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POLAR ASCEND

AR122

1:1 Interactive Architecture Prototypes

Mid Term - 13/03/2026

1 LIVING IN ANTARCTICA | KEY CHALLENGES

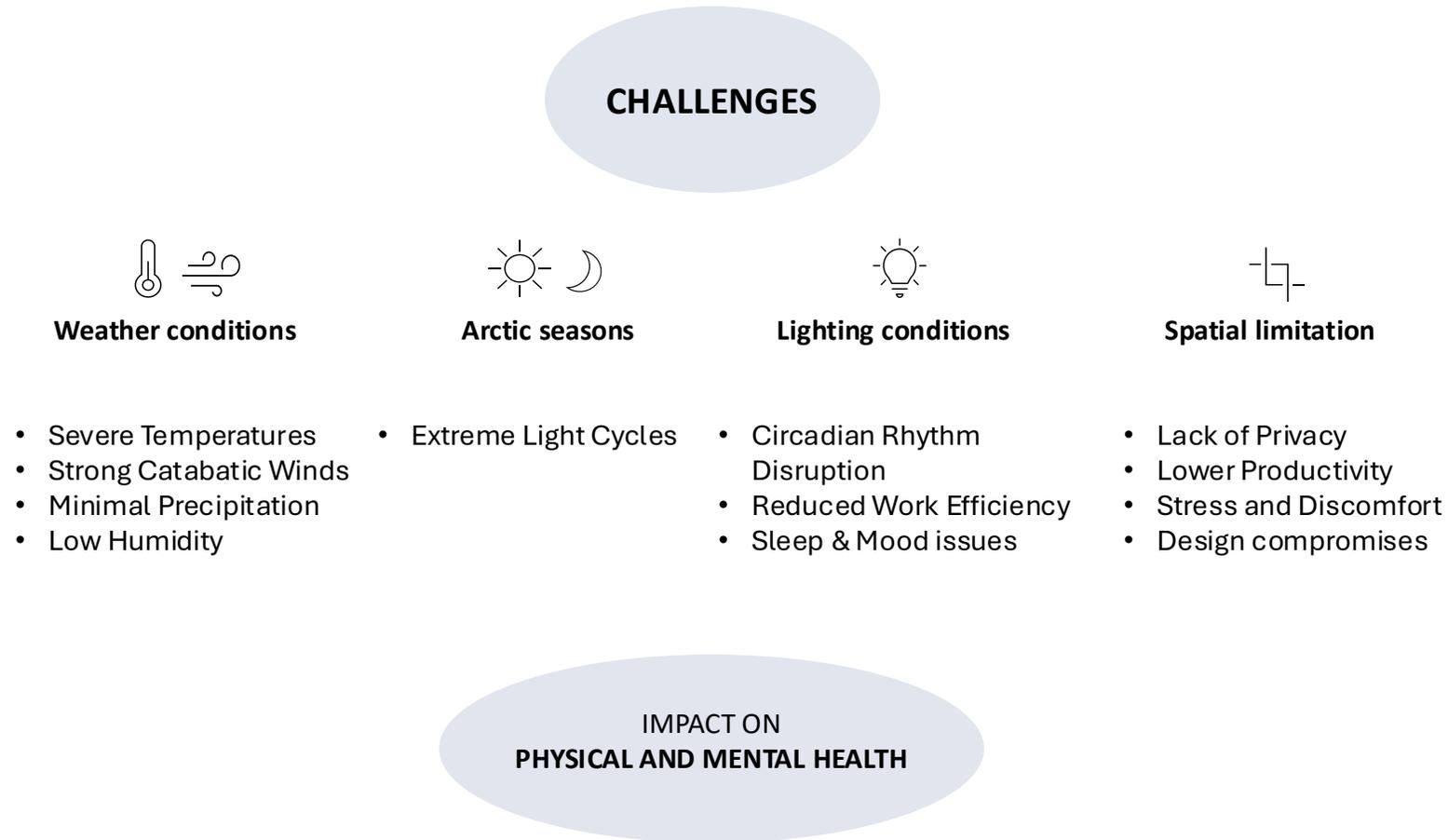


Fig. 1 – Diagram Challenges



1 LIVING IN ANTARCTICA | PROJECT GOAL

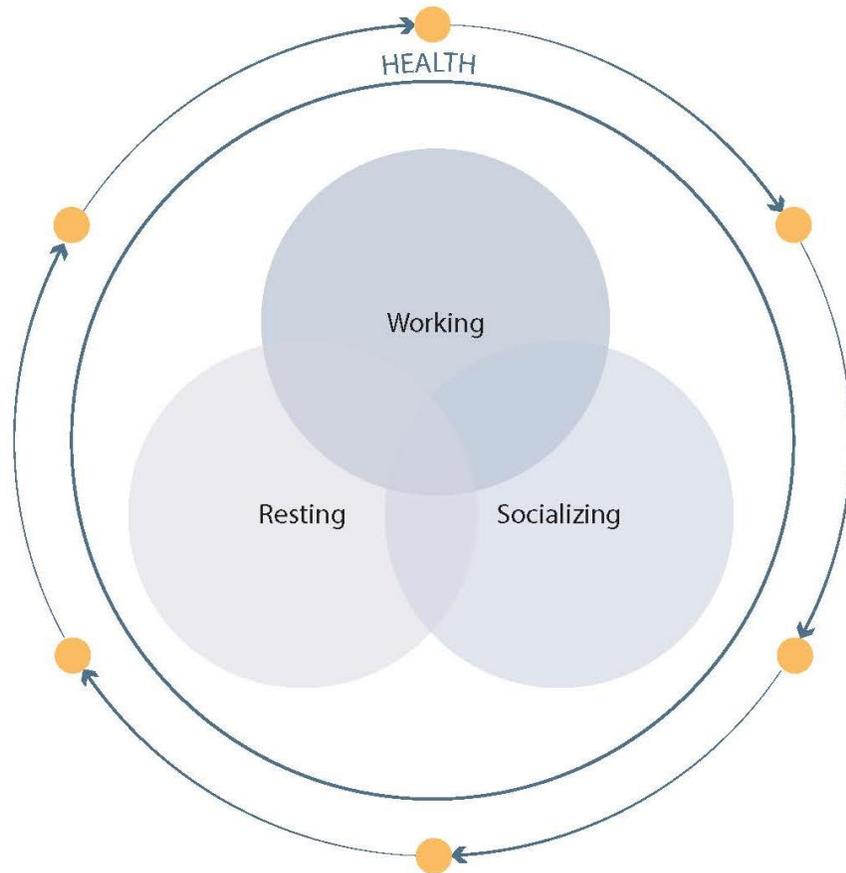


Fig. 3 – Functional Division

Group 3

Fig. 2 – Troll Research Station, Norsk Polarinstitt



AR122 1:1 Interactive Architecture Prototypes

2 DESIGN CONCEPT | THE MOUNTAIN EXPEDITION

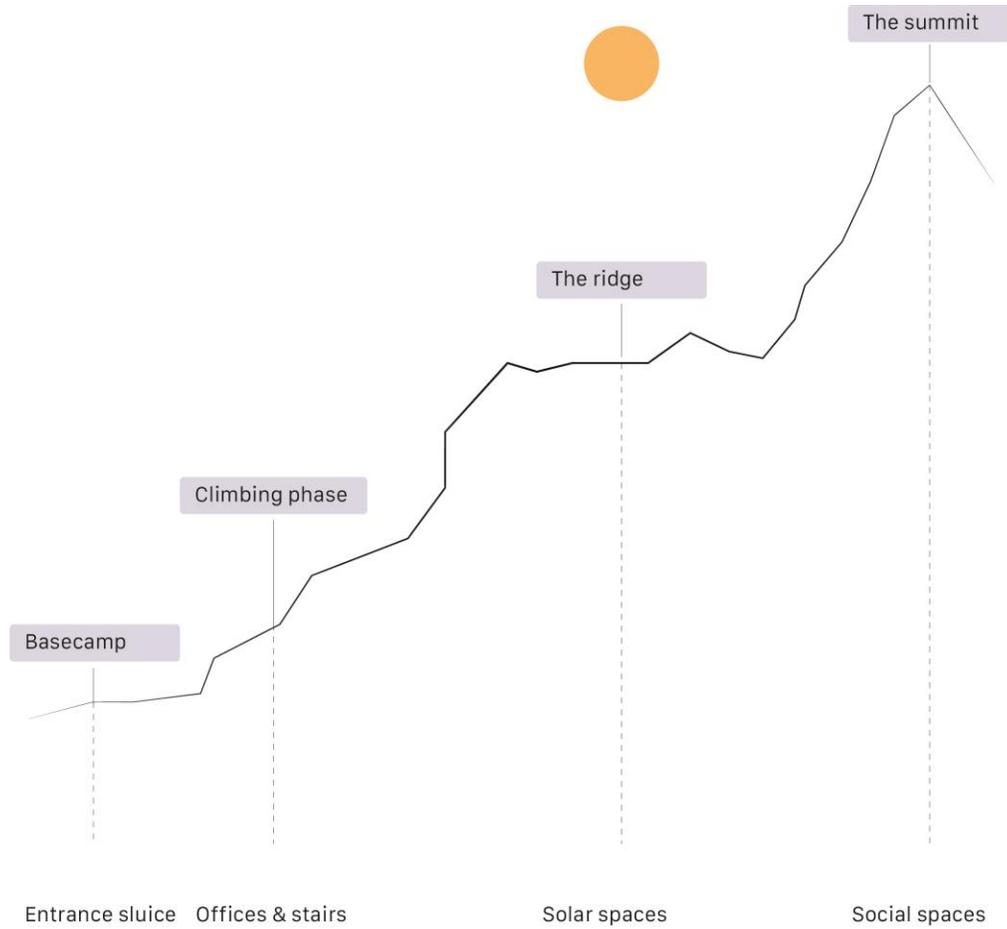


Fig. 4 – Concept Ascend



2 DESIGN CONCEPT | **STACKING**

- Spatial Varsity
- Amplify the quality of each function
- Vertical corridor
- Reduced footprint
- Less foundation

