

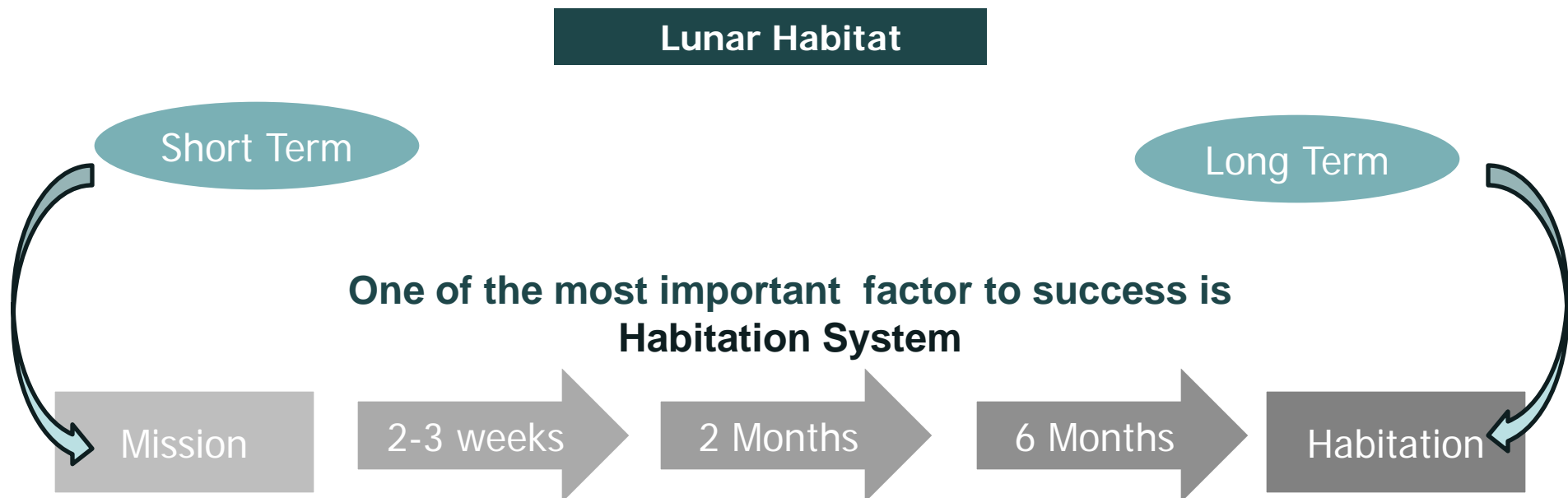
Lunar Habitat Module

Architecture application within Engineering solution



Why Habitat on the Moon?

- The future lunar missions will become greatly extended as much as six month
- From the Moon we can send missions into deep space and Mars
- Tourists may also be interested in a short visit
- and etc...



