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# EFFICIENT LIFE SUPPORT SYSTEM

**Abstract**

Life support systems are a vital part of space travel. They sustain life in the outer space and help the astronauts become independent of the earth. NASA's LSS provide resources like water, air and food in order to help them live and work in space. The Life Support systems have been under development for almost forty years, time in which they evolved tremendously. Anyway, they still remain heavily dependent on earth and therefore cannot really sustain life in missions that involve farther space traveling. So far, even the ISS resupplying missions require very careful planning. In what regards the farther space establishments, we can only expect for the worse.

The outer space is a rough environment for astronauts and their space crafts. The LSS are really fragile and any unfavorable element could affect them negatively. In order to be able to maintain them, we need to understand how they work and how to components interact and fit together. Also, ground testing is vital in order to have a safe system in space.

The primary goal of the LSS is transforming carbon dioxide into oxygen to allow for a stable supply of oxygen. The current systems on board of the ISS are inefficient as they don't recycle the remaining carbon leading to a system unable to sustain itself due to the losses. Our systems recycle the carbon dioxide into lactic acid in a process similar to the one found on the ISS. This is very helpful as lactic acid can be used to increase plant growth and as a pesticide (L-lactic acid).

Another important goal of life support systems is to develop water reclamation systems to support long-term human space exploration. Wastewater management systems have been developed to recycle urine, wastewater, and moisture from crew members and reuse it as clean water. In this way, the system reduces the amount of water and consumables that would need to be launched from Earth.

In conclusion our objective is to present one of the most efficient LSS that could be used for space exploration that can sustain life for very long periods of time with the only resource spent being electricity. We will do this by converting carbon dioxide into oxygen and lactic acid to hasten plant growth, recycling waste water and using easy to produce chemicals to help with hygiene.