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Bush's space vision

Critics will no doubt accuse President George W. Bush of fiscal folly for proposing a grandiose plan for space exploration at a time when the United States faces onerous deficits and insufficient money to meet costly obligations on planet Earth. The critics would be right that money is short and there are many more important things to do than put astronauts on the moon or Mars. But Bush is a canny enough politician to avoid committing much money to his new space vision. He calls for only \$1 billion in new financing for NASA over five years and a reallocation of the current five-year budget of \$86 billion. The cost will of course explode later on, when NASA tries to actually carry out the program. What Bush has really done is promise the moon — literally — while leaving future presidents and Congresses to figure out how to pay the potentially large future bills while they cope with the severe revenue losses caused by Bush's reckless tax cuts.

The political significance of Bush's proposal seemed obvious when Bush gave special thanks to Representative Tom DeLay of Texas and Senator Bill Nelson of Florida for attending his speech. Each comes from a potential swing state, rich in electoral votes, that is or has been governed by a Bush. It is probably not a coincidence that each would benefit from a reju-

venated space program.

Fiscal issues aside, the Bush space exploration plan has some commendable aspects. It would end the troubled shuttle program in 2010, thus relieving NASA of a costly burden that relies on old and finicky technologies. Retirement makes far more sense than trying to extend the shuttle lifetimes for a decade beyond that. The plan would refocus research conducted on the International Space Station to concentrate on the long-term health effects of space travel, a prerequisite to long-distance missions, thereby ending studies of more limited importance. The plan also calls for development of a new spacecraft that could fly not only into low-Earth orbit but also to the moon and Mars.

Before Congress signs off on this plan, it needs to carefully consider whether the reallocation of funds within NASA will cause serious harm to important science programs, robotic explorations or climate-related studies. If so, the loss may be too great to justify full financing of the new program. Congress should also hold a vigorous debate on whether Bush is right to head for the moon first, or whether Mars is a more important destination. In the end, the moon may serve more as a diversion than a steppingstone. The space program badly needs a bold new goal as an organizing principle, but it is important to get it right.

Forget the moon — go directly to Mars

Bush's space plan ■ By Michael Benson

Earth, as we have known for only a small part of the trajectory of the human species, hangs in an inconceivably vast space. That void isn't empty, however; it's crisscrossed by other planets, moons and stars. The planets of our solar system have all been visited by probes now — with the sole exception of tiny, distant Pluto. These preliminary explorations have revealed a diversity of spheres so dazzling that many can hold their own with the wildest science fictional imaginings. More than enough reason, one would think, for human beings to go.

In the mid-1990's I asked the planetary scientist Gregg Hoppa, then involved in decrypting the mysteries of Jupiter's bizarrely ice-enveloped moon Europa, what he thought about crewed space flight. Hoppa's team at the University of Arizona had been beneficiaries of a torrent of information from NASA's late, lamented Jupiter-orbiting Galileo spacecraft — data which, among other things, indicated that Europa most likely possesses a vast liquid-water ocean under its fissured ice shell — and I expected to hear that robots can do everything that astronauts can, do only better and more cheaply. Instead, Hoppa contemplated the question for a moment and finally said: "Well, I wish they'd go somewhere."

This point of view would seem to be supported by both the new Bush space exploration proposal, unveiled Wednesday, and the recent wave of public interest in NASA's successful placement of the first of two robot rovers on the Martian surface. Contrast that with the general public's indifference to the presence of humans in low Earth orbit, be they on the space shuttle, when it's up and running, or the International Space Station. The Spirit rover and its intriguingly crab-like, stereo-eyed twin are only the latest fruit of a determined effort over four decades, by a highly talented coterie of scientists and engineers, to make the best possible use of the small part of NASA's budget allocated for true solar system exploration.

Unfortunately, Bush's election-year vision of where to take America's space program is muddled. If it's true that his plan proposes finally taking human beings out of low Earth orbit — as Hoppa and many others, including myself, would like. But when a single, decisive, dramatic goal would seem to be crucially necessary, Bush wants to have things various ways. Decades after the public's declining interest in lunar exploration helped force NASA to cut the Apollo program short of its full complement of planned missions, Bush argues that we should return to the moon.

This time the purpose would be to establish a permanent base, intended to provide a kind of steppingstone to Mars — the same shaky argument used to justify the International Space Station. Ac-

ording to the plan, a trip by astronauts to Mars itself would be several decades away, and even the putative moon base would be 16 years in the future. The only truly sensible element of this vision is the replacement of the space shuttle by a vehicle capable of taking astronauts well beyond Earth orbit.

NASA has stood in dire need of political direction for decades. But if the human exploration of space is really the goal, as it should be, then the Bush proposal is not the right way to proceed. In fact it is virtually the same nonstarter scenario unveiled, with a similar

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fanfare but dearth of actual funding, by the first President Bush more than a decade ago.

Much of the expense of space flight comes from the quantities of propellant required to get crews and payloads beyond the gravity of Earth or other planets. It therefore makes little sense to use the moon, which possesses its own considerable gravity field, as a waystation to Mars. Even purely on the level of public relations the bleak moon shouldn't be our first destination this second time around. We've been there, done that.

Over the last decade an alternative, more focused and achievable vision of crewed deep space flight has been elaborated. Called Mars Direct, it wouldn't even require much of an increase in NASA's budget — if the shuttle program and the International Space Station were gradually cut back or eliminated, as the Bush plan envisages. The shuttle alone costs half a

billion dollars per flight; Mars Direct is estimated to cost from \$20 billion to \$30 billion — about twice NASA's annual budget, but for a program that would take a decade to complete.

Mars Direct envisions three launchings directly from the Earth to Mars, starting with two large autopiloted Earth-return vehicles designed to precede human astronauts to the Martian surface and manufacture propellant for the return journey from that planet's atmosphere. Thoroughly conceptualized and widely recognized as feasible, Mars Direct can be accomplished largely with proven, existing space shuttle engines and solid rocket boosters. And in contrast to the hit-and-run moon landings of three decades ago, Mars Direct is designed to place humans on Mars for a year — long enough to do some serious exploration.

It's important, however, that neither of these visions of where to take crewed spaceflight drains more cash from NASA's highly successful, but woefully under-funded, robotic program — the only part of NASA that has actually been exploring the solar system for the past three decades. But it's hard to imagine the dogmatic Bush team re-examining the substance of its new initiative, particularly since, given its hazy timetable and lack of real funding, it runs the risk of appearing largely an election-year exercise. So it may take a change of administrations, and a more streamlined and realistic — and therefore truly ambitious — plan to respond to the siren song of deep space.

On the face of it, that might sound like a challenge to the Democratic candidates to come up with a bit of the old "mission thing."

Michael Benson, author of "Beyond: Visions of the Interplanetary Probes," has written about space exploration for *The New Yorker* and *The Atlantic Monthly*.



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