the consequences might be much less severe than initially predicted.

Representative Timothy Wirth (D–CO), among others, has criticized the study, which he terms "five pages of filler." Despite the considerable scientific uncertainties, he says, "there remains substantial evidence on which to build a solid investigation of the policy implications," which the Pentagon has chosen not to heed.

The likelihood that the Reagan Administration will produce the report that Congress seeks is small, however. In February, the General Accounting Office (GAO) contacted "numerous officials . . . within DOD and the military services" and found that they "were very much aware of the nuclear winter issue but they neither planned nor contemplated any actions based on the theory," according to a recent report. "An official of the Plans and Policy staff under the Joint Chiefs of Staff told us that no new policy guidance had been issued or planned based on the nuclear winter issue." Similarly, the White House Office of Science and Technology Policy (OSTP) said that any policy assessments are at least 4 to 5 years away.

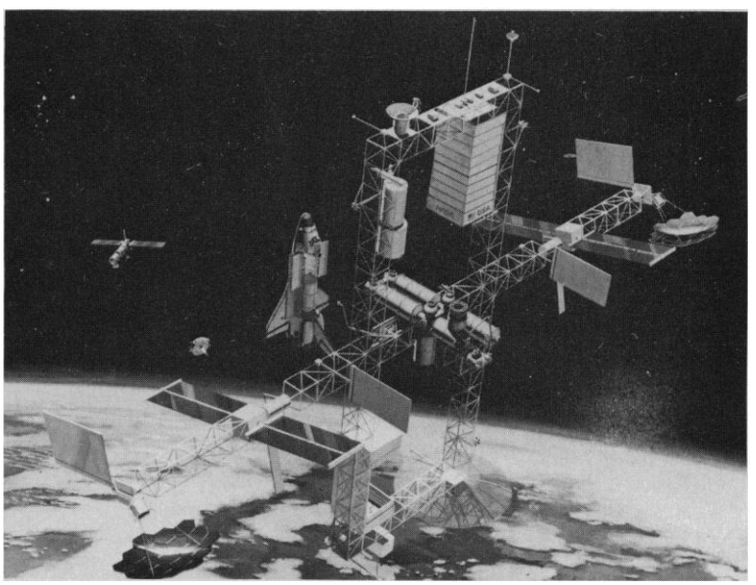
Meanwhile, government research on the subject continues at a level of roughly $5.5 million a year, coordinated by an interagency committee under OSTP's direction. The GAO report revealed for the first time that a range of annual funding options between $3.5 million and $14 million was presented to OSTP by an interagency scientific group last year. ■ **R. JEFFREY SMITH**

NASA Unveils Space Station Concept

Amidst continued budgetary uncertainty in the wake of the Challenger disaster, officials of the National Aeronautics and Space Administration (NASA) have unveiled the new baseline design for their permanently manned space station. Assuming that the program continues as now planned—a big assumption—the "dual-keel" design shown here will form the basis for more detailed studies during the next year, leading to the selection of contractors and the beginning of actual construction in May 1987. The station itself would begin in-orbit operation in 1994, exactly 10 years after President Reagan gave NASA the go-ahead for building a permanently manned space station "within a decade."

"[This] pretty much represents what the space station will look like in orbit," said the agency's new administrator, James C. Fletcher, when he introduced the design. The most obvious structural features are two vertical beams that flank the station's central region; thus the name dual keel. The box-like configuration is stiffer and offers more room for expansion than NASA's previous concept, the so-called "power tower," which clustered the modules at the bottom of one long central spine.

The international character of the space station is indicated by the four pressurized modules. The United States will contribute two modules: one for living, eating, and sleeping, and the other for hands-on laboratory work. (Previous plans called for four U.S. modules; however, design changes in the way the modules are joined to each other means that the total usable volume is only slightly reduced.) The European Space Agency and the Japanese Space Agency are expected to contribute one laboratory module apiece—although the agreement with Europe still has some sticking points (*Science*, 16 May 1986, p. 816). Canada will build a remote manipulator arm that will travel around the station on a kind of cart that moves along the superstructure.



The space station's international character also shows up in a less obvious feature: for the first time in its history, NASA has agreed to do all its engineering in metric units.

The baseline design is somewhat scaled back from NASA's original plan for the station. It will carry a crew of six to eight instead of ten, for example, and it will generate less power. On the other hand, the station is designed so that modules and other structures can be added as the need arises. The baseline configuration shown here will require an investment of $8 billion from the United States and roughly $3 billion to $4 billion total from the foreign partners. As currently scheduled, assembly will begin in 1993, and will require 14 shuttle flights to complete. Maintenance, resupply, and crew rotation will require about eight to ten flights per year thereafter, for about $1.5 billion in annual operating costs.

The immediate question, of course, is whether any of this money will be forthcoming. If NASA gets the go-ahead to build a replacement for Challenger, the money will have to come from somewhere. And with the Gramm-Rudman-Hollings process squeezing the federal budget from every side, the most obvious place to get it is by deferring the space station.

On the other hand, Capitol Hill continues to support the station. NASA has gotten generally high marks from the science and engineering communities for its efforts to design a space station around user needs instead of around pure technology. "I think NASA, up to this point, has been very responsive," says Thomas M. Donahue of the University of Michigan, chairman of the National Research Council's Space Science Board and a vocal skeptic of the space station in the past. And in the Senior Interagency Group on Space, a White House policy group now trying to decide whether NASA should build a replacement shuttle, the station is seen as a major international commitment and an important symbol of the space program as a whole. No one really wants to decimate the station for the sake of a new orbiter.

Nonetheless, choices have to be made. It remains to be seen how they will go. ■

M. MITCHELL WALDROP