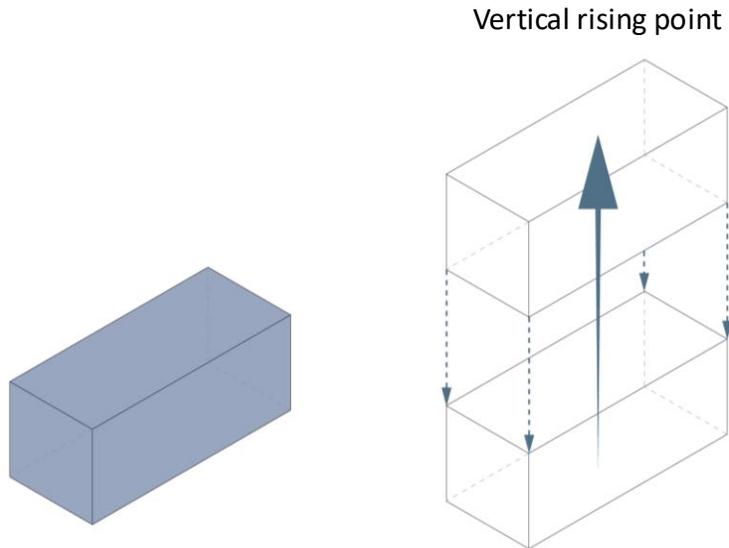


Fig. 5 – Diagram Stacking & Arraying

Fig. 6 – Exterior Vision, AI generated



2 DESIGN CONCEPT | ARRAYING

- Air Lock as a horizontal connector

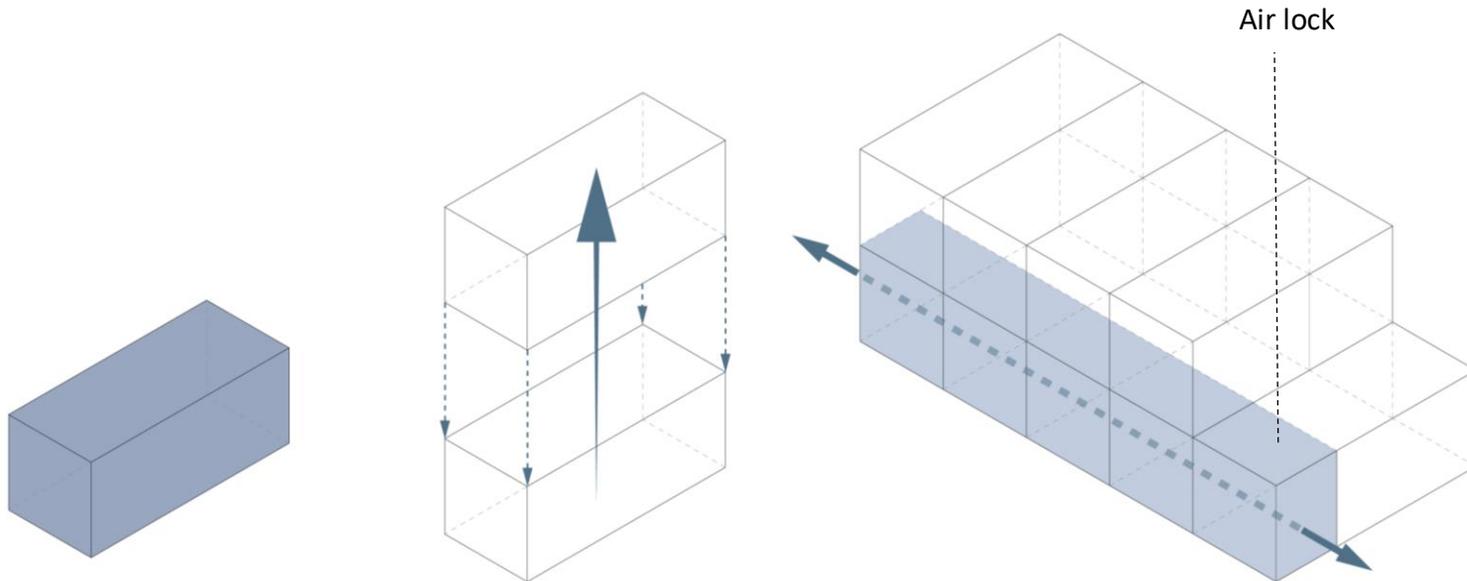


Fig. 5 – Diagram Stacking & Arraying

Fig. 6 – Exterior Vision, AI generated



2 DESIGN CONCEPT | ZONING

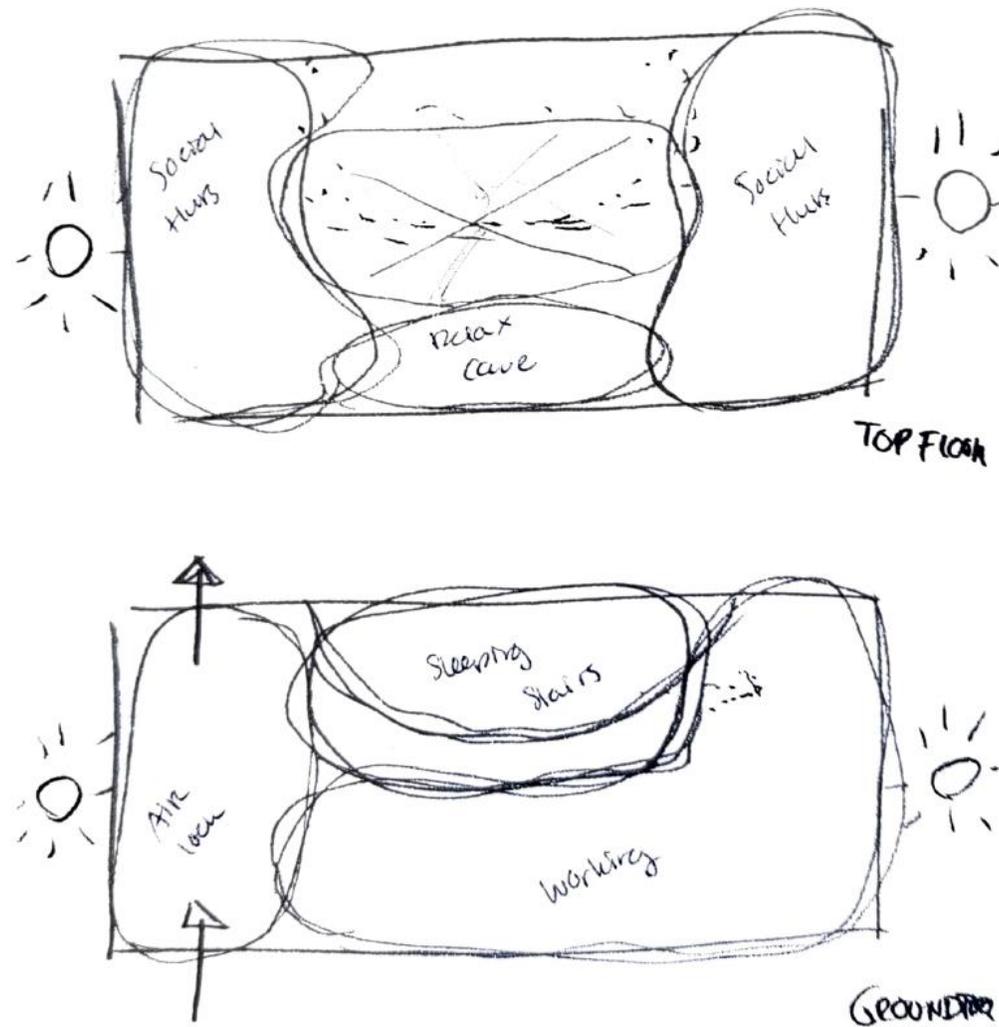
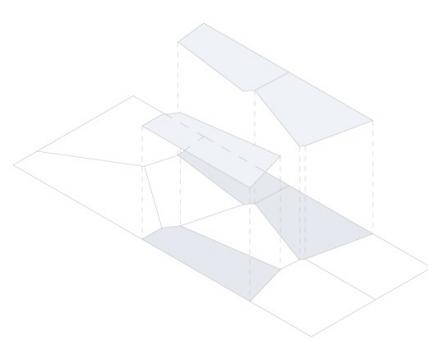
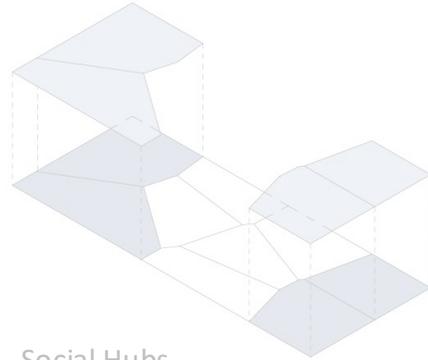


Fig. 7 – Zoning Sketch

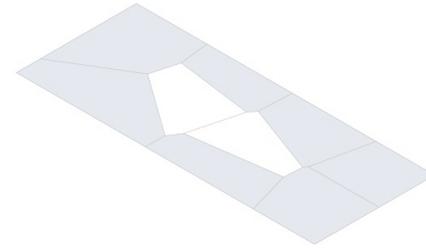
2 DESIGN CONCEPT | SPATIAL CONFIGURATION



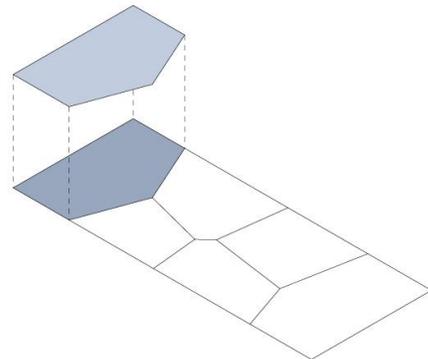
Relaxing cave



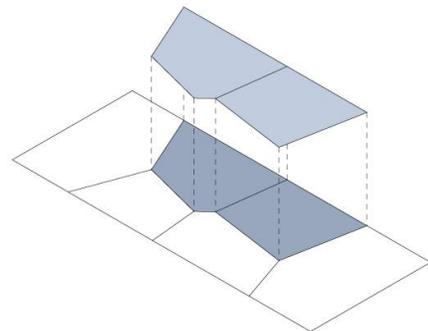
Social Hubs



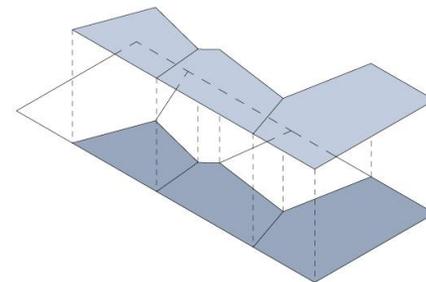
Void



Entrance/Air lock



Stairs/Bed



Kitchenette/Lab

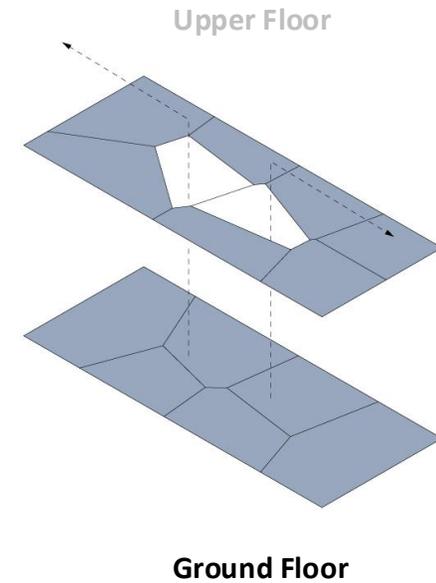
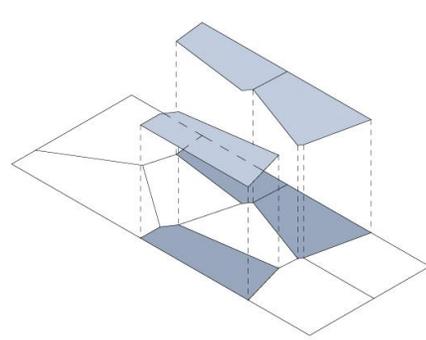
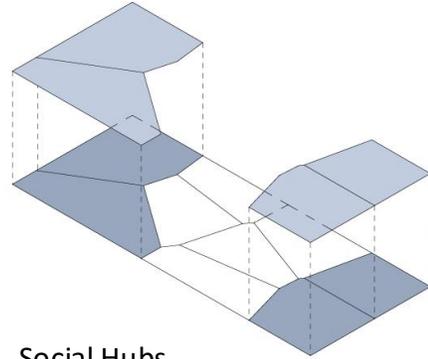


Fig. 8 – Voronoi Zoning / Spatial Configuration

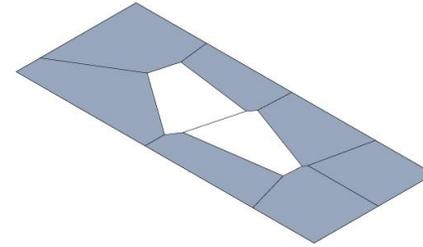
2 DESIGN CONCEPT | SPATIAL CONFIGURATION



