

NASA: Budgeting back from Challenger

It's almost a wonder the administration has a budget plan at all to keep NASA going in the coming fiscal year, with the agency struggling to recover from the Challenger disaster of 13 months ago as well as a host of other problems and hard choices. With trade-offs to be made at every hand, in fact, it is sometimes difficult to tell whether NASA is moving ahead (agency head James C. Fletcher told a Senate subcommittee this week that "we are getting the space program back on track") or losing ground.

The \$9.48 billion being sought from Congress, Fletcher noted, "provides for a strong space program conceived under considerable fiscal restraint." It is a decrease from the \$10.53 billion of fiscal year (FY) 1987, but that amount included a \$2.1 billion addition to build a replacement for Challenger and bring the space shuttle fleet back up to four. Not including the effect of that one-time "booster shot," the new plan represents a 12 percent increase over its predecessor, which in turn was up 9 percent from FY '86.

Yet there are conspicuous absences, some of which concern issues about which NASA has long been urged to take positive action. The Reagan administration, for example, has long spoken of the space shuttle as America's primary means of access to space, and long before the Challenger explosion it set about cutting back NASA's use of conventional rockets, or expendable launch vehicles (ELVs). From that time on, however, numerous committees, commissions, panels and other advisory groups have urged NASA not to put "all its eggs in one basket" and to bring ELVs back into the line-up. Even a "mixed fleet study" by NASA's own Office of Space Flight was in favor of their return — "a viable and necessary augmentation to the overall launch capabilities of the U.S. government," as Fletcher put it. Yet the FY '88 budget plan includes no funds at all to accommodate a mixed fleet program.

Numerous variations on the theme are under study within the agency, from improved versions of existing rockets (such as the "stretched Delta") to NASA's use of new ones being developed for the Department of Defense (DOD) to an unmanned "shuttle-derived vehicle." DOD began seeking its own additional ELVs two years before Challenger blew up, but for the civilian agency, said Fletcher on Feb. 3, "no final policy determination has been made as of this date as to the number or types of vehicles which might be sought for NASA missions."

A key use sought by the administration for shuttles, ELVs or both is the in-orbit construction of a U.S. space station, with hopes that it will involve substantial international participation by the likes of Europe, Japan and Canada. The project

was initially supposed to cost about \$8 billion, but the estimates soon grew (only in part because launch costs were added in) to about \$12 billion, and NASA officials now talk about \$13 billion. That uncertainty, in fact, is a major variable, Fletcher acknowledged to the senators this week, with one key issue being "how much reserve should we allow for changes along the way?"

Now less certain is the station's occupancy date, which slipped from 1992 to 1994 to what Fletcher now calls the "mid-1990s," as other agency officials suggest that full occupancy might be as far away as 1996. The new budget plan has the station changing from mere studies (the "definition phase") to actual development, with the budget bite rising from \$420 million to \$767 million, an increase of \$347 million.

The boost for the space station also happens to come at the same time as a \$34 million drop in NASA's space science

programs — physics and astronomy; life sciences; and planetary exploration. Amid increases in the first two categories, the total includes a \$51 million (14 percent) reduction for missions to other planets. Part of that is because NASA's next two planetary missions, the Galileo orbiter-and-probe of Jupiter and the Magellan Venus radar-mapping orbiter, are past their "funding peaks." Another bit of cost-cutting, however, will result in a two-year delay of the launch of the Mars Observer, formerly scheduled for 1990. Fletcher did not make the slowdown official in his subcommittee testimony, but, says another NASA official, "the current plan is to launch it in '92."

The only significant increase in any of NASA's planetary science items is a 10 percent rise (to \$75.3 million) for research and analysis of planetary data already in hand. Planetary scientists have long sought more money for such studies, in hopes of keeping the field alive before the shortage of new missions sends researchers and graduate students off to other jobs.

— J. Eberhart

Family ties and heart disease

People with two immediate family members who suffer a heart attack before age 55 are at five to 10 times the risk of contracting early heart disease themselves compared with people with no such occurrences in their immediate family. And three-quarters of people whose heart disease can be linked to a genetic predisposition have a second, potentially avoidable, risk factor.

These findings come from what is apparently the largest study to date of the inheritance of heart disease in the United States — a compilation of family histories for more than 94,000 people in Utah. The data are being collected and analyzed by Roger R. Williams and his colleagues at the University of Utah in Salt Lake City. Williams discussed the study at the recent American Heart Association Science Writers Forum in Monterey, Calif.

While other work, such as the ongoing study of residents of Framingham, Mass., has established a positive family history as a risk factor in heart disease, these studies have not gone back more than one or two generations, so the relationship has not been well quantified.

Williams has a prime opportunity to investigate the inheritance of heart disease, says Peter W. F. Wilson of the Framingham study, because the Mormon families that make up the bulk of the Utah study tend to be large, close-knit and available for long-term follow-up. But lifestyle differences such as abstention from alcohol may limit generalizations from the data, Wilson says.

Williams had Utah high school students detail their family health history going back two generations. The researchers verified the process by directly interviewing a sampling of participating families and checking hospital and physician records.

In addition to the five- to 10-fold increase in risk among families with more than two members suffering early heart disease, Williams and his colleagues found that in 75 percent of these families a second factor — high blood pressure, high cholesterol or smoking — appeared to spark the process. As an example, he pointed to a family in which 12 members had heart attacks before age 45. While one or two had high blood pressure and one or two had high cholesterol, *all* of them had smoked. "It would appear the mechanism leading to early heart attacks in this family is an inherited predisposition to something — we don't know what — that is triggered by smoking," he says.

Since the second factor can often be reversed by behavior changes or drugs, the finding underlines the need for cardiologists to counsel family members of people with heart disease to control their own risk factors, Williams says.

The family history study sets up an epidemiologic correlation between genetics and early heart disease. Williams is now looking at several inheritable factors, including changes in apolipoprotein-B (see p.90), to determine whether they are specifically responsible.

— J. Silberner