A Mission to Demonstrate the Production of Lunar Oxygen

A Candidate 2005 NASA Academy Group Project

<u>Situation</u>: A new manned base has been established near the lunar equator. Currently, it is completely re-supplied from the Earth. Several candidate technologies exist to mine oxygen from the lunar regolith. You are tasked with developing a mission to demonstrate in-situ production of oxygen from the lunar regolith.

<u>Disciplines</u>: Geology, Chemistry, Spacecraft Design, Industrial Engineering, Chemical Engineering, Logistics, Optics, Power

<u>Tasks</u>:

- Select a baseline technology to use for the demonstration plant, and a rationale for your selection.
- Determine what infrastructure could be available for use by the plant (power, mining, launch, landing, deployment, labor).
- Determine what the oxygen needs would be for the base, both for breathing and propulsion.
- Size and design the plant to accommodate these needs. Determine and design any additional equipment needed to demonstrate the plant.
- Develop and plan the mission, including mass and power budgets, hardware descriptions, and operations concepts. Provide the details of any human interaction with the plant (deployment), as well as an estimated financial budget.