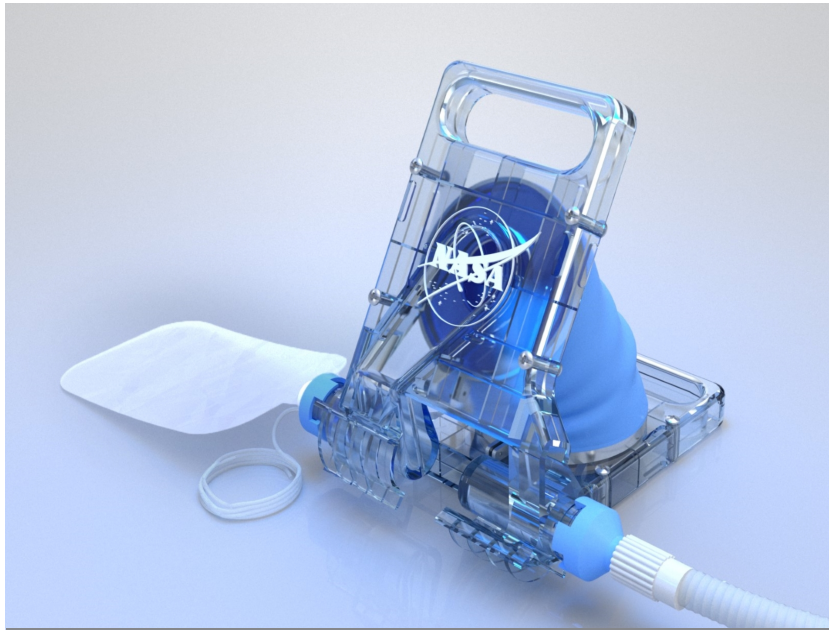


TECHNOLOGY SOLUTION

Health, Medicine and Biotechnology



Human-Powered Ventilator

Portable analog technology is designed to stabilize a patient's respiratory distress.

Innovators at NASA Johnson Space Center have created a human-powered ventilator that utilizes hand-pump motions, rather than hand or wrist motions such as with a Bag Valve Mask (BVM), to help stabilize respiratory distress in a patient, without electricity. By using an arm-pumping motion to operate the accordion-like ventilator, minimally trained operators can provide respiration to a patient on space-based missions with greater endurance. Due to the COVID-19 outbreak, this device was reengineered for terrestrial applications in areas where electrically powered ventilators are nonexistent or in short supply. The ventilator is designed to be made of parts that are portable and inexpensive to manufacture as well as simple to assemble and use. This allows for rapid deployment to areas in need such as resource-poor localities or for use by minimally trained personnel, allowing for quick availability to areas in need.

BENEFITS

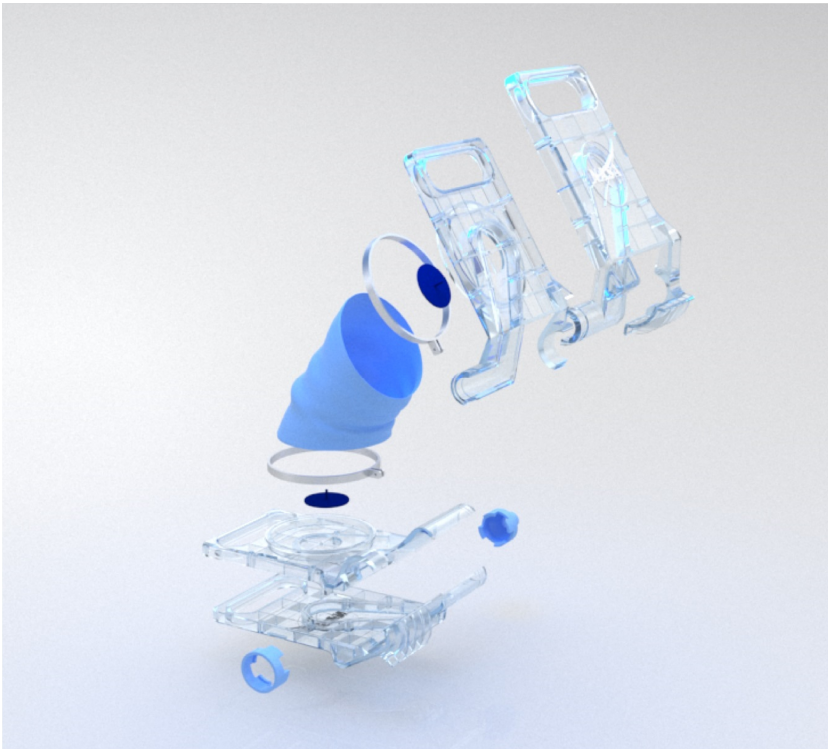
- Low cost and easy to manufacture
- Easy assembly with few individual components
- Does not require sensors or any electronics to operate
- Requires little training
- Ergonomic and easily operated for extended periods of time
- Portable and easy to store



THE TECHNOLOGY

In space there are a limited number of care providers, and those providers are not always clinicians with extensive medical training. Space travel also has limited room to provide care and limited consumables. The Human-Powered Ventilator is compact, portable, and easy to assemble. It is designed so that users can implement hand and arm movements to pump the bellows between two hinged, clamshell-like panels back and forth to provide positive pressure ventilation to the patient. A light spring is incorporated into the design to assist in expanding the bellows, drawing air out of the patient's lungs, and reducing the physical load on the operator without compromising the tactile feel necessary for proper usage. The airflow can be supplemented with prescribed medical vapors, oxygen, etc. via standard industry fittings.

The Human-Powered Ventilator is TRL 6 (system/subsystem prototype has been demonstrated in a relevant environment) and it is now available for your company to license. Please note that NASA does not manufacture products itself for commercial sale.



The Human Powered Ventilator is compact, portable, and lightweight thanks to its few internal parts and integrated casings.

APPLICATIONS

The technology has several potential applications:

- Any location which may lack electricity
- Any confined military or commercial vehicle
- Can provide relief of supply-chain challenges for ventilators in cases of mass distress

PUBLICATIONS

Patent Pending

technology.nasa.gov

More Information

National Aeronautics and Space Administration

Agency Licensing Concierge

Johnson Space Center

2101 NASA Parkway

Houston, TX 77058

202-358-7432

Agency-Patent-Licensing@mail.nasa.gov

www.nasa.gov

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