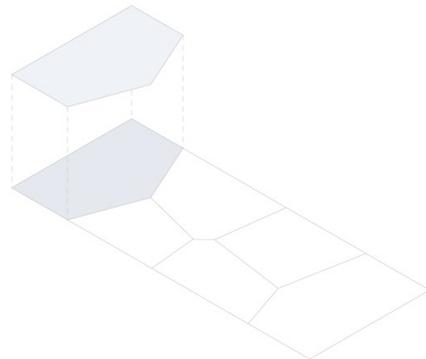
Relaxing cave



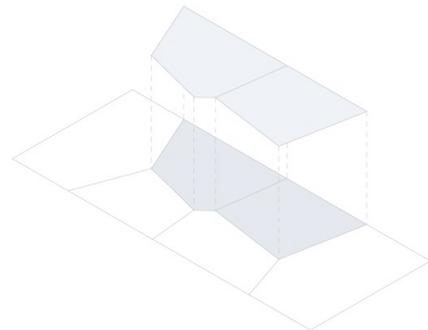
Social Hubs



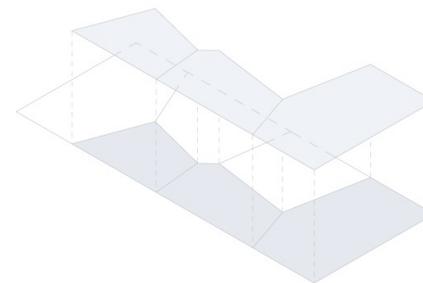
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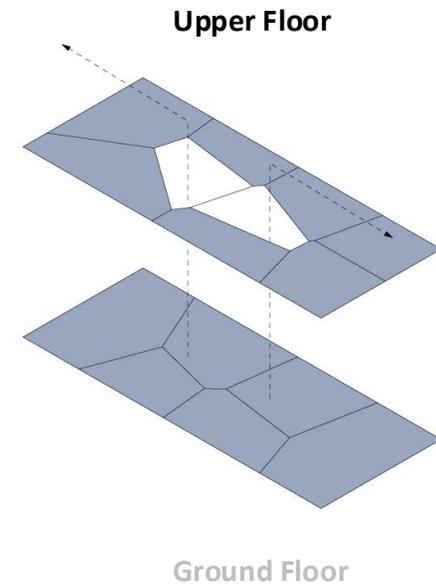


