PROJECT LEAP: LUNAR ECOSYSTEM AND ARCHITECTURAL PROTOTYPE.

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Presented are concepts for an initial lunar base which can serve as the core facility for larger lunar settlements as needs and activities evolve. The study emphasis is upon requirements and architectural components associated with early stages of habitat construction using a modular approach and inflatable structures.

The main purpose of the proposed lunar facility is the mining of regolith for the production of liquid oxygen needed for a large Earth-Moon space infrastructure. Base objectives in science, production, habitation are achieved incrementally as the base evolves according to a growth scenario over a ten year period beginning in the year 2005 with all components in the first phases imported from Earth. Throughout the development of the facility, experimentation on areas of interest related to the process of utilizing lunar resources for self-sufficiency will take place.

Achieving large volumes of spaces within a relatively short period of time and with minimum requirements for construction processes is a major objective in the overall growth plan of the facility and is illustrated using computer generated three-dimensional models. This is accomplished in part by a planned deployment of three basic module components: the common module, the inter-connect node and the airlock. These three elements are delivered to the lunar surface according to increased personnel needs and operational readiness of base functions.

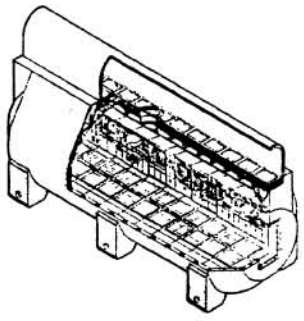

fig. 1 Lab Module Interior View

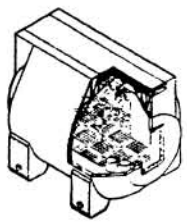

fig. 2 Airlock

fig. 3 Interconnect Node

Due to the hexagonal design of the interconnect node, a "circle the wagons" approach allows the common modules to form perimeters of floor space which can then be enclosed with inflatable domes. The resulting geometry develops a honeycomb pattern that evolves in stages to produce dedicated areas for habitation, laboratories and farming/life support functions.

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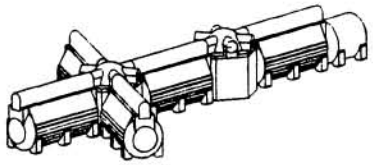

fig. 4 PHASE 1: 2005 - 2006.5

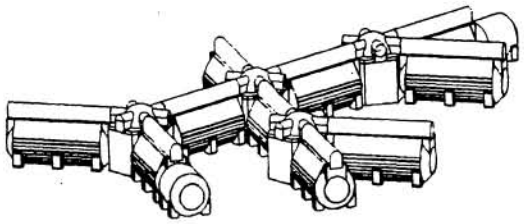

fig. 5 PHASE 2: 2006.5 - 2008

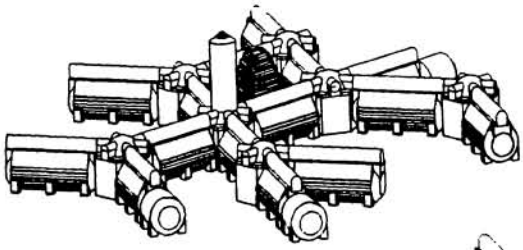

fig. 6 PHASE 3: 2008 - 2010

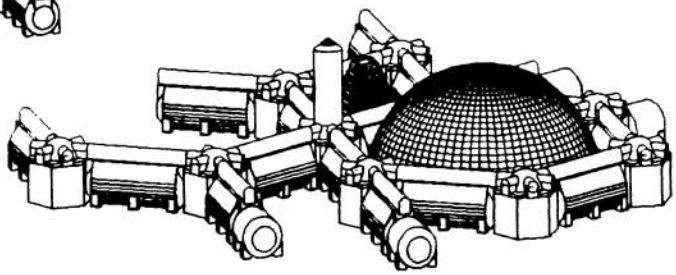

fig. 7 PHASE 4: 2010 - 2012

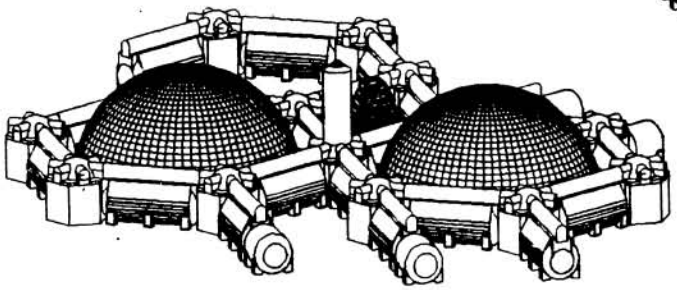

fig. 9 PHASE 6: 2013.5 - 2015

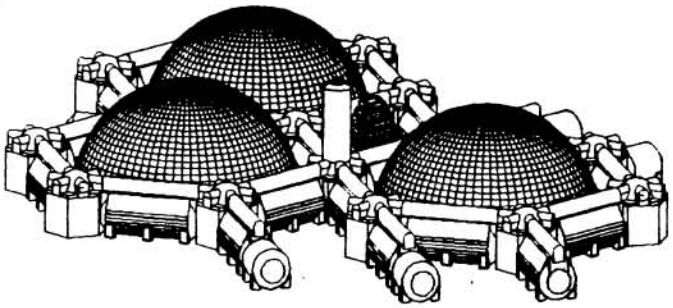

fig. 8 PHASE 5: 2012 -2013.5

This growth pattern also allows for incremental observation and testing for problems associated with pressurizing, covering created volumes with the ultimate goal of using lunar fabricated inflatable fiber-glass membrane for dome fabrication.

Use of indegenous lunar materials for construction is but one step toward the lunar base objective for self-sufficiency and depending on production, complete independence from Earth will eventually be achieved.