# MARS HABITAT Group 1

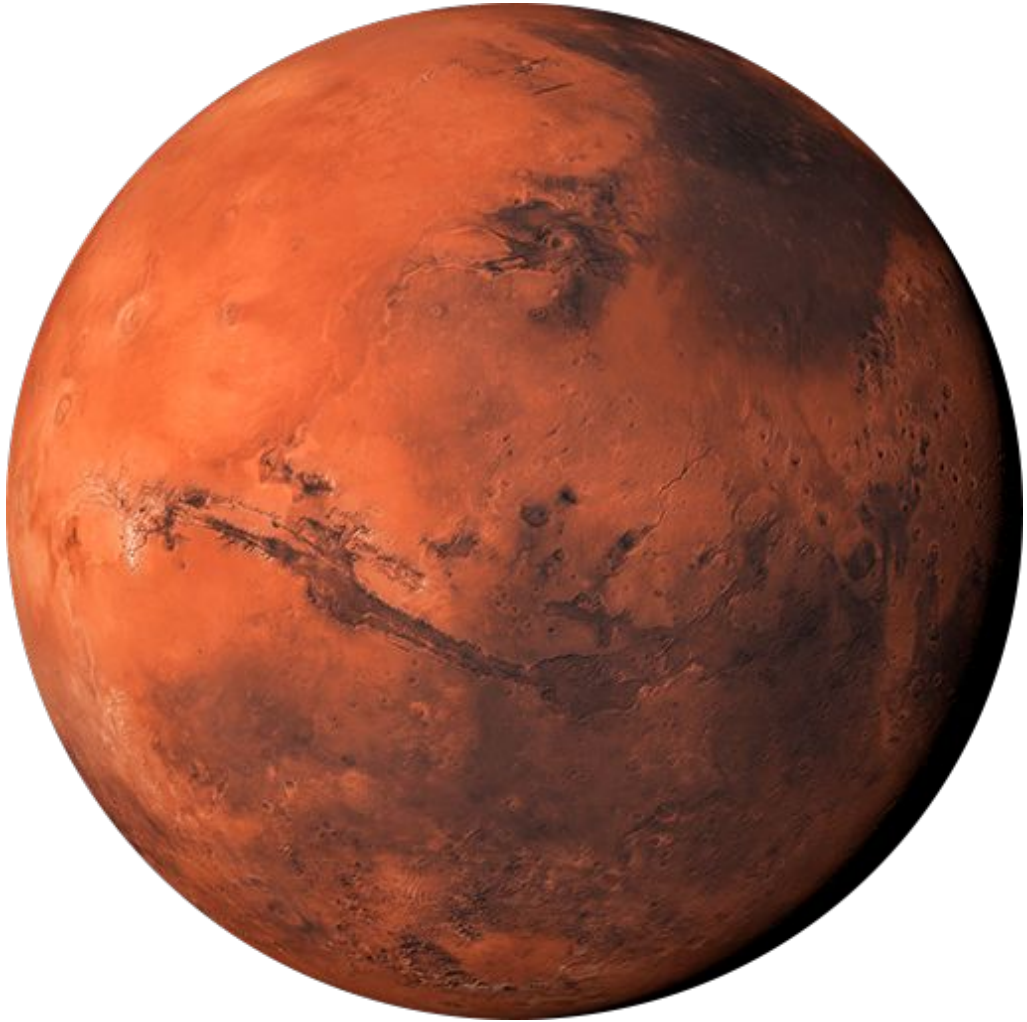
DIYA
GRAYSON
WAN
ANAN
ZHANG

Martian surface temperatures vary from lows of about −143 °C (−225 °F) (at the winter polar caps) to highs of up to 35 °C (95 °F) (in equatorial summer).

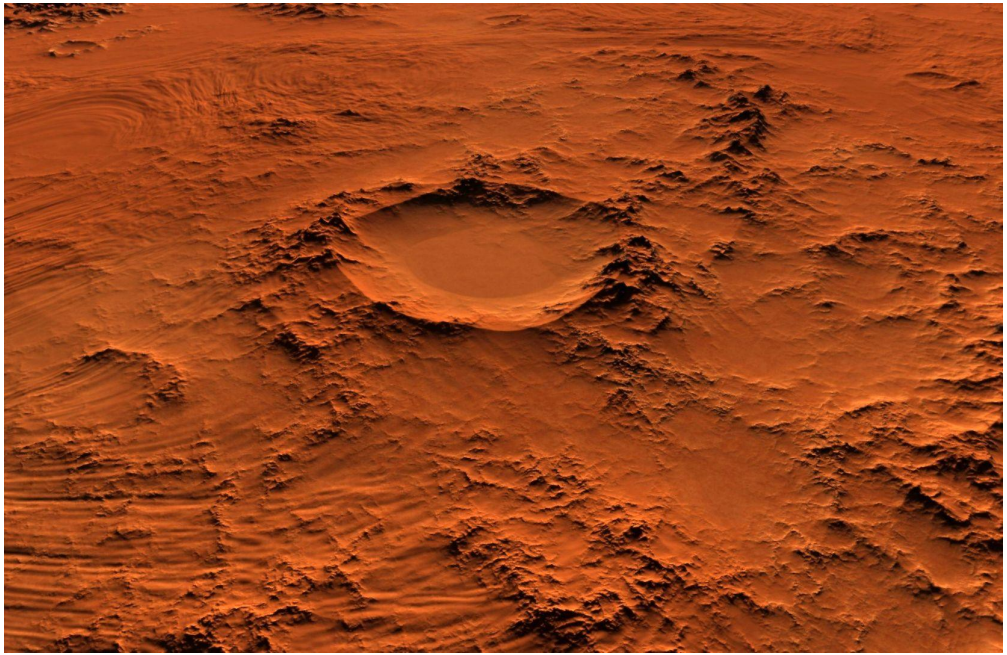
We considered designing the habitat to the equatorial zone.