Fig. 8 – Voronoi Zoning / Spatial Configuration

2 DESIGN CONCEPT | SPATIAL CONFIGURATION

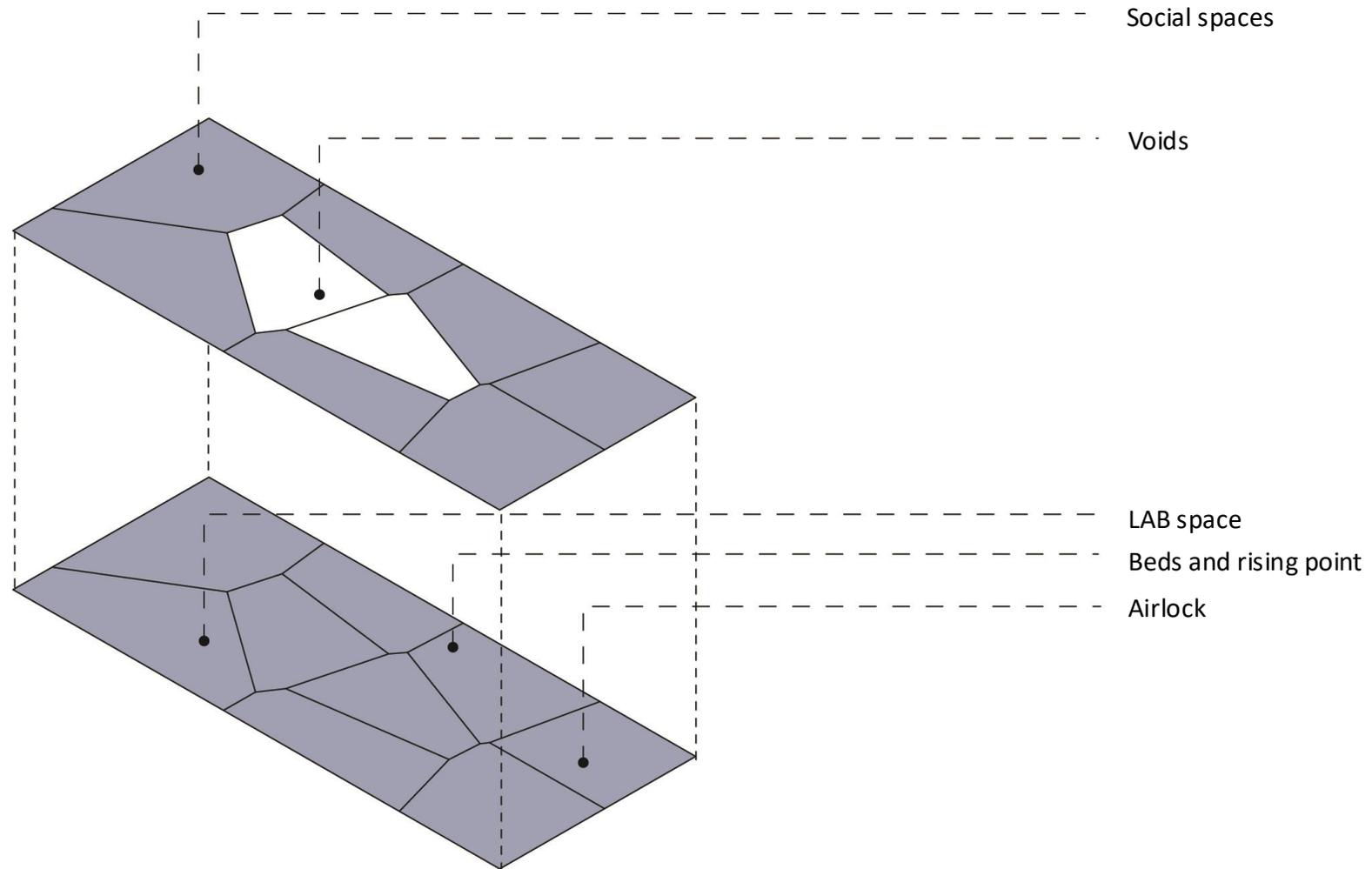


Fig. 8 – Voronoi Zoning / Spatial Configuration

3 FUNCTIONAL SPACES | ACTIVITY MAPPING

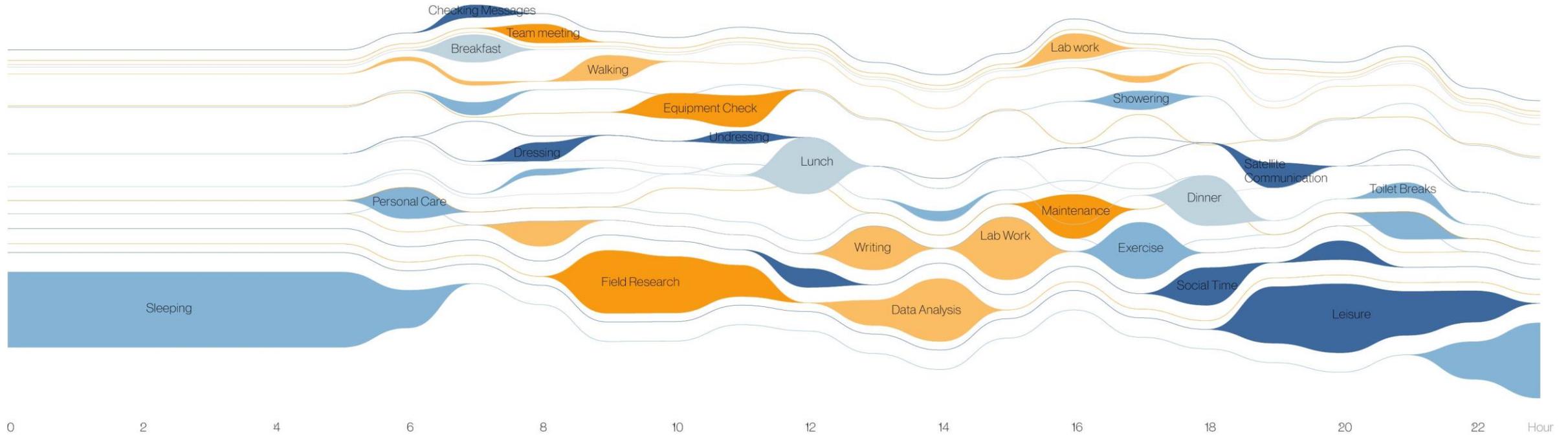


Fig. 9 – Activity Mapping

3 FUNCTIONAL SPACES | ENTRANCE/AIRLOCK

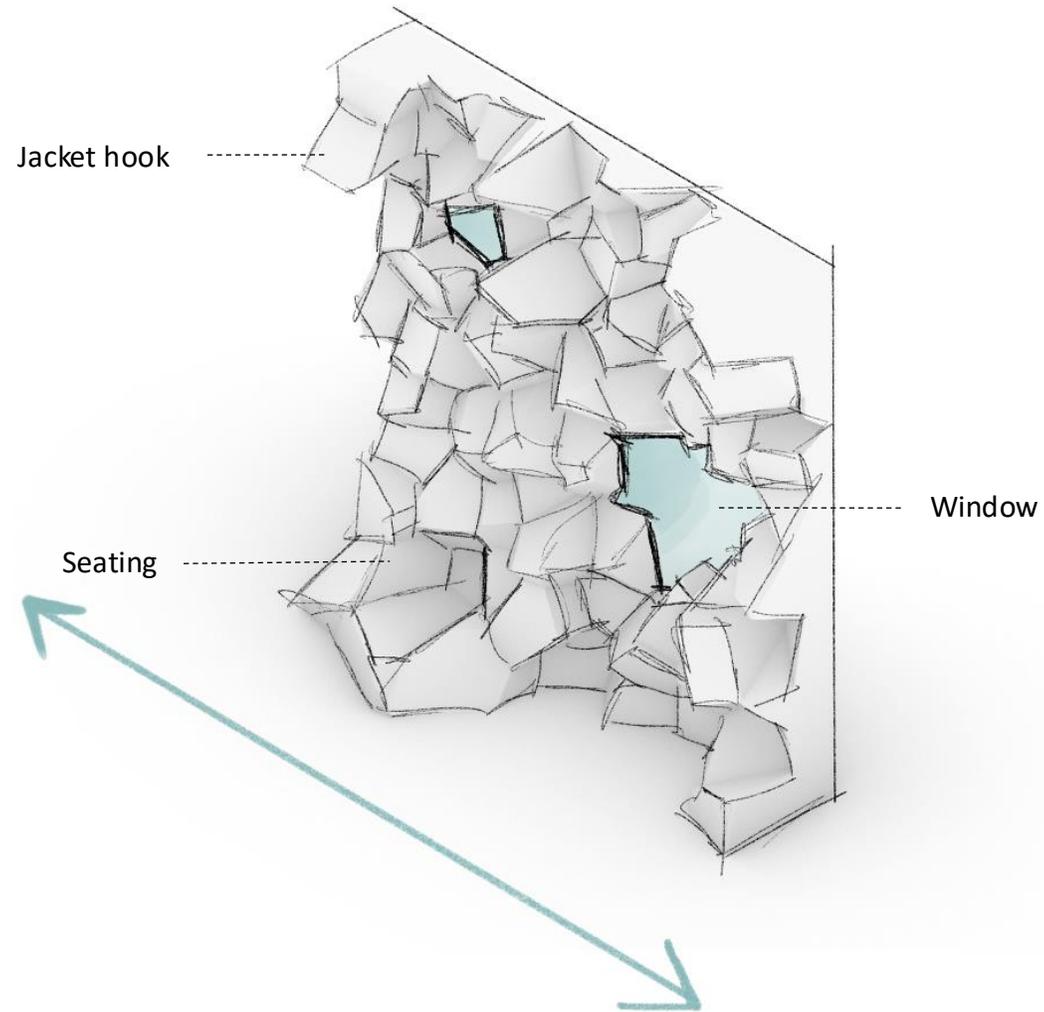


Fig. 10 – Schematic Design – Entrance/Airlock

3 FUNCTIONAL SPACES | CLIMB/SLEEP

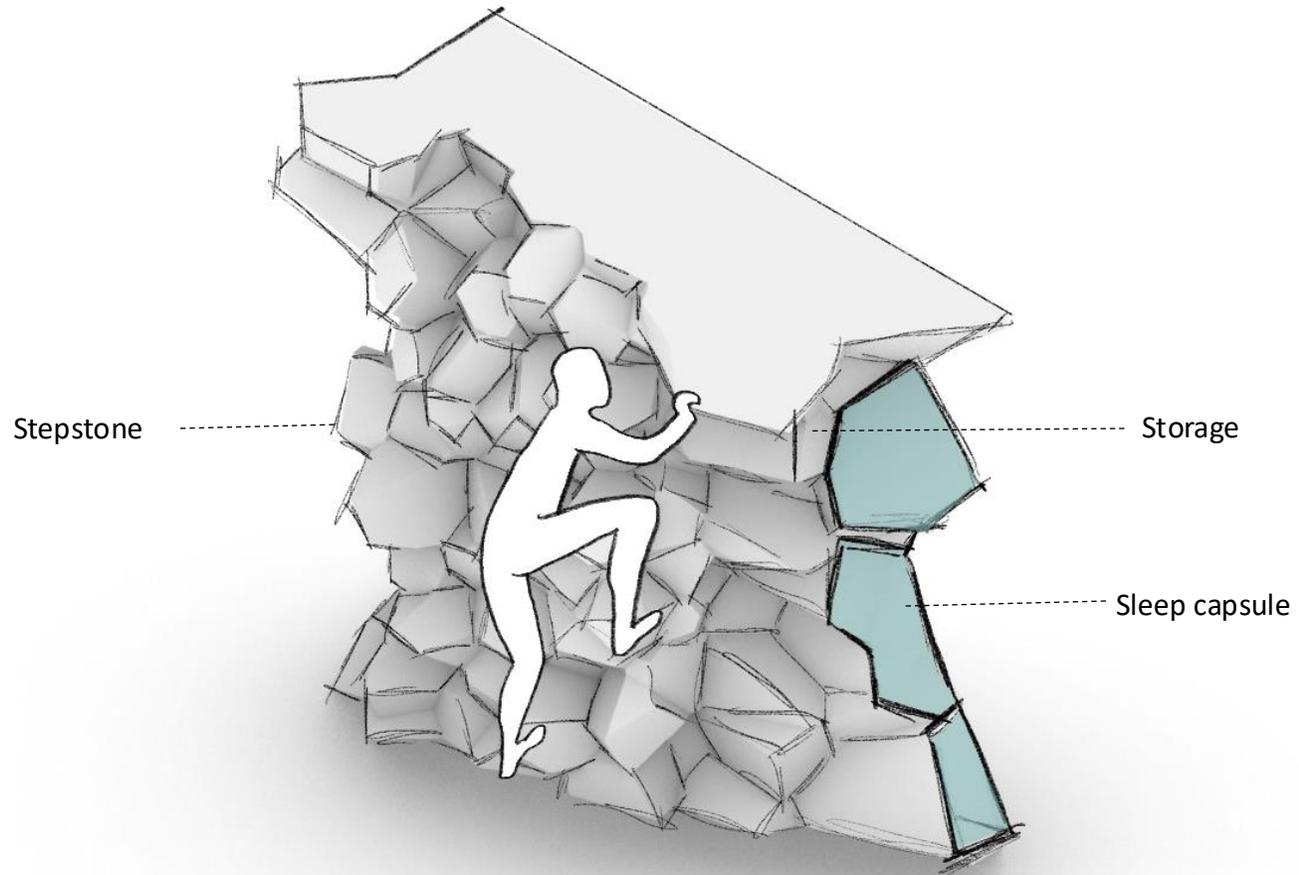
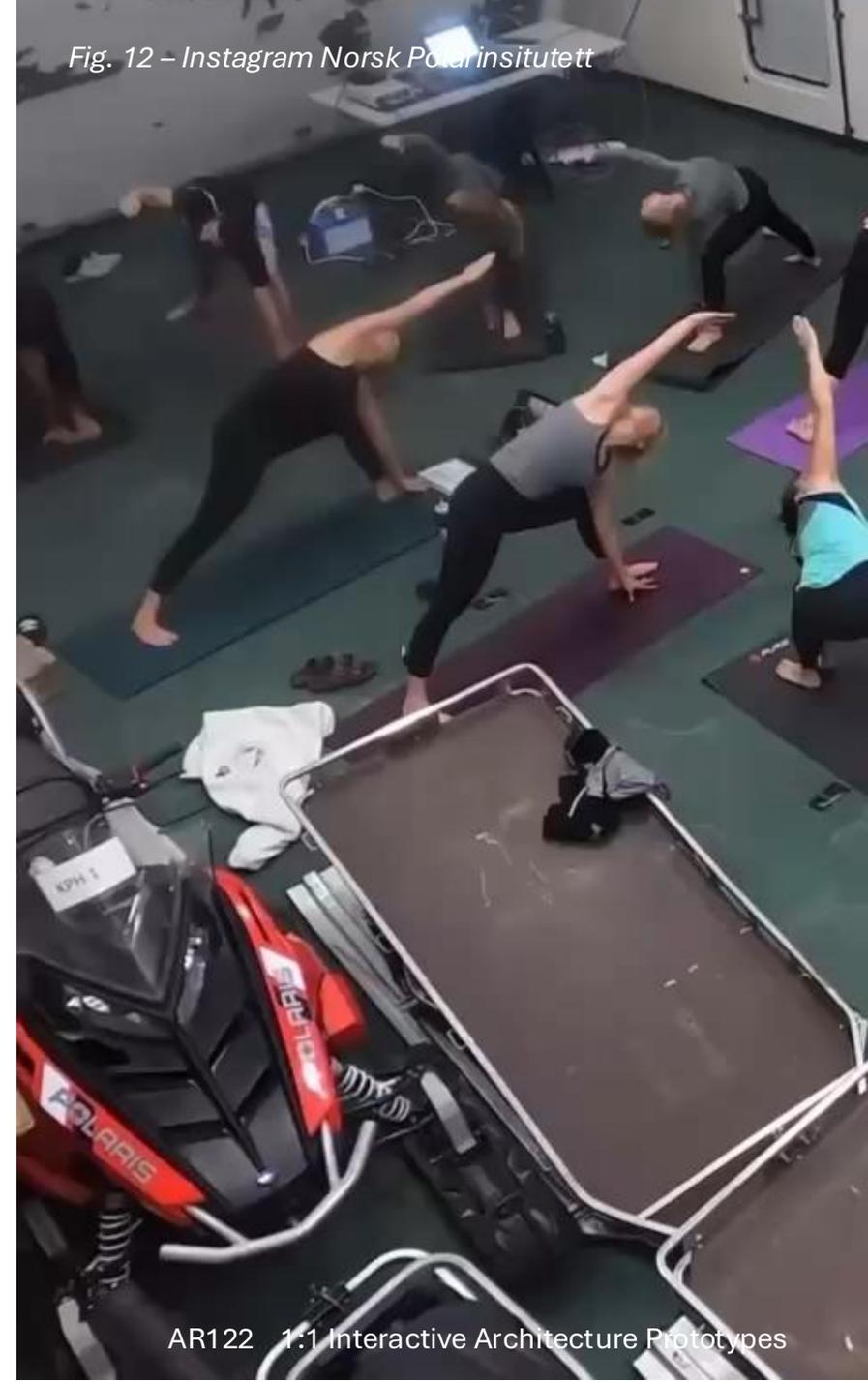


