EARTH SCIENCE

NASA Revises EOS, Adds Small Craft

This week the National Aeronautics and Space Administration (NASA) will unveil its latest plan for the controversial Earth Observing System (EOS), including a radical change in the way data will be distributed to researchers. The space agency is also seeking industry support for a series of smaller, cheaper satellites to complement the three large spacecraft that now make up EOS.

These changes are the agency's response to criticism from Congress and earth scientists of its multibillion-dollar effort to make comprehensive measurements of the Earth's land, seas, and skies. The plans were to be discussed this week at a hearing of the House Science Committee and at a meeting with the National Research Council (NRC) panel that reviewed the EOS program last year (*Science*, 22 September 1995, p. 1665). "We've had a lot thrown at us," says William Townshend, NASA's deputy chief of the Mission to Planet Earth (MTPE) office that oversees the effort. "But we feel we've addressed most of the concerns."

So far, reaction from researchers has been cautiously positive. Berrien Moore, the University of New Hampshire mathematician who chaired the NRC panel, says he is generally upbeat about NASA's new approach, but he will push for additional changes.

EOS has been controversial ever since its conception in the 1980s. Researchers initially argued that NASA was spending too much on hardware and not enough on the actual research. They have also complained that the original EOS data system is outdated and that one of the planned EOS spacecraft should be redesigned as a more focused mission. And lawmakers like Representative Robert Walker (R–PA), who chairs the science committee, have balked at the cost and urged NASA to save money by involving the private sector.

Taking some of Walker's advice to heart, NASA has decided to seek industrial support for small satellites, costing less than $100 million apiece. This new program, to be called Earth System Science Pathfinder, would provide opportunities for scientists not involved in designing the fleet of instruments for the EOS platforms. "EOS has had such a long gestation period," says NASA's Granville Paules. "This is a chance to bring in really new science." Paules is leading the effort in the agency's MTPE office to win financial help from private companies interested in using data for commercial purposes such as weather forecasting.

Each Pathfinder satellite would be overseen by a principal investigator who would be responsible for the overall mission and who would be obligated to release received data immediately to the scientific community, according to a letter to the community from Charles Kennel, NASA's MTPE director. An announcement of opportunity will go out this summer. Townshend says the program's goal is to augment EOS, not compete with it. The first launch could occur by 1998, the same year that the first large EOS spacecraft is slated to go into orbit.

NASA is also paying heed to the NRC's advice in restructuring the EOS data system. The agency's initial plan for a handful of large, government-owned data-processing centers came under fire from scientists who feared they would have little control over how and when satellite data are processed. The NRC group instead proposed a more decentralized system that would allow teams of scientists to compete for the more advanced processing work.

Moore says he supports the NASA move to restructure the data system along the lines proposed by the NRC. "We all have more computer power on our desks now; the Internet and World Wide Web have overtaken the old concept" of centralized data stations, he says.

Another concern of both Congress and the NRC panel is the Chem spacecraft, the third EOS platform, which would examine atmospheric chemicals. Walker has sought to kill funding for the satellite, slated for launch in 2002, while the NRC report warned that the mission was too complicated and should be refocused on measuring ozone in the troposphere. After months of wrangling, NASA officials decided against any dramatic changes. Townshend adds, however, that a team at Goddard Space Flight Center is looking for ways to use advanced technology to slim down the satellite and its instruments.

Townshend says NASA's new plan is open for discussion among politicians and scientists alike. "We may have to go back and do some work," he says. "But we've got some good stuff to show them."

–Andrew Lawler

NUCLEAR WEAPONS

Los Alamos Takes Step Back to Its Roots

It has been 42 years since the last batch of components for the U.S. nuclear arsenal rolled off a rudimentary assembly line at Los Alamos, New Mexico. Since then, the U.S. Department of Energy (DOE) has kept the prosaic task of manufacturing separate from the more rarefied realm of weapons research. But last week, Secretary of Energy Hazel O'Leary unveiled a plan that would end that separation—at least in part—and bring the Los Alamos National Laboratory (LANL) closer to its roots as a maker of nuclear weapons.

DOE

The pits. Plutonium pitmaking at now-defunct Rocky Flats plant *(above)* will be moved to Los Alamos.

The plan, a blueprint for reorganizing nuclear weapons production for the 21st century, would shrink DOE's sprawling nuclear weapons complex—now spread over eight facilities across the United States—without closing any existing plants. Overall, up to 3600 jobs would be eliminated and budgets would drop from $1.5 billion to $1 billion by 2005; as recently as 4 years ago, the complex's annual budget stood at $2.5 billion. The outlook for the weapons research laboratories is brighter. Gone are earlier notions of shifting research from the Lawrence Livermore National Laboratory in Livermore, California, to LANL; instead, all three laboratories—LLNL, LANL, and Sandia National Laboratories—would see modest growth in their defense sectors. For Los Alamos, there's a bonus: inheriting the responsibility for manufacturing plutonium "pits," or fission triggers that are at the heart of hydrogen bombs.

LANL officials downplayed the lab's reentry into weapons manufacturing as relatively insignificant, even hailing it as synergistic with the research and development mission. "There's a feeling among materials scientists that these two missions can coexist," says Earle Marie Hanson, deputy program director for nuclear materials and reconfiguration technology. But critics outside the laboratory see it as a step away from research by a cash-strapped institution. "It's part and parcel of decline of the lab as scientific institution," says Greg Mello, director of the Los Alamos Study Group, a citizens' watchdog group in northern New Mexico.

The last plutonium pit produced at Los Alamos for the weapons arsenal was completed in 1954, when production was shifted