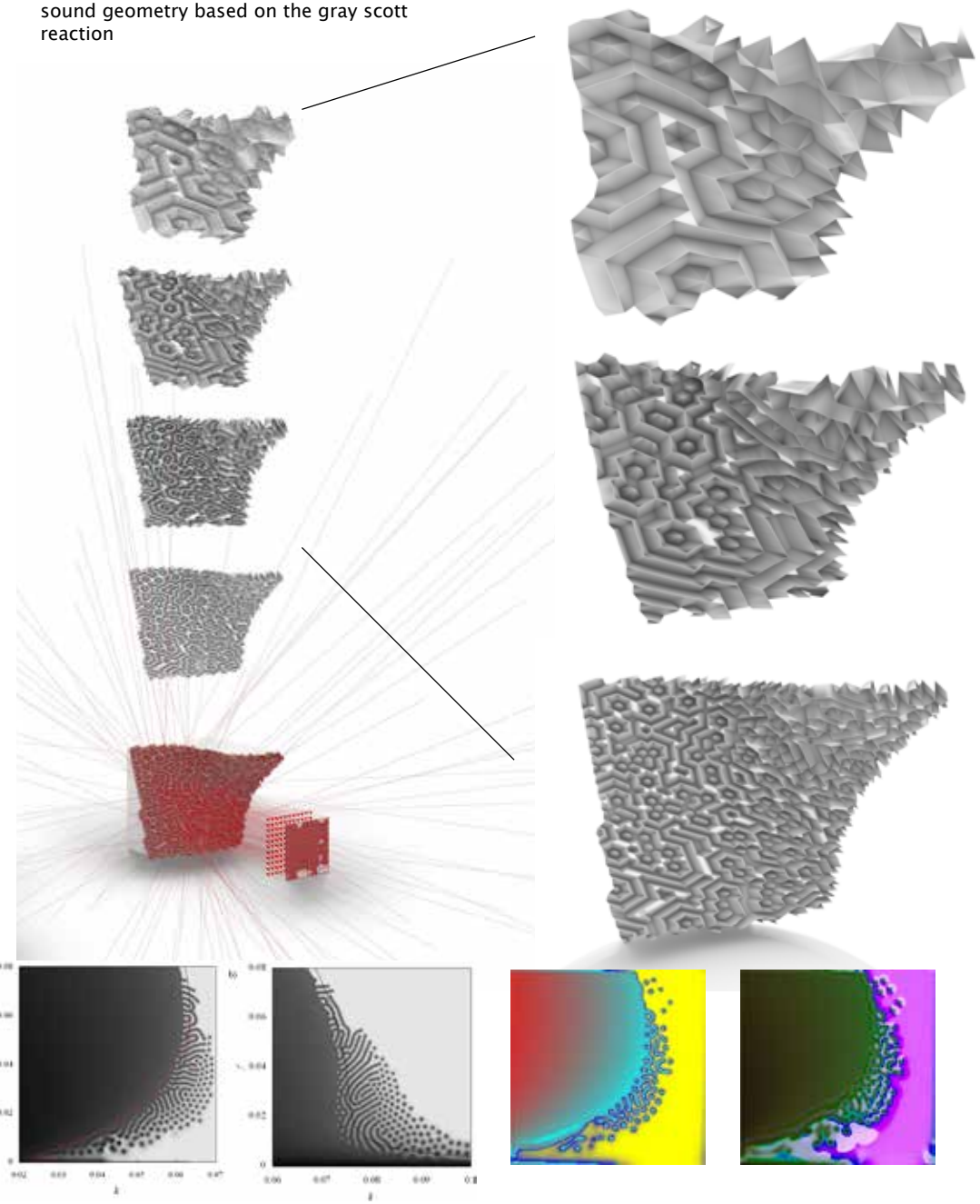
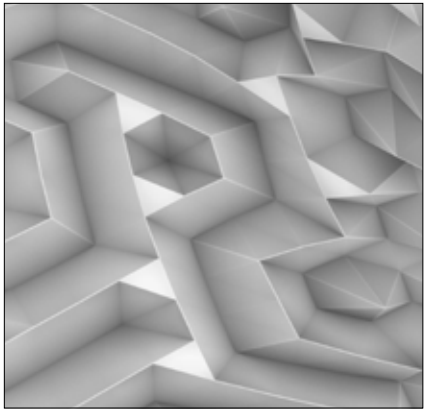
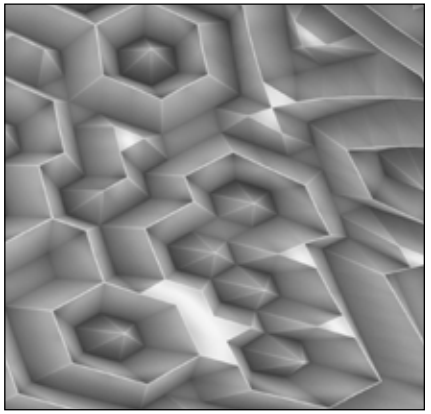
Translation into design

