Budget Crunch Stalls Super Collider

President Reagan's plan for building the world's largest particle accelerator is likely to remain stuck in the R&D phase in 1989 because of limited growth in funding for basic research

PRESIDENT Reagan's plan to begin building the world's largest particle accelerator in 1989, the Superconducting Super Collider (SSC), is running into trouble. With a tight federal budget and the need to maintain ongoing federal research programs, key congressional leaders are saying that no money will be available to start construction of the $5.35-billion machine next year.

Just 7 weeks ago President Reagan asked Congress to provide $363 million to fund ongoing research related to the SSC magnets and to start construction activities. The House Budget Committee, however, voted on 23 March to allocate only $100 million in additional funding to the Department of Energy's general science programs. The House Science, Space, and Technology Committee estimates that this is $100 million short of what is needed just to keep ongoing research programs on track.

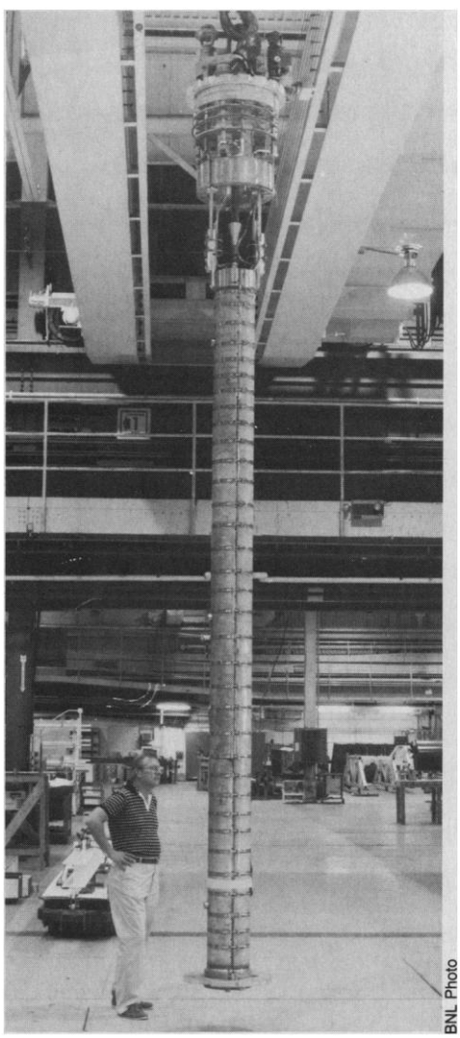
Ultimately, the decision on funding construction of the SSC will be made by the House and Senate Appropriations Committees. But Representative Robert Roe (D–NY), chairman of the House science committee, told DOE officials at a 22 March hearing on the 40-trillion-electron-volt proton-proton accelerator, that "unless there is a miracle" the appropriations committees are unlikely to approve construction money. This would push back the project by a year.

Despite the Budget Committee's action and gloomy outlook for appropriations in 1989, there are no outward signs that the Administration is trying to find a new funding scheme or to compromise with Congress. Instead, DOE Under Secretary Joseph F. Salgado, on 24 March told members of the SSC Industry Group, an ad hoc organization of companies that want to work on the project, that "this is the year we should decide whether it will be built."

Salgado added that if the full request cannot be provided, the Congress at the very least must make a substantial commitment to the project's start. The funding level must be large enough, he says, to convince potential international participants, including the Japanese and Europeans, to bear a portion of the SSC's costs. Otherwise, Salgado says, the SSC proposal might have to be shelved.

The construction of the SSC may have to wait until a new administration is in the White House. No visible drive is being mounted by Republicans or Democrats in Congress to try to initiate the construction phase of the SSC this year.

In fact, some of the project's supporters in the House are unhappy with DOE's management of the SSC undertaking. Representatives Ralph M. Hall (D–TX) and Claudine Schneider (R–RI), both members of the science committee, say department officials have inflated the results of recent discussions with European and Japanese officials to suggest these countries would be making significant contributions (*Science*, 25 March, p. 1483). No firm foreign commitments have been made as yet.



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SSC magnet. *A 17-meter magnet is readied for cryogenic tests at Brookhaven National Lab.*

Another irritant has been DOE's handling of the site selection process. Manuel Lujan, Jr.(R–NM), ranking Republican on the science committee, says the department's criteria discriminated against rural areas such as his home state of New Mexico and that the review of site proposals conducted by the National Academy of Sciences was flawed because site visits were prohibited. He contends that the 21-member panel did not have an adequate understanding of the areas when it excluded various sites for not having sufficient regional services.

In addition, Roe says DOE has bungled the management of SSC from a political standpoint by proceeding to announce sites in January. Support for the project diminished in Congress after the department released the National Academy of Sciences' list of best qualified sites. Of the 35 states examined, the 7 states still competing are Arizona, Colorado, Illinois, Texas, North Carolina, Tennessee, and Michigan.

"We had asked the Administration, for the record, not to go ahead with the preliminary site selection, but to hold it up until we could get a reaction from Congress [on authorizing the project]," Roe reminded committee members at the 22 March hearing. "But the Administration, in candor, ignored that particular request. Now, consequently, we are coming back right now and saying that it is going to take a great deal of effort and energy on a lot of people's parts to make this happen at all."

Still, Roe and Lujan say they want the SSC to go forward and they are expected to try to push an authorization bill through the House this year. While this would send a positive signal to the appropriations committees and to interested foreign collaborators, it would not fund the project. The immediate challenge, says Roe, is "to keep the project alive." Indeed, supporters of the project in industry and Congress are grop-

ing for ways to maintain political support for the SSC.

