

Not Where, But How Do We Go From Here?

by Radford Byerly, Jr.

The administration is currently debating whether to go to the Moon and/or Mars. There are many questions, largely technical in nature—such as whether to go to the Moon first—that can be answered on mostly objective, technical considerations. But we need to debate a harder, political question: *how* will we get the resources—budgets and people—to make the Moon/Mars trip? It will be expensive and budgets are extremely tight. Consider the following three approaches:

The *Space Station Freedom approach*, put very simply, is to secure presidential commitment to a large, complex, integrated, costly, decades-long project. Avoid a national debate on the overall program (as would have happened with Senate ratification of treaties with foreign partners). Instead rely on annual appropriations. Then watch as the project is picked to pieces each year as budgets are cut. This is not a good model, but the budget process is not likely to be reformed for the convenience of space program planners.

The *Apollo approach*, a sentimental favorite, begins with broad national conviction that we need to win a race—any race—with our competition, the Soviet Union. The president chooses to race to the Moon, Congress agrees, and we're off. The commitment lasts until we are clearly winning, then collapses. This model is not good for the long term—the "long-range, continuing commitment" President Bush called for on July 20—in part because the popular support may be for winning a race,

not for space exploration.

We don't seem to have broad national support—i.e. consensus—outside the space community for a major space initiative. Perhaps the managers of the Space Station program were wise to avoid the Senate debate on their overall program because they might have lost. Also, the budget for the Moon/Mars will be bigger than the Space Station by a factor of two to 10 (depending on how much each eventually costs). In today's (and probably tomorrow's) climate, it will be difficult to get that budget, especially since the Soviet Union is no longer a competitor (although our allies are).

The *incremental approach* has not yet been tried. It requires creativity: Specifically, creation of new engineering approaches to a political approach that will work—one that is consistent with political reality. The idea is to take small, discrete steps, which *can* be approved in today's climate, and to secure approval for succeeding steps based on feedback of results of previous ones. Some will say we have such successes and point to the Shuttle program as an example. Other observers will note that Shuttle flight costs many times what was promised, that the flight rate is much lower than promised and that customers like the Department of Defense are abandoning the program; these observers will question Shuttle's success, though it is a great technical achievement.

Such an incremental approach would decouple program elements, so that the problems of success-oriented planning can be avoided, for example,

by not putting all payloads on Shuttle before its reliability is proven.

Had we approached the Space Station this way, the incremental engineering steps might have begun with Extended Duration Orbiter followed by a series of small, special-purpose crew-tended platforms. Subsequent steps would depend on what was learned from the first ones. Such learning would include exactly what microgravity research is needed and how to do it. It is clear that planning a Moon/Mars program in this incremental fashion will be a challenge, but isn't challenge what we are looking for?

Some will claim the incremental approach is too expensive—but compared to what? We have spent billions on the Space Station with little but paper to show for it because the program is replanned after each budget cycle. Some will see the incremental approach as vulnerable to cuts, but again the question must be, compared to what? The highly integrated Space Station program has been cut.

At least we need an open and broad debate about how a Moon/Mars mission ought to be designed. We also need to debate openly and broadly how a Moon/Mars mission can become politically realistic. The point is not that the approach suggested here is optimal. The point is that we can do better than we have in the past, and given strong international competition from our allies, we must. ☆

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