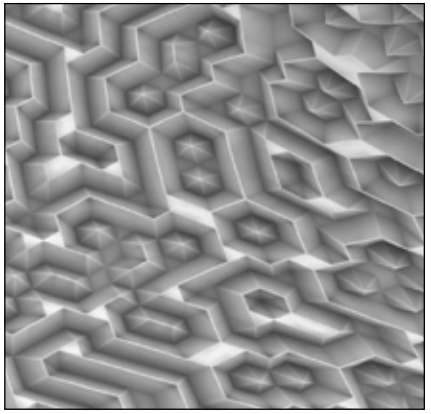
sound geometry based on the gray scott reaction



Size







http://mrob.com/pub/comp/xmorphia/index.html

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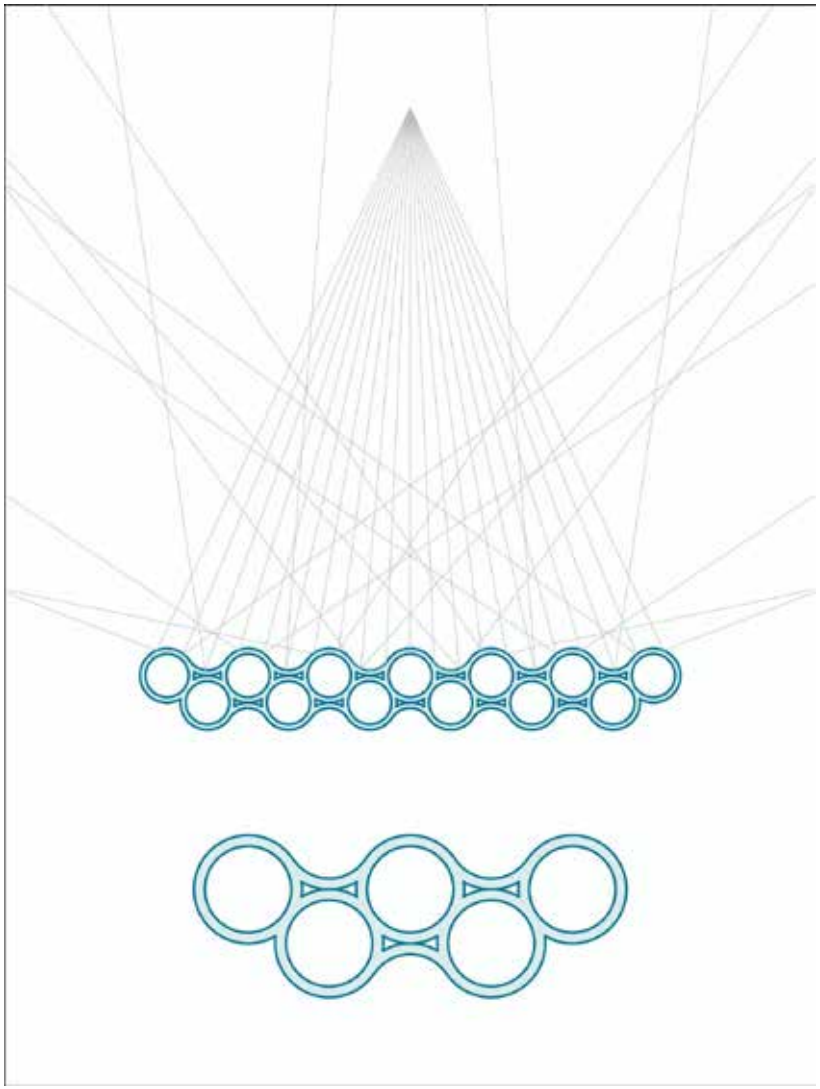

1. Acoustic panel:
2. Diffuses sound
3. Structurally stable
4. Air gaps for better insulation
5. 3D printable
6. Modular
7. Can take any shape and form
8. Eg. circular, spherical, angled corners etc.
9. Size and thickness can vary

