

# Slimmer Station Wins White House Approval

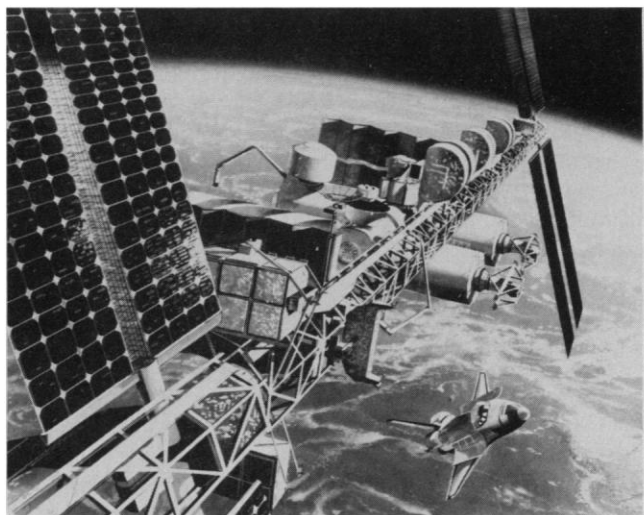
*NASA's austere new plan for the space station wins few scientific accolades, but it is exactly what Congress ordered*

LAST WEEK, THE BUSH ADMINISTRATION brushed aside criticism from space scientists and signed off on the National Aeronautics and Space Administration's stripped-down plan for the U.S. space station. Indeed, the message came through loud and clear in a press conference given by William Lenoir and Richard Khors: Although the station has repeatedly been described as a scientific mission, science is not its number one priority, said the two top NASA officials. The agency's plan will now go to Congress whether or not scientists think it is a good use of R&D funds.

The new proposal—a smaller but only slightly less expensive version of the station that NASA put together 4 years ago—was drawn up at the request of Congress, with advice from a special panel headed by Norman Augustine, president of Martin Marietta. The “restructured” project got its final approval from the White House on 20 March and is now headed for checkout by the appropriations committees on Capitol Hill. They will be inspecting an engineering overhaul, completed during a 5-month dash that began last November. The size of the main “truss” has been reduced and the length of the habitation and lab modules has been shrunk by 40%, allowing them to be loaded with equipment and tested on the ground. Earlier, NASA had planned to carry them into orbit and piece all the bits together in space. If NASA had gone forward with this scheme, admitted Lenoir, associate NASA administrator for space flight, “it would have driven us to our knees.” He further conceded that “we had such big concepts of all the things that we were going to do” in the old plan, “that I personally think we took way too big a first bite.”

This second time around, the number of solar panels has been reduced; the installation of other support equipment has been delayed; the assembly and maintenance process has been simplified; and the number of shuttle support flights through 1999 has been cut from 34 to between 23 and 26.

All this has significantly reduced the station's scientific capabilities as well. NASA expects to put the first module up in early 1996 and have a “man-tended” station (habitable only when the shuttle is attached)



**The meter's ticking.** *Although it is \$8 billion cheaper, the space station is still a “million-dollar-an-hour proposition,” says microgravity scientist Robert Sekerka.*

running by mid-1997. But it would not be able to sustain a crew on its own until the year 2000, and most of the scientific equipment would not arrive until later, in 2001 or beyond. Power, data handling capacity, and crew size have also been cut back.

Yet all these changes have brought but a modest projected reduction in cost: down from \$38.3 billion to \$30 billion. The biggest cut (65% of the total reduction) is accomplished by delaying the self-sustaining operational phase and omitting post-1999 operations from this budget. The other savings come from trimming back on hardware (19%) and using fewer shuttle flights (16%).

While this may sell members of the appropriations subcommittees, it didn't impress the space science community. Just a few days before NASA disclosed these details, a panel of experts, the Space Studies Board at the National Research Council, issued a critical report stating that the plan for the station's operational phase was too vague to offer much hope of producing good research (*Science*, 22 March, p. 1421.) Neither life science nor materials researchers—the two groups that are supposed to get primary use of the facility—were happy with what they saw. Panel members concluded that significant work could not get started on the station until sometime in the 21st century, and, even

then, that it was not clear that the equipment or crew would be adequate for the tasks that need to be done.

However, Lenoir said the dissatisfaction of the Space Studies Board came as no surprise, for the “board has never been a large fan of the space station. Their conclusion is consistent with what they have said every time they have talked about [the station],” he added at the press conference.

Sometimes when advice from a group of experts is unequivocal, unanimous, and persistent over many years, these qualities increase its potency. In this case, however, just the opposite seems to be true. Lenoir indicated that because the Space Studies Board had found the same faults in earlier versions of the station, its views could be set aside as old news without a qualm. Consistency ranks low among the virtues admired in Washington, D.C.

Lenoir also made clear that NASA's first priority is to get the station built, and that its second is to develop uses for it. “We never maintained that we were going to build a space station just to support science,” he said. Invoking the views of Vice President Dan Quayle, chairman of the policy-making National Space Council that endorsed the new plan, Lenoir continued: “We're building a space station because it's in line with our path to the future and with the things this country wants to do in space; incidentally, we find that it's also a very good tool to support science.”

But when will the science begin? Lenoir and other NASA officials have said their primary aim is to enable the station to support work in biomedicine and the life sciences, because the results will be valuable for planning long duration human travel in space. In an “evolutionary” approach, NASA intends to get this research started in the spacelab aboard the shuttle in the next few years and then gradually “transition” it onto the station.