As the lower gravity on Mars allows larger differences in elevation than on Earth, the pressure can be quite different in lower and higher areas.

Mars also lacks the magnetosphere that protects Earth. The average natural radiation level on Mars is about 40-50 times the average on Earth.
Habitats are to be equipped with radiation shielding, therefore best protection may be achieved with shelter built in natural caves or set into cliffs or hillsides.



# Energy Requirements

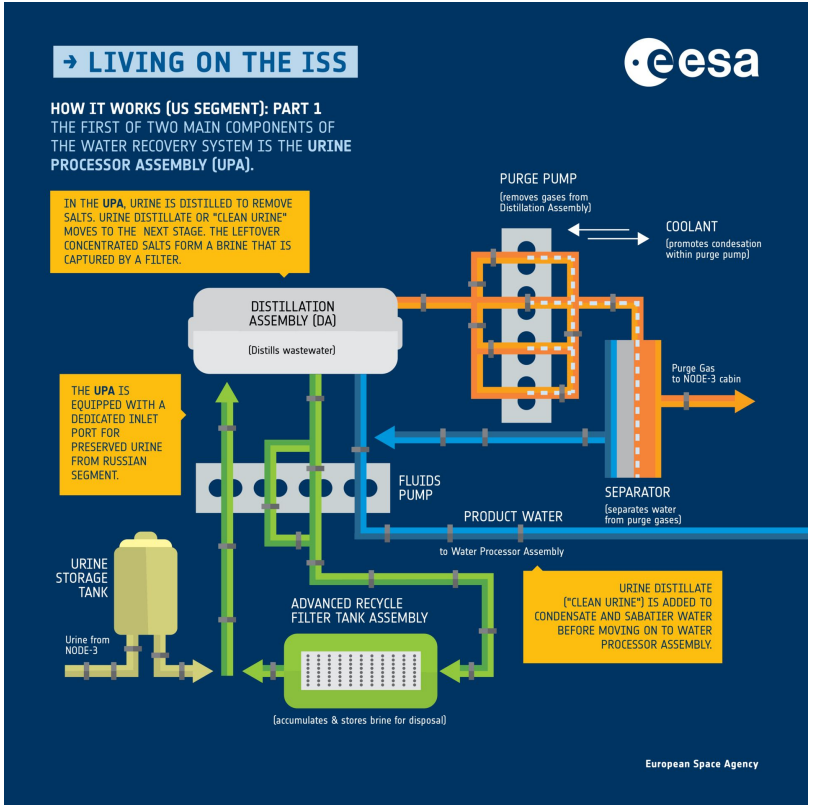


Considering the four main forms of energy production on Mars:

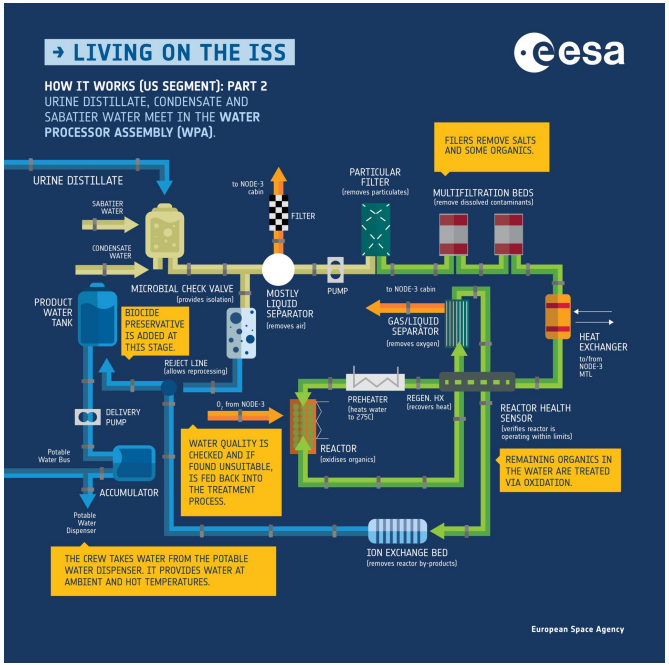
- Solar energy
- Nuclear energy
- Wind energy
- Geothermal energy

