

**A DECADE OF TELEROBOTICS IN REHABILITATION: DEMONSTRATED  
UTILITY BLOCKED BY THE HIGH COST OF MANIPULATION AND THE  
COMPLEXITY OF THE USER INTERFACE**

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The Stanford/VA Interactive Robotics Laboratory set out in 1978 to test the hypothesis that industrial robotics technology could be applied to serve the manipulation needs of severely impaired individuals. Five generations of hardware, three generations of system software, and over 125 experimental subjects later, we believe that genuine utility is achievable. The experience includes development of over 65 task applications using voiced command, joystick control, natural language command and 3D object designation technology.

A brief foray into virtual environments, using flight simulator technology, was instructive. If reality and virtuality come for comparable prices, you cannot beat reality.

A detailed review of assistive robot anatomy and the performance specifications needed to achieve cost/beneficial utility will be used to support discussion of the future of rehabilitation telerobotics. Poised on the threshold of commercial viability, but constrained by the high cost of technically adequate manipulators, this worthy application domain flounders temporarily. In the long run, it will be the user interface that governs utility.