2014 JACQUES ROUGERIE FONDATION "INNOVATION AND ARCHITECTURE FOR SPACE" AWARD

NAME OF THE PROJECT ORIGAMI SUITCASE

DESCRIPTION FOLDING HABITAT FOR INDIVIDUAL AND GROUP

FONDATION JACQUES ROUGERIE
GÉNÉRATION ESPACE MER
INSTITUT DE FRANCE

ORIGAMI SUITCASE
FOLDING HABITAT FOR INDIVIDUAL AND GROUP

NEAR VIEW OF GLOBAL CITY

THESIS: HABITAT FOR CONNECTED LIVING

To address human habitation in space, Origami Suitcase proposes a flexible system that can scale the individual space habitat to the an urban scale. Considering the needs of the space traveler, who lives in his or her spaceship - or suitcase - Origami Suitcase connects the solo traveler to other solo explorers via the operation of folding and unfolding. Solo traveler ships unfold to become a piece of the community grid. Without gravity and orientation, habitats in space can leverage three dimensions and better address the housing of free floating humans. Collapsible spaces and folding geometries perform spatial acrobatics that connect the space-faring individual to the space-faring community.

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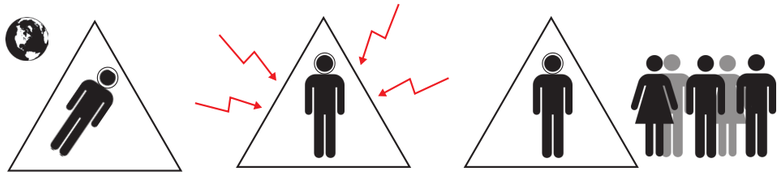
ORIGAMI SUITCASE
CONCEPT OF THE TRAVELER

PERILS OF SPACE TRAVEL
addressing the human condition



no gravity radiation **isolation**

NEEDS OF THE TRAVELER
In space, the individual is exposed to the void without earthly comforts. Mission functions, power and logistics aside, the individual is confronted by three challenges: radiation, lack of gravity, and isolation. While radiation can be minimized through materials, and the lack of gravity by a spinning machine, isolation is a much more complex issue. The space traveler must carry everything he has in his ship, and the ship becomes his temporary universe. The ship, therefore, behaves much like a traveler's suitcase, containing everything the individual needs on a voyage. The individual lives out of his suitcase, and the suitcase behaves like home.

DESIRE FOR A COMMUNITY
Isolation can also be resolved by connecting the traveler to other travelers in space. Like a traveler tavern, or an airport lounge, different space travelers can connect with each other and exchange information and stories. A group of suitcase travelers can form a community, and the suitcases themselves become a common ground for this group neighborhood. What if the suitcases, closed, form individual habitats, while suitcases, opened, form a patchwork grid for a future city? Thus, Mode 1 the individual and Mode 2 the city are established, connecting two human conditions.

SUITCASE
URBAN GRID

OPEN SUITCASE
programs and experiences of space travel

TOP
MISSION FUNCTION
VIEWPORT
COMMUNICATIONS
ANTENNA
LOCATION MAPPING

BOTTOM
LIVING FUNCTION
EQUIPMENT
CREDENTIALS
OBSERVATION
ENTERTAINMENT
SANITATION
CLOTHING + COMFORT
MEMORY OF EARTH
PLANT

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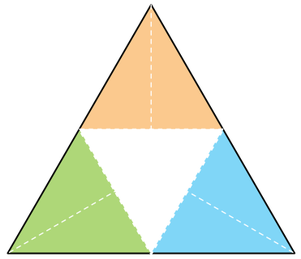
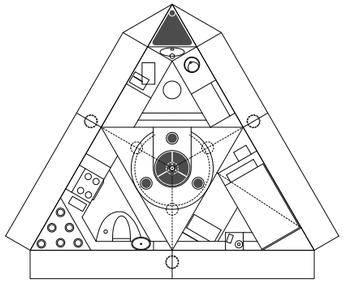
ORIGAMI SUITCASE
HABITAT FOR THE INDIVIDUAL

