

OTA: Space science's 'uncertain future'

Space science has been increasingly affected by tight money in recent years, to the point where NASA has only a single approved interplanetary spacecraft mission left ahead of it (the Galileo orbiter-and-probe of Jupiter), and even the analysis of data already in hand from past missions has been sharply curtailed. Now a report from the Congressional Office of Technology Assessment suggests that the survival of the United States' space science program may depend on finding new ways to fund it, manage it and establish its priorities.

Though the effects of the strained economy are widespread, the OTA document sees space science as being in a "particularly acute" situation. "Most research activities," the report says, "follow a cycle in which new subdisciplines are born, grow to maturity, and then taper off into a continued, but reduced level of activity. But space science, as a relatively new field of research, finds itself with all of its subdisciplines still ripe for further growth. No space science subdisciplines have yet reached a point of naturally reduced activity." Furthermore, "as the number of missions has declined, those that remain have tended to be more complex, sophisticated and expensive, and have tended to squeeze out the smaller and less expensive missions which have in the past supported a broad research base."

With tightly constrained funding divided among fewer and larger missions, according to the report, "an increasingly heterogeneous space science community has been forced into a mode of divisive competition for available resources." In fact, it says, "because of the current situation in planetary science funding, no experimenter can with any reasonable degree of assurance foresee the time when his experiment, if selected, will fly; no laboratory scientist can feel confident that a new research project will be funded long enough to come to fruition." The consequence is that, "increasingly, universities and industry are assessing the opportunities to be so minimal that they will no longer pursue them; as a result, experienced scientists are leaving these fields, and students and other new researchers are not entering them."

The 50-page report, prepared at the request of Rep. Cooper Evans (R-Iowa), is only what OTA calls a "technical memorandum," submitted without the review or formal approval of the full Technology Assessment Board. According to OTA it does not attempt to rank space science against "other national priorities," nor, officially, to recommend specific courses of action. Even so, its findings imply a direction.

"NASA's emphasis on supporting new

starts [individual projects, such as planetary missions, added to the budget] has tended to concentrate attention on hardware and operations, rather than on the total scientific project," says the report. "Consequently, proper attention to the problem of data analysis has not been given beyond that required for the major, relatively easily achieved initial results of the experiment." The most-discussed alternative, the report advises, is to divide the science budget into two parts: an essentially stable one covering the science—data analysis, theory, instrument design and other ongoing activities—and a second one for the missions themselves. With this approach, "budgets for important continuing activities . . . would be separated from (and thereby protected from cost overruns in) the budgets for major missions." Such a "programmatic" approach, says the report, "might make the entire space science effort—planning, execution and data analysis—more effective."

Another factor considered in the OTA analysis is management and organization. In the case of astronomy, for example, NASA is the lead agency in charge of observations from spacecraft, while the National Science Foundation has primary responsibility for ground-based studies. This distinction, however, the report suggests, "is becoming arbitrary," because scientists increasingly use data of both types. One suggestion is that NSF could take a larger role in post-mission analysis of space-derived data, while NASA funds more of such ground-based work as may relate to its overall mission. Adjusting such a balance can be difficult, however, and the report says that "scientists generally do not believe that existing coordinating mechanisms are very effective." The report notes opinions that perhaps the Office of Management and Budget or the Office of Science and Technology Policy should take a more active role in inter-agency coordination, "if only to set up a formal cross-agency advisory mechanism."

Another approach would be to expand the role of the existing Space Science Board of the National Academy of Sciences. At present, the SSB makes its recommendations only to NASA, but OTA's analysis suggests that it could become involved with other agencies, perhaps even in interactions with Congress.

The report also expressed concern with the troubled state of U.S. involvement in cooperative international space projects, such as the U.S./European Halley's Comet rendezvous mission that died when NASA's role was canceled after considerable European investment. International cooperation is desirable, even necessary, the report suggests, and "nothing will more effectively prevent future joint missions than a U.S. record of broken promises." They should, "if at all possible, be kept."
—J. Eberhart

Human insulin for sale

Human insulin production by genetically engineered bacteria was hailed as the first demonstration that the recombinant DNA technology could have large-scale practical applications (SN: 9/16/78, p. 195). Now, four years later, this product is the first created by gene-splicing to reach the marketplace. After receiving official approval, Eli Lilly International Corp. has begun sales in the United Kingdom of "Humulin," or human insulin of recombinant DNA origin. (The company is downplaying the role of bacteria in the hormone's production because people associate bacteria with disease.) A recent British study of 94 insulin-dependent diabetics showed only slight differences between the activity of the new insulin and the conventional preparation from pig or cow pancreas. A possible advantage of the new product is that the few diabetics who are allergic to animal insulin may be able to use human insulin. Novo Industry, which dominates the European insulin market, last June introduced "humanized" insulin, in which pig insulin is chemically converted to match the human type (SN: 9/27/80, p. 203). The decision of whether to switch to one of these new insulins is "up to the physician and patient," a spokesman for Lilly insists. However, Humulin's approval was preceded by an extensive image advertising campaign in medical journals. The product's price will be comparable to highly purified pork insulin. In the United States, Lilly has applied to the Food and Drug Administration for approval of Humulin and is awaiting its response. Pig insulin converted to the human form is not marketed in this country. □

Endangered species act

A three-year extension of the endangered species act, passed by both the Senate and House of Representatives, went last week to the President for his signature. The bill makes no major changes in protection of rare plants and animals, but streamlines some of the procedures. The new act simplifies the process for exemption from restrictions and shortens the time required for the Fish and Wildlife Service to act on exemption requests. The bill also expedites listing species as endangered or threatened and imposes deadlines for action on petitions submitted. Under the proposed law the Secretary of the Interior is authorized to establish populations of threatened or endangered species in new locations. It specifies that such populations be treated as threatened, rather than endangered, thus allowing more discretion in their management and protection. The bill has the support of both conservation and industry groups. □