



中国航天

A composite background image featuring a rocket launch on the left, a satellite in orbit on the right, and the Great Wall of China winding across a landscape in the foreground, all set against a blue sky with light rays.

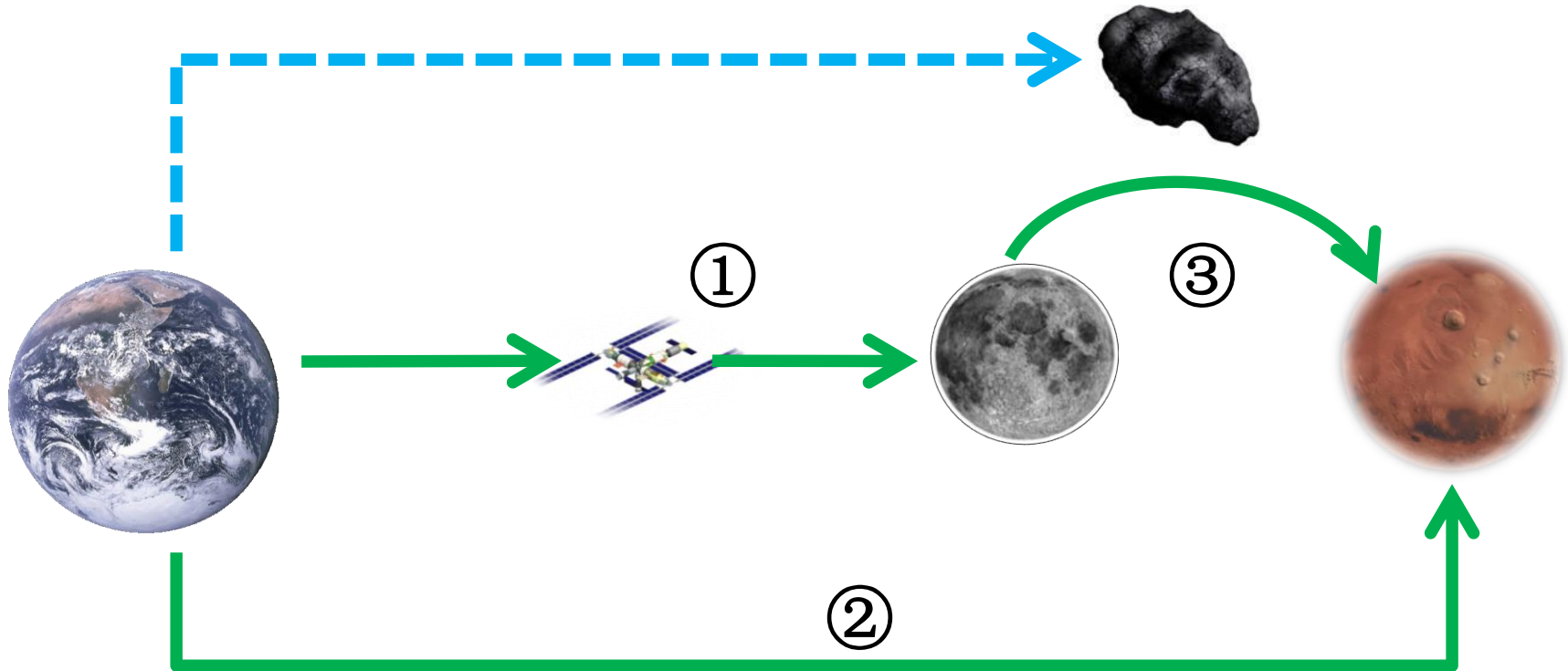
4 Issues of Human Deep Space Exploration

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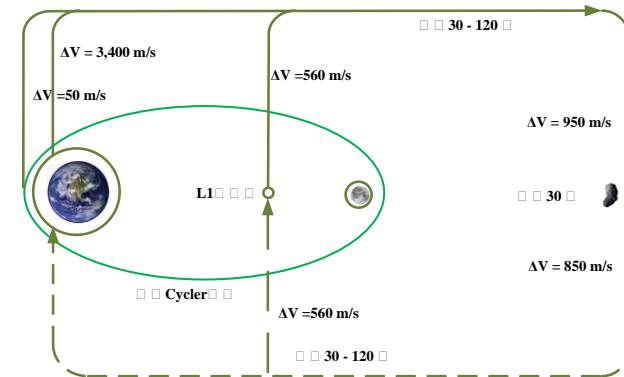
4 Issues of Human Deep Space Exploration

1. Deep space exploration based on Halo orbit Sun-Moon L1/L2

Libration Points

3-body libration points have very important value in deep space exploration missions. There not only have ideal locations for some special science exploration missions, but also perfect gateways for the interplanetary exploration.