**Our habitat will primarily use Solar energy and nuclear energy.**

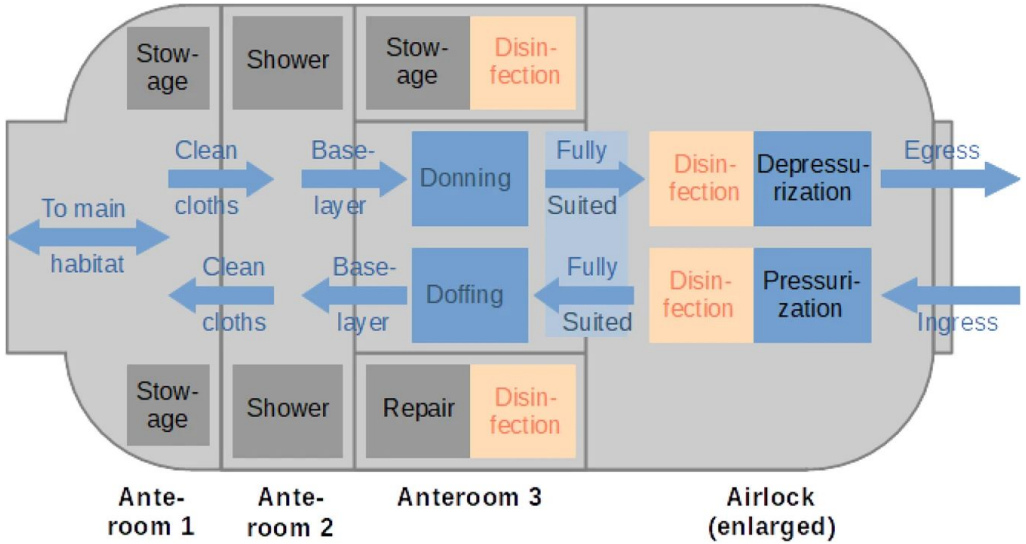
# Water Recycling System




Learning about the recycling water on the International Space Station

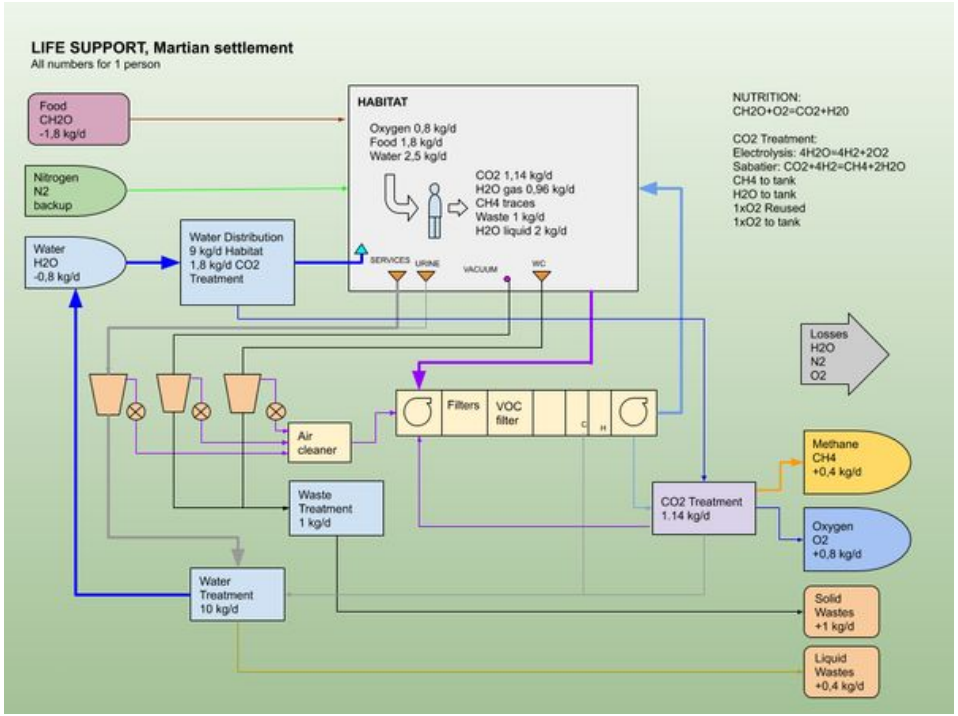


# Air Lock Function for Entrance




The airlock module is recommended to be divided into four sections based on information, with access to the main habitat through at least three anterooms.

