TELEROBOTIC REMOTE PRESENCE: ACHIEVEMENTS AND CHALLENGES

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The Marine Sciences and Technology Department of the Naval Ocean Systems Center has as one of its particular thrusts the development of telerobotic work systems which blend the capabilities of a human with those afforded by automation technologies. The goal of these systems is to give a human operator the subjective experience of being at a remote work site when he is in fact at a location well removed from the (potentially hazardous) work area. Systems of this type are said to exhibit "telepresence". Telepresence is accomplished through the use of spatially correspondent controls and high-fidelity sensory feedback systems which utilize the human operator's cognitive and sensory capabilities in a manner that is natural to him. A major advantage of the telepresence approach is that the human operator does not have to concentrate on how to use unfamiliar or unnatural displays and controls but instead uses his own cognitive and manipulative abilities to perform the task. As a consequence, the telepresence approach minimizes the time required to perform work as well as minimizing the amount of training required to use sophisticated undersea work systems.

Although the goals of a telerobotic human-machine interface exhibiting telepresence are intuitively straightforward to grasp, the quantification of terms such as "correspondent controls" and "high-fidelity sensory feedback" in a manner useful for development remains a major challenge to the field. In addition, the proper blending of automated assistance, remote work site sensory feedback, and artificially generated sensory feedback, is both a fascinating and challenging endeavor. This talk will attempt to outline the progress in human-machine interfaces from the perspective of telerobotic remote presence and to suggest avenues for future research.