

Portable, Wearable Powered Upper Extremity Robotic Device

A NEW CO-DEVELOPMENT OPPORTUNITY

Reference No: 80JSC021PUERD

Potential Commercial Applications: Department of Defense (DoD); medical rehabilitation; industrial and construction worker safety, injury prevention, and assistance; PPE offloading

Keywords: exoskeleton, powered orthotic, rehabilitation, stroke, traumatic brain injury, biofeedback, PPE, robotic assistance, wearable robotics, sensing

Purpose:

NASA JSC seeks parties interested in co-developing technology associated with its Armstrong powered upper extremity robotic device to improve reliability, enhance coordinated control, increase range of motion, and improve comfort and fit. The Center has developed many wearable robotic technologies for targeted use cases that have contributed to the medical, industrial, and space domains. The agency seeks to advance the state-of-the-art of its current Armstrong wearable powered robotic device.

By co-advancing this multi-use technology, NASA JSC and interested parties may be able to extend and enhance the current capabilities related to limb range of motion, control, customization of assistance, and biofeedback. These advancements would thereby create a more advanced wearable robotic device with the ability to contribute toward increases in mission performance and decreases in injury rate and fatigue in space; rehabilitate the neural pathways of those surviving stroke, traumatic brain injury (TBI), or other neurological injuries; and augment industrial and construction workers for safety and efficiency.

Technology:

NASA JSC's goal is to improve the current wearable robotic device design to create a fully customizable device whose multi-domain technology will improve life on Earth as well as help contribute to astronaut safety and effectiveness.

R&D Status:

NASA JSC's current Armstrong wearable was initially designed as a rehabilitation device for survivors of TBI. The technology has been evaluated on multiple TBI subjects, whereby safety and feasibility were demonstrated. Component technology has shown promise for a lightweight spacesuit augmentation solution. The actuated garment has the ability to control the shoulder and elbow either to assist an able-bodied person or provide desired real-time control of the limb to aid in rehabilitation. Real-time feedback is available to assist physical therapists. Armstrong's adaptable control software makes custom therapy and assistance routines easy to realize.

Intellectual Property (IP):

Multiple individual technologies associated with robotics are currently available for co-development and licensing. Visit [Robonaut 2](#) and click on [Licensing Opportunities](#).

This co-development project may produce new IP that could be jointly owned by NASA and the partner or may become the property of the partner.