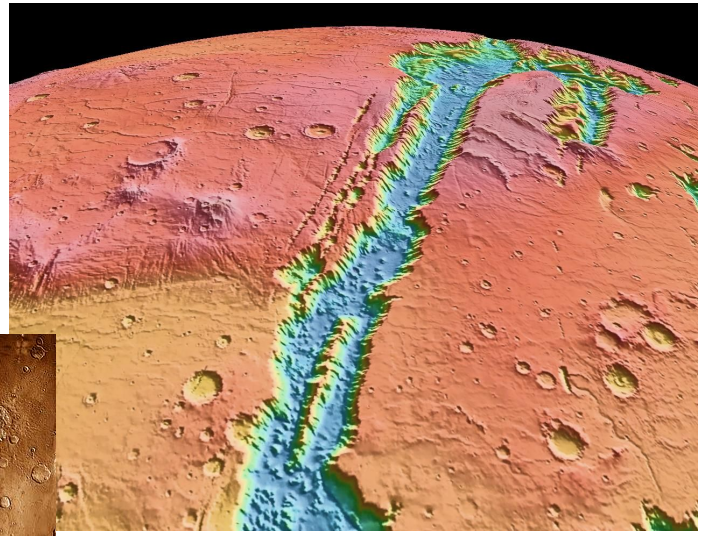
# Life Support System

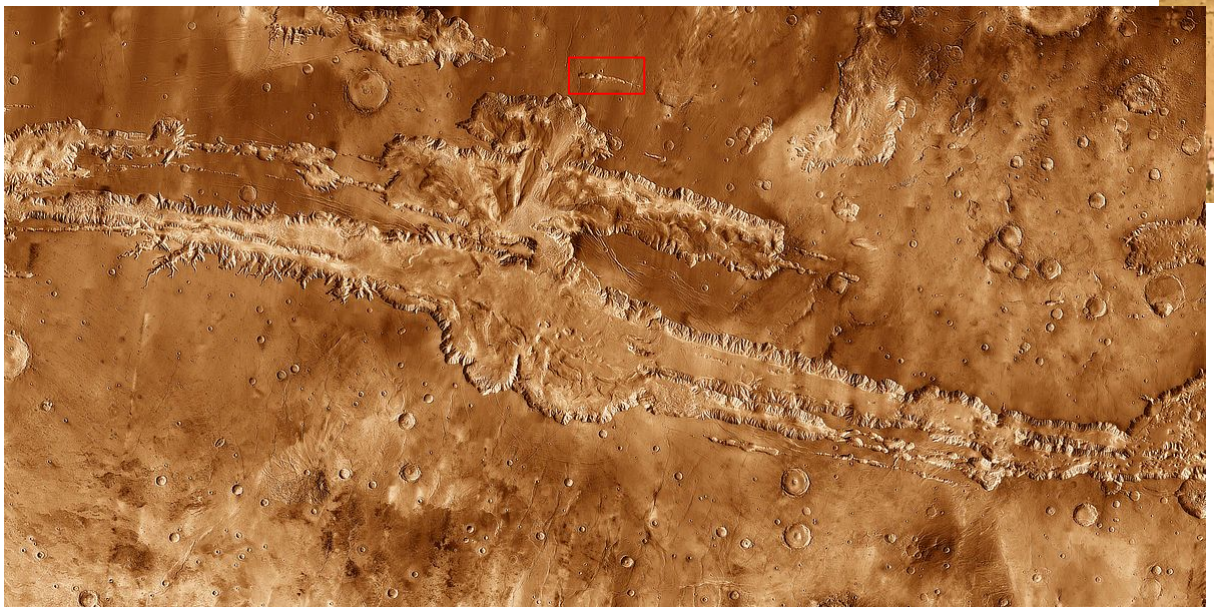



To produce food locally, a near-natural carbon cycle with the growing of food and the production of oxygen at the same time is required.

# Design in the cracks

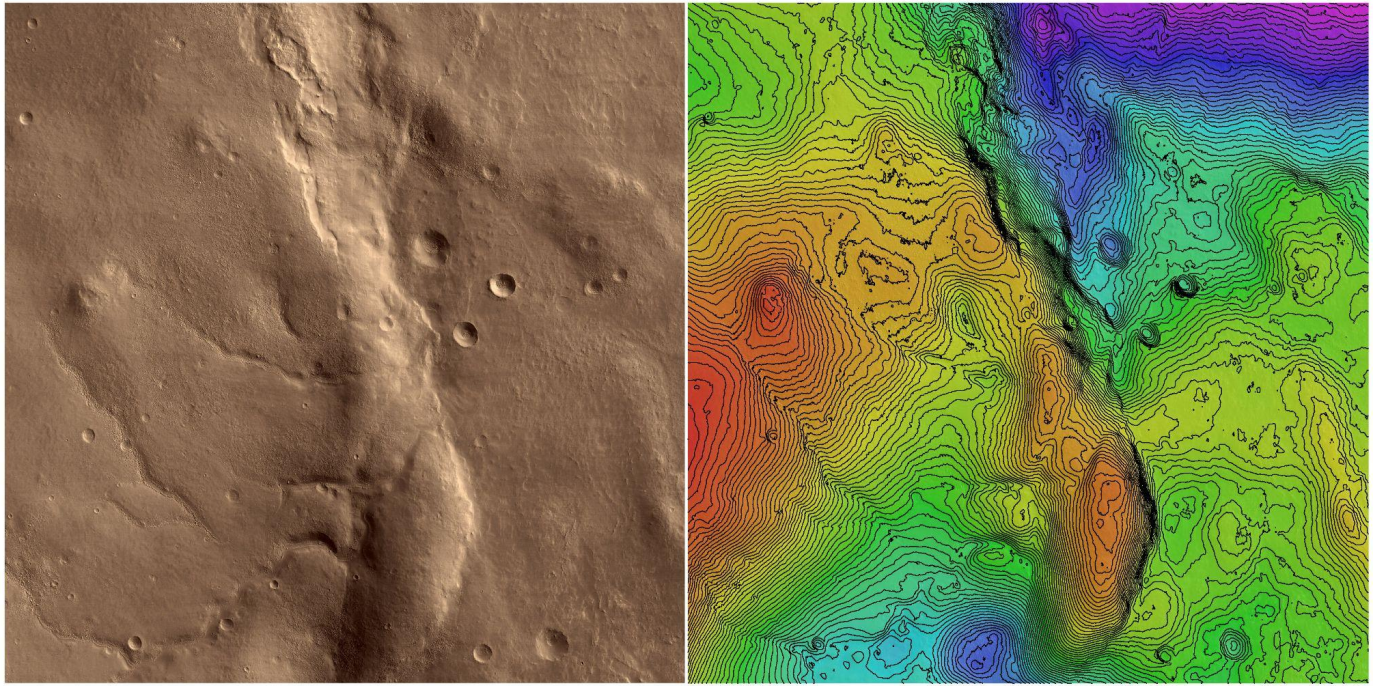
**Valles Marineris,** Valles Marineris stretches over 4,000 km (2,500 mi) across Mars, mostly east-west just below the equator, as seen in this Viking 1 orbiter image mosaic. The three Tharsis Montes are at left; towards the top, an ancient outflow channel stretches northward from Echus Chasma to Kasei Valles. Similar outflow channels extend from the east end of Valles Marineris towards Mars's northern lowlands.



