

that address directly the implications of the First Amendment for the constitutional status of scientific research, and there are no court decisions that establish definitively a First Amendment right to conduct research on any topic, without limitation or restriction. The prevailing assumption is that scientific activity has general protection, subject to limitation where a clear national interest is involved."

It then goes on to state: "Even where prohibitions on research are not involved, however, science and technology may eventually raise constitutional issues. The Federal government is often the only source of adequate funding for scientific research in which industry has no interest. There is no constitutional right to government research funding. But objections to some areas of research, such as those involved in interspecies genetic exchange and perhaps someday human cloning, are sometimes rooted in values that are intrinsically religious in nature, yet not universally shared. Government restrictions on funding particular research projects in these sensitive areas may in the future be challenged as suspect under the establishment clause of the First Amendment or the equal protection clause of the Fourteenth Amendment."

The Fourth Amendment, which

was understood in 1787 to limit physical trespass and seizure of papers, effects and "things," came to extend to people and their privacy by a 1967 Supreme Court decision. The Court said that electronic snooping should be considered a form of search and seizure governed by rules and procedures based on historic safeguards but adapted to new technological capabilities. Today, virtually unlimited means, including space satellites, exist for electronic surveillance at almost no risk of detection by those being watched. At the other extreme of remote sensing is analysis of individual physical characteristics, such as fingerprints, blood, semen and genetic material. Examinations of these intimate elements, says OTA, "have been held not to violate the Fourth Amendment or other constitutional prohibitions against forced self-incrimination, if their disclosure is otherwise reasonable."

OTA's paper also comments on the expanding use of computers, databases and telecommunications technologies in law enforcement and in dealing with potential dissidence and political opposition, which are protected under the Fifth, Sixth and Eighth Amendments. These uses raise questions about due process. As the paper states, "Computer models and statistical analysis used to support judicial and administrative deci-

sions may also be challenged on constitutional grounds, particularly if used in a predictive mode—say, what is the probability of an offender committing another crime if he or she is paroled?"

The problem here involves a whole lot more than pouring new wine into old bottles. Constitutional democracy is at stake, OTA suggests. In the next few weeks, OTA will publish four more papers relating to questions of equity and justice that were never raised by James Madison, Alexander Hamilton and other authors of the Constitution simply because they could not foresee the future. The first paper concerns science, technology, national security and open communication. Another examines how government has dealt with new technologies. The third is about biology-based technologies, medical intervention, public health and the Bill of Rights. The fourth is on criminal justice. Each in its own way is chockablock with uncertainties about current and future relationships between the government and the people. As OTA says at the end of its paper, "Strong legislative and judicial actions may be necessary to protect that sphere of individual, private activity that the Founding Fathers cherished and that the Constitution has always implicitly protected."

—IRWIN GOODWIN

DOE SUBMITS 36 SSC SITE BIDS WHILE HOUSE SEEKS TO MICRO-MANAGE PROJECT

At 4 am on 1 September, New York officials were waiting for the Department of Energy to open the glass doors of the Forrestal Building. By 8, Oklahoma was there. Texas appeared just after the news media arrived and, in the classic tradition of the Lone Star State, unloaded 60 boxes of documents, weighing some 2400 pounds—which led two of the state's congressmen, known for their hostility on most issues, Representative Jack Brooks, a Democrat, and Senator Phil Gramm, a Republican, to exchange banter for the camera crews on the unsurpassed greatness of their state. So began the official competition for the site of the giant particle accelerator called the Superconducting Super Collider.

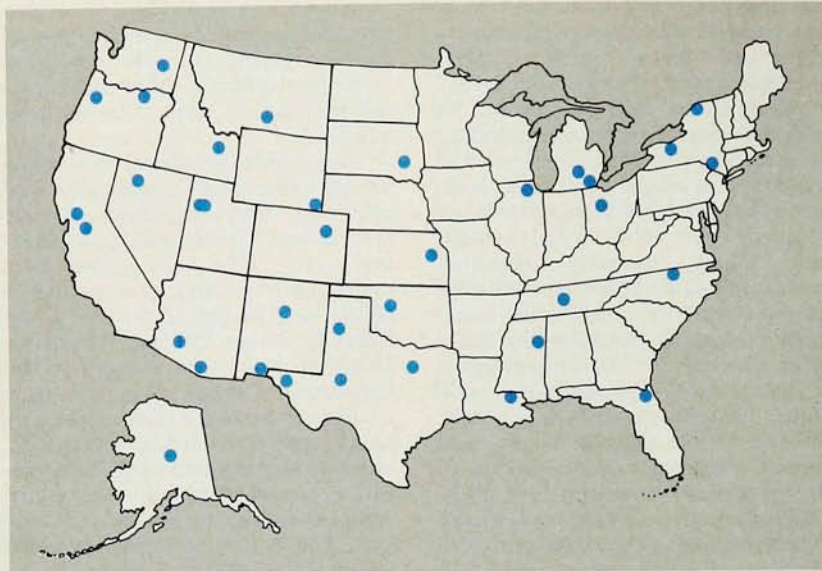
The SSC, which would hurtle two beams of protons in opposite directions around a 53-mile oval ring into collisions at 40 TeV in the center of mass, is figured to cost \$4.4 billion in today's dollar values and possibly

\$5.3 billion when it is completed in 1996. But there's no certainty of this. Though President Reagan gave the machine his blessing last 30 January with the admonition "Throw deep" (PHYSICS TODAY, March 1987, page 47), Congress has yet to approve its construction. When the 1988 fiscal year began on 1 October, the fate of the SSC was as unsettled as the government's entire budget for the year. While an act of Congress saying there shall be an SSC isn't really necessary until the final decision on the machine is made in 1989, most everyone associated with it would be less nervous if it had formal backing now.