- Most of the lunar exploration are primarily concerned with the function of the critical systems with disregard to the **Human Interfaces**
- Everything at NASA is **built to performance specifications**
- **Habitability's importance**
- **Volumetric Plan and Configuration**

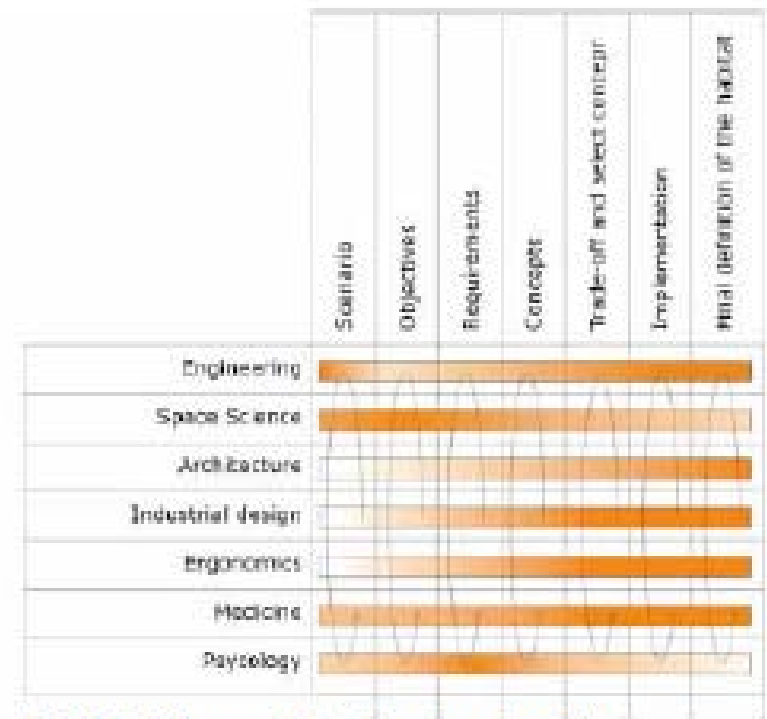
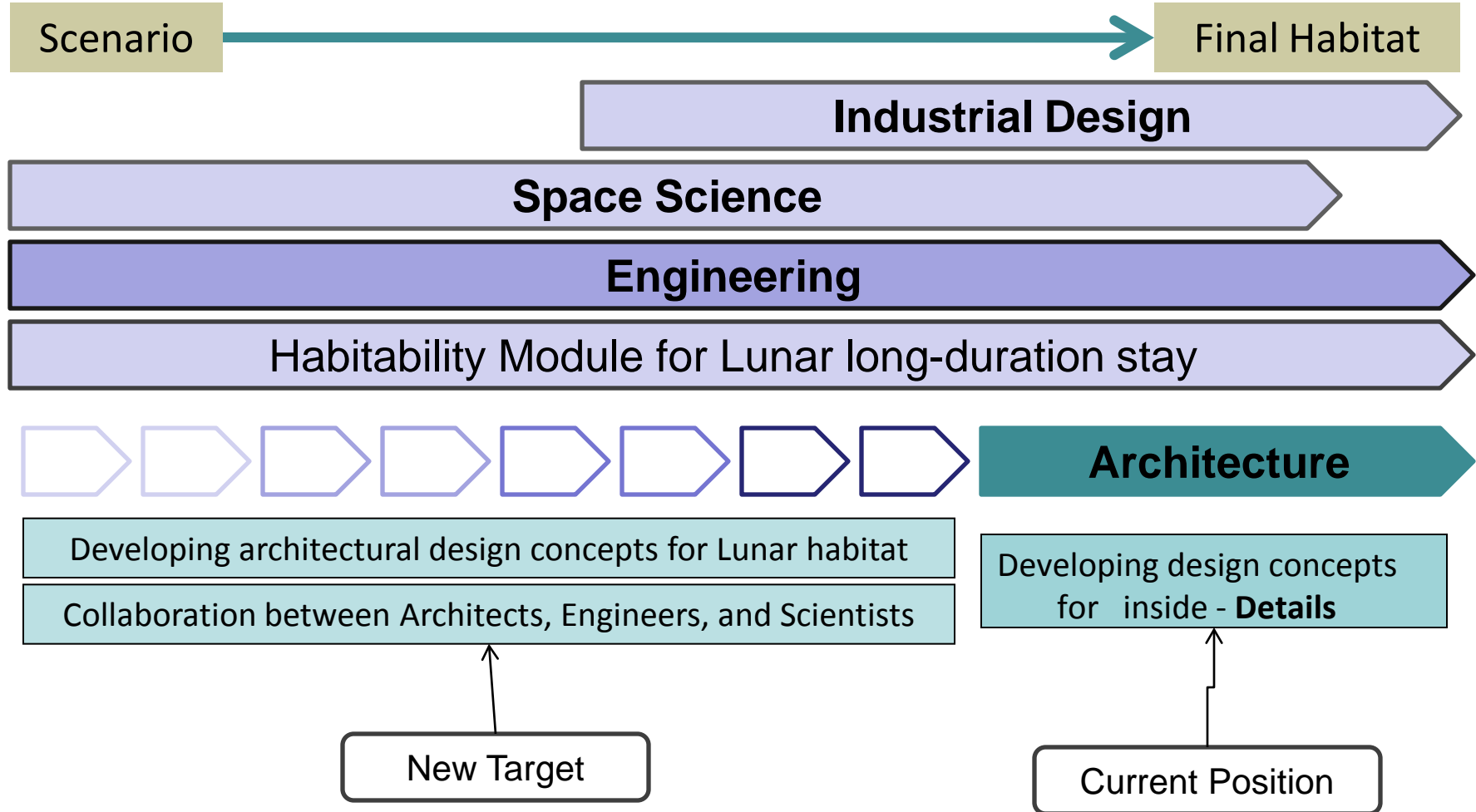