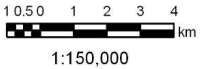


**AEB_000001_0000**
**First MRO HiRISE image of Mars**

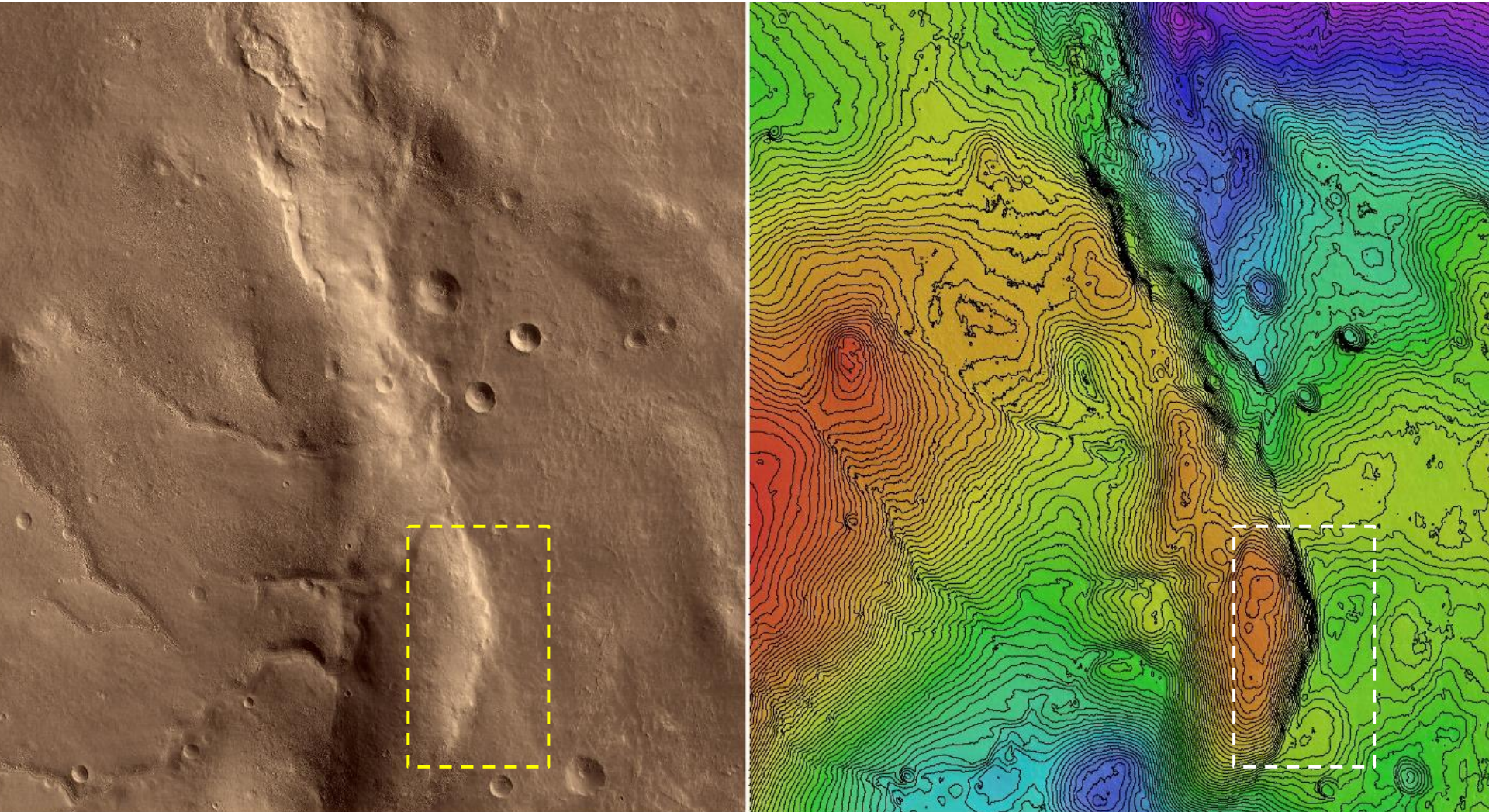
Topographic model from photoclinometry
2.5m per image pixel, 5m per elevation point



