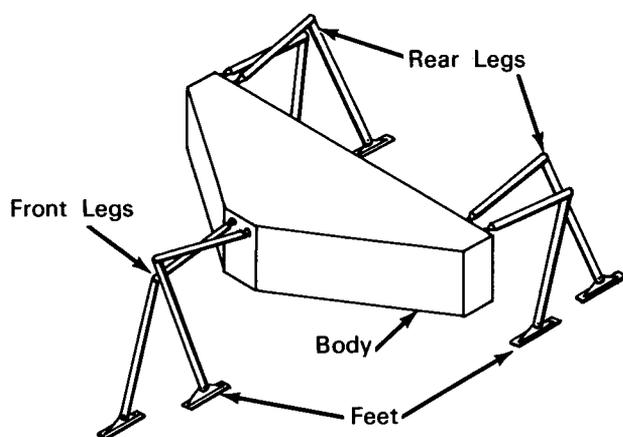


NASA TECH BRIEF

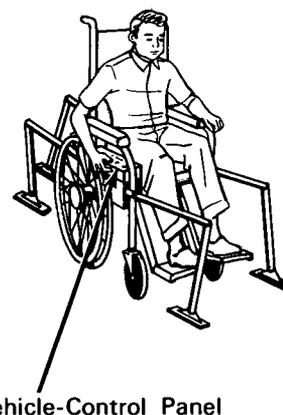


This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

Vehicle Walks on Varied Terrain, Can Assist Handicapped Persons



BASIC VEHICLE



ADAPTATION TO WHEELCHAIR

The problem: Designing a vehicle capable of traversing varied terrain at moderate speeds (up to 4 miles per hour). Development of such a vehicle was originally undertaken to meet NASA requirements for a remotely controlled instrument carrier to be used for unmanned exploration of lunar and planetary surfaces.

The solution: A battery-powered motorized vehicle with three pairs of legs that are connected to push rods and a series of linkages.

How it's done: Locomotion of the basic vehicle is accomplished by three pairs of legs, one pair in the front and two pairs in the rear. Each leg consists of an upper horizontal portion, a middle vertical portion, and a foot. Two cams connected to the drive mechanism (a small motor, gearbox, and push rods) control the motion of the legs. The two outer

rear legs move in unison with the right front leg, and the two inner rear legs move in unison with the left front leg. Each set of three legs is lifted to clear or rest on any expected obstacle on the terrain to be traversed by the vehicle and advanced a fixed distance for the succeeding step. A system of spring-loaded vertical-motion linkages permits obstacles (within design limitations) to be traversed with a minimum disturbance of the vehicle's axes. The linkages are arranged to permit the legs to be folded when the vehicle is stored.

Steering is accomplished by a small motor, which swings the front pair of legs to the desired angle. The rear legs are connected by a differential linkage to compensate for the required variation in step length or speed between the right and left pairs of rear legs when turns are made.

(continued overleaf)

The body of the vehicle can be constructed to conform to any one of several shapes, depending on the intended application. For use as a perambulator by handicapped persons, the basic vehicle would be provided with a comfortable seat and a convenient control panel. Unlike a motorized wheelchair, this vehicle would traverse beach sand, street curbs, and open fields without assistance. The basic design could also be adapted as an auxiliary means of locomotion for existing motorized wheelchairs. With this adaptation, a wheelchair could easily cross over thresholds, and curbs, or other low obstacles.

Notes:

1. With suitable modifications and appropriate instrumentation to permit remote control, the vehicle could be used on varied terrain for detection of land mines, searching for desert travelers,

rescuing trapped miners, civil defense operations, and rescue work in devastated or contaminated areas.

2. An alternate configuration is also being considered. This design would have a rectangular body with 4 sets of legs; 2 sets in front and two in the rear.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Western Operations Office
150 Pico Boulevard
Santa Monica, California, 90406
Reference: B64-10274

Patent Status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Western Operations Office
(WOO-005)