Fig. 11 – Schematic Design - Climb/Sleep

Fig. 12 – Instagram Norsk Polarinstitutt



3 FUNCTIONAL SPACES | KITCHENETTE/LAB



Fig. 13 – Schematic Design – Kitchenette/Lab

3 FUNCTIONAL SPACES | RELAXATION CAVE

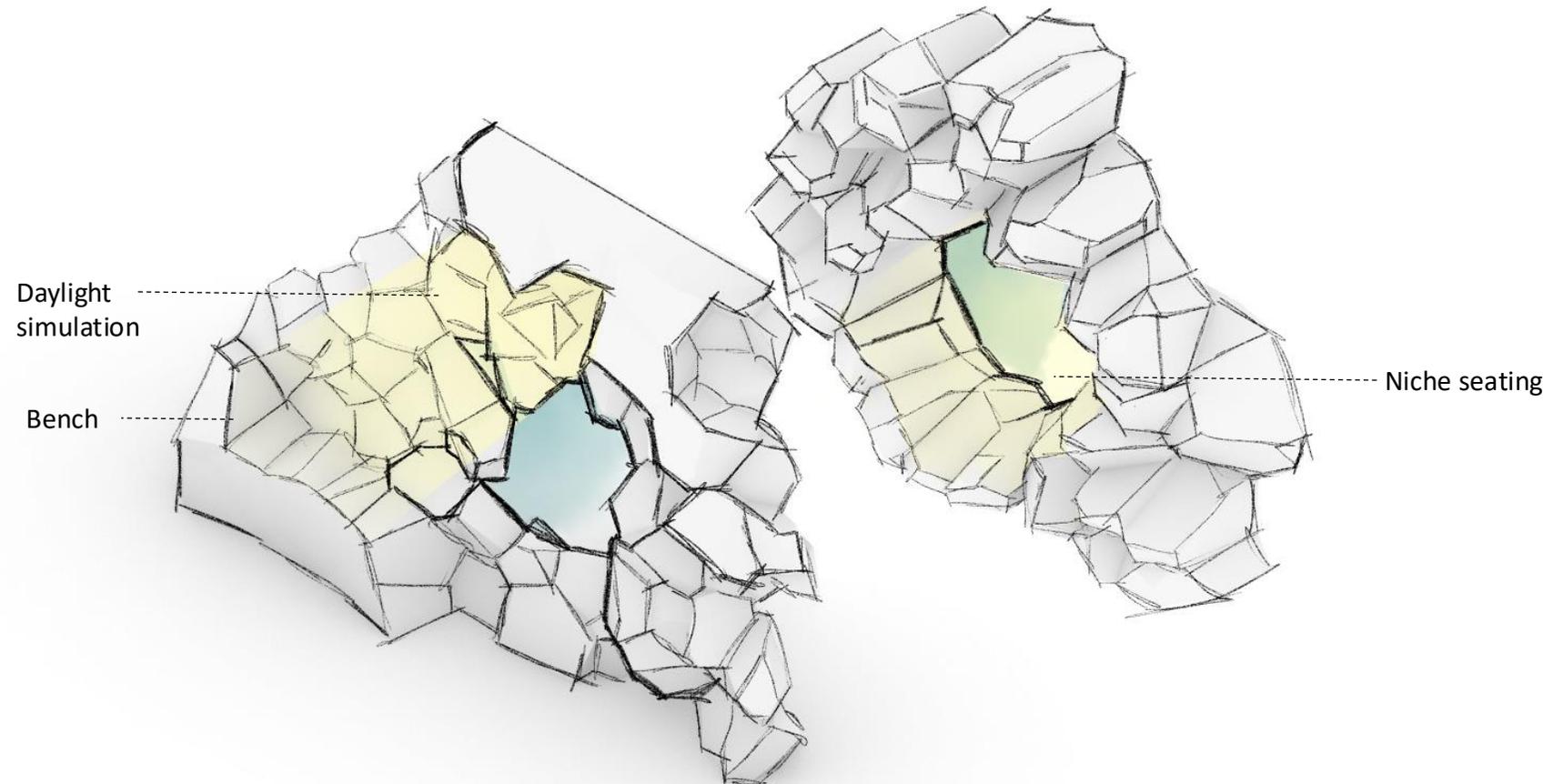


Fig. 14 – Schematic Design – Relaxation Cave

3 FUNCTIONAL SPACES | SOCIAL HUB

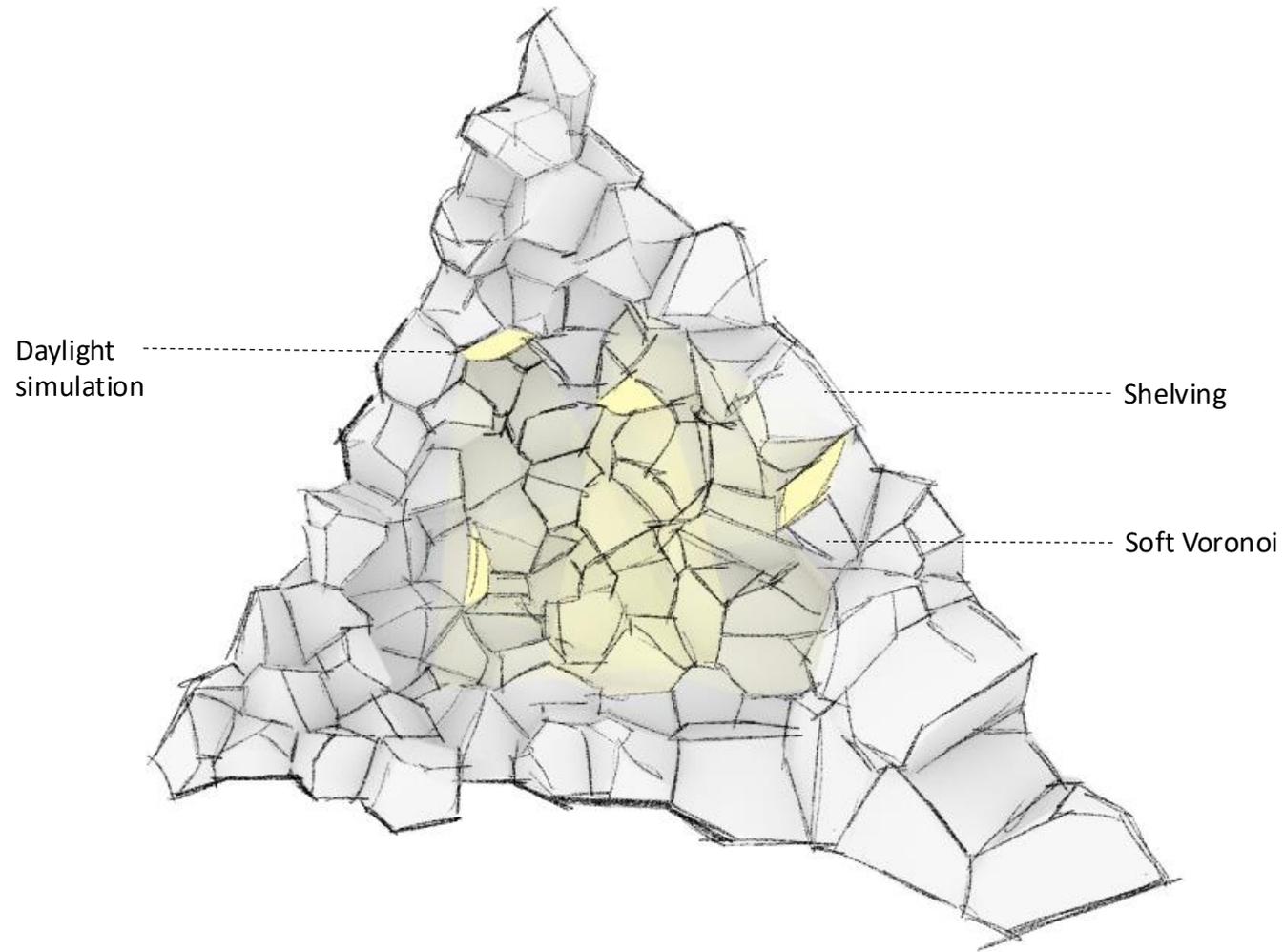
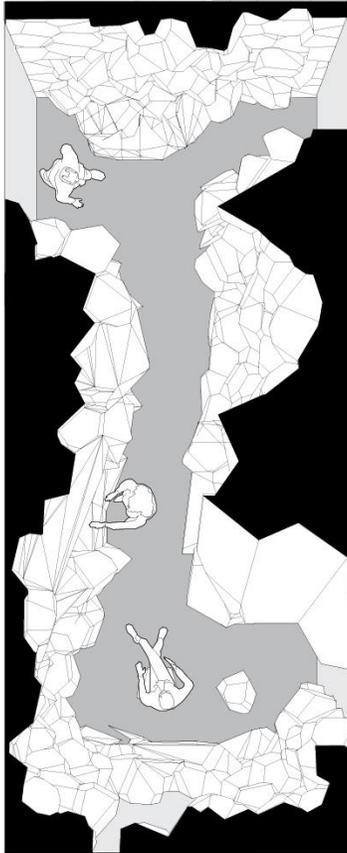
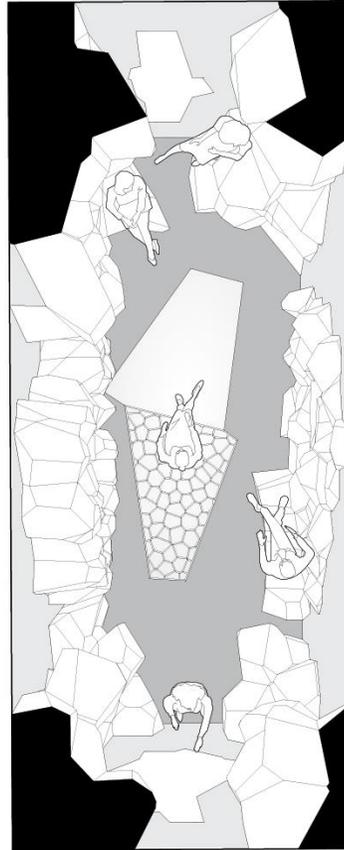


Fig. 15 – Schematic Design - Social Hub

4 INTERIOR OVERVIEW | FLOORPLANS



Ground Floor



Upper Floor

Fig. 16 – Floorplans

Fig. 17 – Interior Vision, AI generated



4 INTERIOR OVERVIEW | FLOORPLANS

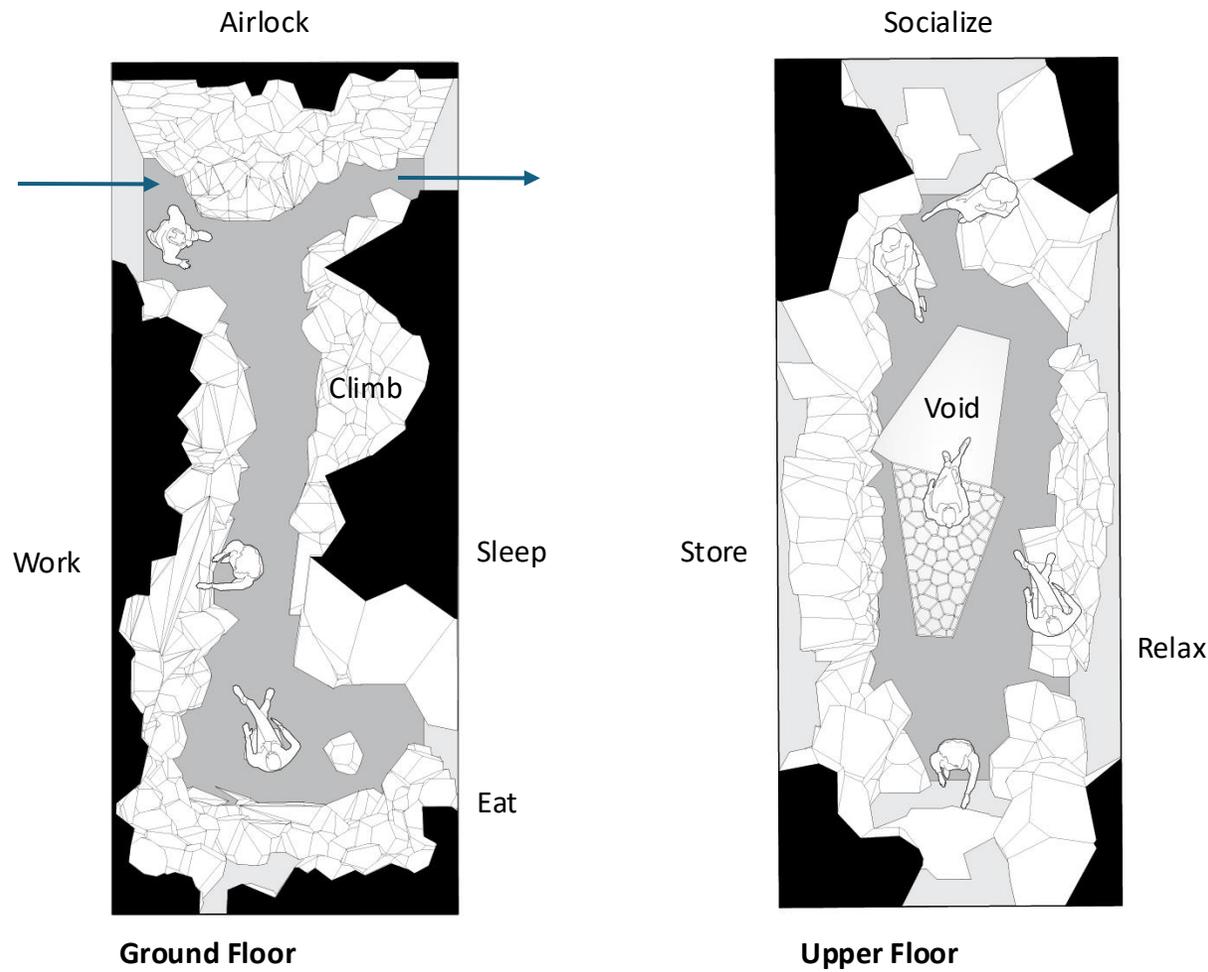


Fig. 16 – Floorplans

Fig. 17 – Interior Vision, AI generated



5 LIGHTING | OUTDOOR DAYLIGHT CONDITIONS

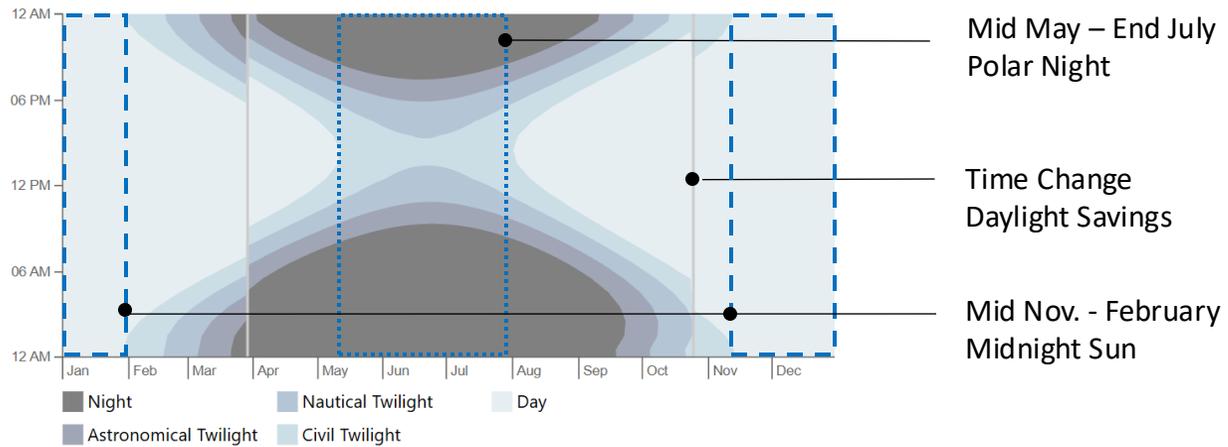
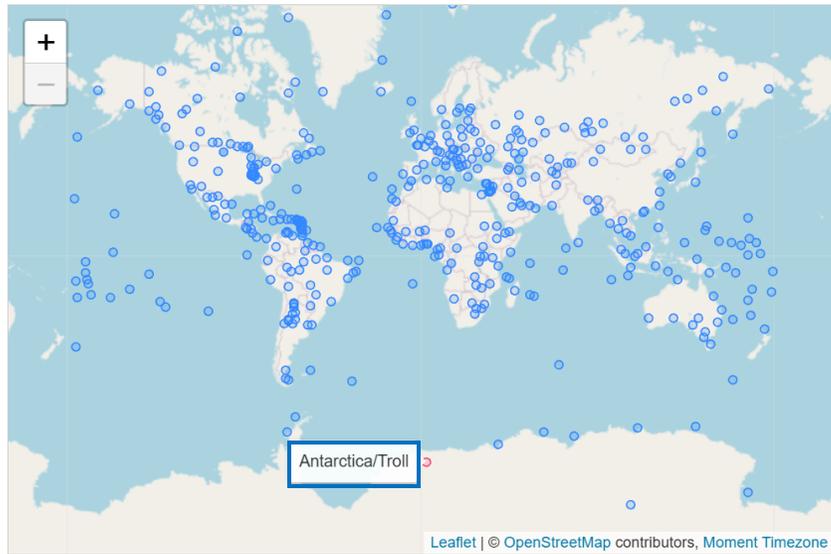


