

about long-term strategies. NASA assigned a few of us to lead science discussions, plan drive scenarios and coordinate activities of the two rovers.

The Gusev site resembled other locations on which Mars spacecraft have landed. For the first few months MER-A won the drive-for-distance contest, sometimes clocking as much as 35 meters per sol (a third the length of a foot-



This extra rover was used to practice the landing exit.

ball field), while autonomously avoiding big rocks in its path. The geology of this site was interesting, but the only evidence for water discovered so far was altered material in tiny veins in the lava rocks scattered about the site.

The Meridiani site proved particularly fascinating as it contained the first outcrop (rock in place rather than loose rubble). The outcrop was visible only because Opportunity rolled to a stop inside a small crater. (This was such an unlikely hole-in-one that I'm contemplating taking up golf again.) The rover photographed the outcrop along its length, employing a procedure we called "drive-by shooting," a description our NASA handlers deemed politically incorrect. The delicately layered rock was formed by evaporation of water, precipitating various kinds of salts. None of us expected water to be confirmed in such a spectacular and unambiguous fashion. The outcrop contains tiny spheres like blueberries, also formed by water, and millions of them have been shed onto the surrounding soil.

As I write this, both rovers are still alive, and now engaged in death marches. They will succumb eventually to the martian winter, which provides less sunlight to recharge the batteries and overnight temperatures of several hundred degrees below zero that will likely harm the electronics. During their short lives, the rovers have found a place in the American consciousness. They are

the focus of almost daily updates on CNN, grist for innumerable cartoons and several Letterman monologues, and the subject of a charming John Updike poem in *The New Yorker*. During the first two months of operation, the MER website had more than eight billion hits! But is this visibility enough payoff? As a taxpayer, you might well ask what else you got for your \$820 million. Besides the scientific and engineering discoveries, which were remarkable (but that will frankly be lost on most citizens), I believe the long-lasting result will be this mission's effect on our children, who must supply the next generation of scientists and engineers. Spacecraft missions, especially exciting ones like MER, inspire by demon-

strating that technological innovation can be thrilling and scientific discovery can be fun. I hope that lesson will not be lost on the next generation.

HARRY (HAP) MCSWEEN is a professor and former head of the department of Earth and planetary sciences at the University of Tennessee. He graduated from The Citadel in 1967 with a degree in chemistry, then received graduate degrees in geology from the University of Georgia and Harvard University.

He also served as an Air Force pilot during the Vietnam era. McSween is the author of four popular science books and presently serves as a NASA investigator for four ongoing spacecraft missions. He lives with his family in Knoxville, Tenn., and can be reached at mcsween@utk.edu.