Table 1: Scheme of the design approach

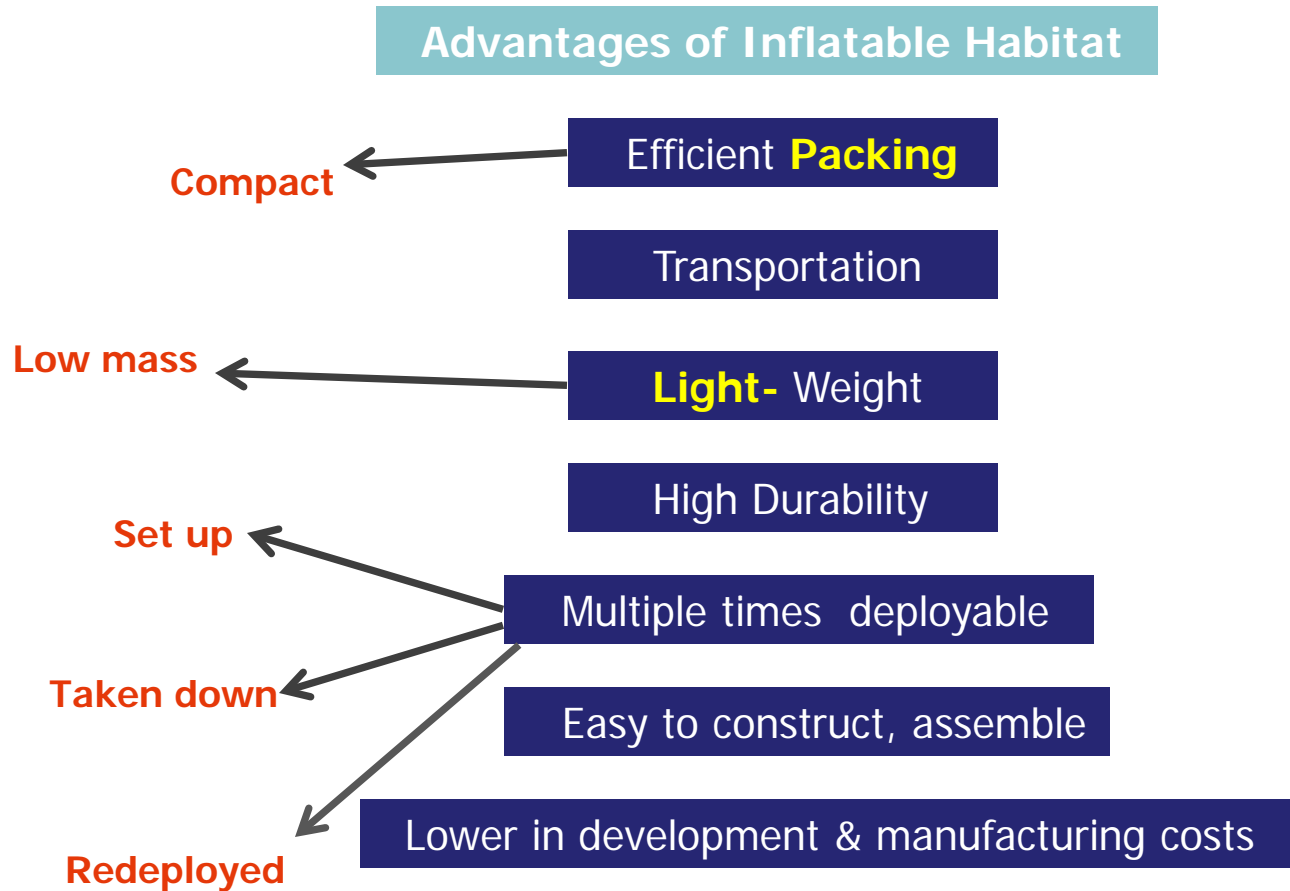




Antarctica Project

- ❑ **Main Purpose** : To demonstrate the performance characteristics of a deployable habitat in an extreme environment.
- ❑ **Key Features** : To be easily transported in small package and set up quickly one on site.
- ❑ **Its strength comes** : An innovation tubular construction under a layer of insulation.
- ❑ The **overall objective** of this joint project is to **design, construct, and test a proof-of-concept** inflatable structure, focusing on how **easy** it is to **deploy** and how durable it is in an extremely harsh environment – Antarctica.
- ❑ The habitat has been used from January 2008 through February 2009.



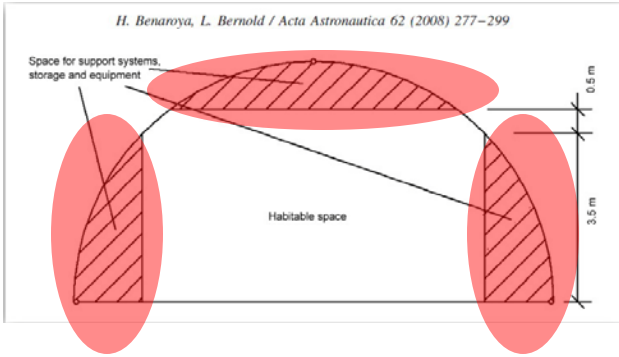


Current Problems of Inflatable Habitat

Functional

It's for a mission not habitat

Weak Structure



It's not enough as Habitability

Useless spaces

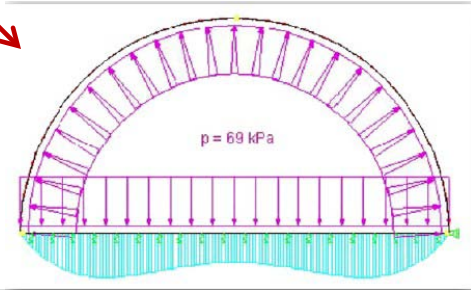
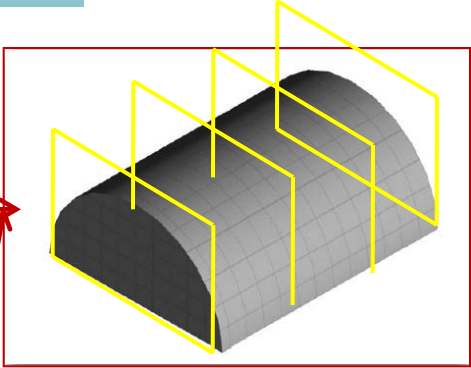
Less Stability

