'LUNAFILT' MECHANISM FOR THE FILTERATION OF LUNAR DUST. R. A. Chandrachud[1], [1]B.K. Birla College Affiliated To Mumbai University (rachandrachud@gmail.com).

Introduction to Lunar Dust Problems on Lunar Surface: Dust builds up upon the objects in the lunar environment. The composition of lunar dust on the lunar surface is about 50% SiO_2, 15% Al_2O_3, 10% CaO, 10% MgO, 5% TiO_2 and 5-15% Iron[1].The surface systems on the lunar surface must be freed from dust before humans are chronically exposed to it. The problems which humans may face within near future must be addressed and resolved at the earliest which may include use of vacuum suits and advancements in suit designing along with development of structurally potent and feasible dust capturing devices.

Problem Solving Dust Filtration Mechanism WITH 'LUNAFILT': The Electrostatic systems seem a better alternative for dust removal on the lunar facilities compared to mechanical direct air processes, vibrations of high frequency, and brushes

Electrostatic systems: The catering technique for dust problem can be primarily accomplished through electrostatic systems. This causes dust to be repelled from the object it is resting. The system comprises of a conductive plate. On this plate a charge can be placed. Dust being repelled is a result of charging of objects which are in contact with plate. A current of gas can be fed through the chamber at the point and dust will carried away resulting into reduced dust levels.

Ceramic Filter 'LUNAFILT' : Then this dusty gas is passed through a thin filmed ceramic multilayer filter to remove the dust. This particular filter can be cleansed by blowing gas simply rearwards through it. One filter is expected to run 1 Million cycles of filtration. The expected life span for the better adsorption and high efficiency is recommended 5 years but it could be used for next 5 years in adverse conditions.

Effect of microgravity: This method can be also used in microgravity and then put to test on lunar surface. This will work better in microgravity as there will be no conductive plate but objects will hold conductive bars. In microgravity there is lack of acceleration. Thus particles tend to show more desired nature for the system as compared to other environment.

WHY 'LUNAFILT' ? : The exposure of dust to machines accelerate the machinery decay due to abrasion. It may also produce faults in the sensitive systems. Concerning human health they may act as carcinogens and irritants also. The prolong exposure could produce chronic disorders in the living things. Thus 'LUNAFILT'with Lunar Dust Filtration Mechanism offers solution for this issue.

Dust protection for humans on lunar facilities: A small amount of dust inhaled in the lunar facilities such as ISRU units is potentially much more damaging to the health of human beings. Thus there must be adequate importance shown to the protection of humans from the lunar dust. The suits of Apollo astronauts were reported to be quickly wore out due to lunar dust. Thus, Reducing the number of joints to one or two the air loss rates could be reduced. Along with that it can be ensured that suits are not locked by lunar dust. The dust mask also carries immense importance while human operation in the metal refining ISRU units. Exposure to a small amount of dust could lead to undesired situation on the metal refining lunar ISRU units.

Features of this system: The system utilizes electric charge and ceramic filter. The other components of the system can be reused as they do not get worn. As per the guidelines for a good decon system the entire cycle takes only 20 seconds (20 seconds ensure more dust removal and effective operation). This system is non invasive and hardly dangerous.

Future Scope: In near future the importance of lunar surface structures would be emphasized like never before due to moons position and resource availability. The team studying this project would identify the problem arising due to lunar dust on the lunar structures and seriousness regarding it , their feasibility, practical implementation and need of current moment.

References: [1] D. Loftus, E. Tranfield, J. Rask, C. McCrosssin, NASA ARC, The Chemical Reactivity of Lunar Dust Relevant to Human Exploration of the Moon