Fig. 18 – Daylight Conditions – Troll Station

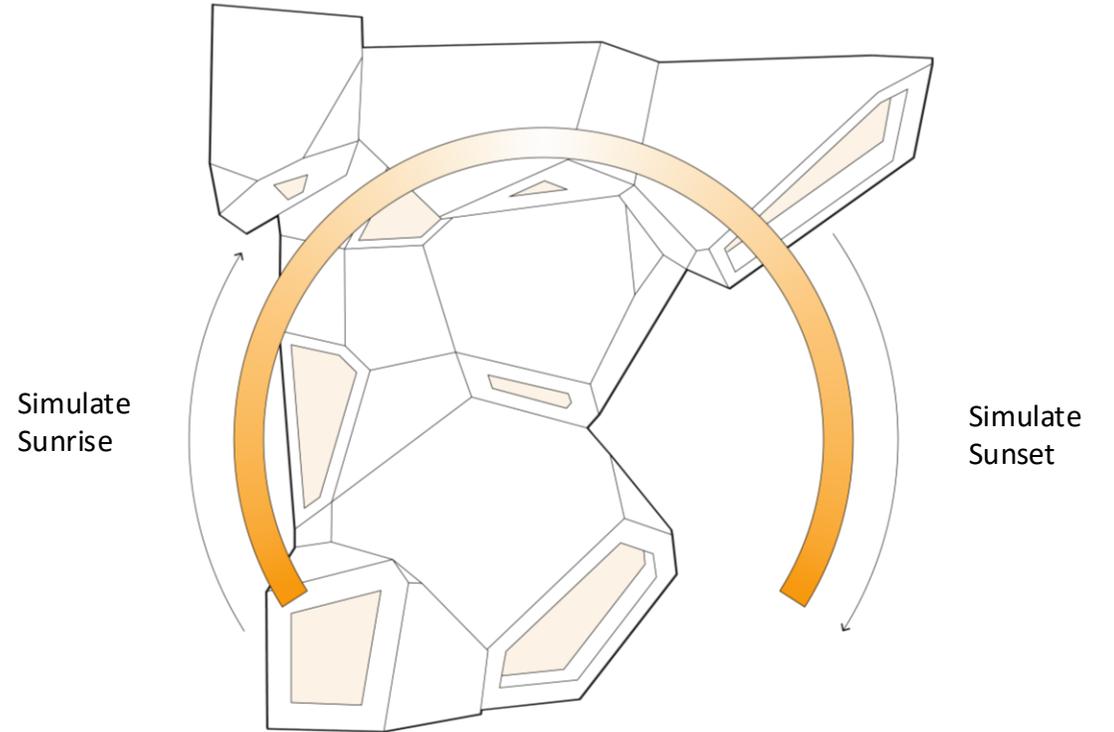


Fig. 19 – Concept Diagram Lighting

5 LIGHTING | MATRIX & SIMULATION

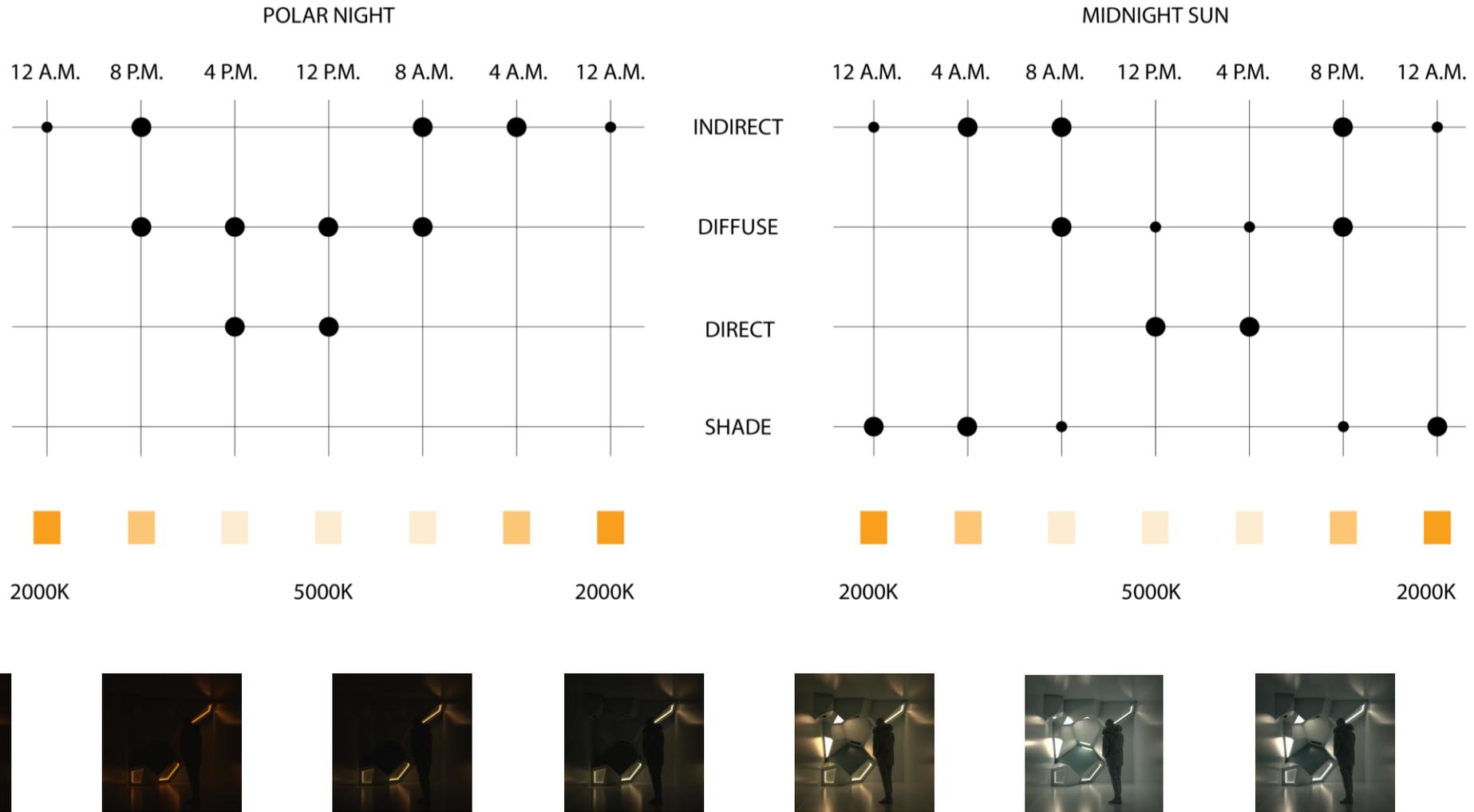


Fig. 20 & 21 – Lighting Matrix & Light Simulation

5 LIGHTING | ANIMATION VISION

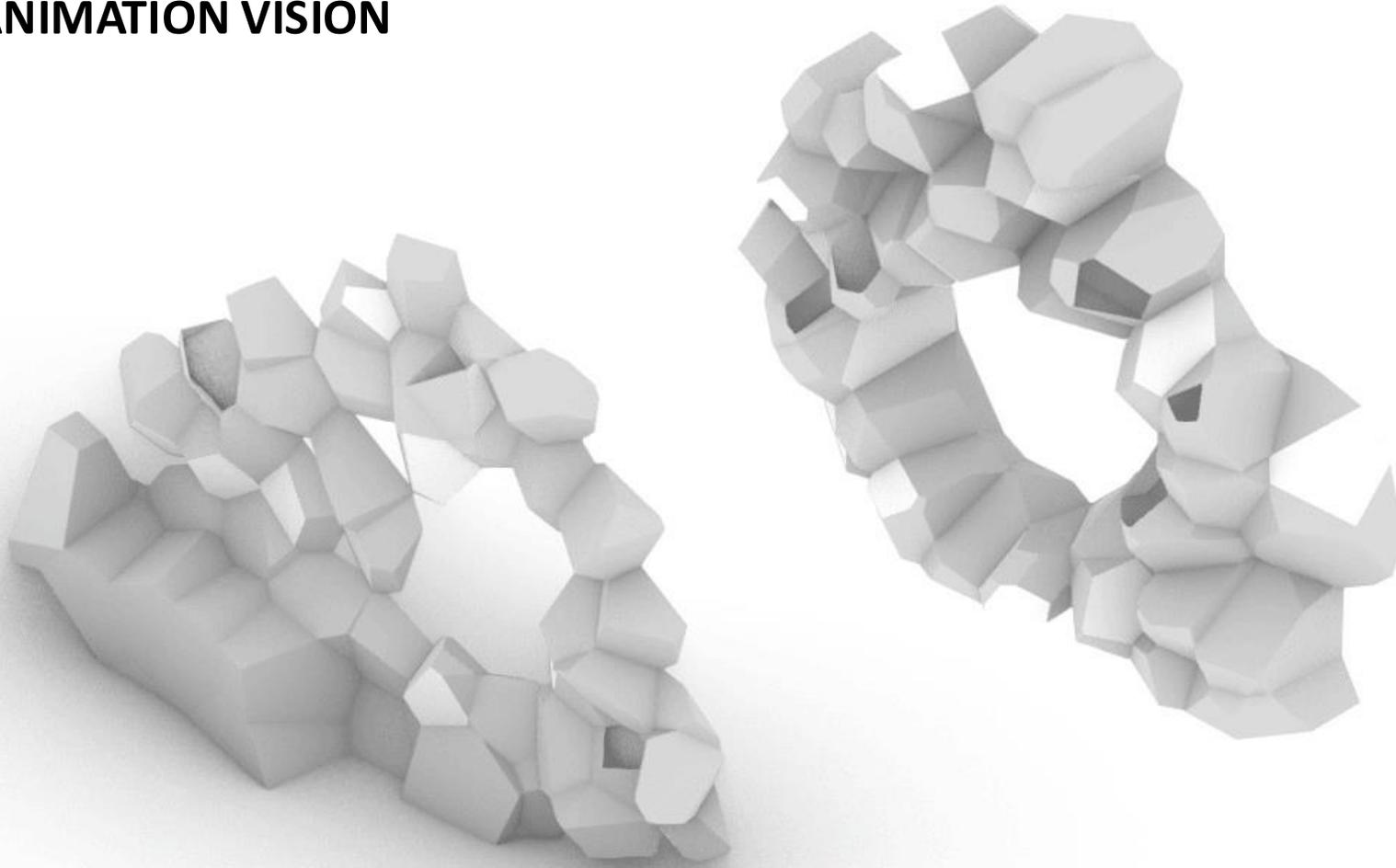


Fig. 22 – Animation Lighting

5 LIGHTING | FURTHER DEVELOPMENT

Aml Ambient Intelligence (Aml)

- Context-aware
- Adaptive
- Responsive to human presence

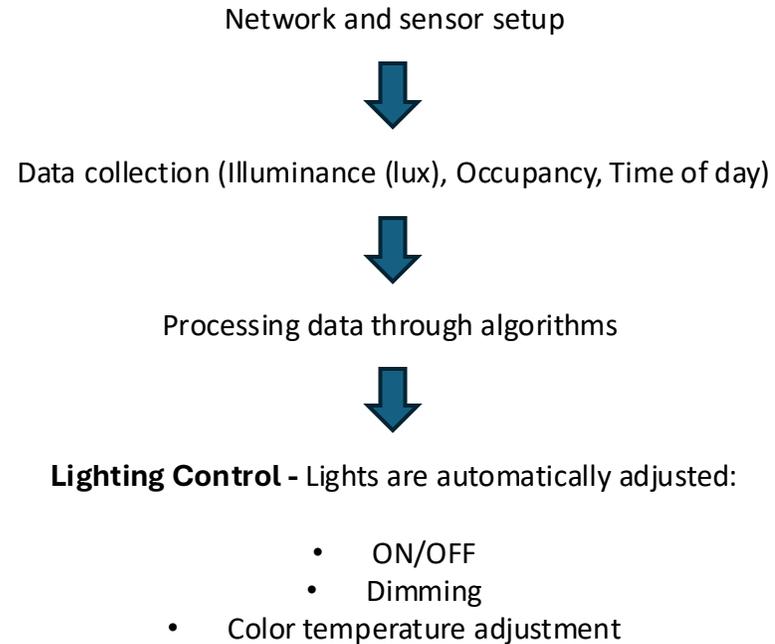
WSN (Wireless Sensor Network)

