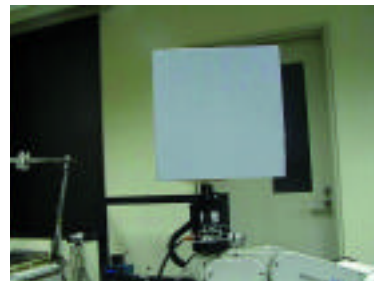


X'tal Vision (Crystal Vision) is a projection-based augmented-reality system composed of a projector with a small iris and a retroreflective screen. It allows users to observe stereoscopic images with almost correct occlusion relationships between the virtual and the real environment. The small iris mounted on the projector has an extensive depth of field, which enables the free arrangement and free shape of

the screen. X'tal Vision was demonstrated at SIGGRAPH 98 and SIGGRAPH 99. By extending the technology to telecommunication, X'tal Head allows users to observe a stereoscopic head image of a remote person. A head-tracked camera with a constant-orientation link captures the head image, and the system displays a novel, realistic "talking head."



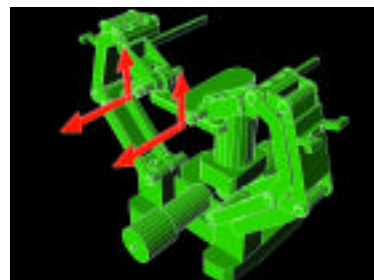
*A constant-orientation camera with an operator.*



*A cubic retroreflective screen, which is attached to a five-degree-of-freedom manipulator.*



*Projected image. Both the image and the cubic screen are controlled to follow the remote person's head motion.*



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*A prototype of a constant-orientation camera.*