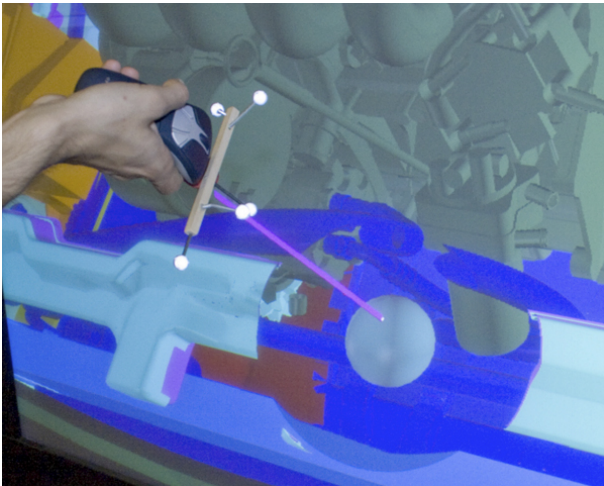


Improving co-located collaboration with show-through techniques

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Multi-user virtual reality systems enable natural interaction with shared virtual worlds. Users can talk to each other, gesture and point into the virtual scenery as if it were real. As in reality, referring to objects by pointing, results often in a situation whereon objects are occluded from the other users viewpoints. While in reality this problem can only be solved by adapting the viewing position, specialized individual views of the shared virtual scene enable various other solutions. As one such solution we propose show-through techniques to make sure that the objects one is pointing to can be seen by others. We analyzed the

influence of such augmented viewing techniques on the spatial understanding of the scene, the rapidity of mutual information exchange as well as the social behavior of users. The results of our user study revealed that show-through techniques support spatial understanding on a similar level as walking around to achieve a non-occluded view of specified objects. However, advantages in terms of comfort, user acceptance and compliance to social protocols could be shown, which suggest that virtual reality techniques can in fact be better than 3D reality.