- Design of transfer trajectory based on invariant manifold
- Design and correction of Halo orbit
- Research on center manifold of collinear libration points
- Design of translunar libration orbit based on unstable nature boundary of 3 body dynamics

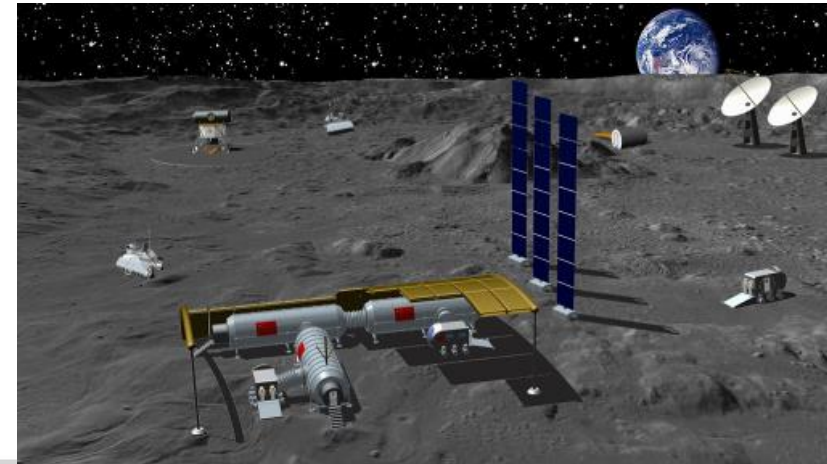


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2. Celestial base construction technology

Celestial bases comprises Lunar base, Martian base and so on. Astronaut security, comfort and space utilization should be considered while building celestial bases. The influence of gravity, space environment, landform and physiognomy, in situ resource utilization are also the key factors to enhance the construction efficiency and decrease the difficulty of building celestial base. Besides, celestial base architectonics is also a burgeoning subject in recent years. Which includes:

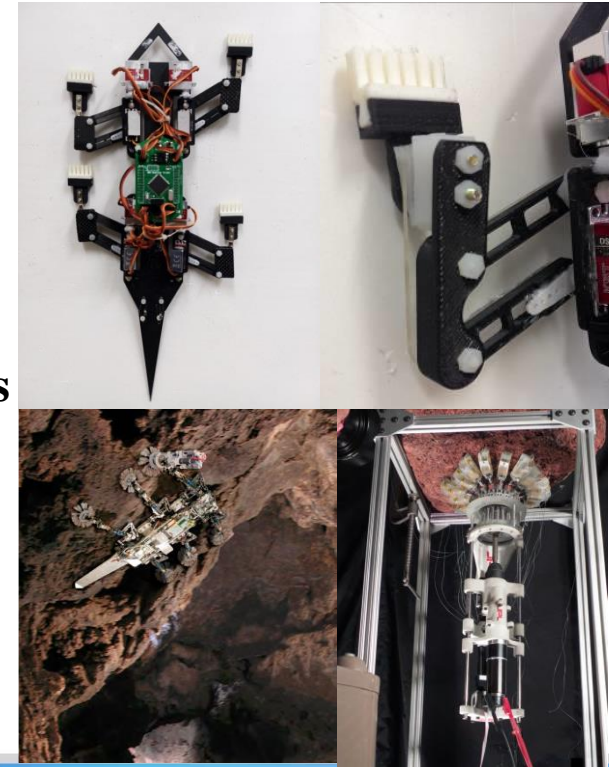
- Site selection
- Configuration and construction
- Energy and thermal control
- Bioregenerative life support
- Maintainability and extendability



3. Bionic space robot technology

For the weak gravity celestial planets, it is necessary to research a new landing attachment mechanism, which gives insurance to detectors to make available observation of weak gravity celestial planets. Meanwhile, this kind of bionic space robot also can be used for the observation and service of spacecrafts. Thus, the bionic space robot technology gets more and more attention in recent years. Which includes:

- Attachment characteristics analysis of weak gravity celestial planets
- Dynamic model and characteristics analysis of alcula mechanism
- Bionic alcula and mechanical lock model analysis on asteroid
- Experiment techniques of bionic robot attachment
- Space target capture technique based on bionic theory



4. Planet pollution protection technology

As the depth development of deep space exploration, human found that the celestial planets such as mars may have liquid state water, which means that there may be life on celestial planets. In order to avoid mistaken estimation on life form, it is necessary for us to protect the natural environment of celestial planets, and develop the planet pollution protection technology. Which includes:

- **Forward and backward pollution sources analysis of human and unhuman missions**
- **Testing techniques and methods of pollution**
- **Pollution protection methods and pathways**
- **Pollution protection of human spacecrafts**



Thank you!