

**Technology**

Head position monitor for control of wheelchairs, computers, or other assisted technologies

**Inventor**

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**Key Features**

- Head-operated control interface that can be used in conjunction with an isometric joystick controller
- Used to direct wheelchairs, computers, and other assisted technologies
- Requires only a small magnet worn on the rear of the head
- Retains calibration with movement

**Stage of Development**

Reduced to practice with prototypes developed

**Keywords**

Rehab/Assistive Device  
- Wheelchair  
- Traumatic brain injury  
- Headrest

**Patent Status**

None

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## Head Position Monitor (VA Reference No. 05-126)

*Novel head-operated control interface for individuals with impaired hand use to direct wheelchairs, computers, and other assisted technologies*

**Technology**

The Department of Veterans Affairs has developed a head position monitor (HPM) that provides a head-operated control interface for individuals with impaired hand use to direct wheelchairs, computers, and other assisted technologies. The HPM is activated by a small magnet worn on the rear of the user's head.

**Description**

The HPM is comprised of four components: a curved enclosure that surrounds the head; an array of 19 linear analog Hall effect sensors housed within the enclosure; an embedded microcontroller; and, a signal processor. The HPM works in conjunction with an isometric joystick controller, VA ID 02-023 *Variable Compliance Joystick with Compensation Algorithms*, and not as a stand-alone product.

When the HPM and joystick are working together they can direct an electric-powered wheelchair for individuals with traumatic brain injury. Many individuals with traumatic brain injury are not aware whether a wheelchair is moving in the desired direction until it's too late for correction. The HPM and joystick assist in the operation of a wheelchair, safely allowing individuals with traumatic brain injury to develop and hone the proper skills for independent operation.

**Competitive Advantage**

Existing head control technologies with proportional control rely on infrared, ultrasound, gyroscopes, or a combination of these transducers. These technologies act as "relative" pointers meaning the system detects changes in head position but has no stationary or permanent reference. The accuracy and alignment degrade within minutes and the user must frequently recalibrate the system by making a gesture that resets the center point. Users find it difficult to find the "neutral position" consistently.

This invention:

- Has the ability to operate as an absolute pointer and will retain calibration because sensors are mounted in a stationary headrest.
- Will be less stigmatizing than similar products because the device only requires a small magnet on the rear of the head unlike similar products that require either reflectors or emitters to be worn around the face.
- Does not require the head to be mechanically tethered to the sensory array and the user can freely lift his or her head away from the headrest at anytime.

**Status**

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license, and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).