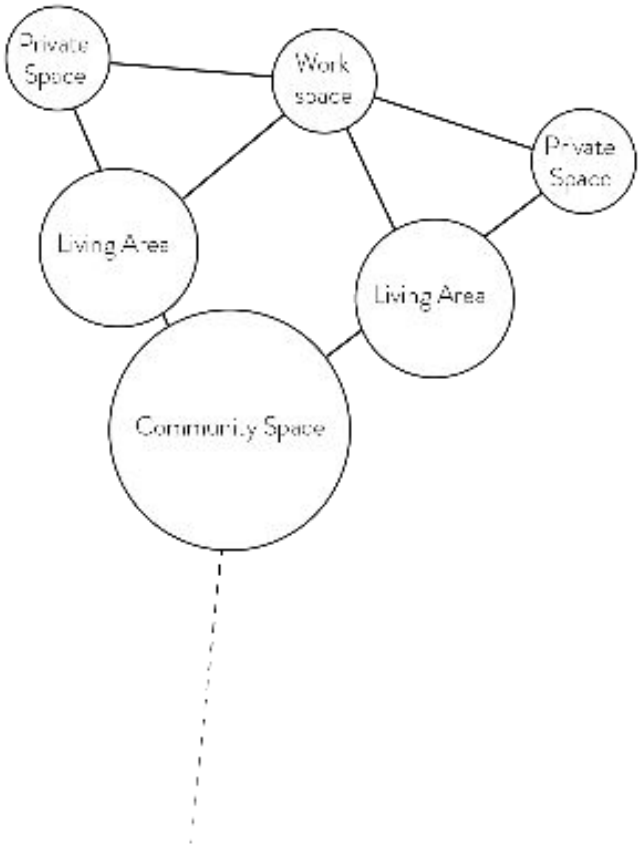
simulated natural color

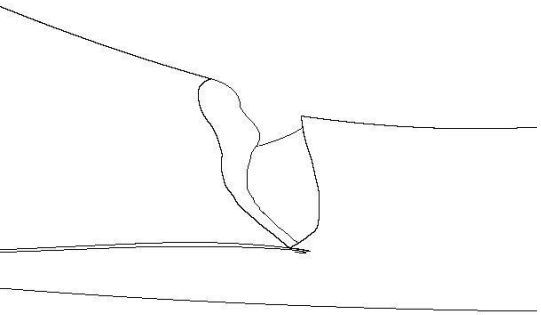


20m contour interval

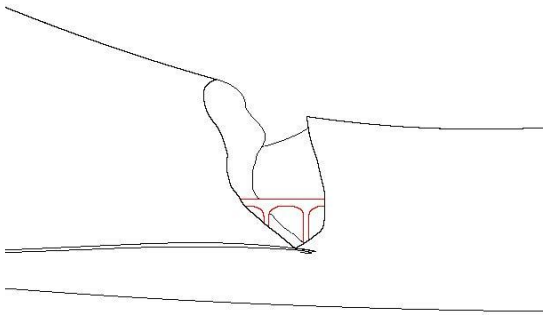


Components - Communal Spaces+Workspace+Housing Units

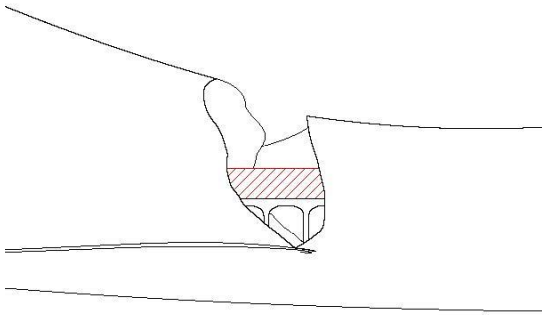




Site Section



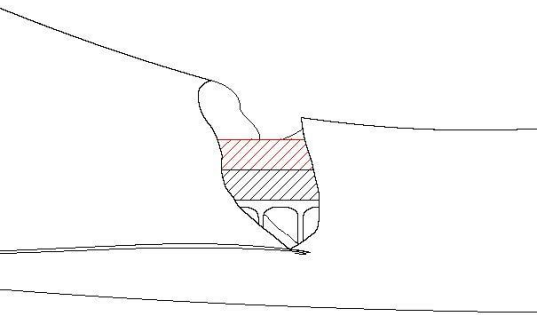
Support



Level 1

*Life Support, Rooms + Support Spaces*

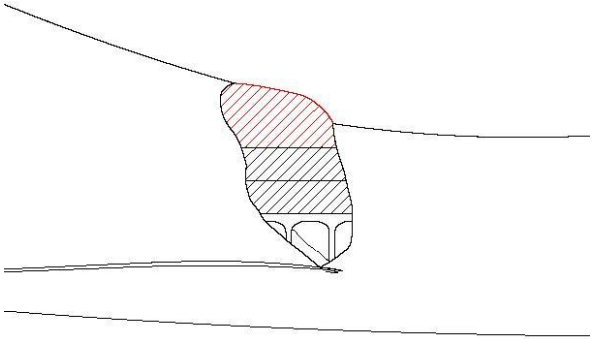
*4.5m² 10m² 2.5m²*