FOLDING TRIANGLE
concept to reality



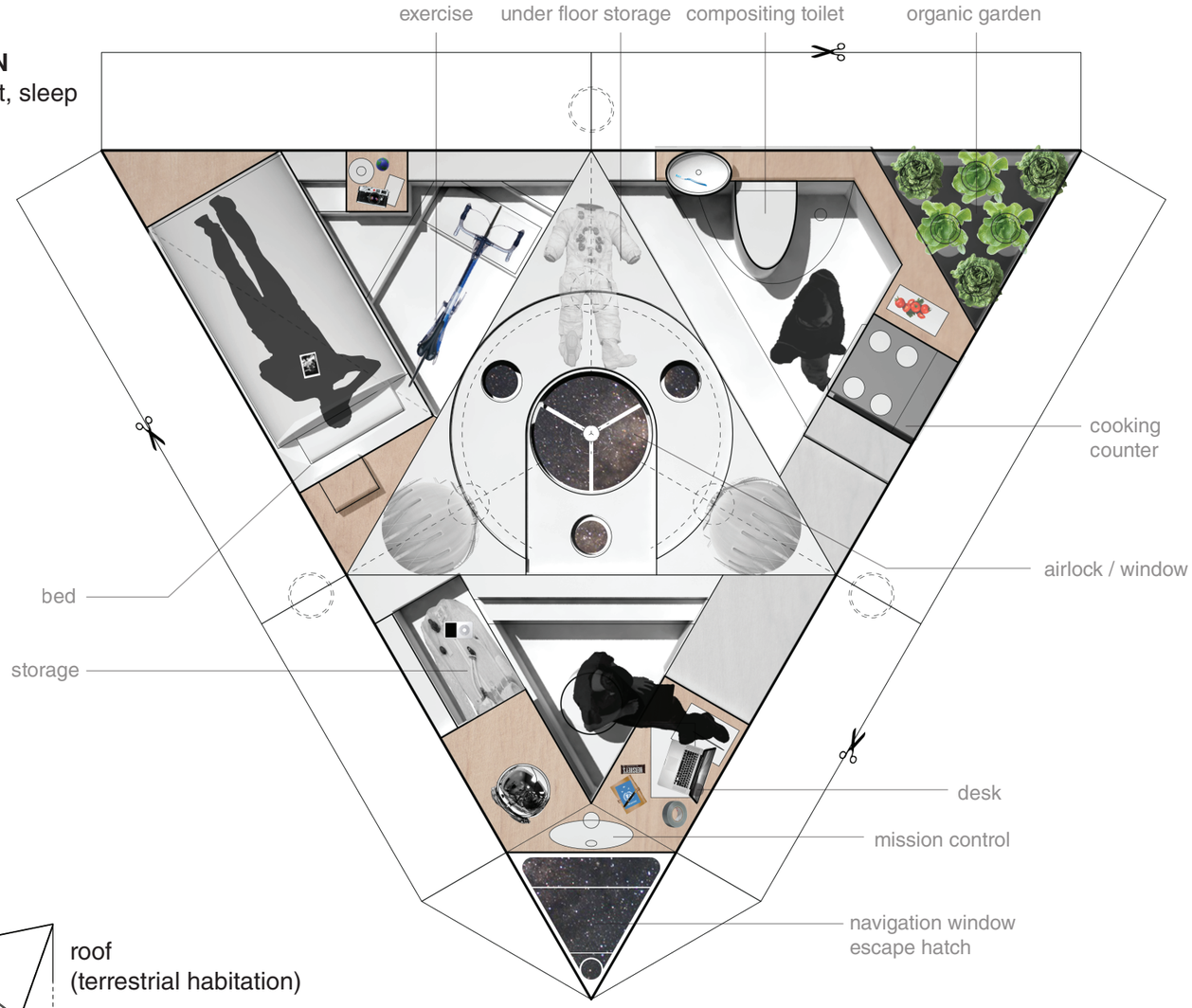
diagram



plan

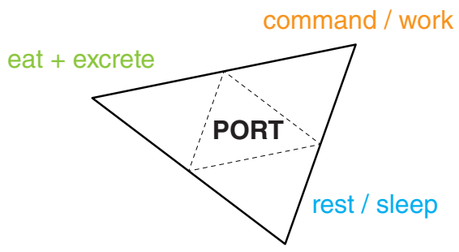
perspective

UNFOLDED PLAN
space for work, eat, sleep

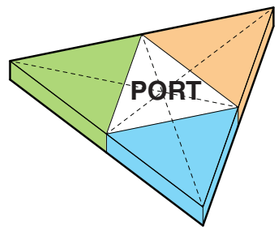


MACHINE FOR SOLO LIVING
Mode 1 of Origami Suitcase is the space for individual living. This 3m x 3m x 3m living pyramid is composed of three sides and three corresponding programs: a place to work, a place to sleep, and a place to eat/excrete. As there is no gravity in space, each program can be embedded into each plane or wall of the pyramid module, thereby creating a protective void space.The individual enters the habitat from the bottom side, which houses the airlock as well as mechanical equipment and storage space. The work and sleep planes compose of the cockpit and the bed, respectively. The eat/excrete wall forms a full sustainable biocycle, in which human waste become composting for a small garden, and the garden becomes a food source for the individual. All water usage can be recycled and fed back into the contained system.

