*LUNAR-I rover*

System and Mission Requirements file

The moon is the nearest space object near to earth and it is the only natural satellite earth has. Distance from earth to moon is 384,400km. But mankind reached the moon during 60’ and 70’s.

LUNAR-I rover is a concept design for ESA’s upcoming lunar mission program under the ‘Terrae Novae Strategy’. The primary goal of the Lunar-I rover is to study and explore the moon’s south pole and preserved water in the PSR(permanent shadowed region).

Rover has these 4 main objectives.

* Reach the Moon’s south pole/PSR area.
* Study the area.
* Extract samples of ice/water.
* Return to moonship.

Mission Requirements

Before we started this project, we carefully studied Apollo and recent missions to moon such as ISRO’s ‘Chandrayan’ project.

Main objective, for the mission is to explore the south pole area and collect samples of water.

The purpose of the mission is to study the areas which contain water/ice and bring back samples for further research. This will be a great opportunity to future missions specially we can determine how humans can use the water resources for future missions such as drinking supplies and as a fuel source.

LUNAR-I rover has these mission requirements.

1. Functional –

The main objective of the mission is to land the LUNAR-I rover near moon’s south pole and explore the selected PSRs and collect samples of the water.

To meet these objectives, the designed system must have a good connection between sub-systems and a good communication system with the mission control.

Main challenges for the functions of the rover system are vacuum space, darkness/no sun light, sustainable energy resource(difficult to use solar energy due to no sun light) radiation, lunar dust.

1. Operational –

Rovers main task is to explore the selected are in the PSR. Rover’s main operational duties are to take photos using its camera system, map the area using Lunar Penetrating Radar(LPR) system.

Rover is included with robotic arm that can be controlled from mission control room. This robotic arm will take samples and collect them inside the storage of the rover.

1. Constraints –

LUNAR-I rover will be built for one specific task only. The main and only task of the rover is to explore and collect samples of the water which is preserved in moon’s south pole.

System Requirements

There are multiple factors that can be a cause for completing a successful mission. System meeting its specific requirements will play a significant role throughout the mission. Rover’s technical capabilities and design should help to achieve its mission purpose.

LUNAR-I rover will need these system requirements.

1. Performances (expecting) and design –

LUNAR-I rover will include a navigation system to find the way throughout its journey on moon. The robotic arm which can be controlled by the mission control center will collect samples of water from the surface.

Rover will have a 6-wheel suspension system for its movements throughout the mission.

Our aim is to build the rover as light as possible as this is a one mission rover system.

Rover will also include the lunar penetrating radar system to map the area which it will explore.

Rover will also include an advanced camera system to get a 360-angle viewpoint from the rover.

Rover will also include an advanced direct communication system as distance between moon and the ground using high-gain microwave antenna for sending data directly to earth/ground control center.

This will be current and up-to-date mission and system requirements file for LUNAR-I rover mission proposal.

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