Level 2

*Living Areas, Kitchen, Sanitation*

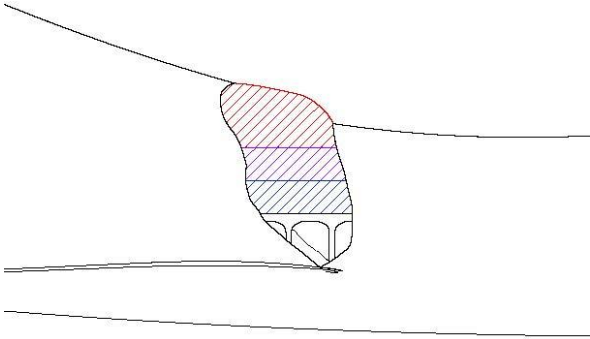
*10m² 4.5m²*



Level 3

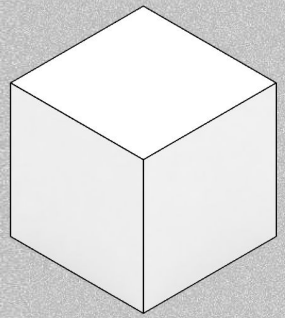
*Common Areas, Workspace, Machinery*

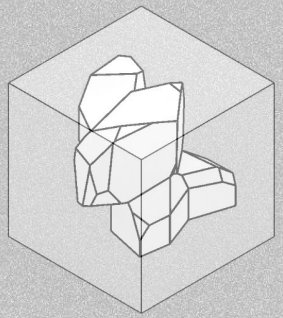
*12m² 4.5m² 4.5m²*

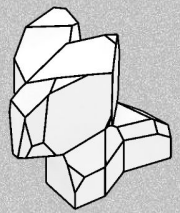


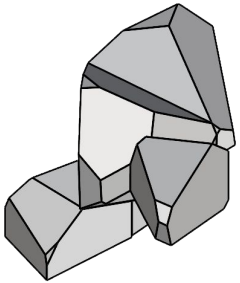
Totality

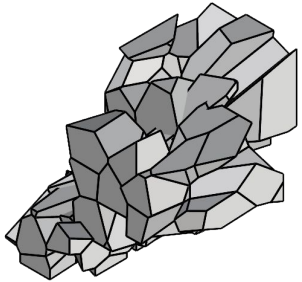
# Design Development

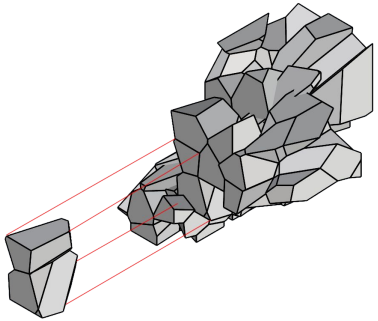