Untrustworthy

Dust problem

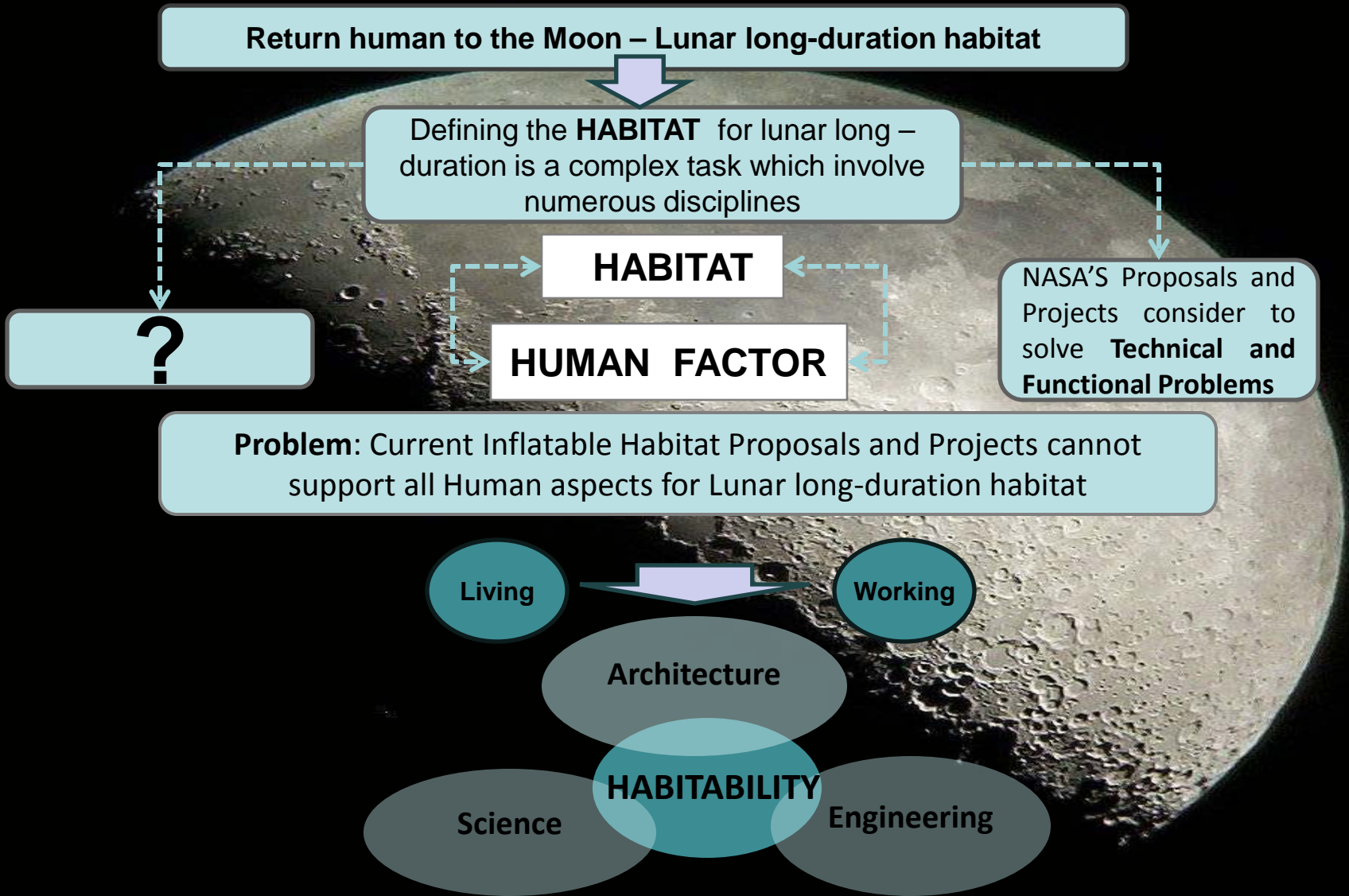
Damageable

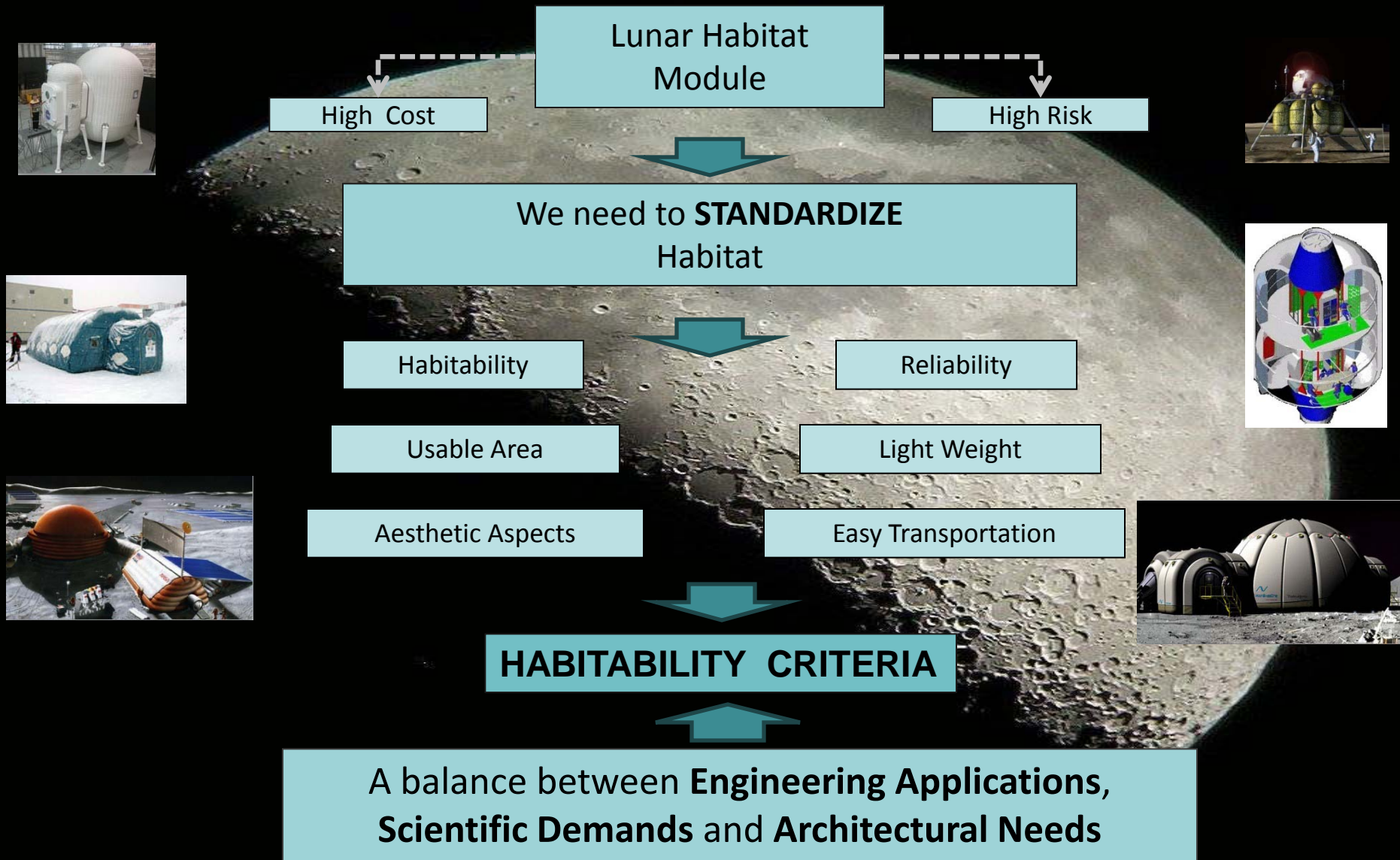
Inside design