-
-

-

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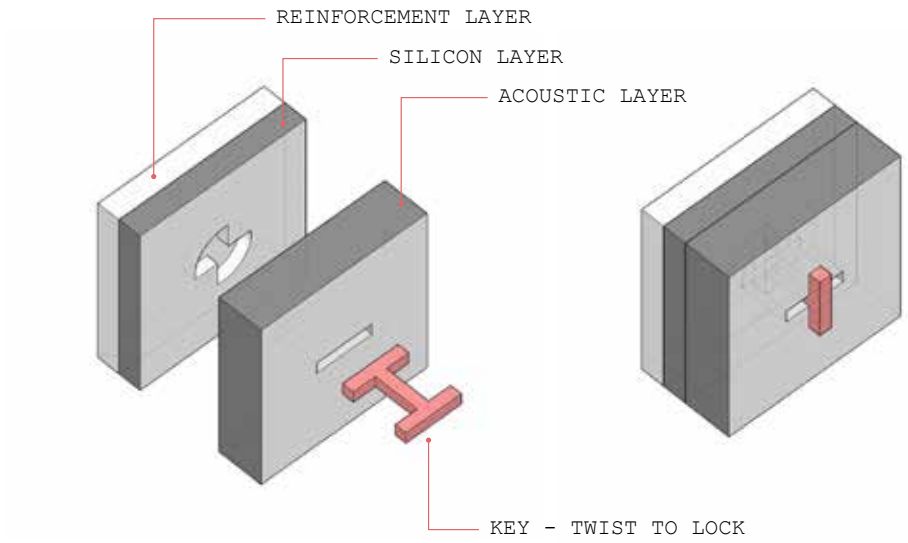
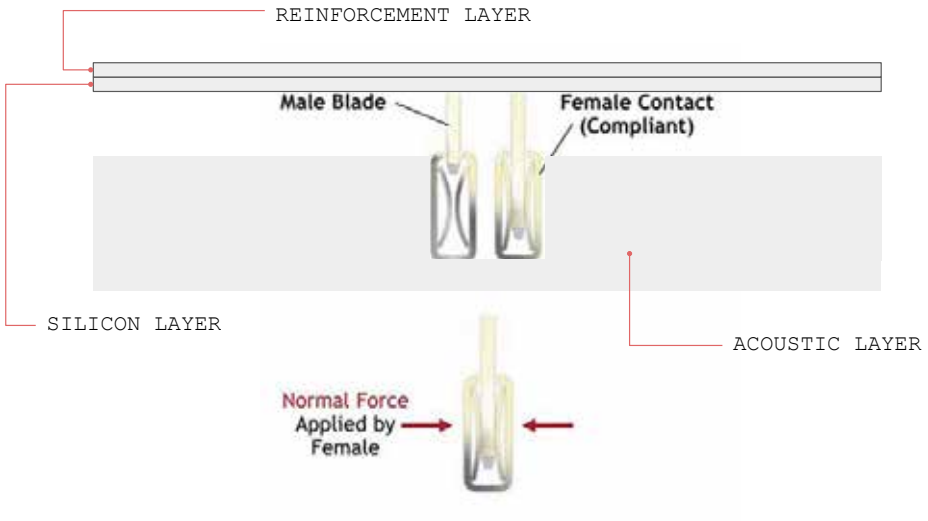
6. **Connecting concepts**
7. Oxygen system Analysis

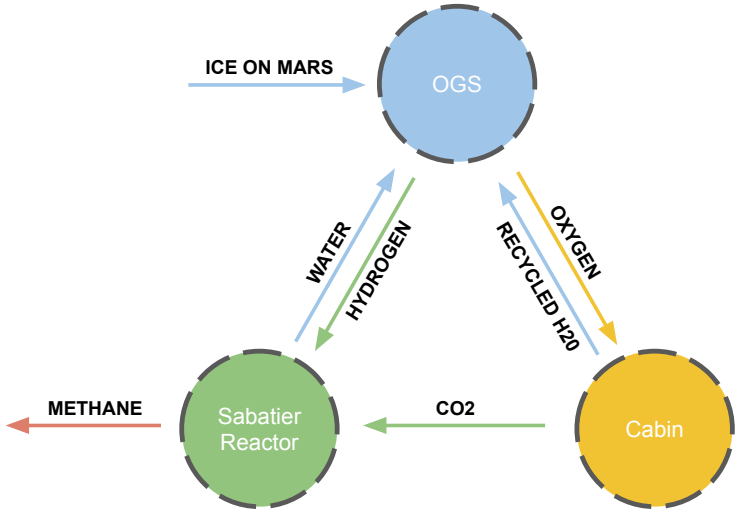




1:1 Interactive Architectural Prototypes
Group 3

Second Pitch

1. Overall Scheme
2. Structural analysis
3. Structural concepts
4. Acoustic analysis
5. Acoustic concepts
6. Connecting concepts
7. **Oxygen system Analysis**



OGS (Oxygen generation system)

By using electrolysis, water is transformed into oxygen and hydrogen in this system.

Production:
- Continuous operation - 9 kg of oxygen per day
- Cyclic operation - 5.5 kg of oxygen per day

Oxygen required:
- 840 g per person per day
- Replacement of oxygen lost due to experiment use, airlock depressurisation, module leakage and carbon dioxide venting.

Hydrogen:
- Hydrogen is fed into the **Sabatier reactor**
- Combines the H2 with CO2 to create water and methane.
- The water then feeds back into OGS

Water:
- Sabatier reactor
- Recycled water from urine, waste water, condensation.
- Ice below Mars's surface could be used.