



National Aeronautics and
Space Administration



TECHNOLOGY SOLUTION

Aerospace

Foot Pedal Controller

[Novel system and device to control movement of an object in three-dimensional space using foot pedals](#)

Innovators at the NASA Johnson Space Center (JSC) have developed a novel foot-pedal operated system and device to control movement of an object in three-dimensional (3D) space. The Foot Pedal Controller system enables operators to control movement of spacecraft, aircraft, and watercraft using only foot pedals. This design leaves the hands free for simultaneous operation of other equipment. The Foot Pedal Controller integrates six articulating mechanisms and motion sensors and provides continuous positional feedback to the operator. Motion control across six degrees-of-freedom is enabled by three-control motions for each foot. Specifically, the foot pedal controller moves the object forward/backward, up/down, left/right (translation in three perpendicular axes) combined with rotation about three perpendicular axes, often termed pitch, yaw, and roll.

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

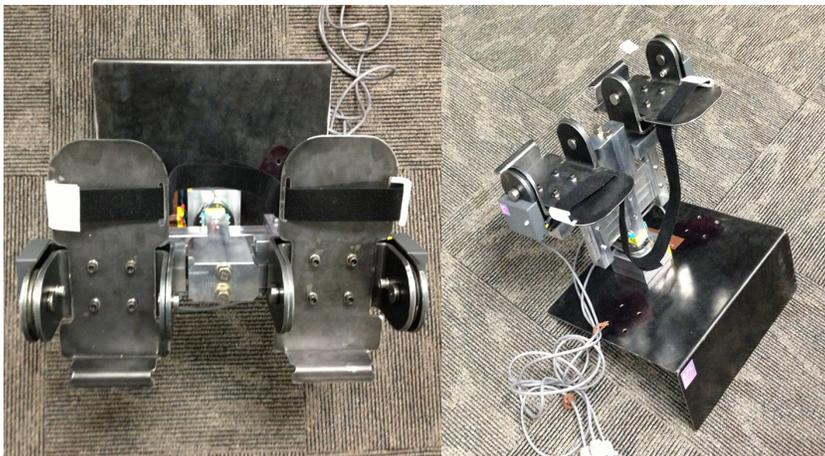
- True 3D - controls movement in real and simulated three dimensional environments
- Hands free - enables simultaneous operation of additional components, weapons, or equipment.
- Adaptable - support fixed apparatus and shoe-like control interfaces
- Intuitive - control movements mimic natural movements of a human to enable easier learning and more effective skill retention
- Ergonomic - design optimized to reduce fatigue



THE TECHNOLOGY

The Foot Pedal Controller enables an operator of a spacecraft, aircraft, or watercraft, or a simulation of one in a video game, to control all translational and rotational movement using two foot pedals. This novel technology allows control across all six degrees of freedom, unlike any technology on the market. The components of the technology are a support structure, a left foot pedal, a right foot pedal, and supporting electronics. The Foot Pedal Controller is intuitive, easy to learn, and has ergonomic features that accommodate and stabilize the operator's feet. A working prototype is available to demonstrate key technology features to potential licensees.

The Foot Pedal Controller technology could be used in designs for the flight deck of the future, video game controls, drone operations and flight simulators. This technology can be useful in any application where it is preferred or desirable to use the feet to control motion rather than using the hands. A potential market could be foot control of equipment by people with arm or hand disabilities. A unique aspect of the innovation is the consideration of natural foot mechanics in the design and placement of the sensors and actuators to reduce operator fatigue. The axes of rotation of the Controller align with the joints of the foot so the foot moves naturally to control the movement of the craft. NASA seeks collaborations with companies interested in licensing and partnering to further develop and commercialize the technology.



Foot Pedal Controller Prototype Top and Side View

APPLICATIONS

The technology has several potential applications:

- Aircraft, spacecraft and watercraft control
- 3D Video Gaming
- Accessible Equipment - for individuals with hand/arm restrictions or disabilities
- Robotics Mobility
- Drone Operations
- Flight Simulation

PUBLICATIONS

Patent No: 10180699

technology.nasa.gov

More Information

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NP-2015-05-1757-HQ

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MSC-25391-1, MSC-TOPS-52