Feasibility of South Pole Landing Site on the Moon

Nuffield Foundation – Lunar Mission One
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INTRODUCTION

Choosing the perfect landing site for the lunar lander is very important for the Lunar Mission One project. The proposed landing site is the South Pole. It is crucial that this site chosen will allow the lunar lander to land safely and correctly aligned in order to perform the job it needs to do. The hypothesis is that if the South Pole is the best suited landing site then it will be the most effective landing site for the drilling of a borehole. Lunar Mission One have chosen the South Pole -Aitken basin as the landing site which is a huge impact crater (circular depression in the surface of the moon) on the far side of the moon. It is roughly 2,500 kilometres in diameter and 13 kilometres deep. It is one of the largest known impact craters in the solar system. It is the largest, oldest and deepest basin recognized on the Moon. The South Pole is a previously unexplored area of the moon making it scientifically interesting to investigate .

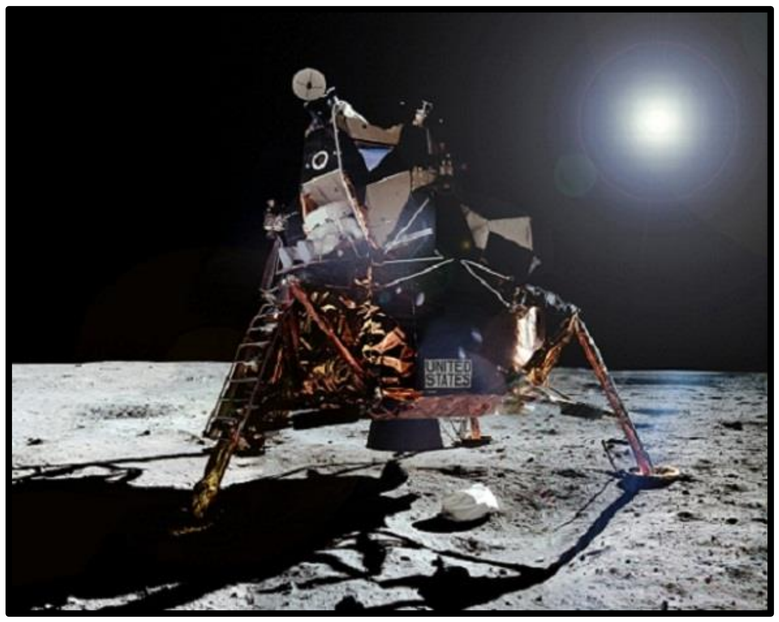
METHOD

There is a key criteria in deciding the perfect the landing site which is sun visibility, landing hazard, steepness of the slope, the availability of a direct line of sight to earth for communications, geological interest and the distance to get to the site. This is a main criteria to follow in determining the perfect landing site. But it is ideal to use other resources in order to make sure the best suitable landing site is chosen.

CONCLUSION

In conclusion, there are many factors that go into deciding the best suitable landing site and the south Pole of the Moon satisfies the majority of these factors resulting in the south pole of the moon being the best suited landing site for the lunar lander.

The Moon's Surface



Spacecraft On the Moon

RESULTS

Sun visibility plays a major factor in the land selection criteria as the lunar lander relies extensively on this for its source of power. The lunar South Pole can achieve near constant levels of sunlight to power the lander (depending on the time of year and the angle of the sun and the height) because it experiences extended periods of sunlight. Landing hazard refers to the materials at the South-Pole that may interrupt or affect the lunar lander. For example, boulders or stones may be an obstacle for the lunar lander. NASA have developed a program called Lunar Mapping and Modelling project and provides products, resources such as image mosaics, digital elevation models, hazard assessment maps, This way the target areas in this case the South – Pole of the moon can be searched for boulders which may be a potential hazard to the lander. Slope steepness should also to be considered. Due to lander design, a slope steeper than 15° can cause the lander to topple and possibly causing it to roll.

If the lander were not to be on its feet and upright, then the mission has failed so it is vital that slope analysis is done to determine the steepness. In order to avoid landing on unsafe terrain, an autonomous Hazard Detection and Avoidance (HDA) system is employed. Direct line of sight to Earth for communications is important. The South – Pole is in direct line to the earth so that communications can be enabled between the lander and the control centre on Earth. Nonetheless, when picking a site, it must have geological interest. The South Pole fits this criteria because of the unique surface conditions found at certain sites in terms of solar illumination, the proximity of scientifically interesting locations such as permanently shadowed craters and the potential existence of resources which might be utilized.

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