

## **ADVANCED LIFE SUPPORT FOR OPTIMAL MANAGEMENT OF VITAL RESOURCES IN HUMAN SPACE EXPLORATION MISSIONS**

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Manned space exploration is entering a new exciting age, where mankind will step again beyond Low Earth Orbit, while commercial space stations will start appearing. Our next concrete step is the Moon orbit, and both the Lunar surface and the advancing toward Mars are in the space agencies' plans. Recovery of wastewater as freshwater, atmosphere cleaning, as well as on-board food production are among the most urgent needs for manned spacecrafts. The main requirements, particularly in long-duration missions, include the minimization of the hardware mass, volume, power consumption and crew time, while maximizing safety and reliability. Space environment constraints offer new opportunities for science and technology, leading often to innovative solutions that could be also useful for our daily life. This talk discusses some of the challenges linked to the development of the next generation of crew advanced life support systems, showcasing opportunities for nanotechnologies contribute into solving them.