COMPLEX ARCHITECTURAL CONCEPT AND TECHNOLOGY FOR CREATING BUILDINGS OF GREAT INNER SPACE ON THE MOON, WITH LOW ASSET REQUIREMENT AND HIGH EFFICIENCY. ***B. Boldoghy[1], J. Kummert[1], T. P. Varga[2], I. Szilágyi[2], I. Darányi[2], Sz. Bérczi[3], T. N. Varga[4], G. Hudoba Jr.[5],*** [1] Ferroelektric Engineering Pan Konceptum Ltd., H-1116 Budapest, Vasvirág sor 72., Hungary, (konceptum@vipmail.hu), [2] VTPatent Agency, H-1111 Budapest, Bertalan L. u. 20., Hungary (info@vtpatent.hu), [3]Eötvös Loránd University, Institute of Physics, H-1117 Budapest, Pázmány P. s. 1/a., Hungary (bercziszani@ludens.elte.hu). [4]Eötvös József High School, H-2890 Tata, Tanoda tér 5. (mirene@freemail.hu), Hungary, [5]Hudoba Design, 6611 Oakland str. Pennsylvania, 19149 PA, USA.

Introduction: The essence of our proposal is a comprehensive, complex construction and architectural concept, a building technology for creating buildings of great space, great inner volume with a method of low asset requirement and high efficiency on the lunar surface. That buildings of arch structure should be created from the local materials, which can be used on the lunar surface as well as in lunar valleys, ditches and craters.

Main considerations: 1. minimal asset requirement – devices, equipment to be delivered to the site, 2. devices, equipment to be produced on site, 3. maximum achievement – from the point of view of the inner space, volume of the building to be constructed, 4. marginal additional requirements, 5. energy consumption, 6. human resources requirement, 7. other supplementary technologies, devices.

This structure can be built on lunar surface and in lunar ditches, valleys as well. In case it is built in lunar ditches or valleys and covered with a lunar regolith layer of proper thickness according to our previous proposals, then a structure of balanced inner space temperature can be made. Besides this however creating buildings on the lunar surface should not be disregarded either.

In case of several applications there is a demand for buildings on the lunar surface as well (shop-floors, hangars, silos), however those ones would not be of balanced inner temperature. Though they can be made of great size, great inner space structures. These structures could be covered with lunar regolith in a similar way to our concept made known earlier [1-2]. Several suggestions were published regarding the method beforehand as well. The cost-effective solution of their construction is however not yet clarified.

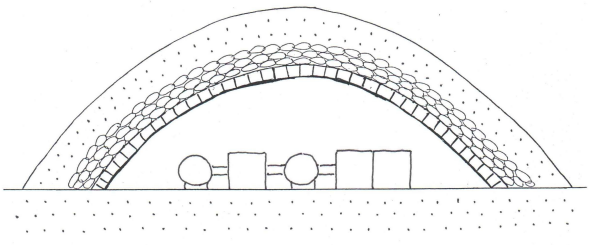

Fig. 1 *Industrial building of arched structure and of great inner space on the Lunar surface*

The necessary prime and supplementary technologies: 1. Making solid, load-bearing building elements from regolith, the lunar dust - 'lunar building brick factory' This is the essence of our present concept. 2. Bagging of regolith, the lunar dust – creating modular units – which can be easily transported, moved, used on the required spot in the required quantity. 3. Moving and leveling of the lunar dust, soil: conveyor belts, worm gear control excavators, bulldozers. 4. Use of available well-known supplementary technologies is necessary, respectively sufficient.

Considerations of the building element - Lunar brick: Main parameters: material, strength of material, dimension, side convergence (wedge mechanism), balanced forces. The sides of the building elements can be parallel or convergent.

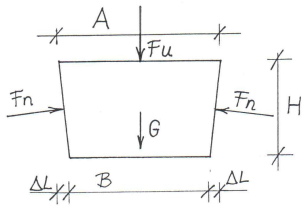

Fig. 2 Geometrical shaping of the Lunar building element (brick), dimension, geometrical formation, and forces

Feasibility study: Main steps and necessary devices of a production technology of a lunar building element: 1. Finding a proper production technology. If it exists, it should be fitted to the lunar conditions, or a novel technology for lunar conditions should be found. 2. To achieve this it is necessary to find and open up regolith resources of appropriate quality and quantity. 3. It is important, that the place of exploitation and production should not be too far from the place of application (transportation problems).

Making of a solid "brick" unit of lunar regolith is possible in two ways: with the use of a binding material, or with caking, burning. The binding material can be produced on the Moon, or it must be transported – then the costs are considerably higher. For caking, burning it could be used with local materials of silicate base, e.g. lunar basalts or anorthositic rocks. It requires more facilities and energy, but it can be more const-effective in the long run.

References: [1] Kummert et al., Organizational Concept of Buildings of Levelled Temperature Interior Space on the Moon, SRR VII conf. 2005 (*#2007*), [2] Boldoghy, et. al., Construction of a Lunar Architectural Environment…, 37 LPSC 2006 (#1152), [3] Boldoghy et. al.: Feasibility Concept Of Creating Protected Spaces, SRR VIII conf. 2006, [4] G. A. Smithers et. al., A One-Piece Lunar Regolith-Bag Garage Prototype, SRR VIII conf. 2006, [5] Boldoghy, et. al., Practical Realization of Covering Lunar Buildings for Ensure Leveled Temperature Environment 38 LPSC 2007 (#1380).