- Sense environmental conditions
- Process data locally
- Communicate wirelessly with other nodes



Fig. 23 – Illustration AI

5 LIGHTING | FURTHER DEVELOPMENT



- **motion sensors** → detect human movement
- **Light (lux) sensors** → measure daylight intensity
- **Occupancy sensors** → determine if a room is used
- **Temperature sensors** → environmental monitoring

6 FRAGMENT | MINIMAL VORONOI CELL

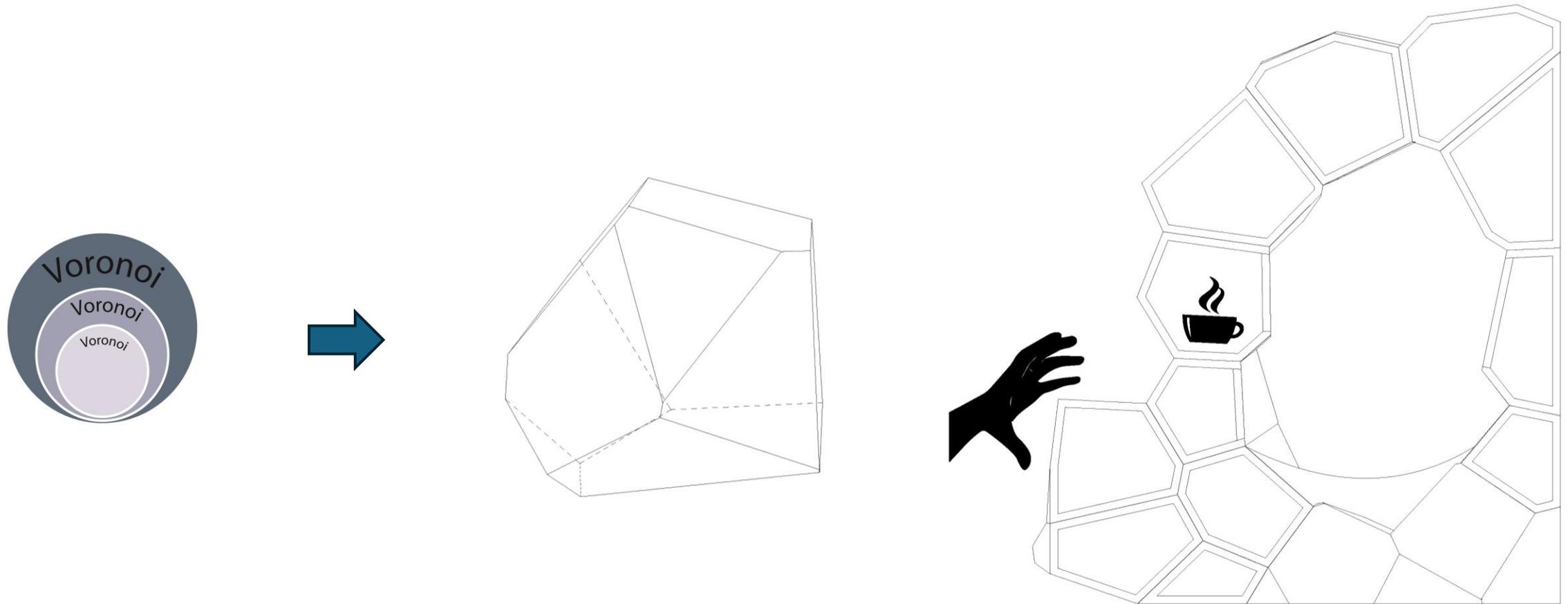


Fig. 24 – Fragment Diagrams

7 FRAGMENT | EMERGENCY LIGHTING

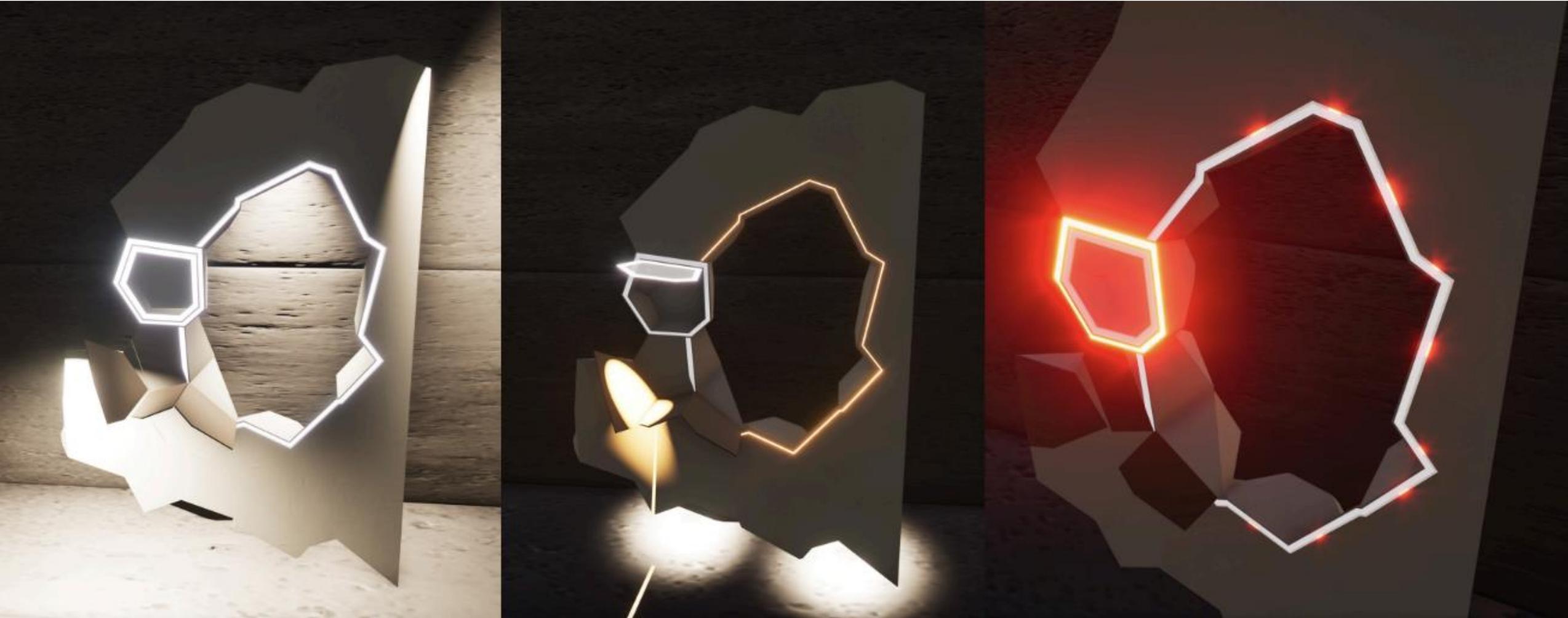


Fig. 25 – Animation Emergency Lighting

7 FRAGMENT | EMERGENCY LIGHTING



Fig. 25 – Animation Emergency Lighting

8 FOLDING | STORAGE

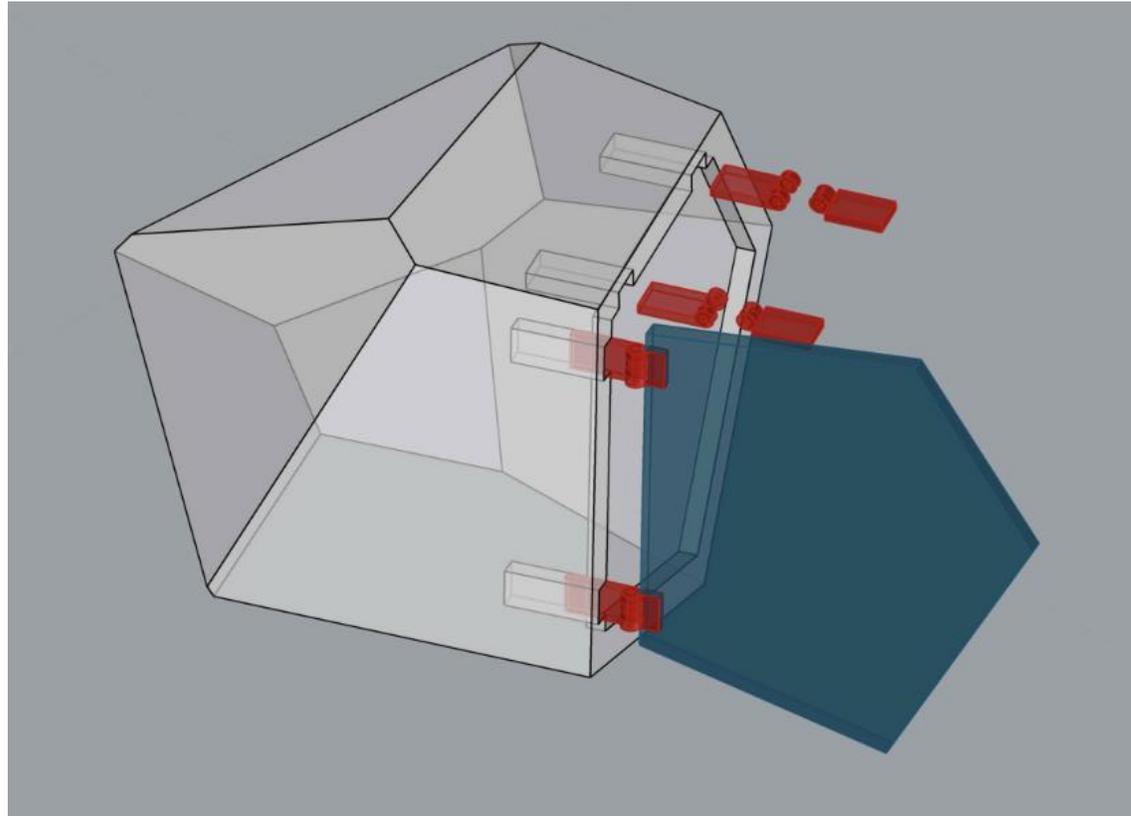


Fig. 25 – Animation Folding

8 FOLDING | **PRIVACY SCREENS & TABLES**

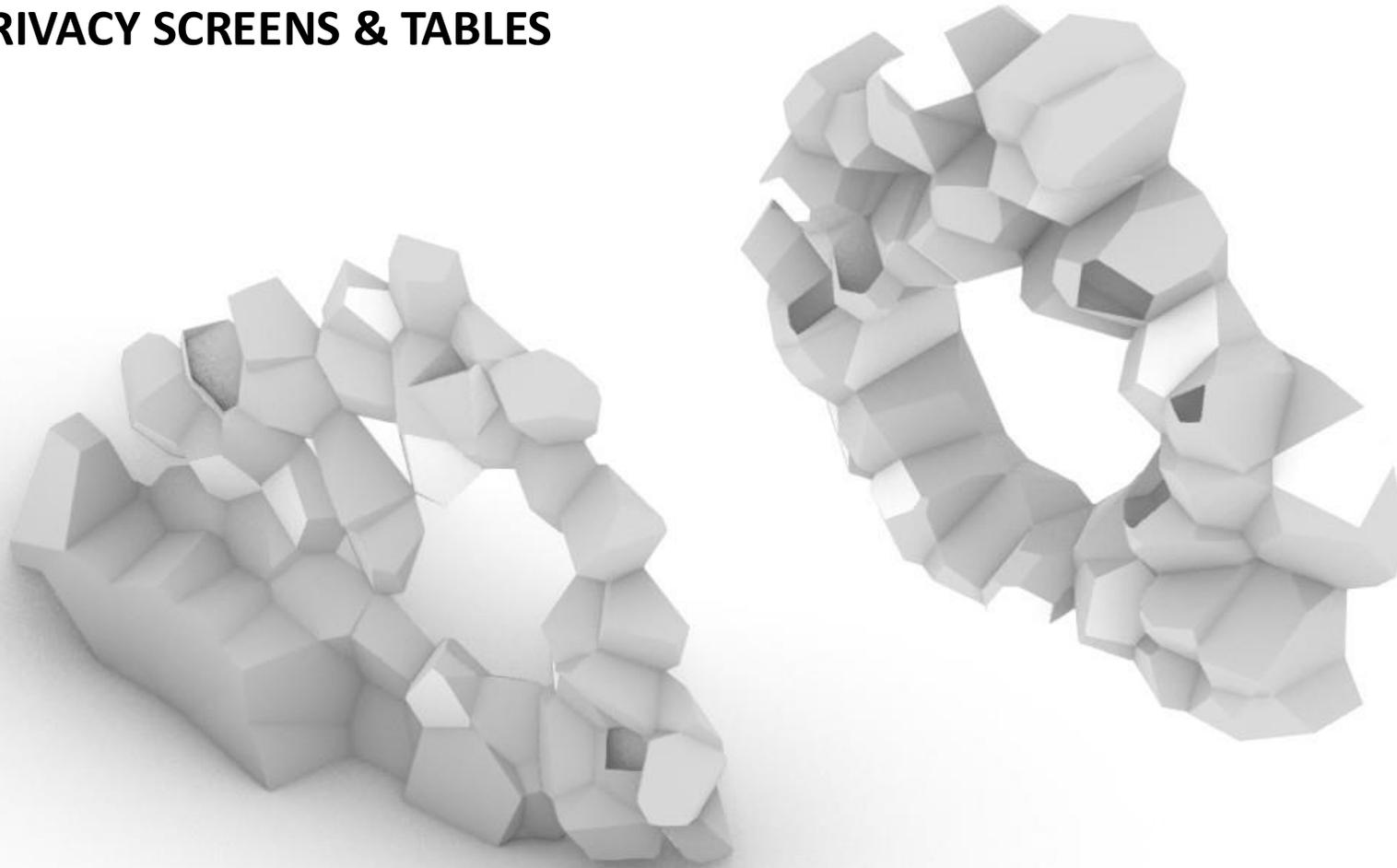


Fig. 26 – Animation Folding

8 FOLDING | STORAGE

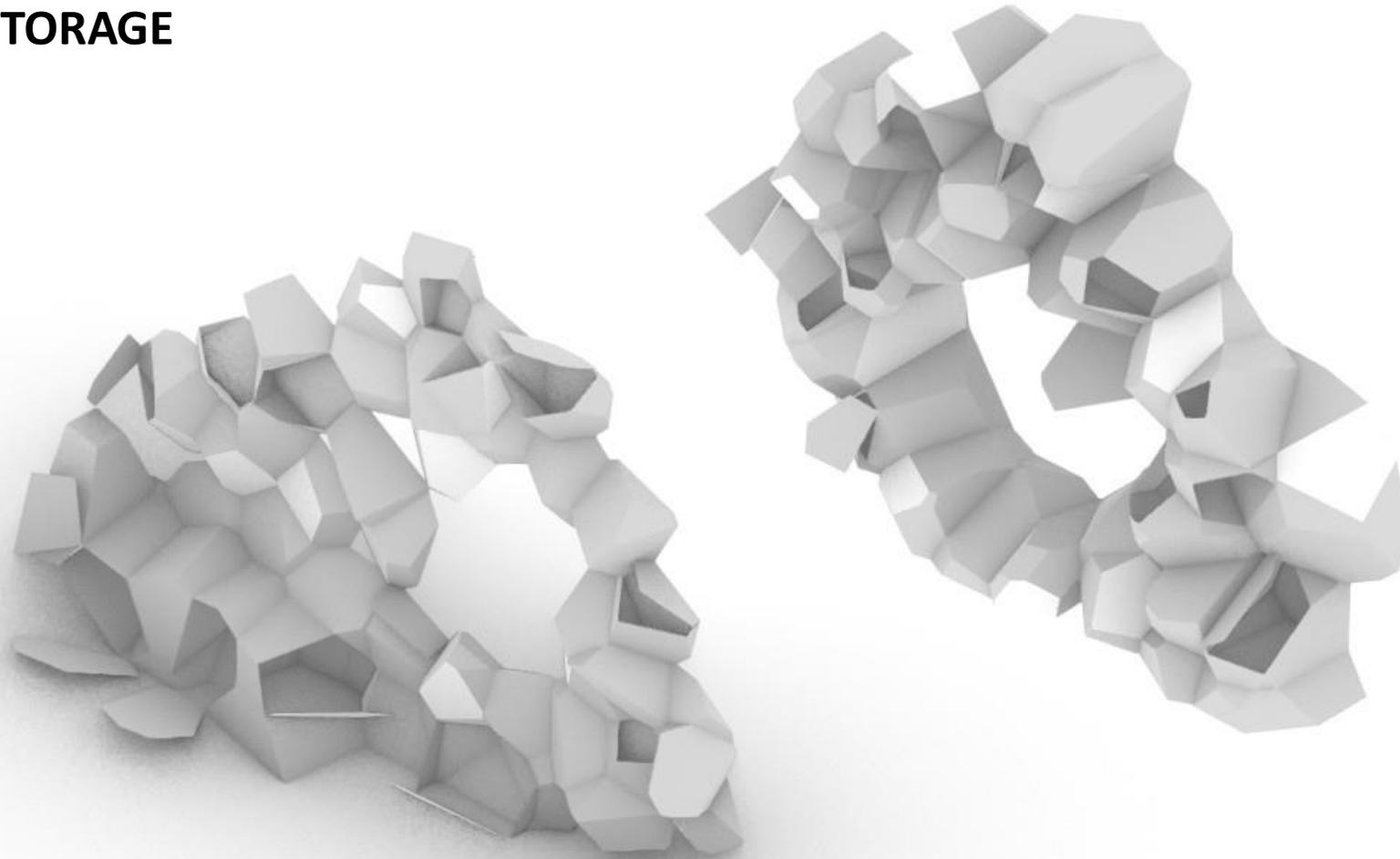
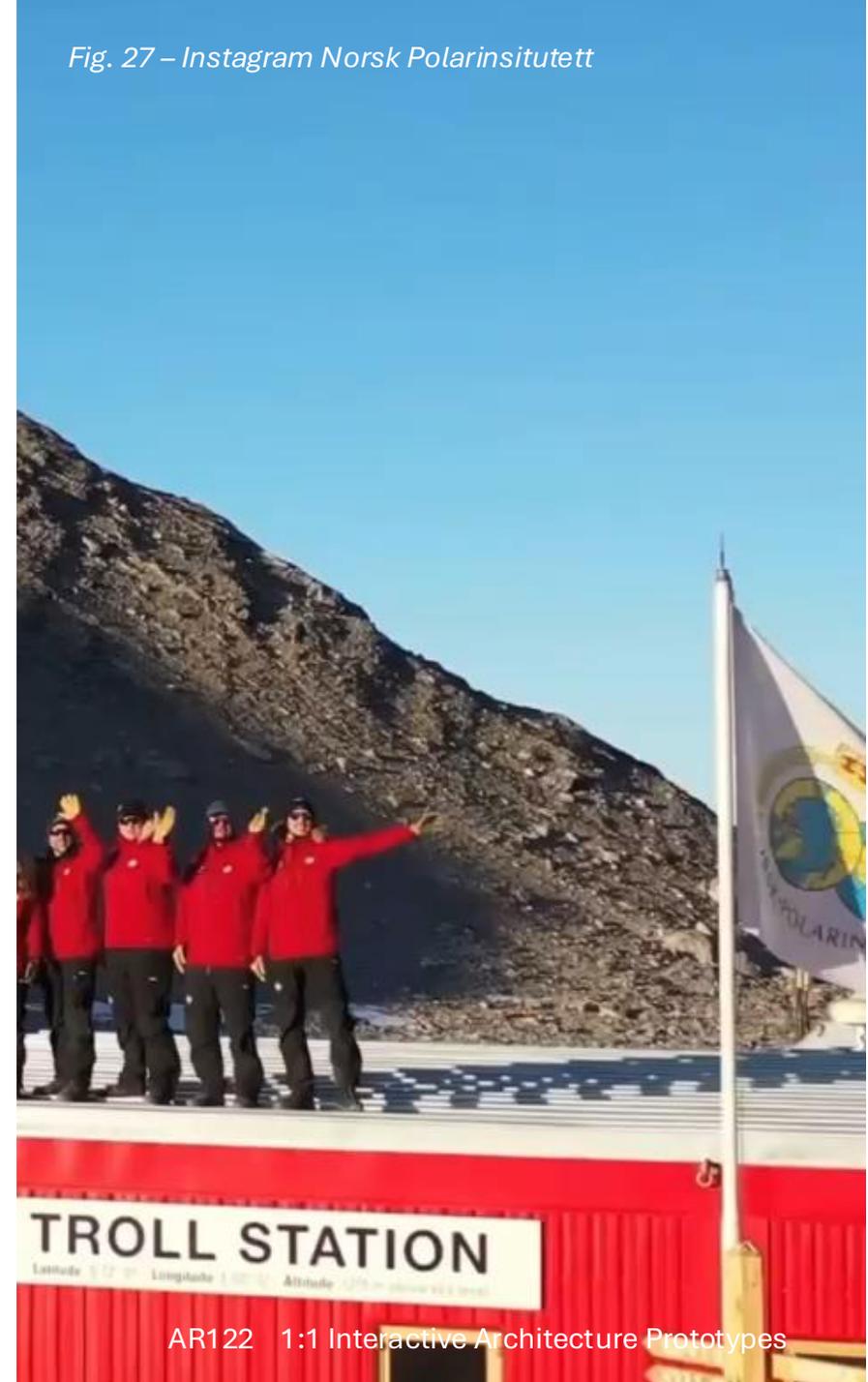


Fig. 26 – Animation Folding

THANK YOU FOR YOUR ATTENTION!

Fig. 27 – Instagram Norsk Polarinsitutett



REFERENCES

- Fig. 1 – Diagram Challenges
Diagram created by the authors, March 2026
- Fig. 2 – Troll Research Station, Norsk Polarinstituttt
<https://npolar.no/en/toner/>, March 2026
- Fig. 3 – Functional Division
Diagram created by the authors, March 2026
- Fig. 4 – Concept Ascend
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- Fig. 5 – Diagram Stacking & Arraying
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- Fig. 6 – Exterior Vision, AI generated
Generated with Gemini AI, March 2026
- Fig. 7 – Zoning Sketch
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- Fig. 8 – Voronoi Zoning / Spatial Configuration
