options, including retaining some or all of the programs at Menlo Park" and promised to assemble a committee to "review the options."

Eaton says "there is no connection whatsoever" between the Menlo Park memo and his retirement, which he began discussing with Babbitt early summer. Indeed, he says, because of the "flap over Menlo Park" he agreed to stay 2 1/2 weeks longer than he had originally planned. Eaton also defends his reshaping of the agency: "There are still people who are clinging to the past, but others have moved on and seen that the future in all of science is that we need to demonstrate our value to the American people." Basic research, he adds, isn't "lost" but "rolled up inside."

"There is validity in [Eaton's] claims that they have at least survived the threat of annihilation," agrees David Simpson, president of the Incorporated Research Institutions for Seismology in Washington, D.C., who notes that geological surveys around the world are fighting the same battle. "I hope he's been able to set the stage for a stronger USGS." Bill Ellsworth, a seismologist in Menlo Park, agrees. "There have been some pretty difficult times," but "we're finally beginning to come out of that." The moving memo, he says, "has thrown things here into a bit of turmoil, but most understand it's reasonable to study ways to be more cost effective. I think all of us now just have to wait and see."

–Jocelyn Kaiser

PLANETARY SCIENCE

Company Targets Asteroid—and Profits

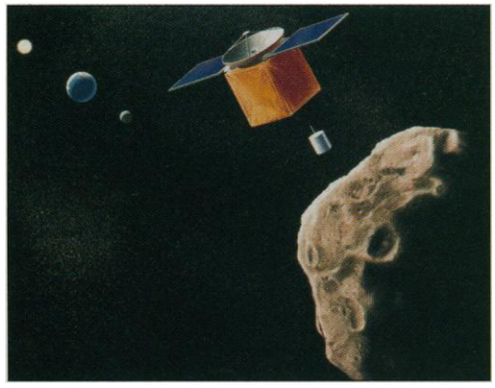
Geologists routinely work with oil and gas companies, and biologists form the backbone of the biotechnology industry. But space scientists typically have little contact with the rough-and-tumble world of profit and loss. That could change, however, if a group of entrepreneurs pulls off the first privately financed mission beyond Earth's orbit. The company hopes to make money by selling data gathered from a nearby asteroid. And it is counting on a steep discount in the cost of such data, compared with what NASA would have to spend to collect it, to attract customers. It also hopes to offer a platform for government-built instruments.

"We are bringing a commonsense business approach to a science mission," says Jim Benson, who chairs SpaceDev, the Steamboat Springs, Colorado–based company that is pursuing the venture. "This could trigger an explosion of planetary science data." The company says it can build, launch, and operate the probe, called Near Earth Asteroid Prospector (NEAP), for less than $50 million, a fraction of what it would cost NASA.

The plan, unveiled last week at a press conference in Washington, is to use a small spacecraft with well-tested instruments that would send back encrypted data on the asteroid's composition. The data then could be sold to customers, including NASA. NASA officials say they welcome the mission but would purchase data only if and when researchers show an interest.

Scientists working with the company say that shouldn't be a problem. SpaceDev plans to send its craft, which will weigh about 300 kilograms, to one of the thousands of small asteroids and comets that pass close to Earth's orbit. Such objects are cheaper to reach than the moon or Mars, because their weak gravitational fields require less fuel for a rendezvous. They also provide inviting targets for researchers interested in the formation of the solar system, because they are among its oldest inhabitants. "They offer an extremely diverse collection of materials," says James Arnold, a University of California, San Diego (UCSD), chemist specializing in asteroids who is a consultant on the venture. "The whole periodic table is up there." The fact that NASA has already planned flights to asteroids and comets is proof of the market for such data, he adds.

Arnold and Benson say that SpaceDev can do the job for far less than what it would cost NASA by using off-the-shelf technology and avoiding the complex procurement and management rules that government agencies must follow. The company also is drawing on graduate students at UCSD and other universities to help design the probe before choosing an aerospace company to build it. For example, each data set from NASA's Near Earth Asteroid Rendezvous, now en route to an asteroid, will cost $50 million to $60 million per instrument, Benson says. "NEAP will be about one-fourth that cost, so we're betting the demand will be there."



SPACEDEV

Private bodies. Colorado company plans to sell data from proposed mission to near-Earth asteroid.

NEAP would carry a multiband camera, a neutron spectrometer to detect the presence of water, and a small alpha proton x-ray spectrometer that would fall to the object's surface to catalog the surface composition. All of these instruments have been used successfully aboard NASA spacecraft, and they would be built by the same companies, says Arnold, who adds that there is room for three additional small instruments. Benson hopes to interest NASA, for example, in buying a ride for a tiny 1-kilogram rover that would crawl across the asteroid's surface.

SpaceDev's data would be sent back via NASA's Deep Space Network, perhaps in exchange for other science that the probe would conduct. Benson says he expects NASA to be the primary customer for the data, and that SpaceDev will want "cash on delivery."

The notion of buying data is not new. The agency has paid Orbital Sciences Corp. to provide remote-sensing results, but the mission was dogged with delays and problems that have made NASA leery of the arrangement. So while NASA space science chief Wes Huntress praises the new venture, he says the agency is making no promises. "It's exciting—it's the first truly commercial proposal for planetary exploration," he says. "When they have their data and a science proposal, we'd be delighted to put it through our competitive review process."

Planetary scientists not associated with SpaceDev say that new data could be a boon for the field, but they have adopted a wait-and-see attitude. "I'd be glad to look at whatever they get," says Clark Chapman, an asteroid expert at the Southwest Research Institute in Boulder, Colorado. While he's skeptical that sales could recoup SpaceDev's costs, he hopes NASA will consider the relative cost of obtaining the data itself.

Benson declines to reveal the names of his investors or how much money SpaceDev has raised. But he says the company is only $6 million or $7 million shy of the total needed to build the spacecraft, with anywhere from $8 million to $26 million more needed to cover launch costs. The precise cost of the mission will depend on which launcher—most likely U.S. or Russian—is chosen, he says, but the total will be under $50 million. The spacecraft is expected to be built next year and launched in mid-1999, arriving at a not-yet-chosen target 9 to 16 months later.

Once the data have been collected, SpaceDev managers want to land the probe and stake a claim. Ultimately, company officials envision extracting minerals from asteroids and water from extinguished comets to fuel planetary missions or build space stations.

–Andrew Lawler