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BIOCONTAMINATION INTEGRATED CONTROL OF WET SYSTEMS FOR SPACE  
EXPLORATION (BIOWYSE)

**Abstract**

Control of microbiological contamination within spacecraft is of huge importance for long-duration manned space missions: such systems must guarantee crew well-being, health, and subsistence. The development of materials and methods to prevent, monitor, and mitigate environmental microbial contamination and its harmful effects are thus required. Considering the application of such systems to spacecraft, possible solutions must be safe, automated, lightweight, reliable, efficient, and require minimal energy, consumables, maintenance, etc. The “Biocontamination Integrated Control of Wet Systems for Space Exploration” (BIOWYSE) project focuses on the development and demonstration of a compact, integrated, and automated solution (hardware software) to biocontamination control. The BIOWYSE system is designed to prevent, monitor, and mitigate the risk of microbiological contamination in water systems and humid surfaces onboard ISS and in future human space exploration missions. Automation and synergy of these processes lead to reduction in crew time, decreased energy requirements, procedure simplification, and additional safety measures. Prevention and real-time monitoring, together with an appropriate control system, can reduce the decontamination effort requirement and radically improve efficiency. The BIOWYSE system and its subsystems, modules, and operational modes are described in this paper.