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BIOWYSE: A SOLUTION FOR REAL-TIME, AUTOMATED AND INTEGRATED BIOCONTAMINATION CONTROL

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Abstract

Space exploration requires reliable, rapid, significant and safe methods for preventing, monitoring and controlling biocontamination risk in water loops and humid areas in manned Space habitats. Water is one of the most important resources of our everyday life. Its microbiological control in houses, public water dispensers and special conditions (e.g.: epidemics, catastrophes, isolation) is crucial. The presented solution is automated, compact and portable, and above all “integrated” – i.e.: composed of modules working in synergy (prevention, monitoring, control and decontamination). It was designed for space applications, thus microgravity-compatible. BIOWYSE integrated system combines biostatic/biocide action with real-time biomonitoring and almost instantaneous UV-based disinfection. It is an automated and compact system, meaning low crew time need and suitable transportability. In an automated way, the Prevention Module prevents biofilm formation and the Decontamination Module immediately counteracts water microbial load increment upon checks by the Monitoring Module. BIOWYSE has full potential for exploitation for ISS and future manned Space Exploration missions and represents an innovative tool with a wide application potential in a large number of situations on Earth.

Key words: ATP-metry, biocide, bioluminescence, biomass, biostatic, decontamination, microbial contamination, monitoring, prevention, spacecraft, UV-C LED

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