“For biologists, ‘evolutionary’ is a troublesome word,” says L. Dennis Smith, executive vice chancellor of the University of California at Irvine and chairman of the Space Studies Board subcommittee on life sciences. “We know that evolution takes a long time.”

It is essential, in Smith's view, that any life science program worth the money include

long duration habitation in space and the use of a centrifuge to serve as a gravitational "control" in studying the effects of weightlessness. However, Smith says, NASA does not know "when, how big, or where" the centrifuge will be. There is no plan for a dedicated life sciences lab. And he is not optimistic about using the station in its man-tended mode. "The operational word in life sciences is 'life,'" Smith says, and life is not something that can be turned on and off or managed by robots. He speaks wistfully of the old Skylab module that died in the 1970s after a brief period of use. It offered an "effective" bioscience lab, Smith says, permitting extended visits to space long before the shuttle was launched.

Robert F. Sekerka, dean of the Mellon College of Science at Carnegie-Mellon University and chairman of a group of physical microgravity scientists who reviewed the station for the Space Studies Board, also holds a low opinion of NASA's plan. "You don't want to use a big hammer to kill a little rabbit," he says, yet that is what NASA is doing in building a station to carry out some microgravity experiments. A less expensive "free-flyer" capsule would be adequate—in some cases even better.

Anticipating this argument, perhaps, NASA officials suggested at the 21 March briefing that sensitive microgravity experiments could be run aboard the station before the crew moves in, during its "man-tended" period from 1997 to 1999. But Sekerka points out that if NASA is serious about this, it would have to build a new set of robotic devices to run the experiments remotely, and there are as yet no plans to buy such equipment. Sekerka likes the idea, though: "You would make lemonade out of a lemon if you could do that," he says.

What really troubles members of the Space Studies Board, however, is the staggering inefficiency of the project. "Suppose it has a useful lifetime of 30 years," Sekerka says. Assume that the initial cost is, as NASA claims, \$30 billion, and that the lifetime operating costs are \$100 billion—a reasonable extrapolation, according to Sekerka. "Then this turns out to be a million-dollar-an-hour proposition. As a taxpayer," Sekerka says, "I personally wonder whether it's worth it."

But the president and his staff have declared that the investment is worth it, for reasons other than any possible scientific rewards, and now the funding decision passes to Congress. Since NASA has obediently followed instructions for redesigning the station handed down by the appropriations committees last fall, the chances are that Congress will also approve.

■ ELIOT MARSHALL

## For Rent. Suitable Creative Thinker

*Immediate occupancy: Charming summer house in the village of Caputh on the shores of Lake Templin, near Berlin. Large garden. Forty square-meter living room. Great historical significance.*

The state of Brandenburg is about to become the owner of Albert Einstein's beloved summer house—the only solid memento of the great physicist's life in Germany—and it is looking for a tenant.

The house cost Einstein and his wife, Elsa, their life savings of 60,000 marks (some 3 years' salary for a professor) when he had it built in 1929. "A disaster, but rather a nice one," was how Einstein described his "hut" at the time. For 3 years, it was to give him enormous pleasure. Although he could not swim, Einstein spent his time sailing on Lake Templin, a few minutes walk from the house. When pondering some knotty problem, he often failed to return to the house before dark. There was no telephone; instead Einstein relied on neighbors, who would take calls for the Nobel laureate and summon him by blowing on a trumpet.

Then, in January 1933, Adolf Hitler became chancellor of Germany. The Einsteins were away in the United States, where Albert was lecturing, and never saw the summer house again. Shortly afterward, the Nazi government confiscated his property and turned the house over to a youth organization of the National Socialist Party. Einstein's boat was advertised for sale in the local newspaper in 1934. After the war, the East German government offered Einstein no compensation for his losses.

The house seems to have been forgotten until the centennial of Einstein's birth in 1979. Then the East German Academy of Sciences, anxious to do the right thing, contacted Einstein's step-daughter Margot and received her approval for ownership of the house to be transferred to the academy. Their tenure, however, was not to last long. Thanks to German reunification, the East German Academy is about to be dissolved, putting Einstein's home in the hands of the state of Brandenburg.

One possibility for the house would be to turn it into a museum. Local villagers support the idea in the hope that it would bring in visitors and aid their depressed economy. But this is the one use that Einstein specifically forbade in his will—and the academy has already promised Einstein's heirs that they will obey his wishes.

Jürgen Dittberger, state secretary in the ministry of science of Brandenburg, says the state would like the University of Potsdam to take it over for a physics conference center. One snag: The University of Potsdam does not yet exist and plans for its creation will

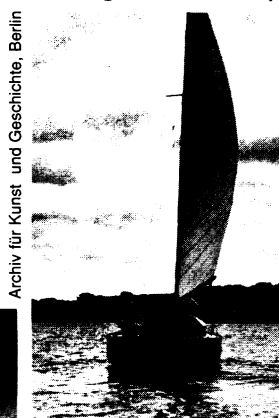
probably be on hold until Germany has sorted out its bills for the Gulf war.

The German Science Council, the Wissenschaftsrat, is now examining the problem. It is expected to recommend that land be bought near the house for a conference center and that the house itself be reserved for receptions and small seminars. The German-Jewish Foundation and the Hebrew University of Jerusalem have also expressed interest in taking over the property.

■ RICHARD SIETMANN

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Archiv für Kunst und Geschichte, Berlin



**Blowing in the wind.**  
*Fifty years ago Albert Einstein pondered the problems of general relativity while sailing on Lake Templin, near Berlin. German physicists are now wondering what to do with his summer home there (below).*



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