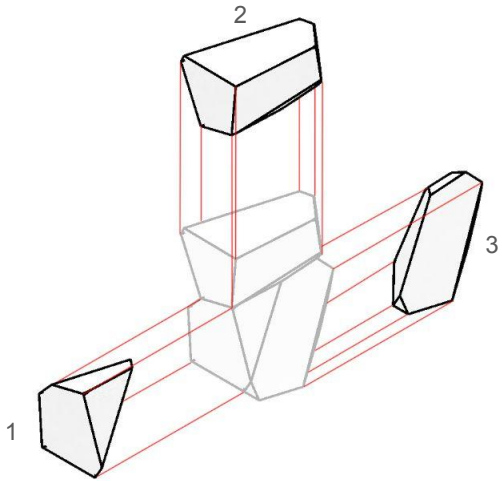




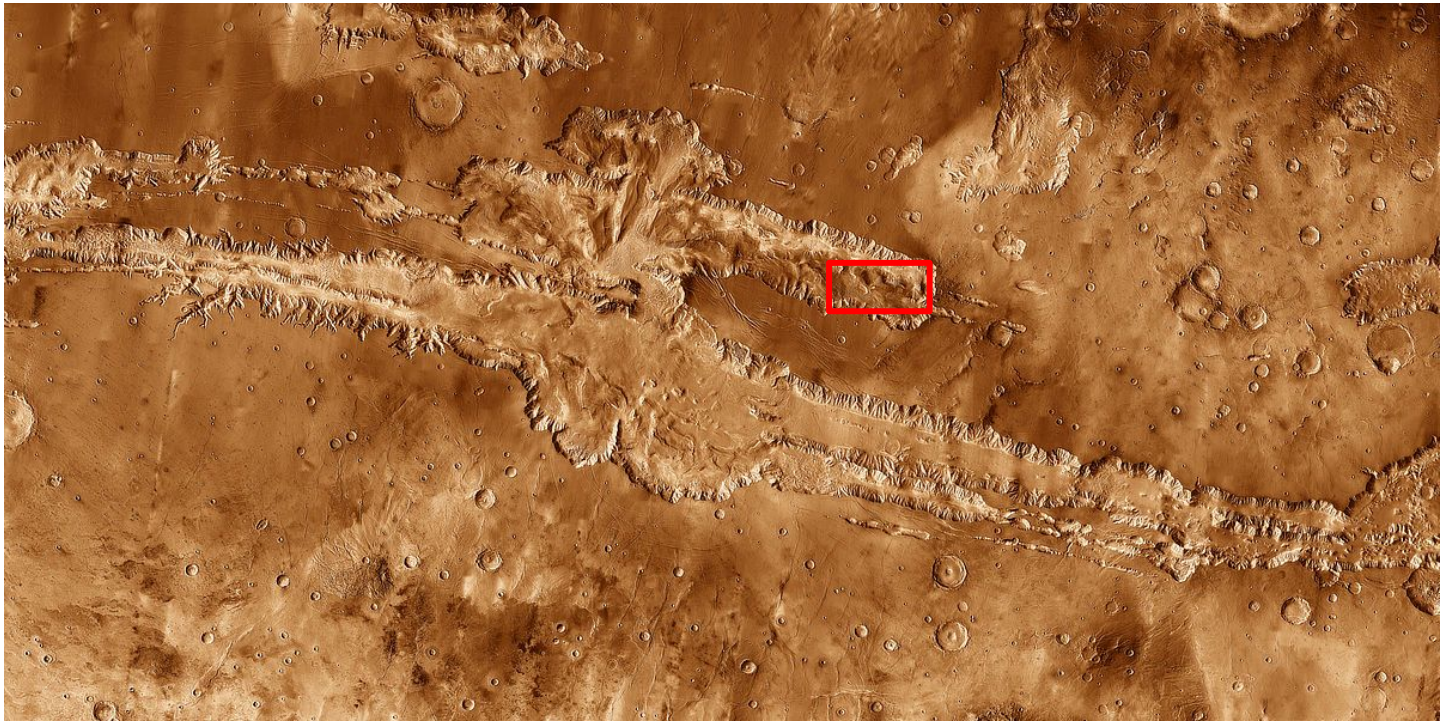




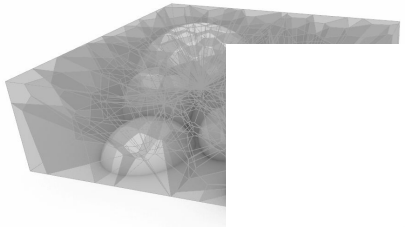


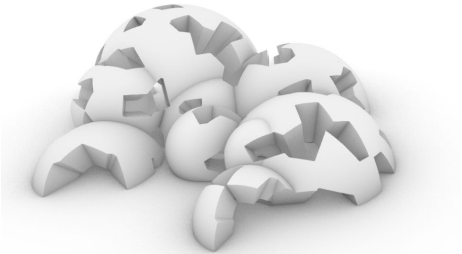

2
3
1

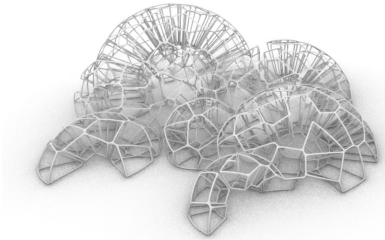
# Design in the Valley

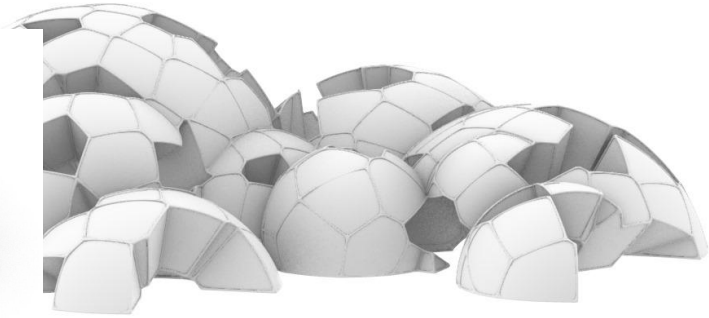


# Form Generation





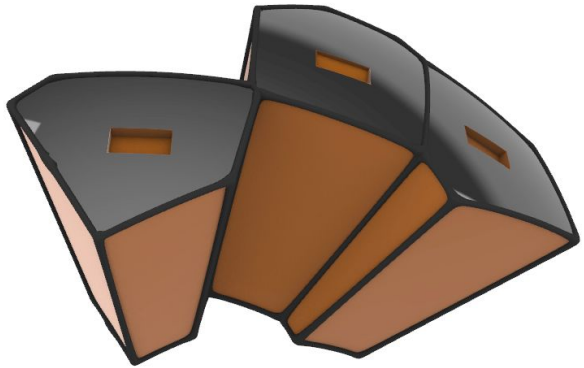




# Fragment selection

Solar Panel

3d Printed Concrete units

Metal Support

Robot Arm assemble and install