One possibility would be to reschedule the date for announcing the preferred location for the 52-mile race-track shaped collider. Site selection already has been slipped from July, but some project backers believe that it now may be necessary to delay the decision to next year, pushing back the date to help maintain political support for the project. So far, however, Salgado favors proceeding on schedule.

Roe and Senator Jim Sasser (D–TN) of the Senate Budget Committee also want DOE to develop a plan for moving the project forward with less money. How much money the SSC receives in, 1989, they say, could depend on what alternatives the DOE comes up with.

A major portion of the 1989 budget request, $283 million, would go for engineering design, site preparation, and procurement of long lead time collider components and support systems. Another $64 million in operating funds and $16 million in capital equipment are needed to expand the magnet research and development program, which now is funded at $25 million. The aim is to build 30 full-length (17 meters) magnets and to get industry involved in the project.

Funding for the SSC could easily be below $100 million and perhaps run as little as $32 million in 1989. At this level R&D work on the SSC's superconducting magnets would be slowed significantly. House and Senate leaders appear to want to keep the R&D effort on track, but no one can make any guarantees about the outcome of the SSC budget at this point. Says Sasser of the budgetary situation, "We are in a fiscal straight jacket." ■ **MARK CRAWFORD**

Mars Mania and NASA

The drumbeat of publicity surrounding the Soviet missions to Mars has begun. In July, the Soviets plan to launch a probe to Phobos, a small, dark moon circling Mars. In 1992 they hope to send off a more ambitious project that would land a probe on Martian soil. The press, taking note of these bold plans, has begun to make wisecracks about the "red planet." The *New York Times* recently announced in a headline that humans expect to land on Mars soon and asked: "Will they be Russian, American—or both?"

Meanwhile, a different sound echoes through the halls of the National Aeronautics and Space Administration (NASA) in Washington, D.C. It is the regular chop of the budget ax. Like many other agencies, NASA is having a hard time this spring fitting within the tight limits of the budget law. Rather than cancel big projects, it is trying to amputate a bit here and a bit there. Ironically, one of the victims waiting in line to see NASA's surgeon is the Mars Observer. If the prognosis is bad, this project could lose an instrument or two. But Geoffrey Briggs, NASA's director of scientific exploration of the solar system, says he hopes to "beat down the cost" in the next week so that this drastic step will be unnecessary.

Scheduled originally for launch in 1990, then put back until 1992, the Mars Observer is the only existing U.S. project that will be able to revel in the Mars hoopla of the next few years. It is to be a robot satellite, originally designed as one of a series of cheap solar system probes for launch on the shuttle. (NASA's last mission to Mars was in 1976, when the Viking landers photographed the surface and tested the soil.)

The Mars Observer will carry a half dozen instruments to measure the climate, chemistry, and geological features of Mars—all chosen because they will complement the work of other planetary probes, according to Jeffrey Rosendhal, a former NASA scientist now at George Washington University's Space Policy Institute. "Any decision to remove one of them for cost reasons would have a significant impact on the science of the mission," he says.

NASA managers sent out an alarm early this year, warning that the project was heading for a crisis. Costs appeared to be $4 million above guidelines for 1989, and more than $36 million above guidelines through 1992. If the costs of the Mars Observer are added to unexpected costs of other planetary probes—the Magellan vehicle destined for Venus; Galileo, for Jupiter; and Ulysses, for the sun—NASA faces a $44-million crisis in planetary science this year.

Because the Mars Observer is last in the launch queue, it is the least developed and its costs are growing the fastest. For this reason, it may have to make the greatest sacrifice. Project manager William Purdy of the Jet Propulsion Laboratory in Pasadena confirms that "It seems inevitable that we'll have to take something out of the mission." And there is at least "a chance" that an instrument will be eliminated.

The main push in the cost increase came in 1986 when NASA decided to delay the launch 2 years. The delay was triggered in part by the shuttle accident but also by a squabble between NASA and congressional staffers over which was the most appropriate rocket to use (*Science*, 13 February 1987, p. 743). One official says that NASA has not recovered yet from the run-in with Congress and is still unsure of the means of transport. It has ordered that the Mars Observer fit both the shuttle and the Titan expendable launcher—a costly dual capability.

Scientists working on the Mars mission know about the threat to remove an instrument or two, but they hope this is merely a warning. Says Jacob Trombka of the Goddard Space Flight Center, "We're going to look at everything; we hope we can absorb the 5% that's necessary" to keep the project within budget bounds without losing an instrument. "All the working groups are doing all we can to keep the entire range of experiments." The impact of the cooperative penny-pinching will not be known for 6 to 8 months, when a final decision on the instruments for the Mars Observer will come down.

America's Mars enthusiasts may not be able to match the Soviet pace of exploration this year, but they will not be left entirely out of the picture. According to NASA, the Soviets have agreed to install a little aluminum plaque on the Phobos vehicle to commemorate Asaph Hall, the U.S. astronomer who first spotted Phobos and the second Martian moon, Deimos. The image will include a reproduction of a page from Hall's notebook, dated 11 August 1877, in which he noted the discovery of the Martian moons. The plaque was the brainstorm of Hall's great great grandson, Andrew Hyde, who works for Senator John Warner (R–VA). He proposed the idea to NASA, and NASA passed it along to a receptive Soviet Academy of Sciences.

Hyde says that his great great grandfather "in his wildest imagination, never could have imagined" that his name would one day appear on a Soviet plaque on Phobos. ■

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