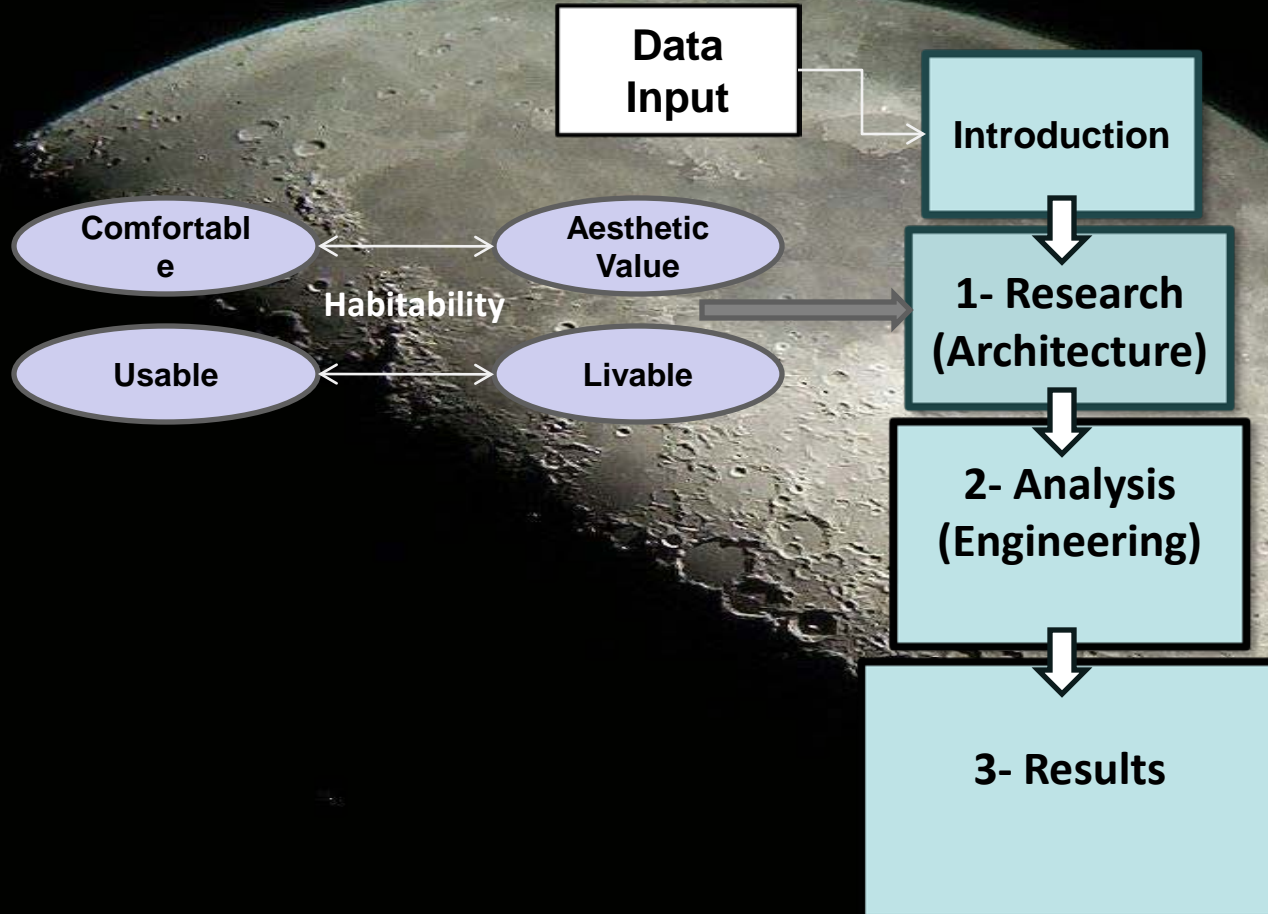


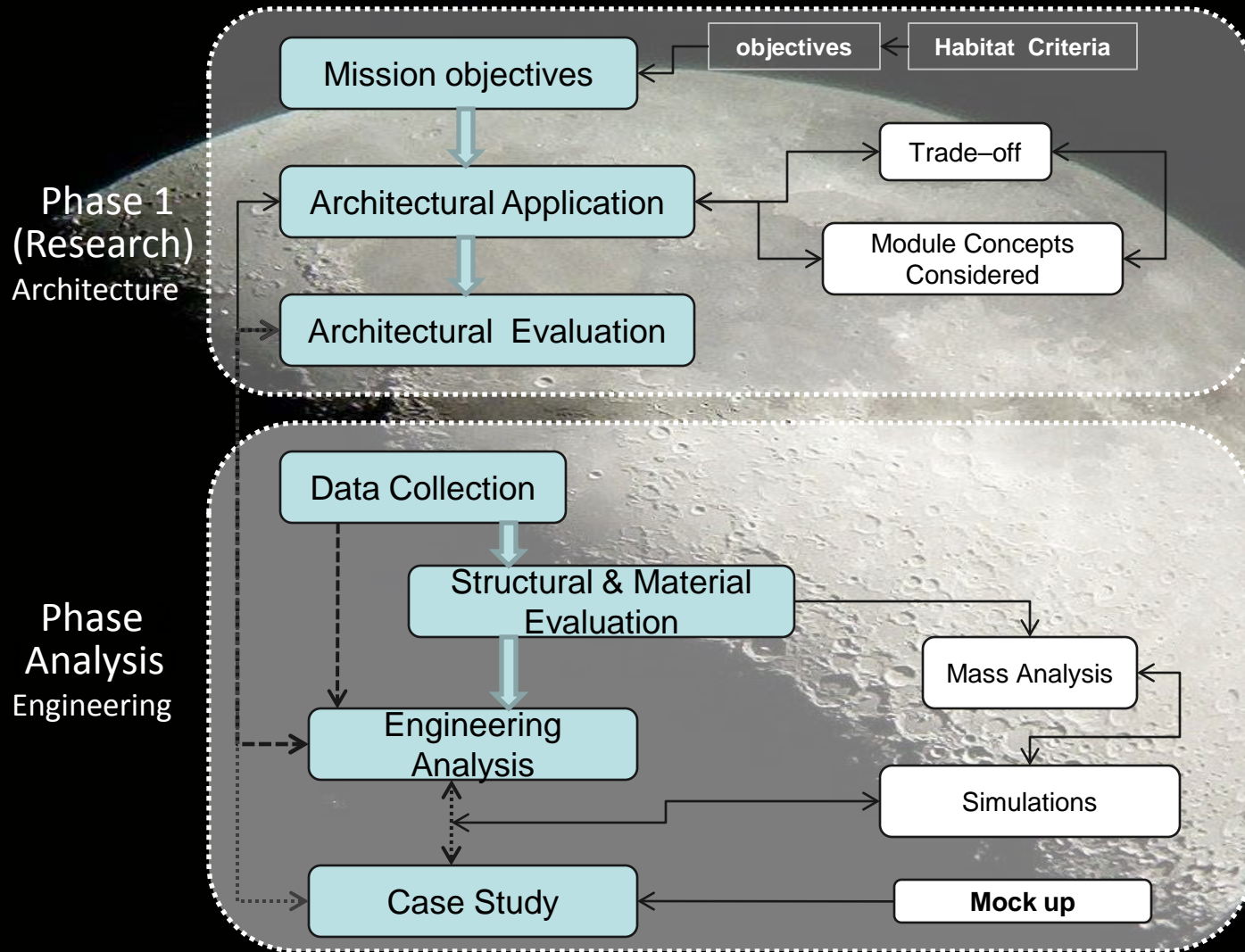
Disadvantages

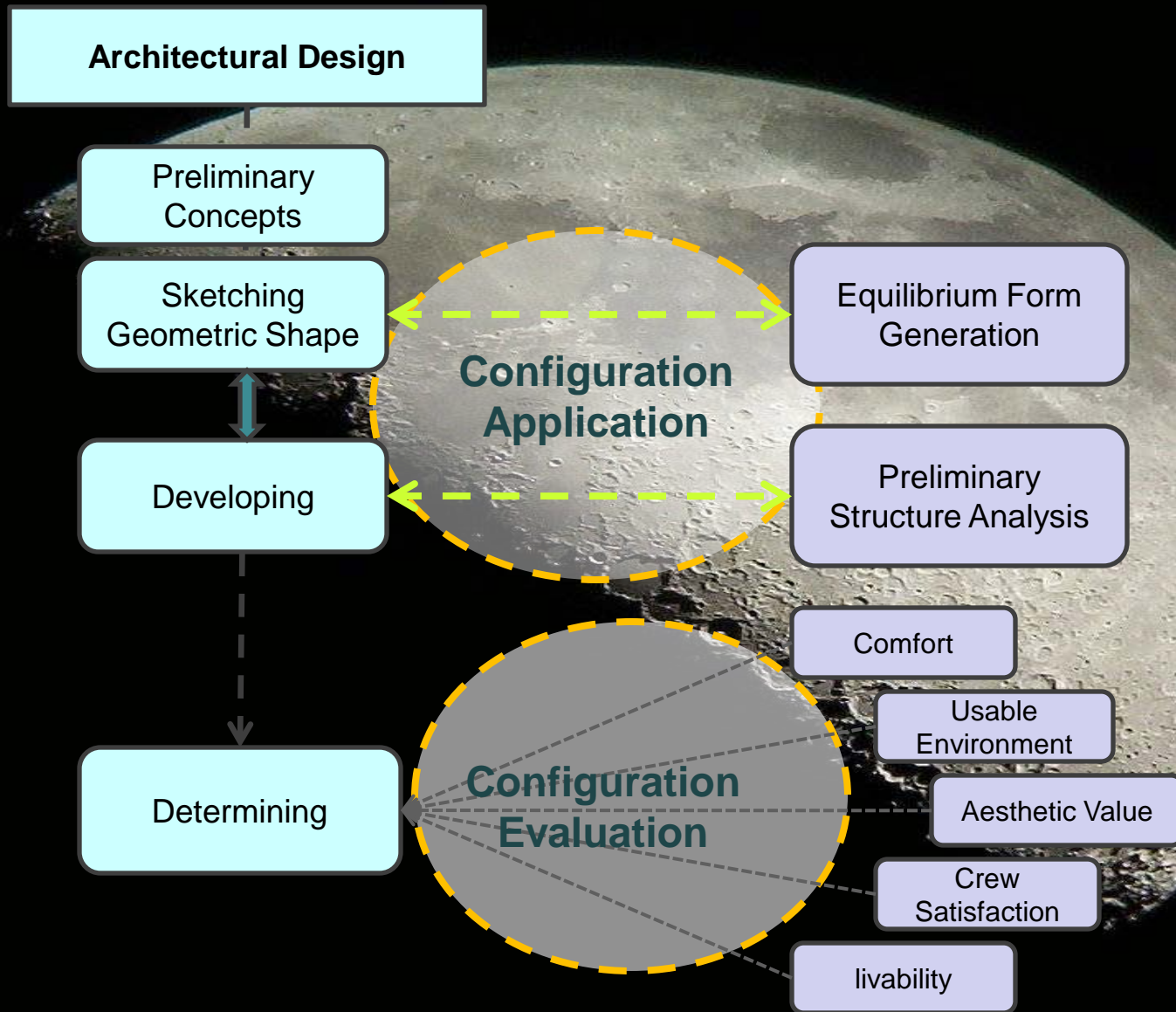
- Cannot provide habitability for long duration stay
- degassing properties
- risk of losing internal pressure
- high human labor requirements to install equipment



