# Space Browsers: A Tool for Ubiquitous Tele-Embodiment

**V**ideo tele-conferencing lacks personal mobility and autonomy; we cannot control what we see or hear. Even with cameras in every room, the experience lacks the spatial continuity of a walk around the building.

In *Space Browsers*, this problem is solved by a small helium blimp with a video camera and other equipment mounted on it. This tele-mobot *Space Browser* immerses the user in a remote world by providing real-time remote environmental information, continuity of motion, and user control of that motion. These elements provide the cues necessary to stitch together an entire experience into a coherent picture of a building and its occupants. Users can also communicate with the remote world and its inhabitants using this system.

A *Space Browser* has several motors directly connected to small propellers, a video camera, a microphone, a speaker, and a radio transmitter. The payload is less than a pound. At the other end of the radio link, a computer links the blimp's sensors and actuators to the network.

The remote "pilot" uses a Java applet, running within any Java-supporting Web browser, to deliver continuous motion commands to the blimp. The pilot observes the real world from the viewpoint of the blimp, listens to sounds and conversations within its close proximity, and communicates by simply speaking to the computer. Many people can experience this version of tele-embodiment simultaneously, since users who are not in direct control of the blimp can passively view the live video and audio as a pilot navigates.

*Space Browsers* provide a new means of remote human interaction. They allow users to easily travel vast distances from their computers and interact in a familiar manner with others. Because they are inexpensive, *Space Browsers* have the potential to provide ubiquitous telepresence.

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