As it is, the research subcommittee of the House Science, Space and Technology Committee last June authorized \$25 million for another year of R&D and refused to grant the Reagan Administration's request for another \$10 million for construction items requiring long lead times. The committee's authorization bill con-

tained language that would withhold Congress's authority to build the SSC—at least for fiscal 1988. The Senate appropriations subcommittee that has jurisdiction over energy programs proposed giving all \$35 million to continued R&D, with the understanding that DOE would not begin construction.

In early August, however, action on the SSC took a new turn. Members of the House science committee, led by Manuel Luhan Jr, the ranking Republican on the committee, put together a coalition to support the President's request. After Luhan had enlisted more than 230 House members, enough to guarantee passage in the House, Robert A. Roe, the New Jersey Democrat who is chairman of the science committee, was persuaded by the numbers to overcome his reluctance to back such a costly project during a tight fiscal year. Within days, he and Luhan introduced H.R. 3228, a two-para-



Competition for collider pits 25 states with 36 sites (represented by dots) against one another.

graph bill that would provide \$10 million for initial construction materials and authorize "such sums as may be necessary for FY 89 and subsequent years." Roe also consented to sign a "Dear Colleague" letter, drafted by Luhan, that exhorted all members of Congress to join in support of "the most challenging and exciting scientific project which this nation has ever undertaken on the surface of the Earth."

Turn of events

Then, on 15 October, after two days of divisive debate, the House science committee agreed to substitute H. R. 3228. The revised H. R. 3228, known as the SSC Project Authorization of 1987, would enable DOE to proceed with building and operating the machine. It contains 11 provisions, many attaching strings from Capitol Hill to DOE's management of the project. In addition it would provide \$10 million in 1988 for construction items requiring long lead times, \$283 million for construction costs in 1989 and \$585 million in 1990.

During the final hours of debate, some committee members attempted to defeat the bill, arguing that the SSC's cost would cut into the budgets of other science projects, though most agreed that the collider was too important to kill or postpone indefinitely. The battleground for the SSC now moves to the floor and back rooms of Congress.

The magnitude of the project goes a long way toward explaining why 43 proposals were entered for the SSC site. The state that wins the collider

gets 4500 construction jobs, 2500 permanent positions, a \$275 million annual operating budget and the prestige that goes with having the crown jewel of particle physics. Perhaps that's why the governors of Ohio, Louisiana and Colorado journeyed to Washington to deliver their applications.

By the deadline on 2 September, bids had come from governments, commissions, organizations and individuals in 25 states—though California's arrived with only 8 minutes to spare after a partisan dispute in its legislature about affirmative action hiring goals for minorities and women. Even though DOE had limited official applications to 200 pages, few states were willing to rest their cases so briefly. Accordingly, many added maps, graphs, geological reports and treatises boosting air quality, ski resorts, parks, forests, local wineries and physics departments. DOE estimated the total weight of all the tomes at 3 tons.

To enter the competition, states had to meet a handful of criteria: DOE expects 16 000 acres of free land for the collider, as well as adequate power, water, housing, schools, transportation and cultural amenities. Building on the site also must have "no known unacceptable environmental impacts." DOE staff, working under Wilmot (Bill) Hess, associate director for high-energy and nuclear physics, screened the proposals solely on whether they met the minimum criteria. The scientific merits of the SSC are not part of the contest, since DOE has already approved the design and

components, which were decided by a team, headed by Maury Tigner of Cornell, working the past three years at the University of California at Berkeley.

Hess's group had little difficulty eliminating 7 of the 43 site proposals. On 16 September, a DOE news release quoted Energy Secretary John S. Herrington as saying that the rejected bids failed to meet the minimum specifications set forth by his agency. Most were found to lack adequate land, electricity and water. All raised environmental questions about constructing, operating and decommissioning the accelerator. Each also contained uncertainties about obtaining the land without cost to the Federal government.

Three of the proposals ruled out were submitted by individuals for sites in Texas. A bid in central Utah put forward by the Larsen Institute of Technological Evolution was thrown out, as was one from an entrepreneur in Grant County, Washington. New York State's proposal of an area straddling its border with Canada did not meet the criterion that the site must be within the continental US. Also rejected was a proposal submitted by Paul Jablonka, a part-time graduate student in computer science at the University of Arizona, to place the SSC in orbit at a point known as L-5, where Earth-Moon gravitational forces are roughly in balance.

The remaining proposals were sent the same day to the National Academy of Sciences, where a 21-member panel will select an unranked "short list" of the best-qualified sites. The size of the selection committee grew by one in September after complaints from some states that California had an unfair advantage with six members, including the chairman, Edward A. Frieman, director of the Scripps Institution of Oceanography. When the committee was originally named, one member, Thomas A. Everhart, was chancellor of the University of Illinois at Urbana-Champaign. Within days after the announcement, he was appointed president of Caltech, leaving Illinois with no representation. The academy quickly added another member—Walter E. Massey, vice president for research at the University of Chicago and former director of Argonne National Laboratory.

It has not gone unnoticed, though, that the winning proposal will be selected next July by another Californian, John Herrington, DOE's chief, most probably with the complete concurrence of his boss, California's own Ronald Reagan. —IRWIN GOODWIN ■