

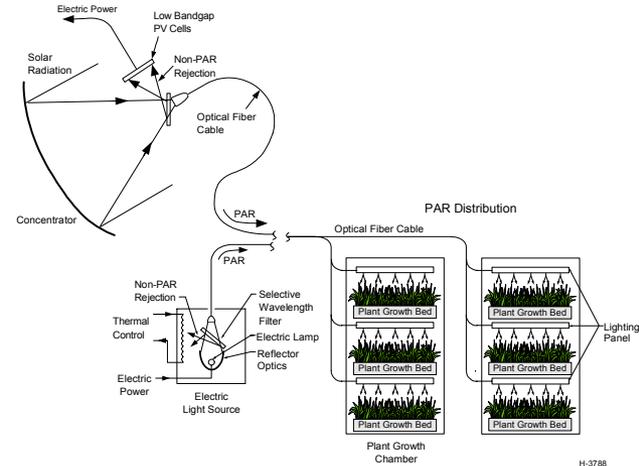
Transmission and Distribution of Photosynthetically Active Radiation (PAR) for Biomass Production in Exploration Missions

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Identification and Significance of Innovation

- Solar lighting is delivered to plant lighting chamber via flexible optical waveguide
- Only PAR spectra are delivered, reducing heat removal work to a minimum
- Electric lighting may be combined with solar lighting
- The proposed solar power system can be used for multiple applications such as ISRU material processing
- The weight of the proposed system will be less than half of that of the current NASA baseline system



Technical Objectives and Work Plan

- Develop engineering prototype
- Install the system at the Space Life Sciences Lab, NASA/KSC, for performance evaluation
- Conduct system optimization and develop design for a lunar based system for plant growing and ISRU
- Prepare space-qualified prototype to be developed in Phase III

NASA and Non-NASA Applications

- Biomass Production on Lunar Base and in Transit to Mars
- Regenerative Lifesupport for long duration Space Missions
- Thermal power source for ISRU such as oxygen production on the moon
- Power Generation on the moon using heat engine

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