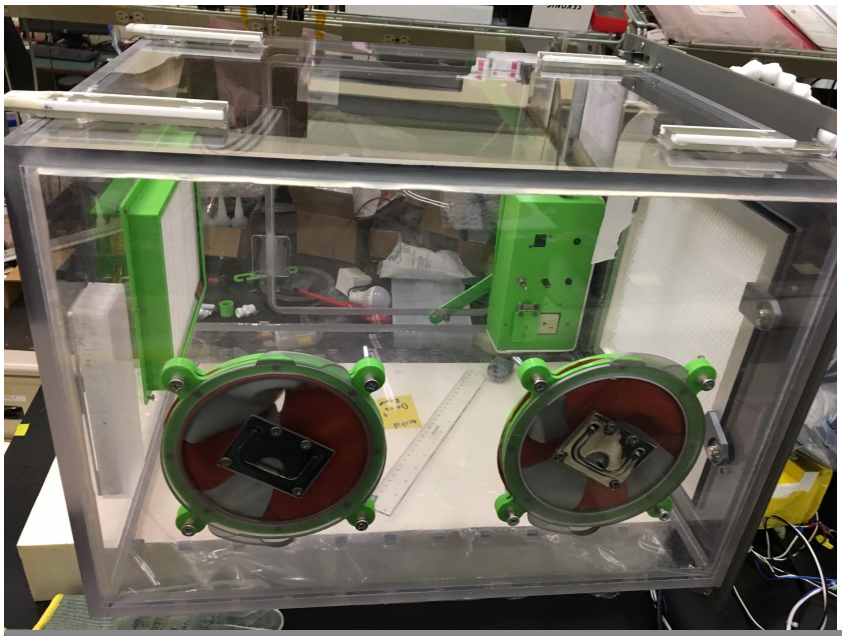

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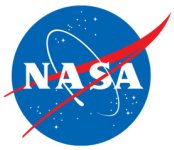


TECHNOLOGY SOLUTION

Health, Medicine and Biotechnology

Portable Science Enclosure Features Unique Innovations

Provides a compact enclosure system enhanced by novel seal and through-port innovations

Innovators at NASA Johnson Space Center have designed a science enclosure system for science experiments conducted aboard the International Space Station (ISS). It allows users the ability to safely manipulate objects of study within the transparent enclosure by utilizing protective boundary layer innovations whose designs may be transferable to other containment systems. The science enclosure system can support experiments that would require Biosafety Level (BSL) 2 containment.

The science enclosure employs a ventilation system that provides laminar flow throughout its interior with low electrical draw. The enclosure has a compact, low-profile, rectangular design that allows it to be easily stowed and transported. It features glove ports that interface with novel fasteners to facilitate the simple attachment of glove and seal assemblies or pass-through ports.

The science enclosure system, glove seal, and through-port have a technology readiness level (TRL) 6 (System/sub-system model or prototype demonstration in an operational environment), and each are now available for patent licensing. Please note that NASA does not manufacture products itself for commercial sale.

BENEFITS

- Compact low-mass design facilitates portability and easy stowage
- Biosafety Level 2 capable
- Provides laminar airflow with reversible ventilation
- Requires minimal electrical draw
- Utilizes HEPA filters
- Accommodates array of glove materials
- Modular design features quick-change glove ports
- Lab proven technology
- Unique through-port traps microdroplets
- Inexpensive to produce

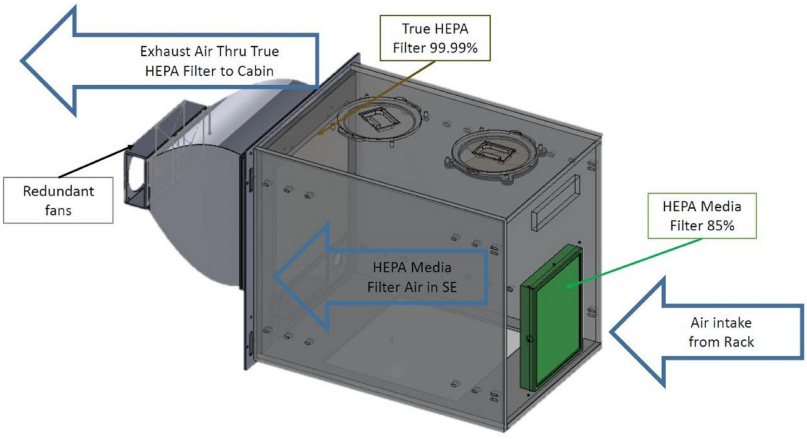
THE TECHNOLOGY

In the development of this technology for the ISS, engineers had to pay careful attention to electrical draw efficiency, ease-of-use, mass reduction, production cost, and safety, as conducting scientific research under spacecraft stressors is an important requirement.

To create a controlled environment within the science enclosure, engineers designed a ventilation system incorporating an external fan/blower that pulls air across a HEPA filter and diffuses it in a manner that creates an even laminar flow within the enclosure before exiting through the exhaust filter.

The glove seal forms an airtight and liquid impervious seal. This novel design also allows the user flexibility to choose their own task-specific glove material, facilitates easy tool-free assembly and quick glove changes, and may be transferable to other types of enclosures. Another key feature is that a through-port can be quickly fitted to an empty glove port.

Due to the science enclosure system intended application aboard the ISS, its electrical draw does not exceed 24V, thereby making it feasible to power it from a battery for terrestrial field use or other applications where accessing power is a challenge. The combination of its performance, portability, BSL 2 capability, and inexpensive production costs could position the science enclosure system and accompanying innovations to be valuable in the fields of education, research, clean rooms, hospitals, and disaster relief efforts.



Shown: Illustration shows prototype enclosure for ISS-rack installation

APPLICATIONS

The technology has several potential applications:

- Artifact storage and showcase
- Clean rooms
- Disaster relief areas
- Education
- Field use
- Hospitals
- Incubators
- Lab research
- Other containment systems

technology.nasa.gov

NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

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More Information

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