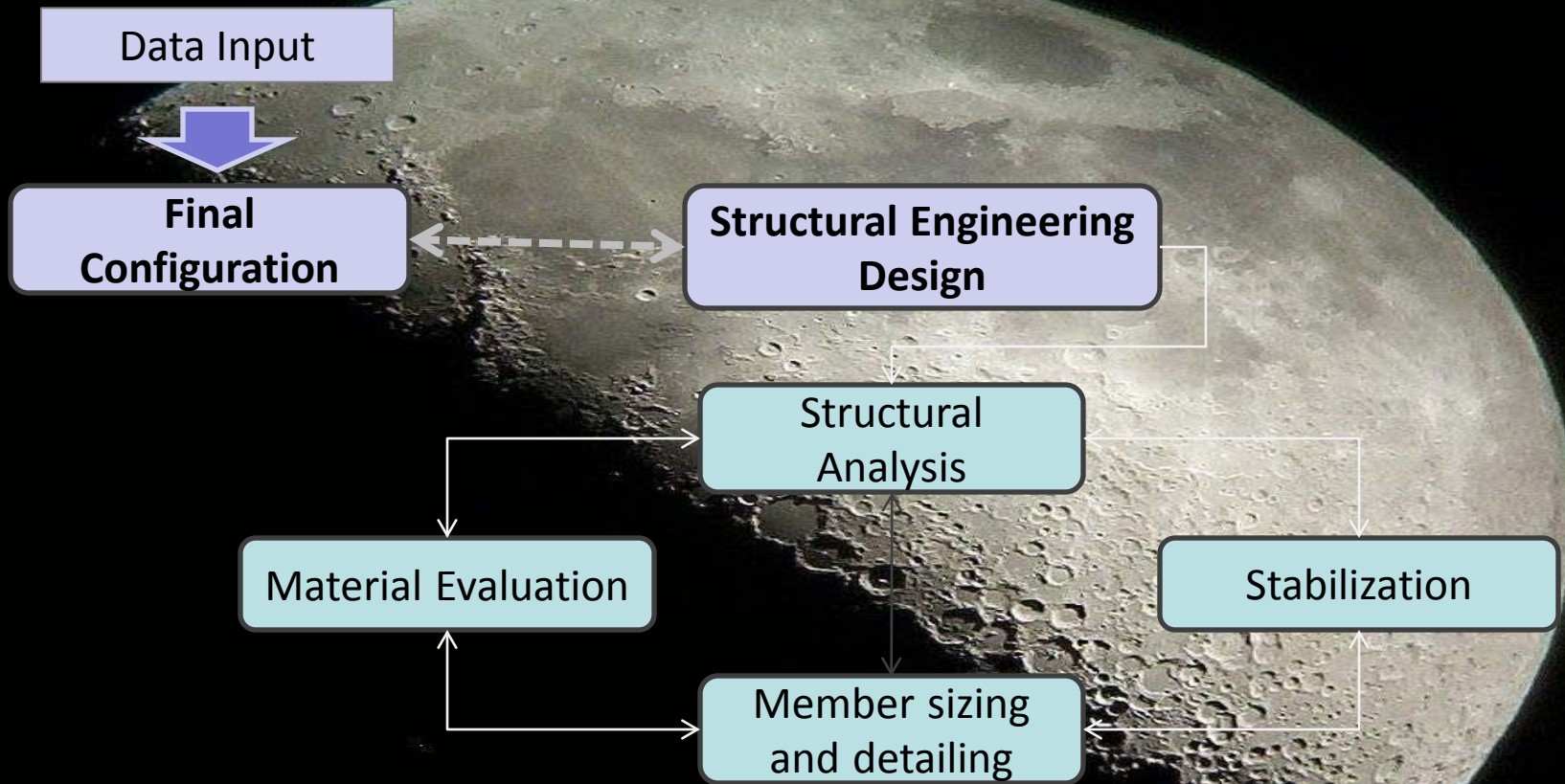


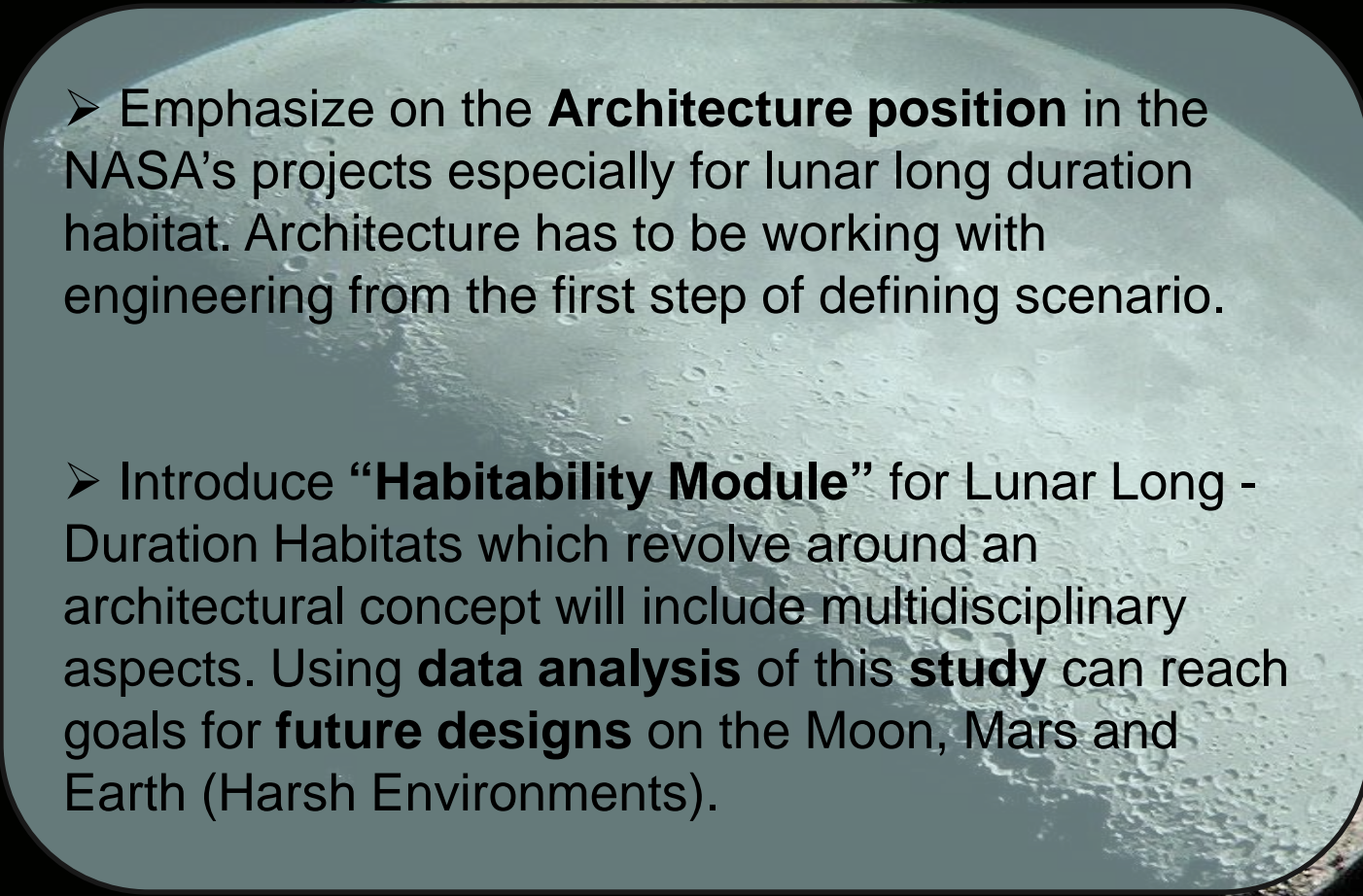


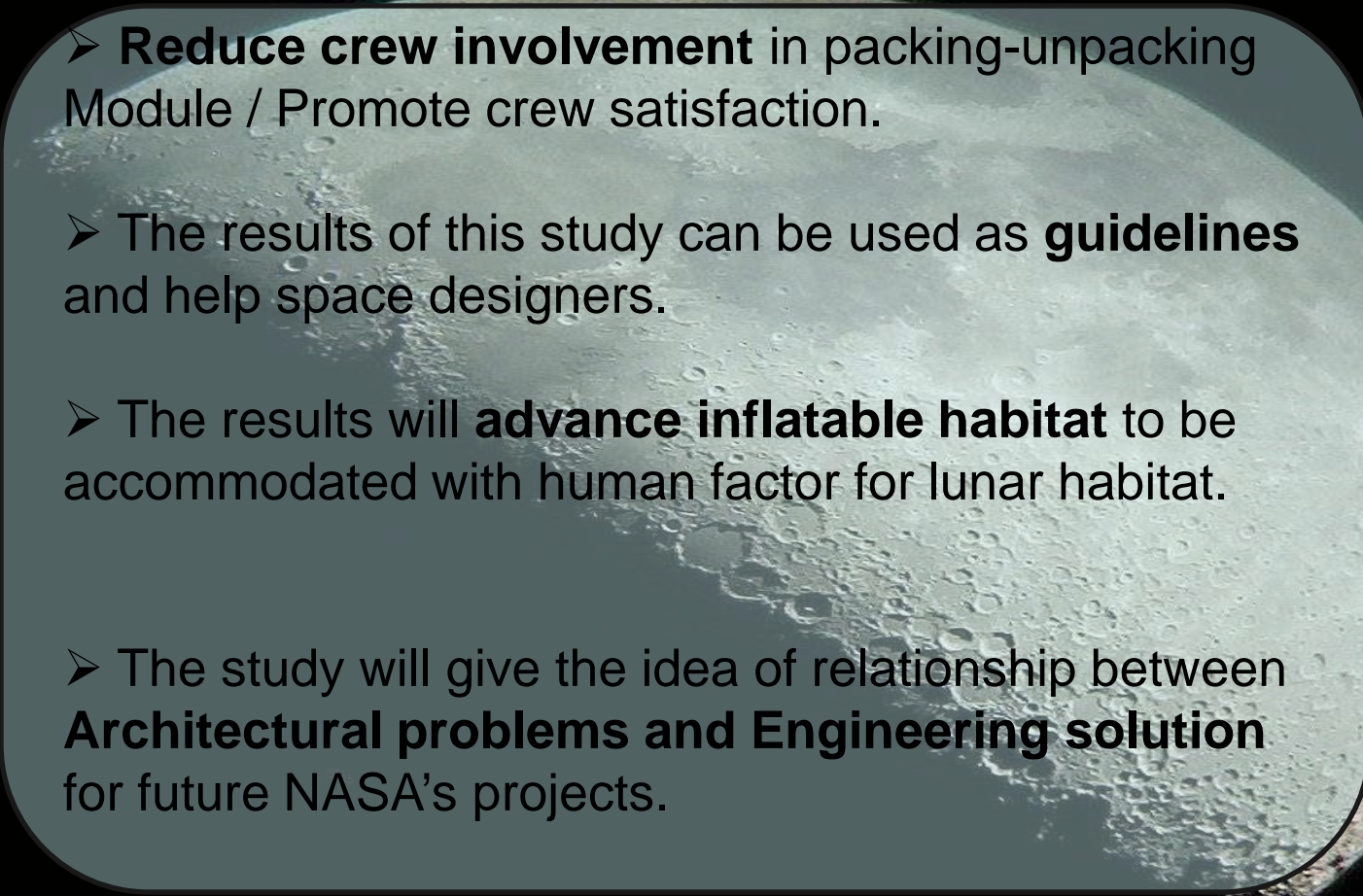




Trade off- Diagram



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- Emphasize on the **Architecture position** in the NASA's projects especially for lunar long duration habitat. Architecture has to be working with engineering from the first step of defining scenario.
 - Introduce “**Habitability Module**” for Lunar Long - Duration Habitats which revolve around an architectural concept will include multidisciplinary aspects. Using **data analysis** of this **study** can reach goals for **future designs** on the Moon, Mars and Earth (Harsh Environments).

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- **Reduce crew involvement** in packing-unpacking Module / Promote crew satisfaction.
 - The results of this study can be used as **guidelines** and help space designers.
 - The results will **advance inflatable habitat** to be accommodated with human factor for lunar habitat.
 - The study will give the idea of relationship between **Architectural problems and Engineering solution** for future NASA's projects.



Thank You