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LEONARDO THINKS

Opinion: Live from Mars

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Today, 4 July 1997, is an exciting day for art [1]. Although the art of telepresence has been consistently explored since the late 1980s, today the landing of the Mars Pathfinder spacecraft brought telepresence to the masses. This historic event rekindled the drama of distance and the cultural meaning of telepresence for the imagination of the general public, reversing the numbing effects of the habitual intake of televised entertainment and newscasting. In the terrestrial afternoon, Pathfinder sent the first images transmitted from the surface of Mars live on television. The first images to arrive from the Ares Vallis area were small grayscale pictures, and, on television at least, the resolution was rather low. The initial broadcast images appeared on a computer screen inside a small window that floated among many other windows on the computer's desktop. The image shown on the air seemed to indicate that a cameraman pointed his camera to the computer monitor, eagerly awaiting and immediately retransmitting the first picture as it appeared on the computer screen at the (U.S.) National Aeronautics and Space Administration (NASA). The Cable News Network (CNN) announcer was ecstatic and, contrary to journalism protocol, clearly expressed her own excitement about what she herself was seeing for the first time.

While perhaps unimpressive in the eyes of the visually literate public accustomed to flashy digital effects on television and in movies, these stills are profoundly significant, overcoming real space (Mars is 119 million miles from Earth) with near real-time contiguousness. Their meaning does not arise from cinematic entertainment, but from the raised awareness of the Universe we have gained by being collectively telepresent on the Martian surface. These pictures were not representations of science-fiction scenarios, but a de facto window into another world entirely. The feeling of remote presence was intense-"We're there!" shouted NASA mission-control personnel.

As with the Moon landing before, what is most remarkable about the Pathfinder mission is not the technological tour de force, but the fact that millions of people simultaneously watched the first images as they were broadcast (and soon uploaded to NASA's World Wide Web site). It took about

10 minutes for each encoded image to arrive; it took the NASA team about 30 minutes to process the data stream into color images. As the first color images were unveiled, again, live on CNN, approximately 1 hour after arrival, I was struck with the realization that what I was seeing at that very moment, in the privacy of my home, was exactly what the surface of the fourth rock from the Sun looked like 1 hour before! Twenty-one years ago, Viking gave us our first glimpses of the Red Planet. Today, through this near real-time experience, Pathfinder gave us a sense of being telepresent on Mars. While it took the spacecraft 7 months to travel to Mars, the near-instantaneity-given the relative distance between the planets-of the telecommand, remote response and image-retrieval touched us with a renewed sense of proximity beyond the material limits of physical space.

This is the first time that a fully mobile and wireless telerobot (the rover Sojourner) has been sent to explore another planet, a true landmark for telepresence and for the history of the space program. The pictures of the landing site taken by Pathfinder will be used to determine the exploratory path of the rover, which is 2 x 1.5 ft wide and 1 ft tall. Once deployed, the rover will navigate and negotiate the terrain on its own, at a speed of 2 ft per minute. A unique kind of human-machine interaction is taking place in this mission: the cognitive process of a human being is remotely projected to a distant robot, which in turn has autonomy to sense the surroundings and make decisions that are in its best interest (for example, to prevent an accidental fall from a cliff).

While the aesthetic dimension of this experience will go unnoticed by those most directly involved in the project as well as by telespectators, it is precisely this aspect of the media event I witnessed today that I find particularly significant. Some of the aesthetic features unique to this telepresence event are the relativity of space and time (7 months to get there, 10 minutes to transmit a picture); the nature of the human-machine interface (combination of teleoperation and autonomy); remote space negotiation and navigation (unpredictability of the terrain, feeling of remote presence); teleoperation (remote control of a robot); capture, transmission, reception, processing and unveiling of the images; the instantaneousness of the pictures; the realization of all this live on television (integration between the one-to-one experience of remote control with the public space of television); and the impact of this telepresence event on the collective consciousness. All this, I suggest, has paramount aesthetic value-aesthetic, not artistic.

The investigation of the artistic dimension of telepresence, however, is a fascinating challenge that must be met. It is clear that the aesthetic dimension of this historic event introduces telepresence to the population at large, pointing to a future in which personal telepresence will be an integral part of our daily lives. As our presence on the Red Planet increases via telerobots and, eventually, with humans, one can easily foresee Webcams enabling us to look at the Martian surface on the Internet with the same ease and regularity as today we see the skylines of several North American cities. Other forms of personal telepresence will be developed in the future in many segments of society. For example, a telerobotic hand might perform surgery remotely, or a document located in one city could receive the original signature of an individual in another town miles away. Artists working today can directly respond to an event of this magnitude by working with the very same means employed in the fantastic exploration of outer space: telepresence, remote

operation and networking. No object can rival the experiential quality of today's event.

The very first images broadcast live on CNN were hard to discern or recognize as landscapes. In science, as in art, what one cannot recognize, one cognizes. Awareness of the unfamiliar remote terrain, coupled with intermittent visual feedback, has guided and will continue to guide the telexploration of the dry flood channel where the spacecraft landed. As Pathfinder deploys its small rover Sojourner on the inviting crimson terrain, it will be searching the Martian surface (and below it) for signs of life, intelligent or not, present or past. I need no further evidence, however, because today I saw, telepresentially, clear signs of intelligent life on the surface of Mars: ours.

Endnotes

[1] This text was originally written on 4 July 1997, date of the historic Mars landing, and published on 5 July 1997, on the Internet. It was also published in the July 1997 issue of Leonardo Electronic Almanac (LEA). LEA can be ordered through the MIT Press at <journals-orders@mit.edu>.

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