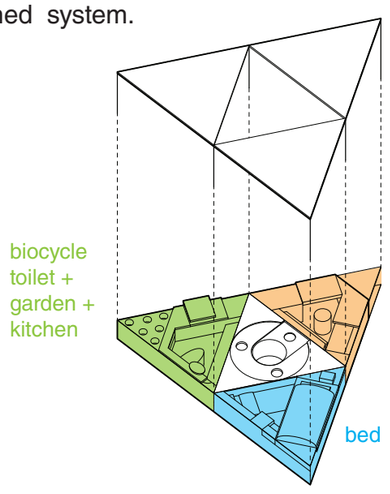
PROCESS DIAGRAM
from 2D habitat to 3D capsule



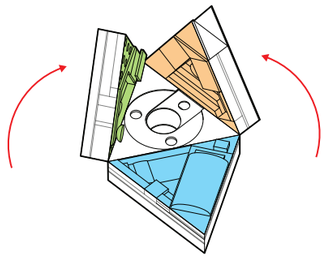
1 division of essential life programs



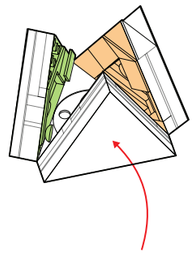
2 add program thickness (600mm)



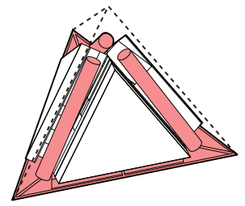
3 add program thickness (600mm)



4 fold sides



5 close module



6 add mechanical functions

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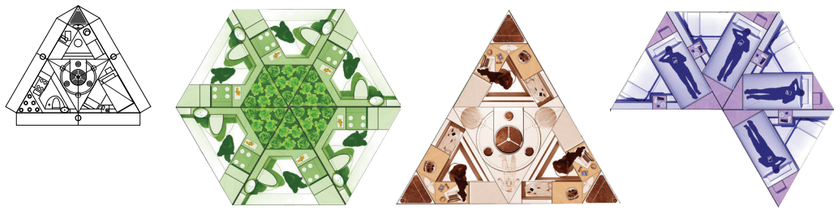
ORIGAMI SUITCASE
FROM INDIVIDUAL TO THE CITY

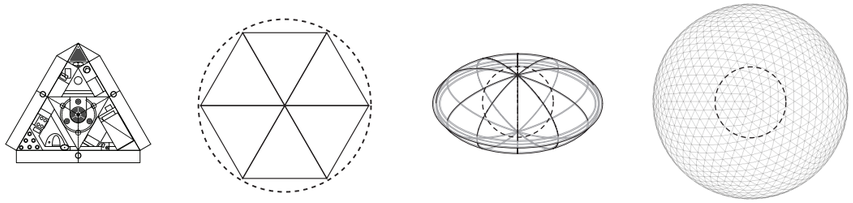
TRANSFORMATION / RECONNECTION
community variations



