

System Architecture Development for a Self-Sustaining Lunar Colony
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ORBITEC proposes to develop an overall system architecture for the goal of establishing a truly self-supporting lunar colony, independent of sustained Earth resources and supplies. By deliberate design, we will define a self-supporting lunar colony that would be able to survive and grow, with only initial supplies from Earth. We intend to show that a design of a self-sufficient architecture is not only feasible, but is an attractive alternative to what might be considered a regular Earthsupported lunar colony. The establishment of such a colony would indeed be a grand step into space and would absolutely drive new innovative approaches/developments for self-sufficiency that would ultimately support a much lower cost and highly-survivable human colonization of Mars and other planetary bodies. Once established, the lunar colony will implement many innovative applications for the production of needed structures and commodities from lunar materials. Examples include: (1) the manufacture of raw materials and structures for use on the surface for habitats, production facilities and transportation infrastructure; (2) production of oxygen, nitrogen, carbon dioxide, water and food for life support; (3) the production of hydrogen and oxygen propellants/fuels from the lunar water ice-bearing lunar regolith at the poles for use in ground and flight vehicles operating on the surface, in Lunar orbit, Earth orbit, libration points, and deep space; and (4) production of chemical, solar and nuclear energy production systems. The psychological step for man going from the Moon to other localities in space would be much smaller than first leaving the Earth gravity, and thus a lunar colony could become a stepping stone for the expansion of humanity into space. In developing a realistic architecture for a self-supporting lunar colony, a wide range of technical expertise is needed. Areas of R&D that will come into focus include: biology, human behavioural sciences, automation and robotics, ground and space transportation/propulsion, mining and processing of resources, inflatable and non-inflatable facility construction, communications, manufacture of tools and equipment, recreation and entertainment, solar and nuclear power generation and energy storage, political science/government, external and internal commercial activities, and etc. The Phase I investigation will start with basic human needs such as, habitat/shelter/shielding, oxygen, nitrogen, carbon dioxide, food and water (see Figure 1). Each need is registered as a requirement to be fulfilled by a design parameter. Each design parameter will then be similarly broken down in requirements. Various tasks will then be conducted that will lead to establishing feasibility for the concept.

