

Studies on Lunar Base construction: architectural environment, thermal balance, economic technologies, local materials, on site assembly.

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We studied the strategies, technologies, designs of the Lunar Base architectural construction from the viewpoint of physical constraints (i.e. energy balance, strength and insulating properties of the lunar materials), engineering constraints (i.e. building technology, transports, insulating layers) and geological environment (allocation of the buildings). Our results contain proposals on the general strategy, on the local production technology, on arrangement and insulation solutions and the emplacement of the lunar base.

We propose a complex architectural design for the lunar environment. It is economic to place the first long term used buildings below the surface. This way large mass of lunar soil can be used as insulator. Lunar soil can be moved by a lunar rover bulldozer to cover the deposited container with regolith. We propose a double insulating layer system both using lunar soil as thermal insulator. We also propose a geological setting of the implementation of the architectural units in a groove or small valley mouth where not only the deposition of soil is economic but the enlargement of the station is possible in valley direction.

Using the insulating and strength data of the lunar soil the following main technology phases of construction of the lunar base architecture are proposed. After transport of the primary container ISS type unit blocks from Earth to the lunar surface: 1) grading and basis forming in the bedrock for the frame, 2) assembly of the architectural constructions of the frame, (from frame units a spatial skeletal structure is built on the site which holds the stresses and load of the weight of both the cylindrical modules and the other insulating layers), 3) parallel filling the insulating quilted-coat like units with lunar fine soil, 4) fixing the quilted-coat like second insulating units to the surface of ISS type unit blocks, 5) final emplacement of the container blocks on the frame, 6) burial of the living bubble units by the lunar regolith from the plains surrounding the valley of lunar base locality.

The best geological site for such lunar base construction is at the mouth of smaller valleis with at least 10 meters width. We propose the locality of the Aristarchus crater,

where several larger and smaller rilles can be found.