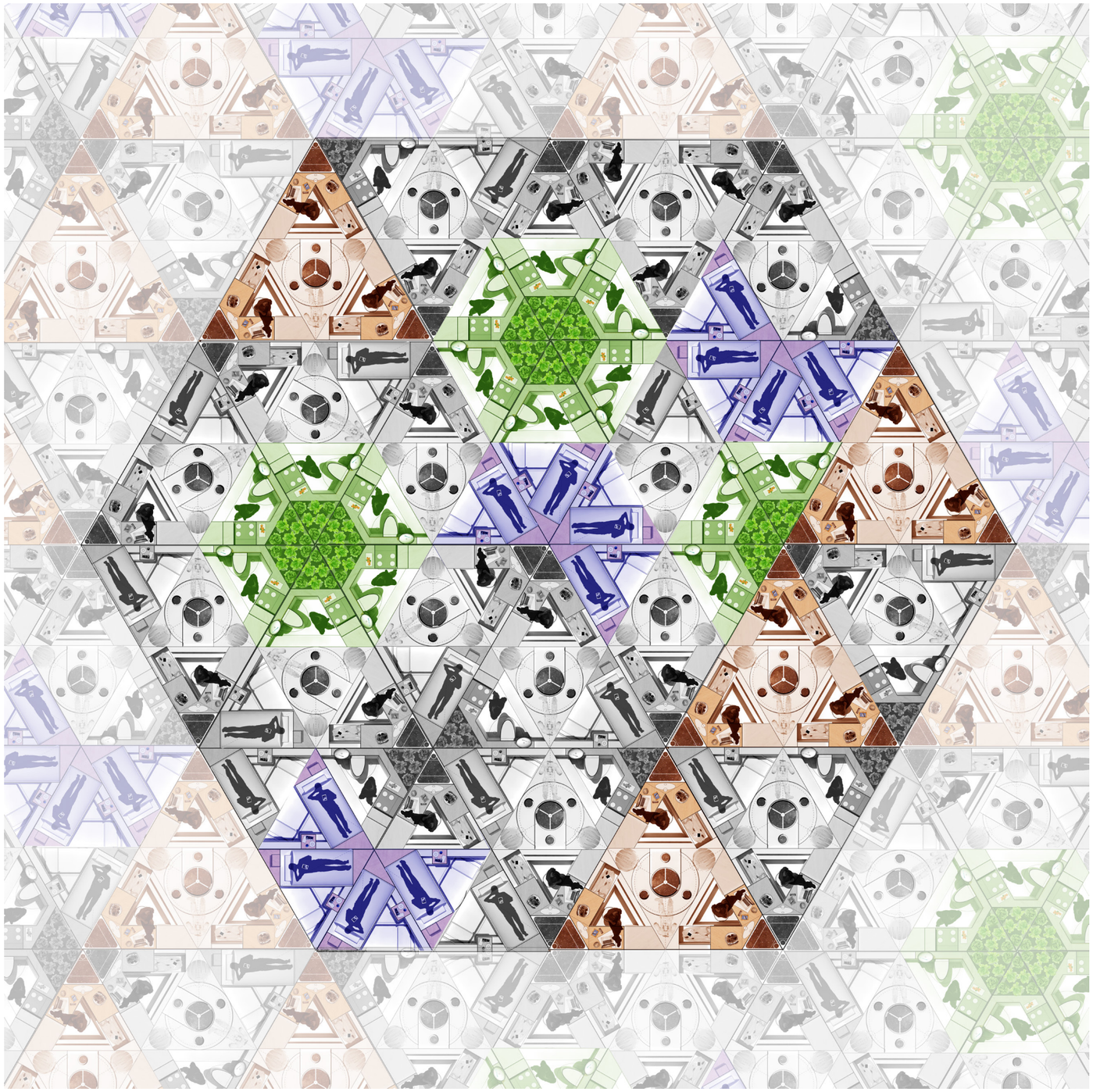
SOLO LIVING TO COMMUNITY LIVING
From Mode 1, the living module for the individual can connect with other modules for program variations and group living. Stitching together unfolded modules, a new urban plan can be created, and individuals can float from one program area to another. Throught accidental and preconditioned juxtapositions, zones of intensified programs can be established, such as intensified gardens (green), intensified work labs (red), and communal rest zones (blue). The easy coupling of 3-side programs allow groups of travelers to define the identity and purpose of their communities.

FOUNDATION FOR SPACE URBANISM
Capitalizing on the flexibility of modules, as well as the lack of gravity, this folded typology for living can create the foundations for a new space urbanism. In a hibernated state, in which individuals and their units are flattened, unfolded pods could link together to form elliptical groups. In an activated state, two elliptical groups can come together to form an ellipsoid community, which provide an activated space inside. Ellipsoids can build new infrastructure within this shell. In more ambitious urban groups, the pods in the ellipsoid communities could merge to form geodesic global cities, whose interior can support new installations for society.

