

WallWalker 2-D Vertical Locomotion System Moves Rapidly From DOE Funded Pilot Demonstrations Towards Full Commercial Application

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Abstract

WallWalker represents a new generation robotic locomotion system to deliver a variety of high force/high energy/high velocity work processes to large vertical surfaces and storage tanks. The technology is based upon simple kinematic models of motion and industrial-grade components that will stand up to the harsh working environments found at DOE environmental remediation sites. Low cost and reliability are embodied in the design to ensure that the technology is applied well beyond the bounds of the laboratory and demonstration use.

WallWalker motion uses commercially available PC-based controllers and conventional cable drives to position a load along any path defined by simple triangulation calculations. In the 2-dimensional variation, two motors are mounted at the highest point of a vertical wall. From there, a cable is extended from each motor to intersect at a common 'work point' to which a working load/process module is attached. Arbitrary path motions and velocities can be easily programmed at the operator's touch screen control panel to command the process over walls in excess of 50 feet wide by 50 feet tall. Prototype process modules have been developed to perform concrete scabbling, ultrahigh pressure water jetting, and radiation surveys.

Initial pilot scale demonstrations, co-funded by FETC and Pentek, were conducted at DOE's ETEC site in California in 1996. These efforts have been followed by further equipment ruggedizing and commercial demonstrations at Battelle Columbus and the Hanford 105C reactor. Recent decontamination of the four concrete walls of an 80 foot x 25 foot x 16 foot high retention basin at the Westinghouse Waltz Mill site was completed and without downtime and without manned presence, further demonstrating commercial viability of the prototype technology only 12 months after the initial ETEC pilot.

Future plans include:

- scale-up of the scabber module to increase prototype productivity 3 - 5 times;
- development of recyclable abrasive blasting capability;
- commercialization of the water jetting module to remove marine coatings; and
- study of a 3-D configuration to support retrieval of high level tank waste