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- Fig. 9 – Activity Mapping
Diagram created by the authors, March 2026
- Fig. 10 – Schematic Design – Air Lock
Diagram created by the authors, March 2026
- Fig. 11 – Schematic Design – Climb/Sleep
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- Fig. 12 – Instagram Norsk Polarinstituttt
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- Fig. 13 – Schematic Design – Kitchenette/Lab
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- Fig. 14 – Schematic Design – Relaxation Cave
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<https://epsalt.ca/projects/daylight> , March 2026
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<https://www.eweek.com/artificial-intelligence/>, March 2026
- Fig. 24 – Fragment Diagrams
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- Fig. 25 – Animation Emergency Lighting
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- Fig. 26 – Animation Folding
Diagram created by the authors, March 2026
- Fig. 27 – Instagram Norsk Polarinstituttt
Diagram created by the authors, March 2026

REMARKS FOR TASK

- The following slides can be understood as a **lego-set** for the container.
 - Each element should suit **multiple functions**, while being a **stand-alone unit**.
 - The **shape** we used for the diagrams can be understood as **inspiration** and is not binding, feel free to explore.
 - The size of the elements should fit into the space assigned to it (look at bubble diagram)
 - Always think about **lighting, folding and re-configuration** (if you would like to make a gif, text Lisa, she knows how to do that)
-
- Start – Caterina
 - Zoning & Spatial Config. - Juliette