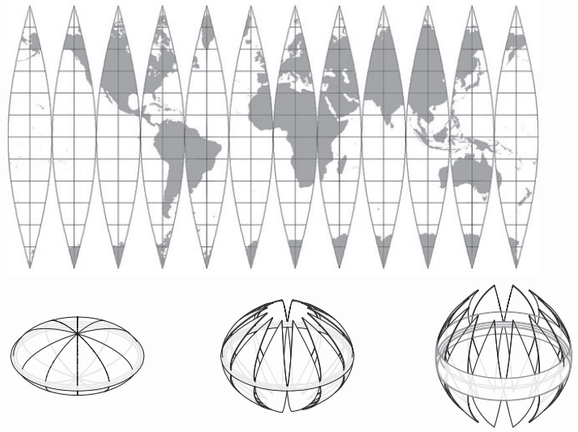
GROUP DYNAMICS



TILED NEIGHBORHOOD
tesselation of individual ships and states



ORIGAMI SUITCASE
HABITAT FOR A CITY



MACHINE FOR GROUP LIVING

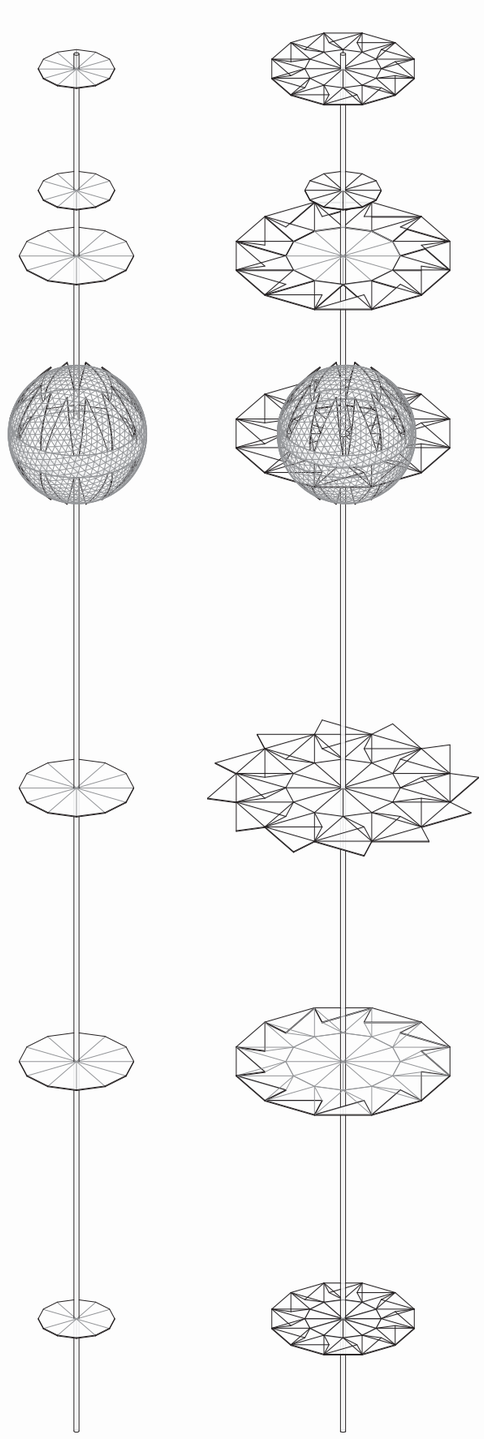
It begins as a simple elliptical shape, traveling through space as a compact vessel. The fifty thousand occupants are safely enclosed by the exterior shell.

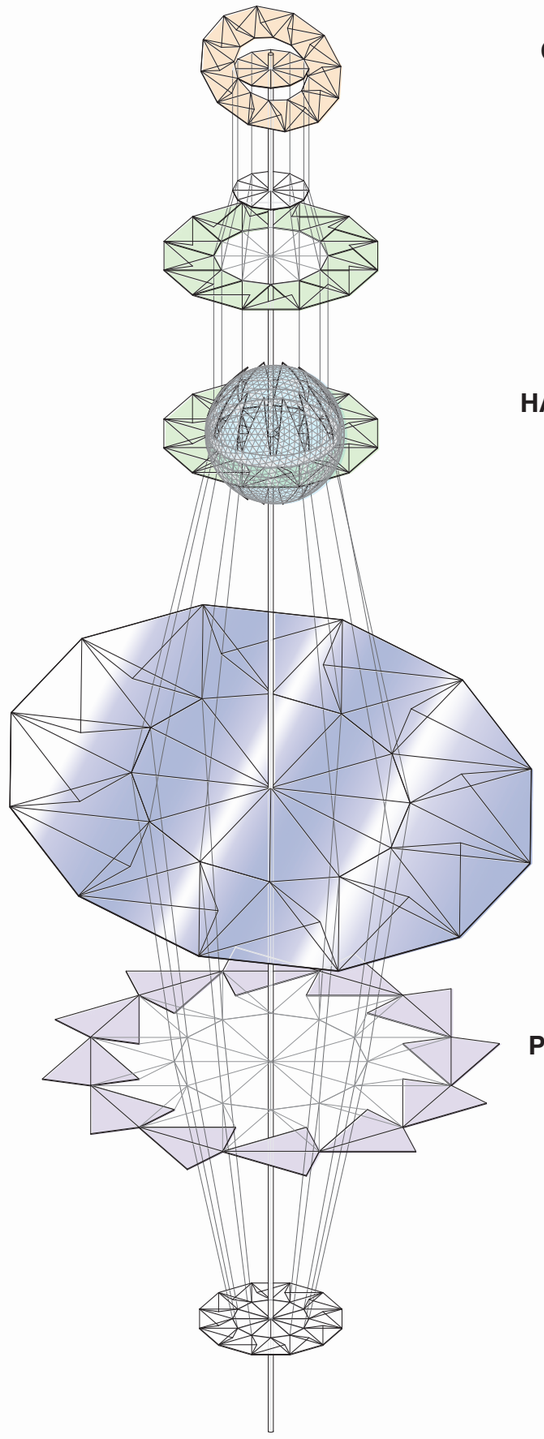
When the station reaches its destination, it begins to open up, revealing the more delicate materials within. When the structure is fully open, a central core that serves as both vertical structure and circulation is created.

