National Aeronautics and Space Administration

International Space Station Spinoffs

A multinational effort involving NASA employees and contractors in 37 states and agencies in 15 countries, the International Space Station (ISS) is humanity's home in space and has captured the world's imagination since its first component launched into orbit in 1998. While the ISS provides invaluable information about living in space—essential for future colonies on the Moon and Mars—everything from the station's construction to biological experiments conducted onboard have led to spinoffs that are improving life on Earth. As the ISS inches closer to completion, NASA highlights ISS-influenced technologies that are advancing fitness and medicine, purifying air and water, and enhancing safety, among many other benefits.

Bioreactors Advance Disease Treatments

A NASA device used to cultivate healthy cell tissues for space station and Earth experiments is now enhancing medical research. Treatments developed using bioreactor-grown cells may be used to counter conditions like heart disease, diabetes, and sickle cell anemia.

Image-Capture Devices Extend Medicine's Reach

An ISS experiment led to the development of medical ultrasound diagnostic techniques for long-distance use. Technology created to capture and transmit these ultrasound results over the Internet allows patients from professional athletes to mountain climbers to receive medical attention as soon as needed.

Resistance Systems Provide Healthy Workouts

Developed to help astronauts perform vital exercise during long stays on the ISS, stretching elastomer technology now serves as an effective source of resistance for workout machines on Earth, replicating the feel and results—but not the unwieldy bulk—of free weights.

Programmable Ovens Let You Start Dinner From the Web

Engineers who designed the ISS Electric Power System created "embedded web technology" which allows users to control devices remotely, including a commercial oven. With both heating and cooling capabilities, this oven can refrigerate a prepared dish until the programmable cooking cycle begins, allowing dinner to be perfectly cooked when the user arrives home.

Aeroponic Gardens Help Plants Grow Faster and Healthier

A soil-less plant-growth experiment that enabled plants to grow healthy without the use of pesticides has enabled the development of a commercial aeroponic system. The sterile environment allows plants to grow disease-free and with 98 percent less water and no pesticides.

Systems Make Automobile Testing More Accurate

Automobile safety testing improved when a NASA charge coupled device camera was combined with a newly-developed synthetic mask skin covering for crash test dummies. As a combined system, the technologies provide more precise, repeatable predictions of laceration injuries sustained in automobile accidents.

Air Purifiers Eliminate Pathogens, Preserve Food

NASA research into sustaining perishable foods for long-duration space missions resulted in the development of an air-cleaning device which eliminates airborne bacteria, mold, fungi, mycotoxins, viruses, volatile organic compounds, and odors.

Robotics Offer Newfound Surgical Capabilities

Robotics designed for intricate repairs on the ISS find many industry uses, including a minimally invasive knee surgery procedure, where its precision control makes it ideal for inserting a very small implant.

Life Support System Recycles Water

A water filtration system providing safe, affordable drinking water throughout the world is the result of work done by NASA engineers who created the Regenerative Environmental Control and Life Support System, a complex system of devices intended to sustain the astronauts living on the International Space Station.

LEDs Alleviate Pain, Speed Rehabilitation

Tiny light-emitting diode (LED) chips used to grow plants on the International Space Station are used for wound healing and chronic pain alleviation on Earth and have been successfully applied in cases of pediatric brain tumors and the prevention of oral mucositis in bone marrow transplant patients.

For more information about NASA spinoffs, please visit **spinoff.nasa.gov**.

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