optimistic," Esposito says. "It shows that NASA and Congress are committed to flying faster, cheaper missions."

While Goldin attempts to nudge NASA toward more small, high-tech ventures, he must also make the best of several troubled big-science projects already under way. "It's ironic, but Goldin's success is linked to having to fix the mistakes of the past," notes John M. Logsdon, a space policy analyst at George Washington University. NASA has already devised fixes for the nearsighted *Hubble Space Telescope,* and *Galileo* continues to transmit valuable scientific results despite its faulty antenna.

In response to congressional pressure, NASA has also placed several upcoming missions on budgetary diets. The agency has pared back both the Cassini mission to Saturn and the ambitious fleet of satellites that will make up the *Earth Observing System.* The *Advanced X-ray Astrophysics Facility,* a satellite observatory that would complement *Hubble* and the *Compton Gamma Ray Observatory,* has been split into two smaller instruments, only one of which is on track to receive congressional funding. Pike dryly remarks that "so far 'cheaper, faster, better' has turned out to mean 'less.' "

Not surprisingly, the space station—NASA's porkiest project—is also in dire political trouble. The station is already years behind schedule and billions of dollars over the budget envisioned by President Ronald Reagan 10 years ago. Last summer a measure in the House of Representatives to kill the station failed by just one vote. Yet although Congress subsequently terminated the Superconducting Super Collider, the station soldiers on.

The space station's new lease on life is financed by the growing detente between the U.S. and Russia. Last August, Vice President Al Gore and Prime Minister Viktor S. Chernomyrdin signed an accord promising cooperation between the two nations' space programs. Goldin recently outlined a three-stage plan to combine the revamped space station *Alpha* with the Russian station *Mir* by 2001, two years earlier than the current schedule for *Alpha* alone. Goldin claims such an arrangement could save up to $3.5 billion. Meanwhile he is drastically cutting the size of the space station management team.

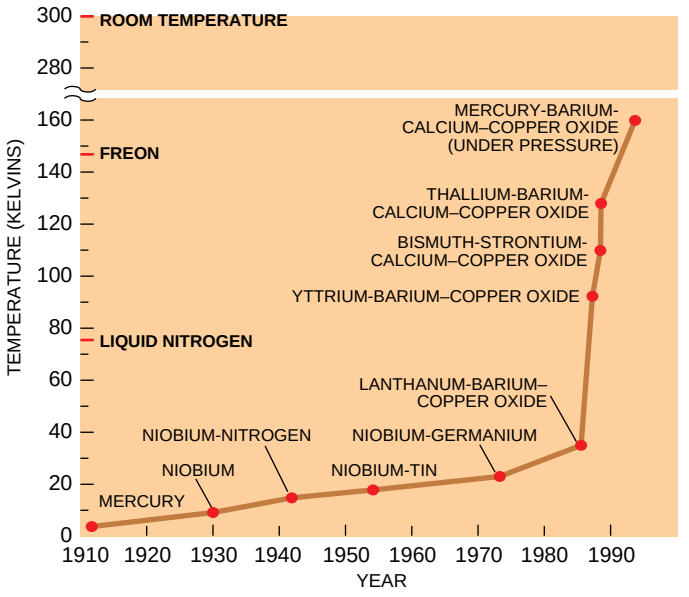
So, ironic though it may seem, the battered and bloated space station might yet be the vehicle that carries NASA into a future characterized by the efficiencies that should accompany international cooperation. The remodeled space station, Friedman says, could serve as the core of an internationally conscious NASA that will move away from massive, autarkic projects such as the *Mars Observer.* To accomplish such a change, NASA will need, in Pike's words, "significant restructuring": stronger long-range planning and more efficient management (and, of course, a small bout of good luck). Time will tell whether Goldin's team at NASA can exorcise Joe Btfsplk. —*Corey S. Powell*

Getting a New Rise out of Superconductors

Avoiding pressure is usually good advice—but not for scientists trying to get ceramics to become superconducting at higher temperatures. Indeed, putting the squeeze on mercury-barium-calcium–copper oxide, a new family of ceramic superconductor discovered last year, has boosted its transition temperature to record levels. "We now have a new set of results of 164 kelvins at 300 kilobars [about 300,000 atmospheres]," says Paul C. W. Chu of the University of Houston.

The as yet unpublished result comes on the heels of two other high-pressure reports, one by Chu and the other by Manuel Nuñez-Regueiro of the CNRS in Grenoble and their colleagues. The groups found that the mercury compound, called 1223 (for the ratio of the compound's first four constituent elements), becomes superconducting above 153 kelvins at 150,000 atmospheres and 157 kelvins at 200,000 atmospheres. Those critical temperatures mean the compounds could be cooled with the common (but environmentally hostile) coolant freon. The pressure, achieved by placing a sample in a vise, apparently moves the layers of copper oxide in the material closer together. For some unknown reason, the proximity enables the electrons to flow more freely. The investigators hope to sidestep the high pressures, which render the results impractical for applications, with a chemical substitution. By replacing one of the elements with a smaller one, they would lessen the distance between copper oxide layers. In fact, Chu and his colleagues used such a strategy to discover the superconductor yttrium-barium–copper oxide in 1987.

The surging competition is reminiscent of the early days of high-temperature superconductivity, when records seemed to fall every few months and unconfirmed reports hinted at superconducting transitions at room temperature. Although the new mercury oxides have reinvigorated the chase, physicists will not be dumping their supply of cryogen just yet. The mercury compounds do not seem to be able to go much higher. "At this moment, the empirical data suggest we can go to 180 kelvins," Chu says in a somewhat disappointed tone. But the 180-degree view still shows just how far critical temperatures have come since superconductivity was discovered in 1911. —*Philip Yam*



CRITICAL TEMPERATURES remained below 23 kelvins until the discovery of the copper oxides in the late 1980s.