LETTERS

Small but significant

National Research Council reports on NASA's "new philosophy" about small planetary missions (such as Mars Pathfinder, right) are discussed. The University of North Dakota credits generous donations from corporations with "significantly" reducing "research and teaching downtime" after damaging Red River flooding in April 1997. And ecologists debate how to discover "novel patterns in natural ecosystems" in island area studies.

Small NASA Missions

Andrew Lawler's article "Small missions lift planetary science" (News & Comment, 12 Sept., p. 1596) highlights the ongoing transformation in the exploration by the National Aeronautics and Space Administration (NASA) of the solar system: a steady stream of relatively small, focused flights (for example, the successful Mars Pathfinder and the soon-to-be-launched Lunar Prospector) is replacing the infrequent multibillion-dollar, comprehensive missions (Galileo, now observing Jupiter and its retinue of moons, and Cassini, launched to Saturn) that NASA used to fly. The introduction of these "smaller, cheaper, faster" missions has reinvigorated a stagnant field.

Three recent National Research Council (NRC) reports (*1*) agree with Lawler's analysis that NASA's new philosophy brings many advantages. For small planetary missions to fulfill their promise, however, certain guidelines must be met. Each mission should be proposed as an integrated package led by a principal investigator and should be selected through open competition; this is not being done in NASA's New Millennium Program, nor in its Mars Surveyor Program. Moreover, NASA should impose minimal restrictions on the mission design. Last, NASA's past practices must change to eliminate unnecessary oversight and review.

Long-term scientific objectives will only be fully achieved if sufficient funds are made available for spacecraft operations and for the full analysis of the data returned by these missions. In the past, mission concepts have been gestated by judicious funding from NASA's Research and Analysis (R&A) program; yet R&A funding has declined consistently over the last few years. In addition, streamlined missions necessarily trade higher risk of failure for lower cost and faster schedules; yet it is far from clear whether NASA's aversion to risk has lessened.

Finally, a responsive program for planetary exploration will require a mix of mission sizes ranging from comprehensive missions with multiple objectives to small missions with highly constrained scientific goals (*2*). The jury is still out on whether small missions will return as much knowledge, both scientific and technological, per dollar as have the flagship missions of the past.

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References

1. *The Role of Small Missions in Planetary and Lunar Exploration* (National Academy Press, Washington, DC, 1995).
2. *An Integrated Strategy for the Planetary Sciences: 1995–2010* (National Academy Press, Washington, DC, 1994).

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Corporate Philanthropy

The University of North Dakota in Grand Forks sustained significant damage to lower levels of many buildings during the flooding of the upper Red River valley in April 1997. In addition to direct damage by water, electrical service was disrupted for an extended period, which threatened the storage of biomedical and research materials housed in the university's School of Medicine. Although this building was served by an emergency generator, a shortage of diesel fuel required that electricity be supplied for 3 hours "on" and 3 hours "off" during several days before community-supplied power was restored. This practice was sufficient to save most