The Greatest Field Trip Ever

The first three months of 2004 have witnessed the most complex, expensive, and exciting field excursion in the history of our science. The paired exploration of Mars by the rovers Spirit and Opportunity has served to stir the public's imagination about science in ways not seen since the Apollo program of the late 60s and early 70s. These missions appeal to the public largely because of their focus on the search for sedimentary records that could provide evidence for the past existence of surface water on Mars. The presence of temporally persistent lakes or small seas on the Martian surface could, of course, have served as a locus for the development of extraterrestrial life. A potential, no matter how remote, that would have profound scientific and philosophical implications. Yet, the question exists in the minds of many of our students as well as the public at large, is there sufficient justification for the expense associated with planetary exploration?

While the answer to such a question may seem self-evident to those of us trained in the geological sciences, it is, in my opinion, our responsibility to explain to an increasingly skeptical public, why continued exploration of our solar system is essential. Rather than focusing a defense of the Mars missions in terms of its technical or scientific merit, I would suggest a simpler approach to dealing with doubters. There are four general arguments that could be made in support of space exploration in general and planetary missions specifically:

First, it's cool. Being able to explore the surface of another world via radio interface, to literally drive around by remote control, to conduct experiments on samples *in situ* is a very cool thing. It's amazing, it's fantastic. It is, in the end, fundamental to the human spirit to attempt those things that, in their accomplishment, stir our souls.

(For more information visit
http://marsrovers.jpl.nasa.gov/home/)

Second, it's hard. The scientific and technical problems associated with the most recent Mars missions are breathtaking in their complexity. To deliver safely to the surface of another world highly sophisticated scientific instruments on mobile platforms is a remarkable feat. To accomplish the goals of the missions while troubleshooting, improvising, and overcoming malfunctions and setbacks is an even greater challenge. The problems presented are hard, and in their solution, we learn as much about ourselves as we do about science and technology.

Third, we can. The problem is both interesting and difficult, but it is not unbounded in its complexity. Planetary exploration is a problem with achievable solutions. Other scientific and social problems are important and difficult but their complexity makes the achievement of even partial solutions highly unlikely. As such, the bounded complexity of space exploration makes it a very attractive target for scientific funding due to the increased likelihood of a meaningful intellectual return on investment.

Finally, we must. The Earth is a natural laboratory in which we are participating in an on-going experiment. The other terrestrial worlds afford us the opportunity to evaluate other, largely independent, natural experiments. By understanding the geological history and current conditions experienced by our planetary neighbors, we gain a richer understanding of Earth's systems. The rapid rate of anthropogenic alteration of the Earth demands that we learn how these other systems have evolved.

While these arguments would likely prove to be unsuccessful on Capital Hill, they do, I believe, provide a mechanism for countering the argument "Why are we wasting so much money on some stupid rocks on Mars when we have so many problems here?" I hope all of you have enjoyed this most recent, and most amazing geological fieldtrip as much as I have.

Carl N. Drummond
Editor