



National Aeronautics and
Space Administration



TECHNOLOGY SOLUTION

Environment

Microwave-Based Water Decontamination System

[Chemical free water purification method and device](#)

Innovators at the NASA Johnson Space Center have developed a microwave based system that eradicates bacteria. The technology can be used to treat water systems to generate potable water. The technology was originally developed to address the water purification needs and challenges on the International Space Station (ISS). Current water purification methods onboard the ISS use hazardous chemicals and require consumable products to be transported from Earth to the ISS.

This NASA Technology is available for your company to license and develop into a commercial product. NASA does not manufacture products for commercial sale.

BENEFITS

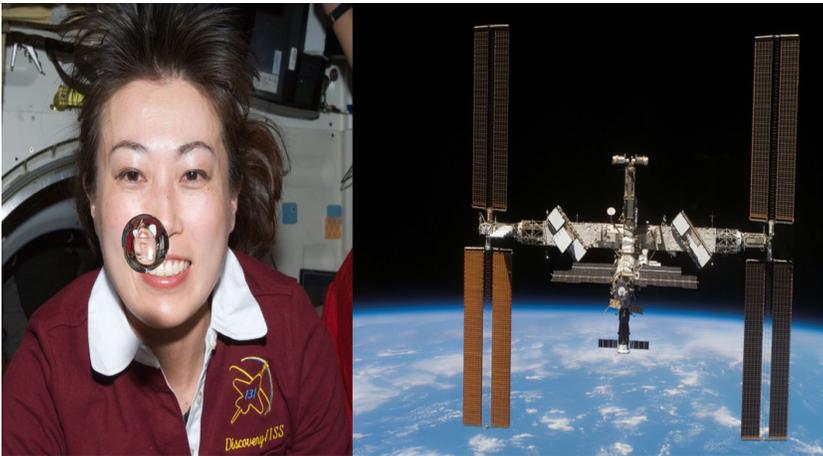
- Small and lightweight
- Portable device
- Chemical free
- Uses minimal consumable products



THE TECHNOLOGY

Bacterial contamination of water systems used in microgravity is a major issue for NASA because biofilms can clog or interfere with water system functions and bacterial ingestion can be harmful to astronaut health. To address this problem, NASA innovators developed a microwave based technology to purify contaminated water by eradicating and eliminating bacteria that grows in systems that generate potable water, in equipment utilizing cooling loops and heat exchangers, and removing bacterial contamination that is present on a variety of surfaces. This decontamination system is chemical free and requires minimal to no consumables.

Initial testing identified a specific microwave frequency band and exposure times for killing bacteria (*Burkholderia cepacia*) and biofilm. Test results show that exposing static water to microwave energy for 90 seconds can effectively kill waterborne bacteria and biofilm within a water filtration system. Additional testing, using a circulating water test bed, demonstrated that microwave energy at the selected frequency can effectively eradicate waterborne bacteria within 30 seconds. This technology could be further developed into a portable, lightweight system for use in remote locations as well as commercial space applications. The microwave decontamination system could also be added to existing water systems to extend the life of the system.



The technology developed to improve water purification for the astronauts on the International Space Station, can be used for water purification on Earth that benefits from the technology being chemical free and portable.

APPLICATIONS

The technology has several potential applications:

- Potable Water Purification
- Heat Exchangers and Water Cooling Systems
- Isolated Geographical Locations
- Hospital and Research Facilities
- Commercial Space Flight
- Decontamination Systems

PUBLICATIONS

Patent No: 9242874; 9328000

technology.nasa.gov

More Information

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Agency Licensing Concierge

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