OTA to NASA: Accidents Will Happen

Even as Congress wonders how it is supposed to pay for the National Aeronautics and Space Administration's (NASA's) $16-billion space station—not to mention President Bush's $400-billion vision of manned lunar bases and expeditions to Mars—the Congressional Office of Technology Assessment (OTA) has delivered a not-so-gentle reminder: the price of continued human activity in space will be more than just money. Inevitably, more space shuttles will be lost and more astronauts will die.

"If the United States wishes to send people into space on a routine basis," declares the OTA's newly released report on human space flight,* "[the Nation] will have to accept the likelihood that loss of life will occur."

The mathematics are ineluctable, the report points out. Suppose, for example, that NASA is correct when it says that the shuttle is 98% reliable. That works out to a 50–50 chance of losing an orbiter during the next 34 flights. Carrying the calculations a few steps further, that means a 72% chance of losing an orbiter before the first space station assembly flight (flight 92) and an 88% chance of losing an orbiter before the station is finally completed (flight 134).

If NASA could guarantee 99% reliability, the odds against loss of life improve considerably. But that's a big step. Including the Challenger disaster, the shuttle's overall success rate on the 30 launches to date is 96.67%. The agency contends that its post-Challenger fixes have made the shuttle substantially safer than it was, but by just how much is difficult, if not impossible, to say.

So piloted flights will always have risks. "If such risks are perceived to be too high," says the report, "the Nation may decide to reduce its emphasis on placing humans in space."

That message seems to be resonating strongly on Capitol Hill, where the space subcommittees have long been urging NASA to minimize the shuttle launch rate as a matter of simple prudence. Just recently, in fact, the House of Representatives passed an amendment to the agency's 1990 authorization act that prohibits NASA from using the shuttle to launch satellites, or to do anything else that does not absolutely require human presence, unless the NASA administrator explains why in writing.

"We need to shift our view," says one congressional insider. "The shuttle should not be a truck, but a manned platform"—and one to be used sparingly. Politically and economically, he says, the country simply cannot sustain a space program that destroys an orbiter and kills a crew every 3 years or so.

In fairness, NASA's post-Challenger flight plan does call for flying many of its former shuttle payloads on expendable rockets. But OTA points out that if and when the agency starts building its space station in the mid-1990s, the shuttle goes right back to being a truck: the current construction timetable calls for eight flights per year for several years just to haul the pieces up and put them together, and then about five flight per year to keep the station resupplied.

With that kind of schedule, even the nonfatal loss of another shuttle orbiter could be disastrous. "It doesn't have to be this horrible explosion-type thing that occurred," said Representative Bill Nelson (D–FL), chairman of the House Space Science Subcommittee, at a news conference marking the release of the OTA report. "It could be the complete elimination of an orbiter in a mistake made in preparation, a crane drops something on the fuselage and it is suddenly out of commission for 2 or 3 years."

With just such possibilities in mind, the OTA devotes the bulk of its report to analyzing the prospects for more robust and reliable human-carrying launch systems, as well as unpiloted launch vehicles. But the bottom line is that like flying on an airplane, space travel has a certain risk, and there's just no getting around that.

■ M. MITCHELL WALDROP

*"Round Trip to Orbit: Human Spaceflight Alternatives," Office of Technology Assessment, Washington, D.C., 2 August 1989.

Wanted: $25 Million for Mouse House

At a time when decrying pork-barrel politics in science is popular, the Jackson Laboratory's attempt to win congressional support for a special $25-million appropriation may be the exception to the rule.

Three months ago fire swept through the lab's giant mouse house, leaving scientists nationwide bereft of the inbred and mutant mice that are the stock-in-trade of biomedical research (*Science*, 19 May, p. 767). The devastating conflagration consumed 500,000 research animals and wiped out the lab's production building. For researchers who count on weekly shipments of JAX mice it was a real blow. The National Institutes of Health alone uses 117 types of JAX mice. "This loss is currently creating very serious problems for research scientists all over the world," said James B. Wyngaarden, then director of NIH.

Fortunately none of the lab's foundation stocks, or the mice that Jackson scientists were using in their own research, were lost. The mouse colony can be repopulated but it will take time.

Several foundations have come forward with donations—notably the Howard Hughes Medical Institute with three quarters of a million dollars—and so far $1.2 million has been collected. But it is not nearly enough. The total cost of rebuilding is likely to be $40 million. Laboratory director Kenneth Paigen estimates that "it would take years" to rebuild with private donations.

With only $9 million in insurance, Jackson lab director Paigen has turned to Congress for help. This month, Democrat George J. Mitchell of Maine, who luckily happens to be majority leader of the Senate, introduced a special bill providing $25 million to make sure the country's supply of rare mice is restored. Reflecting what may be a new congressional reluctance to go in for earmarking for scientific facilties, Mitchell's bill says $25 million should be awarded through a "competitive application process." "If another laboratory can gear up better and faster than Jackson, they have a chance at these funds," Mitchell says. Although no one expects that the Jackson lab will have any serious competition, the tone of the bill rejects what could be called traditional "pork-barrel" politics.

The Mitchell bill, which has the backing of both Democratic senator Edward M. Kennedy and Republican senator Orrin G. Hatch of the Committee on Labor and Human Resources, has passed in the Senate,

Jackson Laboratory

Depleted resource. *Genetically valuable mice, such as this obese mutant, are in short supply since the fire.*