

CUTTING THE COST OF FREEDOM

To the uninitiated, the new space station looks similar to the old Freedom Space Station. But to NASA, Congress, and the President, the new design represents an \$18 billion saving in construction and operations costs over the 20-year lifetime of the orbiting station.

President Clinton selected the new space station design in June from a trio of options offered by NASA and independently assessed by a blue-ribbon panel chaired by Charles Vest, President of MIT. Option A, the one selected, builds up the space station from a single core lab module. Compared to the original Freedom plans, the new design incorporates fewer truss segments and uses more common modules and simplified power and environmental systems to cut costs. Rejected Option B made use of more existing Freedom components. Option C, a radical redesign, consisted of a large central module launched in one piece with a minimal capacity to expand by adding lab modules built by other countries.

Under the modular design President Clinton selected, the first shuttle to deliver station components into orbit will blast off in October 1997. By December 1997, after only three construction flights, the station will be ready for use as a giant power supply. Astronauts won't yet live on the station, but the shuttle with an existing Spacelab on board will dock with the station and use its solar arrays to power the shuttle/Spacelab combination for three-week missions.

One more shuttle flight will give the station what NASA calls "human tended capability." By spring 1998 the station will include its central U.S.-built core/lab module with experiment racks, a Canadian remote manipulator arm, an Italian logistics module, and additional docking ports. However, the shuttle will still remain docked while the station is in use.

By December 1999, an additional 8 shuttle flights will bring the station to its "international human tended" phase. The station will then contain the Japanese Experiment Module, the European Space Agency's Columbus module, and more solar arrays. Astronauts will carry out research during 20-day-long shuttle missions. Between shuttle flights, the station will be deserted.

Not until September 2000 does the station acquire "permanent human capability." Achieving this milestone requires four more shuttle flights to add a habitation module, airlock, and more solar power arrays. The shuttle will deliver crew to the station who remain on board after the shuttle leaves. Two Russian Soyuz spacecraft remain attached as lifeboats to get the crew back to Earth in the event of an emergency.

The Vest Committee estimates it will cost \$25 billion to bring the space station to this permanent status, \$9 billion of which has already been spent over the years in developing Freedom. By comparison, the committee estimates that the real cost of bringing the original Freedom design to permanent status would have been \$8 to \$9 billion more

and cost another \$1 billion a year for ten years to operate.

While the changes in the physical design account for some of the savings, most of the cuts will come from streamlining NASA's management. In his statement to the press, President Clinton said, "We are going to redesign NASA as we redesign the space station." A senior administration official suggests that "NASA as currently structured cannot build this space station or any other, and a 30 percent reduction in federal and contract employees is required to be able to produce any space station. Right now, the management structure is labyrinthine. Everybody is in charge and no one is accountable."

Although the new design saves money in the long run, NASA's approved 1994 budget now calls for \$2.1 billion earmarked for the station, \$300 million more than originally asked for. The \$300 million comes out of a fund for developing new technology at NASA which includes NASA's low-cost Discovery planet probes (see "Cheap Shots," August 1993). Fortunately, funding for the first Discovery mission was not affected, although NASA has not yet decided if this will be the MESUR Mars lander or the NEAR asteroid probe. The major mission to Saturn, Cassini, also received full funding in the 1994 budget. However, NASA cut funds to Missions Operations and Data Analysis, a move which may jeopardize the rapid processing of data from existing craft such as Galileo at Jupiter and the Mars Observer orbiter.