

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Life Support, habitats and EVA Systems (7)

Author: Dr. Marc M. Cohen
Space Cooperative Inc., United States, marc@space.coop

Dr. Rocco Mancinelli
SETI Institute, United States, rmancinelli@seti.org

Mr. Jurek Parodi
National Aeronautics and Space Administration (NASA), Ames Research Center, United States,
jurek.parodi@nasa.gov

WATER WALLS OVERVIEW

Abstract

This overview describes the several systems that comprise the Water Walls approach to creating a Life Support system using a simple membrane technology to supplement and in some functions, to replace the complex and too failure-prone existing life support systems. The primary innovation is to try to achieve reliability through the massive redundancy of inexpensive, passive forward osmosis membrane placed within simple but sturdy polyethylene bags. A key element is the calculation that photosynthesis by algae is about an order of magnitude more power-efficient at scrubbing CO₂ and generating O₂ than the Sabatier Reactor. This overview describes the Functional Flow concept and for the relationship among the Water Walls subsystems. It explains the Process Block approach and how it was ultimately consolidated to achieve more clarity and simplicity at the at the higher system level while developing refinement and component characterizations at the subsystem level. Finally, it illustrates the application of Water Walls to a representative space crew habitat module.