Discs that were once enclosed in the ellipse are spread out along the vertical corridor. They unfold and become inhabitable spaces, each with its own designated function.

The space station thus becomes a hub where people can gather and relieve the tension accumulated from solitary travel and exploration. The habitat functions not only as sleeping spaces, but also as a tavern where stories of adventure can be exchanged, a work space for the explorers, and garden space.

As people arrive and leave from the hub, the petals disintegrate and rebuild themselves. Places that were left empty by other people are filled by those who newly arrive.





COMMUNICATIONS

LABORATORY

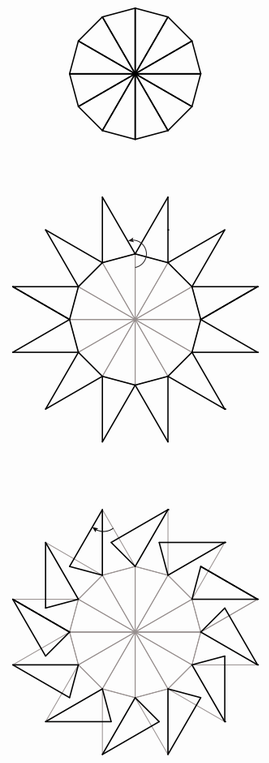
GARDEN SPACE

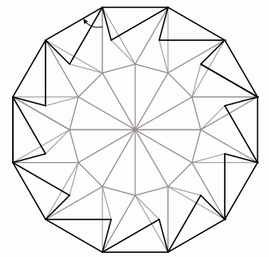
HABITAT/GREENERY

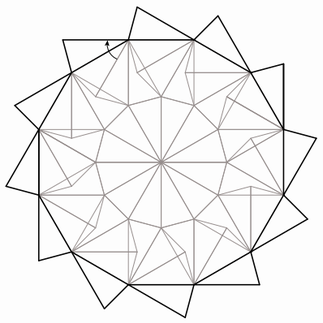
SOLAR PANELS

POWER/COMPUTER SYSTEMS

TELESCOPE







1. compact disc 2. opening 3. fully opened 4. sphere framework 5. program discs expanding 6. fully expanded

unfolding of the program discs

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ORIGAMI SUITCASE
A NARRATION

FAR VIEW OF GLOBAL CITY, EXPANDED

I was lost for months, my communication system malfunctioning. There was nothing in sight besides asteroids and the occasional planet that flew past my window. There was not much to keep me company. Just a few memorabilia from home.

As I drifted past the field of stone, something suddenly whisked past me, to fast to be a natural object. Upon closer inspection, I realized it was another ship.

A friend! I thought as I followed it to what may be a respite.

I first saw the gleam of the solar panels, reflecting light into the biosphere. The bright light shone in the distance as I gleefully approached the tavern.

The other discs eventually came into view as I approached the framework that houses my pod. The gardens, laboratory, and most importantly, the tavern. After so long in solitude, I welcome the approach of other people.

I make my way towards the tiled colors of the globe. Orange, blue, green. The familiar patches are a welcome sight. Steering towards the modules, I find an empty spot to park my pod. My ship unfolds and becomes part of the gestalt.

To listen to stories. To tell my own. To feel at home.

SPACE TRAVELER, UPON FINDING THE GLOBAL CITY
NEAR FUTURE

VIEW OF THE GLOBAL CITY
machine for connected space living

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